

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

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March 7, 2016

## Abstract

Do minority founders face racial bias when attempt to raise capital for newly launched businesses? If so, why? To address this question, this paper uses the Kauffman Firm Survey (KFS) to examine financing patterns among minority and non-minority entrepreneurs at startup and during the early years of operation. Although black-owned businesses start with less financial capital, they do not increase financing faster eliminating their ability to catch up over time. Black-owned startups also face more difficulty in raising external capital, which is not compensated for by substitution towards other sources of capital such as owner's equity. Instead, black entrepreneurs invest less from all major sources of capital at startup and during early-stages of growth. A substantial part of the difference in access to total and external capital stems from large differences in credit scores. In contrast, differences in human capital measures, need for capital, business types, local banking conditions, and spatial clustering contribute relatively little to why black entrepreneurs obtain less financial capital. We do, however, find some suggestive evidence that racial bias in lending may play at least a partial role in financial capital differences.

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

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\*This draft is dated March 7, 2016. We are grateful for comments and suggestions from Scott Frame, Melinda Petre, Elijah Brewer, and participants at the AEA meetings, the Society for Government Economists meetings, the CESifo Conference on Entrepreneurship and Economics, the Federal Reserve Bank of Cleveland and Kauffman Foundation Conference on Entrepreneurial Finance, the International Conference on Panel Data, and the APPAM meetings.

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# 1 Introduction

Understanding the frictions and constraints that entrepreneurs face when they attempt to raise capital to start businesses is one of the central questions of entrepreneurial finance, but answering it is difficult because the details of how startups raise external funding are poorly understood. Much of what we know about entrepreneurial finance comes from firms that are already established, have already received venture capital funding, or are on the verge of going public. Although many popular accounts of the startup process stress the role of friends, family and informal capital channels, recent evidence indicates that banks also play a critical role in the startup process. For example, Robb and Robinson (2014) show that bank debt is the most common source of external financing for startups, ahead of supplier financing, venture capital, angel financing, or bootstrapped financing from friends and family. Because founders are by definition raising capital in the absence of a firm-level track record, their personal characteristics, including their financial record and personal wealth may play an important role in the fundraising process.

The goal of this paper is to provide the first detailed empirical analysis of whether minority entrepreneurs experience different financing outcomes when they attempt to raise capital to start and grow their businesses. To explore this issue, 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. A major advantage of our dataset is that it includes confidential administrative data on credit ratings from Dun & Bradstreet matched to all businesses in the KFS. The panel structure of the KFS is important for studying the financing decisions of startups, because it 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.

Understanding how capital markets affect the growth and survival of startups is an

important question in its own right, but understanding how capital markets differentially impact the growth and survival of minority startups is especially important for several reasons. Minority borrowers tend to have lower credit ratings potentially limiting their access to capital (Board of Governors 2007). Minorities also tend to have lower levels of wealth. For example, in the United States the median level of net worth among black households is fourteen times lower than that of white households, and in the United Kingdom the median net worth of black households is five times lower than that of white households (U.S. Census Bureau 2014; U.K. Office for National Statistics 2014).<sup>1</sup> Finally, minority entrepreneurs may face discrimination in loan markets. Several recent studies find 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).

We frame our analysis around two previously unexplored questions. First, we ask whether minority entrepreneurs experience different financing outcomes, both at founding and as the firm matures. To briefly preview our findings on this first question, we find that minority-owned business ventures (defined here as African-American owned) 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 over time.

The unprecedented detail of the confidential and restricted-access KFS data also 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 star-

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<sup>1</sup>Contributing to lower levels of total wealth and presenting an additional constraint for collateral and liquid assets, home ownership and equity also tend to be lower among minorities (Constant et al. 2009; U.K. Department for Communities and Local Government 2014; U.S. Census Bureau 2014).

tups. In other words, they are not able to simply substitute owner equity or debt for the lack of ability to find financing through bank loans.

One possible explanation for this finding could be that black entrepreneurs have lower demand for external financial capital. To explore this possibility, we use newly available survey information in the KFS that gauges demand and unmet need for credit among entrepreneurs. Although black borrowers apply for bank loans less frequently than non-minority borrowers, 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. Thus, racial differences in capital use likely stem from differential barriers to access to capital, rather than differences in the demand for capital.

