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SCHOOL QUALITY AND BLACK-WHITE RELATIVE EARNINGS: A DIRECT ASSESSMENT

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ABSTRACT

The average wage differential between black and white men fell from 40 percent in 1960 to 25 percent in 1980. Much of this convergence is attributable to a relative increase in the rate of return to schooling among black workers. It is widely argued that the growth in the relative return to black education reflects the dramatic improvements in the quality of black schooling over the past century. To test this hypothesis we have assembled data on three aspects of school quality -- pupil-teacher ratios, annual teacher pay, and term length -- for black and white schools in 18 segregated states from 1915 to 1966. The school quality data are linked to estimated rates of return to education for Southern-born men from different cohorts and states, measured in 1960, 1970, and 1980. Improvements in the relative quality of black schools explain 20 percent of the narrowing of the black-white earnings gap between 1960 and 1980.

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During the 1960s and 1970s African American men made substantial progress toward earnings equality with whites. The average wage differential between black and white men narrowed from 40 percent in 1960 to 25 percent in 1980. By comparison black-white relative earnings were remarkably stable during the 1950s and 1980s.[1] Despite the singular importance of the wage gains from 1960 to 1980, economists remain divided as to their causes. Smith and Welch (1986,1989) argue that improvements in the relative quality of black education were mainly responsible for the relative rise in black wages after 1960. Other researchers, including Freeman (1973), Vroman (1974), and Donohue and Heckman (1990), argue that federal government policies, including passage of the 1964 Civil Rights Act, were instrumental in closing the wage gap.

Nationwide trends in earnings and schooling data suggest that both hypotheses have some merit. Tabulations from the Current Population Survey show a rise in black-white relative earnings in the years immediately following passage of the Civil Rights Act.[2] This change is often cited as evidence that equal employment opportunity programs led to a closing of the earnings gap. Blacks who entered the labor market in the 1960s, however, had received substantially more and better education than any previous generation of black workers. In the 1920s, for example, pupil-teacher ratios in Southern black schools were 50 percent higher than those in white schools, while the average school term was 20 percent shorter. By the late 1950s conditions in black and white schools were similar in many

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[1] These and many other aspects of black economic progress since 1940 are described in Smith and Welch (1986, 1989).

[2] See Freeman (1973) and Brown (1984). Ashenfelter (1970) presents evidence that part of the rise in black-white relative earnings measured in the Current Population Survey between 1966 and 1967 is attributable to a change in sampling and processing procedures.

Southern states. Because better-educated cohorts of black workers began to enter the labor force at about the time the Civil Rights Act took effect, nationwide earnings patterns cannot easily distinguish the effects of improved school quality from the impact of federal anti-discrimination policies.

Nevertheless, aggregate trends in relative school quality mask wide differences across states in the rate of convergence of black and white school quality. In this paper we use these interstate differences to disentangle the role of school quality in the evolution of the black-white earnings gap. The key to our analysis is a set of state-specific school quality measures for the black and white schools in the 18 segregated Southern states during the period from 1915 to 1966. To our knowledge this is the most complete series of state-level data on the quality of Southern schools presently available. We combine these quality measures with state-specific estimates of the rate of return to schooling and the mean level of earnings for Southern-born men in the 1960, 1970, and 1980 Censuses. We then use the combined earnings and schooling data to answer two questions: What is the effect of relative school quality on the relative returns to education earned by black and white men? What fraction of the closing of the black-white earnings gap between 1960 and 1980 is explained by changes in relative school quality?

Before turning to these questions we present a descriptive analysis of the earnings gap between black and white men in the 1960, 1970 and 1980 Censuses. Our analysis establishes the importance of intercohort changes in determining the evolution of the black-white earnings gap. We then decompose intercohort changes in the wage gap into components attributable to earnings growth among Southern-born and non-Southern-born blacks. Sixty

percent of the closing of the earnings gap between cohorts born in the 1920s and cohorts born in the 1940s is attributed to the closing of the wage gap between Southern-born blacks and Southern-born whites.

Among Southern-born workers increases in the relative return to education for later cohorts of blacks can explain most of the narrowing of the relative wage gap. Cross-tabulations of rates of return to education by race and region of birth show that the return to education for later cohorts of Southern-born blacks rose relative to Southern-born whites and relative to Northern-born blacks. This pattern suggests that higher returns to schooling for Southern-born blacks were driven by increases in the quality of Southern black education, and not simply by an economy-wide reduction in discrimination against better-educated black workers.

In Part II of the paper we present estimates of school quality by cohort, race, and state of birth, and link these quality measures to estimated rates of return to education for Southern-born workers. To control for possible differences in the return to education in different regions of the country, we estimate rates of return to schooling for men who were born in the South between 1910 and 1949 and who worked in a Northern metropolitan area in 1960, 1970, or 1980. We find a strong correlation between simple measures of relative school quality for black and white pupils and their relative rates of return to schooling. Changes in relative pupil-teacher ratios, term lengths, and teachers' salaries can explain at least one-half of the intercohort growth in black-white relative returns to education, and 15-25 percent of the overall convergence in black relative returns to education between 1960 and 1980.

We conclude our study with a direct assessment of the effects of school quality on the black-white wage gap. Here, we follow a simple "reduced form" approach and regress measures of the black-white wage gap by cohort and state of birth on measures of the corresponding gap in school quality. Again, there is a positive correlation between black-white relative wages and objective measures of black-white relative school quality. Changes in relative school quality explain one-quarter or more of the decline in the black-white wage gap between earlier and later cohorts of workers, and 15-20 percent of the closing of the overall black-white wage gap for Southern-born workers between 1960 and 1980.

I. The Evolution of Black/White Earnings: 1960-1980

Table 1 presents estimates of average wage rates for black and white male workers in the 1960, 1970, and 1980 decennial censuses.[3] The table gives overall averages of log weekly wages for men age 21-60 together with means for each 10-year birth cohort. The three right-hand columns contain estimated black-white wage differentials by cohort of birth and census year. Overall, the mean log wage differential was -.480 in 1960, -.388 in 1970, and -.293 in 1980. A similar trend emerges from a comparison of the ratios of average wage levels (in the bottom row of the table) which rose from 0.62 in 1960 to 0.67 in 1970, and 0.75 in 1980.

A comparison of wage gaps in consecutive Censuses suggests that much of the overall increase in black-white relative earnings between 1960 and 1980 arose from the replacement of older cohorts of workers by younger

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[3] Precise descriptions of the samples used to construct these averages are provided in the Data Appendix.

cohorts with smaller wage gaps. For example, between 1960 and 1970, the black-white wage gap for the 1910-19 birth cohort fell only 1.8 percent, while the gaps for the 1920-29 and 1930-39 cohorts actually increased slightly. However, the entry of the 1940-49 cohort together with the exit of the 1900-09 cohort reduced the overall wage gap by close to 10 percentage points. A similar pattern holds between 1970 and 1980, although the wage gaps for the two older (1920-29 and 1930-39) cohorts closed noticeably between 1970 and 1980.

Changes in the wage gap between 1960 and 1980 are decomposed into within-cohort and between-cohort components in Table 2. To understand this decomposition, write the overall wage gap between black and white workers in 1960, g_{60}, as a weighted average of the wage gaps for cohorts 1 (born 1900-09), 2 (born 1910-19), 3 (born 1920-29), and 4 (born 1930-39):

$$g_{60} = \alpha_{60}^{1}\, g_{60}^{1} + \alpha_{60}^{2}\, g_{60}^{2} + \alpha_{60}^{3}\, g_{60}^{3} + \alpha_{60}^{4}\, g_{60}^{4},$$

where α_{60}^{c} is the relative weight of cohort c in the labor force in 1960 (assumed to be equal for whites and blacks), and g_{60}^{c} is the relative wage gap for cohort c in 1960.[4] Then the change in the wage gap between 1960 and 1970 is:

$$\begin{aligned}(1)\quad g_{70} - g_{60} = {} & \alpha_{60}^{2}\cdot(g_{70}^{2} - g_{60}^{2}) + \alpha_{60}^{3}\cdot(g_{70}^{3} - g_{60}^{3}) + \alpha_{60}^{4}\cdot(g_{70}^{4} - g_{60}^{4}) \\ & + \alpha_{60}^{1}\cdot(g_{70}^{5} - g_{60}^{1}) \\ & + (\alpha_{70}^{2} - \alpha_{60}^{2})\cdot(g_{70}^{2} - g_{70}^{5}) \\ & + (\alpha_{70}^{3} - \alpha_{60}^{3})\cdot(g_{70}^{3} - g_{70}^{5}) \\ & + (\alpha_{70}^{4} - \alpha_{60}^{4})\cdot(g_{70}^{4} - g_{70}^{5}),\end{aligned}$$

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[4] Unless the age distributions of the white and black labor forces are identical, this equation is not strictly correct. As the population shares in Table 1 suggest, however, the age distributions are fairly similar. We use the age distribution of all workers (white and black) in Table 2.

where g_{70}^{5} refers to the wage gap for cohort 5 (born 1940-49) in 1970. The first three terms of this decomposition represent the within-cohort changes in wage gaps for the three continuing cohorts. Between 1960 and 1970, these terms are trivial, yielding a net change in the overall wage gap of -0.002. Between 1970 and 1980, on the other hand, changes for two of the continuing cohorts are larger: 11 percent for the 1920-29 cohort and 7.2 percent for the 1930-39 cohort. These improvements were offset by an increase in the relative wage gap for the 1940-49 cohort.

