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Access to Capital among Minority-Owned Startups**

By

Robert Fairlie, Alicia Robb, and David T. Robinson

Stanford Institute for Economic Policy Research
Stanford University
Stanford, CA 94305
(650) 725-1874

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Black and White: Access to Capital among Minority-Owned Startups*

Robert Fairlie[†]

Alicia Robb[‡]

David T. Robinson[§]

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Abstract

We use confidential and restricted-access data from the Kauffman Firm Survey (KFS) and Dun & Bradstreet (D&B) to explore whether minority founders face racial bias when they raise capital for new businesses. Black-owned businesses are persistently smaller and face more difficulty in raising external capital. Large differences in credit worthiness are important for explaining the difference. Even controlling for credit worthiness, persistent differences in perceptions of treatment by banks are also important. Spatial variation in banking conditions and historical attitudes towards race are consistent with racial bias. In contrast, differences in human capital measures, need for capital, business types, and spatial mismatch in banking and clustering contribute relatively little to why black entrepreneurs obtain less financial capital.

Keywords: access to capital, entrepreneurs, minorities, startups.

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[†]University of California, Santa Cruz, Stanford University and NBER. E-mail: rfairlie@ucsc.edu.

[‡]Kauffman Foundation and University of California, Berkeley. E-mail: aliciarobb@berkeley.edu.

[§]Fuqua School of Business, Duke University and NBER, E-mail: davidr@duke.edu.

1 Introduction

More than half a century after the passage of the Civil Rights Act, economic differences between whites and African-Americans continue to be a source of social and political tension in the United States. The median household income for black families is \$37,000 with one out of four black families living in poverty, compared with a median income of \$63,000 and poverty rate of 9 percent for white families (U.S. Census Bureau 2016). Inequality is even higher for wealth and financial assets. For example, the median household net worth for black families is fourteen times lower than that of whites and only 6 percent of black families own stocks or mutual funds (U.S. Census Bureau 2014). Levels of home ownership and home equity are also much lower among black families (U.S. Census Bureau 2014).

Entrepreneurship is often viewed as a mechanism for promoting economic growth, wealth accumulation and job creation in minority communities, a tool for alleviating these differences (Boston, 1999, 2006; Bradford 2003). Yet, access to financial capital is a critical element of new business formation. Given the pronounced differences between whites and blacks in terms of income and wealth measures, it is important to ask whether they face different conditions in capital markets, and if so, to explore the causes of these differences. This paper provides the first detailed empirical analysis of whether minority entrepreneurs experience different financing outcomes when they attempt to raise capital to start new businesses.

To explore racial differences in access to capital for startups, we use the confidential, restricted-access version of the Kauffman Firm Survey (KFS), which is the only dataset that provides panel data for startups with detailed information on financing amounts and sources, as well as a large enough sample size of minority firms. We also obtained special confidential administrative data on credit ratings from Dun & Bradstreet and matched these data to all businesses in the restricted-access version of the KFS. For later survey waves, we also have information on founder net worth. The unprecedented detail of the KFS data allow us to control for many characteristics that are correlated with race but

would typically remain unobservable. Moreover, the panel structure of the KFS allows us to focus on both the initial capital that firms receive in their founding year and new capital injections secured in the firm's next seven years of operations. Ultimately this allows us not only to measure initial differences, but also study whether any differences in initial capital are diminished as startups build track records or, if instead, they persist over time.

Our analysis is structured as follows. First, we ask whether African-American entrepreneurs experience different financing outcomes, both at founding and as the firm matures. Here we find that African-American business ventures start smaller in terms of overall financial capital and invest capital at a slower rate in the years following startup. This means that black/white funding differences present at the firm's founding persist and even worsen over time.

Detailed information on the type of financing used at business founding allow us to explore the channels through which this persistent difference occurs. Racial differences in outside debt explain more than half of the disparities in total financial capital. Indeed, leverage ratios for black-owned startups are persistently below those observed for white-owned startups. But, the disparities do not end here: black-owned startups also have lower levels of all other major sources of funding than do white-owned startups. In other words, they are not able simply to substitute owner equity or debt for bank loans.

Given these findings, our second set of questions asks what factors explain these differences. We are particularly interested in examining whether credit scores differ between black and white startups and whether any existing differences contribute to financing disparities. Surprisingly, there is very little evidence on this question and the only evidence is from larger, more established and older businesses (Cavalluzzo and Wolken 2005). Using the KFS, we find large differences between black- and white-owned startups along many business and owner characteristics, including credit scores. Using decomposition techniques developed by Blinder (1973) and Oaxaca (1973), we assess how much of the racial differences in total capital investments can be attributed to differences in these and

other observable characteristics. The decomposition models indicate that the largest part of the difference is driven by differences in credit scores between black and white entrepreneurs. In contrast, human capital measures (measured by education and previous experience) explain very little of the differences in financial capital use. Controlling for wealth and characteristics associated with capital needs have little effect on this result – we continue to find that credit scores explain a substantial part of the gap, whereas human capital measures explain very little.

While credit scores account for the bulk of the observable differences in outcomes between white and black borrowers, part of the difference remains unexplained by business and owner characteristics, suggesting that attitudes, expectations and racial bias in lending may also play a role. To explore this channel, we use detailed questions in the KFS that measure demand for loans, loan rejections, and the expected fear of denial among borrowers. Black entrepreneurs apply for bank loans less frequently than white entrepreneurs, but this stems largely from differences in the fear of rejection. Overall, black entrepreneurs are about three times more likely to state that they did not apply for credit when needed for fear of having their loan application denied. Similarly, black-owned startups are about three times less likely than white-owned startups to report that their loan requests are always approved. These differences persist even after controlling for credit scores and net worth. This analysis, combined with the inclusion of industry and regional controls, suggests that differences in the demand for external financial capital are unlikely to be the main driver of the differences we observe.

In light of the importance of expectations about credit market outcomes for explaining differences between white and black entrepreneurs, in the final part of the paper we explore two identification strategies for assessing the degree to which racial bias in lending practices explains the differences we see. Because local banks are widely thought to rely more heavily on personal relationships and other types of soft information in making lending decisions, regional concentration of local banks introduces variation in the use of soft information in lending. First, we ask whether black perceptions of credit outcomes

are more or less favorable in markets where soft information is stronger. We find that areas where local banks are stronger are areas where black-owned businesses generally borrow less, not more. Second, we explore historical regional variation in racial inequality. Here we find that blacks are more likely to report lower capital levels and higher unmet capital needs in areas with higher historical inequality.

Overall, these findings paint a nuanced picture of why racial differences in access to capital persist. Differences in credit scores mean that on average, black entrepreneurs are statistically greater credit risks, which means that from a purely objective point of view, we should expect them to face more difficult borrowing conditions in credit markets. But this is not the whole story. Even among borrowers with strong credit histories, black entrepreneurs do not expect to be met with the same success as white entrepreneurs at the bank's lending desk. Moreover, there is no evidence that these differences are attenuated in settings in which soft information would be more plentiful. These results are all the more stark given the fact that our very research design itself conditions on entry into entrepreneurship in the first place.

The balance of the paper is organized as follows. In Section 2, we describe the KFS panel that follows startups from their founding through seven years of operations after their startup year. In Section 3, we examine the use of financial capital (levels and detailed sources) among black and white firms at startup and in the years following startup. Section 4 explores racial differences in credit scores, a central component of our analysis. In Section 5, we explore credit score differences and other potential causes of racial differences in financial capital. Section 6 explores the potential role of racial bias in capital markets, while Section 7 concludes.

2 The Kauffman Firm Survey

We use the confidential, restricted access version of the Kauffman Firm Survey (KFS) to study how startups access capital markets. The KFS is a longitudinal survey of new businesses in the United States, collecting annual information for a sample of 4,928 firms that

began operations in 2004. The underlying sample frame for the KFS is Dun and Bradstreet (D&B) data. The D&B data are known to exclude many small scale, non-employer business activities by individuals. This is important because the results that we present for the KFS cannot be driven by different rates of ownership of small-scale businesses or consulting-type activities by black and white entrepreneurs.

The KFS data contain unprecedented detail on the financing patterns of startups, as well as detailed information on both the firm itself and up to ten business owners of the firm. In addition to the 2004 baseline year data, we also use the seven years of follow up data covering calendar years 2005 through 2011. Detailed information on the owners includes race, gender, age, education, previous startup experience, and previous work experience. Detailed information on the firm includes industry, physical location, employment, sales, intellectual property, and financial capital used at start-up and over time. The detailed financing information in the KFS allows us to examine the relative importance of each source of financing at start up and over time.

The confidential, restricted-access version of the KFS includes credit scores, continuous measures of key variables, such as financing, and more detail on industries and geographic locations than the publicly-available KFS. To obtain more precise and detailed measures of credit scores, we obtained a special confidential administrative dataset from D&B matched to all businesses in the KFS.

The KFS is the only large, nationally representative, longitudinal dataset providing detailed information on new firms and their financing activities. Most previous research on the use of financial capital among small businesses has relied on cross-sectional data on existing businesses. For example, the Survey of Business Owner (SBO) data provide information on the amount of startup capital, but provide only retrospective information for surviving businesses and do not provide information on the relative importance of the different sources of financing. Another commonly-used dataset, the Federal Reserve Board's Survey of Small Business Finances (SSBF), provides information on recent financing, but does not provide information on financing at startup or the early stages of firm

growth (and was discontinued after 2003). Furthermore, both the SBO and the SSBF are cross sectional surveys that do not provide information on firm financing over time for the same sets of firms. Finally, fundraising levels in the KFS are measured annually, and are thus less prone to recall bias as is the case with both the SBO and the SSBF.

We restrict our attention to the set of firms that either survived over the sample period or that have been verified as going out of business over the sample period. In most analyses, we condition on survival in that year, but we also conduct robustness checks taking alternative approaches to addressing survival. Our main results are not sensitive to the approach, and we discuss the robustness check results below. We also specifically focus on firms that have a white or black primary owner. These restrictions result in a sample of 3,551 firms that began operations in 2004 and either continued through the final year in the sample period (2011) or can be verified to have exited sometime over the period.

We assign owner demographics at the firm level based on the primary owner. For firms with multiple owners (35 percent of the sample), the primary owner is designated by having the largest equity share in the business. In cases where two or more owners owned equal shares, hours worked and a series of other variables are used to create a rank ordering of owners in order to define a primary owner following the algorithm proposed in Ballou et al (2008). We include businesses with owners of all races in the regression analysis, but focus our comparisons on black- and white-owned businesses. Following standard conventions in the literature, the white category includes only non-Hispanic whites.

3 Patterns in Financial Capital Use

We first examine whether minority startups invest less capital at startup than non-minority startups. We also examine whether minority startups catch up or fall further behind in financial capital investments during the first several years after startup. Figure 1 displays total capital investments by black and white entrepreneurs at startup and each of the seven subsequent years after startup. Black entrepreneurs use substantially less startup

capital than white entrepreneurs - the average level of startup capital among black entrepreneurs is \$35,205 compared with \$106,720 for white entrepreneurs. In the first year after startup new businesses continue to invest substantial amounts of financial capital. The average level of investment is \$81,697 for white firms. The racial disparities remain large with black firms investing only an average of \$34,462.

As levels of capital investment decline as startups age, black/white disparities in capital investment also decline. The disparities in capital investment become smaller, but do not disappear, even by the seventh year after startup. Black-owned businesses are not raising capital at a differentially faster rate as they gain a track record to compensate for their smaller initial funding. These patterns imply that the initial funding differences between black and white businesses persist and even worsen over time.

3.1 Capital Structure Differences

Using the detailed financial capital information in the KFS, we also explore the previously unanswered question of whether minority and non-minority startups differ in their early-stage financing structure. For example, are minority entrepreneurs more likely to substitute personal investments for business debt or substitute credit cards for bank loans in the face of discrimination (Chatterji and Seamans 2012)? If these differences exist do they contribute to disparities in the total amounts of financial capital investments?

The KFS contains finely detailed sources of funding for startups, which are reported along with summary statistics in Appendix Table I. To facilitate an analysis of broad patterns in the data, in most of our analysis we follow Robb and Robinson (2014) and group the detailed categories into six broad buckets based on the source of capital and the structure of the capital (reported in Table I). The three alternative sources of capital are owners, insiders, and outsiders; the two alternative types of capital are debt and equity. The distinction between sources captures whether the funding source is the founder, informal channels such as friends or close associates of the founder who are not direct owners of the business, or formal channels such as banks, venture capital firms, and angel investors. Robb and Robinson (2014) make distinctions along these lines because the personal bal-

ance sheets of business owners and the balance sheets of the firms themselves are often deeply intertwined at the time the business is founded, and therefore there is little practical distinction between, for instance, a business credit card and a personal credit card, or a personal bank loan and a business bank loan.

