Negative Self-selection into Self-employment among African Americans

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April 7, 2005

Abstract

This paper attempts to shed light on the mechanism behind the lower rate of self-employment (SE) among African Americans compared with whites. Both consumer discrimination and discrimination in the credit market, combined with anti-discrimination law enforcement in the salary/wage (SW) sector, explain why African Americans, those with high earning capacity in particular, are less likely to be SE because the cost of being discriminated against is high. Borjas and Bronars (1989) tested negative self-selection into SE among African Americans using Heckman's sample-selection correction under certain excluded variable assumptions. Using matched CPS panel data, this paper tests the same prediction without relying on any excluded variable assumptions. More specifically, current SE workers are divided into future SW and SE workers, and the distributions of the current earnings of these two groups are compared. The analysis reveals both positive and negative self-selection into SE among whites, but almost only negative self-selection among African Americans. This finding is consistent with the theoretical predictions of consumer and credit market discrimination against African-American self-employed workers and confirms Borjas and Bronars (1989)'s empirical results.

1   Introduction

During the 1990s, self-employed (SE) workers persistently consisted of about 12 to 13 percent of the male work force in the US. The breakdown of this number indicates a significantly different SE rate for the various racial groups. While 13 to 14 percent of the non-Hispanic, white male work force was SE, the number for African Americans was between 5 and 6 percent (Fairlie (2003)). This low rate of SE among African Americans has attracted much attention from the media and academicians because SE is often considered as a vehicle of upward social mobility for ethnic and racial minority group members that enables them to circumvent market discrimination.[1] In addition, the differential likelihood of small-business ownership creates tensions among the various ethnic and racial groups, as documented in Fukuyama (1995).

The low SE rate among African Americans is rather surprising because African Americans can avoid employer discrimination by starting their own businesses. If African Americans use SE as a means to avoid employer discrimination in the absence of discrimination in other markets, then the SE rate among African Americans should be higher.[2] Other forms of discrimination against African Americans, however, explain the lower SE rate among them. Namely, (i) consumer discrimination against African-American SE

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[1] Evidence for young, less-educated workers is provided in Fairlie (2004)

[2] This possibility was pointed out by Moore (1983); however, he did not find evidence that African-American workers use SE as a means to avoid employer discrimination.

workers as suggested by Borjas and Bronars (1989), and (ii) small business credit market discrimination against African Americans as documented by Blanchflower, Levine, and Zimmerman (2003) and Cavalluzzo, Cavalluzzo, and Wolken (2002). Fairlie (1999) revealed that both a lower rate of entry into SE and a higher exit rate from SE by African Americans contribute to the lower rate of SE among them, using the Panel Study of Income Dynamics. He found that the racial difference in asset holding and the probability of having a self-employed father explained between 15 and 30% of the gap in the entry rate. However, the rest of the difference in the entry rate and almost all the difference in the exit rate between African Americans and whites could not be explained by differences in observable characteristics. He then speculated that the remaining gap would be due to consumer or credit market discrimination. Kim and Deltas (2002) also carefully compared the transition rates into and out of SE by whites and African Americans, using matched CPS files, and they observed a lower entry rate into and a higher exit rate out of SE among African Americans, as in Fairlie (1999). Due to the large data set, they could separate the sample by age groups and found evidence of a declining entry-rate difference across racial groups as workers aged. They speculated from this evidence that African Americans accumulate assets as they age and mitigate liquidity constraints due to credit market discrimination.

The purpose of this paper is to test whether discrimination against African-American SE workers can explain the lower SE rate among African Amer-

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icans. The basic theoretical framework employed in this paper is the one suggested by Borjas and Bronars (1989). Their theory predicts that the returns to skill are different across SE and salary/wage (SW) sectors for African Americans, while the returns do not depend on sectors for whites. Due to the consumer discrimination against African-American SE workers, the returns to skill in the SE sector is lower than the return in the SW sector for African Americans, while the returns to skill are the same in both sectors for whites. This simple Roy model predicts that African Americans with high, unobserved skill are less likely to be SE. This paper examines the difference in the self-selection mechanism into SE across racial groups using 2 years of panel data created by matching Current Population Surveys (CPS) in consecutive years.