Given these findings, our second question asks what factors explain this restricted access to capital. Here, we find large differences between black and white startups along many business and owner characteristics. In particular, we find that black entrepreneurs have lower credit scores and lower levels of human capital (as measured by education and experience). 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, surprisingly, human capital measures explain very little of the differences in financial capital use. Instead, a large part of the difference is driven by differences in credit scores between black and white entrepreneurs. 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.

We also take two preliminary steps towards understanding whether potential racial bias in capital markets explains differences. First, we find that areas where local banks

are stronger are generally areas where black-owned businesses borrow less, not more. Because local banks are widely thought to rely more heavily on personal relationships and other types of soft information in making lending decisions, racial bias in banking may be at least part of the story. Second, we explore regional variation in inequality and 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 provide four major contributions to the literature. They provide the first detailed evidence that minority startups experience different financing outcomes, both at founding and as the firm matures (previous studies only focus on surviving later-stage firms). Second, by taking advantage of confidential, restricted-access administrative data on credit scores, the results provide the first evidence on the role of credit scores in explaining racial disparities in financing among startups. Third, we provide the first detailed evidence refuting the argument that low levels of financing are simply due to black entrepreneurs having lower demand for external financial capital. Fourth, we provide new findings on whether potential racial bias in capital markets explains differences.

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. In section 4, we explore the causes of racial differences in financial capital. Section 5 explores the potential role of racial bias in capital markets, while Section 6 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 Brad-

street (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 differences in small-scale business or consulting-type activities owned by black and white entrepreneurs.

The KFS data contain unprecedented detail on the financing patterns of these firms, 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 version. We obtained confidential administrative data from D&B on credit scores 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 ethnicity of the primary owner. For firms with multiple owners (35 per cent of the sample), the primary owner is designated by the largest equity share. 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?

We report sources of startup capital and how they differ by race. 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. 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 like friends or close associates of the founder who are not direct owners of the business, or formal channels like banks, venture capital firms, angel investors, etc. Robb and Robinson (2014) make distinctions along these lines because the personal balance 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. These would show up as outside debt. Table I shows that the 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 presumably reflects 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 third to around \$11,000 in years 1-3 after startup and by years 4-7 after startup has dropped to around \$4,000 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 white-owned businesses do.

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 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 that lower amounts of personal and family wealth make this substitution an imperfect one. This results in businesses that start with smaller amounts of financial capital and that do not "catch up" over time.

One final method that helps to summarize some of these findings is to decompose the white-black gap in total financial capital into the 6 different sources of capital. For startup capital, 64 percent of the total black/white difference is due to differences in outside debt. The next biggest factors are outside equity, which contributes 25 percent of the difference, and owner equity, which contributes 21 percent of the difference.

The findings for subsequent years indicate roughly similar patterns. Racial differences in total financial capital investments are substantially due to differences in outside debt (59 percent for years 1-3 and 66 percent for years 4-7). Outside equity makes up between 15 and 23 percent of the total difference. Owner's equity becomes less important in explaining why black business invest less capital in the early years after startup.

### *3.2 Racial Patterns in Need for Capital*

Evidence from the KFS indicates that black startups obtain less financing than white startups especially in outside debt financing. But, it is possible that these differences simply reflect differences in the need for capital. Black entrepreneurs might need less capital than white entrepreneurs to start and grow their businesses, possibly due to owning different types of businesses or having different goals for growth. To explore this question directly, this section examines several variables in the KFS that capture attitudes towards borrowing and capital market experience.

One possible explanation for this finding could simply be that black entrepreneurs have lower demand for external financial capital. To explore this possibility, we use newly available survey information in the KFS that gauges demand and unmet need for credit among entrepreneurs.

Beginning in 2007, the KFS included a series of questions gauging borrowing intentions, which are not commonly available. 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 III. 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 III.<sup>2</sup> 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 75<sup>th</sup> 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.