Thus, owner equity reflects the cash and personal savings that the business owners put into the firm, not including cash that they access through mechanisms like home equity lines of credit (which would show up as outside debt). Table I shows that racial differences in owner's equity are pronounced. In the year the business is founded, black owners contribute around \$19,500 of personal equity, compared with around \$34,500 for white business owners. This difference may reflect large differences in the underlying average net worth across the two groups. In subsequent years, there is significant convergence in the average amounts of personal equity injected into the business, but this largely reflects the fact that personal equity injections from white business owners dramatically decline in the years after founding: the average amount drops to around \$11,000 in years 1-3 after startup and to around \$4,000 by years 4-7 after startup on average for white-owned businesses. On average, insider equity (that is, equity injections from friends, family or other non-business owner acquaintances) is a negligible source of financing for most firms, but again, black-owned businesses uniformly secure less capital from this source than do white-owned businesses.

Differences in outside equity—venture capital, angel financing, and the like are more stark. The average black-owned business has around \$500 of outside equity, whereas the average white-owned business has more than \$18,500 from outside equity at founding. Throughout the first eight years of the firms' existence, outside equity is a negligible source of funding for black-owned businesses. Because the distribution of outside equity is highly skewed—most firms never receive any, but the ones that do receive outside equity receive relatively large amounts—the figures reported in Table II essentially tell us that VC funding of black-owned businesses is exceedingly rare.

Owner debt includes personal loans extended to the business by the founder. These

are small on average for both black-owned and white-owned firms, but white-owned businesses have higher average amounts here as well, often by a factor of five. Patterns in insider debt between white- and black-owned firms also reveal a relative disadvantage among black-owned firms.

The largest quantitative difference between white- and black-owned businesses is in the amount of outside debt they use to finance their businesses. Outside debt includes personal loans, business loans, personal and business credit cards, as well as other types of loans made by banks either directly to business owners for the purpose starting their business or else to the business itself. Robb and Robinson (2014) show that on average, this is the largest source of financing for firms in the KFS. Here, we see that this is only true of white-owned firms. At startup, black-owned firms borrow about one-half as much as they put in of their own capital, whereas white-owned firms borrow about 1.7 times what they put in of their own capital. In the year of founding, white-owned firms on average borrow nearly six times as much black-owned firms. Although the amount of outside debt accessed by black-owned businesses grows steadily over time, average outside debt for black-owned businesses is substantially lower than that seen among white-owned firms.

The vast differences in total funding at founding, and the persistent differences in the overall size of later capital injections, makes it difficult to determine differences in the relative sources of capital. To address this, we examine the capital structures of startups at founding as well as the structure of later capital injections by scaling each source of capital by the total amount of financial capital. Scaling by total capital reveals that black-owned businesses persistently rely on less outside debt throughout the early years of the firm's life: t-tests of the difference in outside debt between white- and black-owned firms reveal that the difference is highly statistically significant. By and large, this is compensated by a greater relative reliance on owner equity injections, both at founding and in the years following. At startup, black-owned businesses are financed by more than half owner equity, whereas white-owned businesses are financed by less than one-

third owner equity. Subsequent capital injections in black-owned businesses are around 15-25% owner equity, whereas for white-owned businesses they approach 10-15% owner equity as the business matures.

Table II digs deeper into the differences in access to debt for minority and white-owned startups by looking at the specific sources of debt financing. In the founding year, there are differences between black and white owned businesses across a wide array of debt sources. Only one percent of black owners obtain business loans, compared with 7% for white-owned firms. While 30% of white-owned businesses use business credit cards in their founding year, only 15% of black owned businesses do. Similarly, 18% of white business owners rely on personal loans for their business in the founding year, while only 14% of black-owned businesses do. All these differences are statistically significant.

What sources offset these differences? It is not the case that black-owned businesses rely more on personal credit cards. In fact, the opposite is true. Instead, black-owned businesses appear to rely more on informal borrowing from family members: 14% of black-owned businesses relied on family loans in their founding year, while only 9% of white-owned businesses do. Interestingly, the average amounts borrowed from family and other sources are not statistically different between minority and non-minority businesses. This could be a reflection of liquidity constraints in the network of family members that are stronger for black-owned businesses than for white-owned firms (Fairlie and Robb 2008). Average amounts of capital from personal bank loans and business bank loans are statistically smaller for black-owned businesses. Black-owned businesses continue to rely on family loans to a greater degree than white-owned firms in the three years following the firm's founding. This suggests that access to formal debt channels remains limited for minorities.

All told, the descriptive evidence in Tables I and II suggests that black-owned businesses have more difficulty in accessing formal credit channels, and they attempt to substitute by a heavier reliance on informal channels and personal equity, but this substitution is an imperfect one (perhaps due to less personal and family wealth). This results in

businesses that start with smaller amounts of financial capital and that do not “catch up” over time.

4 Racial Differences in Credit Scores

The next step in our analysis is to try to explain the large differences in financing outcomes that we observe between black-owned and white-owned startups. While the KFS contains unprecedented detail on the business formation process, the availability of business credit scores allows us to control for many differences in firm characteristics that would be observable by bank lending personnel but typically unobservable to the econometrician. Because business credit scores are so critical to our analysis, we first describe the credit scores and examine racial differences in them before examining how they explain differences in outcomes.

Our administrative data from D&B for all firms in the KFS includes two different measures of credit scores allowing for the most comprehensive look at racial differences ever taken in the literature. Credit scores are not available on most surveys, perhaps because most entrepreneurs do not know readily what their scores are. To be sure, the SSBF includes information on credit scores, but only for larger, more established, and older businesses (Cavalluzo and Wolken 2005).

4.1 *Measuring Business Credit Ratings*

Particularly for a new firm, having a credit rating inherently reduces the information asymmetry between loan applicant and lender (Gorton and Winton 2003). A credit score provides significant information to the lender about the creditworthiness of the applicant, thereby reducing the information asymmetry dramatically. The KFS contains two measures of creditworthiness that differ in the way that they are intended to be used: one is a forward-looking measure of repayment probability, while the other is a backward-looking measure of past repayment activity. We use both measures in our analysis.

4.1.1 D&B Commercial Credit Score

The D&B Commercial Credit Score (CCS) predicts a business's likelihood of becoming severely delinquent in its payments over the next 12-month period. D&B defines a severely delinquent company as one that pays its financial obligation 90+ days past terms, obtains legal relief from creditors, or ceases operations without paying all creditors in full over the next 12 months (based on the information in D&B's commercial database).

Panel A of Table III describes how numerical scores are assigned. The commercial credit score we use takes on five values. Being in risk class 1 corresponds to being in the top decile of creditworthiness, while risk class 5 corresponds to the lowest decile of credit worthiness. Risk classes 2 and 4 contain twenty-percent bands of creditworthiness, while an entrepreneur is assigned to the middle risk class if they lie between the 30th and 70th percentile. A "0" is assigned to businesses designated as open bankruptcy, out of business at this location, or higher risk.

An important feature of the D&B commercial credit score is the fact that it is a forward-looking measure. It attempts to predict future default based on observable borrower characteristics.

4.1.2 PAYDEX Score

Unlike the CCS, which is forward-looking in nature, the PAYDEX score is a unique, dollar-weighted indicator of payment performance based on payment experiences, as reported to D&B by trade references. D&B must have 3 or more pieces of trade to calculate a PAYDEX score, therefore scores will be unavailable for many firms, especially in the beginning of their life.

Table III outlines the specific score (between 1–100) and what each means. A score of 100 is assigned to business owners who pay their bills in advance of what is required to receive the discounts that are implicit in the terms of sale. A score of 90 corresponds to business owners who pay in time to capture discounts, and a score of 80 corresponds to those who pay promptly. Scores below 80 reflect differing degrees of tardiness in payment, with scores of 50 or below corresponding to being more than 30 days late.

4.2 *Summary Statistics on Credit Scores*

Summary statistics of both credit scores, tabulated by race, are presented in Table IV. The top block reports Paydex scores for those with available scores. In the initial year, white business founders have a score of around 72, while black founders have a score of around 59. This difference is highly statistically significant.

While the top block of numbers points to differences in the average credit score conditional on having a credit score, the second block of numbers reports the fraction of respondents who have Paydex scores, broken out by race. In the initial year, only around 4% of white business owners and around 1% of black business owners have Paydex scores. This number jumps considerably after the first survey year for both racial groups, presumably as more of the required criteria for forming the score are available, but across all survey years, black business owners have Paydex scores at a lower rate than white business owners.

The next two blocks of numbers report the percentages of business owners who either are late (Paydex score < 50%) or prompt (Paydex score > 80%). Between 5% and 9% of white business owners are delinquent, depending on the survey year, but rates for black business owners are much higher. Black business owners on average are roughly five times more likely to be delinquent than white business owners. These differences are highly statistically significant. A smaller percentage of black business owners than white business owners pay promptly, but the differences between white owners and black owners are more muted for this category.

The final two blocks of rows for Table IV report summary statistics for the Commercial Credit Score (CCS).¹ While the raw differences in the scores by race appear to be less stark, they are significantly different from one another. Moreover, the CCS has much more coverage for both racial categories, especially in the early years of the survey.

¹We report averages of the public-use credit score buckets in this table, not the actual numerical values, which are confidential. In the regression analysis we are able to work with the confidential values directly.

5 What Explains Racial Differences in Financial Capital?

In this section we link business credit scores and other business and founder characteristics to the differences in financial capital reported in Section 3. We begin by examining the difference in total capital raised across all sources. Given its importance, we then turn to examining differences in the amount of bank debt. The final step is to examine the resulting leverage.

5.1 *Total Financial Capital*

Table V models variation in the natural log of the total amount of capital (from all sources) based on race, owner characteristics and business characteristics. To parsimoniously capture variation in the importance of race over time, we break the panel into the initial year (Year 0), the next three years (Years 1-3), and the final four years of the panel (Years 4-7). Within each year grouping we include various sets of independent variables. We estimate all regressions with OLS adjusting for the stratified sampling frame of the KFS.

Industry fixed effects at the two-digit NAICS level are included in all specifications to capture general differences in capital levels based on types of businesses started. The inclusion of industry fixed effects partly addresses the concern that black and white businesses differ in their need for capital. We discuss this issue further below in the decompositions.

In column (1) we report the baseline specification for the startup year of the KFS (Year 0). The loading on the black dummy variable illustrates that black-owned businesses have total capital investments that are roughly 60 percent lower than the total capital investments of white-owned businesses, controlling for the main business and owner characteristics. This result indicates that racial differences in the included owner and business characteristics cannot explain all of the black-white disparities in financial capital. We discuss this finding in more detail below when we present the decomposition estimates, and turn to a discussion of the results for our key explanatory variables.

Credit scores have a large positive effect on the amount of capital raised. Previous

research focusing on established businesses finds that credit scores have a negative effect on loan denial rates (Cavalluzzo and Wolken 2005). We find that moving up 10 percentile points in the credit score distribution is associated with an increase in financial capital by roughly 20 percent.

In the regression models we also include measures of formal education (in the form of dummy variables for levels), prior work experience to starting the business (both industry specific and non-industry specific), and previous entrepreneurial experience. These variables capture the human capital of the entrepreneur. Education and prior work experience in the same industry have been found to be important determinants of business success in previous research (Van Praag et al. 2005; Parker 2009). We find some evidence that education is important, but no evidence of important effects for prior work experience. Previous entrepreneurial experience is positively associated with capital investments, perhaps due to prior knowledge of finding capital.

In columns (2) and (3) we include a range of detailed additional controls for business type, growth goals and performance, moving beyond our measures of human capital and credit scores. In column (2) we add controls for firm characteristics to condition on the fact that black and white founders may open different types of businesses with different capital needs. We include dummies for whether the firm sells a product or service, whether it is based out of the founder's home, and whether it has patents or other intellectual property. In column (3) we further add possibly endogenous measures of firm goals and performance. We include a dummy for whether the business is full-time or part-time, its incorporation status, and employment level.

There are two important results from these additional sets of specifications. First, we find that the remaining black/white differences in capital use not attributable to industry, human capital, credit score and other differences are also not due to differences in capital need measured by these additional variables. The inclusion of detailed controls of business types, goals and performance have little affect on the minority loading, but the controls themselves indicate that home-based businesses invest less capital, and

product-centered businesses and businesses with intellectual property invest more capital, as would be expected. When we further add additional controls for firm performance and growth goals, such as whether the business is full-time or part-time, its incorporation status, and employment level, the black-founder loading does not change. Although many of these controls may well be endogenous, the stability of the black-owner loading across different specifications suggests that remaining black/white differences in capital use are not primarily driven by differences in firm types, goals and demand for capital.

Second, we find that the addition of these variables does not substantially change the coefficient estimates on credit scores and human capital measures. This is important because it suggests that credit scores are not simply proxying for the success or type of business.

Columns (4)-(6) analyze fundraising in the three years immediately after the startup year (years 1-3). For this time period, we find a small and statistically insignificant black coefficient across all of the reported specifications indicating that owner and business characteristics can explain the entire black/white difference in financial capital. The effect of credit scores on raising capital continues to be strong for this period. Owner's education generally has a positive effect on financial capital investments. Entrepreneurs with prior business experience also have larger financial capital investments.

