Long-Run Differences in Wealth:

A Microdata Analysis of US White-Black Differences in Wealth Directly After Mass Emancipation of Southern Slaves.

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ABSTRACT: This study analyzed racial inequality by decomposing historical black-white differences in wealth using regression decomposition. This technique decomposes economic differences into the portion explained by differences in characteristics and the unexplained portion due to different returns to a set of characteristics (See, e.g., Blinder 1973 and Oaxaca 1973). Preliminary results confirm that the size and source of contemporary black-white wealth differences have historical roots: In 1870, at least 75 percent of white-black wealth differences were not explained by characteristic differences described by the classical model. This is consistent with wealth decompositions of late-twentieth century data that show three-quarters of white-black differences were unexplained (See, e.g., Blau and Graham 1990). Furthermore, this study found that 77.8 percent of white-black wealth differences were not explained in states that abolished slavery well before the Civil War while 87.9 percent of white-black wealth differences were unexplained in states that abolished slavery after the Civil War. **Key words:** economic discrimination, regression decomposition, wealth inequality, and slavery.

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The study of racial differences in factor market supply decisions and prices, as reflected in the literature on labor supply, wages and income, presents only a subset of the factors that contribute to the wealth portfolios of black and white households. Andrew Brimmer (1988) confirms this when stating: "The ownership of wealth by blacks reflects the same pattern of deficits evident when one looks at money income. However, the shortfall of wealth is much larger. To a considerable extent the latter can be traced to a long history of deprivation in this country" (p. 153).

In 1984, blacks held 7.2 percent of US aggregate income, but only 3 percent of US aggregate wealth (Brimmer 1988). This large disparity in wealth have persisted throughout the twentieth century: Between 1940 and 1988, the black mean was 13 to 23 percent of white mean, and the black median 4 to 10 percent of white median (Wolff 1992). But the origin of these differences has not been researched. Several studies have analyzed white-black wealth differences using empirical results from modern data to propose policies that address the current wealth gap. This study combines empirical results from historical data with results from studies that analyzed modern data and provides new insights into the historical and intertemporal dimensions of the white-black wealth gap.

The structure of the paper is as follows: In the first section, I present a brief review of the literature, data and descriptive statistics. In the second section, I present the wealth identity and econometrics. In the last section, I present the empirical results and a brief summary.

Related Studies

Several studies (See, e.g., Pennsylvania Abolitionist Society 1838, Society of Friends 1849, Dubois 1899, Jackson 1939, Soltow 1972, Soltow 1975, Berlin 1979, De Canio 1979, Higgs 1982, Spriggs 1984, Margo 1984, Hornsby 1989, Eggert 1997, Hershberg 1997, and Bodenhorn 1999) have addressed historical differences in wealth. However, their results are often limited by non-representative local samples, small samples, or descriptive analyses that do not employ potential explanatory variables.

Blau and Graham (1990) produced a seminal study of racial wealth inequality using regression decomposition. After controlling for income and demographic variables, they found that 78 percent of the wealth gap remained unexplained in 1976[1]. This study has made significant contributions to our understanding of economic discrimination in terms of modern wealth differences. This paper will build upon their findings by analyzing white-black wealth differences directly after the Civil War and the mass emancipation of southern slaves.

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[1] Since initial wealth (inheritance), savings (income net consumption based on preferences), and assets (including homeownership) form a household's portfolio of wealth, researchers have also provided a separate look at these aspects of white-black wealth differences. For instance, several studies have focused on white-black wealth differences due to differences in inheritance (See, e.g., Menchik and Jianakopolis 1997, Wolff 1998, and Altonji, Doraszelski and Segal 2000). Other studies have focused on white-black wealth differences due to differences in income, savings and preferences (See, e.g., Terrell 1971, Franklin and Smith 1977, Oliver and Shapiro 1989, Wolff 1992, Oliver and Shapiro 1997, Conley 1999, Keister 2000a, Keister 2001,and Wolff 2001). Additional studies have focused on white-black wealth differences due to differences in assets and homeownership (See, e.g., Terrell 1971, Birmbaum and Weston 1974, Brimmer 1988, Snyder 1989, Wolff 1992, Wolff 1998, Hurst, Luoh and Stafford 1998, Chiteji and Stafford 1999, and Keister 2000b).

US Census Data in1870

This study employs a national representative sample and supplemental over-sample of blacks (or ex-slaves) from the Integrated Public Use Microdata Sample (IPUMS) in 1870. The source of IPUMS data is the population schedules of the US census manuscripts. The US conducted its first census in 1790 and its first modern census in 1850 when individuals became the units of enumeration[2]. Note that we must always be conscious of possible errors in enumeration when analyzing census data[3]. This sample overcomes some of these issues by

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[2] The 1870 census manuscripts contain responses to important socioeconomic inquiries including age, sex, color, marital status, literacy status, whether the individual attended school during the year, occupation, state or country of birth, value of real estate, and value of personal estate (other forms of wealth) for all individuals in a given household.

Real estate value was enumerated based on guidelines specified in the Circular to Marshals. It specified that "under heading 8 insert the value of real estate owned by each individual enumerated. You are to obtain the value of real estate by inquiry of each individual who was supposed to own real estate, be the same located where it may, and insert the amount in dollars. No abatement of the value is to be made on account of any lien or encumbrance thereon in the nature of debt" (Magnuson 1995, p347) Personal estate value (other wealth) was also enumerated based on guidelines that specified "Personal estate is to be inclusive of all bonds, stocks, mortgages, notes, live stock, plate, jewels, or furniture, but exclusive of wearing apparel" (p.349). For more on the quality of historical census data, see Wright 1900, Steckel 1991, and Magnuson 1995.

Note that sample includes the reported wealth of household heads. Enumerators only recorded the value of wealth if an individual had more than 100 dollars in nominal wealth. Lee Soltow (1975) described $100 in 1870 as "the value of eighty acres of land at the minimum prices of $1.25 an acre or of one or two horses at prevailing prices. It was the equivalent of one-fifth of average annual income per worker in 1860" (p.24).

