



Can the “one-drop rule” tell us anything about racial discrimination? New evidence from the multiple race question on the 2000 Census[☆]

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ARTICLE INFO

Article history:

Received 27 June 2008

Received in revised form 14 December 2008

Accepted 18 January 2009

Available online 27 January 2009

JEL classification:

J15

J71

Keywords:

Race

Discrimination

ABSTRACT

The inclusion of multiple race information for the first time in the 2000 Census allows for a novel test for the presence of labor discrimination using the “one-drop rule.” Identifying discrimination is straightforward and essentially relies on the discontinuous nature of the one-drop rule, which treats biracial blacks similarly as monoracial blacks. If biracial blacks have levels of unmeasurable and measurable human capital that lie between the levels of monoracial blacks and whites then, absent discrimination, their wages should also lie between the wages of the two groups. Estimates from the Census indicate that biracial blacks have levels of education that lie almost perfectly between monoracial blacks and whites. In contrast, however, biracial blacks have wages that are roughly similar to monoracial blacks after controlling for education and potential work experience. Estimates from the 1980 Census also do not indicate that the parental characteristics and educational outcomes of biracial children differ from what would be expected by having both black and white parents. Several additional factors that potentially affect the human capital of biracial adults are explored. These findings provide some suggestive evidence on the “one drop rule” and the presence of discrimination in the labor market and provide new estimates of wages and educational levels of biracial blacks.

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1. Introduction

For the first time since the Government began enumerating the population, the U.S. Census Bureau allowed individuals to report more than one race. As a result, nearly 7 million people reported more than one major racial category in 2000 (U.S. Census Bureau, 2001). These new Census data allow for a novel and relatively straightforward method of testing for the presence of racial discrimination in the labor market. If discrimination exists, the wages of black/white biracials are likely to be similarly depressed as those of monoracial blacks because of the “one-drop rule” or hypodescent, which states that one drop of black blood makes someone black.¹ Thus, employers may discriminate against both monoracial and biracial blacks.

On the other hand, biracial blacks are not likely to have similar family backgrounds as monoracial blacks because of the presence of a white parent.² Biracial blacks are also likely to have different levels of both measurable and unmeasurable human capital than mono-

racial blacks. In fact, there is evidence indicating that the educational outcomes of biracial blacks tend to lie between those of monoracial blacks and whites (Harris and Thomas, 2002; Herman, 2002; Gullickson, 2003).

Identifying discrimination is straightforward and essentially relies on the discontinuous nature of the one-drop rule, which treats biracial blacks similarly as monoracial blacks. If biracial blacks have levels of unmeasurable and measurable human capital that lie between the levels of monoracial blacks and whites then, absent discrimination, their wages should also lie between the wages of the two groups. Therefore, a finding that biracial blacks have similar wages as monoracial blacks provides some suggestive evidence of discrimination.³

Of course, similar wages between monoracial and biracial blacks may be consistent with other explanations. For example, biracial blacks may face emotional hardship and other problems affecting educational attainment or earnings especially when young. Previous studies find evidence of more behavioral problems among biracial black children, but the evidence on “marginal man” is not entirely uniform (Herman, 2002; Fulton, 1997; Fryer et al., 2008; Ruebeck et al., 2008). Furthermore, observable years of schooling and other

[☆] I would like to thank Sandy Darity, Steve Trejo, Deniz Gevrek, and David Harris for helpful comments and suggestions.

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¹ The one-drop rule or hypodescent has a long legal history in the United States. Some states even had laws during the Jim Crow period that defined a white person as someone who has no non-white blood. More recently, hypodescent has been popular in terms of black identity. See Hickman (1997), Campbell (2003), and Gullickson (2003).

² For brevity, I refer to black/white biracials as biracial blacks.

³ See Blinder (1973), Oaxaca (1973) and Reimers (1983) for examples of earlier studies of labor market discrimination, and Darity and Mason (1998) and Altonji and Blank (1999) for reviews of the literature on labor market discrimination.

personal characteristics can be compared. Biracial blacks may also have different family backgrounds than a simple average of monoracial black and white families. Evidence on these potential differences can be obtained by examining historical data on children who have both a black and white parent and children who have parents of the same race. If biracial children have very different family and parental characteristics than what is predicted by averaging the characteristics of monoracial black and white children then there is reason to suspect that the current cohort of biracial adults may have different levels of unobserved human capital than expected.

A comparison of wages, education and other characteristics between monoracial and biracial blacks to explore the discrimination hypothesis has not been conducted in the previous literature. To be sure, several previous studies have examined the educational and economic outcomes of biracial individuals, however, these studies generally rely on relatively small sample sizes. For example, the PSID contains only 50 biracial (black/white) individuals and the NLSY97 only contains 60 biracial individuals (Gullickson, 2003). The 1995 CPS included a special Race and Ethnicity Supplement, but it contains less than 200 black/white biracial individuals of all ages (Campbell, 2003). Larger samples are available for examining children from the National Longitudinal Study of Adolescent Health (Harris, 2002; Fryer et al., 2008; Ruebeck et al., 2008) and by matching children to parents living in the same household in the Census (as discussed below), but these datasets do not allow for analyses of the labor market outcomes of working-age adults.⁴ The 2000 Census is the first dataset to provide a large enough sample to make very precise comparisons between the labor market outcomes of adult biracial blacks and monoracial blacks. In addition to exploring the one-drop rule and discrimination hypothesis, the following estimates from the Census provide the first detailed comparison of wages, education and other demographic characteristics between monoracial blacks, monoracial whites and biracial blacks based on large sample sizes. This study is also the first to examine the family and parental characteristics of the current cohort of young adult biracial blacks when they were children in 1980. The findings are important because of the rising number of interracial marriages and biracial children in the United States (Rosenfeld and Kim, 2005; Fryer, 2007).

To preview the results, estimates from the 2000 Census indicate that biracial blacks have levels of education that lie half way between monoracial blacks and whites, but have wages that are roughly similar to monoracial blacks. In addition, estimates from the 1980 Census do not provide evidence that the family and parental characteristics of biracial blacks differ from what would be expected by having both black and white parents. These findings suggest that the unobserved human capital of biracial blacks may lie between those of monoracial blacks and whites, but their wages are depressed possibly due to the “one drop rule” and discrimination in the labor market. Alternative explanations are explored and are not generally supported by the evidence. One exception is that biracial children are found to have more behavioral problems than monoracial children, which may result in lower levels of unobserved human capital and lower wages. Observable human capital in childhood and adulthood, however, does not appear to be affected by the increased incidence of these problems in childhood.

The paper proceeds as follows. Section 2 presents a simple theoretical model of how the one-drop rule might affect wages relative to observed and unobserved human capital. The primary dataset used in the analysis, the 2000 Census, is discussed in Section 3. Section 4 contains a detailed comparison of wages conditioning and not conditioning on differences in education and other characteristics. The parental characteristics of biracial children are also compared to

monoracial children, and alternative explanations are explored. Section 5 concludes.