Columns (7) and (8) study the next four years (years 4-7) after startup. The effects of credit scores and human capital measures are generally similar for this time period (see specification 7). In year 4 the KFS started to include some categorical information on the net worth of the entrepreneur. Including wealth controls in the regression (Column (8)) does not affect the coefficients or statistical significance of the credit score or human capital variables. The black coefficient also remains relatively small and is not statistically significant. Wealth is generally associated with higher levels of capital investments.

5.2 *Decompositions*

Estimates from the KFS indicate that black businesses have lower credit scores, less human capital and differ along several other dimensions (as noted in Appendix Table II).

The regression estimates also indicate that many of these variables are important determinants of financial capital investments at each of the three time periods. Taken together, these results suggest that racial differences in business and owner characteristics may contribute to why black-owned businesses have lower financial investments than white-owned businesses. The separate impact of each factor on the racial gap in financing, however, is difficult to summarize without further analysis.

To explore these issues further, we employ a technique pioneered by Blinder (1973) and Oaxaca (1973) that decomposes the inter-group differences in a dependent variable into those due to different observable characteristics across groups (sometimes referred to as the endowment effect) and those due to different “prices” of characteristics of groups. Consider a regression $Y = X\beta + \epsilon$ with group means of the independent variables for the black and white subpopulations given by \bar{X}^B and \bar{X}^W . To implement the standard Blinder-Oaxaca decomposition, we begin by writing the inter-group difference in the average value of a dependent variable, Y , as:

$$\bar{Y}^W - \bar{Y}^B = [\bar{X}^W - \bar{X}^B] \hat{\beta}^W + \bar{X}^B [\hat{\beta}^W - \hat{\beta}^B] \quad (1)$$

The first term, $[\bar{X}^W - \bar{X}^B] \hat{\beta}^W$, reflects the part of the inter-group difference that can be attributed to differences in the group averages of the independent variables X —differences in observables. The second term reflects the different “prices” or factor loadings of the characteristics across the two groups.

There are two issues associated with implementing Equation 1. The first concerns how to deal with the second term of the equation, $\bar{X}^B [\hat{\beta}^W - \hat{\beta}^B]$. This “unexplained” component of the decomposition partly captures contributions from group differences in unobserved characteristics. This part is sensitive to the choice of omitted characteristics making the results difficult to interpret. Another issue that arises is the “index” problem is that the decomposition itself can either be written using coefficient weights β^W or β^B .²

To deal with both these issues, we use an alternative method developed by Oaxaca

²Note that an alternative formulation of Equation 1 is $\bar{Y}^W - \bar{Y}^B = [\bar{X}^W - \bar{X}^B] \hat{\beta}^B + \bar{X}^W [\hat{\beta}^W - \hat{\beta}^B]$.

and Ransom (2004), which is to weight the first term of the decomposition expression using coefficient estimates from a pooled sample of the two groups. Following this approach, we calculate the decompositions by using coefficient estimates from regressions that includes a sample of all racial groups. We thus calculate the first term in the decompositions as:

$$[\bar{X}^W - \bar{X}^B] \hat{\beta}^* \quad (2)$$

where \bar{X}^j are means of firm characteristics of race j , $\hat{\beta}^*$ is a vector of pooled coefficient estimates, and $j = W$ or B for white or black, respectively.

We report estimates using pooled estimates from a regression that includes both white and black observations (Oaxaca and Ransom 1994). It is becoming increasingly popular when studying racial differences to use the full sample of all races to estimate the coefficients (Fairlie and Robb 2007). This version of the pooled sample is advantageous in that it incorporates the full market response and does not exclude other racial groups. The full set of racial and ethnic dummies in the regression specification are included to allow us to remove any influence on the coefficients from racial differences that are correlated with any of the explanatory variables.

We further investigate this issue by first estimating regressions with interaction terms for black race and found few differences. We also performed decompositions using white and black coefficients separately. The decomposition estimates using white coefficients were very similar to the decomposition estimates using the pooled coefficients, which is consistent with whites representing a large share of the full sample. Decomposition estimates using the black coefficients are also similar, but less precise. We focus on results using the pooled sample of all races.

Table VI presents decompositions of the racial difference in total capital. Following the previous tables, we break the panel into the initial startup year, years 1-3 following start up, and years 4-7. following startup The regressions used to calculate the decompositions are reported in specifications 1, 4, 7 and 8 in Table V. In the startup year, the white-black difference in total financial capital is 76 log points. Of this gap in startup financing, credit

scores explain the most of any factor. Lower levels of credit scores among black businesses explain 12 log points of the gap in total capital.

Our human capital measures, education and previous experience (work within industry, work in other industry, and startup) explain only a small share of the gap. Industry differences explain none of the gap. Overall, the included business and owner characteristics explain 15 log points of the 76 log point gap (one-fifth). The rest is unexplained and potentially due to unobservable factors.

In subsequent years, the gap becomes smaller, consistent with the results presented in Figure 1 above. The gap falls to 27 log points in both years 1-3 and years 4-7. The human capital measures and industry dummies continue to explain only a small share of the gap in financial capital investments. Interestingly, credit scores explain more of the gap. They explain 15 log points in years 1-3 and 20 log points in years 4-7. The increase is large in absolute terms, but even larger relative to the gap. Credit scores alone explain 15 of the 27 log point gap in total financial capital in years 1-3 and 20 of the 27 log point gap in years 4-7. This is a sizeable amount for one factor.

In years 4-7 we also have wealth measures, which are included in specification 4 (Column 8 from Table V). Lower levels of wealth among blacks explain 8 log points of the gap in financial capital. Clearly, low levels of wealth among blacks restrict their ability to invest wealth directly into their businesses or use their wealth as collateral for loans. Another important finding from this specification is that the contribution of racial differences in credit scores remains large (18 log points). Credit scores for black businesses are not simply proxying for low levels of wealth. Finally, the combination of the wealth and credit score contributions indicates that the entire gap in capital investments during years 4-7 are due to these two factors.

In all years, credit scores provide large contributions to the racial gaps in capital use.³

³We also estimate the regression models and decompositions using the starting value for credit scores for all observations including those from years 1-7. Credit scores generally increase slightly over time in our sample among startup firms. We find that initial credit scores have strong effects on financial capital use in all sample periods and explain a large portion of the gaps in the decompositions. We also experimented with different functional forms for credit scores, and find that the linear specification fits the data well. To investigate this we first examined a scatterplot between capital use and credit scores. We found no evidence of any clear threshold effects or discontinuities. Next, we estimated quadratic specifications and

This finding is important because it suggests that black entrepreneurs are limited in the amount of capital they can raise because they do not have high enough credit ratings to obtain loans. The finding of little or no effect for industry is also important because it demonstrates that differences in need based on type of business are not driving the results. In fact, differences in industry, which are likely to be first-order correlated with capital needs, do not contribute to why black entrepreneurs invest less capital than white entrepreneurs.

5.3 *Outside Debt*

Given the importance of outside debt illustrated in Section 3, we now turn to exploring the potential causes of racial differences in access to outside debt, both in terms of overall dollar amounts and in terms of its share of overall capital. Exploring potential explanations for differences in outside debt may also be useful for shedding further light on the importance of credit scores and provide a useful consistency check on this variable. Credit ratings are undoubtedly one of the most important pieces of information used by banks and other financial institutions in loan determination. Table VII reports regression results, which follow the same format as Table V, except that the dependent variable is the log of total outside debt instead of the log of total financial capital.

The results for the determinants and patterns over time for outside debt are fairly similar to those for total financial capital. Credit scores exert a strong influence on the ability of businesses to find outside debt. Even controlling for an extensive list of business characteristics proxying for need and ability to raise capital (i.e. make products, intellectual property, home-based, part-time, incorporated, and employment) the coefficient on credit scores is large, positive and statistically significant. The results for human capital measures are also similar, with previous startup experience demonstrating the strongest association with outside debt capital, but also some evidence of the influence of education and work experience. Wealth is a stronger predictor of outside debt, which may be

higher order polynomials. In all of these cases, we found similar decomposition estimates for black/white differences in credit scores.

due to the importance of personal wealth as collateral in obtaining loans.

Table VIII reports decomposition results for outside debt. In the decompositions, specifications 1-4 use coefficients from the regression specifications 1, 4, 7, and 8, respectively. Credit scores explain roughly the same amount of the gaps in outside debt as they did for the gaps in total financial capital. Racial differences in the human capital measures and industry distributions contribute only slightly to the black-white gaps in outside debt. Lower levels of black wealth provide a large, positive contribution to racial gaps in outside debt. However, it is credit scores that explain the largest share of the difference.

5.4 Leverage

Table IX and Table X examine leverage—the ratio of outside debt to total capital. This measure reflects the amount of borrowing that has occurred, but is ultimately influenced by the intended scale of the business or the level of personal assets. Studying the leverage ratio itself allows us to ask whether minority-owned businesses access proportionally more or less debt than white-owned businesses regardless of their nominal scale. Black firms are less leveraged than are white firms. At startup, the average leverage ratio is 0.19 for white firms and 0.12 for black firms. Leverage ratios increase over time, but the black/white gap only increases slightly.

Credit scores explain a substantial portion of the racial gaps in leverage ratios over the years of observation. In years 1-3, they explain nearly a third of the difference, while in years 4-7 they explain roughly half of the racial gap in leverage ratios. In the underlying regressions, credit scores have large estimated effects on leverage. Wealth differences also explain a substantial portion of the leverage gap. The results reported in the final specification indicate that lower credit scores and wealth among black startups explain three-fourths of the sizeable racial gap in leverage. On the other hand, racial differences in human capital measures explain very little of the gaps in leverage ratios as they are not strong predictors of leverage ratios.

These results indicate that black-owned firms are not just accessing lower levels of debt because the firms themselves are smaller. Instead, the evidence indicates that black-

owned firms rely proportionally less on outside debt, even conditioning on their size.

5.5 Spatial Mismatch, Spatial Clustering and Survival

In this section, we investigate three additional potential explanations for racial differences in capital investments. One possible factor is that there might be a spatial mismatch between black entrepreneurs and access to bank credit. To check for this, we repeat our analysis but include the share of deposits held by local banks as opposed to national banks. We also examine whether black entrepreneurs are located in areas with less competition in banks (measured by an Herfindahl index). Decompositions do not indicate that black/white differences in banking availability and competition contribute to the gaps in capital investments (see Appendix Table III).

Second, spatial clustering more generally might be responsible for our findings. This could be due to black/white geographical differences in economic conditions, policies and business climates in addition to differences in spatial mismatch in banking. To investigate this further, we added state fixed effects to our regressions and decompositions. Although black and white entrepreneurs are geographically concentrated in different states, the differences do not contribute to gaps in financing (see Appendix Table III).

To push the analysis even further, we estimate a model that includes county fixed effects. We cannot perform a decomposition with county fixed effects because there are too many. Instead, we examine how much the black dummy variable changes when moving from the previous model with state fixed effects and measures of spatial mismatch in banking to models that instead include county fixed effects. For all three time periods, the black dummy changes only slightly. Thus, our results do not appear to be driven by the fact that minority business owners are clustered in areas with less economic opportunity, thereby making them systematically less attractive businesses to fund.

Third, an important concern with the estimates for the two time periods after startup is survival bias. All of the reported estimates thus far condition on survival up to that point in time. If a firm goes out of business it no longer contributes to racial differences in financial capital, but does count in all years when it was operating. Thus, the estimates are

similar in spirit to cross-sectional estimates provided in most previous datasets (except without the concern for recall bias).

We take a number of steps to control for the endogeneity of survival. First, we condition the sample on including only firms surviving through the last year in the survey (year 7 after startup). Taking this approach, we find similar results (i.e. credit scores explain a substantial portion of the difference and even larger in this case). We also take an approach that is in the spirit of a bounds analysis (e.g. Fairlie, Karlan and Zinman 2015). We estimate the regressions and decompositions assuming as a lower bound that all non-surviving businesses would have used zero financial capital in that year. The mean differences in financial capital are roughly similar, and the explanations do not change for the gaps. As a potential upper bound we also impute all non-surviving firm observations as equal to the median level of financial capital among surviving firms. Again, the regression and decomposition results are not sensitive to this imputation. Another piece of evidence suggesting that our results are not overly sensitive to survival bias is that we find that racial differences in year dummies have no effect in the decompositions. These dummies essentially capture differences in survival years.

6 Racial Differences in Credit Market Expectations

The previous analysis indicates that the large fraction of the explainable difference in access to capital for black- and white-owned startups stems from differences in the underlying creditworthiness of black and white business owners. In this section, we explore explanations for the part that remains unexplained by our decompositions. Specifically, we focus on differences in attitudes and expectations about the bank borrowing experience. To explore this, we use newly available survey information in the KFS that gauges demand and unmet need for credit among entrepreneurs.