Furthermore, zero wealth is not equivalent to zero dollar-wages per hour, where one must account for the participation decision to obtain robust estimates. Instead, not having any initial wealth, savings, and assets leads to one possessing zero wealth.

[3] Steckel (1991) recommends cautious use of the 19th and early 20th century U.S. census results. The original purpose of the U.S. census was for taxation and U.S. House of Representatives appropriations. However, a "growing desire for statistical information, curiosity about society, and heightened interest in international and regional comparisons led to expanded collection by the federal census" (pp.582-83). He suggests that as the census data is more disaggregated, the likelihood of error increases with early U.S. census data. He noted that under-enumeration, over-enumeration and misreporting are errors that affect the quality of census data and led to the creation of the Census Bureau in 1902. Some of these errors may be attributed to the poor training of early enumerators and lower quality of early census administration. He found that larger households, non-traditional households (converted homes), lower-educated persons and persons with poor English-language skills tended to be omitted from the census. Steckel provides several examples of errors in census data collected on Blacks. For instance, changes in the Black population over census years suggested under-enumeration in the 1870 census. "The extraordinarily low increase during the 1860's and very large increase during the 1870's suggest the black population was significantly under-enumerated in the 1870 Census" (p.587). The change in back population was 9.9 percent between 1860 and 1870, and 34.9 percent between 1870 and 1880. Note that one must also consider the impact of the 1850 Fugitive

combining a 1-in-100 random sample with a supplemental sample of 1-in-50 blacks from the

1870 US census manuscripts. The final sample includes 18,929 black household heads and

68,096 white household heads[4].

Sample descriptive statistics were presented in Table 1. In 1870, the average black

household had $124 in wealth while the average white household had $3,553 in wealth, such that

the black mean was 3.5 percent of the white mean. These estimates are consistent with the

estimates by Lee Soltow (1972, 1975). Although Soltow (1972) only collected a sample of 393

non-white individuals in 1870, he found the average black wealth was $73 and average white

wealth was $2,661. Using a sample of 151 black individuals, Soltow (1975) found similar

results: average black wealth was $74 while average white wealth in $2,691 in 1870.

On average, white household heads were likely to be literate more than black household

heads: Table 1 shows that 89 percent of the white household heads in the sample could read and

write while only 15 percent of black household heads in the sample could read and write[5].

Additionally, the structure of the average white household tended to differ from the

structure of the average ex-slave household in 1870. Foremost, Table 1 shows that the average

white household head in the sample was 43 years old while the average black household head in

the sample was 40 years old. Furthermore, Table 1 shows that 82 percent of white household

heads in the sample were married while 72 percent of black household heads in the sample were

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Slave Act and the 14th Amendment to the US Constitution, adopted in 1870, on the changes in these percentages and the incentives of blacks to be enumerated.

[4] Note that the sample studied in this paper was restricted to heads of households. Investigating the wealth from a random sample of household heads is more productive than investigating a random sample of individuals since wealth is often used to purchase durable goods and durables are more likely to benefit the entire household rather than one individual in a household. Furthermore, census enumerators tended to sum up the wealth of a household and report it under the head of household.

[5] Note that most slaves were barred from learning to read and write. After emancipation, the only ex-slaves that were likely to learn to read or write were younger household heads.

married. Similarly, the average white household head in the sample had 2.5 children and 5.2

household members while the average black household head in the sample had 2.2 children and

4.7 household members.

To analyze the statistical significance of racial differences in sample variables, hypothesis

tests results were presented in Table 2. T-tests were used to test the null hypothesis that the

white-black difference in the population means equals zero. Since the t-statistics were greater

than critical value (2.576), we can reject the null hypothesis that the white-black difference in the

population means equals zero for all the variables in regression analysis at a one percent level of

significance.

Race and Wealth

The purpose of wealth has varied from over time. From an economics perspective, wealth

is the accumulation of resources that have market value and can be liquidated for present and

future consumption. This study proceeds based on the most measurable assumption: households

reside in a country with a mixed economy of markets and social planning, such that they have an

incentive to accumulate material wealth for intertemporal household consumption and social

influence.

To understand the determinants of wealth by race, consider the following wealth identity:

[1]
$$W_{w,t} = (1 + i_w)W_{w,t-1} + (r_{w,t}h_{w,t} - p_t c_{w,t})$$

where $W_{w,t}$ represents the portfolio of wealth for whites, w, at time t=1…T ; $W_{w,t-1}$ represents

the previous period portfolio of wealth for whites, w, at time t=0…T-1 ; i_w represents the

average interest rate earned on previous period portfolio of wealth for whites, w, at time t=1…T;

$r_{w,t}$ represents the wages for whites, w, at time t=1…T; $h_{w,t}$ represents the number of hours

worked for whites, w, at time t=1…T; p_t represents prices for goods consumed at time t=1…T;

and $c_{w,t}$ represents the goods consumed by whites, w, at time t=1…T; such that:

[2]
$$W_{w,t} = \sum_{\tau=1}^{t} (1+i_w)^{t-\tau} (r_{w,\tau} h_{w,\tau} - p_\tau c_{w,\tau}) + (1+i_w)^t W_{w,o}$$

where $W_{w,o}$ are the initial assets of whites. Analogously, we can write for blacks:

[3]
$$W_{B,t} = \sum_{\tau=1}^{t} (1+i_B)^{t-\tau} (r_{B,\tau} h_{B,\tau} - p_\tau c_{B,\tau}) + (1+i_B)^t W_{B,o} .$$

where $W_{B,t}$ represents the portfolio of wealth for black, B, at time t=1…T ; $W_{B,t-1}$ represents the

previous period portfolio of wealth for blacks, B, at time t=0…T-1 ; i_B represents the average

interest rate earned on previous period portfolio of wealth for blacks, B, at time t=1…T; $r_{B,t}$

represents the wages for blacks, B, at time t=1…T; $h_{B,t}$ represents the number of hours worked

for blacks, B, at time t=1…T; p_t represents prices for goods consumed at time t=1…T; and $c_{B,t}$

represents the goods consumed by blacks, B, at time t=1…T, and where $W_{B,o}$ is the initial assets

of blacks.

