Racial Disparities in Small Business Lending*

Tao Chen	Chen Lin	Camelia Minoiu	Bo Sun
Nanyang Business School	University of Hong Kong	Atlanta Fed	University of Virginia †

June 2023

*We thank seminar participants at the Bank for International Settlements, Carnegie Mellon University, Cheung Kong Graduate School of Business, Federal Reserve Board, Federal Reserve Bank of Atlanta, Fanhai International School of Finance, National University of Singapore, Peking University Guanghua School of Management, University of Virginia Darden School of Business, 2021 Women in System Economic Research Conference, and 2021 Federal Reserve System Committee on Financial Institutions, Regulation, and Markets. The views expressed herein are those of the authors' and do not necessarily reflect the opinions of the Board of Governors of the Federal Reserve System.

†Tao Chen:jtchen@ntu.edu.sg; Chen Lin: chenlin1@hku.hk; Camelia Minoiu: Camelia.Minoiu@atl.frb.org; Bo Sun: Sunb@darden.virginia.edu.

Racial Disparities in Small Business Lending

Abstract

Racial disparities in small business lending—despite portending significant economic ramifications—have been understudied primarily due to the paucity of information about small firms. We build a new dataset with rich loan-level information and document that, even after accounting for extensive borrower and lender attributes, large racial disparities in loan denial and interest rates exist in small business lending. Exploiting the chronology of banking deregulation episodes, we find that an exogenous intensification of bank competition has a quantitatively large effect of narrowing the racial gaps, and such an effect is predominantly driven by entrant banks. The unique information structure in small business lending—characterized by the importance of localized, soft information—presents an untapped opportunity to examine the distinct implication from Becker (1957) on the prominent role of new entry in closing racial gaps, a prediction that helps uncover the source of racial disparities and yet has been overlooked in the discrimination literature. The confluence of our results is consistent with the notion that racial prejudice, which can manifest itself in lending relationships in generational ways, drives part of small business lending decisions. Also importantly, our findings substantiate Becker's insight that market forces can mitigate the manifestation of prejudice on the credit market outcomes, thereby helping minorities advance economically.

Keywords: Racial disparities, Small business lending, Banking deregulation

JEL Classifications: G21; G32; G3

1 Introduction

Small businesses are the lifeblood of the U.S. economy, employing nearly half of private-sector employees and generating over half of U.S. GDP in 2019. Yet, small businesses were hit the hardest by the COVID-19 pandemic, and the number of active small businesses fell by 22% over the crucial two-month window from February to April 2020, with striking racial differences: Black-owned businesses experienced declines of 41%, twice the drop in active business ownership among whites.[1] In addition to their geographic concentration in COVID-19 hot spots, black-owned firms also tend to have preexisting funding gaps and thus had little cushion entering the crisis. Understanding racial disparities in small business lending is therefore critical, not only because they affect the growth of minority-owned businesses, which in turn would hinder competition, but also because they may foreshadow longer-term ramifications for economic inequality, especially in times of stress.[2] Moreover, equitable access to small businesses credit is important as it affects intergenerational wealth-building and economic mobility of entrepreneurs, job creation for other people of color, and amenities investments for underserved communities. Despite the massive and growing discrimination literature, however, we know alarmingly little about the extent and nature of racial disparities in small business lending. In this paper, we attempt to address this omission.

Establishing racial biases in lending practices, especially for small businesses, is challenging. One difficulty is that information on borrower characteristics has been especially sparse; rich data are not as readily available as in other credit markets. Another, more serious issue is that racial differentials in credit markets, gauged from loan denials or pricing, may be caused by unobserved characteristics that correlate with race, a common theme among critics of studies on racial biases. This critique is particularly relevant for small business lending, because information about small businesses is thought to be "soft" and needs to be collected locally by lenders over time through relationships with firms.[3] The paucity and opacity of information about small firms makes it especially difficult to identify the extent and nature of racial disparities.

[1] See, for example, Fairlie (2020).

[2] Lin (2020), among others, shows that reduced bank lending leads to a decrease in real activity in small businesses.

[3] As small businesses typically do not have public financial statements, lenders look for contextual information to determine a borrower's creditworthiness— such as the industry prospects (some industries are concentrated locally), clientele characteristics, and the business owner attributes— and gather such information locally through personal contacts. See, for example, Petersen and Rajan (1994), Berger and Udell (1995), Berger et al. (1998), Berger and Udell (2002), Degryse and Ongena (2005), Beck (2013), Berger et al. (2005), and Cortés et al. (2020).

We attempt to address both of these issues. For the first issue, we construct a novel dataset that links thousands of small business owners with hundreds of lenders across the country, with extensive details for each loan: demographics of borrowers, including the race, ethnicity, gender, credit rating score, credit history, and personal wealth; all key underwriting variables; and comprehensive financial and geographical information on lenders. Precisely, we link together the Call Reports, the quarterly financial statements that U.S. commercial banks and bank holding companies file; the Survey of Small Business Finance (SSBF) that was conducted by the Federal Reserve Board and was stratified to ensure a nationally representative sample; and the FDIC Summary of Deposits Database that contains detailed information on bank branches.

For the second issue, we address the challenge of attributing *any* racial disparities to discrimination by exploiting exogenous changes in bank competition to examine sharp yet subtle predictions from the canonical Becker (1957) theory of racial prejudice. Applying Becker (1957) to lending implies that lenders with racial prejudice have a distaste for lending to black business owners. They may indulge this distaste by refusing to lend to black business owners or, if they do lend to them, charging them a higher interest rate than white business owners of identical credentials. Incentives, therefore, exist to enter the market and exploit the profitable racial differentials; such incentives are strongest among the nonprejudiced lenders, as minority loans are cheapest to them, in utility terms. The theory thus predicts that, with lowered banking entry barriers, nonprejudiced lenders enter the market and initiate minority loans, boosting the relative supply of black business loans and consequently reducing the racial gap. We document conforming data patterns, exploiting the staggered implementation of banking deregulation that represent exogenous shocks to competition that hit different states at different points in time. Specifically, we find that increased bank competition—facilitated by Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA)—has a quantitatively large effect on reducing racial gaps, an effect primarily driven by *entrant banks*. Additionally, we provide auxiliary evidence that racial differentials in small business lending vary with regional racial animus and are most prominent in areas with severe racial bias against blacks.

This pivotal role of entrants in narrowing racial gaps post-IBBEA is consistent with taste-based discrimination (Becker, 1957) yet stands in stark contrast with implications from statistical discrimination, given the information structure of small business lending. In theories of statistical discrimination, individual attributes that may statistically vary with race underpin the racial differences in economic

outcomes—that is, in the absence of perfect information, the optimal prediction of individual attributes by an economic decision-maker is a weighted average of the individual-specific signal and the group-specific information, such as the average creditworthiness of borrowers in the same racial group. The less informative the signal of the individual applicant is, the more weight a decision maker would place on the average attribute of other applicants from the same group. As entrant banks— lacking soft, local information that is acquired through contacts over time— face noisier signals of individual credit risks, the statistical discrimination theory predicts that, compared to incumbent banks, profit-maximizing entrants would rationally place a greater weight on easily observable information on race and statistically discriminate against blacks more, a pattern opposite to what we find. Put differently, the information structure of the small business credit market — where information is not only "soft" but also subject to locality — presents a unique opportunity to highlight the prominent role of new entry in closing racial gaps, an overlooked predication of Becker (1957) that helps illuminate the sources of racial disparities in bank lending.

We begin our analysis by documenting stylized facts on racial disparities in small business lending. One important margin of racial biases is the loan application accept or reject decision, which has been difficult to study because of a lack of data on rejected applicants. Utilizing the extensive information in our unique dataset about loan applicants including those rejected, we find substantial differences in loan denial rates between black- and white-owned firms. Without any controls, black owners, on average, are over 36 percentage points more likely to be denied bank loans than white business owners. After controlling for applicants' business credit scores, business return on assets, personal and business credit histories, personal wealth, and a number of bank characteristics, as well as industry, lender, and state-by-year fixed effects, we continue to find economically and statistically significant differences in the loan denial rate: Black business owners are over 20 percentage points more likely to be denied credit than their white counterparts.[4]

Another margin where racial bias could affect outcomes for prospective minority business owners is the interest rates they pay. Without any controls, black business owners, on average, pay interest rates

[4]Our results are not driven by differences in preferences for credit use, or the propensity to apply for credit, on the part of the business owner. We find that compared with black business owners, white owners are actually much more likely to apply for bank loans, controlling for financial characteristics of the firm and its owner. Data indicate that black- and other minority-owned firms are much more likely to report that they did not apply for a loan, even though they needed credit, because they thought they would be rejected. Black- and other minority-owned firms are 57 percentage points and 31 percentage points, respectively, more likely to withhold an application fearing denial.

that are about 1.73 percentage points higher than white owners. After controlling for an extensive set of indicators of borrower credit risk and lender characteristics, as well as industry, lender, and state-by-year effects, we find that differences in interest rates remain sizable: Black business owners obtain rates that are, on average, about 0.55 percentage point higher than white owners. Moreover, racial disparities in loan denial and interest rates do not diminish after controlling for the principal business owner's personal wealth. The pattern suggesting that disparate treatment across race may exist beyond the racial wealth gap— an important element inherently embedded in small business lending decisions—is a stark one, as wealth accumulation is where racial inequality in the United States manifests prominently and is itself a function of various forms of discrimination. s Now, what gives rise to the substantial racial disparities in small business lending? We attempt to tackle the key empirical challenge in studies of discrimination — attributing *any* racial differentials to taste-based discrimination (Becker, 1957) versus statistical discrimination (Phelps, 1972; Arrow, 1973) —- by evaluating whether part of such racial disparities can be competed away. The Becker (1957) theory of racial prejudice predicts that, with lower bank entry barriers, entrants with weak or no racial prejudice can initiate profitable loans by lending to black business owners, boosting the relative supply of black business loans and thereby narrowing the racial gap. In contrast, statistical discrimination—traditionally modeled as a profit-maximizing solution to imperfect information—will not lessen as competition intensifies.

Exploiting the staggered implementation of banking deregulation— Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA)— that allowed banks to expand across state lines, we show that lowered bank entry barriers lead to increased competition, which, in turn, substantially reduces racial disparities in small business lending. Our approach builds on prior studies establishing that the state-level deregulation is not related to economic factors, and the chronology of deregulation episodes can be viewed as exogenous shocks that affect different states at different times. We further show that the proclivity of a state to deregulate earlier or more forcefully is not correlated with factors affecting racial gaps in a state. Using differences in state-imposed barriers to interstate branching as an instrument for bank competition, we find that a one standard deviation increase in bank competition reduces the extent of racial disparities in loan denial and interest rates by 36% and 50%, respectively. The quantitatively large competition effect is consistent with the key insight in Becker's theory but runs counter to statistical discrimination.

Also strikingly, we find that the reduction in racial disparities is primarily driven by new entrants. Based on Becker (1957), with prejudice driving part of the racial disparities, nondiscriminatory lenders are (most) incentivized to enter the market and exploit the profitable interest rate differentials by making black business loans, and it is precisely their entry that helps narrow the racial gap. Extracting information from the FDIC Summary of Deposit database, we consider a bank an entrant in a state if the bank had no branches in that state in the year of the previous survey. Otherwise, a bank is considered to be an incumbent. Using subsample analysis, we find that black business owners who borrow from incumbent banks, on average, pay interest rates that are 2.25 percentage points higher than their white counterparts, while no statistically significant racial gap in interest rates is found among out-of-state entrant banks. The racial disparity in denial rates is also considerably lower among entrants (21 percentage points), compared to incumbent banks (36 percentage points). The Wald test suggests that the differences between entrants and incumbents on both margins of racial differentials are statistically significant.

Isolating this salient role of new entry in closing racial gaps post-IBBEA helps illuminate the sources of racial disparities. Under the null that there is no taste-based discrimination pre-IBBEA, entrants would be expected to exhibit similar or larger racial disparities in their lending practice, compared to incumbent banks. That is, if the pre-IBBEA racial gaps were entirely a result of statistical discrimination, newly entering banks — facing noisier individual-specific signals of credit risk — would place a heavier weight on easily observed group-specific signals, such as race, and statistically discriminate against black owners more. If the pre-IBBEA racial gaps were fully driven by omitted variable bias (or, put differently, justifiable by differences in individual credit attributes), an out-of-state lender that joins a new market, albeit lacking the soft information on credit attributes that correlate with race, can observe the sizable racial gap in the market rates and therefore gauge that such credit attributes exist. This is precisely a setting where conditions for statistical discrimination apply: The rational response of entrants would be to mimic incumbents and start statistically discriminating against blacks, using race as a summary variable for those credit attributes that they do not yet observe. That is, the self-perpetuating mechanism associated with statistical discrimination—existing disparities breed statistical discrimination—implies similar racial disparities between entrant and incumbent banks. Taken together, our finding that an exogenous intensification of credit competition significantly reduces racial disparities, primarily driven by new entrants, is consistent with Becker's

(1957) theory of racial prejudice but not with profit-driven statistical discrimination.