Beginning in 2007, the KFS includes a series of questions gauging borrowing intentions. Access to measures of attitudes towards borrowing among entrepreneurs is extremely rare. The new questions ask whether the startup business applied for a loan

that year, and whether it did not apply for a loan that year because of a fear of rejection. Among those startups that did apply, a follow-up question asked whether they were always approved, always denied, or sometimes approved and sometimes denied.

Racial differences in responses to these questions are analyzed in Table XI. We report survey-weighted averages by minority ownership status, both for the sample as a whole, as well as splits based on notable points in the distribution of credit scores. White entrepreneurs are more likely to apply for loans than black entrepreneurs, which potentially reflects different capital needs, but could also reflect different attitudes and expectations of the loan application process. When we focus on borrowers with below-median credit scores, there is no statistical difference in the rates of loan application, but among above-median borrowers, loan application rates are lower for blacks than for whites.

Turning to those who did not apply for loans that year, we also study racial differences in whether they did not apply for fear of rejection in Table XI.⁴ There are massive differences in fear of rejection between white and black business owners. Overall, black business owners are about three times more likely to not apply for loans because of fear of rejection than white business owners. This difference is highly statistically significant. Although it is even more pronounced among below-median credit borrowers, even among credit worthy borrowers we find that blacks are more than twice as likely than whites to fear rejection. Black business owners whose credit scores are above the 75th percentile for the entire sample are still more than twice as likely as white business owners of similar creditworthiness to not apply for a loan for fear of having their loan application denied.⁵

Another measure of unmet financing needs is whether loans are always approved, always denied, or sometimes approved and sometimes denied. Results are reported in Table XI. Here, the results mirror those from the discussion above. Black business owners

⁴Although did not apply for fear of rejection is asked of all respondents, some owners who applied for loans might have wanted to apply for additional loans, but focus on only those firms who did not apply for a new loan for clarity. The results are unchanged if we examine all responses to this question.

⁵Bone, Christensen and Williams (2014) conduct field experiments with black and white “mystery shoppers” at consumer banking institutions and find large racial differences in the way loan officers treat potential applicants. Compared to white mystery shoppers, black and hispanic mystery shoppers were less frequently offered help to complete the loan application, they were less frequently offered a business card from the loan officer, and they were less frequently offered help with future banking needs.

are significantly less likely to report that they are always approved for loans. This holds across different points in the distribution of credit scores.

A useful summary measure of whether a startup experiences unmet capital need combines responses to being denied a loan application and not applying for a loan because of fear of rejection. Affirmative answers to these two questions imply that the startup did not obtain all of the capital needed. Using this measure, black startups are much more likely to face unmet need for capital than are white startups.

Taken together, these results suggest that the lower levels of borrowing that we have documented above are a reflection of unmet need, stemming at least in part from different attitudes and perceptions of the banking process, and not simply because black startups need less capital to grow than white startups. To be sure, all of these questions are subjective, and we do not want to interpret these findings too strongly. But, these new findings do provide some suggestive evidence that black startups also have a strong need for capital and that racial differences in capital need are not driving the results.⁶

Tables XII and XIII place the results from the previous section into a multivariate analysis. Even controlling for a detailed set of firm and founder characteristics, we still observe pronounced differences in the fear of denial and loan denial rates based on the race of the firm founder. Although these findings do not provide conclusive evidence of discrimination, they provide evidence consistent with racial bias in capital markets. They are also consistent with previous findings for larger, more established and older businesses that minority-owned firms experience higher loan denial probabilities and pay higher interest rates than white-owned businesses even after controlling for differences in credit-worthiness and other factors (Bostic and Lampani 1999; Cavalluzzo, Cavalluzzo and Wolken 2002; Blanchflower, Levine and Zimmerman 2003; Blanchard, Zhao and Yinger 2008; Bates and Robb, 2014). Finally, these findings also provide evidence that racial differences in financing patterns are not simply due to lower levels of financing needs among black startups.

⁶Interestingly, there is no evidence that blacks have less preference for business ownership and in fact might have a stronger preference (Walstad and Kourilsky 1998; Koellinger and Minniti 2006).

6.1 *Are Racial Differences Correlated with Local Banking Conditions?*

To bring us closer to an answer to whether differences in credit market outcomes between black and white borrowers reflects different attitudes about credit markets among borrowers or different actions among lenders, the final step of our analysis explores how attitudes and access to capital between black and white owned businesses vary with regional measures of inequality and racial bias. To identify local variation in racial attitudes we exploit two sources of variation that are potentially exogenous to the credit-worthiness of any specific entrepreneurial venture.

6.1.1 *The Strength of Local Banks*

The first potential source of identification is motivated by a long literature in banking that draws a distinction between soft information and hard information. Hard information—like that contained in credit scores—is quantitative and impersonal, and can be easily transmitted, while soft information is qualitative, and while it may be very precise, it is difficult to communicate credibly (see Peterson, 2004).

Here, the crux of our identification strategy lies in the fact that large, national banks have been shown to have an advantage in hard information, while in contrast, small, opaque firms are more likely to flourish in environments where soft information is in greater supply (Berger, Miller, Petersen, Rajan, and Stein, 2001; Brickley, Link, and Smith, 2003). We identify whether a borrower is operating in an environment characterized by strong local banks, in which soft information is more actionable, or whether they operate in areas dominated by large banks, where soft information is less important. Exploiting regional variation in the structure of local banking markets allows us to develop variation in the degree to which hard versus soft information can be used in the lending process. We can thereby gain insight on whether the differences between lending to black- and white-owned businesses reflects different attitudes by borrowers about the quality of black- and white-owned businesses, or whether they instead represent differences in attitudes by would-be borrowers about how their experiences will play out.

Specifically, if the differences between black and white borrowing levels reflects the fact that in the black community, borrowers of heterogeneous quality are pooled in a manner that makes the average black-owned borrower unattractive conditional on their credit score (hard information), then markets characterized by greater reliance on soft information will disproportionately favor black borrowers, because in these markets the greater reliance on soft information separates the pool of otherwise indistinguishable borrowers into those of high and low quality.

In Table XIV we estimate regression models that explain variation in reporting that a respondent did not apply for fear of denial. Given that credit scores, a measure of hard information on credit-worthiness, are generally lower for black-owned businesses, a greater reliance on soft information in the lending decision might potentially favor a borrower with lower credit scores if that borrower scored higher along dimensions that were observable to the lender but not necessarily objectively verifiable. Such environments would favor black-owned businesses, because the reliance on soft information could substitute for the lower credit scores and wealth. On the other hand, a greater reliance on soft information might make lending conditions worse for minority borrowers if the greater reliance on soft information allowed lenders greater latitude to cater to racial preferences or biases.

Panel A tests this basic hypothesis by regressing fear of denial on the same controls from Table IV, but with the addition of local banking variables. In column (2) we add the share of county bank deposits held by local banks and find that areas with higher local bank concentration are areas in which new businesses are much less likely to report that they do not apply for fear of denial.⁷ This comports with a wide body of evidence suggesting that small, informationally opaque businesses have an easier time securing bank loans in areas where local bank concentrations are higher.

Column (3) introduces an interaction term to explore whether black and white-owned businesses experience different outcomes in high local bank concentration areas. If black-owned businesses found it easier to borrow in these markets, presumably because of a

⁷Data are from the FDIC Summary of Deposits. See <https://www5.fdic.gov/sod/>.

greater ease in acting on soft information, then we would expect the interaction term to be negative—their reluctance to apply for loans for fear of denial would be attenuated in these markets.

Instead we find the opposite. The interaction term is positive, indicating that black-owned businesses are not less afraid of denial in environments where local banking conditions are stronger. Although we cannot rule out the possibility that local banks are simply acting on better information about the underlying creditworthiness of the firms in question and acting accordingly, there is certainly no evidence that more soft information makes it easier for minority businesses to borrow from banks.

Columns (4) and (5) add measures of local bank market power to sharpen the analysis. If local banking markets are highly competitive, then the franchise value of any individual banking relationship may be lower, thus diminishing the incentive to collect soft information in the first place. This may be why we see the results in columns (2) and (3) that we see. To explore this possibility we add the Herfindahl index of the local banking market. Areas with high concentrations are ones in which the information rents are higher; in these markets there is presumably a greater advantage to acting on soft information.

In Column (4), we find that areas with higher local bank market concentration are areas where the fear of denial is lower for new business borrowers. This is consistent with the idea that the high concentration makes it more profitable for the bank to invest in acquiring information about borrowers. This does not, however, translate into easier relative banking conditions for black-owned businesses. Minority businesses in these regions are not less afraid to borrow.

The evidence in Panel A, therefore, speaks against the idea that soft information can substitute for hard information in a manner that alleviates lending disparities.⁸

⁸We also examine results for overall financial capital. We find that the main effects of local banking conditions have no effect on overall financial capital, which indicates that for the average borrower, substitution into financing alternatives outside the local banking market attenuates any differences in banking conditions. Yet interactions with minority status indicate that black-owned businesses are restricted overall in obtaining capital as a result of the restricted access to local bank lending. This is important because it indicates that blacks cannot simply substitute from other sources when facing racial bias in lending markets.

To push the analysis further, we ask whether soft information affects unmet need for capital. This combines loan denials and negative borrowing expectations into a single measure. In Panel B of XIV, we report a Probit analysis for unmet capital need (as defined above) on race and interactions with the banking variables. The coefficient estimates match the spirit of what is reported in Panel A. This confirms that borrower expectations translate into lending market outcomes: entrepreneurs in areas with stronger local banks are less likely to be denied or to receive less than they ask for, but this is an effect that is confined to white borrowers.

6.2 *Regional Inequality and Racial Bias*

A second source of variation that is useful for identifying racial bias in credit markets is regional variation in inequality. Because contemporaneous measures of inequality are likely to be correlated with contemporaneous business conditions, we use a measure of historical inequality obtained from Braggion, Dwarkasing, and Ongena (2015). In particular, they instrument current measures of income inequality at the MSA level with data on the historical distribution of farm plot-sizes in 1890. Braggion, Dwarkasing and Ongena (2015) show that the historical distribution of plot sizes in 1890 is highly correlated with current measures of inequality and use this measure to show that more historically unequal regions have lower rates of self-employment. Based on the fact that areas with high degree of skewness in the historical size distribution of landholdings are areas in which slavery was common, we build on their insight and ask whether racial differences in borrowing attitudes and outcomes are more pronounced in these areas by exploring interactions of the Gini coefficient with the business owner's race.

The main idea is to ask whether perceptions of lending outcomes are different in areas with high historical inequality. The first three columns of Table XV indicate that they are. In Panel A, we report regression results for the fear of denial on race, the historical Gini coefficient, and the race/gini interaction, along with all the variables listed in Table IV. Local areas with high levels of historical inequality have much higher levels of the fear of denial among black entrepreneurs relative to white entrepreneurs than areas with low

levels of inequality.

In Panel B of Table XV, we report a probit analysis for unmet capital need on race, the historical Gini coefficient, and the race/gini interaction. Regions with high levels of historical inequality have higher average levels of respondents reporting that they have unmet capital need, and these effects are more pronounced among black borrowers in areas with high inequality.

Ultimately these measures fall short of separating borrower attitudes from lender attitudes. Lender racial perceptions may be the ultimate reason why we see that black-owned businesses are more reluctant to borrow in areas with high historical inequality. The fact that banking markets in which soft information is likely to be more important are not more favorable for black borrowers is also consistent with the idea that black business owners are suspicious that lenders will tilt lending decisions racially. Anticipating that they will face racial discrimination, either rightly or wrongly, black borrowers may opt out of seeking capital. While our tests cannot cleanly separate these two possibilities, they do illustrate the fact that attitudes and outcomes that perpetuate differences between white and black owned businesses are not ameliorated by the availability of soft information, and are worse in areas with high historical inequality.

7 Conclusion

This paper uses confidential, restricted-access microdata from the KFS to explore how minority and non-minority startups differ in terms of their access to capital. The financial detail available in the KFS and panel data following startups through the first seven years of existence allow us to establish a number of novel results. Black entrepreneurs start businesses at a substantially smaller scale than white entrepreneurs. They also obtain less financial capital in the early years of the firm's operation than white entrepreneurs. Thus, initial funding differences do not disappear and instead persist over time. We also find that black entrepreneurs access less outside debt in the founding year and in the years that follow, which is by the far the largest cause of disparities in total financial capital.

Taken together, this implies that leverage ratios for young firms owned by black owners are persistently below those owned by whites. Black entrepreneurs are also not simply substituting investments from other sources. We find that black entrepreneurs invest less from all major sources of capital.

These differences in financial capital use do not appear to be due to differences in the need for capital between black and white entrepreneurs. Black startups report substantially higher levels of loan denials and overall unmet need for capital than white startups, even after controlling for differences in credit scores. Moreover, industry differences, which should represent first-order differences in need for capital if differences in demand were driving the results, do not explain racial disparities. The inclusion of detailed, potentially endogenous business characteristics including performance, goals for growth, and type of business also has little effect on the racial differences we find.