While Borjas and Bronars (1989) tested the theoretical prediction with the heckit method, using cross-sectional data under a strong exclusion-restriction assumption, this paper relaxes that strong assumption by using panel data. Exploiting the panel structure, I can identify future SW workers from the pool of current SW workers. By comparing the current wage/salary distribution of future SE workers and SW stayers, I can examine whether negative selection into SE is more prevalent among African Americans than whites.

The analysis of self-selection patterns using panel data reveals that the selection into SE jobs is more likely to occur from the low and high ends of the wage distribution among white SW workers. In contrast, only those African-American SW workers whose wages are located at the lower end of

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wage distribution are more likely to be SE in the following year. The fact that positive self-selection into SE occurs only among white SW workers is consistent with the existence of consumer or credit market discrimination against African-American SE workers.

The rest of the paper is organized as follows. Section 2 introduces theories predicting both a lower SE rate among African Americans and negative self-selection into SE. Section 3 critically reviews the previous evidence on the negative self-selection into SE among African Americans. Section 4 proposes a more robust method of identifying African-Americans' negative self-selection into SE. Section 5 discusses the data used in this study. Section 6 explains the empirical results based on matched CPS files, and Section 7 concludes.

2 Negative Self-selection into SE among African Americans

2.1 Consumer Discrimination

Borjas and Bronars (1989) used the search theoretic framework to describe how majority group members' consumer discrimination against minority group members discourages minority workers with high earning capacity from starting up their own businesses. They modeled SE workers as agents who produce goods with heterogenous productivity and sell the products with homogenous sales ability, allocating their limited time to production and selling activities optimally. In the model, majority consumers are agents with discriminatory

tendencies who buy from minority sellers only when the prices they charge are sufficiently lower than the prices of majority sellers. The consumers do not know the sellers' race or the prices charged before visiting them. In this environment, minority business owners decide the price of goods before the customers' visits. Such decisions are equivalent to those of whether they will sell to the majority or not, since by lowering the price, minority business owners can sell to majority consumers. As the optimal decision, more productive minority business owners are more likely to lower the price than less productive minority business owners, since the opportunity cost of letting majority consumers pass by is too high. In other words, productive minority business owners attempt to capture a larger market, including majority consumers, by lowering their productsf prices, since they produce more goods due to a higher production ability. As a result, the return to productivity among minority business owners is lower than the return among majority owners, since more productive majority business owners do not have to lower their prices to capture a larger market.[3]

In the labor market of the salary/wage (SW) sector, minority workers are also discriminated against by majority employers, but if their skills are discounted by the same fraction regardless of skill level, the return to skill is the same as the one among majority workers. Holzer (1998) reported that larger firms disproportionately hire more African Americans than smaller firms, even after controlling for firms' characteristics, such as industry or location.

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[3]Consumers have inelastic demand below the reservation price in their model.

He speculated stricter enforcement of anti-discrimination laws among larger firms as an explanation for the finding. Since larger firms pay higher wages to workers, to the degree that larger firms select African Americans based on skill level, the return to skill in the SW sector among African Americans may be even higher than among whites.

Due to the different forms of discrimination against African Americans in the SE and SW sectors, the return to skill in the SE sector is lower than the return to skill in the SW sector for African Americans. The returns to skill are equivalent in the SE and SW sectors for whites. In this simple Roy model setting, only those who have low skill self-select into SW among African Americans, while we cannot obtain a specific prediction for the self-selection mechanism into SE among whites. The selection into SE differs across racial groups; negative selection occurs more frequently among minority workers than among majority workers as evidenced by Borjas and Bronars (1989).

2.2 Credit Market Discrimination

Blanchflower, Levine, and Zimmerman (2003) analyzed discrimination in the small business credit market using the 1993 and 1998 National Survey of Small Business Finances. They showed that African-American business owners are twice as likely to have their business loan applications denied as white business owners, even after controlling the factors that may affect credit-worthiness. They also reported that African-American business owners are charged higher interest rates and are more likely to hesitate to apply for

business loans because they expect that they are likely to be rejected. Since liquidity constraints constitute a critical issue in business start up and survival,[4] discrimination in the small business credit market explains the lower rate of SE among African Americans. Cavalluzzo, Cavalluzzo, and Wolken (2002) used the same data as Blanchflower, Levine, and Zimmerman (2003) that were supplemented by credit (risk) scores created by Dun and Bradstreet (D&B), a consulting firm that offers information on small businesses. They also found that the loan denial rate of African-American business owners was significantly higher than that of white male business owners, even after controlling for a rich set of explanatory variables, including credit scores by D&B that presumably reflect the credit worthiness of each business.