That being said, there are alternative stories (outside the two workhorse models in the discrimination literature) that we cannot rule out. For instance, stereotyping possibly stemming from *heuristic simplification* could unduly magnify racial differentials in any economic setting (e.g., Hirshleifer, 2001; Daniel, Hirshleifer, and Teoh, 2002; Hirshleifer, 2015; Hirshleifer et al., 2019). However, it has been shown that such behavioral biases are deeply rooted in human psychology and would not be expected to be mitigated by increased competition (e.g., Shleifer, 2012; Kahneman, 2003). Although these alternative stories can be broadly categorized under the notion of "taste based," they arguably have a different flavor. Importantly, though, they also have to do with disparate treatment across race that has no economic basis, which is the main hypothesis explored in this article.

In the final part of this article, we provide additional evidence suggesting that racial prejudice matters for explaining racial disparities in small business lending. Specifically, using the racial Implicit Association Test (IAT) scores developed by Project Implicit at Harvard University, we find that racial differentials in small business lending manifest most in areas with strong animus towards blacks. Based on the idea that racial biases are often subtle or unconscious and that respondents to surveys are understandably reluctant to admit to socially sanctioned behavior, the IAT focuses on automatic associations instead of an explicit response, and uses the strength of association, measured by response time, in a computerized categorization task in which participants sort categories of pictures (white or black faces) and words (representing positive or negative attributes).[5] Following Charles and Guryan (2008), we measure the marginal level of prejudice among lenders in a state with the marginal IAT scores, where the marginal is approximated by the pth percentile of the IAT distribution and p is the fraction of small businesses that are black owned. Using the marginal (and the average) IAT in each state, we find that the interest rate differential across race is primarily concentrated among banks located in regions with pronounced racial biases against blacks.

To the best of our knowledge, our analysis is the first study that exploits exogenous changes in bank competition to shed light on the nature of racial disparities in credit markets. We also initiate a first attempt to drill down to the role of entrants versus incumbents and highlight how that overlooked

[5]Greenwald et al. (2009) offer evidence for the IAT's reliability, internal consistency, and various forms of validity. Stronger racial bias measured using IAT scores has been found to be associated with discrimination in the education, criminal justice and healthcare systems (e.g., Carpers et al. 2017; Dehon et al. 2017; Cunningham et al. 2020; Williams et al. 2020.).

distinction might be illuminating about racial disparities in economic outcomes we observe.

Our contribution in this article is twofold. First, with an informational rich dataset, we exploit the chronology of banking deregulation episodes to gauge the role of racial prejudice in accounting for racial gaps in small business credit markets, guided by Becker (1957).[6] To the extent that the data patterns coherently fit with Becker (1957) in totality yet run counter to a profit-maximizing rationale, it leaves open the possibility that racial prejudice, in part, drives observed racial disparities in small business lending, highlighting ways in which financial institutions perpetuate and entrench racial inequalities in the economy. Racial disparities present in banking—as an institution that has exercised enormous influence in shaping access to opportunity—can engender significant implications for economic stability, especially in times of crises, as the recent experience during the COVID-19 pandemic indicates.

Second, we provide causal evidence on how bank deregulation can reduce the manifestation of prejudice on the credit market outcomes, uncovering an important role of economic policymaking in accounting for the dynamics of racial inequality in small businesses. To that end, our analysis provides support—using credit market data— for Becker's hallmark idea that market forces can help minorities advance economically.

Our paper directly contributes to the literature on racial biases in financial markets. The majority of the studies focus on racial disparities in residential mortgages and the peer-to-peer lending market.[7] Recently, Dougal et al. (2019) examine racial discrimination in higher education bond markets. Another recent paper by Fairlie, Robb, and Robinson (2020) focuses on new business ventures and document evidence for racial inequality in access to capital among startups. There is a small literature examining racial differentials in small business lending. Cavalluzzo and Cavalluzzo (1998) find large differentials in loan denial rates for female- and minority-owned small businesses. Blanchower, Levine, and Zimmerman (2003) find that black entrepreneurs are roughly twice as likely to be denied credit and are charged higher interest rates for approved loans. However, these prior studies on small business lending lack information on lenders and, more importantly, do not address the nature of the

[6]Similar to using measures of denial and pricing, using ex post loan performance to measure potential discrimination is also problematic because of overly restrictive assumptions about the distributions of qualified borrowers across racial groups, in addition to the omitted variables problem (e.g., Horne, 1997; Ross and Yinger, 2002; Brueckner, 1996; Ross, 1996; Yinger, 1996).

[7]See, for example, Munnell et al. (1992), Macey (1994), Ferguson and Peters (1996), Pope and Sydnor (2011), Bhutta and Hizmo (2019), and Bartlett et al. (2019).

racial differentials. Exploiting the staggered implementation of the interstate branching deregulation, with a unique dataset that has significant advantages over those used in prior studies, our study provides new evidence on the origins of racial disparities in small business credit markets, pointing to taste-based discrimination and also highlighting a critical role of economic policymaking in mitigating racial disparities.[8]

The rest of the paper is organized as follows. Section 2 describes the data construction. Section 3 presents our empirical analysis on the magnitude of racial disparities in small business lending. In Section 4, following a brief theoretical overview, we analyze the effect an intensification of bank competition has on racial disparities in small business lending, as well as the channels such an effect operates through. Section 5 concludes.

2 Data construction

We construct a novel dataset extracting information from three main sources. The first source comes from the SSBF that was conducted by the Federal Reserve Board on the credit market experiences of U.S. small businesses, defined as firms with fewer than 500 employees.[9] The survey, which was conducted in 1987, 1993, 1998, and 2003, is among the most extensive data sets available on small business finances. Following Rice and Strahan (2010), we focus on the data from the 1993, 1998, and 2003 surveys.[10] From the survey data, we have detailed information on owner racial background, firm assets, liabilities, profits, firm age, credit history and personal wealth of the owner, and the relationships with banks and other lenders. The second source is the Call Reports, the quarterly financial statements of U.S. commercial banks and bank holding companies. We link the two datasets and also match state-level banking information based on lenders' location. In addition, we supplement our data with business credit scores obtained by the Federal Reserve Board from Dun & Bradstreet

[8] Also supporting the view that deregulation can reduce discrimination, Heywood and Peoples (1994) and Peoples and Talley (2001) find that the deregulation of the trucking industry increased the relative wage rates of black workers. Black and Strahan (2001) show that women's share of employment in managerial positions increased following bank deregulation. Levine, Levkov, and Rubinstein (2014) show that banking deregulation can boost black workers' relative wages by facilitating the entry of new nonfinancial firms.

[9] For complete documentation on the Survey of Small Business Finance, see https://www.federalreserve.gov/Pubs/Oss/Oss3/nssbftoc.htm.

[10] Rice and Strahan (2010) argue that the 1993 survey represents a better "control" sample than the 1987 survey because unobservable economic and technological factors are more similar to the post-interstate banking sample during the latter period compared to the earlier one. The last two surveys (1998 and 2003) occur after passage of IBBEA and can be thought of as the "treatment" group in our empirical design.

(D&B). Lastly, we merge the dataset with the FDIC Summary of Deposits to glean information on bank branches, which is used to identify the progress of banks' expansion across state lines.

Merging information on owner racial background, lender characteristics, and bank financial variables results in a sample of 3,355 firm-year observations used in our analysis. Among these firm-year observations, 85.8% of the applications were approved with bank credit, and we have the corresponding information on interest rates.

Demographic information

Information about small business owners' racial background comes directly from the SSBF in 1993, 1998, and 2003. We mainly use two measures to capture demographic groups. The first measure is a dummy variable, *Black*, indicating whether the owner is African American. The second measure, *Other Minority*, represents whether the owner is Asian, Native American, Hispanic, or another race or ethnicity. The base group is thus non-Hispanic white (hereafter white) business owners. Panel A of Table 1 presents the summary statistics of the major variables used in the paper. In our sample, 4.7% of the firms are owned by blacks, and 8.5% of the firms are owned by other minorities.

Loan denial and interest rates

Our analysis focuses on differences in denial rates across race. To that end, our first measure is the probability of being denied for credit (*Denied*), an indicator that equals one if the borrower was denied in the most recent request for credit, or zero otherwise. As shown in Panel A of Table 1, 14.2% of firms in our sample were denied in the most recent request for credit. The measure has a standard deviation of 34.9% and averages 13.2% in 1993, 26.1% in 1998, and 10.2% in 2003.

The second measure is the initial nominal interest rate on the firm's most recent approved loan in percentage points, with an average of 7.183% and a standard deviation of 2.515%. Across the three surveys, the interest rate averages 8.3% in 1993, 8.92% in 1998, and 5.66% in 2003. We plot the distribution of interest rates by race in Figure 3: In addition to an interest rate premium experienced by black-owned businesses, on average, relative to white-owned business, the distribution of interest rates paid by black-owned businesses is also more compressed than that experienced by white-owned businesses. It appears that lenders treat black-owned businesses more like an average black-owned business and differentiate more among white-owned businesses.

Lender and borrower characteristics

We consider lender characteristics that have been linked to differences in lending, shown in Panel A of Table 1, including 1) *Log of lender assets*, which measures lender size using the natural logarithm of the total assets of the lender; 2) *Lender ROA*, which represents the lender's accounting performance using the return on assets; 3) *Lender leverage*, measured by the debt to asset ratio of the lender; and 4) *Lender non-performing loan*, calculated as the percentage of non-performing loans in total bank lending.

We also consider a battery of variables capturing borrowers' credit characteristics, also shown in Panel A of Table 1. Specifically, *Log of borrower assets* is the natural logarithm of the total assets of a borrower. *Log of borrower age* refers to the firm's age, as measured by the natural logarithm of the firm age in years as reported by the firm in the survey. We take the natural logarithm of these two variables to address the skewness in distribution. *Bankruptcy within the past 7 years* indicates whether the firm's principal owner declared bankruptcy within the preceding seven years. *Delinquent on business obligations 1 (2, 3) time* indicates whether the firm's principal owner was 60 or more days delinquent on business obligations one time (two, three, or more times) within the past three years. We also control for the accounting performance of the borrower, measured by the borrower's return of assets, *Borrower ROA*. We further include an indicator variable representing whether a borrower is a corporation, an indicator variable representing whether the borrower has a deposit with the lender, and an indicator variable representing whether the borrower is in a metropolitan statistical area (MSA). We measure banking market concentration by the Herfindahl-Hirshman bank deposit index. In addition, we control for the credit score of the borrower, D&B credit score, which varies from one to five, with one indicating the safest type of borrower and five the riskiest.

3 Empirical analysis

3.1 Univariate results

We first present the results from a univariate test of racial differentials in small business credit markets without controls in Panel B of Table 1, which displays substantial differences in both denial rates and interest rates between black- and white-owned businesses. Specifically, black business owners are, on average, about 37.9 percentage points more likely to be denied bank loans than white business owners. In addition, black business owners, on average, pay interest rates that are about 1.79 percentage points

higher than white owners. Such sizable differences are significant at the 1% level.

Some firms might choose not to apply in expectation of denial, and we further examine one variable, *Unmet credit needs*, defined as one if the firm was denied credit or did not apply for fear of denial (as reported in the survey) in the past three years, and zero otherwise.[11] We find that black owners are about 39.2 percentage points more likely than white owners to be subject to unmet credit needs, a pattern statistically significant at the 1% level.

3.2 Baseline analysis

We estimate racial disparities in small business lending using the following equation:

$$Y_{i,j,k,t} = \alpha_t + \gamma_j + \theta_k + \delta Black_{i,j,k,t} + \text{lender, firm, and other controls}_{i,j,k,t} + \epsilon_{i,j,k,t}, \qquad (1)$$

where α_t are the year fixed effects, γ_j are the state fixed effects, and θ_k are the industry fixed effects. By including these fixed effects, we purge the cross-state and cross-industry variations, mitigating concerns that the coefficient on race might be biased because of its correlation with omitted state or industry characteristics. In an alternative model specification, we add bank fixed effects, industry-by-year fixed effects, and state-by-year fixed effects, in order to address concerns that minority loan pricing may vary with lender or regional fixed costs and control for potentially dynamic regional and industry characteristics.