2. Simple theoretical model

A very simple model is useful to illustrate the approach taken here. First, assume that wages are determined by measurable and unmeasurable human capital, and discrimination. Clearly, this is an oversimplification because many additional factors determine wages (e.g. economic conditions, social capital geographic location, etc...), but it is useful for illustrating how the one-drop rule can be used to test for discrimination. Abstracting from a more realistic model of wage determination, wages can be expressed as:

$$w = X\beta + \theta + d, \quad (1)$$

where X captures measurable human capital (e.g. years of schooling), β captures the returns to measurable human capital, θ captures unmeasurable human capital and its returns (e.g. school quality), and d is a discrimination component. Using this equation, wages for whites and blacks can be expressed as the following:

$$w^W = X^W\beta + \theta^W \quad (2)$$

$$w^B = X^B\beta + \theta^B + d. \quad (3)$$

This is the standard discrimination model of wages where black wages are lower than white wages by the amount of the discrimination component (Becker, 1971). The wage difference after controlling for observable and unobservable human capital then is determined by how much discriminating employers are willing to “pay” in lost profits to discriminate against black workers.

The strictest interpretation of the one-drop rule suggests that biracial blacks face the same level of discrimination in the labor market as monoracial blacks. This implies that their wages are partly determined by the discrimination component, d . If one also assumes that biracial blacks have the average characteristics of blacks and whites then biracial black wages are:

$$w^{BW} = 1/2(X^B + X^W)\beta + 1/2(\theta^B + \theta^W) + d. \quad (4)$$

Therefore, the discrimination component can be expressed as a function of wages:

$$d = 2w^{BW} - (w^B + w^W). \quad (5)$$

This expression indicates that the presence of discrimination by employers against blacks is consistent with the wages of biracial blacks being lower than the average of monoracial black and white wages.

One of the key assumptions of this simple model is that biracial blacks have levels of human capital that lie half way between those of monoracial blacks and monoracial whites. This assumption can easily be tested by comparing the average education levels of biracial blacks, monoracial blacks and monoracial whites in the data. Another key assumption is that levels of unmeasurable human capital follow the same pattern. This assumption cannot be tested directly, but some suggestive evidence can be obtained by examining differences in family backgrounds, such as family income and parental education levels.

Of course, there are many additional factors affecting the wages of the three groups, but this simple model illustrates the basic identification strategy. The one-drop rule creates a discontinuous treatment of individuals, but the characteristics of these individuals, including their measurable and unmeasurable human capital, should be more continuous. The finding of continuous, or in this case roughly

⁴ Although the confidential version of the National Longitudinal Study of Adolescent Health contains a total of 90,000 observations, the main samples used in recent studies include 100–300 observations for black/white biracial children.

Table 1
Average education, wages and other characteristics for white, black, and biracial men 2000 Census.

	Monoracial Whites	Black/White Biracials	Monoracial Blacks
<i>Ages 20–64</i>			
Years of schooling	13.6	13.0	12.4
College degree %	28.4%	17.9%	11.4%
Age	41.0	32.0	38.6
Potential experience	21.4	13.0	20.2
Married	63.0%	35.4%	44.4%
Number of children	0.73	0.73	0.78
Mean wage	22.04	15.74	17.39
Mean log wage	2.79	2.47	2.53
Sample size	2,800,087	2822	367,692
<i>Ages 20–40</i>			
Years of schooling	13.5	12.9	12.4
College degree	25.4%	15.7%	9.9%
Age	30.7	27.2	30.1
Potential experience	11.2	8.3	11.6
Married	50.9%	28.9%	36.6%
Number of children	0.87	0.75	0.89
Mean wage	18.04	14.26	15.30
Mean log wage	2.63	2.39	2.42
Sample size	1,325,481	2197	204,537

Note: The samples exclude Hispanics, immigrants and individuals reporting more than 2 races.

equidistant, levels of observable human capital and family backgrounds suggests that the unobservable characteristics may also be equidistant between the groups. In addition, historical data providing information on when the current cohort of adults were children may also be useful for exploring differences in unmeasurable characteristics (information on family backgrounds and parental characteristics are not available for adults).

Another important simplification in the model is that it focuses only on discrimination in the labor market. I am not modeling the potential for pre-market discrimination against biracial blacks because of the one-drop rule. The main test of the one-drop rule is to compare where biracial wages lie in the racial wage distribution to where biracial education levels lie in the racial educational distribution. But, if discrimination occurs earlier and results in substantially lower levels of formal education received by biracial blacks then the test may understate the effects of the one-drop rule and potentially not detect broader racial discrimination. Although the focus here is primarily on labor market discrimination conditioning on realized education, I discuss these issues more below and estimate separate models without and without controls for education.⁵

3. Data

The data used in this study are from the Public Use Microdata (PUMS) 5-Percent Samples of the 2000 U.S. Census of Population. For the first time, the 2000 Census questionnaire allowed individuals to report more than one race.⁶ Nearly 7 million people or 2.4% of the population reported more than one major race (U.S. Bureau of the Census, 2001). Of those reporting more than one race, 93.3% reported two races. One of the most common racial combinations is white/black. Nearly 800,000 people reported being black and white, representing 11.5% of all individuals reporting multiple races.

The 2000 PUMS 5-Percent Sample from the Census provides the largest national sample of biracial blacks with detailed information on demographic characteristics and wages. In the main sample used

below, observations for 2822 biracial black men between the ages 20–64 are available. Younger and older workers are excluded from the sample to focus on individuals with a stronger attachment to the workforce. The focus on male workers is consistent with much of the literature examining black/white wage differences. Wage differentials are substantially smaller for women. Individuals reporting more than 2 races are also excluded from the sample. Biracial blacks are thus defined as individuals who report black and white on the race question and no additional races. Unfortunately, the Census does not provide information on the race of parents for adults. I investigate whether the self-identification of being black/white biracial on the 2000 Census appears to be reasonably accurate below. Non-random self-identification of biracials as black or white can lead to biased estimates of wage differentials.

4. Results

Do biracial blacks have average characteristics that lie between those of monoracial whites and blacks? Table 1 reports estimates of education levels, age and other demographic characteristics for monoracial whites, monoracial blacks, and biracial blacks from the 2000 Census.⁷ Estimates from the 2000 Census indicate that biracial blacks have average education levels that lie between those of monoracial blacks and whites. In fact, the mean years of schooling among biracials lies nearly perfectly in the middle of the monoracial black and white means. Biracial blacks have an average of 13.0 years of schooling compared to an average of 13.6 for monoracial whites and 12.4 for monoracial blacks. Estimates from the 2000 Census also indicate that the percentage of biracial blacks graduating from college is similar to the average of the percentages of blacks and whites graduating from college. Finally, the entire educational distribution of biracial blacks lies between those of monoracial whites and blacks (see Fig. 1).