Yet the racial differences we find cannot readily be attributed to simple explanations, such as white lenders looking unfavorably upon black borrowers. There are large differences in credit worthiness between black and white entrepreneurs. Detailed administrative data on credit ratings linked to all KFS businesses provides the first evidence in the literature of extensive differences between black and white startups. The relatively low credit scores for black business owners explain a substantial amount of the gaps in both financing at startup and in the years after startup. Controlling for founder net worth and business credit scores essentially explains away the race gap in financing in some years. Taken together, these results imply that a great deal of the capital investment differences between black- and white-owned businesses is the result of persistent differences in the founder's financial health that are present at the very inception of the firm. This connects our findings to a burgeoning literature in household finance and financial literacy (see Lusardi and Mitchell, 2009) and suggests interesting connections between household financial planning, behavioral finance, race and entrepreneurship.

At the same time, although average racial differences in access to startup capital can be largely explained away by differences in credit worthiness and net worth, our evidence

clearly indicates an enduring belief among even the most credit-worthy black borrowers that they will be turned away as borrowers. The fact that many well-qualified black borrowers do not apply for credit, even when they feel they need it, because they anticipate being denied credit suggests that overcoming differences between black and white borrowers is not simply a matter of expanding the supply of credit available to lower income borrowers. Getting to the root cause of racial differences in the way that new businesses are financed likely requires changes in perceptions and financial planning behaviors as much as it requires augmenting the supply of credit to traditionally underserved borrowers.

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Figure 1
Total Capital Investment by Years since Startup and Race, Kauffman Firm Survey

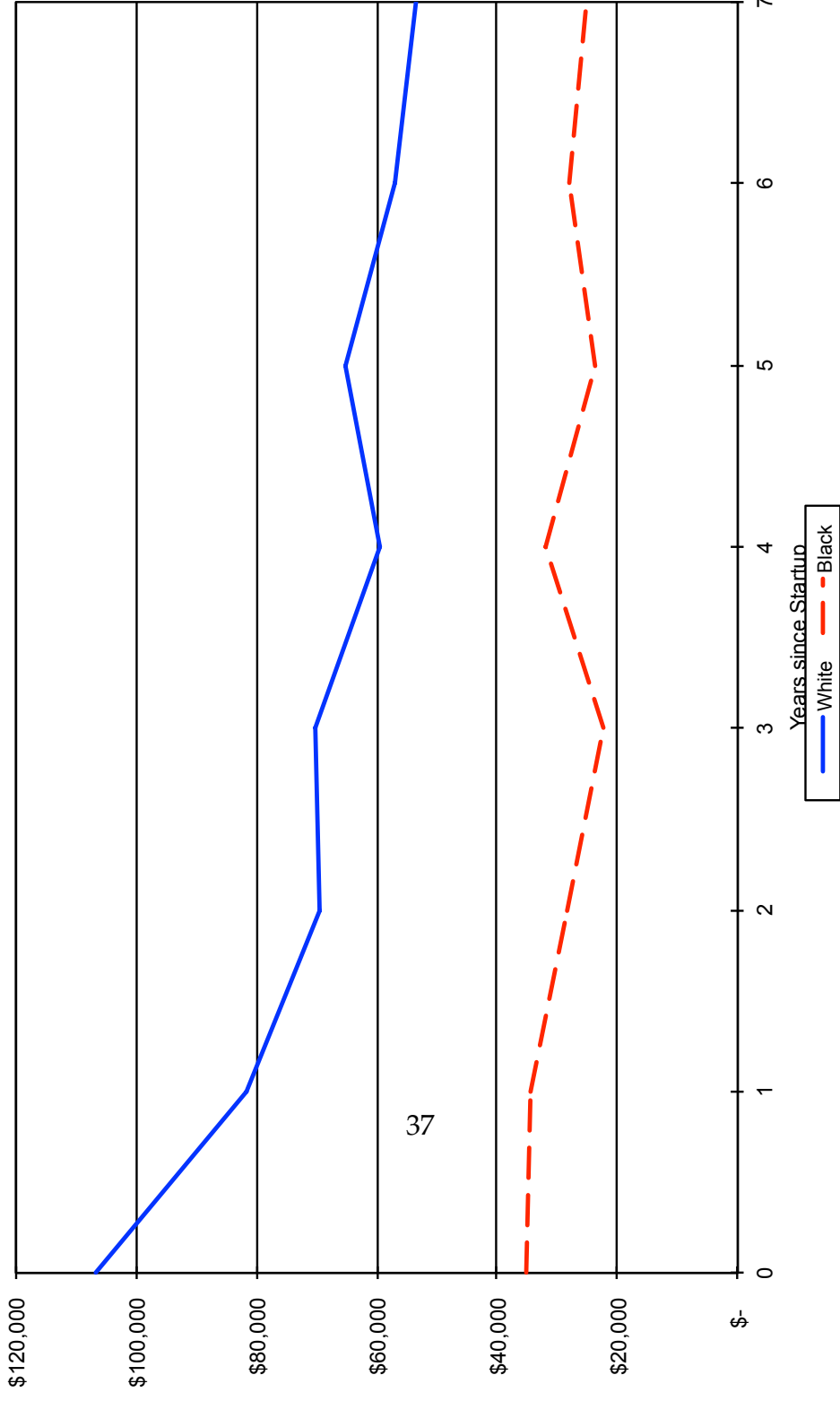


Table I: Racial Differences in Sources of Funding

This table reports survey-weighted mean values by race for broad funding categories. The components of the classifications (Owner, Insider, Outsider/Debt, Equity) are described in detail in Appendix Table A.1. The final column reports p-values from the t-test of the difference between black- and white-owned businesses.

	Overall Mean	White Mean	Black Mean	p-value(diff)
<u>KFS Initial Survey Year</u>				
Owner's Equity	33,078	34,426	19,562	0.00
Informal Equity	2,117	2,139	440	0.14
Formal Equity	16,768	18,543	536	0.10
Owner Debt	4,890	5,228	1,010	0.05
Informal Debt	6,663	7,195	2,849	0.17
Formal Debt	51,680	56,663	10,809	0.01
Total Financial Capital	99,344	106,720	35,205	0.00
Leverage Ratio	0.19	0.19	0.12	0.00
<u>KFS Survey Years 1-3</u>				
Owner's Equity	13,047	13,308	8,555	0.13
Formal Equity	14,864	16,499	551	0.07
Informal Equity	1,206	1,284	664	0.48
Owner Debt	4,200	4,336	2,297	0.15
Informal Debt	5,385	5,713	2,491	0.49
Formal Debt	51,147	54,813	14,883	0.19
Total Financial Capital	69,256	72,958	29,107	0.00
Leverage Ratio	0.29	0.30	0.21	0.00
<u>KFS Survey Years 4-7</u>				
Owner's Equity	8,327	7,944	4,678	0.42
Formal Equity	7,663	8,339	1,227	0.20
Informal Equity	1,037	1,047	254	0.63
Owner Debt	3,618	3,671	3,482	0.42
Informal Debt	4,898	5,176	979	0.21
Formal Debt	48,616	49,809	20,265	0.64
Total Financial Capital	58,684	59,825	27,348	0.54
Leverage Ratio	0.29	0.29	0.20	0.00

Table II: A Closer Look at Sources of Debt

This table reports survey-weighted mean values by race for dummy variables that track the use of particular types of credit, as well as for mean values of these sources of credit. The final column reports p-values from the t-test of the difference between black- and white-owned businesses. The first block of numbers for each year range ("Uses") reports the proportion of the sample that indicates they use that form of debt. The lower block of numbers for each year range (indicated with \$) reports the average dollar amounts for that funding category.

	Overall Mean	White Mean	Black Mean	p-value(diff)
<u>KFS Initial Survey Year</u>				
Uses Personal Credit Cards	0.48	0.49	0.34	0.00
Uses Personal Bank Loan	0.18	0.18	0.14	0.01
Uses Business Credit Cards	0.28	0.30	0.15	0.00
Uses Loans from Family Members	0.10	0.09	0.14	0.00
Uses Business Bank Loans	0.06	0.07	0.01	0.00
Personal Bank Loan (\$)	13,660	14,497	6,971	0.04
Personal Loans from Fam. (\$)	2,465	2,571	1,801	0.36
Personal Loans, Other Sources (\$)	4,360	4,659	2,161	0.24
Business Bank Loan (\$)	9,540	10,551	1,106	0.03
Business Non-bank Loans (\$)	5,510	6,035	866	0.06
<u>KFS Survey Years 1-3</u>				
Uses Personal Credit Cards	0.38	0.38	0.35	0.84
Uses Personal Bank Loan	0.13	0.13	0.08	0.01
Uses Business Credit Cards	0.42	0.43	0.32	0.00
Uses Loans from Family Members	0.07	0.07	0.12	0.00
Uses Business Bank Loans	0.06	0.06	0.03	0.02
Personal Bank Loan (\$)	7,992	8,228	4,171	0.05
Personal Loans from Fam. (\$)	1,454	1,491	1,323	0.17
Personal Loans, Other Sources (\$)	1,999	2,070	1,451	0.60
Business Bank Loan (\$)	5,039	5,589	625	0.01
Business Non-bank Loans (\$)	2,933	3,085	742	0.08
<u>KFS Survey Years 4-7</u>				
Uses Personal Credit Cards	0.33	0.33	0.30	0.23
Uses Personal Bank Loan	0.08	0.09	0.05	0.08
Uses Business Credit Cards	0.41	0.43	0.27	0.00
Uses Loans from Family Members	0.06	0.06	0.08	0.00
Uses Business Bank Loans	0.05	0.05	0.02	0.08
Personal Bank Loan (\$)	2,523	2,719	635	0.04
Personal Loans from Fam. (\$)	677	702	298	0.34
Personal Loans, Other Sources (\$)	944	973	343	0.58
Business Bank Loan (\$)	2,589	2,624	1,392	0.25
Business Non-bank Loans (\$)	1,484	1,507	521	0.43

Table III: Credit Score Definitions

This table describes two credit scores available in the confidential version of the Kauffman Firm Survey. The CCS score is a predictive score that anticipates the probability of delinquency in the next 12 months. The Paydex score is a retrospective score that reports the actual historical payment behavior over the last 12 months.

Panel A: Commercial Credit Score (CCS) Definitions			
Commercial Credit Score	Credit Score Percentile	Credit Risk Class	Incidence of Delinquency
542 – 670	91 – 100	1	2.10%
501 – 541	71 – 90	2	4.50%
393 – 500	31 – 70	3	14.70%
366 – 392	11 – 30	4	31.30%
101 – 365	1 – 10	5	61.50%

Panel B: Paydex Definitions	
PAYDEX	Payment Practices
100	Anticipate
90	Discount
80	Prompt
70	15 Days Beyond Terms
60	22 Days Beyond Terms
50	30 Days Beyond Terms
40	60 Days Beyond Terms
30	90 Days Beyond Terms
20	120 Days Beyond Terms
1 – 19	Over 120 Days Beyond Terms
0	Unavailable

Table IV: Summary Statistics on Credit Scores

This table summarizes credit scores and credit score availability for each survey wave based on the race of the respondent. Numbers in parentheses are standard errors. Please see the previous table for scores and definitions.

