Are Blacks Really Doing Worse than Before in the Labor Market? – Evidence from the NLSY

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Abstract

This paper compares the black-white wage gap for the NLSY 79 cohort and the NLSY 97 cohort. There are three major findings in this paper: 1. The black-white wage gap for males and females conditional on pre-market ability is no longer sensitive to the control for education for the NLSY 97 cohort because both black males and females are no longer getting higher education levels conditional on ability. 2. The black-white wage gap for males is larger conditional on AFQT for the NLSY 97 cohort, and the reason is because employment of the NLSY 79 cohort was much more sensitive to recessions leading to a positively selected black male sample with higher observed wages. The employment outcomes for blacks in the NSLY 97 cohort were less sensitive, so the black-white wage gap conditional on premarket ability is large. 3. Pre-market ability is less important for males in the NLSY 97 cohort.

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I. Introduction

It is believed that the black-white labor market outcomes converge in recent years. Most of the previous literature use the census data to show the convergence of the black-white wage gap. Juhn, Murphy and Pierce (1991) find that during the early 1980s the black-white wage gap remained constant but started to slowly converge in the late 1980s and the early 1990s. Altonji and Black (1999) also show the similar evidence of the convergence. Couch and Daly (2002) and Couch and Daly (2005) show the black-white wage gap for males fell 0.6 percentage points per year between 1990 and 2001. For workers with less than 10 years of working experience, the gap declines by 1.4 percentage points per year.

One disadvantage of census data is that it does not contain any measure of the ability of workers. To overcome the disadvantage, other literature uses the longitudinal data from the National Longitudinal Survey of Youth (NLSY) because it contains Armed Forces Qualification Test (AFQT) scores which can be used as proxies of the true ability for workers. Neal and Johnson (1996) use the sample from the NLSY 79 to conclude that two-thirds of the black-white wage gap in the early 1990s can be explained by pre-market ability differences between blacks and whites. Lang and Manove (2010) argue that in the model of Neal and Johnson (1996), one should also control for education because blacks get awarded in the labor market for the higher education levels conditional on pre-market ability. Fryer (2010) shows the evidence that racial differences in labor market outcomes are reduced conditional on pre-market ability in the 21st century by comparing the outcomes in 2006 from the NLSY 79 and the NLSY 97.

However, Fryer (2010) fails to control for the age distribution of the samples from the NLSY 79 and the NLSY 97. In 2006 the respondents in the NLSY 79 cohort were between 41 and 48 years old, and the respondents in the NLSY 97 cohort were between 21 and 25 years old.

Wilson (1980), Altonji and Pierret (2001), Couch and Daly (2002) and Arcidiacono, Bayer and Hizmo (2010) all conclude that the racial differences of labor market outcomes are small at early career. If one fails to control for the age distribution of two samples, the black-white wage gap is not directly comparable because the older cohort may suffer from racial discrimination in the labor market.

In this paper, I re-visit the black-white wage gap changes between the NLSY 79 and the NLSY 97 cohorts because I want to control for the pre-market ability in the model. I match the age distribution of both cohorts so that I can compare the black-white wage gap changes at the same career stage in both cohorts. The longitudinal data in the NLSY also allows me to control for the economic environment differences between the two cohorts. Therefore, I focus on two panel samples instead of cross-sectional samples[1]. Furthermore, following the suggestion in Lang and Manove (2010), I control for both the premarket ability and the education level in the model.

There are three major findings in this paper. First, for the 97 cohort, the black-white wage gap for males is no longer sensitive to the control for education levels. Second, I find that the unconditional black-white wage gap for both males and females is the same for the 79 and 97 cohorts. On the other hand, surprisingly, the black-white wage gap for men conditional on pre-market ability and education is higher for the 97 cohort, which suggests the black-white wage gap did not converge in the early 21st century. Third, both the conditional and unconditional black-white wage gap for women is similar between the two cohorts and the wage gap conditional on pre-market ability and education levels are near zero. Pre-market ability is less important for determining wages for the men in the 97 cohort.

[1] Neal and Johnson (1996), Lang and Manove (2010) and Fryer (2010) only did cross-sectional analysis.

In the next sections of this paper, I present the estimates of several possible mechanisms that may explain the changes between the two cohorts. Since the black-white wage gap is no longer sensitive to the control of education for both males and females, I estimate the changes in the black-white education gap conditional on pre-market ability. I find strong evidence that blacks no longer get higher education levels than whites conditional on pre-market ability. Second, because of the larger black-white wage gap for males in the 97 cohort than for males in the 79 cohort, I examine the impact of business cycles to black male workers for the two cohorts. The results show that black males in the 79 cohort were more likely to be laid off during recessions. By further examining the characteristics of the black males who were more likely to be laid off in the 79 cohort, I find that black males in the 79 cohort with low pre-market ability and low education levels have the highest probability of being laid off during recessions. However, for blacks in the 97 cohort, the disparity of the employment is consistent throughout the business cycle. Black males no longer suffer from the higher probability of being laid off during recessions. In other words, black males in the 79 cohort were positively selected during recession, which results in relatively higher wage rates during recessions for black males in the 79 cohort. Then the black-white wage gap for the 79 cohort is underestimated in absolute values. Even though it looks like that the conditional black-white wage gap for males in the 97 cohort diverges, in fact it is because black males have better employment during recessions in the late 1990s and early 21st century.

The rest of the paper is organized as follows: Part II describes the sample section criteria for the cross-sectional analysis sample and the panel analysis sample from the NLSY 79 and the NLSY 97. Part III describes the cross-sectional model specification and panel model specification. Part IV presents the replications of Neal and Johnson (1996) using both the cross-

sectional analysis sample and the panel analysis sample from the NLSY 79 and the NLSY 97. Part V shows the main findings from the estimates in Part IV. Part VI investigates possible mechanisms. Part VII concludes.

II. Data

I start by replicating the main results in Neal and Johnson (1996) using the cross-sectional samples from the NLSY 79 and the NLSY 97. I then construct two sets of panel sample from the NLSY 79 and the NLSY 97 because the economic circumstances are different between two cross-sectional samples. Panel samples are better capturing economic environment than cross-sectional sample.

1. Cross-Sectional Samples

The cross-sectional sample for the NLSY 79 cohort is drawn from wave 1990 and 1991 in the NLSY 79. The key variables include the wage variable[1], the race dummy variables[2], Armed Forces Qualification Test (AFQT) scores[3], age[4] and education levels[5]. The sample is restricted to anyone who is born after 1961.[6] The AFQT scores are standardized by different age groups.

