Racial Differences in Access to Capital for Innovative Startups

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Abstract

This paper uses data from the Current Population Survey and the Kauffman Firm Survey to examine racial differences in the prevalence of innovative business ownership and in the amount of financing that innovation-intensive firms obtain. We find clear evidence that the racial differences in access to capital among startups found more broadly in Fairlie, Robb and Robinson (2022) are also visible among innovation-intensive firms. Part of the disparity arises because black founders are much more likely than white founders with similar credit scores to anticipate that banks will reject their loan applications, and thus not apply for credit at all. Policies aimed at addressing funding disparities must confront these challenges.

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1 Introduction

A large body of economic research points to the importance of self-employment and business ownership as channels for wealth accumulation. Not only is wealth disproportionately concentrated in the hands of entrepreneurs, but entrepreneurs are more likely to experience greater upward mobility in wealth over their lifetimes (Quadrini, 1999). Entrepreneurship is thus often viewed as a mechanism for promoting economic mobility, wealth accumulation, and job creation in minority communities, representing a potential tool for alleviating racial disparities (Boston 1999, 2006; Stoll et al. 2001; Bradford 2003, 2014; Fairlie and Robb 2008).

Recent research finds large disparities between Black- and white-owned startups in access to financing, both in the initial year of founding as well as in subsequent years (Fairlie, Robb and Robinson 2022). Black-owned businesses not only start smaller, but they do not converge to the size of white-owned businesses: Financial injections in later years do not make up for the initial racial difference. Robb and Robinson (2014) show that bank financing is the most common source of capital for new businesses; indeed, reduced

reliance on bank financing among black founders is a major driver of the overall differences in total financial capital identified by Fairlie, Robb, and Robinson (2022).

The differential access to bank financing has its roots in both supply-side and demand-side considerations. On the demand side, across the distribution of credit scores, black entrepreneurs are more likely to report fear of denial as reason they did not seek out a loan. They thus "self-screen" out of the debt market, not applying for loans when a white entrepreneur with a similar credit otherwise would. Their reluctance is perhaps understandable: on the supply side, areas with stronger local banks support greater small business lending, but not for black borrowers. Reliance on "soft information," often thought to favor lending to small, new, opaque businesses, exacerbates rather than attenuates racial differences in bank debt for startups.

The findings of Fairlie, Robb and Robinson (2022) are based on a broad cross-section of entrepreneurs, representing businesses ranging from unincorporated businesses operating out of the home of the founder with no additional employees to venture-backed firms with employees and patents in the year of their founding. Although their results control for industry and location, entrepreneurship comes in a wide range of flavors. Many policy discussions treat self-employment and entrepreneurship as though they are one the same, yet self-employed individuals and entrepreneurs differ on a number of important dimensions (Levine and Rubinstein, 2018). Non-employer businesses make up the vast majority of firms in the United States (Davis et al, 2007). Most of these firms have low capital requirements, only very modest growth ambitions, and are primarily driven by non-pecuniary motivations (Hurst and Pugsley, 2011). On the other hand, a small number of new firms born every year grow dramatically, create jobs, and consume financial resources in the process (Haltiwanger, Jarmin and Miranda, 2011).

Given what we know about the pronounced racial wealth disparities in the US (US Census Bureau, 2016), the stark differences in human and financial capital across the self-employment/entrepreneurship spectrum raise an important question. Are the racial differences in financing that we observe an artifact of sorting into self-employment with relatively low capital requirements, or do racial differences in financing exist even among high-growth potential startups?

The policy implications of this question are important. If the racial differences in access to capital for startups in the cross-section primarily reflects differential sorting of black founders into less capital-intensive, lower-growth potential businesses, then this places the onus on policies that are aimed to rectify racial disparities in access to education and training in order to boost representation in innovation fields, as identified in Cook, Gerson and Kuan (2017). If, on the other hand, racial disparities persist even among innovation-intensive businesses, then policies that address the supply-side and demand-side causes for racial

disparities in access to funding are likely to be important for boosting rates of minority representation in high-tech innovation.

We take up this question by analyzing microdata from both the Current Population Survey (CPS) and the Kauffman Firm Survey (KFS). The CPS data allow us to explore racial inequality in rates of business ownership for innovation-intensive businesses and in representation in the labor force in those industries. The CPS data do not allow us to examine the sources of financing for innovation-intensive businesses. For that we turn to the KFS.

To preview our key results, the CPS data show that Blacks are under-represented in innovation-intensive business ownership. The is consistent with recent work by Cook et al (2021), which illustrates racial disparities in the education and training that leads to many careers in innovation. When we examine data from the KFS, we find that the gap between black-owned and white-owned innovation-intensive businesses is at least as large, if not larger, than what we observe when we look at the broader cross-section of self-employment and entrepreneurship. Thus, while the CPS data support the idea that there is sorting into lower capital self-employment along racial lines, we still find large racial differences in access to bank financing among incorporated, employer businesses with intellectual property.

The remainder of the paper is organized as follows. In Section 2, we describe the datasets: the Current Population Survey (CPS) and the Kauffman Firms Survey (KFS). Section 3 presents business ownership patterns by race using the CPS. Section 4 presents our results on racial inequality in financing using the KFS. Section 5 concludes.

2 Data

2.1 Current Population Survey

We measure self-employed business ownership at the individual owner level using microdata from the basic monthly files of the Current Population Survey (CPS). The CPS, conducted monthly by the U.S. Bureau of the Census and the U.S. Bureau of Labor Statistics, is representative of the entire U.S. population and contain observations for more than 130,000 people. The CPS has been conducted monthly since 1940 and is the underlying source of official government statistics on employment and unemployment. Data are collected by personal interviews. The data cover all persons in the civilian noninstitutionalized population of the United States living in households. To estimate business ownership in the CPS data, we identify all individuals who

own a business as their main job in the survey month (based on the class of worker question and monthly labor force recode). The main job is defined as the one with the most hours worked during the survey week. Thus, individuals who start side businesses will not be counted if they are working more hours on a wage and salary job. The CPS captures the current work activity of the business owner, and whether that business owner is currently operating the business. Only individuals ages 18 to 65 who are in the labor force are included to focus on business ownership patterns among the working-age population. The measure of business ownership in the CPS captures all business owners including those who own incorporated or unincorporated businesses, and those who are employers or non-employers. In addition to providing information on business ownership and current activity, the CPS data include information on detailed demographic information such as the race and ethnicity of the owner. The data also include information on the industry and incorporation status of the business. The CPS data have been used in previous research to study self-employment, business ownership and entrepreneurship (e.g. see Hipple and Hammond 2016; Chatterji et al. 2014; Fairlie and Chatterji 2013; Levine and Rubenstein 2017; Wang 2019; Fairlie and Fossen 2019).