Variable	Group	Survey Wave:							
		0	1	2	3	4	5	6	7
Paydex Scr.	ALL	72.15 (1.07)	71.93 (0.63)	71.04 (0.66)	71.79 (0.53)	71.54 (0.55)	71.64 (0.54)	71.43 (0.60)	70.87 (0.61)
	White	72.84 (0.99)	72.28 (0.63)	71.84 (0.63)	72.61 (0.50)	72.35 (0.53)	72.50 (0.51)	72.48 (0.56)	72.08 (0.58)
	Black	58.51 (11.71)	65.13 (3.87)	58.06 (4.40)	58.91 (3.40)	59.78 (3.75)	57.80 (3.86)	57.13 (3.97)	55.04 (4.15)
% Have Pdx Scr.	ALL	4.1 (0.4)	14.6 (0.7)	23.0 (0.9)	40.7 (1.2)	47.1 (1.2)	49.8 (1.3)	52.5 (1.3)	59.0 (1.3)
	White	4.3 (0.4)	15.1 (0.8)	24.0 (1.0)	41.8 (1.2)	48.1 (1.3)	51.4 (1.3)	53.9 (1.4)	60.6 (1.3)
	Black	1.6 (0.7)	9.6 (2.0)	15.8 (2.8)	28.6 (3.9)	34.8 (4.3)	30.0 (4.3)	37.6 (4.6)	44.1 (4.9)
% Pdx < 50	ALL	6.6 (2.3)	5.4 (1.2)	7.1 (1.2)	7.8 (1.0)	9.0 (1.0)	7.4 (0.9)	8.3 (1.0)	10.8 (1.1)
	White	4.9 (2.0)	4.2 (1.1)	5.7 (1.2)	6.2 (1.0)	7.5 (1.0)	6.4 (0.9)	6.8 (1.0)	8.8 (1.0)
	Black	22.7 (20.1)	27.0 (10.2)	29.5 (9.0)	33.3 (7.7)	29.4 (7.0)	26.9 (7.3)	30.1 (6.9)	37.1 (7.0)
% Pdx ≥ 80	ALL	36.9 (4.3)	39.0 (2.6)	41.0 (2.3)	44.8 (1.9)	48.8 (1.8)	51.6 (1.8)	54.5 (1.8)	54.9 (1.7)
	White	36.9 (4.5)	38.8 (2.7)	42.1 (2.3)	45.2 (2.0)	49.6 (1.9)	52.4 (1.9)	55.9 (1.9)	56.7 (1.8)
	Black	25.3 (21.6)	39.4 (10.7)	21.7 (7.6)	32.9 (7.4)	37.2 (7.3)	37.9 (8.1)	40.1 (7.3)	37.2 (7.0)
CCS	ALL	3.43 (0.02)	3.27 (0.02)	3.01 (0.02)	2.85 (0.03)	2.77 (0.03)	2.71 (0.03)	2.73 (0.04)	2.70 (0.04)
	White	3.42 (0.02)	3.24 (0.02)	2.97 (0.02)	2.81 (0.03)	2.72 (0.03)	2.67 (0.03)	2.70 (0.04)	2.67 (0.04)
	Black	3.55 (0.05)	3.63 (0.06)	3.44 (0.09)	3.18 (0.13)	3.25 (0.12)	3.12 (0.16)	3.07 (0.17)	3.06 (0.19)
% Have CCS	ALL	76.1 (0.8)	98.0 (0.3)	86.4 (0.7)	84.8 (0.9)	91.4 (0.7)	82.7 (1.0)	81.8 (1.0)	78.4 (1.1)
	White	77.1 (0.8)	98.3 (0.2)	87.3 (0.8)	85.5 (0.9)	91.4 (0.7)	84.0 (1.0)	83.1 (1.0)	79.6 (1.1)
	Black	67.5 (2.8)	95.1 (1.7)	77.6 (3.4)	74.7 (4.2)	89.7 (2.8)	68.8 (4.5)	67.1 (4.7)	66.5 (4.7)

Table V: Regression Analysis of the Log of Total Capital

This table models variation in the amount of total capital from all sources, include founder, insider and outside debt and equity. All columns include industry fixed effects and controls for other racial categories. Columns (4)-(10) are pooled OLS with survey-year fixed effects included.

VARIABLES	(1) Year 0	(2) Year 0	(3) Year 0	(4) Years 1-3	(5) Years 1-3	(6) Years 1-3	(7) Years 4-7	(8) Years 4-7	(9) Years 4-7	(10) Years 4-7
Black	-0.6105*** (0.109)	-0.5641*** (0.105)	-0.5810*** (0.102)	-0.0416 (0.089)	0.0138 (0.090)	0.0537 (0.090)	0.0132 (0.093)	0.0645 (0.093)	0.1418 (0.095)	0.0722 (0.095)
Female	-0.2828*** (0.080)	-0.2585*** (0.076)	-0.1486** (0.074)	-0.5031*** (0.063)	-0.4663*** (0.062)	-0.3916*** (0.063)	-0.2997*** (0.065)	-0.2948*** (0.065)	-0.2338*** (0.064)	-0.2047*** (0.065)
Previous Industry Experience	-0.0027 (0.004)	-0.0035 (0.004)	-0.0031 (0.004)	-0.0029 (0.003)	-0.0036 (0.003)	-0.0014 (0.003)	-0.0018 (0.003)	-0.0047 (0.004)	-0.0031 (0.003)	-0.0014 (0.004)
Experience Outside Industry	0.0047 (0.004)	0.0079** (0.004)	0.0137*** (0.003)	-0.0025 (0.003)	-0.0005 (0.003)	0.0050* (0.003)	-0.0035 (0.003)	-0.0056* (0.003)	-0.0018 (0.003)	0.0049 (0.003)
Some College	0.0906 (0.110)	0.0841 (0.106)	0.0341 (0.102)	0.0927 (0.092)	0.0599 (0.093)	0.0003 (0.091)	0.2973*** (0.094)	0.2666*** (0.094)	0.2131** (0.095)	0.1929** (0.093)
College Deg.	0.2114* (0.121)	0.1592 (0.118)	0.0756 (0.114)	0.2140** (0.099)	0.1072 (0.100)	0.0346 (0.099)	0.4380*** (0.101)	0.3467*** (0.102)	0.2455** (0.103)	0.2203** (0.101)
Grad. Deg.	0.4594*** (0.138)	0.3552*** (0.135)	0.2433* (0.131)	0.3705*** (0.111)	0.2225** (0.110)	0.1737 (0.110)	0.4052*** (0.113)	0.2811** (0.116)	0.1388 (0.114)	0.1226 (0.113)
Prev. Startup Exp.	0.2934*** (0.074)	0.1553** (0.072)	0.1061 (0.069)	0.4382*** (0.058)	0.2932*** (0.057)	0.2604*** (0.057)	0.3489*** (0.059)	0.3329*** (0.059)	0.2123*** (0.058)	0.2097*** (0.058)
Credit Score	0.0207*** (0.002)	0.0167*** (0.002)	0.0123*** (0.002)	0.0150*** (0.001)	0.0119*** (0.001)	0.0092*** (0.001)	0.0104*** (0.001)	0.0097*** (0.001)	0.0082*** (0.001)	0.0067*** (0.001)
Makes Product		0.2243*** (0.081)	0.2176*** (0.077)		0.3392*** (0.064)	0.3368*** (0.064)			0.2939*** (0.066)	0.2957*** (0.066)
Intel. Property		0.2022** (0.086)	0.0810 (0.082)		0.5823*** (0.073)	0.4984*** (0.072)			0.4598*** (0.076)	0.3163*** (0.077)
Home-based		-1.1503*** (0.074)	-0.7336*** (0.075)		-0.7617*** (0.058)	-0.4782*** (0.062)			-0.7672*** (0.059)	-0.5042*** (0.062)
Part time Bus.			-0.8227*** (0.086)			-0.5893*** (0.067)				-0.4844*** (0.066)
Incorporated			0.6945*** (0.071)			0.5495*** (0.059)				0.4868*** (0.059)
Employment			0.0613*** (0.012)			0.0260*** (0.007)				0.0222*** (0.005)
Net Worth: Missing									0.4122*** (0.125)	0.2644** (0.128)
Net Worth: Neg. or Zero									0.4087*** (0.124)	0.3041** (0.123)
Net Worth: \$51,000-100,000									-0.0037 (0.094)	-0.0222 (0.093)
Net Worth: \$100,001-250,000									0.1771** (0.085)	0.1636* (0.085)
Net Worth: \$250,000+									0.4502*** (0.085)	0.3816*** (0.085)
Observations	3,975	3,972	3,840	9,006	8,842	8,578	8,460	8,460	8,426	8,173
R-squared	0.114	0.189	0.271	0.082	0.122	0.159	0.060	0.066	0.103	0.134

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table VI: Decomposing Racial Differences in the Log of Total Capital

This table presents Oaxaca-Blinder decompositions of the log total amount of financial capital. The upper panel reports differences in the mean values of black and white log total capital. The bottom panel decomposes the mean difference into amounts explained by each of the independent variables. Education is the total variation explained by the group of dummy variables that capture different levels of educational attainment (see previous table); Industry is the total amount explained by the industry dummies; Wealth is the amount explained by the high wealth dummy and the dummy for whether wealth is missing. Column (1) is based on Column (1) from the previous table. Column (2) is based on Column (4) from the previous table, while columns (3) and (4) are based on columns (7) and (8) from the previous table, respectively.

		(1)	(2)	(3)	(4)
Differential	White	9.7923	8.8529	8.3968	8.3968
	Black	9.0319	8.5855	8.1274	8.1274
	Difference	0.7604	0.2675	0.2695	0.2695
Explained	Experience	0.0168	0.0213	0.0108	0.0031
	Gender	0.0155	0.0251	0.0178	0.0175
	Education	0.0067	0.0080	0.0083	0.0018
	Credit	0.1190	0.1467	0.1962	0.1839
	Industry	-0.0081	0.0253	0.0471	0.0472
	Wealth				0.0780
	Years		-0.0005	0.0025	0.0025
	Total		0.1499	0.2259	0.2827
Observations		3,493	7,966	7,516	7,516

Table VII: Regression Analysis of the Log of Outside Debt

This table models variation in the amount of outside debt. The dependent variable is the natural log of the total outside debt raised by the firm in the specific year in question. All columns include industry fixed effects and controls for other racial categories. Columns (4)-(10) are pooled OLS with survey-year fixed effects included.

VARIABLES	(1) Year 0	(2) Year 0	(3) Year 0	(4) Years 1-3	(5) Years 1-3	(6) Years 1-3	(7) Years 4-7	(8) Years 4-7	(9) Years 4-7	(10) Years 4-7
Black	-0.5255*** (0.110)	-0.4867*** (0.112)	-0.5005*** (0.108)	-0.3227*** (0.081)	-0.2965*** (0.083)	-0.2787*** (0.084)	-0.2345*** (0.079)	-0.1277 (0.080)	-0.0771 (0.080)	-0.1382* (0.079)
Female	-0.2058** (0.090)	-0.1940** (0.089)	-0.0920 (0.089)	-0.3898*** (0.060)	-0.3623*** (0.061)	-0.2919*** (0.061)	-0.2669*** (0.060)	-0.2628*** (0.060)	-0.2126*** (0.059)	-0.1903*** (0.060)
Previous Industry Experience	0.0003 (0.005)	-0.0001 (0.005)	-0.0014 (0.004)	-0.0057* (0.003)	-0.0060* (0.003)	-0.0044 (0.003)	-0.0067** (0.003)	-0.0119*** (0.003)	-0.0105*** (0.003)	-0.0088*** (0.003)
Experience Outside Industry	0.0075* (0.004)	0.0092** (0.004)	0.0117*** (0.004)	-0.0028 (0.003)	-0.0013 (0.003)	-0.0032 (0.003)	-0.0087*** (0.003)	-0.0123*** (0.003)	-0.0087*** (0.003)	-0.0034 (0.003)
Some College	0.1048 (0.125)	0.1070 (0.124)	0.0615 (0.122)	0.1500* (0.088)	0.1360 (0.090)	0.0751 (0.088)	0.2747*** (0.086)	0.2163** (0.086)	0.1636* (0.086)	0.1324 (0.084)
College Deg.	0.1330 (0.136)	0.1079 (0.135)	0.0177 (0.135)	0.2415** (0.095)	0.1819* (0.097)	0.0910 (0.096)	0.4321*** (0.093)	0.2823*** (0.093)	0.2007** (0.094)	0.1601* (0.093)
Grad. Deg.	0.4402*** (0.156)	0.3875** (0.156)	0.2915* (0.156)	0.2490** (0.107)	0.1504 (0.107)	0.0819 (0.108)	0.3574*** (0.104)	0.1601 (0.107)	0.0306 (0.106)	0.0291 (0.105)
Prev. Startup Exp.	0.2320*** (0.083)	0.1488* (0.083)	0.0939 (0.082)	0.2842*** (0.057)	0.1789*** (0.057)	0.1384** (0.057)	0.2548*** (0.055)	0.2384*** (0.054)	0.1426*** (0.054)	0.1347** (0.054)
Credit Score	0.0192*** (0.002)	0.0168** (0.002)	0.0139*** (0.002)	0.0164*** (0.001)	0.0143*** (0.001)	0.0116*** (0.001)	0.0126*** (0.001)	0.0116*** (0.001)	0.0103*** (0.001)	0.0088*** (0.001)
Makes Product	0.2611*** (0.091)	0.2565*** (0.091)	0.2565*** (0.091)	0.2205*** (0.062)	0.2205*** (0.062)	0.2204*** (0.062)	0.2204*** (0.062)	0.2204*** (0.062)	0.1032* (0.061)	0.1148* (0.061)
Intel. Property	-0.0035 (0.100)	-0.0035 (0.100)	-0.1246 (0.097)	0.3313*** (0.074)	0.3313*** (0.074)	0.2535*** (0.073)	0.3173*** (0.073)	0.3173*** (0.072)	0.1988*** (0.072)	0.1988*** (0.073)
Home-based	-0.6944*** (0.082)	-0.3848*** (0.082)	-0.3848*** (0.083)	-0.5737*** (0.056)	-0.5737*** (0.056)	-0.2950*** (0.060)	-0.2950*** (0.060)	-0.2950*** (0.060)	-0.6792*** (0.054)	-0.4310*** (0.057)
Part time Bus.	-0.3272*** (0.089)	-0.3272*** (0.089)	-0.3272*** (0.089)	-0.4835*** (0.064)	-0.4835*** (0.064)	-0.4835*** (0.064)	-0.4835*** (0.064)	-0.4835*** (0.064)	-0.3616*** (0.059)	-0.3616*** (0.059)
Incorporated	0.4842*** (0.083)	0.4842*** (0.083)	0.4842*** (0.083)	0.5881*** (0.057)	0.5881*** (0.057)	0.5881*** (0.057)	0.5881*** (0.057)	0.5881*** (0.054)	0.4885*** (0.054)	0.4885*** (0.054)
Employment	0.0758*** (0.013)	0.0758*** (0.013)	0.0758*** (0.013)	0.0268*** (0.007)	0.0268*** (0.007)	0.0268*** (0.007)	0.0268*** (0.007)	0.0268*** (0.007)	0.0229*** (0.005)	0.0229*** (0.005)
Net Worth: Missing								0.3088*** (0.113)	0.2475** (0.114)	0.1220 (0.115)
Net Worth: Neg. or Zero								0.3521*** (0.112)	0.3587*** (0.112)	0.2474** (0.110)
Net Worth: \$51,000-100,000								0.0488 (0.082)	0.0627 (0.082)	0.0342 (0.083)
Net Worth: \$100,001-250,000								0.2705*** (0.076)	0.2601*** (0.076)	0.1808** (0.075)
Net Worth: \$250,000+								0.6654*** (0.077)	0.6111*** (0.077)	0.4286*** (0.078)
Observations	3,975	3,972	3,840	9,006	8,842	8,578	8,460	8,460	8,426	8,173
R-squared	0.074	0.100	0.151	0.073	0.095	0.133	0.071	0.084	0.112	0.144