The next term in the decomposition captures the direct effect of replacing the oldest cohort (the 1900-09 cohort in 1960, for example) with the youngest cohort. The effect is simply the weight of the oldest cohort in the base year, multiplied by the difference between the wage gap for the oldest cohort in the base year and the gap for the youngest cohort in the final year. This term contributes a 5.5 percent reduction in the average wage gap between 1960 and 1970, and a 5.8 percent reduction between 1970 and 1980.

The final three terms in the decomposition reflect a re-weighing of the older cohorts in later censuses. Between 1960 and 1970, for example, the relative weight of the 1910-19 cohort declined by .063. This weight is shifted to the youngest cohort: hence the net effect is the product of the change in weights for the cohort and the difference in wage gaps between the continuing cohort and the entering cohort. Re-weighting of the continuing cohorts contributes a 3.7 point decline in the overall wage gap between 1960 and 1970, and a 2.6 percent decline in the overall gap between 1970 and 1980.

The results in Table 2 confirm that virtually all of the decline in the black-white relative wage gap between 1960 and 1970 was due to the entry of younger and larger cohorts (with substantially smaller wage gaps) and the exit of older and smaller cohorts (with substantially higher wage gaps). Between 1970 and 1980, however, within-cohort changes among the two older cohorts of workers contributed about one-quarter of the overall decline in the wage gap. Over the 20 year period, within-cohort changes contributed 10 percent of the overall 19 point decline in the black/white relative wage gap.[5]

A. The Importance of Southern-Born Workers for the Black/White Wage Gap

Any explanation for improvements in the relative earnings of later cohorts of black men must focus on improvements for Southern-born workers, simply because a large majority (over 80 percent) of blacks born between 1900 and 1960 were born in the South.[6] The importance of changes among Southern-born men for the evolution of the overall wage gap is illustrated in Table 3. The decomposition in this table uses the fact that the wage gap (g) for a particular cohort can be written as:

$$g = \gamma^B (y_S^B - y^W) + (1 - \gamma_B) \cdot (y_N^B - y^W)$$

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[5] A similar decomposition is performed by Duncan and Hoffman (1983) using data on individuals in the Panel Study of Income Dynamics (PSID). Duncan and Hoffman conclude that about one-half of the decline in the black-white wage gap (for Southern-born and Northern born-workers) between the late 1960s and the late 1970s is attributable to cohort effects.

[6] The percentage of blacks born in the South is higher for older cohorts (up to 90 percent for the 1900-1909 cohort), and also varies depending on the population under consideration (for example, workers versus non-workers).

where γ^B represents the fraction of black workers born in the South, y^W represents the mean log wage of white workers, and y_S^B and y_N^B represent the means of log wages for blacks born inside and outside the South, respectively. If the fraction of blacks born in the South is approximately constant then the change in the relative wage gap between any two cohorts, Δg, can be written as:

$$(2) \quad \Delta g = \gamma^B (\Delta y_S^B - \Delta y^W) + (1 - \gamma_B)\cdot(\Delta y_N^B - \Delta y^W),$$

where Δy^W is the intercohort change in the mean log wage for white workers, and Δy_S^B and Δy_N^B are the corresponding changes for blacks born inside and outside the South. The first of these terms measures the change in the overall wage gap attributable to the relative earnings growth of Southern-born blacks, while the second measures the change attributable to the relative earnings growth of non-Southern-born blacks. Inter-cohort changes in the regional distribution of black births add a third "residual" component to this breakdown.

The first column of Table 3 compares the wage gap of the 1930-39 cohort (measured in 1970) to that of the 1920-29 cohort (measured in 1960). The entry in row 1 shows that the black-white wage gap was 8.2 percent lower for the 1930-39 cohort than for the 1920-29 cohort at a similar point in their lifecycle. The entry in row 3 shows that 7.2 percentage points of this change is due to the relative earnings gains of Southern-born blacks. The share of this "Southern-born effect" in the total intercohort change is reported in row 8. An alternative comparison of the same two cohorts is presented in the second column of Table 3, using data from the 1970 Census to measure the wage gap for the 1920-29 cohort, and data from the 1980

Census to measure the wage gap for the 1930-39 cohort. The inter-cohort gap is larger in the later comparison, as is the share of the change attributable to relative earnings growth for Southern-born black workers.[7]

The relative contribution of Southern-born blacks can be further decomposed by noting that

$$\Delta y^W = \Delta y_S^W + (1 - \gamma^W)\cdot(\Delta y_N^W - \Delta y_S^W),$$

where γ^W is the fraction of whites born in the South and Δy_N^W and Δy_S^W represent the intercohort changes in mean log wages for Northern-born and Southern-born whites. Thus

$$\gamma^B (\Delta y_S^B - \Delta y^W) = \gamma^B \Delta g_S + \gamma^B (1 - \gamma^W)\cdot(\Delta y_N^W - \Delta y_S^W),$$

where Δg_S is the intercohort change in the black-white wage gap among Southern-born men. The overall Southern-born effect reflects both the change in the wage gap among Southern-born workers (weighted by γ^B) and the earnings growth of Southern-born whites relative to Northern-born whites (weighted by $\gamma^B (1 - \gamma^W)$). The shares of these two components in the overall intercohort relative wage change are reported in the bottom 2 rows of Table 3. Changes in the wage gap among Southern-born workers account for 60 percent of the intercohort change in black-white relative wages. Increases in the earnings of Southern-born whites relative to whites born elsewhere in the US account for an additional 8-25 percent of the intercohort change.

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[7] Other comparisons of these two cohorts are also possible. For example, one can compare the wage gap of the 1920-29 cohort in 1960 to the wage gap of the 1930-39 cohort in the same year. This comparison leads to a similar estimate of the fraction of the inter-cohort change attributable to changes among Southern-born blacks.

The third and fourth columns of Table 3 present similar decompositions of the change in the black-white wage gap between the 1930-39 birth cohort and the 1940-49 birth cohort. Again, over 70 percent of the growth in the relative earnings of black workers is attributable to the earnings gains of Southern-born blacks, with most of this reflecting the narrowing of the black-white wage gap between Southern-born workers. In view of this fact, we turn next to a decomposition of changes in the black-white wage gap for Southern-born men.

Consider a linear regression model that expresses the logarithm of weekly earnings (y) as a function of a vector of characteristics X (education, potential experience, the square of potential experience, and indicator variables for marital status, residence in the different Census regions, and residence in an SMSA) and a person-specific error term:

$$y = X\beta + \varepsilon.$$

We have estimated the coefficients β by race and cohort of birth for Southern-born whites and blacks in the 1960, 1970 and 1980 Censuses. We can then write the black-white relative wage gap for a particular age group in 1960 as

$$g_{60} = X^B_{60}\beta^B_{60} - X^W_{60}\beta^W_{60},$$

where X^B_{60} represents the mean of the X vector for blacks in 1960, and β^B_{60} represents the vector of estimated regression coefficients for blacks in 1960. The inter-cohort change in the wage gap for this age group between 1960 and 1970 is

$$(3) \qquad g_{70} - g_{60} = (X^B_{70} - X^B_{60})\beta^B_{60} + (\beta^B_{70} - \beta^B_{60})X^B_{70} - (X^W_{70} - X^W_{60})\beta^W_{60} - (\beta^W_{70} - \beta^W_{60})X^W_{70}.$$

This change consists of the change in the mean characteristics for blacks (multiplied by the base-period regression coefficients for blacks); the change in the regression coefficients for blacks (multiplied by the end-period mean characteristics); and two analogous terms for whites.

Table 4 presents the portions of each component of this decomposition attributable to education.[8] The second and third rows of the table present the predicted effects of changes in the mean levels of schooling for blacks and whites, respectively, between the initial and ending years. The fourth row of the table sums these two components, giving the total change in the relative wage gap attributable to changes in the relative levels of education for the two groups. In most cases the sum is small or negative. There are two reasons for this. First, mean years of education rose quickly for both blacks and whites, implying only modest relative gains for blacks. Second, the coefficients associated with schooling are typically lower for blacks, implying a smaller wage gain, other things equal.

By comparison, changes in the relative return to education can in principle account for all of the intercohort decline in the relative wage gap. The predicted effects of changes in the returns to education for black and white workers are presented in the fifth and sixth rows of the table, respectively, and the sum of these two components is presented in row 7. In every column of the table, the predicted effect of changes in

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[8]Appendix Table 1 reports cohort-specific measures of relative earnings, schooling, and rates of return to schooling for whites and blacks born in the South.

the relative return to education is larger than the total change in the relative wage gap.[9]

The conclusions from Table 4 are unchanged when the decomposition is performed using base-period mean characteristics to weight changes in the returns to education, and end-period coefficients to weight changes in the means of education. This alternative weighting scheme gives slightly more weight to relative increases in the level of education for blacks, and correspondingly less weight to relative increases in the return to education. Even using base-period education levels as weights, however, the changes in the relative return to education are on average as large as the overall increases in relative wages.