2.2 Kauffman Firm Survey

We use the confidential, restricted access version of the Kauffman Firm Survey (KFS) to study how startups access capital markets. The KFS is a longitudinal survey of new businesses in the United States, collecting annual information for a sample of 4,928 firms that began operations in 2004. The underlying sample frame for the KFS is Dun and Bradstreet (D&B) data.

The KFS data contain unprecedented detail on the financing patterns of startups, as well as detailed information on both the firm itself and up to ten business owners of the firm. In addition to the 2004 baseline year data, we use the seven years of follow up data covering calendar years 2005 through 2011. Detailed information on the owners includes race, gender, age, education, previous startup experience, and previous work experience. Detailed information on the firm includes industry, physical location, employment, sales, intellectual property, and financial capital used at start-up and over time. The detailed financing information in the KFS allows us to examine the relative importance of each source of financing at start up and over time. The confidential, restricted-access version of the KFS includes credit scores, continuous measures of key variables, such as financing, and more detail on industries and geographic locations than the publicly-available KFS. The KFS was also designed using sample weights to be representative of all new businesses in the U.S. economy and not restricted to a narrow set of industries or business types. We also have administrative

data on credit scores from D&B matched to all firms in the KFS. Credit scores are not available on most surveys, perhaps because most entrepreneurs do not know readily know what their scores are. While the KFS contains unprecedented detail on the business formation process, the availability of business credit scores allows us to control for many differences in firm characteristics that would be observable by bank lending personnel but typically unobservable to the econometrician.

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 (e.g. the Survey of Business Owners and Survey of Small Business Finances). Another advantage of the KFS is that fundraising levels are measured annually, and are thus less prone to recall bias than cross-sectional datasets asking for retrospecitive information.

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 previous work finds that results are robust to alternative approaches to addressing survival (Fairlie, Robb and Robinson 2022). We also specifically focus on firms that have a white or black primary owner.

To do this, we assign owner demographics at the firm level based on the primary owner. For firms with multiple owners (35 percent of the sample), the primary owner is designated by having the largest equity share in the business. In cases where two or more owners owned equal shares, hours worked and a series of other variables are used to create a rank ordering of owners in order to define a primary owner following the algorithm proposed in Ballou et al (2008). We include businesses with owners of all races in the regression analysis, but focus our comparisons on black- and white-owned businesses. Following standard conventions in the literature, the white category includes only non-Hispanic whites. Using these definitions, we find that 9.1 percent of the KFS sample of startups is black-owned. The percentage of black-owned startups does not notably change over time indicating similar survival rates. In the seventh year after startup we find that 8.4 percent of the KFS sample is black-owned.

2.3 Identifying Innovative Businesses

The CPS and KFS are very different surveys, and they require us to take a slightly different approach to identifying innovative businesses. For the CPS, we focus on the individual-level industries that have the

highest growth and innovation potential. These are Information, Financial activities, and Professional and Business Services.

For the KFS data, we offer both an industry-based definition and a firm-based definition of whether a startup is innovation intensive. For the firm-based measure, we flag firms that are incorporated, have employees in addition to the founder, and have some kind of intellectual property—either a patent or trademark.[1] This is no doubt a restrictive definition, one that many innovation intensive firms do not meet in the year of their founding, but this nevertheless leaves us with a set of firms that have a high likelihood of pursuing innovation. By imposing a strict criterion for whether a business is innovation intensive, we presumably make it more difficult to detect racial differences, because we screen out many more firms that lack sufficient amounts of initial capital. whether a firm operates in NAICS codes 31 (manufacturing) or 71 (arts, entertainment and recreation). These are industries that have high rates of employer businesses and business incorporation in the KFS.

3 Racial Differences in the Rate of Business Ownership

3.1 Overall Business Ownership Patterns

We start at the broadest level of examining differences in business ownership patterns by race using the CPS microdata. Analyzing business ownership patterns allows us to examine the extensive margin of participation in innovative startup activity by black and white founders before turning to the intensive margin of financing differences. Figure 1 displays business ownership rates for Blacks and whites (non-Latinx) from 1996 to 2021.

Insert Figure 1 here

Over the entire time period, Blacks have lower levels of business ownership than whites, and the disparity is large. Blacks have an average business ownership over the time period of 4.4 percent compared with 10.1 percent for whites. The trends show some evidence of convergence over time in rates but this is because of a decline in white rates as much as an increase in Black rates. There are also some large changes in 2020 and 2021 which are likely due to COVID disruptions (Fairlie 2020). We do not focus on those here. Overall, Blacks are much less likely to own businesses than are whites. The gap has narrowed over the past two and a half decades but remains large in recent years. Just prior to the economic disruptions of

[1] See Fairlie and Miranda (2016) for evidence linking incorporation status and employment to growth orientation.

COVID-19, Black business ownership rate was 5.1 percent compared with 9.3 percent for whites. This is the starting point for racial inequality in business ownership before turning to innovative businesses.

3.2 Innovative Business Ownership

We turn next to examining differences by race in the ownership of innovative businesses. Figure 2 displays the ownership of innovative businesses by race. Blacks have much lower levels of ownership of innovative businesses than do whites. In the early 2000s, around 1.1% of Blacks own innovative businesses. In comparison, over 3% of whites were owners of innovative businesses in the early 2000s. While the rate of black innovative business ownership has trended upward slightly since then, innovative business ownership is about twice as prevalent among whites as among Blacks.