This credit market discrimination also presumably creates negative self-selection into SE among African Americans when workers' ability and capital stock are complementary in SE production.[5] When ability and capital are complementary, it is optimal for workers with high ability to run large businesses. However, if high-ability African Americans who are prospective SE workers learn that they cannot raise enough funds from the credit market, then they are likely to work as SW workers because their high ability can be well-compensated without being constrained by the credit market. At the same time, low-ability African Americans who have a low level of optimal

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[4]See Holtz-Eakin, Joulfaian, and Rosen (1994a), Holtz-Eakin, Joulfaian, and Rosen (1994b), and Evans and Jovanovic (1989).

[5]Empirical studies generally have found that capital and skilled labor are p-complements, while capital and unskilled labor are p-substitutes. See Hamermesh (1993), chapter 3, for a far- reaching literature review.

capital stock are more likely to finance their investments without being constrained by the credit market. The key here is that high-ability African Americans are disproportionately penalized compared with low-ability African Americans due to credit market discrimination when they attempt to become SE. As a result, negative self-selection into SE occurs among African Americans.

3 Findings by Borjas and Bronars (1989)

Both consumer discrimination and credit market discrimination predict negative self-selection into SE among African Americans. Using 1980 Census cross-sectional data, Borjas and Bronars (1989) examined the differential self-selection rule into SE to test their own consumer discrimination hypothesis. Using Heckman's sample-selection correction method, the earnings of each sector were broken down into (i) the part explained by background variables, (ii) the part due to self-selection, and (iii) an error term correlated with neither background variables nor self-selection. The model they employed is laid out as follows. At first, the decision to be SE is estimated by the model:

$$self_i = 1(x_i\pi + v_i \geq 0), v_i \sim N(0, 1), \tag{1}$$

where x_i is a set of variables that determines a worker's SE status. Then the earnings in each sector is defined as

$$\ln w_i^{sw} = x_{1i}\beta^{sw} + e_i^{sw}, \tag{2}$$

and

$$\ln w_i^{se} = x_{1i}\beta^{se} + e_i^{se}, \tag{3}$$

where x_{1i} is a set of variables that affects a worker's earnings in each sector, which is a part of x_i. Since x_{1i} is included in the wage equations, the difference in the expected earnings in each sector affects workers' sector choice. In addition, the part of x_i not included in x_{1i} may include the factor that affects the decision to be SE, but not earnings, such as a preference for autonomy or attitude toward risk. The error terms $(v_i, e_i^{sw}, e_i^{se})$ are independent of x_i with a zero mean. The error terms in the wage equations are correlated with the error terms in the selection equation in the way that $e_i^{sw} = \gamma^{sw}v_i + u_i^{sw}$ and $e_i^{se} = \gamma^{se}v_i + u_i^{se}$. The conditional expectation of earnings in each sector after the selection is expressed as

$$E(\ln w_i^{sw}|x_i) = x_{1i}\beta^{sw} + \gamma^{sw}E(v_i|v_i < -x_i\pi), \tag{4}$$

and

$$E(\ln w_i^{se}|x_i) = x_{1i}\beta^{se} + \gamma^{se}E(v_i|v_i \geq -x_i\pi), \tag{5}$$

if $E(u_i^j|x_i) = 0$ for $j = se, sw$. Here $\gamma^{sw} < 0$ implies positive self-selection into the SW sector (Those who become SW based on unobserved characteristics earn more as SW workers) and $\gamma^{se} > 0$ implies positive self-selection into the SE sector (Those who become SE based on unobserved characteristics earn more as SE workers). Borjas and Bronars (1989) implemented these two-step estimations for each racial group using the 1980 U.S. Census file and found statistically significantly positive γ^{se} for whites, but could not reject $\gamma^{se} = 0$

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for African Americans. They interpreted these results as evidence of positive self-selection into SE among whites, but not among African Americans.