In contrast to these estimates, biracial blacks are much younger on average than monoracial blacks and whites. These patterns capture the strong upward trend in biracial marriages over time in the United States (U.S. Census Bureau, 1998). The average age of biracial blacks is 32.0 compared to 38.6 and 41.0 for blacks and whites, respectively. The relative youth of biracial blacks translates into having lower levels of potential work experience and lower marriage rates than monoracials. The average number of children, however, is roughly similar.

Table 1 also reports estimates of average characteristics for biracial blacks and monoracial blacks and whites for a sample of men ages 20–40. The mean age of the biracial group is now more similar to the mean age of blacks and whites. Potential work experience is also more similar for this younger age group. Focusing on younger adults does not change the finding for education, however. Biracial blacks have mean years of schooling and a college graduation rate that are very similar to the average of the monoracial black and white means. Thus, biracial blacks have levels of measurable human capital that lie roughly half way between monoracial blacks and whites.

It is also useful to compare the geographical distribution of biracial blacks to those of monoracial whites and blacks. Table 2 reports estimates of the distributions across the nine Census divisions or regions in the United States. All three groups have similar likelihoods of living in the Middle Atlantic and East North Central regions. Biracial blacks are more likely than either monoracial blacks or whites to live in the Pacific region. They are less likely to live in the East South Central and West South Central regions than monoracial blacks or whites. The percentage of biracials living in the New England, West North Central and Mountain regions lies between those for blacks and whites. Overall, the main differences in the results are that biracial blacks are more likely to live in the Pacific region than either

⁵ See Neal and Johnson (1996) and Lang and Manove (2006) for more discussion of pre-market discrimination and the effects of controlling for education.

⁶ See Perlmann and Waters (2002) for an extensive discussion of the new multiracial information available in the 2000 Census.

⁷ Hispanics and immigrants are excluded from these estimates for biracial blacks and monoracial blacks and whites.

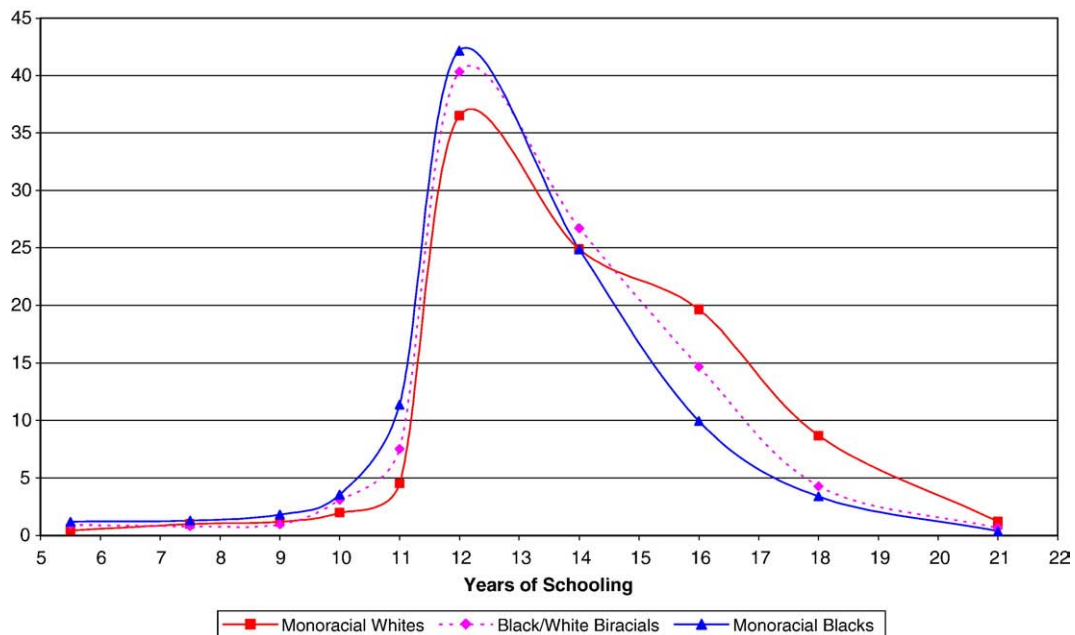


Fig. 1. Educational distributions for white, black and biracial men 2000 Census.

monoracial blacks or whites, and are less likely to live in the South Atlantic region than are monoracial blacks. Although these estimates do not point to glaring differences in geographical distributions, it will be important to control for them later.

4.1. Comparison of wages

In contrast to education levels, the wages of biracial blacks do not lie between those of monoracial blacks and whites (see Table 1). In fact, average wages are slightly lower for biracial blacks than they are for monoracial blacks. The average wage for biracial blacks is \$15.74 compared to \$17.39 for monoracial blacks. For both groups average wages are substantially lower than the average wages of monoracial whites, which are \$22.04.⁸ These patterns of wage differentials across groups also hold when comparing log wages. Biracial blacks have mean wages that are roughly 6% lower than monoracial blacks. The entire distribution of wages is also clearly to the left of the distribution for monoracial whites wage distribution and close to the monoracial black wage distribution (see Fig. 2).

One reason why biracial blacks have slightly lower wages than monoracial blacks is that they are younger and have less work experience. Biracial workers are 6.9 years younger and have 7.3 years less of potential work experience than monoracial black workers. To address this issue, Table 1 also reports estimates of mean wages for the sample of workers ages 20–40. Focusing on this younger cohort of workers, the difference between biracial blacks and monoracial blacks is smaller. The difference in mean log wages for the two groups is now only 0.03. Both groups have substantially lower wages than whites.

The key finding from the wage comparison is that both biracial and monoracial blacks have substantially lower wages on average than monoracial whites. This is somewhat surprising in light of the earlier results indicating that biracial blacks have average levels of education that lie almost perfectly between the education levels of monoracial blacks and whites. All else equal, we would expect the average wages of biracial blacks to lie half way between those of monoracial whites

and blacks. Although focusing on the younger cohort partly resolves differences in potential work experience, a regression approach is needed to more carefully control for additional differences.

4.2. Regression results

I next estimate log wage regressions that include controls for several individual characteristics. Table 3 reports estimates. All specifications include state fixed effects and dummy variables for every major racial category and the largest biracial mixes.⁹ The sample includes men ages 20 to 64 and excludes individuals reporting more than 2 races. Estimates from the base specification indicate that monoracial blacks earn roughly 25% less than monoracial whites. Biracial blacks earn even less on average—7% less than monoracial blacks and 32% less than monoracial whites.¹⁰ These differences, however, do not control for the younger average age and less potential work experience of biracial blacks.

Specification 2 includes a quartic for potential work experience in addition to the main controls. In this specification, the black only and biracial black coefficients remain negative and large in magnitude. The difference between the coefficients, however, increases and is now positive and statistically significant. Although biracial blacks earn more on average than monoracial blacks the difference is relatively small compared to the difference between either monoracial blacks or biracial blacks and monoracial whites. Biracial blacks have wages that are roughly 20% lower than those of monoracial whites.