Insert Figure 2 here

There are two underlying reasons why Blacks are less likely to own innovative businesses: (i) Blacks are less likely to work in innovative industries, and (ii) Blacks are less likely to own businesses conditioning on working in innovative industries. To explore this question, Figure 3 displays the percentage of the labor force in innovative industries by race, and Figure 4 displays the business ownership rate among the labor force in innovative industries.

Insert Figure 3 here

Insert Figure 4 here

Figure 3 shows that Blacks are slightly less likely to work in innovative industries. An average of around 18% of Blacks work in innovative industries compared with around 22% of whites. Conditioning on working in an innovative industry Blacks are substantially less likely to own a business than are whites in these innovative industries. As Figure 4 shows, the number of Blacks working in innovative industries who own a business has grown from around 6% in 2004 to around 9% today, whereas the rate for whites working in innovative industries who own a business has dropped from around 16% to around 14%.

Thus, to conclude, the evidence from the Current Population Survey shows that Blacks are underrepresented among owners of innovative businesses. This is a combination of both underrepresentation in the innovative labor force, as well as being less likely to own businesses conditional on being in the innovative labor force. In the next section we move from the extensive margin of firm entry to the intensive margin of firm size conditional on entry.

4 Racial Differences in Funding For New Businesses

Next we focus on the set of entrepreneurs operating innovation-intensive businesses with data from the Kauffman Firm Survey to examine racial differences in access to capital for innovation-intensive startups.

Figure 5 illustrates that indeed, innovation-intensive startups are, on average, also capital-intensive startups, at least relative to the proto-typical firm in the Kauffman Firm Survey.

Insert Figure 5 here

The figure compares firms that meet our firm-level innovation-intensive definition (incorporated, employer firms with patents or trademarks) to those that do not. Innovation-intensive firms are around three times larger at inception, on average, with around $250,000 of startup capital in 2004 compared to around $75,000 for non-intensive firms. While low-innovation intensive firms certainly grow during the sample period of the KFS, increasing from about $75,000 at birth to around $300,000 at the end of the sample, the growth among innovation-intensive businesses is dramatically larger. By 2010, the average (surviving) innovation-intensive firm has raised over $1.4 million in total capital.

Given that innovation-intensive firms are so much larger and grow so much more, the immediate question becomes whether we see racial differences in access to capital among these firms. Figure 6 takes up this question by comparing the amount of business debt at inception. The overall difference reported in the left two columns is at least as pronounced when we focused on innovative-intensive firms, as defined either by their industry or by their firm characteristics.

Insert Figure 6 here

To put the scale of this difference in perspective, we computed the average amount of total capital in 2004, including not just business debt but debt from all sources, for black- and white-owned innovative businesses. The 278 white-owned innovation-intensive businesses reported an average total capital in 2004 of around $340,000 while for the 21 black-owned businesses the number was $41,487.

These differences in initial firm size could wash away over time if black-owned businesses raised more outside capital in subsequent years to make up for their lower initial funding amounts. This time-series pattern of initial differences narrowing over time would naturally arise in a setting where initial borrowing conditions were heavily influenced by perceptions of racial differences in creditworthiness in the absence of information about the firm itself, but became less important over time as the startup became less opaque as

it matured. We do not find this pattern in the outside debt raising of black-owned firms in the later years of the survey, as Figure 7 shows.

Insert Figure 7 here

Figure 7 compares the overall difference between black-owned and white-owned firms in the logarithm of new business debt raised in 2008-2011 to the difference observed in innovation-intensive businesses. Using an industry-based definition of innovation intensity, the average amounts of outside debt are essentially equal, and when we focus on a firm-based measure of innovation intensity, we find that black-owned businesses continue to rely on less outside debt than white-owned businesses.

This culminates in what we might term a "Black Startup Capital Deficit" which can be seen in Figure 8. To generate this figure, we regressed the total outside financial capital raised as of 2011 on firm, owner and industry characteristics and reported the coefficient on the variable for founder race. The interpretation of the figure is that it captures the incremental difference attributable to the race of the founder, controlling for other confounding characteristics.

Insert Figure 8 here

As the figure shows, black-owned businesses lag behind white-owned businesses *more* in innovation-intensive settings, not less. Overall, we find that black-owned businesses are around $90,000 smaller than white-owned businesses by the end of the sample. But controlling for business and owner characteristics, black-owned businesses in innovation-intensive industries are around $650,000 smaller than white-owned businesses. If we use a firm-based definition of innovation intensity, black-owned businesses are around $250,000 smaller than similar white-owned innovation-intensive businesses.

Why does this occur? Evidence from Fairlie, Robb and Robinson (2022) shows that an important factor is the fact that black entrepreneurs have worse expectations of banking outcomes than white entrepreneurs with similar credit scores. Consider entrepreneurs whose credit scores place them above the 75^{th} percentile of the distribution of entrepreneurs in the Kauffman Firm Survey. In this group, the authors report that 32% of black entrepreneurs report that they did not apply for a loan for fear of being denied credit. The corresponding figure for white entrepreneurs in this group is 15%, less than half the amount. This indicates that black entrepreneurs expect rejection to a far greater degree than white entrepreneurs and screen themselves out of the market for business loans based on these expectations. Similarly, over 70% of high credit score white entrepreneurs report that they are always approved for loans, while only around 25% of high credit score black entrepreneurs report always being approved.

Figure 9 explores whether these same factors are at play among innovation intensive businesses.

Insert Figure 9 here

The first set of columns report the difference between black and white entrepreneurs in reporting that they did not apply for fear of being rejected, and are obtained from regressions in which an indicator variable flagging did not apply for fear of rejection is regressed on owner race, other owner demographics, business and other characteristics. On the left the point estimate obtained from the full sample is reported, while the remaining two columns report the value for innovation-intensive startups, defined either by industry or firm characteristics. The point estimates indicate that black entrepreneurs are about twice as likely to report that they did not apply for fear of denial in the innovation intensive sample.