Statistical Decompositions of Wealth

To empirically analyze white-black differences in wealth, this study will employ a

regression decomposition technique developed by Ronald Oaxaca (1973) and Alan Blinder

(1973). Appendix A shows how the wealth identity, in equation [2], can be represented in the

following equation:

[4] $$lnW_{w,t} = \pi_{0,w,t} + \pi_{1,w,t} A_{w,t} + \pi_{2,w,t} A_{w,t}^2 + \pi_{3,w,t} L_{w,t} + \pi_{4,w,t} A \cdot L_{w,t} + \pi_{5,w,t} Z_{w,t} + \varepsilon_{w,t}$$

[5] $$= \pi_{w,t} X_{w,t} + \varepsilon_{w,t}$$

where $lnW_{w,t}$ is the log wealth for a vector of white household heads, *w,* at time t=1…T ; $\pi_{w,t}$

are the regression parameter for white household heads, *w,* at time t=1…T; $A_{w,t}$ is the age for a

vector of white household heads, *w,* at time t=1…T; $L_{w,t}$ is a dummy variable for literacy for a

vector of white household heads, *w*, at time t=1…T, which equals one if the household head can

read or write and zero otherwise; $Z_{w,t}$ represents a matrix of preference characteristics for white

household heads, *w,* at time t=1…T; and $\varepsilon_{w,t}$ is the error term for a vector of white household

heads, *w,* at time t=1…T. By the same reasoning,

[6] $$lnW_{B,t} = \pi_{0,B,t} + \pi_{1,B,t} A_{B,t} + \pi_{2,B,t} A_{B,t}^2 + \pi_{3,B,t} L_{B,t} + \pi_{4,B,t} A_{B,t} \cdot L_{B,t} + \pi_{5,B,t} Z_{B,t} + \varepsilon_{B,t}$$

[7] $$= \pi_{B,t} X_{B,t} + \varepsilon_{B,t}$$

where $lnW_{B,t}$ is the log wealth for a vector of black household heads, *B,* at time t=1…T; $\pi_{B,t}$ are

the regression parameter for black household heads, *B,* at time t=1…T; $A_{B,t}$ is the age for a

vector of black household heads, *B,* at time t=1…T; $L_{B,t}$ is a dummy variable for literacy for a

vector of black household heads, *B*, at time t=1…T, which equals one if the household head can

read or write and zero otherwise; $X_{B,t}$ represents a matrix of preference characteristics for black

household heads, *B,* at time t=1…T; $\varepsilon_{B,t}$ is the error term for a vector of black household heads,

B, at time t=1…T.

To decompose white-black differences in wealth, first estimate regression equations [5]

and [7], and subtract the fitted version of equation [7] from the fitted version of equation [5] such

that:

[9]
$$ln\overline{W}_{w.t} - ln\overline{W}_{B.t} = \hat{\pi}_{w,t}\overline{X}_{w,t} - \hat{\pi}_{B,t}\overline{X}_{B,t}$$

where a bar denotes a mean value; $\hat{\pi}_{w,t}$ is the vector of estimated regression coefficients for white

household heads, *w,* at time t=1…T; and $\hat{\pi}_{B,t}$ is a vector of estimated regression coefficients for

black household heads, *B,* at time t=1…T. Let:

[10]
$$\hat{\pi}_{w,t} = \hat{\pi}_{B,t} + \left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right)$$

[11]
$$\overline{X}_{B,t,} = \overline{X}_{w,t} + \left(\overline{X}_{B,t} - \overline{X}_{w,t}\right)$$

Finally, substituting equation [10] and [11] in to equation [9] produces:

[12]
$$ln\overline{W}_{w,t} - ln\overline{W}_{B,t} = \hat{\pi}_{B,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right) + \overline{X}_{w,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right)$$

where $\left\{\overline{X}_{w,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right)\right\}$ measures white-black differences in log wealth due to different wealth

returns to the classical wealth-generating variables. This portion captures unexplained

differences in wealth, due, in part, to discrimination; and $\left\{\hat{\pi}_{B,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right)\right\}$ measures white-

black differences in log wealth due to different averages of variables necessary for generating

wealth. This latter portion captures explained differences in wealth due to differences in classical

characteristics.

The index of coefficients and means on the difference in means and coefficients,

respectively, can impact the empirical results. Blau and Graham (1990) recommend indexing

coefficients from the racial group that is most likely to experience economic discrimination:

"From a policy perspective, the more relevant question appears to be the one addressed when

black functions (coefficients) are employed: what would happen to black wealth if blacks were

given the white means but retained there own functions?" (p. 332). Alternatively, we can rewrite

equation [12] by solving equation [10] for the vector of black coefficients and solving equation

[11] for the vector of white means, producing:

[13] $$ln\overline{W}_{w,t} - ln\overline{W}_{B,t} = \hat{\pi}_{w,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right) + \overline{X}_{B,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right)$$

where $\left\{\overline{X}_{B,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right)\right\}$ also measures differences in log wealth due to different wealth returns

to the classical wealth-generating variable; and $\left\{\hat{\pi}_{w,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right)\right\}$ also measures differences in

log wealth due to different averages of variables necessary for generating wealth. This study will

provide empirical results based on both indices in equation [12] and [13].

Finally, two hypothesis tests will be employed, such that:

[14] $$H_o : \hat{\pi}_{w,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right) = 0, \;\; \hat{\pi}_{B,t}\left(\overline{X}_{w,t} - \overline{X}_{B,t}\right) = 0$$
$$H_A : otherwise$$

[15] $$H_o : \overline{X}_{B,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right) = 0, \;\; \overline{X}_{w,t}\left(\hat{\pi}_{w,t} - \hat{\pi}_{B,t}\right) = 0$$
$$H_A : otherwise$$

Foremost, the null hypothesis, [14], states differences in means do not contribute to white-black

differences in average wealth. If we reject the null hypothesis, then white-black differences in

wealth are not solely unexplained but, in some part, due to differences in classical wealth-

generating characteristics. Second, the null hypothesis, [15], states differences in coefficients do

not contribute to white-black differences in average wealth. If reject the null hypothesis, then

white-black differences in wealth are not solely due to white-black differences in classical

wealth-generating characteristics, but, in some part, unexplained and, in some part, due to

discrimination.