The hourly wage rates are the hourly wage rates of the respondents' current or most recent jobs and are measured in 1991 dollars. Any observations with less than $1 or more than $75 are dropped from the sample.

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[1] The wage variable is the mean of natural log of real wages in both years if workers worked in both years and the natural log of the real wages in the year of employment if workers worked in only one year.
[2] The race dummy variables include black and Hispanic dummies.
[3] As premarket ability proxy.
[4] The age variable is individuals' age in 1991.
[5] The education levels are the highest grades completed in 1991.
[6] Neal and Johnson (1996) argues the working experience or postsecondary school experience will enhance human capital and in turn may increase AFQT scores. The AFQT scores may be contaminated by the post labor market discrimination. Therefore, they drop anyone who is born before 1962 so that those individuals were still in compulsory school by 1978.

The sample from the NLSY 97 is constructed in a similar way. The cross-sectional sample from the NLSY 97 is drawn from wave 2010 and 2011. The key variables[1] are the same as in the NLSY 79 cohort. One of the differences is the race dummy variables because in the NLSY 97 more detailed race information is recorded. The race dummy variables in the NLSY 97 sample include black, Hispanic, Asian, American Indian and other races dummies. The age and education level are individuals' age and highest grade completed in 2011.

The other key difference between two cross-sectional samples is that I do not restrict birth year for the NLSY 97 cohort. In the NLSY 97, the respondents were 12 to 18 years old when the test was administered. All the respondents were still constrained by compulsory school law in 1997 so I do not drop anyone from the NLSY 97 sample due to post labor market experience.[2]

The wage rate is the hourly wage rate of the individual's current or most recent jobs measured in 2011 dollars. Any observation with less than $1 or more than $100 are dropped from the NLSY 97 sample.

Table 1 column (1) and (2) summarize the descriptive statistics of the key variables for male and female, respectively in the NLSY 79 cohort. In total, I have 1592 males and 1429 females in my cross-sectional analysis sample from the NLSY 79. All the individuals in the NLSY 79 cohort were aged from 27 to 29 in 1991. On average, the females' hourly wage rates are almost $2 lower than the males' hourly wage rates. The portions of blacks and Hispanics in female and male subsample are almost the same. The average AFQT score for females is slightly

[1] The wage rate is the hourly wage rate of the individual's current or most recent jobs measured in 2011 dollars. Any observation with less than $1 or more than $100 are dropped from the NLSY 97 sample.

[2] The test format has changed from a paper and pencil test in the NLSY 79 to a computer administered test format in the NLSY 97. Thus, the tests in the NLSY 79 and in the NLSY 97 are not comparable. See Altonji, Bharadwaj and Lange (2009) for constructing comparable test scores across two cohorts.

higher than the average AFQT score for males, but not significantly different from each other. Females on average get more education than males do but the difference is not statistically significant.

Table 1 column (3) and (4) summarizes the key variables in the NLSY 97 cohort. In total, I have 2694 males and 2628 females in the NLSY 97 cohort. The individuals were aged from 27 to 31 years old in 2011. Similar to the NLSY 79 cohort, we find that on average males get higher average wage rates than females do. The race composition is almost the same for male and female subsample. Females get higher average AFQT score than males do but the difference is not significant. On average, females get more education than males do.

2. Panel Samples

The panel data analysis sample for the NLSY 79 cohort is drawn from 1979 – 1994 waves because I want to match the age distribution of the sample from the NLSY 97. Anyone who has already been in the labor market is included in my sample. Individuals who are in the active armed forces are excluded. Those without valid education information or with education less than eight years are also eliminated from the sample.

The key variables in my sample include wage, education, race, gender and AFQT. The wage variable is the hourly wage rate at current or most recent job of the respondent.[1] Any observations with no valid wage information or with less than $1 or greater than $100 are excluded from the sample. The education variable is the highest grade completed at each interview. If the respondent failed to report his or her education level in a certain wave, I will replace his or her education level in that wave with the education level in the previous wave. I assume that the respondent cannot have decreasing education level over the years. That is, if the

[1] The wage rates in the NLSY 79 sample are measured in 1990 dollars using CPI-U from Bureau of Labor Statistics.

respondent's education level in some wave is lower than his or her education level in the previous wave, I will replace his or her education level in the latter wave with the education level in the previous wave. Similar to the cross-sectional analysis sample, the race variables include black dummy and Hispanic dummy. Since the AFQT is administered at different ages of respondents, the AFQT scores are standardized by age groups.

The panel data analysis sample from the NLSY 97 is drawn from 1999 – 2015 waves. The respondents were born between 1980 and 1984 and were 12 – 16 years old at the time of the first interview in 1997. Comparing with the respondents in the NLSY 79, the respondents in the NLSY 97 were younger on average in the first interview.

The key variables are similar to the key variables in the sample from the NLSY 79. The main difference is the race dummies. Since the NLSY 97 records more detailed race information, the race dummies for the sample from the NLSY 97 include black dummy, Hispanic dummy, American Indian dummy, Asian dummy and other races dummy. All the other variables are constructed using the same methods as the construction of the variables in the NLSY 79 sample.[1]

Table 2 column (1) and (2) summarize the key variables in the NLSY 79 panel analysis sample. In the panel analysis sample, I have 5677 males and 5595 females. Similar to the cross-sectional data, on average, the hourly wage rates of females are $2 lower than those of males. The race composition is about the same across genders. The average AFQT score of females is higher than that of males. The average age and the average education level are not significantly different between males and female.

Table 2 column (3) and (4) summarize the key variables in the NLSY 97 panel analysis sample. In the panel analysis sample, I have 3455 males and 3383 females. Similar to the cross-

[1] The wage rates in the NLSY 97 sample are measured in 2011 dollars using CPI-U from Bureau of Labor Statistics.

sectional analysis sample, the average wage rate of males is higher than that of females. The race composition is almost identical across genders. Females on average have higher AFQT scores than males do. The average age and the average education level are not statistically different between two gender groups.

III. Model Specifications

There are two major model specifications in this paper. The first model specification is a cross-sectional model, which is similar to that in Neal and Johnson (1996). The second model specification is a panel model.