We begin by estimating the racial disparities in loan denial using Equation (1), applying a linear and a Probit model. As shown in Panel A of Table 2, we find that across all the model specifications, black business owners are substantially more likely to be denied bank loans. With all controls and most restrictive fixed effects in estimation, for instance, in Column (10) of Panel A in Table 2, black owners are still 21.6 percentage points more likely to be denied in the most recent request for credit relative to their white counterparts. The racial disparities appear to be not only statistically significant but also economically sizable.

The interest rate dynamics also exhibit substantial racial disparities, as shown in Panel B of Table 2, which remain substantial after controlling for an extensive set of indicators of borrower credit risk and lender characteristics, as well as industry-year, lender, and state-year effects: Black business

[11] Note that we cannot study this variable in the regression analysis, as we lack bank-level variables for firms that did not apply for loans.

owners obtain rates that are about 1.11 percentage points higher than white owners.

Inspired by Di Maggio and Yao (2021), we examine the differential discretion lenders employ in lending to black- and white-owned businesses by estimating how much variation in interest rates is explained by standard borrower characteristics across race. We use a range of specifications and also allow for the effects of these borrower characteristics to be non-linear. We estimate the regressions separately for black- and white-owned businesses. The R2 from these regressions offers a gauge for the share of the variation in interest rates that is explained by the observable borrower characteristics. As shown in Panel C of Table 2, for all of these specifications, we find that the R2 for white business owners is notably higher than that for black business owners, and the R2 differences are statistically significant, tested following Erickson and Whited (2002). The smaller R2 for the subsample of black businesses fits with the interpretation that lenders rely less on standard information in pricing black-owned business loans, a pattern also in line with the relatively less price differentiation experienced by black businesses (shown in Figure 1).

As personal wealth can be an integral consideration in small business lending (e.g. Mester, 1997; Mann, 1998; Cavalluzzo and Wolken, 2005), we additionally control for two measures of personal wealth held by the principal business owners, available only in the 1998 and 2003 SSBF: (i) home ownership (i.e., the amount of equity in the home), and (ii) personal net worth excluding home equity.[12] Racial disparities in loan denial and interest rates do not diminish after controlling for the principal business owner's personal wealth (Table 3). This pattern indicating disparate treatment across race that may exist beyond the racial wealth gap— a factor intrinsically embedded in small business lending decisions—is alarming, as wealth accumulation is an area where racial inequality manifests most prominently and is itself, at least in part, a result of decades of racial inequality that imposed barriers to wealth accumulation by black families.[13]

It is of note that, in both Table 2 and Table 3, the estimated coefficients for *Black* are considerably larger with bank fixed effects than without. To the extent that the average rate increase experienced by black business owners is lower than the average rate at the banks black owners go to in equilibrium, this pattern is broadly in line with Becker's insight that black borrowers – albeit avoiding prejudiced

[12]Information on business owners' personal wealth is not available in the 1993 Survey of Small Business Finances.

[13]New data from the 2019 Survey of Consumer Finances (SCF) show that long-standing and substantial wealth disparities persist: the typical white family has eight times the wealth of the typical Black family. The racial wealth gap is, at least in part, the consequence of many decades of racial inequality that imposed barriers to wealth accumulation through either explicit prohibition during slavery or unequal treatment after emancipation.

banks and seeking out low rates from unprejudiced — end up paying a sizable rate premium related to their race.

3.3 Borrower creditworthiness

In this subsection, we study the distribution of racial disparities in small business lending, exploiting borrower heterogeneity in creditworthiness. Based on the D&B credit score of the borrower, we divide our sample into high and low subsamples based on the top and bottom quartiles of the sample distribution; a higher D&B credit score indicates greater credit risk. We conduct the subsample analysis for both *Denied* and *Interest Rate* as the dependent variables.

Racial disparities are most pronounced for firms with low creditworthiness, as shown in Table 4. Black owners with high D&B credit scores (risky) are 39.1 percentage points more likely to be denied in the most recent request credit compared to white owners, while black owners with low credit scores (safe) are 20.1 percentage points more likely to be denied, compared to white owners. The Wald test of equality between subsamples indicates that the difference is statistically significant. In addition, high-credit-score (risky) black owners pay 2.827 percentage points higher than their white counterparts, while low-credit-score (safe) black owners pay 1.195 percentage points higher than their white counterparts. Strikingly, both margins of racial disparities are significantly more pronounced among low-credit firms, pointing to an exacerbation of racial disparities among the most underprivileged.

4 Origins of racial disparities

So far, utilizing a uniquely rich dataset, we have shown that substantial racial gaps exist in small business lending that are unexplained by extensive controls of borrower and lender attributes. It raises the question of what gives rise to such large racial disparities. Broadly speaking, there are three categories of rationales that have been put forth: omitted variable bias, statistical discrimination, and racial prejudice. We now examine whether observed racial differentials are, at least in part, driven by lenders acting out of racial prejudice.

It is, however, theoretically impossible to rule out omitted variable bias, since the control list is inevitably incomplete, or statistical discrimination, as we do not observe how economic actors form their beliefs. We tackle this challenge by resorting to the canonical Becker (1957) model and show

that some of the racial disparities exhibit dynamics predicted by Becker (1957) yet are difficult to rationalize with a profit-driven thesis, such as statistical discrimination or omitted variable bias.

4.1 Theoretical overview

What could induce such substantial racial disparities in small business lending? The two workhorse models of discrimination — the taste-based theory of Becker (1957) and th statistical discrimination theory (Phelps, 1972; Arrow, 1973; Aigner and Cain, 1977) — offer different insights. Applying Becker (1957), originally developed for the context of the labor market, to lending implies that lenders may have a distaste for interacting with black applicants: There is a disamenity value to lending to black business owners. Hence, black business owners are less likely to obtain loans and, when they do, pay a higher interest rate, compared with their white counterparts. In contrast, in statistical discrimination models, the differential treatment across race is due to imperfect information, and discrimination is the result of a signal extraction problem. That is, lenders have limited information about credit risks of loan applicants. When the person-specific information is limited, group-specific information may provide additional information about expected credit risk and is therefore considered by a profit-maximizing lender. While taste-based discrimination is rooted in biases and clearly economically inefficient, statistical discrimination is also socially undesirable, creating negative externality for members of the minority group and representing a mechanism by which racial disparities can be self-perpetuating.

While the two theories produce drastically different implications for policy interventions, studies of discrimination, especially those using data from credit markets, typically have trouble linking racial gaps to a specific theory.[14] Further complicating the problem is the omitted variable problem: The list of control variables is inherently incomplete, and it remains possible that additional variables related to credit attributes could eliminate the disparities.

As it turns out, the unique information structure — characterized by a key role of soft and local information — in the small business credit market, combined with the staggered implementation of banking deregulation, provides an ideal laboratory to examine distinct predictions of the Becker (1957) theory, enabling us to gauge the nature of racial disparities in bank lending.

As a prelude to our empirical analysis, we briefly review the key results from Becker's (1957) seminal

[14] See, for example, Betrand and Duflo (2017), for a review.

work on prejudice, applying it to the context for bank lending.[15] In the Becker (1957) framework, white (w) and black (b) applicants are assumed to be perfect substitutes in credit credentials, in order to isolate lender prejudicial considerations. Lenders are assumed to be differentially racially prejudiced, represented by a disutility (d_i) incurred from lending to black applicants. Lender utility thus depends on his profit (π) and the amount of loans to black-owned businesses he makes (L_b):

$$V_i = \pi_i - d_i L_b,$$

where $\pi_i = r_b L_b + r_w L_w - f(L_b + L_w)$, $f(\cdot)$ is the funding cost of making these loans, and r_b and r_w denote interest rates charged on black- and white-owned businesses, respectively.

Lenders choose loans made to black- and white-owned businesses (L_b and L_w) to maximize their utility. The utility-maximizing choices, L_b^* and L_w^*, satisfy the following conditions:

$$r_w - f'(L_b^* + L_w^*) \leq 0, \text{with equality if } L_w^* > 0$$

$$r_b - f'(L_b^* + L_w^*) - d_i \leq 0, \text{with equality if } L_b^* > 0$$

The equilibrium in the short run requires that the markets for black- and white-owned business loans clear at equilibrium interest rates r_b^* and r_w^*. Some lender will be indifferent between lending to blacks and whites, as long as the distribution of prejudice is sufficiently smooth. The prejudice of this "marginal discriminator," d_i^*, determines the equilibrium racial gap:

$$r_b^* = r_w^* + d_i^*.$$

Figure 2 represents a graphic illustration of the key model predictions. When the relative demand for credit from black-owned businesses is small relative to the number of unprejudiced lenders ($d_i = 0$, represented by the horizontal line AB), as is the case when relative demand is represented by D_1, the marginal discriminator is unprejudiced, resulting in no racial gap in equilibrium. A large relative demand for credit from black owners, depicted by D_2, requires prejudiced lenders to make minority loans, and the ratio of black-owned to white-owned interest rate increases from one to $R > 1$. Black-

[15] The model setup closely follows Becker (1957) and Charles and Guryan (2008), adopted for the bank lending context.

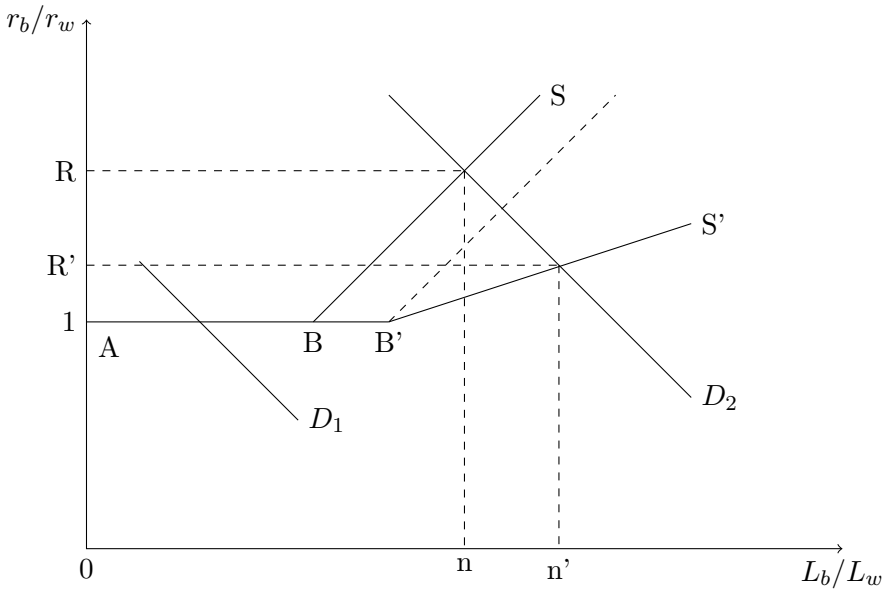


Figure 2: Graphic illustration of Becker (1957) predictions in the banking context

owned businesses pay a higher interest rate than their white counterparts in equilibrium.

Becker's simple framework yields sharp predictions about competition and equilibrium racial gaps in the short run.[16] With more bank entry as a result of lower barriers, non-prejudiced lenders ($d_i = 0$) and lenders with weak racial prejudice (d_i lower than pre-entry d_i^*) can initiate profitable minority loans to arbitrage the interest rate differential, thereby reducing the racial gap. That is, lower entry barriers will increase the number of non-prejudiced lenders (i.e., lengthen the horizontal portion of the relative supply curve, line AB, in Figure 1) and also leads to a reduction in prejudice among lenders likely to be the marginal discriminator (which causes the upward-sloping portion to rotate down to $AB'S'$), boosting the relative supply of loans to black business owners and reducing the equilibrium interest rate ratio to R'. In the equilibrium, lending to black business owners, relative to white business owners, increases from n to n'.

The forgoing analysis results in key implications that strike a clear contrast with statistical dis-

[16]The common criticism of Becker (1957) is that in the short-run equilibrium discussed here, lenders that are less prejudiced than the marginal discriminator earn higher profits than more prejudiced lenders and therefore can expand over time. Under perfect competition, prejudiced lenders are driven out of the market in the long run. Racial gaps arising from prejudice thus disappear in the long run. This criticism is not applicable in our study, as (i) our focus is precisely on the short-run equilibrium, i.e., the years shortly following the passage of IBBEA, and (ii) entry barriers remain nontrivial in banking in the U.S. Nonetheless, it is important to also note that recent research has shown that racial prejudice can lead to persistent racial gaps if there is imperfect information (Black, 1995), imperfect competition, adjustment costs (Lang, Manove, and Dickens, 2005), or if prejudice is portable across roles (Charles and Guryan, 2007).

crimination: With prejudice driving part of racial disparities in lending, incentives exist to enter the credit market and exploit the profitable racial differentials; such incentives are strongest among the nonprejudiced, as minority loans are cheapest to them, in utility terms. This core idea of racial prejudice leaving behind unexploited profitability leads to testable implications of Becker's theory. That is, when the banking entry cost become lower, incentives dictate that more nonprejudiced lenders will enter the credit market; it is precisely their entry that narrows the racial gap. It is worth emphasizing that, in Becker's framework, competition does not alter individual racial prejudice— racial bias can be deeply entrenched; what new entry alters instead is the composition of lenders along the prejudice line.