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 III. Here, the results mirror those from the discussion above. Black business owners are significantly less likely to report that they always obtain the full amount that they are intending to borrow. 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 implies that the startup did not obtain all of the capital needed. Using this measure, black startups are much more

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<sup>2</sup>Although 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.

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, they 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.<sup>3</sup>

## 4 Do Borrower and Business Characteristics Explain Racial Differences in Financial Capital?

The previous section reports large racial differences in financial capital, both in the year that a firm is founded as well as in the years that follow. These differences occur across all sources of capital, but are especially pronounced for outside debt. Additionally, racial differences in capital use do not appear to be simply due to differences in demand or need for capital. Given that the bulk of the difference is unlikely to stem from first-order differences in the demand for capital between minority and non-minority owners, this section explores what factors might explain these differences. We focus on differences between black and white startups in owner and business characteristics, particularly those that might place black entrepreneurs at a disadvantage in their ability to raise capital to start and grow their businesses.

### 4.1 *Human Capital and Credit Scores*

We first investigate whether constraints related to human capital and credit ratings are important in limiting access to capital among black entrepreneurs. A large literature documents differences in education levels between minority and non-minority business owners.<sup>4</sup> Estimates from the KFS for startups also reveal large differences in education

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<sup>3</sup>Interestingly, 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).

<sup>4</sup>See Fairlie and Robb 2008 for a review of this literature.

levels (reported in Appendix Table II). Half of all white entrepreneurs have a 4-year college degree or graduate degree compared with 40 percent of black entrepreneurs. Less well documented, however, are differences in other forms of human capital. We find that black owners have less prior industry work experience and less prior business ownership experience.

We are particularly interested in examining whether there are racial differences in credit scores. Previous research documents racial differences in credit scores and that credit scores contribute to why minority firms have higher loan denial rates, but this evidence is for large, established firms and loan denial rates and not for startups and capital investment levels (Cavalluzzo and Wolken 2005). For startups, we also find substantial differences in credit scores between black and white firms. The average credit score (measured in overall percentiles) among black firms is 30, compared with 37 for white firms.

These mean differences between blacks and whites in credit scores summarize distributional differences quite well. The black/white difference in medians is similar (43 for whites and 32 for blacks). Both distributions appear roughly normal with the black distribution being clearly to the left of the white distribution. The black median lines up with only the 32th percentile in the white distribution and the white median lines up with the 69th percentile in the black distribution. As noted below, we also experiment with functional form and find that a linear relationship with mean differences captures the effects well in the decompositions.

Although these differences between white and black firms in credit scores and human capital are substantial, their effect on racial difference in financial capital investments are unknown. In fact, they can only contribute to racial differences in financial capital investments if they are also important determinants of these investments. Thus, to better understand why racial differences in financial capital exist, we next model the determinants of startup capital and subsequent financial injections. Table IV 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 evi-



dence 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.

Column (4) analyzes 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.

## *4.2 Controlling for Business Type and Performance*

The regression framework provides an additional method of exploring whether racial differences in capital use are due to differences in demand for capital beyond the analysis of the unmet capital need variables above and the inclusion of industry controls.

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 somewhat "endogeneous" 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.

### *4.3 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 impact of each factor, however, is difficult to summarize without further analysis. In particular, we wish to identify the separate contributions from racial

differences in each of the variables included in the regressions to the gap in financing.

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  $\beta^W$  or  $\beta^B$ .<sup>5</sup>

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

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<sup>5</sup>Note that an alternative formulation of Equation 1 is  $\bar{Y}^W - \bar{Y}^B = [\bar{X}^W - \bar{X}^B] \hat{\beta}^B + \bar{X}^W [\hat{\beta}^W - \hat{\beta}^B]$ .

positions as:

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

where  $X^j$  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 V 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 IV). 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.<sup>6</sup> 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

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<sup>6</sup>We 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.

with capital needs, do not contribute to why black entrepreneurs invest less capital than white entrepreneurs.

#### *4.4 Outside Debt*

Given the importance of outside debt illustrated in the 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. Table VI reports regression results, which follow the same format as Table IV, 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 due to the importance of personal wealth as collateral in obtaining loans.

Table VII 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.

## 4.5 *Leverage Ratio*

Table VIII and Table IX 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.