Interpreting Wealth Regression Coefficients

Least squares estimates of coefficients in equations [4] and [6] are presented in Table 3.

Based on calculations of predicted average wealth differences between literate and illiterate

households, literacy tended to provide a larger wealth advantage to whites[6]. Pooled sample

calculations show that literate whites held 75.8 percent more wealth than illiterate whites while

literate blacks held only 18.6 percent more wealth than illiterate blacks[7]. These results are

confirmed when analyzing the standard errors: Table 3 shows that literacy was a (highly)

statistically significant for whites but not for blacks.

Additionally, we can predict an increase wealth with an increase in age although the

magnitude of the increase was larger among literate and white household heads[8]. For blacks, we

can predict a 3.3 percent increase in wealth with an additional year of age among literate blacks

and 1.9 percent increase among illiterate blacks, holding all other variables constant. For whites,

we can predict a 6.5 percent increase in wealth with an additional year of age among literate

whites and a 5.6 percent increase among illiterate whites, holding all other variables constant[9].

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[6] Instead of analyzing regression coefficients on dummy variables in Table 3, differences in wealth were calculated based on dummy variables, *D*, such as literacy status, marital status and urban/rural status, such that:

[16]
$$\frac{\hat{\overline{W}}_{j,D=1} - \hat{\overline{W}}_{j,D=0}}{\hat{\overline{W}}_{j,D=1}} = \frac{exp\left(ln\,\hat{\overline{W}}_{j,D=1}\right) - exp\left(ln\,\hat{\overline{W}}_{j,D=0}\right)}{exp\left(ln\,\hat{\overline{W}}_{j,D=1}\right)}$$

[7] When separating the sample by marital status, similar results were produced in the married sample: married whites that were literate held 73.5 percent more wealth than married whites that were illiterate. However, married blacks that were literate held 25.4 percent more wealth than married blacks that were illiterate. Furthermore, while literacy was a critical wealth-generating factor for single whites, literacy did not provide wealth gains among single blacks: single whites that were literate held 79.3 percent more wealth than single whites that were illiterate. But single blacks that were literate held 6.2 percent less wealth than single blacks that were illiterate. Table 3 shows that literacy was a (highly) statistically significant for whites but not for blacks.

[8] Based on equations [4] and [6], the marginal effect of an additional year of age, at average age, for group *j=w, B* is:

[17]
$$\frac{\partial ln\,W_j}{\partial A_j} = \hat{\pi}_{j,1} + 2\hat{\pi}_{j,2}\overline{A}_j + \hat{\pi}_{j,3}$$

[9] These findings did not vary significantly when separating the sample by marital status. For married blacks, we can predict a 3.8 percent increase in wealth with an additional year of age among literate blacks and 2.3 percent increase among illiterate blacks, holding all other variables constant. For single blacks, we can predict a 2.7 percent increase in wealth with an additional year of age among literate blacks and 1.2 percent increase among illiterate blacks, holding all other variables constant. Furthermore, for married whites, we can predict a 6.7 percent increase in wealth with an additional year of age among literate whites and 5.6 percent increase among illiterate whites, holding all other variables constant. For single whites, we can predict a 5.3 percent increase in wealth with an additional year

Age, age-squared and age-literacy interaction terms were (highly) statistically significant in the black and white pooled samples.

Similarly, whites obtained higher wealth returns to household formation variables, such as marital status, rural/urban status, and household size. Foremost, married whites held 62.1 percent more wealth than single whites while married blacks possessed 49.5 percent more wealth than single blacks[10]. Table 3 shows that marital status was a (highly) statistically significant wealth-generating factor for whites and blacks. Additionally, pooled sample estimates show that rural whites held 77.2 percent more wealth than urban whites while rural blacks held 1.9 percent *less* wealth than urban blacks[11]. Note that rural residence was (highly) statistically significant for whites but not statistically significant for blacks. Pooled sample estimates also show that we can predict a 16.2 percent increase in white wealth with an additional household member, holding all other variables constant, while we can predict an 8.2 percent increase in black wealth with an additional household member, holding all other variables constant[12]. Table 3 shows that household size was a (highly) statistically significant for blacks and whites.

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of age among literate whites and 1.2 percent increase among illiterate blacks, holding all other variables constant. All relevant variables were statistically significant except the age-literacy interaction variable for single whites.

[10] See note 6 for methodology.

[11] See note 6 for methodology. Similar results were obtained when segmenting the sample by marital status: married whites residing in rural areas held 77.3 percent more wealth than married whites residing in urban areas while married blacks residing in rural areas held 8.0 percent more wealth than married blacks residing urban areas. Likewise, single whites residing in rural areas held 76.6 percent more wealth than single whites residing in urban areas while single blacks residing in rural areas held 25.9 percent *less* wealth than single blacks residing urban areas. Rural/urban status was statistically insignificant only among single blacks.

[12] When dividing the sample by marital status, whites obtain similar wealth advantages for whites: we can predict a 17.9 percent increase in wealth among married whites, holding all other variables constant, while we can predict a 12.5 percent increase among single whites, holding all other variables constant, with an additional household member. For blacks, we can predict a 9.2 percent increase in wealth with an additional household member among married blacks, holding all other variables constant, while we can predict a 5.6 percent increase among single blacks, holding all other variables constant, with an additional household member. Table 3 shows that household size was a (highly) statistically significant for blacks and whites in all samples.