What provides an ideal setup to test for the aforementioned predictions— competition can drive away part of racial gaps caused by prejudice, and it is achieved through new entry— is the staggered implementation of banking deregulation that allowed bank expansions across state lines, constituting exogenous shocks to competition that were hitting different states at different times.

It is also of note that, because black applicants in Becker's framework sort into least prejudiced lenders first, what determines the equilibrium racial gap is the *marginal* discriminator, who is the most prejudiced lender that blacks come into contact with in equilibrium. The implication is that lower percentile[s of the prejudice distribution matter more than the average (or the upper percentiles). And under specific conditions, the prejudice of the marginal discriminator can be proxied by the pth percentile of the prejudice distribution, where p is the percentage of small businesses being run by blacks (see, for example, Charles and Guryan, 2008), an implication we additionally examine in Section 4.3.

4.2 Effects of bank competition

U.S. banking regulation had historically prohibited bank expansions across state lines, referred to as interstate branching. Since the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994, banks have been able to engage in interstate branching, albeit subject to considerable restrictions that vary across states. While IBBEA removed federal restrictions on interstate bank expansion, it allowed states to impose anti-competitive measures restricting the entry of out-of-state banks through the establishment of branches. Nonetheless, the implementation of IBBEA resulted in significant growth of interstate branching: In 1994, 62 out-of-state branches existed in a

small number of states; by 2005, the number of out-of-state branches had grown to 24,728. Johnson and Rice (2008) build a dataset of the share of interstate branches as a percentage of total branches in each state-year from 1994 to 2005. They show that, indeed, states with greater restrictions have fewer interstate branches as a share of total branches.

Intensified competition

We use differences in regulatory barriers to interstate branching as an instrument to assess whether increased competition reduces racial disparities in small business lending. The state-imposed restrictions on interstate branching have been shown to increase out-of-state branches and competition (e.g. Johnson and Rice; 2008; Rice and Strahan, 2010). A large empirical literature has established that the successive wave of deregulation across states is exogenous to economic factors.[17] We also confirm that the state-imposed restrictions are uncorrelated with a number of factors that might contribute to racial disparities in small business lending, including the prevailing state-level racial attitudes, the share of Community Reinvestment Act (CRA)–eligible counties in each state, and the racial disparities in credit markets pre-IBBEA.[18] It also does not seem likely that the state-imposed constraints would have affected the racial disparities in ways other than by the competition channel.

We follow Rice and Strahan (2010) and measure regulatory barriers using the index of interstate branching restrictions. The index includes the following four provisions: 1) the minimum age of the institution for acquisition; 2) allowance of de novo interstate branching; 3) allowance of interstate branching by acquisition of a single branch or portions of an institution; and 4) statewide deposit cap on branch acquisition (Kroszner and Strahan, 1999; Johnson and Rice; 2008; Rice and Strahan, 2010). The index is set to zero for states that are most open to out-of-state entry, and a numeric value of one is added to the index when a state adds any of the four restrictions. Following Rice and Strahan (2010), we code the branching restrictions index in 1993 equal to four, its most restrictive value, for

[17] See Kroszner and Strahan (2014) for a survey of the literature.

[18] Specifically, we first correlate the metric for state-level racial biases— introduced in Section 4.3—with the branching restrictions measured in 2003 and 2005. The pairwise correlation is 0.15 and 0.12, respectively, and neither is statistically significant. Second, the CRA seeks to increase credit opportunities for low-to-moderate income neighborhoods and has made open redlining illegal. We compute the share of CRA-eligible counties in each state and find no statistically significant correlation between the deregulation index. Lastly, we check racial disparities before IBBEA was introduced. Because our proxy of racial biases is a regression coefficient with lender and borrower attributes, there is not sufficient data to make econometric inferences at the state level. To the extent that racial attitudes in a financial institution would plausibly affect lending decisions across credit markets similarly, we utilize the mortgage data that are magnitudes larger. We estimate the racial differences in pre-IBBEA period (three years prior to 1994) in each state, and compute the pairwise correlation between the state-specific racial disparity and the deregulation index. The pairwise correlation is 0.09 and is not statistically significant.

all states.

To address concerns that lowered entry barriers might increase market concentration, which, in turn, hinders competition, we first examine and confirm that the state-level deregulation increases bank competition. Specifically, we regress *#Banks*, the natural logarithm of the number of lenders — at the bank level — a small business has, on the branching restrictions index, controlling for all the variables that will ultimately be included in the second-stage regression. We also use the restriction index interacting with race dummies as the instruments for the interaction terms. We include industry, year, and state fixed effects, so the coefficient on the branching restriction index is generated primarily by within-state variation over time. As shown in Panel A of Table 5, we find that the branching restrictions index (a lower value indicating a greater extent of deregulation) is negatively and significantly associated with *#Banks*, suggesting that banking deregulation results in enhanced credit competition in the deregulated states: Firms enjoy lending relationships with more banks in states with fewer restrictions governing out-of-state entry. The first stage F-statistics are well above weak-instrument thresholds, illustrating that the instrument relevance test is easily passed.

The second-stage results show that increased competition significantly narrows racial disparities in small business lending. We find that, for both denial probability and interest rates, intensified competition materially reduces racial differences, as indicated by significant and negative coefficients of the interaction term *#Banks* x *Black*. The economic magnitude is also substantial. For instance, in Columns (2) and (3), a one standard deviation increase in *#Banks* reduces the extent of racial disparities in loan denial and interest rates by about 36% ($= 0.322 * 0.708/0.62$) and 50% ($= 3.578 * 0.708/5.056$), respectively. The results are robust to the inclusion of industry, year, and state fixed effects.

The large competition effect on racial gaps is in line with taste-based discrimination formulated in Becker (1957): If the pre-IBBEA racial differentials are in part driven by racial prejudice and thus represent profitable opportunities to initiate black business loans, increased competition will erode such arbitrage opportunities, attenuating the racial gaps. In contrast, statistical discrimination— conventionally interpreted as a profit-maximizing solution to a signal extraction problem— is not expected to diminish in response to increased competition. More generally, if the pre-IBBEA racial disparities are entirely a result of profit maximization (such as the omitted variable bias), they are not expected to lessen significantly when competition intensifies.

As elaborated in Section 4.1, Becker (1957) predicts that increased competition erodes racial disparities through *new entry*. Next, we proceed to examine the role of entrant banks in closing the racial gaps.

Entrants vs. incumbents

A core idea in the short-run version of the Becker (1957) theory, applied to the banking context, is that, when racial prejudice drives part of racial gaps, unexploited profit opportunities create incentives to come to the market and initiate minority loans, and such incentives are strongest among nonprejudiced lenders as black business loans are the cheapest (in utility terms) to them. When entry barriers become lower, lenders less prejudiced than the marginal discriminator are most incentivized to enter the credit market and earn profits by lending to black applicants. Their entry consequently narrows the racial gap.

This prediction of Becker (1957) on the prominent role of entrants in lowering racial disparities stands in stark contrast with statistical discrimination in our setup. In models of statistical discrimination, profit-maximizing lenders use all the information available to them. Racial disparities arise if it is known to lenders that race is correlated with credit risk; lenders therefore weigh the group-specific (race) information in making lending decisions, in addition to individual-specific information. In small business lending, obtaining reliable information on the creditworthiness of a business takes time because little, if any, public information exists about the performance of most small businesses.[19] In such an informational-opaque small business credit market, entrant banks face noisier signals of individual credit risks, lacking soft information that is acquired through local contacts over time. For profit maximization, entrants —based on theories of statistical discrimination— would rationally place a greater weight on easily observable information on race and statistically discriminate against blacks more, compared to incumbent banks. For example, in the labor market context, Altonji and Pierret (2001) show that if firms statistically discriminate against young workers on the basis of readily available characteristics such as race and education, then as firms learn about worker productivity over time, the coefficients on the easily observed variables would fall, and the coefficients on hard-to-observe correlates of productivity would rise.

[19]Small businesses rarely have publicly traded equity or debt securities, and public information on such firms is typically sparse. Many small businesses also lack detailed balance sheets and other financial information often used by lenders in making underwriting decisions.

We now examine the role of entrants and incumbent banks in accounting for the reduction in racial disparities following the passage of the IBBEA. We glean information on new out-of-state branches by matching the 1998 and 2003 SSBFs with the FDIC Summary of Deposits (SOD) database, which is the annual survey of branch office deposits all FDIC-insured institutions are required to complete.[20] If a bank in a state (in the current SSBF) had no branches operating in that state in the year of the previous SSBF, we consider this bank to be an out-of-state entrant bank in that state. Otherwise, a bank is considered to be an incumbent bank.[21]

We split our sample into entrants and incumbents, conducting subsample analysis for both *Denied* and *Interest Rate* as the dependent variables. We continue to control for extensive borrower and lender characteristics, with bank fixed effects. We also include industry-by-year and state-by-year fixed effects, stripping out dynamic regional and industry-wide characteristics.

We find indications that entrants are essential in narrowing the racial disparities. As shown in Table 6, the racial disparity in interest rates is modest and statistically insignificant among entrants, while it continues to be substantial in magnitude and statistically significant among incumbent banks. Specifically, black business owners who borrow from incumbent banks, on average, pay interest rates that are 2.25 percentage points higher than their white counterparts, while no statistically significant racial gap in interest rates is found among entrants. The racial disparity in denial rates is also considerably lower among entrants (21%), compared to incumbent banks (36%). The Wald test of equality of the *Black* coefficients suggests that the differences between entrants and incumbents on both margins of racial differentials are statistically significant. While our measures of entrants are inevitably rough, these patterns are broadly suggestive of a critical role of entrants in closing the racial gaps.

Of note is that, under the null that there is no taste-based discrimination pre-IBBEA, entrants in our setting would be expected to exhibit similar or larger racial disparities in their lending practice, compared to incumbent banks. That is, if the pre-IBBEA racial gap is entirely a result of statistical discrimination, newly entering banks — facing noisier individual-specific signals of credit risk — would

[20] For the 1998 Survey of Small Business Finance, an entrant is one that had no branches in a state in 1994.

[21] Out-of-state banks could expand into a state by establishing new branches (de novo entry), acquiring a bank and converting it into a branch, or acquiring branches of incumbent banks. Unfortunately, our data do not allow us to distinguish among differential modes of out-of-state entry. In constructing our measure of entrants, we treat all out-of-state branching equally. While de novo branching clearly represents initial entry to the banking market in a given state, ownership changes due to interstate acquisition could nonetheless induce meaningful improvements in lender racial attitudes, potentially improving bank profitability by enabling arbitrage on existing racial differentials.

place a heavier weight on easily observed group-specific signals, such as race, and statistically discriminate against black owners more, as elaborated above. If the pre-IBBEA racial gap is fully driven by omitted variable bias (or, put differently, is justified by differences in individual credit attributes), an out-of-state lender that joins a new market, albeit lacking the soft information on credit attributes that correlate with race, can observe the sizable racial gap in the market rates and therefore gauge that such credit attributes exist. This is precisely a setting where conditions for statistical discrimination apply: The rational response of entrants would be to mimic incumbents and start statistically discriminating against blacks, using race as a summary variable for those credit attributes that they do not yet observe. That is, the self-perpetuating mechanism associated with statistical discrimination — existing disparities breed statistical discrimination — implies similar racial disparities between entrant and incumbent banks.

Taken together, our finding that an exogenous intensification of credit competition significantly reduces racial disparities, primarily driven by new entrants, is consistent with Becker's (1957) theory of racial prejudice but not with profit-driven statistical discrimination.

4.3 Geographic heterogeneity in racial bias

If racial prejudice is an important driver of racial disparities, such disparities should be magnified in states where racial bias runs rampant, as the racial prejudice of the marginal discriminator is likely more severe in these areas. In this subsection, we exploit the regional differences in racial attitudes and examine whether racial disparity in small business lending manifests more strongly among banks located in areas exhibiting more pronounced racial animus against blacks.