The second set of columns report the difference between black and white entrepreneurs in the probability that they are *actually* denied credit, conditional on borrowing. Here we see a different story than that found in the work of Fairlie, Robb and Robinson (2022). While in the full sample, the rate of denial is considerably higher among black entrepreneurs, the statistical significance of the difference among innovation intensive firms vanishes. In short, there is no statistically discernible difference in reported loan denial rates between white and black entrepreneurs operating innovation intensive businesses. We might be underpowered, however, to detect differences here.

5 Conclusion

Racial inequality in access to financing contributes to broader inequality in business success, growth and job creation. This paper builds on recent work that demonstrates pronounced racial differences in the amount of startup capital associated with new firms.

Using data from the KFS, Fairlie, Robb and Robinson (2022) show that black-owned startups receive significantly lower amounts of bank debt than similar white-owned startups, both in the initial year of founding as well as in later years. Instead of focusing on the entirety of firms covered by the KFS, this paper zeroes in on firms that have high-growth potential either because they possess characteristics at founding that are correlated with high-growth potential or because they operate in high-growth industries.

A priori, it is unclear whether we should expect racial differences in startup characteristics found in the broader cross-section to also be present in the sub-sample of innovative firms. One reason why we may see racial differences in average funding is because we see sorting based on racial lines: indeed, our examination

of data from the CPS shows that black founders are under-represented in innovative industries. The primary driver of differences in the broader cross-section could thus be sorting of black founders into settings with low capital requirements, a reflection of lack of equal representation in innovative industries and settings. On the other hand, many innovative startups have large capital requirements, and thus racial differences in access to capital may be exacerbated in these settings because the demand for capital is relatively large.

Our findings show that the racial differences in access to capital for startups found in the broader cross-section are at least as large, if not larger, among innovative startups. Innovation-intensive businesses founded by black entrepreneurs start with less capital in their year of founding. Over time, they do not make up for this initial gap with greater funding; if anything, the funding gap in follow-on capital exacerbates the differences in initial conditions. As a result, we observe a "racial capital deficit" in innovation-intensive businesses after controlling for founder demographics, business characteristics, and other factors that is at least as large as the overall racial capital deficit in startups more broadly. Racial differences in access to capital for startups thus are not primarily explained by sorting of black founders into settings with low capital requirements.