These findings parallel the results presented by Smith and Welch (1989) for all black and white workers. Virtually all of the intercohort changes in the black-white wage gap can be explained by increases in the relative return to education for blacks. Notice, however, that the increasing relative returns documented in Table 4 may reflect either cohort or year effects, since the comparisons are drawn across Censuses. In fact the analysis reported in Section III below suggests that an important component of the increased relative return to education for blacks between 1970 and 1980 is attributable to an economy-wide time effect, rather than a cohort-specific effect.

Lastly, it is worth pointing out that increases in the return to education for Southern-born blacks occurred relative to both Southern-born

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[9]Between 1970 and 1980 the return to education for white workers in the 21-30 age group fell dramatically, while the return to education for black workers was roughly constant. However, the change for whites was counter-acted by a corresponding <u>increase</u> in the coefficient associated with the linear experience term.

whites and Northern-born blacks. This fact is illustrated in Table 5, which uses data from the 1980 Census to estimate rates of return for black and white workers by race, cohort of birth, Southern-born status, and region of residence.[10] The bottom rows of the table give the inter-cohort differences in the rates of return to education between the 1920-29 birth cohort and the 1940-49 birth cohort as of 1980.

Looking across the columns of the table it is clear that rates of return to education vary by region of residence. As noted by Chiswick (1974) and Smith and Welch (1989), rates of return to education are generally higher in the South and lower in the North-Central region. However, a comparison of Southern-born and non-Southern-born men living in the same region shows that Southern-born men from earlier birth cohorts earned systematically lower rates of return to education. For blacks, the difference in returns between Southern-born and non-Southern born men in the 1920-29 cohort is 2-4 percentage points. For whites in the same cohort, the gap is a point or less. Among the 1940-49 cohort the gap in returns between Southern-born and non-Southern-born blacks is only about 1 percentage point, while the gap for whites averages about 0.5 percentage points. Thus, there were substantial increases in the return to education for later cohorts of Southern-born blacks relative to both Southern-born whites and non-Southern-born blacks. These increases are apparent for Southern-born blacks living in every region of the country. The relative increase in the return to schooling for Southern-born blacks over their Northern-born counterparts suggests that the higher returns were not simply

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[10] These rates of return are estimated from linear regressions that contain the same control variables as used in the regressions underlying Table 4. Similar results are found for 1960 and 1970.

a consequence of anti-discrimination policies. Rather, we believe that the data reflect an increase in the market value of a Southern education for black workers. To explain this increase, we turn to data on the quality of schools available to Southern-born men.

II. Two Kinds of Schools

We have collected state-level data by race on three aspects of school quality: the ratio of students to teachers, average term length, and average annual teacher salaries. These data pertain to grades K-12 in public schools and cover the period from 1915 to 1966.[11] Data by race in this time period are only available for 17 Southern and border states and the District of Columbia.[12] Nevertheless, the analysis in the previous section suggests that individuals born in these states, who comprise more than 80 percent of blacks born in the U.S., form a critical group for understanding the narrowing of the black-white earnings gap.

Several sources were canvassed to derive the final compilation of school quality data. Most of the data from 1915 through 1920 are taken from either state reports of education or the U.S. Office of Education's Biennial Survey of Education. Unfortunately, these sources are incomplete, and several states lack data on term length and/or teacher pay before 1920.

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[11] Starting in 1918, the data are available biennially. As noted in Anderson (1988) many counties in the deep South did not provide public high schools for black students until the mid-1920s: thus our quality indicators, which pertain to publicly-supported schools, may be mis-measured for higher-educated blacks born before 1915.

[12] The 18 states with available data are: Alabama, Arkansas, Delaware, D.C., Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. With the exception of Missouri these states comprise the Southern region as defined by the Bureau of the Census.

Between 1922 and 1954, most of the data are available in the Biennial Survey of Education.[13] Missing data were supplemented by the state education reports, whenever possible.[14]

After the Brown v. Board of Education decision in 1954 the federal government and most states ceased publication of schooling data by race. Despite the Brown decision, however, most Southern states continued to operate segregated schools until well into the 1960's. The following table shows the percent of Southern-born blacks (men and women) who attended all-black schools, by birth cohort and level of schooling, based on retrospective responses in two household surveys.[15]

	Birth Cohort:						
	1900-09	1910-19	1920-29	1930-39	1940-49	1950-59	1960-69
Survey: National Survey of Black Americans (sample size = 1,536)							
1. Grade School	93.5	98.3	95.7	96.1	93.4	77.8	47.8
2. Junior High	90.6	92.6	93.3	94.3	90.0	48.4	18.2
3. High School	93.6	92.3	90.7	88.8	85.7	29.9	11.5
4. Any School	94.2	98.9	96.7	96.6	94.6	79.2	50.7
Survey: General Social Survey (sample size = 305)							
5. High School	88.0	93.9	89.1	90.2	80.8	23.4	9.5

[13] Data for some years are taken from periodic reports on black and white schools compiled by the Office of Education, e.g. Blose and Caliver (1936). A complete catalog of the sources used to collect the school quality data is available from the authors on request.

[14] There is some reason for concern about the accuracy of the data in the early part of our sample. We have tried to eliminate obvious errors in individual reports and have cross-checked the data whenever possible. We have also compared reported teacher salaries with mean annual earnings by state and race for teachers in the 1940, 1950 and 1960 Censuses, and found very high correlations between the two series (e.g. 0.95 in 1940).

[15] The estimates in the table are based on data from the National Survey of Black Americans (NSBA) and the General Social Survey (GSS). The NSBA survey is described in Jackson and Gurin (1987) and the GSS survey is described in Davis and Smith (1990). These tabulations are based on Southern-born men with the relevant level of schooling.

The fraction of Southern-born black students attending all-black schools was similar for the 1900-09 cohort and the 1940-49 cohort. Approximately 90 percent of black students born in the South before 1949 attended all-black schools throughout their school career.

In light of this fact we have used data on the numbers of black and white students and teachers in each state, along with average salaries by race, to estimate relative school quality for 1955-1966.[16] These data are derived from annual reports issued by the Southern Education Reporting Service (SERS), a civil rights monitoring group set up by a board of Southern newspaper editors after the Brown decision.[17] SERS obtained data on white and black enrollment, teacher salaries, and numbers of teachers directly from the state education agencies. Although there are some gaps in the available data, we have been able to assemble a complete series on the pupil-teacher ratio by state and race. Fairly complete series on teacher pay are also available for all states except Missouri, Kentucky, and Tennessee.

Table 6 reports average school quality measures by race for the 18 segregated states as a whole over the 1915-1966 period.[18] Relative ratios

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[16] In the later years of our sample some border states show substantial levels of racial integration. In these cases we have assigned white and black schools the same (overall) quality averages. Some states, including Mississippi and Louisiana, continued to publish school data by race until the mid-1960s. Whenever possible, we have used data from the state reports. Term lengths for black and white students were essentially equal by 1954, so we use the overall term length figures for whites and blacks.

[17] Data for 1955-57 are reported in SERS (1959). Data for later years appear in various issues of "Status of School Segregation and Desegregation in the Southern and Border States".

[18] The underlying state-level data are weighted by enrollments to obtain the averages in Table 6. In years when data are missing for some states, we have formed the averages using the available data.

of the quality measures for black and white students are plotted in Figure 1. Inspection of these data suggests three conclusions. First, during most of the 20th century the quality of education for black students lagged far behind that for whites. As recently as 1940 pupil-teacher ratios were 25 percent higher in black schools (38.3 vs. 29.3), the average term length was 10 percent shorter in the black schools (155.8 vs. 170.9), and average annual salaries were 45 percent lower for black teachers ($1,390 vs. $2,491 in 1967 dollars).

Second, there were notable gains in the relative quality of black schools during our sample period. The convergence in black-white school quality began well before the 1954 Brown v. Board of Education decision, and in fact there is little evidence of a break in the series around the time of the desegregation order.[19] The gap in pupil-teacher ratios between black and white schools, for example, fell in almost every year of our sample period. In 1915 the average pupil-teacher ratio in Southern black schools was 61, compared to 38 in white schools. By 1966, the pupil-teacher ratio was 26 for black students and 24 for white students. Similarly, the difference in school term lengths between black and white schools and the gap in real salaries between black and white teachers were virtually eliminated by the mid-1950s.