Racial differences in human capital measures continue to explain very little of the gaps in leverage ratios as they are not strong predictors of leverage ratios. Credit scores, however, 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.

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.

## 4.6 *Local Banking Conditions and Spatial Clustering*

The previous sections demonstrate that black-owned businesses start off with less capital and leverage, consistently rely on less outside leverage over time, and consequently do not converge to the average capital investment of white-owned businesses. Although we find that credit scores contribute substantially to these differences there are two alternative explanations that merit consideration.

One possibility is that local banking conditions differ between black entrepreneurs and white entrepreneurs. In particular, 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. Local banks often develop relationships with small businesses in the area. Black entrepreneurs are located in areas with less local banking shares, but it does not contribute strongly to either total capital invested or outside debt in the regressions. The decompositions also do not indicate that differences in local bank shares contribute to the gaps in capital investments.

We also examine whether black entrepreneurs are located in areas with less competition in banks. To measure bank competition we use an Herfindahl index for banks in the county. In most specifications, we find that increased competition in local banks is associated with higher levels of total capital investments and outside debt. But, we find that differences in local competition are not great, and the decompositions reveal no explanatory power for this factor.

Closely related is the possibility that spatial clustering more generally is 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 local bank conditions. To investigate this further, we added state fixed effects to our regressions and decompositions. State fixed effects capture the effects of differences in economic conditions, policies, business climate and bank conditions at the state level. Although black and white entrepreneurs are geographically concentrated in different states, the differences do not contribute to gaps in financing. Appendix Table III reports decomposition results. We find that state differences explain very little of the gaps in financing. Similarly, we find that local banking conditions explain very little of the gap.

To push the analysis even further, we estimate a model that includes county fixed effects. Local banking conditions are measured at the county level so they are subsumed in the county-level fixed effects. We also 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 county measures of local banking conditions to models that include county fixed effects. We are now controlling for local differences in banking conditions, economic conditions, policies and business climates. For all three time periods, the black dummy changes only slightly from the state fixed effect/local bank conditions model to the county fixed effect model. The direction of movement in the dummies is also inconsistent across specifications. These two findings indicate that county level differences do not explain part of the racial gap in financing.

Taken together, these results indicate that is unlikely that the spatial correlation between the nature of the banking system and the location of minority business owners is driving our results. Our results also 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.

#### *4.7 Robustness Checks*

We check whether these main results are robust to alternative definitions and samples. An important concern with the estimates for the two time periods after startup is survival bias. Of course, survival bias is not relevant for our estimates of startup capital because the KFS is a panel and begins with the firms in their first year of operations. 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 push the panel data in KFS further, however, to examine this issue in more detail.

Ideally, we would estimate a Heckman selection correction model with a probit model for whether the firm survived in that year and a selectivity-corrected equation for financial capital use. We could not, however, find a suitable identifying restriction that both

affects the probability of survival, but is not correlated with the unobservable component of financial capital use in that year. Instead, we explore alternative approaches that avoid this identification problem. 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. We find that human capital measures explain very little, whereas 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. We continue to find that credit scores explain a large part of the gaps and human capital measures very little of 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. Although it is impossible to definitively rule out issues related to survival bias, our main estimates do not appear to be overly sensitive to this potential problem.

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 higher order polynomials. In all of these cases, we found similar decomposition estimates for black/white differences in credit scores. These differences explain a large part of the racial gaps in financial capital.

## 5 Does Racial Bias Contribute to Differences in Financial Capital?

In this final section we investigate the role of possible racial bias against minorities as a potential explanation for differences in financial capital investments. Although it is extremely difficult to empirically isolate racial bias in its various forms and separate this from racially unbiased differences in business judgment that lead to certain types of borrowers to be allocated less capital than other types, we take modest steps in a few directions.

First, we explore whether minority startups are treated differently based on variation in local banking conditions capturing borrowing conditions. By exploiting regional variation in the structure of local banking markets, we can explore whether areas with more local bank lending, or with greater concentrations of local bank market power, exhibit greater or lesser lending to black-owned businesses. This speaks to the potential discrimination on the part of lenders.