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A Figures

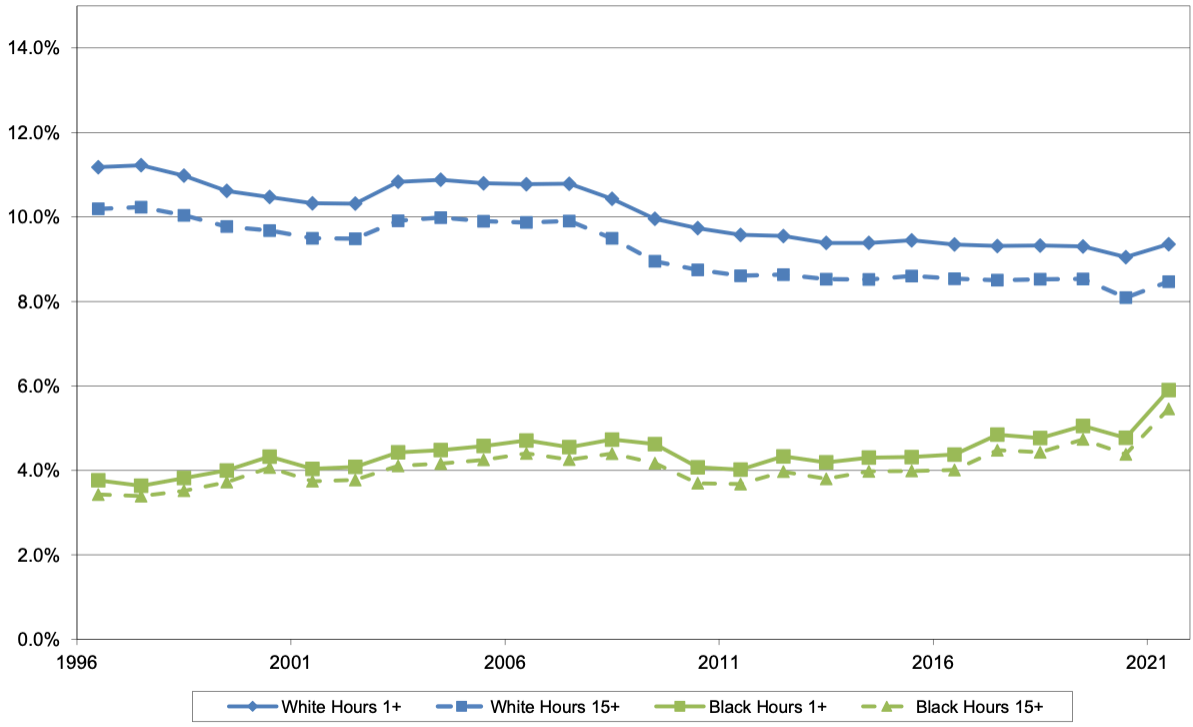

Figure 1: Racial Differences in Business Ownership in CPS

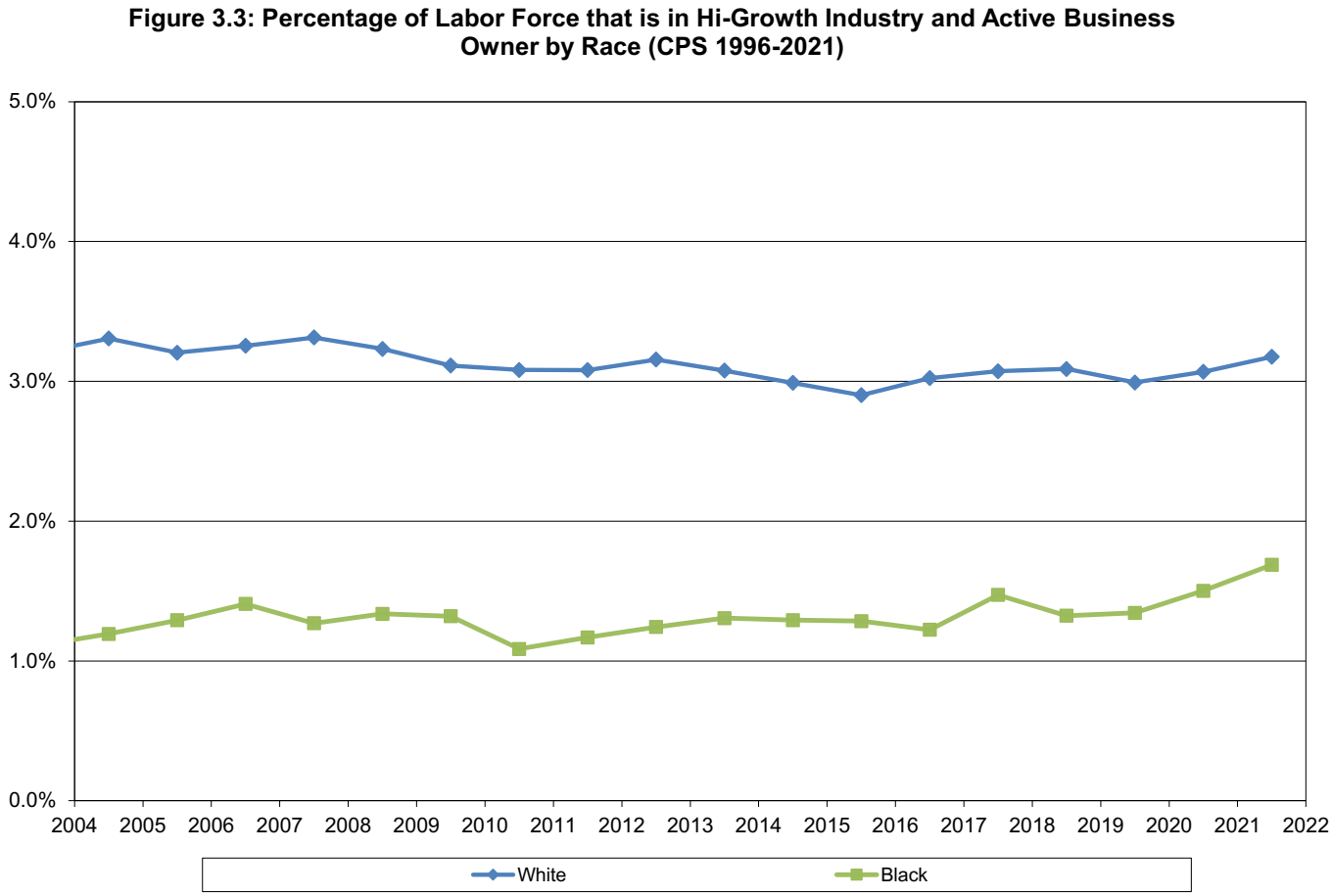

Figure 2: Racial Differences in Business Ownership for High-Growth Firms in CPS

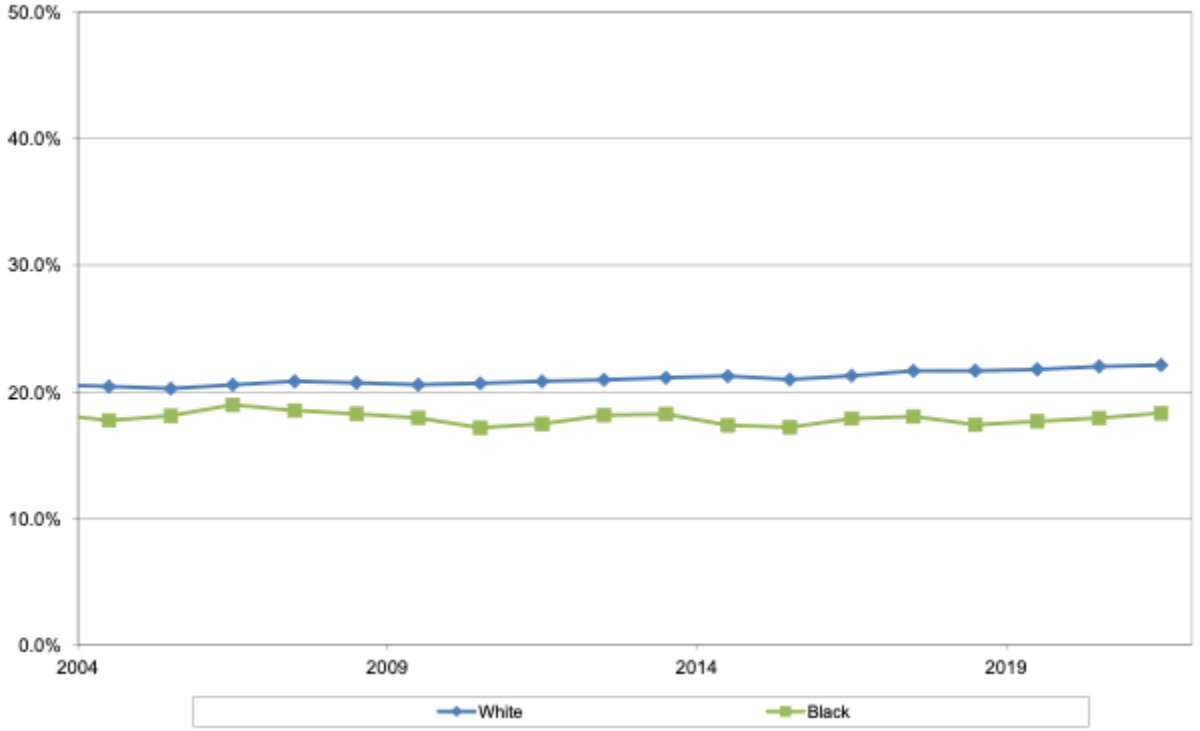

Figure 3: Racial Differences in Labor Force Representation for High-Growth Industries