To gauge regional racial attitudes, we exploit distributional properties of data on the Implicit Association Test (IAT) conducted by Project Implicit at Harvard University. The idea is that racial biases are often thoughts or feelings existing outside conscious awareness and thus are particularly difficult to acknowledge; in addition, survey respondents can be reluctant to admit to racism (Greenwald, McGhee, and Schwartz, 1998). Focusing on automatic associations instead of an explicit response, IAT scores measure relative preference for or against blacks by computing participant response times between various associations. A result revealing a bias against blacks reflects that the respondent tends to rapidly associate images of white people with positive words and images of black people with

negative words. Greenwald et al. (2009) offer evidence for the IAT's reliability, internal consistency, and various forms of validity. Stronger racial bias measured using IAT scores has been found to be associated with discrimination in the education, criminal justice and healthcare systems.[22]

In our analysis, we use 80,000 IAT individual scores that were conducted in 2002-2003, the earliest IAT data available. We also use the IP address linked to each test to identify the respondent's location at the state level. Following Charles and Guryan (2008), we proxy the prejudice of the marginal discriminator using the marginal IAT score, approximated by the pth percentile of the IAT distribution in each state, where p is the fraction of small businesses owned by blacks. Since almost 5% of small businesses in the U.S. are owned by blacks (Table 1), we use the 5^{th} percentile of the IAT distribution in each state to gauge the prejudice of the marginal discriminator in the state. We then divide our sample into high- and low-bias subsamples based on the top and bottom quartiles of the marginal IAT sample distribution.

We re-estimate our baseline model separately for high- and low-bias states, controlling for extensive borrower and lender characteristics. We include bank, industry-by-year, and state-by-year fixed effects. The effect is estimated within the state-year-industry unit, mitigating the impact of dynamic regional or industry characteristics, such as state-level wealth and demographics. Table 7 reveals that the interest rate racial disparities are indeed primarily concentrated among banks located in high-bias states. Racial differential in loan denial among banks located in high-bias states is also substantially higher than in low-bias states. The Wald tests of equality of the coefficients between high- and low-bias subsamples for interest rates and loan denial are rejected at the 1% and 10% levels, respectively.

We also use a state-level average of IAT scores as a proxy for the prevailing racial attitudes in each state. We categorize states into high-average-bias and low-average-bias states based on the top and bottom quartiles of the state-average IAT distribution, and re-estimate the racial disparities using the baseline specification. The results are qualitatively similar and quantitatively smaller, in line with the prediction in Becker (1957) that the lower percentiles matter more than the average (Table 2 in Appendix).

Supporting the view that prejudice may matter, racial differentials are found to manifest strongly in areas with severe racial bias against blacks. The patterns are suggestive of a relationship — linking

[22]See, for example, Carpers et al. (2017), Dehon et al. (2017), Cunningham and Wigfall (2020;), and Williams et al. (2020).

prejudice to racial disparities — that is in line with Becker (1957).

5 Conclusion

Informational opacity of small firms contributes, in part, to the relative scarcity of research on racial disparities in small business lending. We argue that the soft and localized nature of information in the small business credit market actually presents an untapped opportunity to test some subtle, overlooked implications from Becker (1957), helping to uncover the source of racial disparities in bank lending.

To examine the extent of racial disparities in small business lending, we begin by building a unique dataset that entails significant advantages over those used in previous studies of these questions. Specifically, we construct a dataset containing extensive loan information, including firm and lender characteristics, by linking Call Reports and Summary of Deposits data to the SSBF. We find that substantial racial differentials exist in the small business credit market, even after accounting for an exhaustive list of borrower and lender characteristics.

We exploit the IBBEA implementation— banking deregulation that occurred on a state-by-state basis at different times— to isolate the effects of bank entry and competition on racial disparities, key features that set Becker (1957) theory of racial prejudice apart from statistical discrimination theory. We show that lowered bank entry barriers lead to increased competition, which, in turn, substantially reduces the racial disparities in small business lending. Even more striking, we find that such reductions in racial gaps are primarily driven by out-of-state entrant banks, in line with Becker (1957) but at odds with statistical discrimination or omitted variable biases. Finally, we provide auxiliary evidence using geographic variations in racial attitudes: Racial differentials in small business lending are most prominent in areas with severe racial bias against blacks.

To the extent that the data patterns, taken together, coherently fit with Becker's theory but run counter to a profit-maximizing rationale, it leaves open the possibility that racial prejudice might be driving part of bank lending decisions. Such racial bias—once institutionalized—can manifest itself in lending relationships in cumulative ways, perpetuating racial disparities in the economy. Moreover, our analysis provides causal evidence on a quantitatively large effect of financial deregulation on ameliorating racial disparities. To that end, our analysis substantiates Becker's insight that market mechanisms can reduce the manifestation of prejudice in credit market outcomes, helping improve the

economic standing of racial minorities.

References

Agarwal, Sumit, and Robert Hauswald. "Distance and private information in lending." The Review of Financial Studies 23.7 (2010): 2757-2788.

Altonji, Joseph G., and Charles R. Pierret. "Employer learning and statistical discrimination." The Quarterly Journal of Economics 116, no. 1 (2001): 313-350.

Arrow, Kenneth. "The theory of discrimination." Discrimination in labor markets 3.10 (1973): 3-33.

Bartlett, Robert, Adair Morse, Richard Stanton, and Nancy Wallace. "Consumer-lending discrimination in the FinTech era (No. w25943)." (2019).

Beck, Thorsten. "Bank financing for SMEs–lessons from the literature." National Institute Economic Review 225, no. 1 (2013): R23-R38.

Becker, Gary. "The economics of discrimination." (1957).

Berger, Allen N., and Gregory F. Udell. "Relationship lending and lines of credit in small firm finance." Journal of Business (1995): 351-381.

Berger, Allen N., Nathan H. Miller, Mitchell A. Petersen, Raghuram G. Rajan, and Jeremy C. Stein. "Does function follow organizational form? Evidence from the lending practices of large and small banks." Journal of Financial economics 76, no. 2 (2005): 237-269.

Berger, Allen N., and Gregory F. Udell. "Small business credit availability and relationship lending: The importance of bank organisational structure." The Economic Journal 112, no. 477 (2002): F32-F53.

Blanchflower, David G., Phillip B. Levine, and David J. Zimmerman. "Discrimination in the small-business credit market." Review of Economics and Statistics 85.4 (2003): 930-943.

Bhutta, Neil, Andrew C. Chang, Lisa J. Dettling, and Joanne W. Hsu. "Disparities in Wealth by Race and Ethnicity in the 2019 Survey of Consumer Finances," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, (2020), https://doi.org/10.17016/2380-7172.2797.

Bhutta, Neil, Jesse Bricker, Andrew C. Chang, Lisa J. Dettling, Sarena Goodman, Joanne W. Hsu, Kevin B. Moore, Sarah Reber, Alice Henriques Volz, and Richard Windle. "Changes in US family finances from 2016 to 2019: Evidence from the Survey of Consumer Finances." Federal Reserve Bulletin 106, no. 5 (2020).

Bricker, Jesse, Sarena Goodman, Kevin B. Moore, and Alice Henriques Volz. "A Wealth of Information: Augmenting the Survey of Consumer Finances to Characterize the Full US Wealth Distribution." (2021).

Cavalluzzo, Ken S., and Linda C. Cavalluzzo. "Market structure and discrimination: The case of

small businesses." Journal of Money, Credit and Banking (1998): 771-792.

Capers IV, Quinn, Daniel Clinchot, Leon McDougle, and Anthony G. Greenwald. "Implicit racial bias in medical school admissions." Academic Medicine 92, no. 3 (2017): 365-369.

Cetorelli, Nicola, and Philip E. Strahan. "Finance as a barrier to entry: Bank competition and industry structure in local US markets." The Journal of Finance 61.1 (2006): 437-461.

Calomiris, Charles W., Charles M. Kahn, and Stanley D. Longhofer. "Housing-finance intervention and private incentives: helping minorities and the poor." Journal of Money, Credit and Banking 26.3 (1994): 634-674.

Cao, H. Henry, Bing Han, David Hirshleifer, and Harold H. Zhang. "Fear of the unknown: Familiarity and economic decisions." Review of finance 15, no. 1 (2011): 173-206.

Corbae, Dean, and Ross Levine. "Competition, stability, and efficiency in financial markets." Haas School of Business University of California Working Paper (2018).

Cortés, Kristle R., Yuliya Demyanyk, Lei Li, Elena Loutskina, and Philip E. Strahan. "Stress tests and small business lending." Journal of Financial Economics 136, no. 1 (2020): 260-279.

Dougal, Casey, Pengjie Gao, William J. Mayew, and Christopher A. Parsons. "What's in a (school) name? Racial discrimination in higher education bond markets." Journal of Financial Economics 134, no. 3 (2019): 570-590.

Cunningham, George B., and Lisa T. Wigfall. "Race, explicit racial attitudes, implicit racial attitudes, and COVID-19 cases and deaths: An analysis of counties in the United States." PloS one 15, no. 11 (2020).

Daniel, Kent, David Hirshleifer, and Siew Hong Teoh. "Investor psychology in capital markets: Evidence and policy implications." Journal of Monetary Economics 49.1 (2002): 139-209.

Degryse, Hans, and Steven Ongena. "Distance, lending relationships, and competition." The Journal of Finance 60.1 (2005): 231-266.

Dehon, Erin, Nicole Weiss, Jonathan Jones, Whitney Faulconer, Elizabeth Hinton, and Sarah Sterling. "A systematic review of the impact of physician implicit racial bias on clinical decision making." Academic Emergency Medicine 24, no. 8 (2017): 895-904.

Fairlie, Robert. "The impact of COVID-19 on small business owners: Evidence from the first three months after widespread social-distancing restrictions." Journal of economics management strategy 29, no. 4 (2020): 727-740.

Fairlie, Robert W., Alicia Robb, and David T. Robinson. "Black and white: Access to capital among minority-owned startups." No. w28154. National Bureau of Economic Research, 2020.

Fairlie, Robert W., and Alicia M. Robb. "Why are black-owned businesses less successful than white-owned businesses? The role of families, inheritances, and business human capital." Journal of Labor Economics 25, no. 2 (2007): 289-323.

Greenwald, Anthony G., Debbie E. McGhee, and Jordan LK Schwartz. "Measuring individual differences in implicit cognition: the implicit association test." Journal of personality and social psychology 74, no. 6 (1998): 1464.

Greenwald, Anthony G., T. Andrew Poehlman, Eric Luis Uhlmann, and Mahzarin R. Banaji. "Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity." Journal of personality and social psychology 97, no. 1 (2009): 17.

Hirshleifer, David. "Investor psychology and asset pricing." The journal of Finance 56.4 (2001): 1533-1597.

Hirshleifer, David, Yaron Levi, Ben Lourie, and Siew Hong Teoh. "Decision fatigue and heuristic analyst forecasts." Journal of Financial Economics 133, no. 1 (2019): 83-98.

Jiang, Liangliang, Ross Levine, and Chen Lin. "Competition and bank opacity." The Review of Financial Studies 29.7 (2016): 1911-1942.

Johnson, Christian A., and Tara Rice. "Assessing a decade of interstate bank branching." Wash. & Lee L. Rev. 65 (2008): 73.

Johnson, Christian A., and Tara Rice. "Assessing a decade of interstate bank branching," The Washington and Lee Law Review 65, (2008). 73–127.

Kahneman, Daniel. "Maps of bounded rationality: Psychology for behavioral economics." American economic review 93.5 (2003): 1449-1475.

Kerr, William R., and Ramana Nanda. "Democratizing entry: Banking deregulations, financing constraints, and entrepreneurship." Journal of Financial Economics 94.1 (2009): 124-149.

Kroszner, Randall S., and Philip E. Strahan. "What drives deregulation? Economics and politics of the relaxation of bank branching restrictions." The Quarterly Journal of Economics 114.4 (1999): 1437-1467.

Ross Levine, Yona Rubinstein and Alexey Levkov (2014), "Bank Deregulation and Racial Inequality in America," Critical Finance Review: Vol. 3: No. 1, pp 1-48.

Lin, Leming. "Bank deposits and the stock market." The Review of Financial Studies 33, no. 6 (2020): 2622-2658.

Mian, Atif. "Distance constraints: The limits of foreign lending in poor economies." The Journal of Finance 61.3 (2006): 1465-1505.

Di Maggio, Marco, and Vincent Yao. "FinTech borrowers: Lax screening or cream-skimming?." The Review of Financial Studies 34.10 (2021): 4565-4618.

Petersen, Mitchell A., and Raghuram G. Rajan. "The benefits of lending relationships: Evidence from small business data." The Journal of Finance 49.1 (1994): 3-37.