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table VIII: Decomposing Racial Differences in the Log of Outside Debt

This table presents Oaxaca-Blinder decompositions of the log total amount of outside debt. The upper panel reports differences in the mean values of black and white log total outside debt. The bottom panel decomposes the mean difference into amounts explained by each of the independent variables. Education is the total variation explained by the group of dummy variables that capture different levels of educational attainment (see previous table); Industry is the total amount explained by the industry dummies; Wealth is the amount explained by the high wealth dummy and the dummy for whether wealth is missing. Column (1) is based on Column (1) from the previous table. Column (2) is based on Column (4) from the previous table, while columns (3) and (4) are based on columns (7) and (8) from the previous table, respectively.

EQUATION	VARIABLES	(1) Year 0	(2) Years 1-3	(3) Years 4-7	(4) Years 4-7
Differential	White	7.7634	7.8786	7.6813	7.6813
	Black	7.1063	7.3530	7.1642	7.1642
	Difference	0.6571	0.5255	0.5171	0.5171
Explained	Experience	0.0206	0.0048	-0.0067	-0.0201
	Gender	0.0113	0.0195	0.0158	0.0156
	Education	-0.0004	0.0021	0.0092	-0.0003
	Credit	0.1101	0.1596	0.2383	0.2204
	Industry	-0.0099	0.0184	0.0237	0.0235
	Wealth				0.1479
	Years		-0.0015	0.0022	0.0023
	Total	0.1316	0.2028	0.2826	0.3893
	Observations	3,493	7,966	7,516	7,516

Table IX: Regression Analysis of Leverage

This table models variation in leverage, which is the ratio of outside debt to total financial capital. All columns include industry fixed effects and controls for other racial categories. Columns (4)-(11) are pooled OLS with survey-year fixed effects included. A constant is estimated in each model but not reported for brevity. One, two and three asterisks denote significance at the 10, 5, and 1 percent level, respectively.

VARIABLES	(1) Year 0	(2) Year 0	(3) Year 0	(4) Years 1-3	(5) Years 1-3	(6) Years 1-3	(7) Years 4-7	(8) Years 4-7	(9) Years 4-7	(10) Years 4-7
Black	-0.0647** (0.017)	-0.0615** (0.017)	-0.0612** (0.017)	-0.0672** (0.016)	-0.0654** (0.017)	-0.0656** (0.017)	-0.0467** (0.018)	-0.0289 (0.018)	-0.0226 (0.018)	-0.0332* (0.018)
Female	-0.0072 (0.013)	-0.0069 (0.013)	0.0004 (0.013)	-0.0530** (0.011)	-0.0496** (0.012)	-0.0431** (0.012)	-0.0413** (0.012)	-0.0409** (0.012)	-0.0350** (0.012)	-0.0332** (0.012)
Previous Industry Experience	-0.0004 (0.001)	-0.0005 (0.001)	-0.0006 (0.001)	-0.0021** (0.001)	-0.0021** (0.001)	-0.0020** (0.001)	-0.0013** (0.001)	-0.0020** (0.001)	-0.0018** (0.001)	-0.0017** (0.001)
Experience Outside Industry	0.0006 (0.001)	0.0007 (0.001)	0.0008 (0.001)	-0.0009* (0.001)	-0.0007 (0.001)	-0.0001 (0.001)	-0.0019** (0.001)	-0.0023** (0.001)	-0.0019** (0.001)	-0.0012** (0.001)
Some College	-0.0078 (0.019)	-0.0070 (0.019)	-0.0137 (0.019)	0.0329** (0.016)	0.0343** (0.016)	0.0249 (0.016)	0.0600** (0.018)	0.0519** (0.018)	0.0456** (0.018)	0.0420** (0.018)
College Deg.	-0.0190 (0.020)	-0.0200 (0.020)	-0.0282 (0.020)	0.0262 (0.017)	0.0217 (0.017)	0.0104 (0.017)	0.0619** (0.019)	0.0430** (0.019)	0.0326* (0.019)	0.0284 (0.019)
Grad. Deg.	0.0064 (0.022)	0.0040 (0.022)	-0.0037 (0.023)	0.0058 (0.018)	-0.0033 (0.019)	-0.0119 (0.019)	0.0254 (0.020)	0.0011 (0.020)	-0.0163 (0.020)	-0.0133 (0.020)
Prev. Startup Exp.	0.0087 (0.012)	0.0032 (0.012)	0.0000 (0.012)	0.0183* (0.010)	0.0086 (0.011)	0.0071 (0.011)	0.0169 (0.011)	0.0053 (0.011)	0.0033 (0.011)	0.0037 (0.011)
Credit Score	0.0019** (0.000)	0.0018** (0.000)	0.0016** (0.000)	0.0024** (0.000)	0.0022** (0.000)	0.0018** (0.000)	0.0024** (0.000)	0.0023** (0.000)	0.0021** (0.000)	0.0019** (0.000)
Makes Product	0.0224* (0.013)	0.0224* (0.013)	0.0199 (0.013)	0.0157 (0.011)	0.0157 (0.011)	0.0138 (0.011)	0.0138 (0.011)	0.0138 (0.011)	0.0054 (0.013)	0.0067 (0.013)
Intel. Property	-0.0155 (0.014)	-0.0155 (0.014)	-0.0262* (0.014)	0.0173 (0.013)	0.0173 (0.013)	0.0071 (0.013)	0.0071 (0.013)	0.0071 (0.013)	0.0335** (0.014)	0.0173 (0.014)
Home-based	-0.0525** (0.012)	-0.0525** (0.012)	-0.0269** (0.012)	0.0183* (0.010)	-0.0632** (0.010)	-0.0278** (0.011)	0.0169 (0.011)	0.0053 (0.011)	-0.0925** (0.011)	-0.0578** (0.012)
Part time Bus.			-0.0263* (0.014)			-0.0891** (0.012)				-0.0742** (0.012)
Incorporated			0.0341** (0.012)			0.0750** (0.011)				0.0763** (0.011)
Employment			0.0065** (0.001)			0.0020** (0.001)				0.0019** (0.001)
Net Worth: Missing									0.0297 (0.023)	0.0118 (0.023)
Net Worth: Neg. or Zero									0.0306 (0.022)	0.0144 (0.022)
Net Worth: \$51,000-100,000									0.0137 (0.019)	0.0136 (0.019)
Net Worth: \$100,001-250,000									0.0564** (0.017)	0.0488** (0.017)
Net Worth: \$250,000+									0.0797** (0.016)	0.0581** (0.017)
Observations	3,975	3,972	3,840	9,006	8,842	8,578	8,460	8,460	8,426	8,173
R-squared	0.040	0.048	0.066	0.044	0.052	0.071	0.051	0.057	0.069	0.084

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table X: Decomposing Racial Differences in Leverage

This table presents Oaxaca-Blinder decompositions of the leverage ratio, the ratio of outside debt to total financial capital. The upper panel reports differences in the mean values of black and white leverage. The bottom panel decomposes the mean difference into amounts explained by each of the independent variables. Education is the total variation explained by the group of dummy variables that capture different levels of educational attainment (see previous table); Industry is the total amount explained by the industry dummies; Wealth is the amount explained by the high wealth dummy and the dummy for whether wealth is missing. Column (1) is based on Column (1) from the previous table. Column (2) is based on Column (4) from the previous table, while columns (3) and (4) are based on columns (7) and (8) from the previous table, respectively.

EQUATION	VARIABLES	(1) Year 0	(2) Years 1-3	(3) Years 4-7	(4) Years 4-7
Differential	White	0.1983	0.3031	0.2967	0.2967
	Black	0.1238	0.2125	0.2036	0.2036
	Difference	0.0745	0.0906	0.0931	0.0931
Explained	Experience	0.0001	-0.0039	-0.0030	-0.0048
	Gender	0.0004	0.0026	0.0024	0.0024
	Education	-0.0005	-0.0018	-0.0018	-0.0029
	Credit	0.0111	0.0233	0.0458	0.0437
	Industry	-0.0014	0.0035	0.0026	0.0026
	Wealth				0.0228
	Years		-0.0004	0.0003	0.0003
Total		0.0097	0.0234	0.0464	0.0642
	Observations	3,493	7,966	7,516	7,516

Table XI: Racial Differences in Attitudes Towards Formal Debt

This table reports survey-weighted averages by racial group to questions in the KFS that capture attitudes and intentions with respect to borrowing. "Applied for a loan" is a dummy equaling one if the respondent applied for a loan, regardless of whether the loan was approved. "Did not apply for fear of rejection" is one for those borrowers who did not apply for a loan, but who did not only because they anticipated the loan being denied. "Loan Always Approved" is only available for those who applied for a loan: it is a dummy for whether the respondent received the full amount they were asking for, or whether sometimes their loans are denied or reduced in size. "Unmet Need" is 1 if the respondent either did not apply for fear of rejection, or else applied but did not always get the full amount. The column labeled Overall is for all respondents. The remaining columns split the sample on whether the respondent had below or above median credit score, or whether credit scores were above the 75th percentile of observed scores across the whole sample.

		Overall	Credit Score:		
			Below Median	Above Median	Above 75 th
Applied for a Loan					
	White	0.1200	0.0838	0.1414	0.1617
	Black	0.0785	0.0752	0.0834	0.1125
Did Not Apply For Fear of Rejection					
	White	0.1617	0.1666	0.1590	0.1497
	Black	0.4181	0.4746	0.3244	0.3228
Loan Always Approved					
	White	0.6826	0.6201	0.7038	0.7225
	Black	0.2240	0.1153	0.3862	0.2530
Unmet Need					
	White	0.1633	0.1671	0.1611	0.1525
	Black	0.4295	0.4929	0.3246	0.3174

Table XII: Credit-worthiness, Race and Attitudes towards Capital Markets

This table reports Probit analysis connecting attitudes towards capital markets to lending outcomes. The dependent variable is a dummy variable that equals one if the respondent reports that they did not apply for credit out of fear that they would be denied. The analysis is conducted using data from survey waves 4-8. Survey year fixed effects are included in each regression. Controls include number of employees, total assets, owner's education, whether the business is based at home or outside the home, and whether the founder is male or female. A constant is estimated in each model but suppressed for brevity.

	Waves 4-8			
	(1)	(2)	(3)	(4)
Black	0.256*** (0.022)	0.257*** (0.021)	0.211*** (0.026)	0.185*** (0.029)
Net Worth	-	-	-0.055*** (0.005)	-0.046*** (0.005)
CCS	-	-	-	0.047*** (0.006)
Controls	No	Yes	Yes	Yes

Table XIII: Denial Rate and Credit Constrained Regressions

This table reports Probit analysis connecting attitudes towards capital markets to lending outcomes. The dependent variable in Panel A is a dummy measuring whether they applied for credit but were either denied altogether or received less than they applied for. In Panel B, the dependent variable is a dummy that is one if the respondent either failed to apply, or applied and received less than they requested. Survey waves 5-8 are used in the regressions, with survey year fixed effects included. Controls include number of employees, total assets, owner's education, whether the business is based at home or outside the home, and whether the founder is male or female. A constant is estimated in each model but suppressed for brevity.