1. Cross-Sectional Analysis

The cross-sectional model in this paper is similar to the model in Neal and Johnson (1996). The dependent variable is the two-year mean of the natural log of individuals' hourly wage rates. The control variables in the model are race dummy variables, individuals' age, AFQT scores and education levels.

$$\overline{log(wage)} = \beta_0 + \beta_{race}Race_i + \beta_{AFQT}AFQT_i + \beta_{age}Age_i + \beta_{educ}educ_i + \varepsilon_i \qquad (1)$$

The race variables include black and Hispanic dummies in the NLSY 79 sample and black, Hispanic, Asian, American Indian and other races dummies in the NLSY 97 sample because more detailed race information is recorded in the NLSY 97. The individuals' age and education levels are the age and the highest grade completed in 1991 in the NLSY 79 sample and the age and the highest grade completed in 2011 in the NLSY 97 sample.

2. Panel Data Analysis

The main drawback of the cross-sectional analysis is that the sample from the NLSY 79 and the sample from the NLSY 97 are in different economic circumstances. The panel data analysis can give me the ability to capture the economic circumstances over different periods.

The model follows the suggestions in Lang and Manove (2011) where I control for both AFQT and education in the model.

$$\log(wage)_{it} = \beta_0 + \beta_{race}Race_i + \beta_{AFQT}AFQT_i + \beta_{educ}educ_{it} + \beta_{age}Age_{it} + f(x_t) + \varepsilon_{it} \quad (2)$$

where $f(x_t)$ is the years fixed-effect.

IV. Replication of Neal and Johnson (1996)

1. Cross-Sectional Analysis

i. The NLSY 79 cohort

Table 3 panel 1 presents the results of the replication of Neal and Johnson 1996 using the NLSY 79 cohort. Column (1) – (3) present the estimates using males only. Column (4) – (6) present the estimates using females only. Column (1) and (4) present the model with no additional controls. Column (2) and (5) present the estimates for a model controlling for AFQT scores only. Column (3) and (4) present the estimates for a model controlling for AFQT scores and education levels in 1991.

The results in Table 3 panel 1 are almost identical to the results in Neal and Johnson (1996). The estimates in column (1) show that black males on average earn 26% less than white males unconditionally for the NLSY 79 cohort. Conditional on AFQT scores, black males on average earn 8% less than white males. Following Lang and Manove (2011), the estimates in column (3) show that conditioning on AFQT scores and education levels, black males on average earn 10% less than white males. The estimates in column (1) – (3) suggest AFQT alone can explain about two-thirds of the black-white wage gap, and AFQT and education together can explain more than half of the black-white wage gap. Column (4) – (6) in Table 3 panel 1 present the same estimates for females. The estimates show 17% unconditional differences between the

wage of black females and of white females. Conditional on AFQT scores, black females on average earn 7% more than white females. If we control for both AFQT scores and education levels, the estimates suggest black females and white females get same wages.

ii. The NLSY 97 cohort

Similar to Table 3 panel 1, the sample is divided into young males and young females in Table 3 panel 2. Column (1) and (4) present the estimates for a model without any additional controls. Column (2) and (5) present the estimates for a model conditional on AFQT scores. Column (3) and (6) present the estimates for a model conditional on both AFQT scores and education levels.

Column (1) in Table 3 panel 2 shows on average black males get 26% less than white males. Conditional on AFQT scores, we find that black males on average get 17% less than white males. If we compare the coefficients on black in Table 3 panel 2 column (1) and column (2), we find AFQT scores can explain around one-third of the black-white wage gap for the NLSY 97 cohort. Conditional on both AFQT scores and education levels, the coefficient on black in column (3) is two-thirds of the coefficients on black in column (1). It suggests education and AFQT together can explain only one-third of the black-white wage gap for the NLSY 97 cohort.

Column (4) – (6) in Table 3 panel 2 show the estimates for the black females. Column (4) shows black females on average get 15% less than white females for the NLSY 97 cohort. Conditional on AFQT scores, the black-white wage gap disappears for females. If we control for both AFQT and education, the black-white wage gap is still not statistically significant different from zero for females.

2. Panel Data Analysis

The analyses in both Neal and Johnson (1996) and Lang and Manove (2011) are cross-sectional analyses. One of the drawbacks of using cross-sectional samples is that it cannot account for economic circumstance changes. This paper is trying to investigate the changes in the black-white wage gap between the NLSY 79 cohort and the NLSY 97 cohort. The economic environment in 1990 and 1991 must be different from the economic environment in 2010 and 2011. The differences in the economic environment may play a major role in explaining the changes in the black-white wage gap between the two cohorts. Therefore, I run the following panel sample analyses so that I can account for the economic environment factors in the model.

i. Results using the NLSY 79 sample

Table 4 panel 1 presents the estimates of the panel analysis model separated by males and females for the NLSY 79 cohort. All the models in Table 4 panel 1 controls for years fixed-effect. Similar to the cross-sectional analysis estimates, if I do not include any additional controls, black males on average earn 19% less than white males. If I include AFQT scores in the model, a little more than two-thirds of the black-white wage gap disappears. However, conditional on both AFQT scores and education levels, wages for black males on average are 8% lower than wages for white males. The pattern of coefficients change on black from column (1) – (3) in Table 4 panel 1 is really similar to the pattern in Table 3 panel 1.

Column (4) – (6) in Table 4 present the same estimates using females. The results are also consistent with the results in Table 3 panel 1. AFQT can explain all the black-white wage gap for females. Conditional on AFQT scores, black females earn around 9% more than white females on average. If I include both AFQT scores and education levels, black females earn almost identical average wage rates as white females.

ii. Results using the NLSY 97 sample

Table 4 panel 2 presents the estimates of the panel model separated by males and females. All the models in Table 4 panel 2 also control for years fixed-effect. Column (1) shows black males on average earn 19% less than white males if I do not include any additional controls. If I control for AFQT scores, black males earn about 13% less than white males do. That means AFQT scores can explain less than one-third of the black-white wage gap. If I control for both AFQT scores and education levels, the black-white wage gap is almost the same as in column (2). That is, AFQT and education together have the same explanation power as AFQT only for the black-white wage gap for males.

Column (4) – (6) in Table 4 panel 2 show the same estimates for females. If I do not include any controls, black females on average earn about 10% less than white females. However, if I add AFQT scores in the model, all the black-white wage gap for females is gone. Again, I find no wage differences between black females and white females conditioning on both AFQT scores and education levels.

V. Findings

1. Cross-Sectional Analysis

Comparing the results using the NLSY 79 cohort and the NLSY 97 cohort, I can find similar pattern of changes in the coefficients on black for both males and females. The black-white wage gap conditional on AFQT scores only is smaller than the unconditional black-white wage gap for males and females in both cohorts. In fact, after controlling for AFQT scores, the black-white wage gap for females in both cohorts is totally gone. For females in the NLSY 79 cohort, I even find black females on average earn 7% more than white females conditional on AFQT scores.