Unlike other household formation variables, more children tended to lower average white wealth: We can predict a 8.0 percent decrease in white wealth, holding all other variables constant, and a 10.8 percent decrease in wealth among married whites, holding all other variables constant, with additional child. These estimates were (highly) statistically significant, but Table 3 shows that the number of children in a household was not a statistically significant factor for the wealth of singles and blacks.

1870 Wealth Decompositions by Race

Foremost, we reject the null hypothesis, [14], that differences in classical characteristics do not contribute white-black differences in wealth with a 99 percent level of confidence. Pooled sample decompositions, reported in Table 4, show that the average white household had 429.2 percent more wealth than the average black household. But if whites and blacks generated wealth according to black functions (or coefficients), whites would have only held 150.5 percent more average wealth than blacks[13]. If whites and blacks generated wealth according to white functions, whites would have still held 79.2 percent more average wealth than blacks[14]. These results must be interpreted with caution since slaves were often not permitted to read, write or choose the structure of their household.

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[13] These results are consistent with results from segmenting the sample into married and single households in Table 5. Married whites had 426.4 more wealth the married blacks. But if whites and blacks generated wealth according to black functions, married whites would have still held 135.8 percent more wealth than married blacks. Similarly, single whites had 396.5 percent more wealth than single blacks. But if whites and blacks generated wealth according to black functions, single whites would have still held 149.4 percent of single blacks.

[14] These results are also consistent with results from segmenting the sample into married and single households in Table 5. Married whites had 426.4 more wealth the married blacks. But if whites and blacks generated wealth according to white functions, married whites would have still held 77.8 percent more wealth than married blacks. Similarly, single whites had 396.5 percent more wealth than single blacks. But if whites and blacks generated wealth according to white functions, single whites would have still held 56.0 percent of single blacks.

Second, we reject the null hypothesis, [15], that discrimination did not contribute to white-black differences in wealth with a 99 percent level of confidence. Earlier, it was stated that pooled sample decompositions, reported in Table 4, show that the average white household had 429.2 percent more wealth than the average black household. But if whites and blacks generated wealth according to the average black wealth-generating characteristics, then, in absence of discrimination, blacks would have held 350.0 percent more average wealth than they actually possessed in 1870[15]. Similarly, if whites and blacks generated wealth according to the average white wealth-generating characteristics (or means), then, in absence of discrimination, blacks would have held 278.7 percent more average wealth than they actually possessed in 1870[16].

Finally, 99 percent confidence intervals on the mean were presented in Table 4 and Table 5. Pooled sample estimates based on the primary index show that 81.5 percent of white-black wealth differences were unexplained due, in part, to discrimination. The mean for the population is above 75 percent and ranges between 78.3 and 86.3 percent with a 99 percent level of confidence[17]. Pooled sample estimates based on the alternative index show that 64.9 percent of

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[15] Furthermore, these results are consistent with results from segmenting the sample into married and single households in Table 5.Earlier, it was stated that that married whites held 426.4 more wealth the married blacks. But if whites and blacks generated wealth according to average black wealth-generating characteristics, then, in absence of discrimination, married blacks would have held 348.5 percent more average wealth than they actually possessed in 1870. Similarly, earlier it was stated that single whites had 396.5 percent more wealth than single blacks. But if whites and blacks generated wealth according to average black wealth-generating characteristics, then, in absence of discrimination, blacks would have held 340.6 percent more average wealth than they actually possessed in 1870.

[16] Moreover, these results are consistent with results from segmenting the sample into married and single households in Table 5.Earlier, it was stated that married whites held 426.4 more wealth the married blacks. But if whites and blacks generated wealth according to average white wealth-generating characteristics, then, in absence of discrimination, married blacks would have held 290.5 percent more average wealth than they actually possessed in 1870. Similarly, earlier it was stated that single whites had 396.5 percent more wealth than single blacks. But if whites and blacks generated wealth according to average white wealth-generating characteristics, then, in absence of discrimination, blacks would have held 247.1 percent more average wealth than they actually possessed in 1870.

[17] We obtain similar results when employing the primary index and separating the samples by marital status: 81.7 percent of wealth differences between married whites and married blacks were due, in part, to discrimination. The mean for the population was above 70 percent and ranged between 72.1 percent and 99.0 percent with a 99 percent level of confidence. Furthermore, 85.9 percent of wealth differences between single whites and single blacks were

white-black wealth differences were unexplained due, in part, to discrimination. The mean for

the population was still above 50 percent and ranged between 64.5 and 65.3 percent with a 99

percent level of confidence[18].

Wealth Decompositions Over-Time and the Slavery Hypothesis

The results in this study are consistent with studies using the primary index and late-

twentieth century data. Foremost, Blau and Graham (1990) used data from the National

Longitudinal Surveys (NLS) of young men and women in 1976 and 1978, respectively, to

conduct a regression decomposition of wealth by race. After controlling for income and

demographic variables, they found that 78 percent of wealth gap remained unexplained. They

suggested that barriers to businesses and housing, differences in labor market uncertainty and

differences in inheritances might explain their results.

These large unexplained differences in wealth observed directly after emancipation and at

the end of twentieth century might lead to the proposition: Enslavement constraints, as

represented by limitations on most or all economic choices, is improperly omitted from classical

analyses. This proposition is analyzed by decomposing wealth differences between whites and

early ex-slaves (blacks) in slave states (states that abolished slavery after the Civil War) and

northern states (states that abolished slavery well before the Civil War).

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due, in part, to discrimination. The mean for the population was above 75 percent and ranged between 81.3 percent
and 93.3 percent with a 99 percent level of confidence.

[18] We obtain similar results when employing the alternative index and separating the samples by marital status: 68.1
percent of wealth differences between married whites and married blacks were due, in part, to discrimination. The
mean for the population was above 50 percent and ranged between 67.4 percent and 68.6 percent with a 99 percent
level of confidence. Furthermore, 62.3 percent of wealth differences between single whites and single blacks were
due, in part, to discrimination. The mean for the population was above 50 percent and ranged between 61.2 percent
and 63.2 percent with a 99 percent level of confidence.