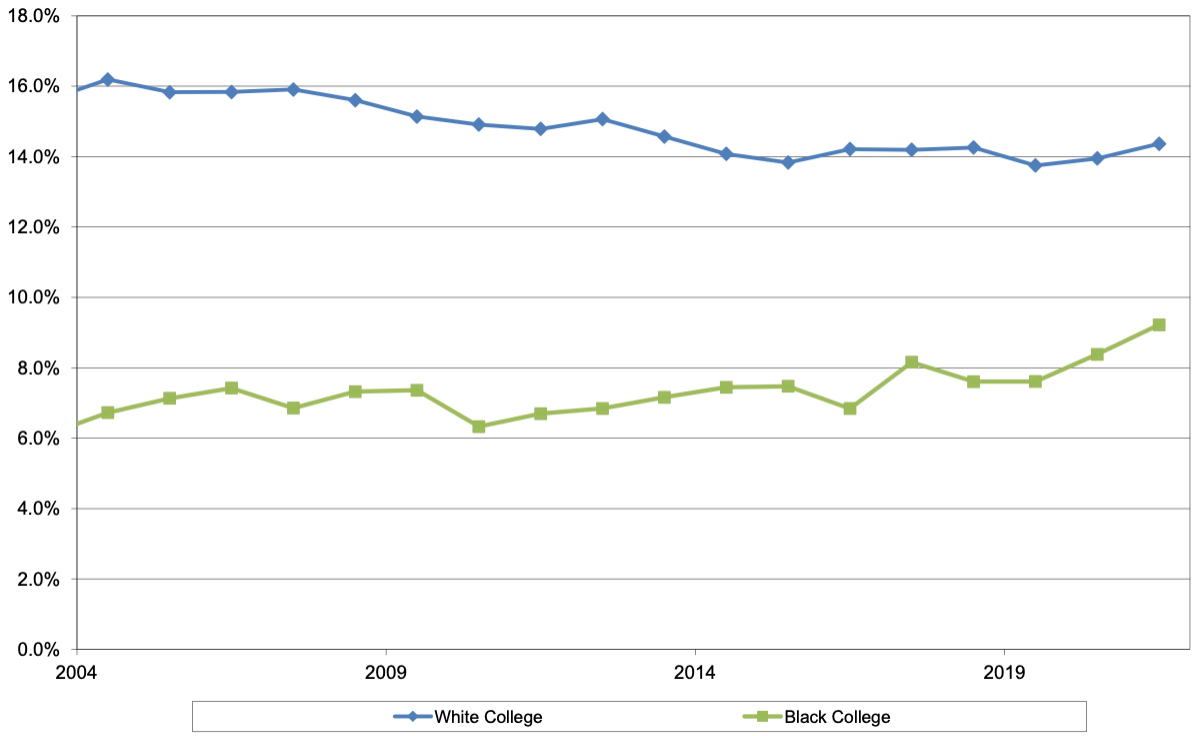

Figure 4: Racial Differences in Business Ownership in High-Growth Industries

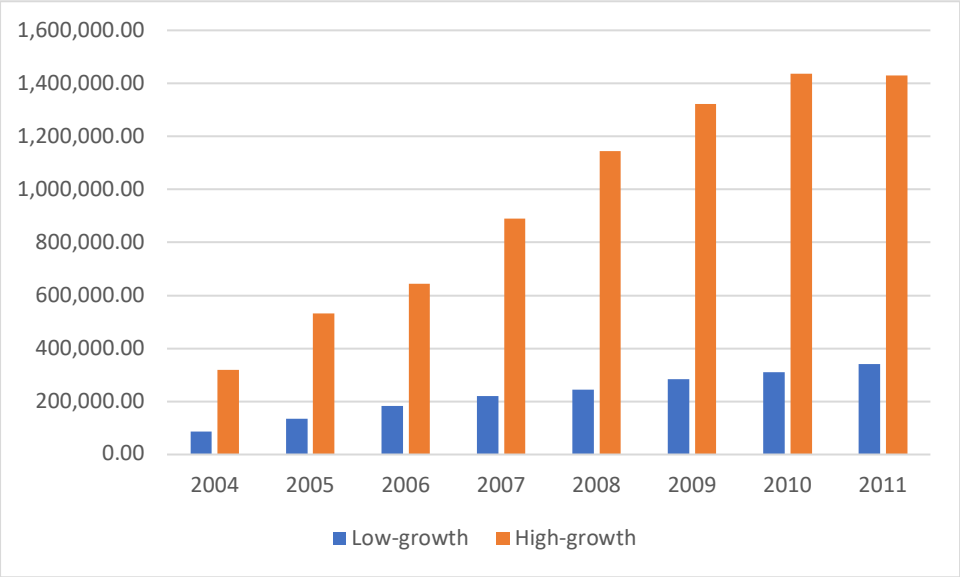

Figure 5: High-Growth Businesses Have High Capital Requirements