When I control for AFQT scores and education levels, the story is different between males and females in the two cohorts. The black-white wage gap conditional on AFQT scores and education levels becomes larger than the black-white wage gap conditional on AFQT scores only but still smaller than the unconditional one for males in both cohorts. While for females, the black-white wage gap conditional on AFQT scores and education levels remains zero for both cohorts.

Taking a further look into the estimates in Table 3, I find the unconditional black-white wage gap for males and females is almost identical across the two cohorts. Black males on average earn 26% less than white males and black females on average earn 15%-17% less than white females unconditionally in both cohorts. Conditioning on AFQT scores only, I find the conditional black-white wage gap is different between the two cohorts. The black-white wage gap conditional on AFQT scores alone is only one-third of the unconditional black-white wage gap for males in the NLSY 79 cohort. For males in the NLSY 97 cohort, the black-white wage gap conditional on AFQT scores is almost two-thirds of the unconditional black-white wage gap. Similarly, for females, the black-white wage gap is reversed for the NLSY 79 cohort and zero for the NLSY 97 cohort after I control for AFQT scores. It seems that AFQT scores have a smaller explanation power for the NLSY 97 cohort than for the NLSY 79 cohort. The estimated coefficients on AFQT also suggest AFQT scores are less important for males in the NLSY 97 cohort than for males in the NLSY 79 cohort.[1] That is also true for females. AFQT scores are also less important for females in the NLSY 97 after I control for education levels. On the other hand, adding education levels in the model still suggests no black-white wage gap for females in both NLSY cohorts.

[1] See Deming (2017).

The estimated coefficients on blacks shows similar pattern of change for both females and males in both cohorts. As shown in column (1) – (3) in Table 3, with no additional control the coefficients on black are the largest in the absolute values for both cohorts. The coefficients become smaller in the absolute values with AFQT scores in the model, as in column (2). The coefficients then rise in the absolute values with both AFQT scores and education levels in the model, as shown in column (3). Similar pattern can be found for females as well in column (4) – (6) in Table 3, but the differences between the coefficients on black in column (5) and (6) are not statistical significant.

2. Panel Data Analysis

We can find similar changes using the panel samples. Comparing the results in panel 1 and panel 2 of Table 4, it is quite obvious that unconditional black-white wage gap for both females and males is almost the same for both cohorts. Black males on average earn almost 20% less than white males. Black females on average earn around 10% less than white females. Conditional on AFQT scores, the black-white wage gap becomes smaller than the unconditional black-white wage gap. As it is similar in the cross-sectional analysis, the changes in the coefficients on black from column (1) to (2) are larger for males in the NLSY 79 cohort than for males in the NLSY 97 cohort. AFQT scores have a larger explanation power for the NLSY 79 cohort. Conditional on AFQT scores and education levels, the black-white wage gap then becomes larger for males in the NLSY 79 cohort but stay almost the same for males in the NLSY 97 cohort.

Similar to the results in Table 3, for females conditional on AFQT scores the black-white wage gap is gone for both cohorts. It suggests AFQT scores explain all the black-white wage

gap. Controlling for AFQT scores and education levels, I still find no black-white wage gap for females.

The patterns of the changes in the coefficients on black are similar to the pattern we find in Table 3. For males, we can find the coefficients are the largest in the absolute values in column (1) Table 4, and the coefficients become the smallest in the absolute values in column (2) and then rise in the absolute values in column (3). We also observe bigger jumps between columns for the NLSY 79 cohort.

When we look at the coefficients on AFQT scores, we can also find that AFQT scores are less important for males in the NLSY 97 cohort in explaining the wage gap. On the other hand, AFQT scores are equally important for both cohorts for females in the panel samples.

Based on the cross-sectional analysis and the panel analysis, we find similar results for males in both cohorts. The unconditional black-white wage gap is around 20% for males in both cohorts. When controlling for AFQT scores, the black-white wage gap then becomes smaller than the unconditional one. The differences between the conditional one and the unconditional one are larger for males in the NLSY 79 cohort than for males in the NLSY 97 cohort. Furthermore, conditional on AFQT scores and education levels, the black-white wage gap then becomes larger again, but still smaller than the unconditional ones. Again, the changes between the black-white wage gap conditional on AFQT scores and education levels and the one conditional on AFQT scores are larger for the NLSY 79 cohort.

When we look at the coefficients on AFQT scores, we find that AFQT scores are less important for males in the NLSY 97 cohort. Yet, the results for females are a little vague. AFQT scores seem to be less important for females in the NLSY 97 cohort according to the cross-sectional analysis. However, the results from the panel analysis suggest equal importance for the

two cohorts. This issue may be something that we can take further investigations in future papers.

Since the results are almost identical from the cross-sectional analysis and panel analysis, I will focus on the panel analysis in my following sections. Panel analyses are better than cross-sectional analyses when researchers want to take into account economic environment factors. Using panel sample will average out the economic environment changes since I want to compare the changes in the black-white wage gap between the two cohorts.

VI. Mechanisms Analyses

1. The Black-White Education Gap

The results from Table 3 and Table 4 suggest when I control for both AFQT and education, the black-white wage gap becomes larger than when I control for AFQT only. Lang and Manove (2011) argue it is because blacks get higher education levels than whites with the same AFQT scores. However, the estimates in Table 3 panel 2 and Table 4 panel 2 show that when I control for both AFQT and education, the black-white wage gap stays the same as when I control for AFQT only. One possible reason is because blacks do not get higher education than whites with the same AFQT scores for the NLSY 97 cohort.

Table 5 presents estimates from the regression of education levels on race, AFQT, and age. All models in Table 5 also control for years fixed-effect. Column (1) and column (2) in Table 5 present the estimates for the NLSY 79 cohort separately for males and females. It shows that black males on average get almost 1 year more of education than white males conditional on AFQT scores. Black females on average get more than 1 year more of education than white females conditional on AFQT scores. The education gap between blacks and whites is statistically significant for the NLSY 79 cohort. Column (3) and column (4) present the estimates

for the NLSY 97 cohort. The results show that black males on average get only 0.16 years more of education than white males conditional on AFQT scores. The education gap is not statistically different from 0. Black females on average get 0.36 years more of education than white females conditional on AFQT scores. The black-white education gaps for both males and females converge very dramatically for the NLSY 97 cohort.