Foremost, we reject the null hypothesis, [14], that differences in classical characteristics do not contribute to differences in wealth among whites and blacks in slaves states and northern states with a 99 percent level of confidence. Decompositions, reported in Table 6, show that the average northern white household had 297.2 percent more wealth than the average northern black household, and the average white household in a slave state had 411.0 percent more wealth than the average black household in a slave state. But if whites and blacks generated wealth according to black functions (or coefficients), northern whites would have only held 129.7 percent more average wealth than northern blacks and whites in slave states would have only held 137.5 percent more average wealth than blacks in slave states. If whites and blacks generated wealth according to white functions, northern whites would have still held 66.0 percent more average wealth than northern blacks and whites in slave states would have still held 49.7 percent more average wealth than blacks in slave states. As stated earlier, these results must be interpreted with caution since slaves were often not permitted to read, write or choose the structure of their household.

Second, we reject the null hypothesis, [15], that discrimination did not contribute to white-black differences in wealth with a 99 percent level of confidence. Earlier, it was stated that decompositions, reported in Table 6, show that the average northern white household had 297.2 percent more wealth than the average northern black household and the average white household in slave states had 411.0 percent more wealth than the average black household in slave states. But if whites and blacks generated wealth according to the average black wealth-generating characteristics (or means), then, in absence of discrimination, northern blacks would have held 167.5 percent more average wealth than they actually possessed and blacks in slave states would have held 273.5 percent more average wealth than they actually possessed in 1870. Similarly, if

whites and blacks generated wealth according to the average white wealth-generating

characteristics, then, in absence of discrimination, northern blacks would have held 231.1 percent

more average wealth than they actually possessed and blacks in slave states would have held

361.3 percent more average wealth than they actually possessed in 1870.

Finally, 99 percent confidence intervals on the mean were presented in Table 6. Northern

sample estimates based on the primary index show that 77.8 percent of white-black wealth

differences in northern states were unexplained due, in part, to discrimination. The mean for the

population is above 75 percent and ranged between 74.5 and 85.7 percent with a 99 percent level

of confidence. Northern sample estimates based on the alternative index show that 56.4 percent

of white-black wealth differences in northern states were unexplained due, in part, to

discrimination. The mean for the population was still above 50 percent and ranged between 50.7

and 60.3 percent with a 99 percent level of confidence.

However, slave sample estimates based on the primary index show that 87.9 percent of

white-black wealth differences in slave states were unexplained due, in part, to discrimination.

The mean for the population is above 75 percent and ranged between 83.7 and 94.2 percent with

a 99 percent level of confidence. Slave sample estimates based on the alternative index show that

66.5 percent of white-black wealth differences in northern states were unexplained due, in part,

to discrimination. The mean for the population was still above 50 percent and ranged between

65.9 and 67.0 percent with a 99 percent level of confidence.

In summary, since the lower boundary of the 99 percent confidence interval on the mean

for unexplained effects remained above 70 percent for decompositions in all samples, based on

the primary index and, at least, above 50 percent for decompositions in all samples, based on the

alternative index, we cannot reject that the claim that white-black differences in wealth due to

unexplained (or discrimination) effects dominated the portion due to characteristic differences.

Furthermore, unexplained effects in states that abolished slavery after the Civil War were 10

percent higher than unexplained effects in states that abolished slavery well before the Civil War.

Table 1. Sample Descriptive Statistics

	Observations	Minimum	Maximum	Mean	St Dev	St Error	95% C. I. on the Mean	
							Lower	Upper
Age								
White	68,096	15	101	42.804	13.547	0.052	42.702	42.905
Black	18,929	15	114	39.840	14.209	0.103	39.637	40.042
Literacy Status								
White	68,096	-	1	0.885	0.319	0.001	0.883	0.888
Black	18,929	-	1	0.146	0.353	0.003	0.141	0.151
Total Wealth								
White	68,096	-	1,500,000	3,552.516	15,518.665	59.469	3,435.956	3,669.076
Black	18,929	-	165,000	124.228	1,604.806	11.664	101.365	147.091
Married								
White	68,096	-	1	0.818	0.386	0.001	0.815	0.821
Black	18,929	-	1	0.716	0.451	0.003	0.710	0.723
Number of Children								
White	68,096	-	9	2.503	2.129	0.008	2.487	2.519
Black	18,929	-	9	2.231	2.107	0.015	2.201	2.261
Number in Household								
White	68,096	1	30	5.166	2.585	0.010	5.147	5.186
Black	18,929	1	25	4.705	2.464	0.018	4.669	4.740
Rural Status								
White	68,096	-	1	0.729	0.445	0.002	0.725	0.732
Black	18,929	-	1	0.859	0.348	0.003	0.854	0.864

Source: Calculations are based on 1870 IPUMS data.

Table 2. Testing White-Black Differences in Means

	T-Statistics	Significance
Age	26.34	***
Literacy Status	275.71	***
Total Wealth	30.34	***
Married	30.79	***
Number of Children	15.57	***
Number in Household	21.95	***
Rural Status	-37.36	***

Source: Calculations are based on 1870 IPUMS data. Note that (*) indicates that the calculation is statistically significant at a ten percent level of significance; (**) indicates that the calculation is statistically significant at a five percent level of significance; and (***) indicates that the calculation is statistically significant at a one percent level of significance.