Panel A: Denied Credit					
	(1)	(2)	(3)	(4)	(5)
Black	0.452*** (0.055)	0.444*** (0.057)	0.359*** (0.075)	0.298*** (0.083)	0.265*** (0.095)
Net Worth=2	-	-	0.091 (0.107)	0.135 (0.119)	-0.006 (0.135)
Net Worth=3	-	-	-0.053 (0.101)	-0.107 (0.114)	-0.095 (0.127)
Net Worth=4	-	-	-0.078 (0.099)	-0.105 (0.112)	-0.068 (0.125)
Net Worth=5	-	-	-0.189** (0.090)	-0.223** (0.100)	-0.208* (0.111)
Controls	No	Yes	Yes	Yes	Yes
CCS Dummies	No	No	No	Yes	Yes
Pdx($n + 1$)	No	No	No	No	Yes
Panel B: Credit Constrained					
	(1)	(2)	(3)	(4)	(5)
Black	-0.422*** (0.051)	-0.420*** (0.057)	-0.348*** (0.069)	-0.281*** (0.075)	-0.285*** (0.092)
Net Worth=2	-	-	-0.019 (0.048)	-0.031 (0.058)	0.009 (0.131)
Net Worth=3	-	-	0.104 (0.102)	0.208* (0.117)	0.181 (0.131)
Net Worth=4	-	-	0.093 (0.100)	0.101 (0.116)	0.032 (0.131)
Net Worth=5	-	-	0.243*** (0.089)	0.296*** (0.102)	0.233* (0.114)
Controls	No	Yes	Yes	Yes	Yes
CCS Dummies	No	No	No	Yes	Yes
Pdx($n + 1$)	No	No	No	No	Yes

Table XIV: Local Banking Conditions and Racial Bias

Panel A reports regressions (Pooled OLS with year dummies) in which the dependent variable is the natural log of total business debt. Panel B reports Probit regressions in which the dependent variable is a dummy if the respondent had unmet capital needs, which is true if the respondent answered yes to “Did Not Apply for Fear of Rejection” or if they reported that they did not always get the full amount they asked for. Local bank share is the share of total county-level deposits held by local banks. Local bank concentration is the herfindahl of local banks at the county level computed using deposits. Standard errors in parentheses, with one, two and three asterisks denoting significance at the 10, 5 and 1percent level. Controls from Table IV included but not shown.

Panel A: Dependent variable is Did Not Apply for Fear of Denial

Black	0.7605*** (0.059)	0.7571*** (0.059)	0.7238*** (0.077)	0.7117*** (0.078)	0.5778*** (0.128)
Local Bank Share		-0.2623** (0.105)	-0.2881*** (0.111)	-0.2594** (0.115)	-0.2557** (0.116)
Local Bank Share × Minority			0.2358 (0.366)	0.3086 (0.381)	0.1578 (0.387)
Local Bank Concentration				-0.5995*** (0.191)	-0.6727*** (0.203)
Bank Conc. × Minority					0.9212 (0.706)
Credit Score	-0.0035*** (0.001)	-0.0035*** (0.001)	-0.0035*** (0.001)	-0.0035*** (0.001)	-0.0035*** (0.001)
Constant	-0.9541*** (0.099)	-0.9093*** (0.101)	-0.9046*** (0.101)	-0.7996*** (0.107)	-0.7862*** (0.107)
Observations	11,204	11,193	11,193	11,193	11,193

Panel B: Dependent variable is Unmet Capital Need

	(1)	(2)	(3)	(4)	(5)
Black	0.7808*** (0.059)	0.7775*** (0.059)	0.7249*** (0.077)	0.7126*** (0.078)	0.5958*** (0.127)
Local Bank Share		-0.2413** (0.107)	-0.2818** (0.113)	-0.2460** (0.118)	-0.2422** (0.118)
Local Bank Share × Minority			0.3715 (0.370)	0.4463 (0.385)	0.3147 (0.394)
Local Bank Concentration				-0.6577*** (0.192)	-0.7224*** (0.205)
Bank Conc. × Minority					0.8042 (0.700)
Credit Score	-0.0034*** (0.001)	-0.0034*** (0.001)	-0.0034*** (0.001)	-0.0034*** (0.001)	-0.0034*** (0.001)
Observations	11,206	11,195	11,195	11,195	11,195

Table XV: Historical Inequality and Racial Bias

Panel A reports regressions (Pooled OLS with year dummies) in which the dependent variable is the natural log of total capital. Panel B reports Probit regressions in which the dependent variable is a dummy if the respondent had unmet capital needs, which is true if the respondent answered yes to “Did Not Apply for Fear of Rejection” or if they reported that they did not always get the full amount they asked for. Regional Historical Gini is the gini coefficient of the MSA in 1890; data from Braggion, Dwarkasing, and Ongena (2015). In each panel a constant is estimated but suppressed for brevity. Standard errors in parentheses, with one, two and three asterisks denoting significance at the 10, 5 and 1percent level. Controls from Table IV included but not shown.

Panel A: Dependent Variable is Did Not Apply For Fear of Denial						
Black	0.8141*** (0.058)	0.7514*** (0.061)	0.2008 (0.276)	0.7605*** (0.059)	0.7022*** (0.061)	0.1819 (0.274)
Historical Inequality		0.5565*** (0.159)	0.4507*** (0.166)		0.6057*** (0.159)	0.5056*** (0.166)
Gini × Minority			1.1465** (0.568)			1.0848* (0.563)
Credit Score				-0.0035*** (0.001)	-0.0032*** (0.001)	-0.0032*** (0.001)
Constant	-1.0867*** (0.097)	-1.3712*** (0.133)	-1.3198*** (0.135)	-0.9541*** (0.099)	-1.2731*** (0.135)	-1.2252*** (0.137)
Observations	11,247	9,436	9,436	11,204	9,396	9,396

Panel B: Dependent variable is Unmet Capital Need						
	(1)	(2)	(3)	(4)	(5)	(6)
Black	0.8323*** (0.058)	0.7622*** (0.060)	0.1579 (0.275)	0.7808*** (0.059)	0.7165*** (0.061)	0.1405 (0.273)
Historical Inequality		0.5762*** (0.157)	0.4609*** (0.164)		0.6239*** (0.157)	0.5139*** (0.165)
Gini × Minority			1.2586** (0.566)			1.2012** (0.560)
Credit Score				-0.0034*** (0.001)	-0.0030*** (0.001)	-0.0030*** (0.001)
Constant	-1.0384*** (0.096)	-1.3343*** (0.132)	-1.2784*** (0.134)	-0.9091*** (0.098)	-1.2429*** (0.134)	-1.1903*** (0.136)
Observations	11,249	9,437	9,437	11,206	9,397	9,397

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A Appendix

This appendix presents detailed raw data on sources of financing for firms in the 2004 Kauffman Firm Survey. It is based on Robb and Robinson (2014). The detailed sources are grouped into six broad categories, based on the source of the capital and the type of capital. These are (owner, informal, formal) \times (debt, equity).

Table A.1 describes the detailed financing choices in 2004 (the founding year for the firms in our sample). The first column, labelled “Full KFS”, includes all 4,928 firms in the Kauffman Firm Survey. For some of these firms, it cannot be verified that they either went out of business or remain in operations, therefore in the remaining columns we include 3,972 firms that either survived over the 2004–2007 period or were verified as going out of business over the same period. This Column is labelled “Analysis Sample.” These two columns report means that include firms with \$0 amounts of a particular source of capital. The third column, labelled “Mean if > 0 ” reports the mean, in dollars, for only firms with positive amounts of that source of funding. The number of respondents reporting a positive amount of each source of funding is reported in the final column.

Table A.2 provides summary statistics for key variables based on the race of the firm owner.

Table A.3 provides a decomposition of the log of total capital as in the main text, but adds controls for spatial clustering and local banking conditions. In particular, we include measures of local bank market concentration and state fixed effects to the standard decomposition analysis discussed in the text.

Table A.1: Detailed Sources of Financing for All 2004 Startups in the KFS

Category	Funding Source	Full KFS	Analysis Sample	Mean if > 0	Count
<u>Owner Equity</u>		33,640	31,734	40,536	3,093
<u>Total Owner Debt:</u>		4,952	5,037	15,765	1,241
	Personal Credit Card balance, owner	2,812	2,811	9,375	1,158
	Personal Credit Card balance, others	1,906	238	7,415	132
	Personal loan, other owners	235	1,989	124,124	67
<u>Total Insider Equity:</u>		2,221	2,102	44,956	177
	Spouse equity	524	646	40,436	62
	Parent equity	1,697	1,456	42,509	126
<u>Total Insider Debt:</u>		7,257	6,362	47,873	480
	Family loan	2,760	2,749	29,232	327
	Family loan to other owners	1,719	284	34,509	29
	Personal loan to other owners	272	550	28,988	73
	Other personal loans	649	924	81,452	45
	Business loan by family	1,156	1,760	57,207	115
	Business loan by owner	635	15	9,411	5
	Business loan by other employees	52	79	22,198	9
<u>Total Outsider Equity:</u>		19,257	15,935	354,540	205
	Angels and other investors	5,148	6,350	244,707	110
	Business equity	6,621	3,645	321,351	56
	Govt. equity	5,242	798	146,624	27
	VC equity	701	4,804	1,162,898	26
	Other equity	1,546	337	187,046	8
<u>Total Outsider Debt:</u>		50,130	47,847	128,706	1,439
	Personal bank loan	18,031	15,859	92,433	641
	Owner business credit card	16,213	1,009	7,107	543
	Personal bank loan by other owners	5,017	1,859	80,650	92
	Business credit card	4,227	812	6,976	452
	Other Business credit cards	2,275	135	7,852	62
	Business bank loans	1,591	17,075	261,358	243
	Credit line balance	1,030	5,057	95,058	210
	Nonbank business loan	133	3,627	214,920	72
	Business loan from Govt.	857	1,331	154,743	34
	Other business loan	241	231	78,281	19
	Other individual loan	206	226	43,202	22
	Other debt	308	626	119,493	22
<u>Total Financial Capital</u>		117,458	109,016	121,981	3,536

Table A.2: Summary Statistics by Race

	Overall Mean	White Mean	Black Mean	p-value(diff)
KFS Initial Survey Year				
Female	0.31	0.30	0.36	0.00
Yrs. Work Experience	11.70	11.88	9.91	0.00
Yrs. Non-Work Experience	13.54	13.57	13.23	0.21
Previous Startup Experience	0.43	0.43	0.38	0.45
Attended Some College	0.36	0.36	0.48	0.00
Graduated College	0.30	0.31	0.24	0.05
Graduate Degree	0.17	0.18	0.16	0.54
Credit Score	35.99	36.50	30.47	0.00
KFS Survey Years 1-3				
Female	0.30	0.29	0.35	0.00
Yrs. Work Experience	12.07	12.25	10.11	0.00
Yrs. Non-Work Experience	13.30	13.33	13.06	0.09
Previous Startup Experience	0.43	0.44	0.38	0.43
Attended Some College	0.36	0.36	0.48	0.00
Graduated College	0.31	0.32	0.26	0.00
Graduate Degree	0.18	0.19	0.16	1.00
Credit Score	41.39	42.27	32.28	0.00
KFS Survey Years 4-7				
Female	0.30	0.29	0.36	0.00
Yrs. Work Experience	12.70	12.84	11.12	0.00
Yrs. Non-Work Experience	12.73	12.76	12.35	0.21
Previous Startup Experience	0.44	0.44	0.40	0.43
Attended Some College	0.35	0.35	0.47	0.00
Graduated College	0.33	0.34	0.26	0.00
Graduate Degree	0.19	0.20	0.16	0.49
Credit Score	52.88	54.51	35.80	0.00
Net Worth: Neg. or Zero	0.07	0.06	0.18	0.00
Net Worth: \$1-50,000	0.15	0.13	0.30	0.00
Net Worth: \$51,000-100,000	0.14	0.14	0.16	0.01
Net Worth: \$100,001-250,000	0.18	0.19	0.13	0.00
Net Worth: \$250,000+	0.39	0.42	0.16	0.00
Net Worth: Missing	0.07	0.07	0.08	0.23

Table A.3: Decomposing Differences in the Log of Total Capital with Spatial Mismatch in Banking and Spatial Clustering Variables

EQUATION	VARIABLES	(1) Year 0	(2) Years 1-3	(3) Years 4-7	(4) Years 4-7
Differential	White	9.7922	8.8525	8.3959	8.3959
	Black	9.0319	8.5855	8.1274	8.1274
	Difference	0.7603	0.2670	0.2685	0.2685
Explained	Experience	0.0181	0.0197	0.0096	0.0020
	Gender	0.0156	0.0257	0.0188	0.0185
	Education	0.0060	0.0067	0.0035	-0.0022
	Credit	0.1186	0.1414	0.1915	0.1805
	Industry	-0.0072	0.0245	0.0495	0.0492
	Wealth				0.0722
	Years		-0.0006	0.0025	0.0025
	State_FEs	0.0061	-0.0018	0.0247	0.0260
	Banking Mismatch	-0.0078	-0.0106	-0.0078	-0.0080
	Total	0.1494	0.2050	0.2923	0.3407
Observations		3,485	7,955	7,507	7,507