Since the conditional black-white education gaps are almost 0 for the NLSY 97 cohort, adding education levels in the model do not have bigger impact on the estimated black-white wage gap for the NLSY 97 cohort than for the NLSY 79 cohort. Therefore, we do not observe a bigger change between column (2) and (3) or column (5) and (6) in Table 4 anymore for the NLSY 97 cohort.

Since I have answered the question why the black-white wage gap does not increase conditioning on education for the NLSY 97 cohort. I will focus on the model specifications with controls of education and AFQT in Table 4 for the following analysis on the changes in the black-white wage gap for the NLSY 79 and the NLSY 97 cohorts.

2. *The Changes in the Black-White Wage Gap*

i. *The Black-White AFQT Gap*

The results using the NLSY 97 cohort suggest AFQT can no longer explain a big part of the black-white gap. The first place to check is whether there are any changes in the black-white AFQT gap. If the AFQT gap between blacks and whites becomes smaller in recent years, the black-white wage gap recent years may not be driven by the black-white AFQT gap.

Table 6 presents the OLS estimate of AFQT scores on race, the education level and the age when the AFQT was administered for both males and females. The first two columns show

estimates for the NLSY 79 cohort and the latter two columns show estimates for the NLSY 97 cohort.

The coefficients on black in column (1) and (3) are relatively close. Both estimates show AFQT scores for black males on average are 1 standard deviation lower than for whites. While the estimates in column (2) and (4) show the black-white AFQT gap has converged a little for the NLSY 97 cohort. The black females on average have almost 1 standard deviation lower than those of white females for the NLSY 79 cohort. For the NLSY 97 cohort, the black females on average get 0.8 standard deviation lower than those of white females. That can explain why the estimates in column (5) in both Table 3 and Table 4 show that AFQT has more explanation power of the black-white wage gap for females when the coefficients on AFQT is almost the same for both females in the two cohorts.

Therefore, the changes in the black-white AFQT gap is the reason why we observe more explanation power in AFQT for females. However, there is no changes in the black-white AFQT gap for males. Thus, the black-white AFQT gap cannot explain why we observe less explanation power in AFQT for males for the NLSY 97 cohort.

Because of the differences in the labor force participation of black and white females, I restrict my analysis on black and white males in the following mechanism analyses.[1]

ii. Business Cycle

Couch and Fairlie (2010) have shown that during recessions blacks are the first fired. Hoynes, Miller and Schaller (2012) find the Great Recession in 2007 and 2008 is more severe than any recessions in the 1980s. Blacks feel more impacts than whites during the Great

[1] As suggested in Neal (2004)

Recession. Cajner, et al. (2017) observe that blacks have higher and more cyclical unemployment rates than whites.

The changes in the impact from recessions on blacks may contribute to the changes in the black-white wage gap between the NLSY 79 cohort and the NLSY 97 cohort. Table 7 presents the estimates of equation (2) adding the interactions between the annual unemployment rates and race dummies using the NLSY 79 cohort and the NLSY 97 cohort separately. The results in column (1) in Table 7 show that during recessions, the black-white wage gap converges for the NLSY 79 cohort. However, the results in column (2) in Table 7 show an opposite story. During recessions for the NLSY 97 cohort, the black-white wage gap becomes larger. The impacts from recessions have opposite effects on the black-white wage gap for the NLSY 79 cohort to the black-white wage gap for the NLSY 97 cohort. Specifically, for the NLSY 79 cohort the black-white wage gap becomes smaller during recessions. On the other hand, for the NLSY 97 cohort the black-white wage gap becomes larger during recessions.

Since the changes in the black-white wage gap is due to the changes in the impact from the recession on blacks, I then look at how blacks react differently during recessions. Table 8 presents the gap in the labor force status by races matching the individuals in my NLSY 79 cohort and my NLSY 97 cohort. The dependent variable in column (1) and column (2) in Table 8 is the employment status[1]. The dependent variable in column (3) and column (4) in Table 8 is the labor force participation status[2]. Columns (1) and (3) present the estimates for the NLSY 79 cohort, and columns (2) and (4) present the estimates for the NLSY 97 cohort.

[1] The dependent variable is a dummy variable. It equals to 1 if the individual is employed and 0 if the individual is unemployed.
[2] The dependent variable is a dummy variable. It equals to 1 if the individual is out of labor force and 0 if the individual is in the labor force (employed or unemployed).

Column (2) shows that blacks are almost 10 percentage points more likely to be unemployed. However, the employment status of black individuals in the NLSY 79 cohort is more vulnerable to business cycles. The estimates in column (1) show that blacks are more likely to be unemployed during recessions for the NLSY 79 cohort. The estimates in column (2) show that the unemployment status for black males does not change much over recessions. In other words, during recessions, the employment status gap between blacks and whites stays the same for the NLSY 97 cohort.

If we look at the labor force participation status, however, the evidence does not show that the labor force participation status for black males changes much over recessions for the two cohorts. The dependent variable in column (3) and (4) is a dummy variable where it equals to 1 if an individual is out of labor force and 0 if an individual is in the labor force. The estimates in columns (3) and (4) show that black males in both cohorts are 7 percentage points more likely to be out of labor force at the natural unemployment rate. For the NLSY 79 cohort, blacks are likely to go back into the labor force even though the percentage points are really small. For the NLSY 97 cohort, there is no significant difference in the labor force participation status between blacks and whites during recessions.

Lastly, I examine the selection during recessions. The estimates are presented in Table 9. The AFQT gap between blacks and whites does not change much during recessions. However, if we look at the educational gap during recession, it is quite clear that the conditional black-white education gap decreases during recessions for the NLSY 79 cohort. On the other hand, the conditional education gap increases during recessions for the NLSY 79 cohort. Fang (2006) suggests that two-thirds of the college wage premium is due to productivity increase from higher education. If blacks with lower education levels were laid off during recessions for the NLSY 79

cohort, one would definitely underestimate the black-white wage gap due to the highly educated blacks in the sample.[1]

Therefore, the reason why we observe blacks were doing better during recessions for the NLSY 79 cohort is possibly due to sample selection. Black workers with low education levels in the NLSY 79 cohort are more likely to be unemployed during recessions, and as a results black sample in the NLSY 79 is positively selected during recessions. In other words, blacks who enjoy wage premiums are remained in the sample during recessions.[2] While for the NLSY 97 cohort, the employment status gap and the labor force participation status gap between blacks and whites are not affected by recessions. Moreover, the conditional education gap between blacks and whites seems to be even larger during recessions.