Petersen, Mitchell A., and Raghuram G. Rajan. "Does distance still matter? The information revolution in small business lending." The journal of Finance 57.6 (2002): 2533-2570.

Phelps, Edmund S. "The statistical theory of racism and sexism." The American Economic Review 62.4 (1972): 659-661.

Rice, Tara, and Philip E. Strahan. "Does credit competition affect small-firm finance?" The Journal of Finance 65.3 (2010): 861-889.

Shleifer, Andrei. "Psychologists at the gate: a review of Daniel Kahneman's thinking, fast and slow." Journal of Economic Literature 50.4 (2012): 1080-91.

Sufi, Amir. "Information asymmetry and financing arrangements: Evidence from syndicated loans." The Journal of Finance 62.2 (2007): 629-668.

Williams, Christina M., Rahul Chaturvedi, and Rodney A. Gabriel. "Policy and law changes to address healthcare inequities for minority populations during COVID-19." Journal of Allergy and Infectious Diseases 1, no. 3 (2020): 49.

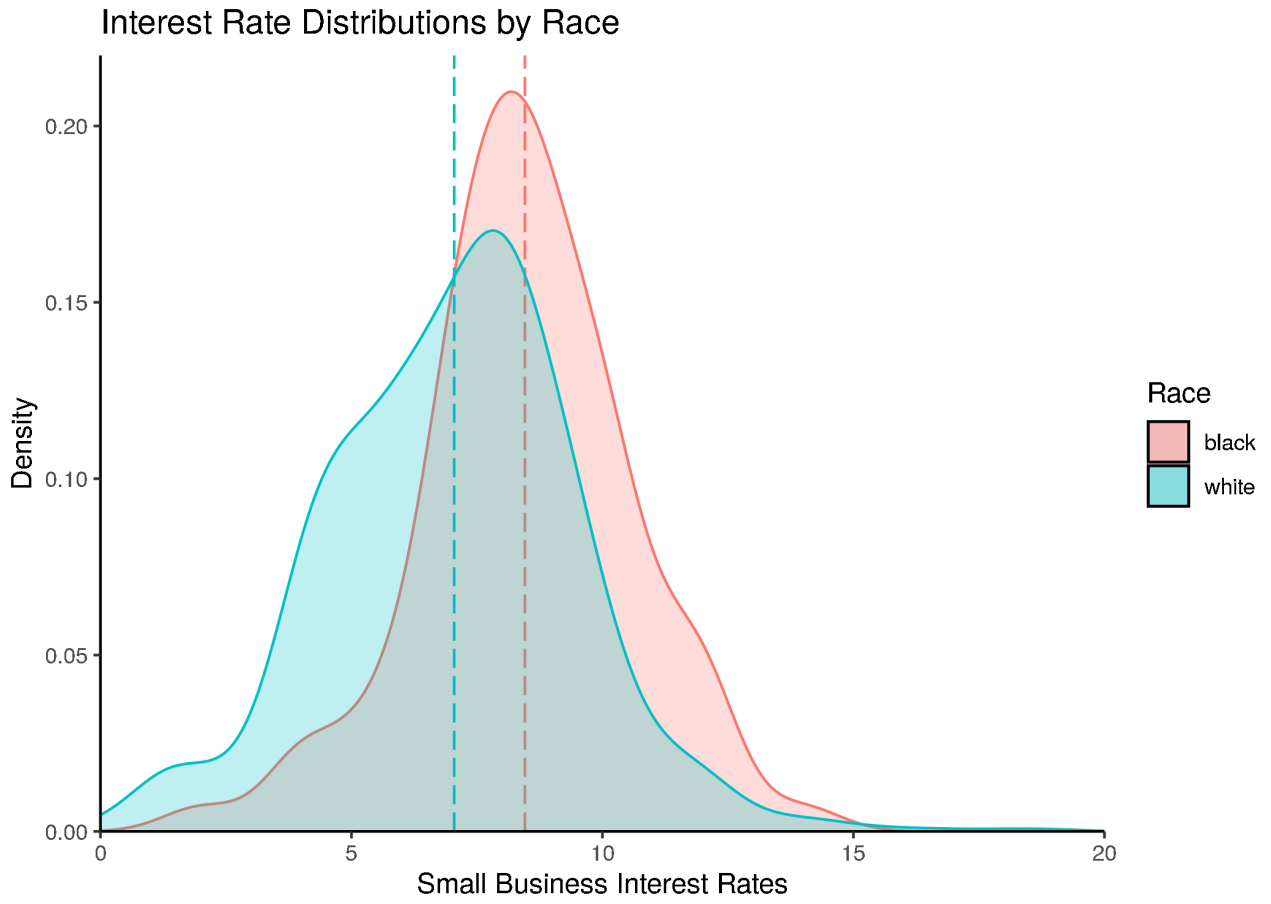


Figure 3: Interest rate distribution by race

Table 1
Summary statistics

This table presents the summary statistics for the major variables used in this paper. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. Panel A presents the summary statistics for major variables used in the paper. Panel B provides univariate test of banking variables across different races. Unmet credit needs is an indicator variable, which is equal to one if the firm was denied credit or did not apply for fear of denial in the past 3 years, and zero otherwise. *, **, *** signify that the statistic is significantly different from the white-owned firm value the 10%, 5%, and 1% level, respectively.

Panel A. Summary Statistics of Major Variables

	Mean	Std.	Q1	Median	Q3	N
Dependent variables:						
Denied	0.142	0.349	0	0	0	3,355
Interest rate	7.183	2.515	5.500	7.360	8.750	2,990
Independent variables:						
Black	0.047	0.211	0	0	0	3,355
Other Minority	0.085	0.278	0	0	0	3,355
Lender characteristics:						
Log of lender assets	14.982	2.736	12.595	14.945	17.101	3,355
Lender ROA	0.007	0.003	0.006	0.008	0.009	3,355
Lender leverage	0.913	0.022	0.904	0.917	0.927	3,355
Lender non-performing loan	0.011	0.012	0	0	0.014	3,355
Borrower characteristics:						
Borrower D&B credit score (1 is safest; 5 is riskiest)	2.841	1.180	2	3.000	4	3,355
Bankruptcy within the past 7 years	0.010	0.097	0	0	0	3,355
Delinquent on business obligations (1 time)	0.028	0.163	0	0	0	3,355
Delinquent on business obligations (2 times)	0.084	0.278	0	0	0	3,355
Delinquent on business obligations (3 or more times)	0.093	0.290	0	0	0	3,355
Log of borrower assets	13.189	2.102	11.660	13.323	14.790	3,355
Log of borrower age (years)	2.618	0.733	2	2.708	3.178	3,355
Indicator if borrower is a corporation	0.751	0.433	1	1	1	3,355
Borrower ROA	0.594	1.905	0	0	0.500	3,355
Indicator if borrower has a deposit with lender	0.345	0.475	0	0	1	3,355
Indicator if borrower is in an MSA	0.780	0.414	1	1	1	3,355
HHI	0.212	0.125	0	0	0	3,355

Log of borrower home equity	11.914	1.727	11	12	13	1,919
Log of borrower net worth	12.535	2.897	12	13	14	2,054
Branching restrictions (4 is most, 0 least, restricted)	2.844	1.428	2	3	4	3,355
#Banks	1.170	0.708	1	1	2	3,355
Entrants	0.418	0.493	0	0	1	2,098
Local racial bias	0.430	0.045	0.401	0.441	0.448	3,355

Panel B. Univariate Test

	All	White	Black	Other Minority
Denied	0.142	0.111	0.490***	0.271***
N	3,550	2,918	153	284
Interest rate	7.183	7.064	8.861***	7.958***
N	2,990	2,678	86	226
Unmet credit needs	0.222	0.182	0.574***	0.313***
N	11,239	9,226	687	1,326

Table 2
Racial disparities: baseline results

This table presents baseline results on racial disparities in small business lending. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the bank level are reported in brackets.

*, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

Panel A. Denied in the Most Recent Loan

	Linear Model					Probit Model				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Black	0.375***	0.362***	0.257***	0.244***	0.288***	0.383***	0.363***	0.212***	0.188***	0.216***
	[0.041]	[0.041]	[0.040]	[0.040]	[0.050]	[0.041]	[0.041]	[0.041]	[0.040]	[0.043]
Other Minority	0.154***	0.145***	0.065**	0.063**	0.083***	0.161***	0.147***	0.043**	0.038**	0.044**
	[0.030]	[0.029]	[0.025]	[0.025]	[0.032]	[0.031]	[0.029]	[0.020]	[0.019]	[0.022]
Log of lender assets		0.013***	0.015***	0.015***	-0.023		0.013***	0.011***	0.011***	0.010***
		[0.003]	[0.003]	[0.003]	[0.032]		[0.003]	[0.002]	[0.002]	[0.003]
Lender ROA		-2.641**	-1.486	-1.516	3.565		-2.574*	-1.369	-1.257	-1.301
		[1.342]	[1.299]	[1.280]	[4.201]		[1.391]	[1.077]	[1.047]	[1.118]
Lender leverage		0.194	0.181	0.212	0.229		0.212	0.029	0.041	0.026
		[0.289]	[0.265]	[0.266]	[0.707]		[0.300]	[0.231]	[0.222]	[0.256]
Lender non-performing loan		-0.088	0.140	0.015	0.625		-0.096	0.114	0.040	0.424
		[0.585]	[0.587]	[0.586]	[1.730]		[0.552]	[0.468]	[0.460]	[0.517]
Borrower D&B credit score (1 is safest; 5 is riskiest)			0.039***	0.027***	0.012*			0.038***	0.026***	0.024***
			[0.005]	[0.005]	[0.007]			[0.004]	[0.004]	[0.004]
Log of borrower assets			-0.032***	-0.032***	-0.033***			-0.028***	-0.027***	-0.033***
			[0.003]	[0.003]	[0.005]			[0.003]	[0.003]	[0.003]
Log of borrower age (years)			-0.032***	-0.034***	-0.040***			-0.029***	-0.030***	-0.037***
			[0.008]	[0.008]	[0.011]			[0.006]	[0.006]	[0.007]
Indicator if borrower is a corporation			-0.014	-0.021	-0.029			-0.006	-0.012	-0.016
			[0.015]	[0.014]	[0.021]			[0.011]	[0.011]	[0.012]

Borrower ROA			-0.015***	-0.014***	-0.016***			-0.012***	-0.011***	-0.013***
			[0.003]	[0.003]	[0.004]			[0.003]	[0.002]	[0.003]
Indicator if borrower has a deposit with lender			-0.038***	-0.032***	-0.029*			-0.039***	-0.033***	-0.034***
			[0.011]	[0.011]	[0.016]			[0.010]	[0.010]	[0.011]
Indicator if borrower is in an MSA			0.021	0.021	-0.032			0.021	0.020	0.039***
			[0.018]	[0.018]	[0.031]			[0.016]	[0.015]	[0.013]
HHI			0.008	-0.000	-0.004			0.025	0.016	0.095*
			[0.055]	[0.054]	[0.113]			[0.054]	[0.053]	[0.057]
Bankruptcy within the past 7 years				0.094	-0.084				0.074	0.074
				[0.082]	[0.081]				[0.073]	[0.068]
Delinquent on business obligations (1 time)				0.127***	0.141**				0.126**	0.126**
				[0.046]	[0.061]				[0.050]	[0.053]
Delinquent on business obligations (2 times)				0.097***	0.112***				0.105***	0.121***
				[0.026]	[0.036]				[0.028]	[0.031]
Delinquent on business obligations (3 or more times)				0.123***	0.133***				0.128***	0.148***
				[0.021]	[0.031]				[0.023]	[0.028]
Industry FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
State FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Year FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Industry × Year FE	No	No	No	No	Yes	No	No	No	No	Yes
State × Year FE	No	No	No	No	Yes	No	No	No	No	Yes
Bank FE	No	No	No	No	Yes	No	No	No	No	Yes
Observations	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355	3,355
Adjusted/ Pseudo R^2	0.063	0.074	0.192	0.206	0.223	0.059	0.073	0.272	0.294	0.343