Third, as noted by Smith (1984), the rate of improvement in the relative quality of black schools varied from decade to decade. During the first 10 years of our sample period (1915-1925) black relative teacher salaries and pupil-teacher ratios showed substantial gains. Relative

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[19]There is a noticeable break in the relative teacher wage series for Mississippi in 1955. For other states, however, there is little indication of any trend shift after 1954.

conditions for black pupils showed comparatively little change in the late 1920s and early 1930s. After 1932, however, there was a marked acceleration in the rate of convergence of teacher salaries and the length of the school term.[20]

A. Inter-State Differences in Relative Black/White School Quality

The aggregated data in Table 6 mask wide differences across the Southern states in the relative quality of black schools, and in the timing of changes in the relative quality of black education. Interstate differences in relative school quality were especially pronounced in the first two decades of 20th century. For example, in the early 1920s pupil-teacher ratios in the black schools in Mississippi were twice as high as those in the white schools. In other states, including Kentucky, Missouri, West Virginia, and Washington, D.C., pupil-teacher ratios were comparable for white and black students. Similarly, black-white relative term lengths ranged from 0.55 in South Carolina to 1.0 in many border states. Perhaps most dramatically, the ratio of black to white teacher salaries ranged from one-third in Mississippi and South Carolina to 1 in West Virginia and Washington, D.C.[21]

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[20] It should be stressed that other dimensions of relative school quality may well have lagged behind the measures that we concentrate on. Bond (1934, pp. 151-171) notes that expenditures on schoolhouses, equipment, and school buses for white students rose very quickly in the early 1930s while similar expenditures for black students lagged.

[21] West Virginia and Washington, D.C. were unusual for the quality of schools provided to blacks early in the 20th century. The unique circumstances of the federal district (including the availability of federal funds) clearly affected the situation in D.C. See United States Commissioner of Education (1871, reprinted 1969) for a detailed survey of black schools in D.C. on the eve of the Civil War.

A key determinant of the relative quality of black schools in a state was the fraction of blacks in the population. During most of the past century, black schools had more meager resources (both in absolute terms and relative to white schools) in states with a higher fraction of blacks.[22] This relationship is illustrated in Figure 2, which graphs the relative pupil-teacher ratio in the white and black schools in each state in 1920 against the fraction of blacks in the 1920 Census. Over 70 percent of the interstate variation in the relative quality of black schools is accounted for by the relative size of the black population.

States also differed in the timing of improvements in the quality of black schools. As is true for the level of school quality for black students, the rate of increase in black school quality varied inversely with the proportion of the black population. In the border states, the NAACP's legal campaign against unequal salaries for black teachers led to rapid wage increases in the late 1930s and early 1940s.[23] Similar changes followed more than a decade later in the deep-Southern states, spurred by expanding legal pressure and the belief that more equal school expenditures might forestall a Supreme Court challenge to the segregated school systems.[24]

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[22]The same relationship was true across different counties within the Southern states: see Bond (1934, pp. 238-245) and Margo (1990, p. 40).

[23]The NAACP campaign was launched in 1934. In anticipation of a more favorable judicial reception in the border states, the first of these lawsuits were filed in Maryland and Virginia. See Bullock (1967) and Margo (1990, chapter 4).

[24]See, for example, the discussions by Griffith (pp.658-659) and Kirk (p. 1129) of legislative actions in Mississippi and South Carolina to improve black schools in the early 1950s.

Some indication of the differences in timing of relative improvements in black school quality is provided in Figure 3. This figure shows pupil-teacher ratios for the black and white schools in two groups of states: those with over 30 percent black population in the 1920 Census, and those with less.[25] Throughout most of the 1915-1966 period, the two groups of states had very similar pupil-teacher ratios in the white schools. In states with a higher concentration of blacks, however, pupil-teacher ratios for black students were uniformly higher. Only in the late 1950s did pupil-teacher ratios in the black schools of Alabama, Mississippi, and South Carolina reach levels achieved in the white schools in the 1920s.

A particularly revealing comparison is between South Carolina and North Carolina. Data on pupil-teacher ratios for these two states are plotted in Figure 4.[26] Despite their geographic proximity, the Carolinas had very different policies regarding black education. Whereas North Carolina was among the most progressive of the non-border Southern states vis-a-vis black schooling, South Carolina was among the least progressive.[27] At the beginning of our sample period the quality of black schools in South Carolina ranked near the bottom of the entire country. On the other hand, schools for whites were actually better in South Carolina

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[25]The states with over 30 percent black population in 1920 are: Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina.

[26]Data in these figures were extended back to 1901 using information from the North Carolina and South Carolina State Reports of Education.

[27]See for example Harlan (1958). This difference is perhaps partially a reflection of the higher fraction of blacks in South Carolina (58 percent in 1900 versus 33 percent in North Carolina), which itself is a legacy of the greater use of slave labor in cotton than tobacco farming (see Fogel and Engerman (1974), pp. 44-45).

than North Carolina for much of this century. This pattern provides a natural comparison that is explored below.

The schooling data presented so far pertain to individual school years. In our analysis of rates of return to schooling in the next section, however, we examine data for men born in 10-year birth cohorts. Consequently, we need to construct average quality measures for individuals born during a particular decade in a particular state. Our method is to assign to each individual an average of the quality variables during the time he attended school, assuming that each child began his schooling at age 6 and attended continuously for as many years as his completed education (up to 12). We then take averages of the quality variables across individuals in a given cohort from a given state. This procedure abstracts from such important considerations as repeated grades and delayed age of school entry. Nevertheless, averaging the school inputs in this way tends to smooth any short-term fluctuations in the school quality variables. In fact, the average assigned to a particular cohort is a weighted average of 20 years of school quality data.[28]

School quality measures for men born in the 1910s, 1920s, 1930s and 1940s are reported in Appendix Tables 2. As expected, the table shows considerable variation in the levels of the school quality variables across states, and in the rate at which the gap between black and white school

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[28]We use state-of-birth and cohort-specific distributions of completed education among workers in the 1970 Census to form these weighted averages. In much of the analysis in Section III we limit the sample to individuals who were born in the South and moved North. Here we use distributions of completed education among workers who are observed in the relevant labor markets in 1970. The state-level quality averages differ very little between the entire sample of Southern-born workers and the subsample of Northern migrants.

quality was reduced. This variation provides the basis for our analysis of school quality effects in the closing of the black-white wage gap.

III. School Quality and the Return to Education

How much of the improved economic position of black workers can be explained by advances in relative school quality? In light of the evidence in Section I relating the earnings gains of black workers to relative increases in the rate of return to education, we provide a first answer to this question by analyzing the connection between school quality and returns to education. We estimate rates of return to education by state of birth and cohort from a simple log-linear regression that includes interactions between state of birth and years of completed education. Specifically, we estimate the following wage equation separately by race, Census year, and 10-year birth cohort:

$$(4) \quad y_{ijs} = \rho_s E_{ijs} + X_{ijs}\beta + \alpha_j + \mu_s + \epsilon_{ijs},$$

where y_{ijs} is the logarithm of the weekly wage earned by individual i living in state j and born in state s, E_{ijs} represents years of education of individual i, ρ_s is the return to education for workers born in state s, X_{ijs} is a vector consisting of potential labor market experience and its square and a current marital status dummy, α_j is a state-of-residence effect, μ_s is a state-of-birth effect, and ϵ_{ijs} is stochastic error term.[29] The equation is estimated separately for the 1910-19, 1920-29 and 1930-39

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[29] In other work (Card and Krueger, 1990), we have noted that the return to education is virtually zero until the grade attained by the second percentile of the education distribution, and is linear thereafter. Equation 4 ignores this non-linearity. Nevertheless, the specification is approximately correct given the low levels of educational attainment among the cohorts of Southern-born men analyzed here.

cohorts using data from the 1960 Census, for the 1910-29, 1920-29, 1930-39, and 1940-49 cohorts using data from the 1970 Census, and for the 1920-29, 1930-39 and 1940-49 cohorts using data from the 1980 Census.[30] These samples yield a set of 360 estimated rates of return to education for 18 states of birth, 2 race groups, and 5 cohorts in 3 Censuses.

An important feature of our analysis is that the returns to education are estimated for the subset of Southern-born men living in the metropolitan areas of 9 Northern states (Illinois, Michigan, Indiana, Wisconsin, Ohio, Pennsylvania, New York, New Jersey, California). Together, residents of metropolitan areas in these states account for 30 percent of all Southern-born blacks and 83 percent of all Southern-born blacks living outside the South.[31] There are two important advantages to analyzing returns to education for Southern-born workers who have moved to the North. First, we abstract from any changes over time in discrimination against better-educated black workers in the South (although we still capture any similar changes that occurred in the North). Second, as noted in Table 5, returns to education vary across regions, and particularly between the South and the rest of the country. By limiting the sample to individuals in Northern metropolitan areas we eliminate most of this regional variation.[32]

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[30]The sample restrictions imposed on individuals with allocated data or extreme values of wages described in the Data Appendix are also employed here.

[31]These percentages are calculated for black men born 1910-1949, as of 1970. The sample sizes are presented in the Data Appendix.