Even though the evidence show that we have a large black-white wage gap for the NLSY 97 cohort than for the NLSY 79 cohort, in fact, it is because black males in the NLSY 97 cohort are actually doing better than the black males in the NLSY 79 cohort, especially during recessions. During recessions, black males in the NLSY 79 cohort were more likely to be unemployed or out of labor force, which causes positive selection bias in the black-white wage gap. However, black males in the NLSY 97 cohort suffered a lot less during recessions. Thus, during recessions, we do not have any positive selection problem in the sample for the NLSY 97 cohort, which give me the larger black-white wage gap for the NLSY 97 cohort. The true story is that black males in the NLSY 97 cohort are doing much better than black males in the NLSY 79 cohort. Black males in the NLSY 97 cohort do not suffer as much as the black males did in the NLSY 79 cohort during recessions.

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[1] See Hoynes, Miller and Schaller (2012). They find that black workers, low education workers are affected by recessions most strongly.

[2] See Arcidiacono, Bayer and Hizmo (2010). Thy find that college-graduated blacks get wage premiums compared to whites within the first ten years in the labor market.

I also investigate the following mechanism analyses, but none of them really explain the fact that we observe the larger black-white wage gap conditional on AFQT and education for the NLSY 97 cohort.

iii. The Annual Unemployment Rate at Age 18 and at Age 22

Most people graduate from high school at age 18 and graduate from colleges at age 22. When they graduate from schools, they have to choose between staying in school and finding a job. Since blacks and whites perform differently during the recessions, blacks and whites can make totally difference decisions even during the same economic circumstance. If it is hard for blacks to find a job, they may choose to stay in school instead of going into the labor market. The decision in turn will affect people's future wage rates.

Table 10 presents the results by adding the annual unemployment rate[1] at age 18 and at age 22. The results show no evidence that the unemployment rate at age 18 or at age 22 explain the changes in the black-white wage gap between the NLSY 79 cohort and the NLSY 97 cohort. If we compare the estimates in Table 10 and the estimates in Table 4, adding the unemployment at age 18 or age 22 do not change the main results. Conditional on AFQT and education, we still observe the larger black-white wage gap for the NLSY 97 cohort.

VII. Conclusion

This paper has three major findings: First, for the 97 cohort, the black-white wage gap for males is no longer sensitive to the control for education levels. Second, I find that the unconditional black-white wage gap for both males and females is the same for the 79 and 97 cohorts. On the other hand, surprisingly, the black-white wage gap for men conditional on pre-market ability and education is higher for the 97 cohort, which suggests the black-white wage

[1] The annual unemployment rate in this paper is the annual unemployment rate from BLS minus 3%.

gap did not converge in the early 21st century. Third, both the conditional and unconditional black-white wage gap for women is similar between the two cohorts and the wage gap conditional on pre-market ability and education levels are near zero. Pre-market ability is less important for determining wages for the men in the 97 cohort.

By looking into the education attainment gap between blacks and whites for the 79 and the 97 cohorts, I find that the black-white education gap converges for the 97 cohort conditional on AFQT scores. Since blacks get almost identical education levels as whites, the black-white wage gap is no longer sensitive to the control for education levels.

Also, I look at the racial gap of AFQT scores for males and females. I find no evidence in explaining the larger conditional black-white wage gap for males in the 97 cohort because the racial AFQT gap for males is almost identical across the two cohorts. However, for females, the black-white AFQT gap has converged for the 97 cohort.

For males, I look into the impact of the business cycle on blacks and whites. During recessions, the black-white wage gap increases for the 97 cohort but decreases for the 79 cohort. The changes in the impact from recessions on blacks between the NLSY 79 cohort and the NLSY 97 cohort cause the changes in the black-white wage gap conditional on AFQT and education.

I also investigate the employment status and the labor force participation status in the NLSY 79 cohort and the NLSY 97 cohort. For the NLSY 79 cohort, the black individuals are more likely to be unemployed during recessions while for the NLSY 97 cohort, the employment and labor force participation statuses for blacks are not affected by recessions. As a result, black males with low wage rates in the 79 cohort are more likely to be dropped out of the sample during recessions, which causes positive selection bias in the 79 cohort, especially during

recessions. However, for the 97 cohort, black males are not affected by the recessions the same way as black males in the 79 cohort. Blacks are doing much better in keeping their jobs during recessions for the 97 cohort than for the 79 cohort. I also look at the selection on observables during recessions. The estimates clearly support that highly educated black males in the 79 cohort are more likely to stay employed during recessions conditional on AFQT scores. All the evidence suggest blacks are positively selected during recessions for the NLSY 79 cohort. Even though the results show a large conditional black-white wage gap for the NLSY 97 cohort, the truth is that black males are doing better during recessions in the NLSY 97 cohort than in the NLSY 79 cohort.

I investigate the following mechanism, such as the annual unemployment rate at age 18 and age 22, but it cannot explain the larger conditional black-white wage gap for the 97 cohort.

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Table 1 Descriptive Statistics of the Cross-Sectional Samples

	NLSY 79		NLSY 97	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Wage	10.32	8.64	15.56	13.90
	(5.81)	(4.97)	(9.78)	(8.82)
Black	0.29	0.30	0.24	0.27
	(0.45)	(0.46)	(0.43)	(0.45)
Hispanic	0.19	0.20	0.20	0.20
	(0.39)	(0.40)	(0.40)	(0.40)
Asian			0.02	0.02
			(0.14)	(0.12)
American Indian			0.01	0.01
			(0.08)	(0.08)
Other Races			0.11	0.11
			(0.31)	(0.31)
AFQT	0.02	0.15	-0.00	0.09
	(1.05)	(0.91)	(1.03)	(0.94)
Age	28.07	28.08	28.92	28.98
	(0.81)	(0.80)	(1.38)	(1.39)
Education	12.81	13.15	13.81	14.58
	(2.42)	(2.27)	(2.50)	(2.56)
Number of Individuals	1592	1429	2694	2628

Note: Standard errors in parenthesis.
The wage is the mean of hourly wages in 1990 and 1991 in the NLSY 79 sample and in 2010 and 2011 in the NLSY 97 sample. Wages in the NLSY 79 sample are measured in 1991 dollars and wages in the NLSY 97 sample are measured in 2011 dollars. Any observations with wages less than $1 or greater than $75 are dropped in the NLSY 79 sample and with wages less than $2 or greater than $100 are dropped in the NLSY97 sample. The age is individuals' age in 1991 in the NLSY 79 sample and individuals' age in 2011 in the NLSY 97 sample. The education is individuals' education in 1991 in the NLSY 79 sample and individuals' age in 2011 in the NLSY 97 sample.