An interesting finding from the 2000 Census documented above is that biracial blacks have levels of education that lie almost perfectly between the education levels of monoracial blacks and whites. Given this finding, the predicted effect of adding controls for education levels is to reduce the wage differences between all three groups. Specification 3 includes dummy variables for every one of the 16

⁹ State fixed effects are included to capture differences in local economic conditions, state policies and other state characteristics.

¹⁰ All racial groups are included in the sample to capture the wage function for the entire labor market. The biracial, monoracial black and monoracial white comparisons are similar when the sample only includes these groups.

⁸ All wage differences between the three groups are statistically significant.

Table 2
Geographical distribution for whites, blacks, and biracials 2000 Census.

	Monoracial Whites	Black/White Biracials	Monoracial Blacks
NewEngland	5.8%	5.1%	1.6%
Middle Atlantic	13.4%	16.2%	12.5%
East North Central	18.3%	18.4%	16.2%
West North Central	8.6%	7.4%	3.2%
South Atlantic	18.0%	14.8%	32.4%
East South Central	6.9%	4.3%	10.3%
West South Central	9.7%	7.2%	13.9%
Mountain	6.8%	6.1%	1.8%
PaciFic	12.5%	20.6%	8.1%
Sample size	2,800,087	2822	367,692

Note: The samples exclude Hispanics, immigrants and individuals reporting more than 2 races.

detailed levels of education available in the 2000 Census.¹¹ Indeed, the inclusion of controls for education reduces the magnitude of the black only coefficient, which captures the difference between monoracial black wages and monoracial white wages. The difference is now 14 log points and is statistically significant. Biracial blacks continue to earn substantially less than monoracial whites with a difference of 12 log points. The difference in wages between biracial blacks and monoracial blacks is now much smaller at only 2.5 log points. As discussed above, controlling for education focuses the analysis on labor market discrimination instead of pre-market discrimination which may have lowered biracial levels of education. Although controlling for education reduces both the monoracial black and biracial black coefficients it does not change the relative size of the coefficients. Biracial blacks continue to have average wages much closer to monoracial blacks than to monoracial whites.

In the final specification reported in Table 3, experience/education interactions are included.¹² These interactions control for differences in the returns to education across different age/experience cohorts due to changes in the labor market, educational selection and educational system. The inclusion of these additional controls has little effect on the results. The coefficients on the black only and biracial dummies are very similar to those reported in the previous specification. The estimates are clearly not sensitive to changing returns to education over time.

In sum, the key finding from the regressions reported in Table 3 is that biracial blacks earn roughly similar wages as monoracial blacks after controlling for differences in potential work experience and education. Both monoracial and biracial blacks earn considerably less than monoracial whites. The unexplained wage differences are roughly 12% for biracial blacks and 14% for monoracial blacks. If biracial blacks have unobserved human capital that lies half way between the monoracial black and white levels, which would be similar to observable education differences, then these estimates are consistent with the one drop rule and discrimination. Biracial wages are lower than the average of monoracial black and monoracial white wages.¹³

The general findings also do not change when focusing on less-educated or more-educated workers. Table 4 reports estimates for the sample of workers with a high school degree or less, and Table 5 reports estimates for the sample of workers with more than a high school degree. For less-educated workers and controlling for only

potential work experience, both monoracial blacks and biracial blacks earn 15 log points less than monoracial whites. As expected, further controls for education result in only a small decline in coefficients. In all specifications controlling for potential work experience or education, I find that biracial blacks earn the same as monoracial blacks.

Among more-educated workers, monoracial blacks have wages that are 23 log points lower than monoracial whites after controlling for potential work experience. Biracial blacks have wages that are 16 log points lower than monoracial whites. Controlling for detailed education levels, results in lower wage differentials—monoracial blacks earn 15 log points less and biracial blacks earn 11 log points less. The differences between biracial blacks and monoracial blacks are small in magnitude relative to the overall differences, but are larger than the biracial/monoracial black differences for less-educated workers. The general pattern of low wages among biracial blacks that are only slightly higher than the wages of monoracial blacks holds within broad educational groups.

4.3. Estimates for a younger cohort

As noted above, biracial blacks tend to be younger on average than monoracial blacks and whites. Thus, the lack of finding of a larger biracial black wage than monoracial black wage may be driven by older workers. To address this concern, I reestimate the regressions using a sample of workers ages 20–40. Estimates are reported in Table 6. This restriction reduces the sample size by 45% and lowers the average wage, but the estimates paint a similar picture.

The coefficient estimate on the black only dummy variable is large, negative and statistically significant. The biracial black coefficient is also large, negative and statistically significant. In contrast, the difference between the biracial and monoracial black coefficients is positive, but relatively small and statistically insignificant in all of the specifications that control for potential work experience or education. Thus, the original estimates are not sensitive to the inclusion of older workers among which biracial blacks are underrepresented relative to monoracial whites and blacks. The analysis of this age cohort is also useful because it allows one to examine their parental characteristics when they were children using the 1980 Census.

4.4. Differences in parental characteristics

Of course, biracial blacks may differ from a simple average of monoracial black and white levels for many other characteristics leading to lower than predicted wages. For example, the family and parental characteristics of biracial children may differ from that predicted by averaging monoracial characteristics. These family background differences may lead to differences in unobservable factors that are related to wages. To investigate this issue further, I use data from the 1980 Census for children ages 0–20 and their parents.¹⁴ Although the 1980 Census does not allow individuals to report multiple races, I can identify biracial children by examining the races of their parents. The 1980 Census provides household identification codes and relationship variables that can be used to match children to their parents. A comparison of parental characteristics for these children provides information on potential differences in unmeasurable human capital among the 20–40 year old cohort in the 2000 Census.¹⁵ These unmeasurable differences may not show up in the

¹¹ The detailed education levels available in the Census are no schooling completed, nursery school to 4th grade, 5th grade or 6th grade, 7th grade or 8th grade, 9th grade, 10th grade, 11th grade, 12th grade (no diploma), high school graduate, some college (but less than 1 year), one or more years of college (no degree), associate degree, bachelor's degree, master's degree, professional degree, and doctorate degree.

¹² Interactions between 5-year experience cohorts and 4 major education thresholds (high school drop out, high school graduate, some college and college graduate) are included.

¹³ The resulting estimate of d in Eq. (5) is negative and statistically significant.

¹⁴ I include all children in the analysis. Estimates are very similar when I limit the sample to boys.

¹⁵ Sample sizes for this cohort increase for monoracial whites and monoracial blacks from 1980 to 2000, but decrease for black/white biracials. The decline in sample sizes for biracials may be caused by the differential reporting of multiple races than parental races. The increase for monoracial blacks may be caused by single-parent families which are captured in 2000, but cannot be identified in 1980.