[32]On the other hand, we are aware that an objection could be raised that migrants are a non-random sample. Any bias from this non-randomness must stem from a correlation between the propensity to migrate, unobserved school quality, and measured school quality in the state. Most research

In the second step of our analysis we relate the percentage return to education for each cohort-race-state-year cell to the quality of education received by men born in the corresponding cohort, state and race group. Specifically, we estimate:

$$(5) \quad \rho^{c}_{str} = bQ^{c}_{sr} + a^{c}_{r} + u_{s} + v_{tr}$$

where ρ^{c}_{str} is the estimated return to education (times 100) for individuals in race group r born in cohort c and state s, measured in year t (t=1960, 1970, 1980), and Q^{c}_{sr} is a measure of average school quality for this race/cohort/state group. We include race-specific cohort effects (a^{c}_{r}) as well as state effects (u_{s}) and race-specific year effects (v_{tr}).[33] Differences between the cohort effects for blacks and whites measure the black-white gap in the return to education. Similarly, the difference-in-differences of the black and white cohort effects between earlier and later cohorts measures the inter-cohort convergence in black-white returns. A comparison of this difference-in-differences with and without the school quality variables included in the regression thus indicates how much of the inter-cohort convergence in black-white relative returns can be explained by changes in school quality.

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suggests that Southern out-migrants were better educated than non-migrants (e.g., Margo, 1990). Thus, the most likely scenario would imply a downward bias in the estimated effect of school quality because, given a fixed school quality threshold for migration, the unobserved component of school quality for individuals in our sample will be negatively correlated with measured school quality in the state.

[33] Notice that some of the parameters in the model could be freed-up even further. For example, the state fixed effects could be allowed to differ by race. When we free-up these restrictions, however, none of the main conclusions of the paper is altered.

The specification of equation (5) assumes that a worker is educated in his state of birth. Although this is not always the case, we believe that it is not a bad approximation. To check this we used microdata from the 1940 Census to calculate the probability that 5-15 year-old children were living in their state of birth. The estimates show that over 90 percent of school-age children in 1940 were living in the state where they were born. We also used information from the National Survey of Black Americans to compare respondents' state of birth with the state where they grew up.[34] For blacks born between 1900 and 1949, 82 percent report they grew up in their state of birth.[35] On the basis of these results we conclude that education quality in an individual's state of birth is a reasonable indicator of true education quality.[36]

A. The Returns to Education By Race

Table 7 illustrates the wide variation across states in the rates of return to education for black and white men. The rates of return are pooled estimates for cohorts born in the South between 1910 and 1939 and

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[34]The survey asks respondents to identify the place they lived the most between age 6 and 16; we use this as a measure of where they grew up.

[35]Although the sample size is relatively small, we also computed the fraction of Southern-born blacks observed living in the North at the time of the survey who report that they grew up in their state of birth. This fraction is 68 percent for individuals born between 1900 and 1949.

[36]Assigning an individual the school quality in his state of birth leads to estimated state-specific returns that are weighted averages of the returns to education in the various states where an individual actually attended school, with weights equal to the probabilities of attending school in a state conditional on the state of birth. This then leads to a downward measurement-error bias in the estimated quality effects in the second-stage regression. Our analysis of returns to education for white men (Card and Krueger (1990)) suggests that the bias is on the order of 10 percent.

observed living in Northern metropolitan areas in 1970. The states are listed in order of the quality of black schools in the state, from worst to best, according to an index of school quality as of 1940.[37] With the exception of Delaware and D.C., the rates of return are estimated with reasonable precision. The racial gap in the return to education (in column (3)) ranges from 4.5 percentage points for men born in South Carolina and Georgia, to a negative (although statistically insignificant) gap for men born in Missouri and West Virginia. Reading down column (2), the pattern of increasing returns is consistent with the notion that better schools lead to higher returns: black men born in states like Delaware, West Virginia, and Missouri earned roughly 3 percent higher earnings per year of schooling than those born in states with lower quality schools, such as Mississippi, Georgia, and South Carolina.

The contrast between South Carolina and North Carolina is especially interesting because, as shown in Figure 4, the quality of black schools was higher in North Carolina than South Carolina in the 1915-1940 period, while the reverse was true for white schools. The estimated returns reflect these differences. Blacks from North Carolina earned much higher rates of return to schooling than those from South Carolina, while whites from South Carolina earned slightly higher return than those from North Carolina. It should be stressed that the rates of return are estimated for samples of men from the two states who were working in the same Northern labor markets.

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[37]The quality index is the product of coefficient estimates of the effects of pupil-teacher ratio, term length, and teacher wage on the return to education for white men reported in Card and Krueger (1990), and the corresponding measures of school quality for black schools in each state.

The relationship between relative school quality and the black-white gap in the return to education is illustrated in Figure 5, which graphs the differences in returns to education from column (3) of Table 7 against the average difference in the pupil-teacher ratio for men in the 1910-19, 1920-29 and 1930-39 cohorts.[38] Racial differences in school quality are highly correlated with the difference in returns to education: variation in the relative pupil-teacher ratio explains over 60 percent of interstate differences in the relative return to education for men in these cohorts.

Differences over time in the return to education for Southern-born blacks and whites living in Northern cities are illustrated in the following table, which is formed from weighted averages of the cohort-and-state-specific estimated rates of return from equation (4):

	Average Return to Education (standard errors)		
	Blacks	Whites	Difference
1960 Census	3.04 (0.20)	6.04 (0.15)	-3.00 (0.25)
1970 Census	3.91 (0.15)	6.58 (0.10)	-2.67 (0.18)
1980 Census	4.33 (0.12)	5.80 (0.08)	-1.47 (0.14)

The relative trends shown by these estimates are similar to the trends in returns for <u>all</u> Southern-born men (reported in Appendix Table 1), although the rates of return are uniformly lower for the Northern urban residents. The black-white difference in returns to education fell by 1.53 points

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[38] We formed an estimate of the average pupil-teacher ratio for men from each state and race group using a simple average of the data for each of the 3 cohorts reported in Appendix Tables 2-4.

between 1960 and 1980, from an initial gap of 3.0 percentage points in 1960 to 1.47 points in 1980.

B. Estimation Results

Table 8 reports regression estimates of equation (5), using the set of 360 estimated rates of return to education by cohort, race, state of birth, and Census year.[39] We begin by examining the effect of the pupil-teacher ratio because, unlike the two other school quality measures, this variable is available for all states in all years. The first three columns pool together the returns to education for blacks and whites, while columns 4-7 present separate estimates by race. Columns (8) and (9) contain results using only the estimated returns for black men in 1960.

The model in the first column excludes the pupil-teacher ratio and state effects. The coefficients on the interaction terms between the black dummy and the cohort effects (rows 6-9) indicate the racial gap in the return to education for each cohort of workers, controlling for race-specific year effects. Between the 1910-19 cohort and the 1930-39 cohort the black-white gap in the return to education closed by nearly 40 percent, from a 3.31 percentage point deficit per year of schooling for the 1910-19 cohort to a 2.02 percentage point deficit for the 1930-39 cohort. The estimated cohort effects indicate a slight widening in the gap in relative returns between the 1930-39 and 1940-49 cohorts, although this difference

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[39]The dependent variables in Tables 8 and 9 differ from the returns reported in Table 7 only in that they are estimated separately for each 10-year birth group in the 1960, 1970 and 1980 Censuses. The second-step regressions are estimated by weighted least squares, using the inverse sampling variances of the estimated returns to education as weights.

is not statistically significant.[40] Assuming 10 years of education, the .94 point decline in the racial gap in the return to education between the 1910-19 cohort and 1940-49 cohort implies a 9.4 percentage point reduction in the black-white earnings gap: about one-half of the decline in the earnings gap actually observed between these cohorts of Southern-born workers (see Appendix Table 1).

The coefficient of -7.45 (t=4.2) on the pupil-teacher ratio in column (2) indicates that a higher pupil-teacher ratio is associated with a lower return to education.[41] To interpret the magnitude of this coefficient, suppose that average class size declined by 10 pupils. This would lead to a 0.75 percentage point increase in the rate of return for each year of education, or a 9 percent increase in earnings for a high school graduate. Column (3) adds state effects to the model, and thus identifies the effect of the pupil-teacher ratio from changes in class-size that occurred within states over time. In this specification the impact of the pupil teacher ratio is smaller, but still sizeable and statistically significant (t=2.5).[42]

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[40]We suspect that this apparent widening arises from the fact that we impose the same year effects on the return to education for all age groups. Relative returns to education for older cohorts of blacks rose between 1970 and 1980, but not for the youngest (1940-49) cohort (see Appendix Table 1). The regression model thus under-predicts the rate of return for blacks in the 1940-49 cohort in 1980, and attributes part of the under-prediction to a permanent cohort effect.

[41]Although we believe that it is a safe to take the pupil-teacher ratio as exogenously determined for blacks in the South for these cohorts, we have experimented with using the fraction of blacks in the state's population as an instrument for the pupil-teacher ratio. The instrumental variables estimates are very close to the OLS estimates reported in Table 8.

[42]The F-statistic for a test of the joint significance of the state effects in column (3) is 2.29, with a probability value of 0.007.