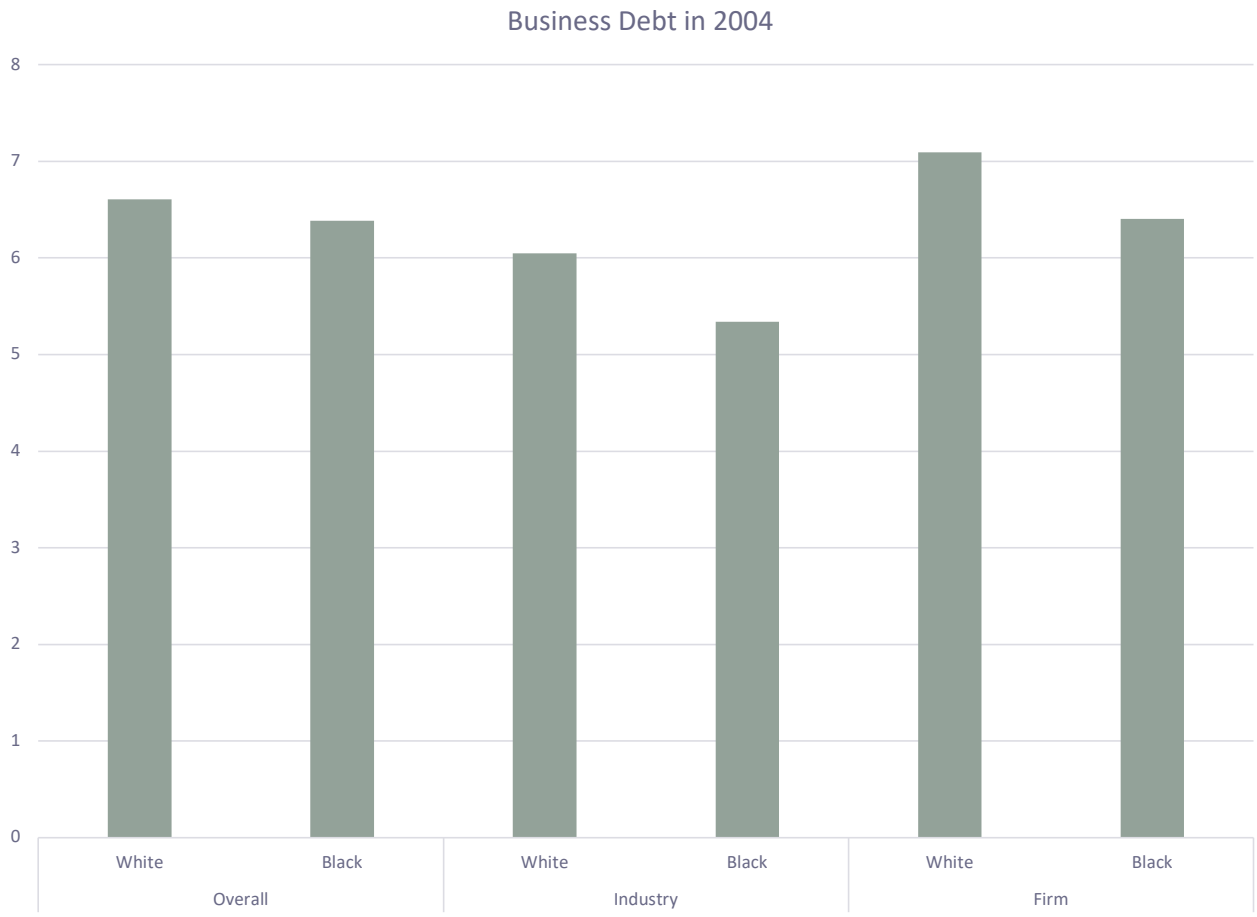

Figure 6: Racial Differences in Business Loans at Inception

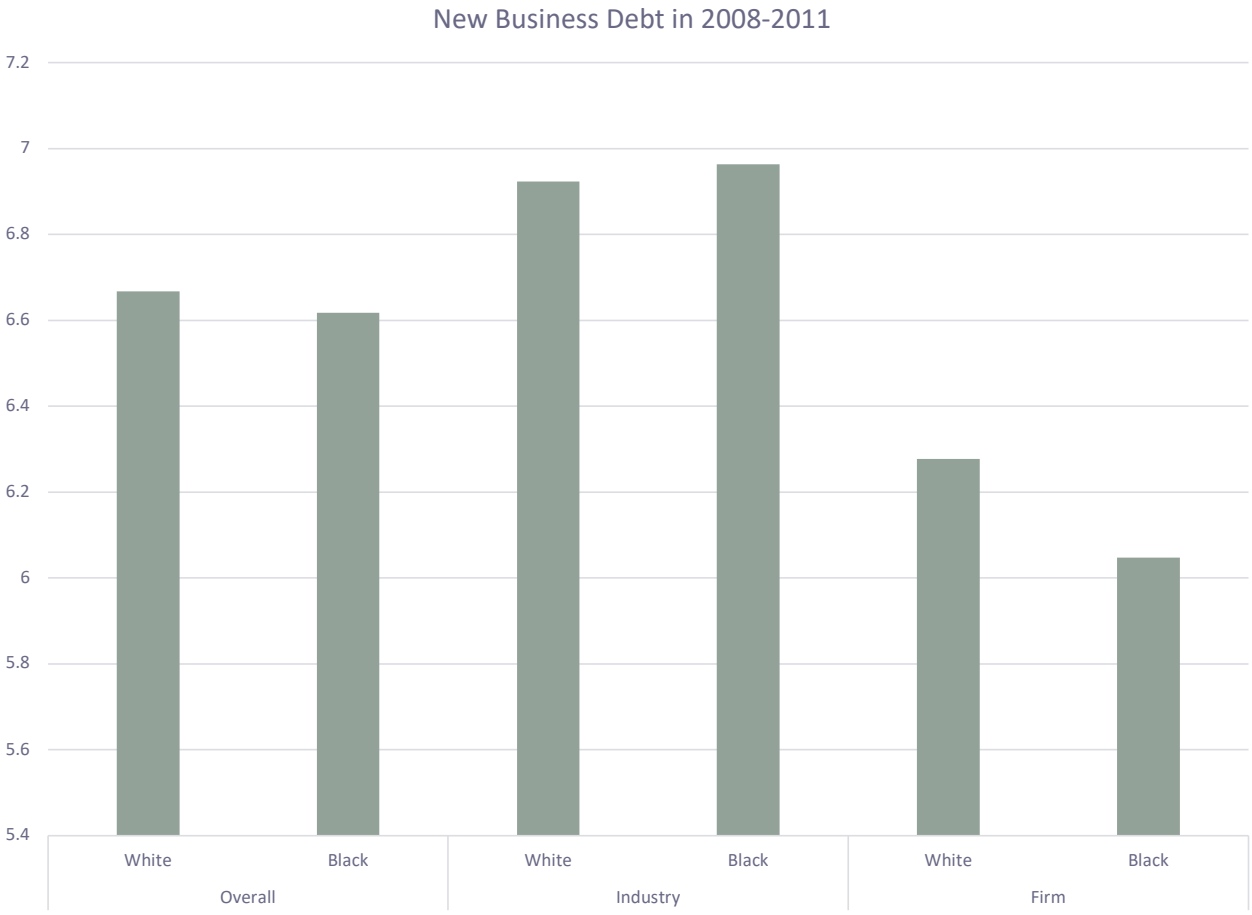

Figure 7: New Debt for Business in Later Survey Years