Borrower perceptions, instead of lender perceptions, are the second channel through which racial bias may impact access to capital. Anticipating that they will face racial discrimination, black borrowers may opt out of seeking capital. The unprecedented detail of the KFS allows us to examine this channel as well.

Third, inequality and other environmental characteristics may create racial bias in access to capital more generally. In areas with more inequality minority entrepreneurs may face difficulty finding any form of capital, whether it is from equity or debt sources. We examine geographical differences in historical inequality as a more exogenous measure that potentially affects financial capital use among black entrepreneurs. We also examine a potentially positive environmental characteristic; being located in an area that has an historically black college.

## 5.1 *Bank Market Conditions and Racial Bias*

In Table X we estimate regression models that explain variation in business lending as a function of local banking conditions interacted with minority ownership status. Because local banks are widely recognized to rely more on “soft” information in making lending decisions (Stein, 1997; Peterson and Rajan, 1995), examining county-level variation in the strength of the local banking sector provides an opportunity to explore whether lender attitudes towards the race of borrowers can explain the patterns in access to capital we observe.

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. In such an environment, black-owned businesses would receive more funding in such areas, 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 the log of business bank debt 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 able to raise larger amounts of bank debt.<sup>7</sup> 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

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<sup>7</sup>Data 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 positive. This is because black-owned businesses are presumably more informationally opaque, on average, than white-owned businesses.

Instead we find the opposite. The interaction term is negative, indicating that black-owned businesses borrow less 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 new business borrowers can get larger amounts of bank debt. 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 banking conditions for black-owned businesses. Minority businesses in these regions borrow less, not more.

The evidence in Panel A, therefore, speaks to the fact that at least some of the disparities that we observe in the financial capital of white- and black-owned businesses stems from attitudes and actions by the banking market.<sup>8</sup> We cannot rule out the possibility

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<sup>8</sup>We 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 in-

that banks simply possess better information about borrower quality in these markets, and that black-owned businesses differ in terms of their underlying credit quality, observables notwithstanding. But these findings are at least consistent with the idea that racial bias by lenders affects financing outcomes for minority borrowers.

## 5.2 *Borrower Attitudes*

Another potential channel through which racial bias may play out is through unmet need for capital. Of course, one part of unmet capital need is loan denials, but as shown above a much larger component of unmet need for capital among black entrepreneurs is driven by negative borrowing expectations. If minority borrowers expect to face discrimination in banking markets, then they may self-select out of this capital channel, accepting lower levels of overall funding than they might otherwise face.

Ultimately it is difficult to disentangle the portion of borrower attitudes that stems from accurate perceptions of the lending environment with those that reflect racial bias. To take a modest step in this direction, we explore how local banking conditions interact with unmet capital need and whether these patterns are consistent with business lending. In Panel B of X, we report a probit analysis for unmet capital need (as defined above) on race and interactions with the banking variables.<sup>9</sup> Although the coefficient estimates on the interaction variables are statistically insignificant they are consistent with what we find for business lending. Positive point estimates for unmet capital need on the minority interactions with local bank share and local bank concentration line up with the negative coefficient estimates found for business lending on these two interactions.

## 5.3 *Inequality and Racial Bias*

Minority entrepreneurs may face racial bias in attempting to acquire capital from a wide range of sources. Certainly, the results presented in Table I indicate that black startups have substantially lower levels of capital from all sources than white startups. To inves-

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icates that blacks cannot simply substitute from other sources when facing racial bias in lending markets.

<sup>9</sup>The results are similar if we use "Did not apply for fear of rejection" as the dependent variable instead of the broader measure of unmet capital need.

tigate this question we exploit regional variation in historical conditions that is arguably more exogenous to the current business environment than current levels of inequality. Racial bias, however, is likely to be very persistent. For the analysis, we use a measure of historical inequality obtained from Braggion, Dwarkasing, and Ongena (2015), the Gini coefficient in an MSA as of 1890. Braggion, Dwarkasing and Ongena (2015) use this measure to show that more historically unequal regions have lower rates of self-employment. 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 see if interactions of race and inequality have different implications for total capital.