However, without relying on the non-linearity of the inverse Mill's ratio, the identification of β^j and γ^j, $(j = sw, se)$ depends on the variable included in x_i but excluded from x_{1i} (Olsen (1980)). Borjas and Bronars (1989) used wife's education and other regional-level variations[6] as excluded variables. However, this excluded variable assumption is rather tenuous, considering the possibility that the excluded variables may directly affect each sectorfs earnings. For example, suppose "ability," which is a part of u_i^j, increases earnings and "ability" is positively correlated with wife's education conditioned on x_{1i} because of assortative mating.[7] Since higher wife's education encourages husband's SE (the estimated coefficient in π corresponding to wife's education was positive), "ability" and $E(v_i | v_i \geq -x_i\pi)$ are negatively correlated conditioned on x_{1i} because the smaller value of v_i satisfies the conditioning set. This negative correlation causes the downward bias for the estimate of γ^{se} due to the violation of $E(u_i^j | x_i) = 0$ for $j = se, sw$. The degree of bias roughly depends on the strength of the correlation between "ability" and wife's education, in other words, the strength of assortative mating. If stronger assortative mating occurs among African Americans,

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[6]Specifically, the SMSA's unemployment rate, the population growth between 1970 and 1980, the crime rate, the level of local government expenditure, and the mean income and education levels in the local labor market were used.

[7]Assortative mating is the notion that individuals marry partners with similar socioeconomic background characteristics. See Pencavel (1998) and Lewis and Oppenheimer (2000) for evidence of assortative mating by education.

then the downward bias of the estimate of γ^{se} is larger for African Americans. This example simply points out that the results obtained in Borjas and Bronars (1989) are attainable even in the absence of the different selection mechanisms across racial groups, but it in no way denies the results they obtained. Regional economic indicators, which were used as the other set of excluded variables in their study, are also likely to affect SE workers' earnings, and the effect can differ across racial groups.[8]

Considering the tenuousness of the identifying assumption employed in their study, their conclusion was suggestive rather than conclusive. Therefore, it is worth reexamining the selection mechanism across racial groups using a different identification strategy.

4 The Identification of Self-selection Using Panel Data

The difficulty in identifying the selection mechanism using cross- sectional data arises because only data after selection are available. Panel data largely

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[8]Rees and Shah (1986) estimated a model with earnings equations for the SE and SW sectors with endogenous sector selection, as in Borjas and Bronars (1989). They used the number of children as the exclusion restriction, but the coefficient for this variable was not statistically significant in the probit sector selection equation. Thus their identification of earnings equations was based on the non-linearity of the inverse- Mill's ratio. Genda and Kambayashi (2002) also estimated a similar model of the earning functions of SE and SW workers with endogenous selection, using Japanese data. Their identification also relied on the non-linearity of the inverse-Mill's ratio. Taylor (1996) used the following as the excluded variables: parent's SE status, the value of housing equity, and the subjective answers to questions about whether the respondent valued the following aspects of jobs: pay, security, initiative, work itself and hours. Some of these excluded variables were significant.

remove the restrictive assumption when identifying the self-selection mechanism because the data before the event of self-selection are available. In the current context, the earnings of two groups of SW workers, the group of workers that becomes SE a year later and the group who stays in the SW sector, offer rich information with which to identify the self-selection mechanism. Specifically, panel data make it possible to relate the point in the wage distribution in year t as a salary/wage (SW) worker and the self-employment (SE) status in year $t+1$. To implement the analysis, I estimated the following probit equation:

$$E(self_{it+1}|wd_{it}, aa_{it}) = \Phi(\beta_0 + wd_{it}\beta_1 + \beta_2 aa_i + wd_{it}aa_i\beta_3), \qquad (6)$$

where Φ is the cumulative normal distribution function and wd_{it} is the set of dummy variables that indicates the location of i's hourly rate of pay in year t in the wage distribution in year t among the same racial group, aa_i is the indicator for African Americans. The dummy variables wd_{it} includes 4 categorical dummy variables; the first dummy variable takes one if the wage of individual i in year t is located between 0 percentile and 20 percentile in the wage distribution in year t in the same racial group. The second, third, and fourth dummy variables correspond to the 20 to 40 percentile, the 60 to 80 percentile, and the 80 to 100 percentile of the wage distribution, respectively. The coefficient for the interaction terms, which is β_3, indicates the difference in the selection mechanisms between African Americans and whites. The theory based on discrimination against African-American SE

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workers predicts that high-wage African Americans will be less likely to self-select into SE than high-wage whites. Thus the theory predicts that the coefficient for the interaction term between the African-Americans dummy and the high-wage dummy is negative.