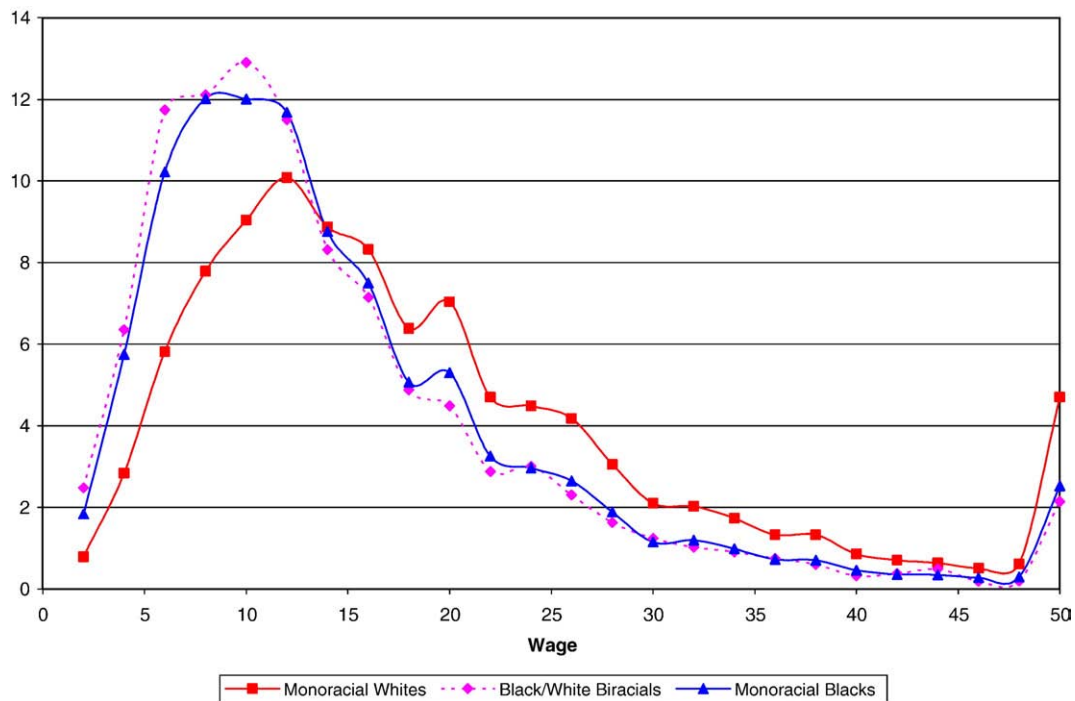


Fig. 2. Wage distributions for black, white, and biracial men 2000 Census.

detailed measure of education included in the regressions discussed above.

Before comparing parental characteristics of the relevant cohort being analyzed in the 2000 Census, it is useful to briefly examine the selectivity of interracial marriage. Fryer (2007) examines interracial marriage patterns over the twentieth century and finds that earlier in the century less-educated blacks and whites were the most likely to intermarry. But, intermarriage rates among the most-educated whites and blacks increased much faster in the 1960s and 1970s, and by 2000 were higher than rates for less-educated blacks and whites. Further evidence is provided by Gevrek (2008) who finds that both black men and women who intermarry are more educated on average than black men and women who marry within their own race. She also finds that intermarriage rates increase with education.

Examining the educational attainment of interracial couples in the 1980 Census, I find a similar pattern (see Table 7). The average education level of black men in interracial marriages is higher than in black only marriages. Black women in interracial marriages also have

higher education levels than black women in black only marriages. The same patterns hold for whites—white men and women in biracial marriages have higher education levels than their counterparts in white only marriages. The differences are not as large, however. Examining all intermarriages, of which 78% are between a black man and white women, I find that the average education level of both men and women is slightly higher than for white only marriages and substantially higher for black only marriages. Black and whites who intermarry in the 1980 Census are more educated on average than those who choose to marry within their own race.

Although these findings for the selectivity of all interracial marriages are suggestive, the most relevant comparison for this analysis is between the parental characteristics of biracial children and the parental characteristics of monoracial children. Table 8 reports education levels and additional characteristics of parents of monoracial white, monoracial black and biracial children.¹⁶ One limitation of this analysis, however, is that I can only include children currently living with both parents. The monoracial/biracial status of those children living with only one parent cannot be identified in the 1980 Census. Estimates from Table 8 indicate that biracial children have mothers that are slightly younger and fathers that are slightly older than the mothers and fathers of either monoracial white or black children. This pattern also holds within direct race/sex comparisons, which are useful because 76% of biracial children have a black father and a white mother.

Average father's income for biracial children lies between the mean for monoracial black children and white children. Mother's

Table 3
Log wage coefficients for blacks and black/white biracials 2000 Census.

	(1)	(2)	(3)	(4)
Black only	-0.2490 (0.0014)	-0.2399 (0.0014)	-0.1411 (0.0013)	-0.1414 (0.0013)
Black/White biracial	-0.3237 (0.0128)	-0.1984 (0.0123)	-0.1166 (0.0114)	-0.1163 (0.0114)
Difference: Black/White biracial-black only	-0.0747 (0.0129)	0.0415 (0.0123)	0.0245 (0.0114)	0.0250 (0.0114)
Potential work experience (quartic)	No	Yes	Yes	Yes
Education dummies (16 levels)	No	No	Yes	Yes
Experience/education interactions	No	No	No	Yes
Sample size	3,064,862	3,064,862	3,064,862	3,064,862

Note: All specifications include state fixed effects and dummy variables for major race categories and the most common mixed races. The sample excludes individuals reporting more than 2 races.

¹⁶ Examining how race is reported for the children of biracial parents, I find that black/white biracial children are much more likely to be recorded as being of black race by the household respondent. For children with a white and black parent in the 1980 Census, 65.4% are reported as being black compared to only 26.8% being reported white. In addition to these categories, 7.4% of children with black and white parents are reported as being other race. For comparison, 99.9% of children with two white parents are reported as white and 99.8% of children with two black parents are reported as black.

Table 4
Log wage coefficients for blacks and black/white biracials for less-educated workers 2000 Census.

	(1)	(2)	(3)	(4)
Black only	−0.1634 (0.0018)	−0.1463 (0.0017)	−0.1330 (0.0017)	−0.1333 (0.0017)
Black/White biracial	−0.2790 (0.0171)	−0.1497 (0.0165)	−0.1254 (0.0163)	−0.1253 (0.0163)
Difference: Black/White biracial-black only	−0.1157 (0.0172)	−0.0034 (0.0165)	0.0077 (0.0164)	0.0079 (0.0164)
Potential work experience (quartic)	No	Yes	Yes	Yes
Education dummies (16 levels)	No	No	Yes	Yes
Experience/education interactions	No	No	No	Yes
Sample size	1,366,769	1,366,769	1,366,769	1,366,769

Note: All specifications include state fixed effects and dummy variables for major race categories and the most common mixed races. The sample includes workers with a high school degree or less education and excludes individuals reporting more than 2 races.

average income for biracial children is higher than for monoracial whites and is the same as for monoracial blacks. The combination of the two indicates that black/white biracial children grew up in families with incomes that lie between those of monoracial white and monoracial black children. The difference, however, is smaller between biracial children and monoracial black children, which may be partly due to the relative youth of the parents of biracial children. Although parental age at birth of the child is similar, biracial children are younger on average implying that their parents are younger than the parents of monoracial children at the time of the survey. Focusing on specific race/sex comparisons, white fathers of biracial children have a lower average income than white fathers of monoracial white children, but black fathers and white mothers have higher average income than their counterparts.