The pupil-teacher ratio also has a negative effect on the return to education in the models in columns 4-7, which are estimated separately by race. The estimated coefficient is somewhat larger for whites than blacks when the state effects are excluded (compare columns (4) and (6)), whereas the opposite holds when state effects are included (columns (5) and (7)). In either case, the difference between the coefficients of the pupil-teacher ratio for blacks and whites is statistically insignificant. Thus, there is no evidence against the (more precise) pooled specifications in columns (2)-(3).

A comparison of the estimated cohort-race interactions in column (1) with those in column (2) shows that the addition of the pupil-teacher ratio to the model can explain much of the inter-cohort convergence in black-white returns to education. For example, when the pupil-teacher ratio is included in column (2), the unexplained change in the black/white return gap between the 1910-19 cohort and the 1930-39 cohort falls from 1.29 points (in column (1)) to 0.59 points. Similarly, the unexplained change between the 1910-19 and 1940-49 cohorts falls from 0.94 points to 0.09 points. In a model without state effects, changes in the relative pupil/teacher ratio therefore explain 54 percent of the convergence in the return to education between the 1910-19 cohort and the 1930-39 cohort, and over 90 percent of the convergence between the 1910-19 and 1940-49 cohorts.

These shares are only slightly lower in the presence of state effects. For example, a comparison of the race-cohort interactions in column (3) to those in a model that includes state effects but excludes the pupil-teacher ratio (not reported in the table) indicates that changes in the pupil-teacher ratio account for 44 percent of the convergence in black/white

returns between the 1910-19 cohort and the 1930-39 cohort, and 68 percent of the convergence between the 1910-19 cohort and the 1940-49 cohort.

While the estimates in Table 8 indicate important inter-cohort effects in the relative return to education, they also imply a sizeable role for the year effects, particularly between 1970 and 1980. For example, the estimated year effects in columns (4) and (6) suggest that rates of return to schooling for blacks were constant between 1960 and 1970, and fell only slightly for whites. However, rates of return in 1980 fell by 0.6 points for blacks and 1.7 points for whites. Thus, changes in the year effects contribute a 1.1 percentage point increase in the relative return to education for blacks between 1960 and 1980. This is about 70 percent of the overall 1.53 percentage point increase in relative rates of return observed in our data -- virtually all of it occurring between 1970 and 1980.

Closer examination of the returns for individual cohorts indicates that the secular increase in the relative return was concentrated among older workers. For whites born in the 1920s and 1930s, rates of return to education fell by almost 2 percentage points between 1970 and 1980. Yet blacks in the same cohorts experienced less than a point decline. In contrast there was little change in relative rates of return between 1970 and 1980 for men born in the 1940s.

One explanation for this pattern is that the relative value of "skill" in the labor market fell between 1970 and 1980.[43] If, as the school quality hypothesis suggests, older blacks have acquired less human capital

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[43] A higher price for skill after 1980 is hypothesized by Juhn, Murphy, and Pierce (1989) to explain the widening of the black-white wage gap over the last decade.

per year of schooling than whites or younger blacks, a general decline in the price of "skill" will lower the return to education more for whites and younger blacks than for older blacks. One way to verify this hypothesis is to allow for a different coefficient on the pupil-teacher ratio in 1980. If students who attended schools with lower pupil-teacher ratios have more human capital per year of schooling, and if the price of "skill" declined from 1970 to 1980, then the pupil-teacher ratio should have a smaller effect (in absolute magnitude) in 1980. Furthermore, allowing for a change in the effect of the pupil-teacher ratio in 1980 should reduce the magnitude of the 1980 year effect for black relative returns to education.

Both of these predictions are correct. When an interaction of the pupil-teacher ratio and the 1980 year effect is added to the model in column (3) of Table 8, the pupil-teacher coefficient for 1960 and 1970 rises to -7.11 (with a standard error of 2.51) while the estimated interaction term is 4.36 (with a standard error of 2.89). These estimates suggest a substantial reduction in the market value of higher quality education between 1970 and 1980. Allowing for this effect, the 1980 year effect for black relative returns to education is 0.71: 40 percent smaller than the year effect reported in Table 8.

These results are consistent with the hypotheses that the market value of higher quality education fell between 1970 and 1980. We believe that further investigation of this hypothesis is warranted -- perhaps using larger samples of workers from all states. In any case, it is clear that relative rates of return to education increased sharply for older black workers in the 1970s, and that this increase contributed substantially to

the reduction in the black-white gap in returns to education between 1970 and 1980.

C. The Effect of School Quality Before the Civil Rights Act

The results in columns (1)-(7) suggest that school quality, as measured by the pupil-teacher ratio, is associated with higher returns to education. Nevertheless, it is interesting to ask if higher quality education had any return for blacks prior to enactment of the Civil Rights Act in 1964. To examine this question, we fit equation (5) using the estimated returns to education for black men in 1960.[44] The results are summarized in columns (8) and (9) of Table 8.

Unfortunately, the resulting estimates of the effect of the pupil-teacher ratio are imprecise, presumably because of the small sample size. The point estimates indicate that even in 1960 a higher pupil-teacher ratio was associated with a lower return to education for black workers, with about the same size of effect as in the pooled sample. However, the t-ratio for the pupil-teacher ratio is only slightly greater than one in column (8), and is slightly less than one in column (9). In view of the imprecision of these estimates, it is difficult to draw any firm conclusions regarding a structural change in the value of higher quality schooling for blacks after passage of the Civil Rights Act.

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[44]The sample contains 18 states and 3 cohorts (1910-19, 1920-29, and 1930-39), for a total of 54 observations.

D. Additional Aspects of School Quality

Table 9 presents estimates of the effect of additional dimensions of school quality for the subset of states that have sufficient data to calculate the average term length and teacher wage by race.[45] Column (1) presents the same model as reported in the first column of Table 8, estimated on the subsample of state-year-cohort observations with complete school quality data. In the subsample, the black-white gap in the return to education is somewhat larger for the two oldest cohorts of workers. This arises from having to drop early observations on several states that historically maintained relatively high-quality black schools (e.g., Missouri and Kentucky).

The remaining models in the table add the three school quality variables, individually and jointly, and with and without state effects. As is the case for the full sample, the pupil-teacher ratio has a negative and statistically significant effect on the return to education, regardless of whether state effects are included or excluded. Similarly, term length and the log of the teacher wage each have a statistically significant, positive effect on the return to education when they are included individually (columns (3)-(4) and (8)-(9)). Indeed, the estimated coefficients suggest that these aspects of school quality have sizeable impacts on earnings. The coefficient of 1.95 on the term length variable in column (8), for example, implies that a 20 day increase in the school term increases a high school graduate's weekly wages by 4.7 percent. The coefficient of the log of the teacher wage in column (9) implies that a 20

[45] In this subsample the average black-white gap in the return to education closed by 1.61 percent between 1960 and 1980 (slightly more than in the overall sample).

percent increase in real teacher wages will lead to a 0.33 percentage point increase in the return to education, or about 4 percent higher earnings for a worker with 12 years of education.

Models that include all three quality measures are presented in columns (5) and (10). As one might expect, the schooling quality variables are highly collinear: the correlation between the pupil-teacher ratio and average term length is -0.91, while the correlation between the pupil-teacher ratio and the log of the average teacher wage is -0.77. As a result the regression model has difficulty parsing out the individual contributions of the three quality indicators. Only the teacher wage is statistically significant when the three variables are included in the same equation. Nevertheless, the quality measures are highly jointly significant, and when they are included together the state effects become statistically insignificant, suggesting that unobserved components of state-level school quality are <u>not</u> omitted from the equation.[46]

The inclusion of the school quality variables reduces the black-white gap in the return to education for each cohort, and also accounts for a sizeable share of the inter-cohort convergence in relative returns. Together, the three measures of school quality account for half of the convergence in relative returns that occurred between the 1910-19 and 1940-49 cohorts (compare rows 7 and 10 of columns (1) and (5). The addition of state effects to the model increases the explained fraction of the change in the black/white returns gap to nearly 80 percent.

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[46]Notice that the inclusion of the teacher wage variable by itself renders the state effects statistically insignificant.

We conclude that school quality, as measured by the relatively crude indicators available to us, can potentially explain 50 to 80 percent of the change in the black/white gap in the return to education between cohorts born in the 1910s and those born in the 1940s. These inter-cohort differences, in turn, explain about 30 percent of the total increase in the relative return to education for blacks between 1960 and 1980. The remainder is explained by year effects, which indicate a 1 percentage point increase in the relative return for black workers between 1970 and 1980. Preliminary evidence suggests that the increase in the relative return to education for black workers in the 1970s is partially due to a decline in the price of "skill", which is reflected in a smaller effect of the pupil-teacher ratio in 1980. In summary, school quality measures can account for 15-25 percent of the total increase in the relative return to education for black men between 1960 and 1980.

IV. School Quality and the Black-White Wage Gap: Reduced Form Estimates

We conclude our analysis by presenting some very simple "reduced form" evidence on the correlation between relative school quality and black-white earnings differences within states. Specifically, we consider estimates of the effect of relative school quality on the gap in earnings between blacks and whites born in the same cohort and in the same state. We also consider the effects of relative school quality on the relative schooling attainments of black and white students.