The first three columns of Table XI indicate that they do. In Panel A, we report regression results for log total capital 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 lower levels of total capital among black entrepreneurs relative to white entrepreneurs than areas with low levels of inequality.

Building on this, we also include the number of historically black colleges and universities in the zip-code as a measure of black social capital. The main idea here is that areas with one or more HBCUs are likely to be areas with better developed black business communities, and with generally higher levels of black social capital.<sup>10</sup> We do not find, however, that areas with more HBCUs have higher levels of total capital among black entrepreneurs relative to white entrepreneurs.

In Panel B of Table XI, 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. Variation in HBCUs, however, has little bearing on unmet capital need for black startups relative to white startups.

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<sup>10</sup>Most zip-codes in the US contain zero HBCUs, but some zip-codes in parts of the South with well-established black communities, like Atlanta, GA and Durham, NC, have more than one HBCU in a single zip-code.

## 6 Conclusion

This paper uses confidential, restricted-access microdata from the KFS to examine capital use patterns among minority and non-minority startups. The unprecedented 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. We find that black entrepreneurs invest substantially less financial capital at startup than white entrepreneurs. They also invest 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 also do not appear to be due to differences between black and white entrepreneurs in the need for capital. Survey responses, although to admittedly subjective questions, reveal that black startups have substantially higher levels of unmet need for capital than white startups. Further evidence is provided by the decompositions indicating that industry differences, which should represent first-order differences in need for capital, do not explain part of the racial gaps in financial capital. The inclusion of very detailed and "endogenous" business performance, goals for growth, and business type variables also has little effect on the black dummy in the regressions. Instead, black startups appear to face constraints to obtaining financing. We do not find, however, that these constraints are related to human capital differences, unfavorable local banking conditions, spatial clustering, or differences in economic conditions, policies and business climates. We do, however, find some suggestive evidence that racial bias in capital markets partly limits the ability of black entrepreneurs to raise capital.

Racial differences in total financial capital, outside debt and leverage ratios are largely



driven by differences in credit scores between black and white entrepreneurs. 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 wealth and characteristics associated with capital needs has little effect on these results – we continue to find that credit scores explain a substantial part of the gap. 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 is an important finding because there was little previously known about the constraints created by relatively low credit scores among black entrepreneurs. Previous evidence was focused on larger, more established businesses and for loan applications (Cavalluzzo and Wolken 2005). Improving the financial health of minority entrepreneurs should represent a top priority for improving the creation and growth prospects of minority-owned businesses. One possibility is through information provided in financial literacy courses, which are gaining momentum in many countries.

In addition to improving economic inefficiency and reducing inequality, removing barriers to access to financial capital faced by minority entrepreneurs is potentially very important for job creation. Minorities represent an increasing share of the total population in many developed countries, and thus minority entrepreneurs, if unconstrained, will increasingly contribute to job creation for themselves and others. But, the potential benefits may be even larger because many of the jobs will be located in low-income communities and many of these jobs will be filled by minorities. For example, in the United States more than 40 percent of black employer firms hire at least 90 percent minority employees (U.S. Census Bureau 1997), and 64 percent of the workforce of fast growing black firms (“gazelles”) is black (Boston 2003, 2006). Unemployment rates among minorities are extremely high in most developed countries, suggesting that the economic, social and political benefits of improved business outcomes of minority-owned firms could be very large (Constant et al. 2011; U.S. Bureau of Labor Statistics 2014; U.K. Department for

Work and Pensions 2014).