The above empirical model examines the self-selection mechanism based on the location of wage in its distribution. However, Borjas and Bronars (1989) pointed to self-selection based on "unobserved" characteristics. To examine the selection based on the unobserved wage component, the unobserved wage component is approximated by the residual of the wage regression that regresses the log of wage on three education-category dummy variables (years of education $< 12, 13 - 15,$ and ≥ 16), age, age squared, the dummy for married individual, three dummy variables to indicate residential regions (midwest, south, and west), a dummy variable for metropolitan areas, 233 three-digit industry dummy variables, and year dummy variables. These regressions were run for each racial group to allow for the difference in the coefficients between African Americans and whites. Based on this wage regression residual, I generated five categorical variables that indicate the location of each individual in the residual wage distribution of each race and each year. The categorical dummy variables correspond to the 0-20, 20-40, 60-80, and 80-100 percentile of the residual wage distribution of each race and each year. The following probit equation is estimated to identify the selection mechanism into SE based on the "unobserved" wage distribution:

$$E(self_{it+1}|rd_{it}, aa_{it}) = \Phi(\gamma_0 + rd_{it}\gamma_1 + \gamma_2 aa_i + rd_{it}aa_i\gamma_3), \qquad (7)$$

where rd_{it} is the set of dummy variables that indicates the location of the residual of individual i in year t in the residual distribution of the same racial group in year t.

5 Data

The two-year panel created by matching adjacent years of the Current Population Survey (CPS) Outgoing Rotation Group (ORG) was used to implement the statistical analysis introduced in the previous section. Since African-American SE workers are rare in the US work force, a panel containing a large number of observations was needed. Because of the relatively small number of cross-sectional units, conventional panel data such as the National Longitudinal Survey or the Panel Study of Income Dynamics were inadequate for this purpose. The merit of using the matched CPS panel is its large sample size, which includes 50,000 households for each cross-section.

CPS randomly picks households according to its stratified sampling scheme and interviews selected households for four consecutive months. Then after a gap of 8 months, the surveyor returns to the original address and interviews for four consecutive months again. Because of this sampling scheme, the first four months and the last four months of the survey can be matched if the household does not move. In the fourth and eighth months (the ORG), earnings-related information is collected in the "earner study" section. In this study, individuals recorded in the CPS ORG files from 1990 to 2000 were matched with the data of the following year using household ID, household

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number, and within household ID (line number). Then erroneous matches were checked using race, sex, and age information.[9] Since household IDs were scrambled in June, July, and August 1995, the matches that included or crossed over these months were not usable. The sample construction is tabulated in Table 1. First I restricted the sample to males between the ages of 16 and 65 who were whites and African Americans. Those who belonged to other racial group, such as Asian, were dropped from the analysis sample. After conditioning based on the availability of valid job-class information (either private, government, or self-employed), non-agricultural, age between 16 and 65, valid household ID, line number and household number, and the availability of non-imputed age, sex, and race information, there were 435,529 observations available for the fourth month of the survey.[10] Among these observations, 300,422 observations were matched based on the household ID, household number, line number, and race, sex, and age information. Thirty percent of the observations from the first year was lost; however, this rather high attrition rate is usual for matched CPS panel data, mainly due to moving households; CPS does not follow movers.[11] Among those matched observations, male SW workers with valid hourly rate of pay information in

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[9]See Madrian and Lefgren (2000) for the various methods of matching and their strengths and drawbacks.

[10]Agricultural workers were excluded from the analysis sample because the self-selection mechanism into self-employment in the agricultural sector could be different from that of the non-agricultural sector, and thus our discussion on discrimination against African-American SE workers is based on the observations in non-agricultural sector.