Table 3. Least Squares Regression Coefficients by Race and Marital Status
(Dependent Variable: Log Wealth)

Sample:	Overall		Married		Singles	
Coefficients:	Black	White	Black	White	Black	White
Constant	-1.093 ***	-3.558 ***	-0.959 ***	-2.646 ***	-0.258	-3.476 ***
	(0.139)	(0.164)	(0.210)	(0.187)	(0.357)	(0.357)
Age	0.053 ***	0.191 ***	0.070 ***	0.196 ***	0.033 ***	0.181 ***
	(0.006)	(0.006)	(0.010)	(0.007)	(0.012)	(0.012)
Age-Squared	-0.000 ***	-0.002 ***	-0.001 ***	-0.002 ***	-0.000 ***	-0.001 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age-Literacy Interaction	0.015 ***	0.009 ***	0.015 **	0.011 ***	0.015 ***	0.005
	(0.003)	(0.003)	(0.005)	(0.003)	(0.005)	(0.005)
Literacy Status	0.206	1.420 ***	0.293	1.330 ***	-0.060	1.576 ***
	(0.140)	(0.121)	(0.193)	(0.140)	(0.266)	(0.266)
Marital Status	0.683 ***	0.971 ***				
	(0.038)	(0.032)				
Number of Children	0.014	-0.080 ***	0.013	-0.108 ***	-0.008	0.014
	(0.013)	(0.009)	(0.018)	(0.010)	(0.021)	(0.021)
Household Size	0.082 ***	0.162 ***	0.092 ***	0.179 ***	0.056 ***	0.125 ***
	(0.011)	(0.007)	(0.015)	(0.008)	(0.015)	(0.015)
Rural/Urban Status	-0.019	1.477 ***	0.084	1.484 ***	-0.230 ***	1.451 ***
	(0.048)	(0.027)	(0.063)	(0.030)	(0.069)	(0.069)
Root MSE	2.247	3.128	2.402	3.054	1.784	3.438
R Squared	0.065	0.148	0.045	0.137	0.036	0.126
Adjusted R-Squared	0.065	0.148	0.045	0.136	0.034	0.125
F-Statistics for black and white coefficients in equations [4] and [6]	165.020 ***	1,474.430 ***	91.790 ***	1,257.100 ***	28.190 ***	254.000 ***
Number of Observations	18,929	68,096	13,558	55,684	5,371	12,413

Source: Calculations are based on 1870 IPUMS data. Standard errors are in parentheses. Note that (*) indicates that the calculation is statistically significant at a ten percent level of significance; (**) indicates that the calculation is statistically significant at a five percent level of significance; and (***) indicates that the calculation is statistically significant at a one percent level of significance. The dummy variables are defined as literacy equals one if the person can read write; marital status equals one if the person is married; and rural status equals one if the persons lives in a locality with less than 1,500 people.

Table 4. Summary of Estimates from Decomposing White-Black Differences in Log Wealth for the Full Sample

| | Differences | | 99 Percent C. I. | |
			Upper	Lower
Primary Index from Equation 12				
White-Black Wealth Differences:	4.292		5.025	3.560
in Coefficients (x White Means)	3.500	***	3.933	3.068
Standard Errors	0.144			
Percent of Sum	*81.5%*		*78.3%*	*86.2%*
in Means (x Black Coefficients)	0.792	***	1.092	0.492
Standard Errors	0.100			
Percent of Sum	*18.5%*		*21.7%*	*13.8%*
Alternative Index from Equation 13				
White-Black Wealth Differences	4.292		4.720	3.865
in Coefficients (x Black Means)	2.787	***	3.084	2.491
Standard Errors	0.099			
Percent of Sum	*64.9%*		*65.3%*	*64.5%*
in Means (x White Coefficients)	1.505	***	1.636	1.373
Standard Errors	0.044			
Percent of Sum	*35.1%*		*34.7%*	*35.5%*

Source: Calculations are based on 1870 IPUMS data. Standard errors are in parentheses. Note that (*) indicates that the calculation is statistically significant at a ten percent level of significance; (**) indicates that the calculation is statistically significant at a five percent level of significance; and (***) indicates that the calculation is statistically significant at a one percent level of significance. Note that the overall samples include 68,096 white observations and 18,929 black observations.

Table 5. Summary of Estimates from Decomposing White-Black Differences in Log Wealth by Marital Status

Sample:	Married			Singles		
		99 Percent C. I.			99 Percent C. I.	
	Differences	Upper	Lower	Differences	Upper	Lower
Primary Index from Equation 12						
White-Black Wealth Differences:	4.264	5.469	3.059	3.965	4.899	3.032
in Coefficients (x White Means)	3.485 ***	3.943	3.028	3.406 ***	3.983	2.829
Standard Errors	0.153			0.192		
Percent of Sum	*81.7%*	*72.1%*	*99.0%*	*85.9%*	*81.3%*	*93.3%*
in Means (x Black Coefficients)	0.778 ***	1.525	0.031	0.560 ***	0.916	0.203
Standard Errors	0.249			0.119		
Percent of Sum	*18.3%*	*27.9%*	*1.0%*	*14.1%*	*18.7%*	*6.7%*
Alternative Index from Equation 13						
White-Black Wealth Differences	4.264	5.241	3.286	3.965	4.426	3.505
in Coefficients (x Black Means)	2.905 ***	3.595	2.215	2.471 ***	2.797	2.145
Standard Errors	0.230			0.109		
Percent of Sum	*68.1%*	*68.6%*	*67.4%*	*62.3%*	*63.2%*	*61.2%*
in Means (x White Coefficients)	1.358 ***	1.646	1.071	1.494 ***	1.629	1.359
Standard Errors	0.096			0.045		
Percent of Sum	*31.9%*	*31.4%*	*32.6%*	*37.7%*	*36.8%*	*38.8%*

Source: Calculations are based on 1870 IPUMS data. Standard errors are in parentheses. Note that (*) indicates that the calculation is statistically significant at a ten percent level of significance; (**) indicates that the calculation is statistically significant at a five percent level of significance; and (***) indicates that the calculation is statistically significant at a one percent level of significance. Note that the married samples include 55,683 white observations and 13,558 black observations; and the singles samples include 12,413 white observations and 5,371 black observations.