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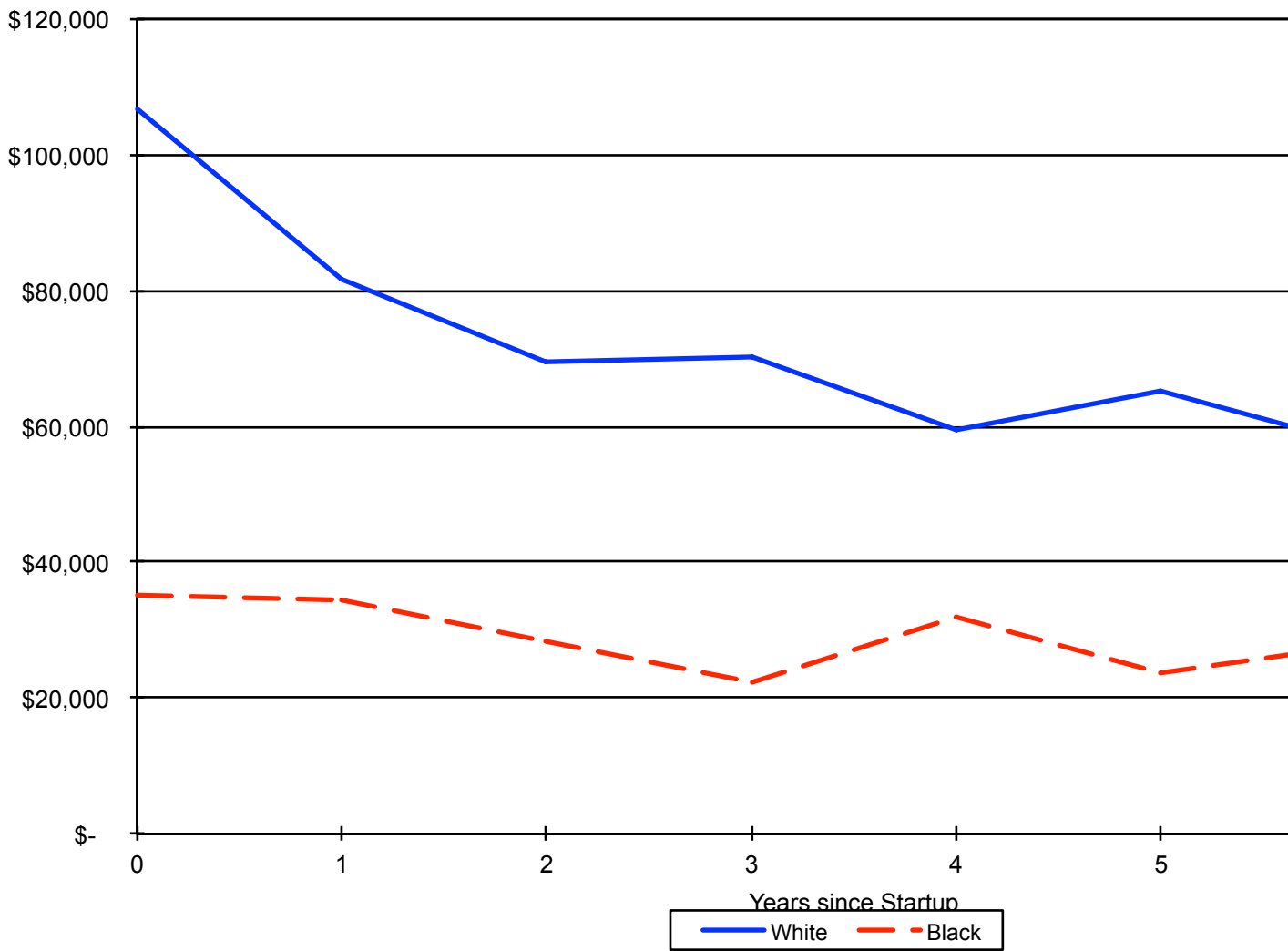
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Figure 1

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



**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: 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 75<sup>th</sup> percentile of observed scores across the whole sample.