[11]See Peracchi and Welch (1995) and Neumark and Kawaguchi (2004) for the usual attrition rate in matched CPS panels.

the first year of the survey were selected. This sample restriction reduced the sample size to 229,471 for 10 independent, 2-year panels. In this sample, self-employment status is defined based on the major source of income. Thus those who held SE and SW jobs at the same time could be classified as either SE or SW depending on the person's major income source.

6   Results

Table 2 tabulates the share of SE workers in the total workforce for whites and African Americans. SE workers accounted for 14.14% and 5.86% of total work force among whites and African Americans, respectively.[12] The difference in the SE rate was partly due to the difference in the entrance rate into SE between whites and African Americans. The lower panel of Table 2 indicates that about 2.58% of SW white workers became SE in the following year, while the number for African Americans was about 1.50%. The data set used in this study confirms the lower rate of SE among African Americans, as well as their lower transition rate into SE.

Table 3 tabulates the difference in the observable characteristics between the two groups of SW workers. The first group consists of those who became SE and the second group consists of those who stayed in SW jobs in the second year. This table attempts to reveal self-selection based on observable characteristics. The notable difference in the selection across racial groups

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[12]These numbers are close to the numbers calculated by Fairlie (2003) (13 - 14 % and 5% for white and African, respectively, during the 1990s) or Borjas and Bronars (1989) (12% for white and 4.5% for African in 1980).

is that among whites, future SE workers were more likely to have higher educational background compared with future stayers. While 35.7% of future SE workers had more than 16 years of education, only 27.8% of future SW workers had that amount. Statistically significant self-selection into self-employment based on higher educational attainment was not found among African Americans. The difference-in-differences estimate was different from zero in the statistical sense, and the difference was large in its magnitude. At the same time, there was not much difference in the age distribution among those who became SE across racial groups. As for marital status, there were no systematic differences between races. As for regional characteristics, the white - African American difference in the relative rate of transition into SE compared with staying in SW was positive in the Northeast and negative in the South.

Figure 1 Panel A draws the distribution of hourly wages for two groups of white SW workers: those who became SE in the following year and those who stayed in SW jobs in the following year. The notable difference is the fatter tail distribution of future SE workers compared with stayers. Both high-earning and low-earning SW workers were likely to become SE in the following year. This result suggests that examining central tendency is not sufficient when we discuss self-selection mechanisms into SE among whites.

Figure 1 Panel B repeats the same exercise using African-American SW workers as the analysis sample. Nearly the entire wage distribution of future SE workers is located to the left of the wage distribution of future SW

workers, and the distribution of future SE workers has a much fatter left tail.

An examination of Figure 1 roughly suggests the existence of both positive and negative self-selection into SE among whites, but almost only negative self-selection into SE among African Americans. To see this point more rigorously, Table 4 Column 1 reports the result of the probit regression of SE status in year $t + 1$ on the dummy variables for the location of wage distribution in year t. High-wage earners whose wage was located in the more than 80 percentile of the wage distribution were about 0.87 percentage points ($t = 7.47$) more likely to self-select into SE in the following year than wage earners whose wages locate between the 40 and 60 percentile of the distribution. This result is consistent with positive self-selection into SE among whites. The negative coefficient for the African-American dummy indicates that median African American wage earners were about 0.90 percentage points ($t = 4.15$) less likely to transition into SE than the median white wage earners. The interaction terms of the African-American dummy and the wage distribution dummy variables indicate that wages located in the 0 to 20, 20 to 40, and 60 to 80 percentiles were all not significant. These results indicated that those African-American wage earners whose wages were located between the 0 and 80 percentile of the wage distribution were uniformly about 0.90 percentage points less likely to self-select into SE than white wage earners who were located in the same position in the wage distribution. The coefficient for the interaction term of African Americans and the dummy for high-end wage earners was negative (-1.14 percentage points)

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and statistically significant ($t = 4.44$). This implies that high-wage African American were 1.14 percentage points less likely to self-select into SE than white wage earners at the top end of the wage distribution. This contrasts with the finding that high-wage white wage earners are about 0.8 percentage points more likely to self-select into SE than the median white wage earners. These results indicate that both positive and negative self-selection into SE is prevalent among whites, but only negative self-selection occurs among African Americans. These results roughly match those obtained in Borjas and Bronars (1989), though they found positive self-selection for white American and no selection among African Americans. The finding that no positive self-selection occurs among African Americans is consistent with discrimination against African-American SE workers.