Returning to a comparison of education, I find that biracial black children have parents with education levels that are similar to whites, but much higher than monoracial blacks. The mean years of completed schooling among the fathers and mothers of biracial children are 12.5 and 12.3, respectively, compared to 11.0 and 11.5 for monoracial black children. Within race/sex classifications, I find that black fathers of biracial children are more educated (1.5 years) than black fathers of monoracial black children. I also find that black mothers of biracial children are more educated than black mothers of monoracial black children although the difference is smaller (0.6 years). Thus, black fathers and mothers of biracial children appear to be more educated than the average black father and mother. For whites, the average education level of mothers of biracial children is similar to the average education level of mothers of monoracial white children, and the average education level of fathers of biracial

Table 5
Log wage coefficients for blacks and black/white biracials for more-educated workers 2000 Census.

	(1)	(2)	(3)	(4)
Black only	−0.2425 (0.0021)	−0.2278 (0.0020)	−0.1490 (0.0019)	−0.1483 (0.0019)
Black/White biracial	−0.3174 (0.0177)	−0.1627 (0.0166)	−0.1083 (0.0157)	−0.1064 (0.0157)
Difference: Black/White biracial-black only	−0.0749 (0.0178)	0.0651 (0.0166)	0.0408 (0.0158)	0.0419 (0.0158)
Potential work experience (quartic)	No	Yes	Yes	Yes
Education dummies (16 levels)	No	No	Yes	Yes
Experience/education interactions	No	No	No	Yes
Sample size	1,698,093	1,698,093	1,698,093	1,698,093

Note: All specifications include state fixed effects and dummy variables for major race categories and the most common mixed races. The sample includes workers with more than a high school degree and excludes individuals reporting more than 2 races.

Table 6
Log wage coefficients for blacks and black/white biracials for ages 20–40 2000 Census.

	(1)	(2)	(3)	(4)
Black only	−0.1967 (0.0018)	−0.2048 (0.0017)	−0.1216 (0.0016)	−0.1220 (0.0016)
Black/White biracial	−0.2511 (0.0137)	−0.1842 (0.0132)	−0.1027 (0.0122)	−0.1037 (0.0122)
Difference: Black/White biracial-black only	−0.0545 (0.0138)	0.0206 (0.0132)	0.0189 (0.0123)	0.0183 (0.0123)
Potential work experience (quartic)	No	Yes	Yes	Yes
Education dummies (16 levels)	No	No	Yes	Yes
Experience/education interactions	No	No	No	Yes
Sample size	1,687,600	1,687,600	1,687,600	1,687,600

Note: All specifications include state fixed effects and dummy variables for major race categories and the most common mixed races. The sample excludes individuals reporting more than 2 races.

children is lower (0.6 years) than the average education level of fathers of monoracial white children.

The finding that biracial children have parental education levels that are much closer to white levels than black levels is interesting and differs from the educational attainment comparison above. Biracial adults in the 2000 Census have education levels that lie almost perfectly between the levels of monoracial whites and blacks. If the higher educational attainment of biracial blacks results in a higher level of unobservable human capital among biracials then this suggests that the wage regression estimates provide even stronger evidence supporting the one-drop rule. All else equal, biracial blacks should have wages that are more similar to whites after controlling for education if parental education has positive effects that are independent of one's own education level.

Table 8 also reports the percent of parents that work for each racial group. The fathers of biracial children have a similar average probability of being employed as the fathers of monoracial black children. The fathers of monoracial white children have a substantially higher average probability of being employed. For mothers, the employment estimates indicate that the mothers of biracial children have employment rates that lie between the employment rates of the mothers of monoracial white and black children.

Biracial black children tend to have a similar geographical distribution as predicted by the average geographical distribution of monoracial white and black children in 1980. The main exception, however, is that a higher percentage of biracial children live in the Pacific division. Lower percentages of biracial black children live in the East South Central and West South Central divisions. The geographical patterns of biracial black children in 1980 are fairly similar to those of biracial black adults in 2000.

Overall, the comparison of parental characteristics indicates that biracial children grew up in families with incomes that lie between monoracial whites and monoracial blacks, but somewhat closer to blacks. On the other hand, the parents of biracial children had education levels that were very similar to those of white parents. I also find some regional differences for biracial children, but these patterns are similar to those noted above for biracial adults in the 2000 Census

Table 7
Own and spousal education by race for all marriages 1980 Census.

Own race	Spousal race		White	
	Black	White	Education	N
Black male	10.5	165,546	12.6	4232
White male	13.0	1160	12.3	2,068,540
Black female	11.2	165,546	12.5	1160
White female	12.6	4232	12.1	2,068,540

Note: The samples include married couples in 1980. Hispanic couples are excluded.

Table 8
Parents' characteristics for white, black, and biracial children ages 0–20 1980 Census.

	Black/White biracials				
	Monoracial		Black father	White father	Monoracial
	Whites	All	White mother	Black mother	Blacks
Father's age at birth	29.0	29.8	29.8	29.9	29.3
Mothers age at birth	26.2	25.1	25.0	25.5	25.9
Father's income	\$20,088	\$14,142	\$13,897	\$14,921	\$12,099
Mothers income	\$3589	\$5104	\$5066	\$5225	\$5134
Father's education	12.9	12.5	12.5	12.3	11.0
Mother's education	12.4	12.3	12.3	12.1	11.5
Father's employment	92.5%	83.8%	84.2%	82.8%	83.8%
Mothers employment	47.5%	54.4%	54.4%	54.3%	59.1%
Sample size	2,134,986	6887	5240	1647	232,761

Note: The samples include native-born children ages 0–20 living with both parents in 1980. Children with Hispanic parents are excluded.

(which are controlled for in the regressions). Although these estimates are only suggestive, they do not provide evidence that the age 20–40 cohort of biracial adults in 2000 grew up in families that were disadvantaged relative to the average of monoracial white and black family backgrounds. Thus, there is no reason to suspect that their levels of unobserved human capital were substantially below the average of the monoracial white and black levels of unobserved human capital. Additionally, the finding that black fathers of biracial children (representing roughly 75% of all biracial children) had higher levels of education than black fathers of monoracial children and white mothers of biracial children had comparable levels of education as white mothers of monoracial children suggests that if anything there was positive selection into intermarriage with children. These findings provide further credibility to the previous interpretation of the regression results.