Table 6. Summary of Estimates from Decomposing White-Black Differences in Log Wealth by Slave State Status

Sample:	North			Slave			
		99 Percent C. I.				99 Percent C. I.	
	Differences	Upper	Lower	Differences		Upper	Lower
Primary Index from Equation 12							
White-Black Wealth Differences:	2.972	4.187	1.757	4.110		4.910	3.310
in Coefficients (x White Means)	2.311 ***	3.117	1.506	3.613	***	4.109	3.117
Standard Errors	0.269			0.165			
Percent of Sum	*77.8%*	*74.5%*	*85.7%*	*87.9%*		*83.7%*	*94.2%*
in Means (x Black Coefficients)	0.660 ***	1.069	0.251	0.497	***	0.801	0.193
Standard Errors	0.136			0.101			
Percent of Sum	*22.2%*	*25.5%*	*14.3%*	*12.1%*		*16.3%*	*5.8%*
Alternative Index from Equation 13							
White-Black Wealth Differences	2.972	3.489	2.454	4.110		4.668	3.553
in Coefficients (x Black Means)	1.675 ***	2.106	1.243	2.735	***	3.129	2.342
Standard Errors	0.144			0.131			
Percent of Sum	*56.4%*	*60.3%*	*50.7%*	*66.5%*		*67.0%*	*65.9%*
in Means (x White Coefficients)	1.297 ***	1.384	1.210	1.375	***	1.539	1.211
Standard Errors	0.029			0.055			
Percent of Sum	*43.6%*	*39.7%*	*49.3%*	*33.5%*		*33.0%*	*34.1%*

Source: Calculations are based on 1870 IPUMS data. Note that (*) indicates that the calculation is statistically significant at a ten percent level of significance; (**) indicates that the calculation is statistically significant at a five percent level of significance; and (***) indicates that the calculation is statistically significant at a one percent level of significance. Note that the north samples include 48,090 white observations and 1,360 black observations, and the slave samples include 20,006 white observations and 17,539 black observations. North states equal one if the state is Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Ohio, Michigan, Iowa, Indiana, and Minnesota. Slave state equals one if the state is Virginia, Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, Kentucky, Maryland, Tennessee, West Virginia, Missouri, Delaware and the District of Columbia.

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A. <u>Appendix</u>: Theory of the Components of the Wealth Identity

If we assume static optimization[19]:

[A1] $h_{B,\tau} = h_B\left(r_{B,t}, p_t\right)$

[A2] $h_{w,\tau} = h_w\left(r_{W,t}, p_t\right)$

[A3] $c_{B,\tau} = c_B\left(r_{B,t}, p_t\right)$

[A4] $c_{w,\tau} = c_w\left(r_{W,t}, p_t\right)$

Thus, substituting equations [A1] and [A3] into equation [3] produces:

[A7] $$W_{B,t} = \left(1+i_{i,B}\right)^t W_{o,B} + \sum_{\tau=1}^{t}\left(1+i_B\right)^{t-\tau}\left[r_{B,t}h_B\left(r_{B,t}, p_t\right) - p_t c_B\left(r_{B,t}, p_t\right)\right]$$

[A8] $$= f\left(r_{B,1}, r_{B,2},...,r_{B,t}, p_1, p_2,..., p_t\ i_B\right)$$

Taking a log linear approximation:

[A9] $$lnW_{B,t} = \omega_{0,B} + \sum_{\tau=1}^{t}\gamma_\tau\ ln\ r_{B,\tau} + \sum_{\tau=1}^{t}\delta_\tau\ ln\ p_\tau + \theta t\ ln\left(i_B\right) + e_{B,t}$$

Note that:

[A10] $$lnr_{B,t} \approx \mu_{o,B} + \mu_{1,B}A_{B,t} + \mu_{2,B}A_{B,t}^2 + \mu_{3,B}S_{B,t} + \mu_{4,B}S_{B,t}^2 + \mu_{5,B}A_{B,t}\cdot S_{B,t} + v_{B,t}$$

[A11] $$\approx \tilde{\mu}_{o,B} + \tilde{\mu}_{1,B}A_{B,t} + \tilde{\mu}_{2,B}A_{B,t}^2 + \tilde{\mu}_{3,B}L_{B,t} + \tilde{\mu}_{4,B}A\cdot L_{B,t} + v_{B,t}$$

Substitute equation [A11] into equation [A9] produces

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[19] Note that hours of work and consumption in an intertemporal optimization setting:

[A5] $$h_t = h_t\left(r_1,...,r_T, p_1,..., p_T, i_B\right)$$

for both blacks and whites. Also,

[A6] $$c_t = c_t\left(r_1,...,r_T, p_1,..., p_T, i_B\right)$$

[A12]
$$lnW_{B,t} = \omega_{0,B} + \gamma_t \left(\tilde{\mu}_{o,B} + \tilde{\mu}_{1,B} A_{B,t} + \tilde{\mu}_{2,B} A_{B,t}^2 + \tilde{\mu}_{3,B} L_{B,t} + \tilde{\mu}_{4,B} A_{B,t} \cdot L_{B,t} + \xi_{B,t} \right)$$

$$+ \sum_{\tau=1}^{t-1} \gamma_\tau \, ln \, r_{B,\tau} + + \sum_{\tau=1}^{t} \delta_\tau \, ln \, p_\tau + \theta t \, ln(i_B) + e_{B,t}$$

such that:

[A13]
$$lnW_{B,t} = \pi_{0,B,t} + \pi_{1,B,t} A_{B,t} + \pi_{2,B,t} A_{B,t}^2 + \pi_{3,B,t} L_{B,t} + \pi_{4,B,t} A_{B,t} \cdot L_{B,t} + \pi_{5,B,t} Z_{B,t} + \varepsilon_{B,t}$$

where:

$$\pi_{0,B,t} = \omega_{0,B} + \gamma_t \tilde{\mu}_{0,B} + \sum_{\tau=1}^{t-1} \gamma_\tau \, ln \, r_{B,\tau} + \sum_{\tau=1}^{t} \delta_\tau \, ln \, p_\tau + \theta t \, ln(i_B)$$

$$\pi_{i,B,t} = \gamma_t \tilde{\mu}_{i,B} \quad for \ i = 1...5$$

$$\varepsilon_{B,t} = \gamma_t \xi_{B,t} + e_{B,t}$$

which is equivalent to equation [6], where t=1870. By the same reasoning, equation [4] is

obtained.