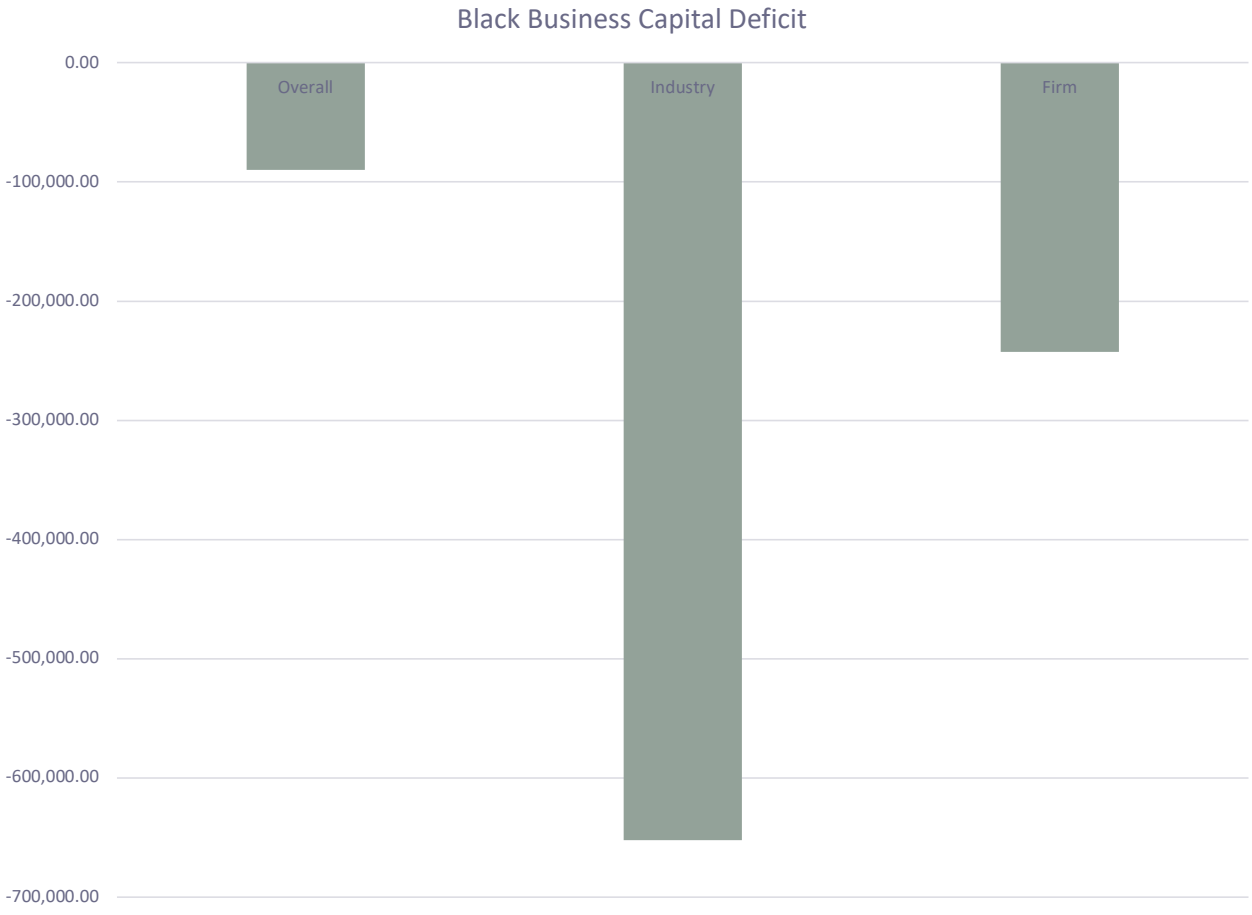

Figure 8: Black owned innovative businesses are smaller

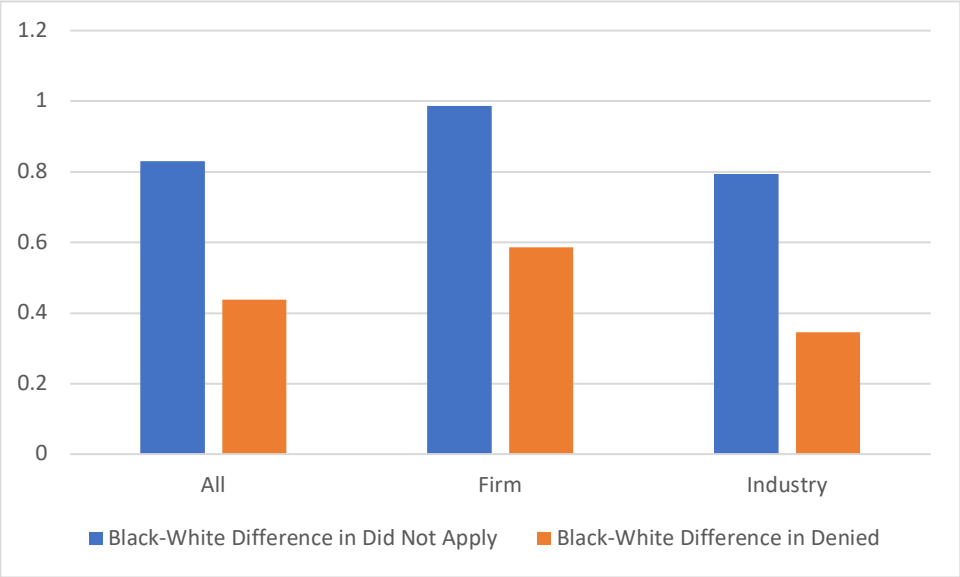

Figure 9: Fear of Denial Shapes Borrowing Behavior