One problem with relying on the 1980 Census, however, is that both parents have to be present in the household to distinguish between biracial and monoracial children. Previous research finds that biracial children are more likely to live with single parents than white children (see Fryer et al., 2008 for example). To investigate this question I turn to the 2000 Census. Although the 2000 Census cannot provide information on the childhood experiences of the current generation of biracial adults, it can provide some suggestive evidence on whether the current generation of biracial children has different parental characteristics than expected.

Estimates from the 2000 Census are reported in Table 9. The percentage of monoracial white children living in two-parent families is 80% compared to 40% of monoracial black children. The percentage

Table 9
Parents' characteristics for white, black, and biracial children ages 0–20 2000 Census.

	Black/White biracials				
	Monoracial whites	All	White mother	Black mother	Monoracial blacks
Two-parent family	80.5%	48.1%	46.0%	52.8%	39.7%
Father's age at birth	30.6	30.2	30.1	30.3	30.0
Mother's age at birth	28.3	26.3	26.0	26.9	26.0
Father's income	\$56,425	\$38,355	\$37,279	\$43,408	\$32,159
Mother's income	\$18,801	\$18,868	\$18,846	\$18,227	\$17,554
Father's education	13.9	13.5	13.4	13.8	12.9
Mother's education	13.7	13.2	13.2	13.4	12.7
Father's employment	92.2%	85.7%	85.4%	86.7%	78.8%
Mother's employment	67.4%	71.0%	71.8%	65.1%	64.9%
Sample size	2,138,477	18,684	15,930	4023	382,946

Notes: (1) The samples include native-born, non-Hispanic children ages 0–20 living with one or two parents in 2000. (2) Mothers of biracial children may report more than one race.

Table 10
Logit regressions for school enrollment among children ages 16–17 1980 Census.

	(1)	(2)	(3)
Both black parents	0.0274 (0.0016)	0.0401 (0.0016)	0.0400 (0.0016)
Black and white parents	–0.0106 (0.0088)	–0.0080 (0.0087)	–0.0071 (0.0087)
Family income	Yes	Yes	Yes
Father's and mother's education	No	Yes	Yes
Father's and mother's employment status and age	No	No	Yes
Sample size	262,737	262,737	262,737

Note: All specifications include controls for age, gender, other children, and state dummies. The sample includes native-born children ages 16–17 in 1980 who have not graduated from high school and live with both parents. Marginal effects and their standard errors are reported.

of biracial children living in two-parent families (48%) is higher than for monoracial black children, but is less than the average of these two rates suggesting a potential disadvantage that the 1980 Census estimates miss. Although these results are for a newer and much larger cohort of biracial children, they suggest that the comparison of parental characteristics for all biracial families may differ from the comparison for two-parent families as discussed above.

Estimates from the 2000 Census also indicate that the parents of biracial children have similar ages at birth of the child as the parents of monoracial white or black children. Father's average income for biracial children is lower than the average of the two monoracial groups, but mother's average income is higher than even the monoracial white group. Similar to the previous results parental education levels among biracial children are more comparable to monoracial white levels than monoracial black levels. Specific race/gender groups in intermarriages continue to generally have higher education levels than their original group levels. Finally, employment levels are roughly halfway between monoracial white and black levels for men and higher than monoracial levels for either monoracial white or black levels. Overall, the comparison of 2000 Census estimates which include single-parent families does not change the previous conclusion. I do not find strong evidence suggesting that biracial children grow up in more disadvantaged families than expected based on monoracial levels. Although they are more likely to be in single-parent families than expected, their parents have higher education levels than expected. Additionally, the incidence of single-parent families was much lower in 1980 than in 2000, especially for black children, suggesting that rates may have been more similar in 1980.¹⁷

4.5. Enrollment status of biracial children

The 1980 Census includes an educational outcome that can be examined for children who live with their parents—enrollment status. A comparison of enrollment status may shed additional light on potential differences in unobserved human capital. Although the 2000 Census regressions control for very detailed educational attainment among adults, differences in unobserved human capital may exist. These differences may be related to pre-market discrimination against blacks and biracial blacks. To investigate this issue I first compare estimates of school enrollment for the children ages 16 to 17 who live with both parents. This age group is at the highest risk of dropping out of school and still generally lives with their parents. Among biracial children in this age group, 90.7% are currently enrolled in school. In comparison 93.3% of monoracial black children and 94.3% of monoracial white children are enrolled in school. Using this measure there is some evidence that biracial children do not perform as well in

¹⁷ The single-parent family rate for blacks increased by 13 percentage points for blacks and 7 percentage points for whites between 1980 and 2000.

school. The simple comparison of enrollment rates, however, does not control for differences in child, family or parental characteristics.

Table 10 reports logit regressions for the probability of being enrolled in school that control for these characteristics. Specification 1 reports estimates from the base specification which includes controls for the child's gender, age, state of residence, number of children in the household and family income. The coefficient estimate on having two black parents is positive and statistically significant. The base group is having two white parents. Interestingly, for the sample of children with two parents, black children have higher enrollment rates than white children, all else equal.

The coefficient estimate on having both a black and white parent is small and statistically insignificant. This finding suggests that the enrollment rate difference between whites and biracial children disappears once family income is controlled for in the regression. The addition of controls for father's and mother's education does not change the result (Specification 2). Finally, controlling for father's and mother's employment status and age also does not change the main finding that biracial children have similar enrollment rates as white children, all else equal. These regression estimates indicate that biracial children do not have negative educational outcomes relative to monoracial whites, and thus do not provide evidence suggesting that biracial blacks have lower than expected levels of unobserved human capital.

A crude proxy for whether a child was held back in school can also be created from the 1980 Census by comparing the child's age to his/her grade in school. For example, students who are ages 10 and higher in the 3rd grade may have been held back a year. Estimates from the 1980 Census indicate that 6.5% of monoracial whites, 12.0% of monoracial blacks, and 8.8% of biracial blacks are old for their grade. Thus, biracial blacks appear to have rates of being held back a grade that are slightly closer to monoracial whites than monoracial blacks.

Recent estimates from the National Survey of Adolescent Health (Add Health) provide additional evidence that the educational outcomes of biracial blacks generally lie between monoracial black and white levels and in some cases closer to monoracial white levels (Harris and Thomas, 2002; Fryer et al., 2008; Ruebeck et al., 2008). Overall, the evidence on educational outcomes during childhood and educational attainment at adulthood presented above do not indicate that biracial blacks have lower than expected levels of human capital.

4.6. Racial self-identification and other issues

A key assumption in the analysis is that individuals who have black and white parents self-identify on the 2000 Census as being both black and white. As noted above the Census does not include information on parental race except for children currently living with their parents. A potential bias is created if a non-random sample of biracial blacks identify themselves as either being monoracial black or monoracial white. For example, if economically successful biracial blacks are more likely to self-identify as being monoracial white then estimates of wage differences between biracial blacks and monoracial whites will be biased upwards. If instead, economically successful biracial blacks tend to self-identify as being monoracial black then estimates of the wage difference will be biased downwards.¹⁸ To my knowledge, there is no direct evidence from other large surveys on the correspondence between self-reports of multiple races and parental races for adults.