Since the analysis so far has not considered the difference in demographic variables, such as educational background, age, marital status, geographic location, and industry to examine the self-selection mechanism, the observed difference in the self-selection mechanism among racial groups may be a product of differential, observable background characteristics, as we observed in Table 3 Column 1. To draw a clearer picture of the self-selection mechanism based on unobservable characteristics, which is the main concern in the discussion of self-selection, an analysis using the residual of the wage regression on education dummies, age, its square, a dummy variable for marital status, and dummy variables for geographic locations and industries appears in Figure 2. The distribution for whites that appears in Panel A clearly indicates

two-sided self-selection. Future SE workers have a fatter tail distribution than future SW workers. However, the distribution of the hourly wage for future SE workers is almost always located to the left of the distribution for future SW workers among African Americans. Table 3 Column 2 contains the result of the probit regression of SE status in year $t+1$ on the dummy variables that indicate the location of the residual wage in its distribution. The residuals are created by regressing the log of wage on education dummies, age, its square, a dummy variable for marital status, and dummy variables for geographic locations and industries. After controlling observed characteristics, stronger negative self-selection into SE is found for whites. Those white wage earners whose residual wage was located at the lowest 20 percentile of the distribution were about 1.4 percentage points ($t = 10.40$) more likely to self-select into SE than median white wage earners. On the contrary, those who were located in the top 20 percent of the residual wage distribution were about 1.6 percentage points ($t = 11.81$) more likely to self-select into self-employment. Median African American wage earners were about 0.5 percentage points ($t = 2.21$) less likely to be SE than white median wage earners. The interaction terms between the African American dummy and the residual wage distribution dummies that corresponded to the 0-20 and 20-40 percentiles of the distribution were not significant. These results imply that negative self-selection into SE occurs among African Americans, as well as among whites. However, the interaction term of African American and the 60-80 or 80-100 percentile distribution dummy variables indicated

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that those African American residual wage earners at the 60-80 and 80-100 percentiles of the distribution were about 0.6 and 1.1 percentage points less likely to be SE than white wage earners whose residual adjusted wage was located at the corresponding percentile of the distribution. The analysis based on regression-adjusted wage clearly indicates both positive and negative self-selection into SE among whites, but only negative self-selection among African Americans.

As seen so far, the analysis based on panel data draws a richer picture of the self-selection mechanism than the analysis using cross-sectional data. The evidence from the panel data at least does not contradict the hypothesis of lower return to skill among African-American SW workers. The interpretation of African Americans' negative self-selection into self-employment cannot be attributed to the specific hypothesis that predicts lower return to skill among African-American SE workers, but the evidence is hard to interpret without presuming some sort of discrimination against high-ability African-American SE workers that is harsher than the discrimination against high-ability African-American SW workers.

The evidence found in this paper indirectly supports the hypothesis that the return to skill in the SE sector is lower than in the SW sector among African Americans. Accordingly, both consumer and credit market discrimination, combined with anti-discrimination law enforcement in the SW sector, remain as explanations for the lower SE rate among African Americans.

7 Discussion

I reported the difference of the self-selection mechanism into self-selection between whites and African Americans, which is consistent with discrimination against African-American SE workers. However, readers might imagine alternative explanations that are consistent with the above findings because the evidence does not directly indicate the existence of discrimination against African-American SE workers. I examine three possible alternative explanations: job loss, liquidity constraint, and risk aversion.