Table 2 Descriptive Statistics of the Panel Samples

	NLSY 79		NLSY 97	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Wage	11.88	9.79	14.69	12.94
	(7.26)	(5.81)	(9.92)	(8.42)
Black	0.25	0.25	0.23	0.27
	(0.434)	(0.431)	(0.420)	(0.444)
Hispanic	0.16	0.16	0.20	0.19
	(0.370)	(0.362)	(0.397)	(0.393)
Asian			0.02	0.02
			(0.137)	(0.123)
American Indian			0.01	0.01
			(0.0804)	(0.0856)
Other Races			0.11	0.11
			(0.308)	(0.308)
AFQT	0.03	0.15	0.03	0.12
	(1.029)	(0.896)	(1.019)	(0.921)
Age	25.94	26.03	24.13	24.15
	(4.752)	(4.736)	(4.741)	(4.706)
Education	12.38	12.81	12.80	13.43
	(2.306)	(2.179)	(3.889)	(4.170)
Number of Observations	63987	59527	37379	37434
Number of Individuals	5677	5595	3455	3383

Note: Standard errors in parenthesis.
The NLSY 79 sample is drawn from the NLSY 79 wave 1979 – 1994. The NLSY 97 sample is drawn from the NLSY 97 wave 1999 – 2015. The wage rates in the NLSY 79 sample are measured in 1990 dollars and the wage rates in the NLSY 97 sample are measured in 2011 dollars. Since the NLSY 97 provides more detailed information on race, I can construct more detailed race dummies for the NLSY 97 sample. Since the NLSY 79 consists more respondents than the NLSY 97 in the first wave, the number of observations and the number of individuals are significantly larger in the NLSY 79.

Table 3 Replication of Neal and Johnson (1996)

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1: Estimates using the NLSY 79 cohort						
Black	-0.261***	-0.0754**	-0.103***	-0.171***	0.0743**	0.00448
	(0.0276)	(0.0297)	(0.0297)	(0.0300)	(0.0317)	(0.0318)
AFQT		0.172***	0.121***		0.242***	0.145***
		(0.0124)	(0.0152)		(0.0151)	(0.0180)
Education			0.0348***			0.0609***
			(0.00649)			(0.00652)
Observations	1,592	1,592	1,592	1,429	1,429	1,429
R-squared	0.060	0.165	0.183	0.022	0.156	0.204
Panel 2: Estimates using the NLSY 97 cohort						
Black	-0.262***	-0.167***	-0.173***	-0.154***	0.0163	-0.0183
	(0.0264)	(0.0277)	(0.0271)	(0.0243)	(0.0247)	(0.0238)
AFQT		0.102***	0.0387***		0.203***	0.0973***
		(0.0117)	(0.0136)		(0.0119)	(0.0138)
Education			0.0464***			0.0753***
			(0.00480)			(0.00462)
Observations	2,694	2,694	2,694	2,694	2,694	2,694
R-Squared	0.055	0.092	0.124	0.025	0.130	0.220

Note: Robust standard errors in parentheses.
The dependent variable is the mean of the natural log of the individuals' hourly wage.
Panel 1 presents the estimates using the NLSY 79 cohort. In panel 1, all wages are measured in 1991 dollars. Any wage observations below $1 or above $75 are dropped from the sample. The models in panel 1 also control for individuals' age in 1991 and Hispanic dummy. The education in column (3) and (6) is the highest grade completed in 1991.
Panel 2 presents the estimates using the NLSY 97 cohort. In panel 2, all wages are measured in 2011 dollars. Any wage observations below $1 or above $100 are dropped from the sample. All models in panel 2 also control for the individuals' age in 2011 and Hispanic, Asian, American Indian, other races dummies. The education in column (3) and (6) is the highest grade completed in year 2011.
*** p<0.01, ** p<0.05, * p<0.1

Table 4 Replication of Neal and Johnson (1996) using Panel Data

	Male			Female		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel 1 Estimates using the NLSY 79 cohort						
Black	-0.192***	-0.0494***	-0.0803***	-0.101***	0.0894***	0.0165
	(0.0106)	(0.0112)	(0.0113)	(0.0112)	(0.0111)	(0.0113)
AFQT		0.129***	0.0823***		0.195***	0.109***
		(0.00469)	(0.00569)		(0.00547)	(0.00632)
Education			0.0337***			0.0606***
			(0.00241)			(0.00237)
Observations	63,987	63,987	63,987	59,527	59,527	59,527
R-squared	0.216	0.236	0.242	0.174	0.214	0.239
Panel 2 Estimates using the NLSY 97 cohort						
Black	-0.187***	-0.126***	-0.128***	-0.102***	0.0149	0.00860
	(0.0133)	(0.0142)	(0.0140)	(0.0138)	(0.0136)	(0.0135)
AFQT		0.0664***	0.0521***		0.143***	0.121***
		(0.00587)	(0.00731)		(0.00629)	(0.00889)
Education			0.0118***			0.0173***
			(0.00359)			(0.00445)
Observations	37,379	37,379	37,379	37,434	37,434	37,434
R-squared	0.212	0.224	0.231	0.181	0.228	0.245

Note: Robust standard errors in parentheses.
The dependent variable is the natural log of the hourly wage rates. All models control for age and years fixed effect. The model in panel 1 control for Hispanic dummy. The model in panel 2 control for Hispanic, Asian, American Indian and other races dummies.
*** p<0.01, ** p<0.05, * p<0.1

Table 5 Education Gap by Race

	NLSY 79		NLSY 97	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
$Black$	0.920***	1.203***	0.164	0.365**
	(0.0589)	(0.0565)	(0.137)	(0.160)
$AFQT$	1.399***	1.427***	1.210***	1.287***
	(0.0251)	(0.0275)	(0.0558)	(0.0624)
$Observations$	63,909	59,292	37,379	37,434
$R-squared$	0.415	0.361	0.154	0.150

Robust standard errors in parentheses. The dependent variable is the education levels. All models control for age and years fixed-effect. The models using the NLSY 79 cohort also control for Hispanic dummy. The models using the NLSY 97 cohort also control for Hispanic, Asian, American Indian and other races dummies.
*** p<0.01, ** p<0.05, * p<0.1