Although a direct comparison is not possible with the Census, there is some indirect evidence suggesting that self-identification of

biracials is not overly biased in one direction or the other.¹⁹ First, the finding that education levels of biracial blacks line up almost perfectly in the middle of monoracial black and monoracial white levels is consistent with unbiased self-identification of biracial blacks. Although these results are only suggestive, it does not appear as though more-educated blacks tend to report either being monoracial black or monoracial white. Second, the geographic distribution of birthplaces for biracial children in 1980 can be compared to the distribution of birthplaces for self-identified biracial adults (ages 20–40) in 2000. The geographical distributions should be similar if non-random self-identification of biracial status is not a problem. Indeed, estimates from the 1980 and 2000 Census indicate very similar regional distributions for the birthplaces of the two groups. Estimates for monoracial blacks and monoracial whites, however, indicate birthplace distributions that are different from biracial blacks.

A related issue is that some biracial blacks may be able to pass as whites to employers, thus weakening any potential effects of the one-drop rule. Obviously, the Census does not measure skin tone or any other characteristics relative to race.²⁰ Without this information, it is impossible to identify whether the self-reporting of biracial status correlates well with skin tone and whether some biracial blacks appear to pass as whites. In the end, however, this issue is less important because of the finding of a large difference. If some biracials avoid the one-drop rule then we should see higher wages than predicted by the model. In other words, the extent to which biracial blacks avoid the one-drop rule should result in a downward bias in the estimates of differences between monoracial whites and biracial blacks.

Are there additional reasons that biracial blacks have lower wages than predicted by measurable human capital and monoracial white and black wage rates? One concern is that biracial blacks may face emotional hardships. Children growing up with parents of two different races may have identity problems, get harassed by other children, and have trouble fitting in with children of either race. These hardships may result in lower observable and unobservable human capital and wages. Interestingly, however, earlier studies do not find consistent evidence for or against the "marginal man" theory (Herman, 2002; Fulton, 1997). More recent research using the 1994–95 National Survey of Adolescent Health (Add Health), however, indicates that biracial children engage in more risky and anti-social behaviors and have more variance in their behavior than monoracial children (Fryer et al., 2008; Ruebeck et al., 2008). Both studies find that biracial children have worse outcomes than monoracial blacks or whites for many outcomes capturing behavior in school and outside of school. There is also evidence suggesting that biracial children have worse psychological outcomes, but for several variables they are in between monoracial whites and blacks. An important question is whether these behaviors and emotions continue into adulthood and whether they have any impact on human capital development. Although I cannot rule out the possibility of more behavioral problems and emotional hardships faced by biracial children, the effects of these factors do not show up in differences in observed human capital measured by educational outcomes in childhood and educational attainment at adulthood. Nevertheless, these factors may result in lower levels of unobserved human capital than expected for biracial blacks.

One remaining issue is that biracial blacks may have worse social capital than the average of monoracial blacks and whites. In particular,

¹⁹ Duncan and Trejo (2007) compare information on Spanish surnames and self-reported Mexican ancestry and find some evidence of negative socioeconomic selection in self-identification of Mexican ancestry. Although this comparison is very useful for Latino groups there is no comparable approach for blacks.

²⁰ A related issue is that the Census also does not provide information on the percentage black. For example, it is impossible to identify if someone is 1/4 black or 1/2 black. There is some evidence of worse labor market outcomes among blacks with darker skin tones from alternative datasets, but there is also evidence suggesting that the relationship between skin tone and degree of African ancestry is weak (see Scarr et al., 1977; Johnson, Farrell, and Stoloff, 2001; Goldsmith et al., 2006, 2007 for example).

¹⁸ Another factor that can lead to a downward bias in differences between groups is measurement error in the classification of race. If some individuals randomly misreport their race then estimated racial differences will be downwardly biased. Thus, in this case and the case in which economically successful biracial blacks tend to report being black, the actual wage differences between biracial blacks and monoracial whites might be larger than the estimates reported above.

if biracial blacks are not easily accepted by either blacks or whites then they may have more limited social networks than otherwise predicted. But, it is not clear that this would create an upwardly biased estimate of the discrimination component because it could easily have the opposite effect. Given the increased diversity of their family backgrounds, biracial blacks may have larger social networks. In this case, biracial blacks may have higher levels of social capital than the average of monoracial blacks and whites, thus leading to an upward bias. Unfortunately, the 2000 Census does not provide information on social networks.

5. Conclusions

The 2000 Census is the first Census to allow individuals to report more than one race. Taking advantage of the large sample sizes provided in the 5-Percent PUMS, I provide new estimates of differences in wages, education and other characteristics between monoracial whites and blacks, and biracial blacks. The comparisons are useful for exploring the “one drop rule” and the presence of labor market discrimination.

Census data provide clear evidence that biracial blacks have levels of education that lie almost perfectly between monoracial blacks and whites. Biracial blacks have an average of 13.0 years of schooling compared to an average of 13.6% for monoracial whites and 12.4% for monoracial blacks. In contrast, however, biracial blacks have wages that are similar to monoracial blacks after controlling for education, experience and several additional factors. Estimates from the main regression specification indicate that unexplained wage differentials are roughly 12% for biracial blacks and 14% for monoracial blacks. In other words, biracial blacks earn roughly the same as monoracial blacks and earn considerably less than monoracial whites after controlling for observable human capital and other characteristics. The findings are robust to the inclusion of different sets of controls and a younger age cohort, and hold for both less-educated and more-educated workers.

Estimates from the 1980 and 2000 Censuses indicate that the family and parental characteristics of biracial children do not differ from what would be expected by having both black and white parents. The main exceptions are that biracial children are more likely to grow up in single-parent families than expected, but on the other hand the parents of biracial children are generally more educated than the parents of monoracial children of the same race. An analysis of school enrollment rates among teenagers also does not provide evidence that biracial black children have negative educational outcomes relative to the average of monoracial black and white children. Previous research using 1994–96 Add Health data, however, finds that biracial children have more behavioral problems than monoracial children, which may result in lower levels of unobserved human capital and lower wages (Fryer et al., 2008; Ruebeck, Averett, and Bodenhorn, 2008). Although this represents a valid concern regarding the interpretation of the results, the findings from Census and Add Health data indicate that observable human capital in childhood and adulthood do not appear to be affected by the increased incidence of these problems in childhood. In the end, the emotional hardship of growing up in a biracial family may result in lower than expected unobserved human capital, but it is unlikely that it accounts for all of the estimated gap between actual and expected wages of biracial blacks.

The findings presented here provide some evidence that is consistent with the “one-drop rule” and presence of labor market discrimination. The focus of the analysis is on labor market discrimination, but it is important to consider how the “one-drop rule” might affect discrimination in pre-market factors and other economic

outcomes. Given the notable rise in interracial marriage rates in recent decades more research is needed on additional economic and social outcomes of biracial individuals.

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