There are several reasons to estimate the reduced form relationship between relative school quality and relative wages. First, although the evidence in the previous section suggests that relative school quality is

an important determinant of relative rates of return to education, it is nevertheless possible that changes in the return to education simply alter the within-group distribution of income, with little or no effect on overall mean earnings. Depending on the substitutability of skill groups, higher quality schools may actually reduce the earnings of less educated workers. Thus, it is important to check that relative quality is directly correlated with relative earnings, and not simply with relative rates of return to education.

Second, increases in school quality potentially affect not only the rates of return to a given level of education, but also the educational attainments of consecutive cohorts of white and black workers. Although our analysis suggests that increases in relative years of schooling were not responsible for the closing of the black-white wage gap between 1960 and 1980, it is still true that education levels of later cohorts of black workers rose sharply. To the extent that these increases were driven by improvements in the quality of schools available to black students, they constitute an important benefit of improved school quality.

Finally, our analysis of returns to education in the previous section is limited to the subsample of Southern-born workers who moved to Northern urban areas. Although this sample restriction provides a convenient way to control for regional variation in the return to education, the estimates may not be representative of the effect of school quality on earnings for Southern-born workers who stayed in the South. Furthermore, the quality of schools may affect the probability of out-migration. Estimates of the reduced-form relation between earnings and school quality using all Southern-born workers capture both of these effects.

A simple summary of the relation between school quality and relative earnings is provided by fitting models of the form:

$$(6)\quad y^c_{bts} - y^c_{wts} = \beta\,(Q^c_{bs} - Q^c_{ws}) + \mu^c + \nu_t + \epsilon^c_{ts},$$

where y^c_{bts} is the mean of log weekly earnings of black workers born in cohort c in state s and measured in year t (t=1960, 1970, 1980), y^c_{wts} is the log of mean weekly wages of white workers from the same cohort and state, $Q^c_{bs} - Q^c_{ws}$ is the black-white gap in the quality of education for students in cohort c and state s, μ^c is a cohort effect, and ν_t is a year effect.[47] We have fit this equation to cohort-level data on relative earnings and relative school quality for observations on 18 states and 4 cohorts in 3 Census years. The earnings data are simple averages of log weekly wages for all Southern-born men, while the school quality data are weighted averages of the biennial state-level data, using the educational distribution of all workers born in each Southern state as weights.[48]

Before turning to the estimates it is worth considering the pattern of black-white relative earnings differentials across the Southern states. These differentials are displayed in Table 10.[49] In general, the wage gap is lower for states with higher relative quality black schools, such as Kentucky, Missouri, Tennessee and West Virginia. Nonetheless, black

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[47] Notice that this differenced specification is equivalent to a model for the level of average wages that includes 180 state-by-year-by-cohort dummies.

[48] None of the conclusions from this analysis is qualitatively altered if the underlying data are limited to the sample of men who moved to the 9 Northern labor markets considered earlier.

[49] The entries in Table 10 are formed as weighted averages of the cohort-year wage gaps for each state, using the inverse sampling variances of the cohort-year observations as weights.

relative earnings are surprisingly low for several states that maintained relatively good black schools, including Maryland, the District of Columbia, and Delaware. Thus, the correlation between relative school quality and the relative wage gap is negative (-0.32), but weaker than the correlation between school quality and the return to education. It is interesting to note that the wage gap is larger for South Carolina than North Carolina, consistent with the pattern of relative returns to education for these two states, and with the pattern of lower quality black schools in South Carolina. The bottom row of Table 10 indicates that the weighted average of the state-level wage gaps fell by 9.8 log points between 1960 and 1980. In spite of the different weighting scheme used to construct the time averages in Table 10, the decline in the average state-level gap is extremely close to the decline in the overall wage gap for all Southern-born men in these cohorts.

Estimates of equation (6) are presented in Table 11. The models in columns (1)-(7) are fitted to measures of relative earnings while in columns (8) and (9) the dependent variable is the difference in mean education for black and white men born in the same state and cohort. These models are included to assess the effect that higher quality black schools may have had in increasing the relative educational attainment of black students during our sample period.

The benchmark model in column (1) includes only cohort and year effects. The estimated cohort effects in rows 5-8 indicate the black-white earnings gap for each 10-year birth cohort, relative to the black-white wage gap for the 1910-19 cohort. For example, the coefficient of .066 in row (6) indicates that the black relative wages were 6.6 percentage points

higher for the 1930-39 cohort than for the 1910-19 cohort. Between the 1910-19 and 1940-49 cohort, the black-white earnings gap for all Southern-born men closed by 13.7 percentage points. Notice also that the year effect for 1980 is positive and significant, implying that black-white relative wages closed by some 3.7 percentage points between 1960 and 1980, holding constant cohort effects. Thus, slightly more than one-third of the overall 9.8 percentage point decline in the black-white wage gap between 1960 and 1980 is attributed to year effects, while the remainder is attributed to cohort effects.

In column (2) we add the relative pupil-teacher ratio to the model. This variable has a negative and statistically significant (t=2.8) coefficient, implying that the black-white wage gap is greater for states and cohorts with a larger gap between the quality of black and white schools. The addition of the relative school quality measure reduces the estimated cohort effects in column (2) relative to those in column (1). Forty percent of the decline in the black-white wage gap between the 1910-19 and 1930-39 cohorts is explained by the convergence in relative pupil-teacher ratios. By comparison, less than 10 percent of the decline in the wage gap between the 1930-39 and 1940-49 cohorts can be attributed to changes in relative school quality. Comparing the 1910-19 and 1940-49 cohorts, changes in the relative pupil-teacher ratio account for 25 percent of the closing of the black-white wage gap.

Columns (3) and (4) estimate the same models for the subset of observations that have complete information on the other school quality measures. Column (5) replaces the pupil-teacher gap with the gap in average school term lengths, while column (6) uses the difference in the

log of mean teacher wages. The quality variables are statistically insignificant in the smaller sample of data, although they all have their expected signs.[50] Interestingly, when the school quality variables are included individually the pupil-teacher ratio tends to account for the greatest share of the decline in the black-white wage gap for different cohorts. For example, comparing the 1910-19 and 1940-49 cohorts, the black-white earnings gap is reduced by 18 percent when the pupil-teacher ratio gap is included, by 12 percent when the term length gap is included, and by 11 percent when the gap in log teacher pay is included. Column (6) includes all three school quality measures in the regression model. Although the variables are statistically insignificant, both individually and jointly, their inclusion reduces the cohort effects by about the same amount as the inclusion of the pupil-teacher ratio variable in Column (4).

Finally, in columns (8) and (9) we regress the gap in years of completed education between blacks and whites on the gap in pupil-teacher ratios. The cohort effects in rows 5-8 of column (8) show a sizeable 1.3 year increase in relative years of education for blacks between the 1910-19 cohort and the 1940-49 cohort. None of the cohort effects in column (9), on the other hand, is different form zero. Thus, virtually all of the increase in relative schooling of blacks is explainable by increases in relative school quality.[51] These results suggest that improvements in

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[50]The absence of teacher wage data forces us to drop all the observations from Kentucky, Missouri, and Tennessee in columns (3)-(7). The deletion of these states significantly curtails the range of variation in the relative school quality variables.

[51]It is interesting to note that simultaneity effects might have been expected to create a positive bias in the estimated effect of the pupil/teacher variable. Holding constant the number of teachers, an increase in enrollment leads to an increase in the pupil/teacher ratio.

school quality were an important stimulus to increased school attendance and completion among black students. Given the lower returns to education earned by black than white men, however, these increases in relative schooling had relatively small net effects on the convergence in relative earnings of black and white workers.

In summary, the reduced form evidence suggests that changes in relative school quality (as measured by the pupil-teacher ratio) can explain about one-quarter of inter-cohort changes in the black-white relative wage gap between men born in the 1910s and those born in the 1940s. Since inter-cohort changes account for two-thirds of the increase in the overall relative wage gap between 1960 and 1980, the reduced form estimates imply that measured school quality can account for 15-20 percent of the convergence in black white earnings in the two decades after 1960. This is similar to the share of the overall increase in the relative return to education attributable to school quality.

V. Summary and Conclusions

This paper presents direct evidence on the role of school quality in explaining the growth of black-white relative earnings between 1960 and 1980. The key to the analysis is a comprehensive set of data on the quality of public schools available to black and white students in the 18 segregated Southern states from 1915 to 1966. Interstate differences in the relative quality of schooling for particular cohorts of workers, and in the rate of convergence of black-white school quality during the past 70 years, provide a valuable tool for gauging the impact of school quality on the black-white earnings gap.