		Overall	Credit Score:		
			Below Median	Above Median	Above 75 <sup>th</sup>
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 IV: 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)	-0.1148** (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)	0.3735*** (0.126)	0.2644** (0.128)
Net Worth: Neg. or Zero								0.4087*** (0.124)	0.4271*** (0.125)	0.3041** (0.123)
Net Worth: 51,000 – 100,000								-0.0037 (0.094)	0.0085 (0.093)	-0.0222 (0.093)
Net Worth: 100,001 – 250,000								0.1771** (0.085)	0.1636* (0.085)	0.0666 (0.085)
Net Worth: 250,000+								0.4502*** (0.085)	0.3816*** (0.085)	0.1873** (0.086)
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 V: 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 VI: 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*** (0.104)	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)	0.2611*** (0.091)	0.2565*** (0.091)	0.2565*** (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)	0.2535*** (0.074)	0.2535*** (0.073)	0.3173*** (0.072)	0.3173*** (0.072)	0.3173*** (0.072)	0.1988*** (0.073)
Home-based	-0.6944*** (0.082)	-0.6944*** (0.082)	-0.3848*** (0.083)	-0.5737*** (0.056)	-0.2950*** (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*** (0.057)	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)	0.3088** (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 VII: 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 VIII: 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)	0.0153 (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)	0.0000 (0.011)	0.0000 (0.011)	0.0054 (0.012)	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)	0.0000 (0.011)	0.0000 (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								0.0321 (0.023)	0.0297 (0.023)	0.0118 (0.023)
Net Worth: Neg. or Zero								0.0274 (0.022)	0.0306 (0.022)	0.0144 (0.022)
Net Worth: 51, 000 – 100, 000								0.0113 (0.019)	0.0137 (0.019)	0.0136 (0.019)
Net Worth: 100, 001 – 250, 000								0.0579*** (0.017)	0.0564*** (0.017)	0.0488*** (0.017)
Net Worth: 250, 000+								0.0862*** (0.016)	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 IX: 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 X: 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 Log(Business Debt)					
	(1)	(2)	(3)	(4)	(5)
Black	-0.1604*** (0.020)	-0.1527*** (0.020)	-0.1071*** (0.025)	-0.1044*** (0.025)	-0.0241 (0.037)
Local Bank Share		0.3285*** (0.060)	0.3508*** (0.063)	0.3354*** (0.064)	0.3333*** (0.064)
Local Bank Share × Minority			-0.3260** (0.131)	-0.3357** (0.132)	-0.2801** (0.132)
Local Bank Concentration				0.2481** (0.101)	0.2798*** (0.107)
Bank Conc. × Minority					-0.5215*** (0.159)
Credit Score	0.0038*** (0.000)	0.0038*** (0.000)	0.0038*** (0.000)	0.0037*** (0.000)	0.0038*** (0.000)
Observations	21,441	21,412	21,412	21,412	21,412
R-squared	0.020	0.022	0.022	0.023	0.023

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 XI: 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). HBCUs is a count of the number of historically black colleges in the zip-code. 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 Log(Total Capital)					
	(1)	(2)	(3)	(4)	(5)
Black	-0.1116** (0.057)	-0.1433** (0.059)	0.4448* (0.262)	0.4411* (0.263)	0.4375* (0.264)
Regional Historical Gini Coefficient		0.2970* (0.157)	0.3889** (0.164)	0.3885** (0.164)	0.3887** (0.164)
Gini × Minority			-1.2261** (0.529)	-1.2217** (0.530)	-1.2188** (0.530)
HBCUs in area				0.0357 (0.117)	-0.0192 (0.202)
HBCU × Minority					0.0930 (0.247)
Credit Score	0.0134*** (0.001)	0.0132*** (0.001)	0.0132*** (0.001)	0.0132*** (0.001)	0.0132*** (0.001)
Observations	21,441	17,856	17,856	17,856	17,856
R-squared	0.110	0.106	0.107	0.107	0.107

Panel B: Dependent variable is Unmet Capital Need					
	(1)	(2)	(3)	(4)	(5)
Black	0.7808*** (0.059)	0.7165*** (0.061)	0.1405 (0.273)	0.1586 (0.272)	0.1551 (0.272)
Regional Historical Gini Coefficient		0.6239*** (0.157)	0.5139*** (0.165)	0.5151*** (0.165)	0.5151*** (0.165)
Gini × Minority			1.2012** (0.560)	1.1778** (0.560)	1.1816** (0.560)
HBCUs in area				-0.1237 (0.137)	-0.2129 (0.265)
HBCU × Minority					0.1148 (0.310)
Credit Score	-0.0034*** (0.001)	-0.0030*** (0.001)	-0.0030*** (0.001)	-0.0030*** (0.001)	-0.0030*** (0.001)
Observations	11,206	9,397	9,397	9,397	9,397

## 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 Local Banking and Spatial Clustering Controls

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
	Local_Banking	-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