Table 6 The AFQT Difference by Race

	NLSY 79		NLSY 97	
	Male	Female	Male	Female
	(1)	(2)	(3)	(4)
Black	-0.962***	-0.963***	-0.905***	-0.798***
	(0.0250)	(0.0231)	(0.0375)	(0.0344)
Education	0.348***	0.299***	0.360***	0.330***
	(0.00716)	(0.00690)	(0.0216)	(0.0188)
Observations	5,677	5,589	3,455	3,383
R-squared	0.417	0.411	0.247	0.238

Note: Robust standard errors in parentheses.
The education in the model is the education levels when the AFQT test was administered. For the NLSY 79 cohort, education is the education level in 1980. For the NLSY 97 cohort, education is the education level in 1998. All models control for age at which the individual took AFQT test. The models using the NLSY 79 cohort also control for Hispanic dummy. The models using the NLSY 97 cohort also control for Hispanic, Asian, American Indian and other races dummies.
*** p<0.01, ** p<0.05, * p<0.1

Table 7 The Black-White Wage Gap Adding the Interactions between Unemployment Rate and Race Dummies

	NLSY 79 (1)	NLSY 97 (2)
$Black$	-0.184***	-0.0443***
	(0.0210)	(0.0142)
$AFQT$	0.0826***	0.0522***
	(0.00569)	(0.00729)
$Education$	0.0335***	0.0117***
	(0.00241)	(0.00356)
$Annual\ Unemployment\ Rates\ \times Black$	0.0263***	-0.0260***
	(0.00397)	(0.00395)
$Observations$	63,987	37,379
$R-squared$	0.242	0.232

Note: Robust standard errors in parentheses.
All models control for age and years fixed-effect. The annual unemployment rates are the annual unemployment rates from BLS website minus 3%. The models using the NLSY 79 cohort also control for Hispanic dummy. The models using the NLSY 97 cohort also control for Hispanic, Asian, American Indian and other races dummies.
*** p<0.01, ** p<0.05, * p<0.1

Table 8 The Labor Force Status by Races

	Employment Status		Labor Force Participation	
	NLSY 79	NLSY 97	NLSY 79	NLSY 97
	(1)	(2)	(3)	(4)
$Black$	-0.0150	-0.0946***	0.0708***	0.0694***
	(0.00998)	(0.00874)	(0.0114)	(0.0108)
$AFQT$	0.0308***	0.0321***	-0.0105***	-0.0173***
	(0.00258)	(0.00300)	(0.00317)	(0.00383)
$Education$	0.00968***	0.00254**	-0.00631***	-0.00184*
	(0.000921)	(0.00129)	(0.00111)	(0.000987)
$Annual\ Unemployment\ Rate$				
$\times\ Black$	-0.0120***	-0.000719	-0.00418*	0.00164
	(0.00239)	(0.00248)	(0.00240)	(0.00246)
$Observations$	75,596	44,363	78,893	47,508
$R-squared$	0.108	0.072	0.101	0.112

Note: Robust standard errors in parentheses.

The dependent variables in this table are constructed using the weekly array information on the labor force participation status in the NLS. If an individual reported he was associated with an employer (either reported the employer information or did not report employer's information) during that week, I consider him as employed in that week. I construct the employment status and the labor force participation status for all individuals in all weeks from 1979 – 1994 in the NLSY 79 sample and 1999 – 2015 in the NLSY 97 sample. Then I collapse the employment status and the labor force participation status by individuals for each year. The employment status and the labor force participation status then are the dependent variables in this table. The number of observations in this table is larger than other tables because I retrieve anyone who is out of labor force or does not have valid wage rates back into the sample.

All models control for age and years fixed-effect. The annual unemployment rates are the annual unemployment rates from BLS website minus 3%.

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

Table 9 Selection on Unobservable and Observables during Recessions

	AFQT Scores		Education Levels	
	NLSY 79	NLSY 97	NLSY 79	NLSY 97
	(1)	(2)	(3)	(4)
$Black$	-1.093***	-0.909***	0.645***	0.534***
	(0.0365)	(0.0422)	(0.0869)	(0.134)
$AFQT$			1.397***	1.210***
			(0.0250)	(0.0558)
$Annual\ Unemployment\ Rate$	-0.00315	-0.000372	0.0691***	-0.114***
$\times\ Black$	(0.00444)	(0.00450)	(0.0122)	(0.0324)
$Observations$	63,987	37,379	63,987	37,379
$R-squared$	0.219	0.163	0.415	0.154

Note: Standard errors in parentheses are clustered at individual levels.
The dependent variable for column (1) and (2) is AFQT scores and for column (3) and (4) is education levels. Other control variables are the same as in table 7. The race dummies include black and Hispanic for the NLSY 79 cohort and black, Hispanic, Asian, American Indian and other races for the NLSY 97 cohort. Since I only focus on the gaps between blacks and whites, I do not report other coefficients in this table.
*** p<0.01, ** p<0.05, * p<0.1

Table 10 The Black-White Wage Gap Controlling for the Annual Unemployment Rates at Age 18 and Age 22

	Annual Unemployment Rates at Age 18		Annual Unemployment Rate at Age 22	
	NLSY 79	NLSY 97	NLSY 79	NLSY 97
	(1)	(2)	(3)	(4)
$Black$	-0.0802***	-0.129***	-0.0794***	-0.108***
	(0.0113)	(0.0140)	(0.0123)	(0.0189)
$AFQT$	0.0823***	0.0520***	0.0857***	0.0677***
	(0.00569)	(0.00730)	(0.00623)	(0.00942)
$Education$	0.0337***	0.0119***	0.0326***	0.00868**
	(0.00241)	(0.00358)	(0.00259)	(0.00365)
$Annual\ Unemployment\ Rate\ at\ Age\ 18$	0.000708	-0.00802		
	(0.00363)	(0.0125)		
			-0.000541	-0.0166
$Annual\ Unemployment\ Rate\ at\ Age\ 21$			(0.00371)	(0.0469)
$Observations$	63,987	37,379	57,249	22,080
$R-squared$	0.242	0.231	0.231	0.214

Note: Robust standard errors in parentheses.
The sample dummy in column (3) equals to 1 if the sample is from the NLSY 79 and 0 otherwise. All models control for age and years fixed-effect. The unemployment rates are the unemployment rates from BLS website minus 3%. The models using the NLSY 79 cohort also control for Hispanic dummy. The models using the NLSY 97 cohort also control for Hispanic, Asian, American Indian and other races dummies.
*** p<0.01, ** p<0.05, * p<0.1