Different probabilities of job loss across the wage distribution can create a correlation between the percentile point of wage distribution and transition into SE. Suppose that low-wage earners in the SW sector are more likely to lose their jobs. If African Americans are less likely to find jobs in the SW sector again and more likely to be SE, then low-wage African-American SW workers in the current year are more likely to be SE in the following year. This mechanism is consistent with the negative self-selection into SE among African Americans found in this paper. If this story is true, we should observe that African-American unemployed workers at the time of the survey are more likely to be SE in the following year. To access this possibility, I examined whether African-American unemployed workers were more likely to be SE in the following year, and the results are reported in Panel C in Table 2. Only 4.33% of African-American unemployed workers became SE in the following year, while 7.16 % of white unemployed workers became SE

in the following year. Because the transition rate from unemployment to SE was higher among whites, I ruled out the possible negative self-selection into SE among African Americans due to job loss. In addition, I examined whether the selection mechanism into SE from unemployment differed across racial groups based on observed characteristics, by tabulating the observed characteristics of unemployed workers in year t and employment status (SE or SW) in year $t + 1$. This tabulation appears in Table 5. Because most of the difference in differences estimates were not statistically significant, I conclude that the selection mechanism from the unemployed pool to SE and SW does not differ between whites and African Americans.

Under a liquidity constraint, an individualfs asset amount is an important determinant of the transition into SE. The asset amount and current wage are likely to be positively correlated through saving behavior. Unfortunately, the CPS ORG files do not record the respondentsf amount of assets and the estimates for the selection equation could be biased due to this omitted variable. The liquidity constraint can explain the reason why white high-wage earners are more likely to be SE in the following year: It is because they are likely to hold more assets. However, if the saving rates are equal for whites and African Americans, we also should observe a similar, positive selection into SE among African Americans. Although African Americans hold a much smaller amount of assets than whites (Straight (2002)), Gittleman and Wolff (2004) reported that saving rates are not different between whites and African Americans given their respective income levels. Thus, there is no clear reason

to believe that the degrees of omitted variable bias are different between whites and African Americans.

Regarding the racial difference in risk attitudes, if high-wage whites are more risk-neutral than high-wage African Americans, then high-wage whites are more likely to be SE than high-wage African Americans. A few studies have examined the racial differences in risk attitudes. In an exceptional study, Hersch (1996) reported that there is no significant difference by race in smoking behavior, seat-belt use, and other risky (or risk-avoiding) behavior, after controlling for demographic and human capital characteristics. Gittleman and Wolff (2004) reported that there is no racial difference in the returns on assets, which is suggestive evidence for a similar asset-risk composition between whites and African Americans. This scant evidence, at least, does not indicate any racial differences in risk attitudes. It is worth noting the possibility that high-paid African-American SW workers are less likely to depart from their current employers than high-paid white SW workers because they expect that they cannot obtain high-paid jobs again due to possible discrimination. However, this behavioral difference is not due to the difference in the risk attitudes between whites and African Americans.

8 Conclusion

This paper attempted to shed light on the mechanism behind the lower rate of SE among African Americans compared with whites. Several theories of discrimination have been explored to explain the lower rate of SE among

African Americans. Among the theories, both consumer discrimination and discrimination in the credit market, combined with anti-discrimination law enforcement in the SW sector, explain why African Americans, high-ability African Americans in particular, are less likely to be SE.

The previous influential study by Borjas and Bronars (1989) found positive self-selection into SE among whites and neutral self-selection into SE among African Americans, using Heckman's sample-selection correction method. A similar but slightly different conclusion was obtained in this paper under a rather weak identifying assumption, using matched CPS panel data. Current SW workers were divided into those who became SE and SW workers in the following year, and the current wages of these two groups were compared. An examination of the entire distribution revealed that both high earners and low earners self-selected into SE among whites. However, among African Americans, only current low earners selected into SE. The data draw a distinct picture of two-sided selection into SE among whites and negative selection into SE among African Americans.

This paper's contribution is twofold. First, an alternative identification strategy using panel data confirmed the results obtained in Borjas and Bronars (1989). Second, the examination of the whole distribution revealed the two-sided, self-selection mechanism among whites. This complex mechanism could not have been found if only the mean of the distribution had been examined, as in Heckman's method.

The finding obtained in this paper is consistent with several hypotheses

predicting a lower rate of return to skill in the SE sector among African workers. Although the specific hypothesis that predicts this outcome cannot be pinned down, the evidence found in this paper certainly offers a stepping stone toward further investigation into the reason why there is such a small number of African-American-owned small businesses. Pinning down the specific hypothesis using a clever identification strategy with richer panel data would be a challenging, but rewarding future project.

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