Panel B. Interest Rate Analysis

	Interest Rate				
	(1)	(2)	(3)	(4)	(5)
Black	1.727***	1.733***	0.574**	0.550*	1.112**
	[0.308]	[0.330]	[0.277]	[0.283]	[0.532]
Other Minority	0.877***	0.934***	0.436**	0.426**	0.509**
	[0.219]	[0.208]	[0.171]	[0.169]	[0.207]
Log of lender assets		-0.225***	-0.046***	-0.045***	-0.282
		[0.026]	[0.015]	[0.015]	[0.187]
Lender ROA		14.412	11.070	10.923	-10.542
		[14.486]	[12.409]	[12.427]	[23.965]
Lender leverage		14.169***	-1.853	-1.864	0.585
		[3.271]	[1.935]	[1.947]	[6.435]
Lender non-performing loan		22.427***	6.731*	6.632	7.892
		[4.806]	[3.998]	[4.038]	[8.583]
Borrower D&B credit score (1 is safest; 5 is riskiest)			0.111***	0.087***	0.077
			[0.031]	[0.033]	[0.048]
Log of borrower assets			-0.280***	-0.280***	-0.266***
			[0.025]	[0.026]	[0.039]
Log of borrower age (years)			-0.157***	-0.162***	-0.143*
			[0.052]	[0.052]	[0.073]
Indicator if borrower is a corporation			-0.183*	-0.194*	-0.259*
			[0.099]	[0.099]	[0.152]
Borrower ROA			-0.023	-0.023	-0.021
			[0.020]	[0.021]	[0.031]
Indicator if borrower has a deposit with lender			0.038	0.045	0.067
			[0.068]	[0.069]	[0.110]
Indicator if borrower is in an MSA			-0.055	-0.058	0.094
			[0.102]	[0.102]	[0.187]
HHI			0.402	0.409	0.945

			[0.384]	[0.385]	[0.923]
Bankruptcy within the past 7 years				0.269	0.225
				[0.419]	[0.599]
Delinquent on business obligations (1 time)				-0.139	-0.463
				[0.238]	[0.393]
Delinquent on business obligations (2 times)				0.347**	0.181
				[0.140]	[0.236]
Delinquent on business obligations (3 or more times)				0.194	0.083
				[0.123]	[0.179]
Industry FE	No	No	Yes	Yes	No
State FE	No	No	Yes	Yes	No
Year FE	No	No	Yes	Yes	No
Industry × Year FE	No	No	No	No	Yes
State × Year FE	No	No	No	No	Yes
Bank FE	No	No	No	No	Yes
Observations	2,990	2,990	2,990	2,990	2,990
Pseudo R^2	0.021	0.094	0.421	0.422	0.379

Table 3
Robustness: controlling for borrower personal wealth

This table presents the racial disparities in small business lending with additional controls on the principal business owner's personal wealth. We use two measures of personal wealth: 1) home equity, measured by the equity in the home owned; 2) net worth, measured by the personal net worth of the owner excluding his/her home. We further take the logarithm for these two variables. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the bank level are reported in brackets. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Denied					Interest Rate				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Black	0.345***	0.326***	0.255***	0.249***	0.282***	2.178***	2.262***	0.982**	0.976**	1.750**
	[0.061]	[0.062]	[0.065]	[0.064]	[0.077]	[0.544]	[0.546]	[0.447]	[0.451]	[0.836]
Other Minority	0.183***	0.173***	0.122***	0.119***	0.135***	0.673**	0.799***	0.462**	0.462**	0.579**
	[0.033]	[0.032]	[0.031]	[0.031]	[0.035]	[0.277]	[0.275]	[0.228]	[0.227]	[0.252]
Log of lender assets		0.013***	0.012***	0.013***	-0.036		-0.104***	-0.049***	-0.050***	-0.317
		[0.004]	[0.003]	[0.003]	[0.072]		[0.031]	[0.018]	[0.018]	[0.386]
Lender ROA		-2.917*	-1.589	-1.812	-0.387		4.613	8.861	9.100	-77.131
		[1.632]	[1.659]	[1.649]	[11.672]		[19.831]	[18.045]	[18.171]	[75.872]
Lender leverage		0.596*	0.385	0.421	1.000		6.147	-2.019	-2.023	0.305
		[0.351]	[0.333]	[0.333]	[1.359]		[4.008]	[2.474]	[2.473]	[12.632]
Lender non-performing loan		-0.869	0.737	0.571	4.755		-17.094	5.318	5.807	15.646
		[1.347]	[1.378]	[1.389]	[6.273]		[12.465]	[10.313]	[10.404]	[52.850]
Borrower D&B credit score (1 is safest; 5 is riskiest)			0.041***	0.030***	0.015			0.094**	0.079*	0.033
			[0.006]	[0.007]	[0.010]			[0.044]	[0.047]	[0.071]
Log of borrower assets			-0.026***	-0.025***	-0.021***			-0.316***	-0.316***	-0.278***
			[0.005]	[0.005]	[0.006]			[0.035]	[0.036]	[0.056]
Log of borrower age (years)			-0.032***	-0.036***	-0.044***			-0.125*	-0.129*	-0.159
			[0.010]	[0.010]	[0.014]			[0.075]	[0.075]	[0.107]
Indicator if borrower is a corporation			-0.007	-0.015	-0.002			0.010	0.012	-0.216
			[0.017]	[0.016]	[0.026]			[0.138]	[0.139]	[0.206]
Borrower ROA			-0.013***	-0.012***	-0.014***			-0.035	-0.033	-0.031
			[0.004]	[0.004]	[0.005]			[0.026]	[0.026]	[0.037]

Indicator if borrower has a deposit with lender			-0.033**	-0.029*	-0.026			0.120	0.126	-0.012
			[0.016]	[0.016]	[0.021]			[0.092]	[0.093]	[0.152]
Indicator if borrower is in an MSA			0.017	0.016	-0.070*			-0.037	-0.026	0.156
			[0.025]	[0.024]	[0.042]			[0.123]	[0.124]	[0.229]
HHI			-0.000	-0.012	0.067			0.671	0.719	1.819
			[0.083]	[0.082]	[0.148]			[0.584]	[0.586]	[1.400]
Bankruptcy within the past 7 years				0.063	-0.223***				0.993	0.526
				[0.120]	[0.066]				[0.994]	[1.077]
Delinquent on business obligations (1 time)				0.119**	0.124*				-0.309	-0.741
				[0.053]	[0.072]				[0.359]	[0.606]
Delinquent on business obligations (2 times)				0.059	0.107*				0.162	0.547
				[0.044]	[0.057]				[0.330]	[0.610]
Delinquent on business obligations (3 or more times)				0.113***	0.123***				0.172	-0.062
				[0.022]	[0.035]				[0.129]	[0.189]
Log of borrower home equity	-0.011***	-0.011***	-0.005**	-0.004**	-0.003	-0.109***	-0.101***	-0.048**	-0.047**	-0.065*
	[0.003]	[0.002]	[0.002]	[0.002]	[0.003]	[0.021]	[0.021]	[0.019]	[0.018]	[0.038]
Log of borrower net worth	-0.019***	-0.019***	-0.009***	-0.008***	-0.009***	-0.138***	-0.131***	-0.030	-0.030	-0.020
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]	[0.026]	[0.026]	[0.020]	[0.020]	[0.028]
Industry FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
State FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Year FE	No	No	Yes	Yes	No	No	No	Yes	Yes	No
Industry × Year FE	No	No	No	No	Yes	No	No	No	No	Yes
State × Year FE	No	No	No	No	Yes	No	No	No	No	Yes
Bank FE	No	No	No	No	Yes	No	No	No	No	Yes
Observations	2,054	2,054	2,048	2,048	2,048	1,860	1,860	1,860	1,860	1,860
Adjusted/ Pseudo R^2	0.110	0.121	0.200	0.211	0.247	0.072	0.087	0.385	0.385	0.350

Table 4
Racial disparities: borrower creditworthiness

This table presents how racial disparities in small business lending vary with borrower creditworthiness. We use D&B credit score to measure the borrower's credit ratings. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. The sample is divided into high and low subsamples based on the top and bottom quartiles of the sample distribution. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the bank level are reported in brackets. Test "high =low" reports the Wald test of equality of the Black (Other Minority) coefficients between the firms in two subsamples. *, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Denied		Interest Rate	
	Borrower D&B Credit Score			
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Black	0.391***	0.201*	2.827**	1.195
	[0.136]	[0.104]	[1.174]	[0.904]
Other Minority	0.035	0.095	0.938*	0.637
	[0.067]	[0.077]	[0.560]	[0.391]
Log of lender assets	0.032	0.045	-0.344	-0.646
	[0.083]	[0.080]	[0.589]	[0.425]
Lender ROA	-17.672*	9.757	17.747	36.006
	[9.094]	[8.542]	[68.109]	[65.395]
Lender leverage	-4.112	2.821**	-16.134	10.629
	[2.496]	[1.356]	[21.038]	[10.380]
Lender non-performing loan	-3.037	1.609	56.469*	4.148
	[5.551]	[3.270]	[32.873]	[24.707]
Log of borrower assets	-0.052***	-0.014	-0.383***	-0.336***
	[0.013]	[0.008]	[0.097]	[0.064]
Log of borrower age (years)	-0.078**	-0.015	0.098	0.111
	[0.035]	[0.029]	[0.320]	[0.222]
Indicator if borrower is a corporation	-0.012	-0.053	-1.144	-0.682**
	[0.066]	[0.043]	[0.740]	[0.324]
Borrower ROA	-0.031*	-0.018	-0.184**	-0.016
	[0.016]	[0.014]	[0.090]	[0.083]
Indicator if borrower has a deposit with lender	-0.097*	-0.021	-0.252	0.106
	[0.054]	[0.030]	[0.383]	[0.255]
Indicator if borrower is in an MSA	-0.070	-0.012	-0.730	-0.222
	[0.090]	[0.053]	[0.805]	[0.340]
HHI	0.048	-0.287	-3.209	-1.598
	[0.377]	[0.182]	[2.602]	[1.461]
Bankruptcy within the past 7 years	-0.124	-0.197	1.986	1.379
	[0.166]	[0.232]	[1.545]	[1.541]
Delinquent on business obligations (1 time)	0.062	0.174	-0.915	-1.840***
	[0.147]	[0.109]	[1.361]	[0.641]

Delinquent on business obligations (2 times)	0.159**	0.088	-0.068	-0.062
	[0.074]	[0.115]	[0.689]	[0.951]
Delinquent on business obligations (3 or more times)	0.172***	-0.141	0.637	-0.628
	[0.060]	[0.097]	[0.589]	[0.504]
Test "high=low" for Black	2.96*		2.91*	
Test "high=low" for Other Minority	0.59		0.20	
Industry × Year FE	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	566	626	397	582
Adjusted R^2	0.173	0.074	0.350	0.334

Table 5
Competition and racial disparities: IV regressions based on banking deregulations

This table presents the IV results of the effect of credit competition on racial disparities in small business lending. We measure credit competition by the natural logarithm of the number of unique relationships the borrower has with all of its lenders (*#Banks*). Banking deregulation is measured by the index of branching restrictions (*Branching restrictions*) following Rice and Strahan (2010). The index includes the following four provisions: 1) the minimum age of the institution for acquisition; 2) allowance of de novo interstate branching; 3) allowance of interstate branching by acquisition of a single branch or portions of an institution; and 4) statewide deposit cap on branch acquisition (Kroszner and Strahan, 1999; Johnson and Rice; 2008; Rice and Strahan, 2010). The index is set to zero for states that are most open to out-of-state entry, and a numeric value of one is added to the index when a state adds any of the four restrictions. Following Rice and Strahan (2010), we code the branching restrictions index in 1993 equal to four, its most restrictive value, for all states. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the state and year level are reported in brackets.

*, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	1st Stage	2nd Stage	
	#Banks	Denied	Interest Rate
	(1)	(2)	(3)
Branching restrictions (4 is most, 0 least, restricted)	-0.024**		
	[0.011]		
#Banks × Black		-0.322***	-3.578**
		[0.103]	[1.394]
#Banks × Other Minority		-0.217	1.168
		[0.176]	[1.146]
Black		0.620***	5.056***
		[0.166]	[1.081]
Other Minority		0.286	-0.650
		[0.194]	[1.076]
#Banks		0.619	-3.501
		[0.505]	[4.285]
Log of lender assets		0.014	-0.044
		[0.009]	[0.034]
Lender ROA		-2.280	15.794**
		[1.890]	[7.633]
Lender leverage		0.459	-2.668
		[0.288]	[3.640]
Lender non-performing loan		1.517*	-1.436
		[0.875]	[7.595]
Borrower D&B credit score (1 is safest; 5 is riskiest)		0.037***	0.033
		[0.008]	[0.080]
Bankruptcy within the past 7 years		0.061	0.515
		[0.063]	[0.473]
Delinquent on business obligations (1 time)		0.127*	0.297
		[0.066]	[0.467]
Delinquent on business obligations (2 times)		0.078	0.405**

		[0.000]	[0.196]
Delinquent on business obligations (3 or more times)		0.103***	0.387***
		[0.009]	[0.105]
Log of borrower assets		-0.039	-0.235*
		[0.031]	[0.140]
Log of borrower age (years)		-0.052***	-0.066
		[0.010]	[0.132]
Indicator if borrower is a corporation		-0.042*	-0.134
		[0.022]	[0.218]
Borrower ROA		-0.013**	-0.040
		[0.006]	[0.040]
Indicator if borrower has a deposit with lender		-0.034**	0.025
		[0.014]	[0.071]
Indicator if borrower is in an MSA		0.005	0.038
		[0.030]	[0.258]
HHI		-0.084	0.998
		[0.105]	[1.105]
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
F-test	23.89		
Observations	3,355	3,355	2,990

Table 6
Racial disparities: entrants vs. incumbents

This table presents racial disparities in small business lending, conditional on whether the lender is an entrant bank or incumbent bank. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. We define a lender as an entrant if the bank had no branches in one state when the last survey was conducted. We collect such information from Bank Regulatory FDIC Summary of Deposits (SOD) database. The data is available starting from 1994, and therefore the analysis in this table focuses on the surveys of 1998 and 2003. For the 1998 Survey of Small Business Finance, an entrant is one that had no branches in a state in 1994. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the bank level are reported in brackets. Test "entrants=incumbents" reports the Wald test of equality of the Black (Other Minority) coefficients between the firms who applied credit from newly entering banks vs. incumbent banks in a given year.

*, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Denied		Interest Rate	
	Entrants	Incumbents	Entrants	Incumbents
	(1)	(2)	(3)	(4)
Black	0.215***	0.363***	0.519	2.247**
	[0.076]	[0.114]	[0.596]	[1.116]
Other Minority	0.095**	0.121***	0.422	0.788**
	[0.048]	[0.042]	[0.406]	[0.310]
Log of lender assets	0.013**	0.010***	-0.070**	-0.066***
	[0.006]	[0.003]	[0.034]	[0.025]
Lender ROA	-2.974	1.215	3.288	2.973
	[3.355]	[2.260]	[27.792]	[18.239]
Lender leverage	0.403	0.506	0.679	-3.152
	[0.565]	[0.512]	[3.315]	[4.135]
Lender non-performing loan	2.454	1.081	-3.539	12.444
	[2.345]	[1.659]	[13.637]	[12.189]
Borrower D&B credit score (1 is safest; 5 is riskiest)	0.028*	0.035***	0.169*	0.068
	[0.015]	[0.007]	[0.096]	[0.057]
Log of borrower assets	-0.034***	-0.024***	-0.316***	-0.388***
	[0.009]	[0.005]	[0.066]	[0.041]
Log of borrower age (years)	-0.058***	-0.023**	-0.299**	0.001
	[0.021]	[0.011]	[0.116]	[0.101]
Indicator if borrower is a corporation	-0.059*	0.019	0.385	-0.351**
	[0.034]	[0.022]	[0.279]	[0.167]
Borrower ROA	-0.017***	-0.010**	-0.043	-0.065**
	[0.006]	[0.004]	[0.042]	[0.031]
Indicator if borrower has a deposit with lender	-0.037	-0.021	0.048	0.245*
	[0.031]	[0.016]	[0.166]	[0.130]
Indicator if borrower is in an MSA	0.036	-0.016	-0.128	0.029
	[0.045]	[0.022]	[0.237]	[0.177]
HHI	0.113	-0.015	0.326	0.867
	[0.159]	[0.084]	[0.810]	[0.924]
Bankruptcy within the past 7 years	0.138	0.006	5.283	-0.490
	[0.282]	[0.144]	[3.358]	[1.100]
Delinquent on business obligations (1 time)	0.240**	0.025	-0.233	-0.276

	[0.110]	[0.053]	[0.519]	[0.510]
Delinquent on business obligations (2 times)	0.046	0.116*	0.790	-0.069
	[0.078]	[0.069]	[0.538]	[0.452]
Delinquent on business obligations (3 or more times)	0.153***	0.081***	0.152	0.249
	[0.047]	[0.029]	[0.239]	[0.178]
Test "entrants=incumbents" for Black	2.95*		3.19*	
Test "entrants=incumbents" for Other Minority	0.01		1.06	
Industry × Year FE	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	854	1,215	729	1,135
Adjusted R^2	0.205	0.185	0.368	0.185

Table 7
Racial disparities: regional racial bias

This table presents how racial disparities in small business lending vary across regions with differential racial attitudes. The primary sample is drawn from the Survey of Small Business Finance (SSBF), conducted in 1993, 1998, and 2003. Local racial bias is measured by the average Implicit Association Test (IAT) score in a state where the lender is located. IAT data come from Project Implicit, which is based on the scores of 1.5 million voluntary takers of IAT, which detects subtle or unconscious racial preferences. Specifically, the IAT is a computerized categorization task in which participants sort stimuli (e.g., pictures, names, and words) into opposing categories. For example, a participant might show faster reaction time between negative words and pictures of Black faces than White faces, which could reflect an association between negativity and blacks (Hall et al., 2015). Therefore, a higher IAT score indicates greater racial bias. We use the result of the tests conducted in 2002-2003, the earliest available IAT data by Project Implicit. Denied is an indicator variable, which is equal to one if the borrower was denied in the most recent request for credit, and zero otherwise. Interest rate refers to the initial nominal interest rate on the firm's most recent loan. The sample is divided into high and low subsamples based on the top and bottom quartiles of the sample distribution. All other variables are defined in Appendix A. Heteroskedasticity-consistent standard errors clustered at the bank level are reported in brackets. Test "high =low" reports the Wald test of equality of the Black (Other Minority) coefficients between the firms that apply credit from banks located in the states with high and low local racial bias in a given year.

*, **, and *** represent statistical significance at the 10%, 5%, and 1% level, respectively.

	Denied		Interest Rate	
	Local Racial Bias Measured by Average IAT Score			
	High	Low	High	Low
	(1)	(2)	(3)	(4)
Black	0.552***	0.317**	2.054**	0.854
	[0.136]	[0.123]	[0.936]	[0.974]
Other Minority	0.027	0.044	0.272	0.794
	[0.115]	[0.066]	[0.578]	[0.524]
Log of lender assets	0.059	-0.222**	0.354	-0.881**
	[0.083]	[0.090]	[0.702]	[0.344]
Lender ROA	-8.895	7.634	-124.337*	-4.598
	[13.076]	[8.874]	[63.999]	[63.269]
Lender leverage	4.805**	-1.547	-6.165	35.249***
	[2.353]	[1.291]	[21.451]	[6.407]
Lender non-performing loan	2.553	6.214***	-25.173	-0.520
	[5.383]	[1.987]	[21.620]	[17.885]
Borrower D&B credit score (1 is safest; 5 is riskiest)	-0.002	0.016	0.157	-0.055
	[0.021]	[0.013]	[0.140]	[0.094]
Log of borrower assets	-0.019	-0.036***	-0.177**	-0.388***
	[0.013]	[0.007]	[0.079]	[0.063]
Log of borrower age (years)	-0.072**	-0.073***	-0.094	0.323**
	[0.028]	[0.026]	[0.145]	[0.140]
Indicator if borrower is a corporation	-0.086	0.033	-0.542	-0.286
	[0.066]	[0.053]	[0.588]	[0.282]
Borrower ROA	-0.020	-0.008	-0.065	-0.083
	[0.015]	[0.012]	[0.083]	[0.118]
Indicator if borrower has a deposit with lender	-0.095**	-0.020	-0.194	0.235

	[0.046]	[0.030]	[0.400]	[0.193]
Indicator if borrower is in an MSA	0.074	-0.071	-0.487	0.545
	[0.138]	[0.095]	[0.833]	[0.421]
HHI	0.753**	-0.169	2.356	4.628**
	[0.328]	[0.253]	[2.244]	[2.226]
Bankruptcy within the past 7 years	-0.033	-0.308**	0.324	-1.356
	[0.231]	[0.135]	[0.876]	[1.520]
Delinquent on business obligations (1 time)	0.087	-0.038	-2.096**	-0.040
	[0.215]	[0.123]	[1.013]	[1.074]
Delinquent on business obligations (2 times)	0.195	0.103*	-0.196	0.681
	[0.155]	[0.056]	[0.724]	[0.667]
Delinquent on business obligations (3 or more times)	0.120*	0.140**	-0.138	0.110
	[0.068]	[0.054]	[0.522]	[0.369]
Test "high=low" for Black	3.01*		6.64***	
Test "high=low" for Other Minority	0.89		7.38***	
Industry × Year FE	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Observations	379	670	321	560
Adjusted R^2	0.352	0.236	0.421	0.424

Appendix

Variable Definitions

Variable	Definition
Dependent variables	
Denied	A dummy variable, set to 1 if the firm was denied credit in the most recent request for credit, 0 otherwise.
Interest rate	The interest rate paid on the most recent approved loan in percentage point.
Lender characteristics	
Black	A dummy variable, indicating whether the owner is African American or not.
Other minority	A dummy variable, indicating whether the owner is Asian, Native American, Hispanic, or another race or ethnicity.
Log of lender assets	Natural logarithm of the total assets of the lender (in millions of dollars).
Lender ROA	Return on asset of the lender
Lender leverage	Debt to asset ratio of the lender
Lender non-performing loan	Percentage of non-performing loans in the total loans lent out by the bank.
Borrower characteristics	
Borrower D&B credit score (1 is safest; 5 is riskiest)	Credit score of the borrower, which varies from one to five, with one indicating the safest type of borrower and five the riskiest. This credit risk rating is derived from the Dun & Bradstreet credit score of the company and is available in all survey years.
Bankruptcy within the past 7 years	Indicates whether the firm's principal owner declared bankruptcy within the preceding 7 years.
Delinquent on business obligations (1 time)	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 1 time within the last 3 years.
Delinquent on business obligations (2 times)	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 2 times within the last 3 years.
Delinquent on business obligations (3 or more times)	Indicates whether the firm's principal owner was 60 or more days delinquent on business obligations 3 times or more within the last 3 years.
Log of borrower assets	Natural logarithm of the total assets of a borrower.
Log of borrower age (years)	Natural logarithm of the firm age in years as reported by the firm in the survey.
Indicator if borrower is a corporation	Indicates whether the firm is a corporation or not.
Borrower ROA	Return on asset of the borrower.
Indicator if borrower has a deposit with lender	An indicator equal to one if the borrower has a deposit account with the lender, and zero otherwise.
Indicator if borrower is in an MSA	Indicates whether the firm's headquarters are located in an MSA (MSA = 1) or rural area (MSA = 0).
HHI	Herfindahl-Hirshman bank deposit index of banking market concentration.
Log of borrower home equity	Natural logarithm of the equity in the home owned by the firm's principal owner.

Log of borrower net worth	Natural logarithm of the personal net worth of the owner excluding his/her home.
Branching restrictions (4 is most, 0 least, restricted)	We follow Rice and Strahan (2010) and measure regulatory barriers using the index of interstate branching restrictions. The index includes the following four provisions: 1) the minimum age of the institution for acquisition; 2) allowance of de novo interstate branching; 3) allowance of interstate branching by acquisition of a single branch or portions of an institution; and 4) statewide deposit cap on branch acquisition (Kroszner and Strahan, 1999; Johnson and Rice; 2008; Rice and Strahan, 2010). The index is set to zero for states that are most open to out-of-state entry, and a numeric value of one is added to the index when a state adds any of the four restrictions. Following Rice and Strahan (2010), we code the branching restrictions index in 1993 equal to four, its most restrictive value, for all states.
#Banks	Natural logarithm of the number of unique relationships the borrower has with all of its lenders in a given year.
Entrants	We define a lender as a newly entering bank (entrant) if the bank has no branches in one state when the last survey was conducted. Otherwise, a bank is considered to be an incumbent bank. We collect such information from Bank Regulatory FDIC Summary of Deposits (SOD) database. For the 1998 Survey of Small Business Finance, an entrant is one that had no branches in a state in 1994.
Local racial bias	Average Implicit Association Test (IAT) score in a state where the lender is located. IAT data come from Project Implicit, which is based on the scores of 1.5 million voluntary takers of IAT, which detects subtle or unconscious racial preferences. Specifically, the IAT is a computerized categorization task in which participants sort stimuli (e.g., pictures, names, and words) into opposing categories as quickly and accurately as possible. For example, a participant might show faster reaction time between negative words and pictures of Black faces than White faces, which could reflect an association between negativity and Blacks (Hall et al., 2015). Therefore, a higher IAT score indicates greater racial bias. We use the result of the tests conducted in 2002-2003, the earliest available IAT data by Project Implicit.