Previous research has indicated that changes in the rate of return to schooling can account for virtually all of the increase in relative black-white earnings between 1960 and 1980. We reach the same conclusion from an analysis of relative earnings of Southern-born workers in the 1960, 1970, and 1980 Census. In view of this fact, most of our empirical analysis concentrates on measuring the relation between school quality and the rate of return to schooling for cohorts of black and white workers born in the South between 1910 and 1949. To control for regional differences in the relative value of education, and possible changes in the labor market opportunities for better-educated black workers in the South during the 1960s and 1970s, we estimate rates of return to schooling for Southern-born blacks and whites who worked in a common set of Northern labor markets in 1960, 1970, and 1980. Rates of return to education are estimated for workers from each of the segregated states by race and cohort of birth. We then relate the estimated rates of return to three measures of school quality during the time that individuals in the state-cohort-race group attended school.

We find a strong relationship between school quality and the economic return to additional years of education. Changes in school quality can explain from 50 to 80 percent of the relative increase in the return to schooling for black workers born in 1940-49 over those born in 1910-19. These inter-cohort changes, in turn, account for some 30 percent of the overall increase in the relative return to schooling for Southern-born blacks between 1960 and 1980. Thus, measures of school quality explain 15-25 percent of the convergence in relative rates of return to schooling for black workers between 1960 and 1980.

The remainder of the convergence in black-white relative returns to education is attributed to an economy-wide increase in the relative value of black education between 1970 and 1980. While returns to education for white workers fell sharply during the 1970's, returns for older cohorts of black workers, in particular, were relatively stable. One explanation for this pattern is that the market price of acquired human capital (including higher quality education) fell between 1970 and 1980. We find some initial support for this hypothesis. In addition, increased demand for skilled black workers, stimulated by government legislation and judicial pressure, may have contributed to the relative rise in the return to education for black workers in the 1970s.[52] More evidence on the nature of these changes, and on the determinants of earnings for older cohorts of black workers, should be a priority for future research.

We also present some simple "reduced form" evidence on the linkage between relative school quality and relative earnings. Here, we relate the relative earnings gap between black and white workers from the same cohort and state of birth to the difference in school quality between black and white schools in the state during the time the cohort attended school. Again, we find a systematic relation between relative school quality and relative success in the labor market. Measures of school quality can explain roughly 25 percent of the convergence in black-white relative earnings between cohorts born in 1910-19 and those born in 1940-49, and 15-20 percent of the overall growth in black-white relative earnings between 1960 and 1980.

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[52]See Heckman and Payner (1989) for a study of changes in the racial composition of employment in the South Carolina textile industry.

In our view, the evidence suggests that changes in school quality were responsible for some, but by no means all, of the narrowing of the black-white earnings gap after 1960. Given the limited nature of the school quality information currently available, and measurement errors induced by interstate mobility of children, our estimates may well understate the role of school quality. Data on other dimensions of school quality, such as teacher education or experience, could possibly increase the explanatory power of measured school quality. Nevertheless, our analysis indicates that a significant share of the relative earnings gains made by black workers between 1970 and 1980 arose through increases in the relative earnings of continuing cohorts of older black workers. If the quality of education is a permanent attribute of individuals (as we have assumed), these changes cannot be explained by school quality effects.

Data Appendix
Description of Census Data

Results in Tables 1-5 and 7-11 and Appendix Table A1 all use data from the 1960, 1970 and 1980 Censuses. The 1980 Census sample is taken from the Public-Use A Sample, which is a self-weighting sample of 5% of the U.S. population. The 1970 Census sample is taken from two 1% Public-Use samples: the 1% State Sample (5% Form) and the 1% State Sample (15% Form). Thus, in 1970 we have a self-weighting 2% sample of the population. The 1960 Census sample is taken from the 1% Public-Use Sample, and is a self-weighting sample of 1% of the U.S. population.

To the extent possible, we constructed the extracts from each Census in a similar fashion. Year of birth is derived from information on current age and quarter of birth. The extracts only include men born in the 48 Continental states whose race is identified as "white" or "black", and who worked at least one week in the previous year. In 1970 and 1980, individuals with imputed information on age, race, sex, education, weeks worked, or annual earnings are excluded from the sample. The imputation flags available in the 1960 Census are limited; our extract of the 1960 Census excludes individuals with imputed age. In each Census extract, the weekly wage is calculated as the ratio of annual earnings to weeks worked in the preceding year. We exclude individuals whose real weekly wage (in 1979 dollars) is less than $35 or greater than $2,501. The 1960 and 1970 Censuses report weeks of work and annual earnings in several intervals. We converted the interval estimates of weeks worked to continuous amounts by assigning the mean of each interval, which we estimated from the 1980 Census. Interval estimates of annual earnings were converted to continuous dollars by taking the midpoint of each interval.

The samples used in Table 1,2,3, and 5 use men born in all 48 states. The samples used in Tables 4, are based on men born in the Southern region (using the Census Bureau's definition of the Southern region.) The data underlying the estimates in Tables 7-9 consist of men morn in the 18 segregated states who resided in a metropolitan area of one of nine states (Illinois, Michigan, Indiana, Wisconsin, Ohio, Pennsylvania, New York, New Jersey, California) when the Census took place. The data in Tables 10 and 11 are based on men born in the 18 segregated states, regardless of their residence. Table 7 is estimated from a sample of 9,677 blacks and 18,778 whites. The sample sizes for the first-step estimates used in Tables 8-9 and Tables 10-11 are below.

Sample Size Tables 8-9			Sample Size Tables 10-11		
Year	Blacks	Whites	Year	Blacks	Whites
1960	5,826	9,884	1960	19,731	75,561
1970	12,793	25,600	1970	42,683	193,182
1980	21,467	41,120	1980	67,432	329,695

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Appendix Table 1
Decomposition of Average Wages: Southern-Born Men
(estimated standard errors in parentheses)

	1960		1970		1980		Black - White		
	Whites	Blacks	Whites	Blacks	Whites	Blacks	1960	1970	1980
1900-1909									
Number	14055	4331							
Mn Log Wage	4.461	4.057					-0.404		
Std dev	0.603	0.586					(0.010)		
Mean Ed	8.808	6.106					-2.702		
Beta-Ed	0.057	0.020					-0.037		
Std(beta)	(0.002)	(0.004)					(0.004)		
Weight	0.170	0.182							
1910-1919									
Number	20136	6171	32811	8288					
Mn Log Wage	4.534	4.119	4.972	4.568			-0.414	-0.404	
Std dev	0.567	0.561	0.604	0.578			(0.008)	(0.007)	
Mean Ed	9.608	7.069	9.910	7.342			-2.540	-2.568	
Beta-Ed	0.060	0.032	0.057	0.032			-0.028	-0.025	
Std(beta)	(0.002)	(0.003)	(0.001)	(0.003)			(0.003)	(0.003)	
Weight	0.243	0.260	0.186	0.198					
1920-1929									
Number	24813	7025	43456	10376	78749	16460			
Mn Log Wage	4.539	4.125	5.079	4.672	5.832	5.507	-0.414	-0.407	-0.326
Std dev	0.511	0.533	0.565	0.554	0.595	0.601	(0.007)	(0.006)	(0.005)
Mean Ed	10.397	8.356	10.787	8.773	11.233	9.432	-2.041	-2.013	-1.800
Beta-Ed	0.068	0.046	0.065	0.040	0.051	0.034	-0.022	-0.025	-0.017
Std(beta)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
Weight	0.300	0.296	0.247	0.248	0.173	0.164			
1930-1939									
Number	23705	6210	44811	10822	92427	20823			
Mn Log Wage	4.208	3.888	5.045	4.693	5.874	5.580	-0.320	-0.352	-0.295
Std dev	0.548	0.544	0.510	0.532	0.557	0.577	(0.008)	(0.006)	(0.004)
Mean Ed	11.027	9.453	11.553	10.155	12.117	10.948	-1.574	-1.398	-1.169
Beta-Ed	0.087	0.063	0.075	0.062	0.064	0.054	-0.025	-0.014	-0.011
Std(beta)	(0.002)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)
Weight	0.287	0.262	0.255	0.258	0.203	0.207			
1940-1949									
Number			54879	12400	130661	28728			
Mn Log Wage			4.692	4.492	5.792	5.544		-0.200	-0.248
Std dev			0.563	0.567	0.530	0.558		(0.006)	(0.004)
Mean Ed			12.107	11.074	13.033	12.119		-1.033	-0.914
Beta-Ed			0.092	0.084	0.078	0.074		-0.008	-0.005
Std(beta)			(0.001)	(0.003)	(0.001)	(0.002)		(0.003)	(0.002)
Weight			0.312	0.296	0.287	0.286			

Decomposition of Average Wages Southern-Born Only

Continued

	1960		1970		1980		Black - White		
	Whites	Blacks	Whites	Blacks	Whites	Blacks	1960	1970	1980
1950-1959									
Number					153048	34561			
Mn Log Wage					5.380	5.188			-0.193
Std dev					0.555	0.571			(0.003)
Mean Ed					12.781	12.217			-0.563
Beta-Ed					0.067	0.084			0.017
Std(beta)					(0.001)	(0.002)			(0.002)
Weight					0.336	0.344			
All									
Mean Log Wage	4.430	4.048	4.930	4.604	5.677	5.423	-0.380	-0.326	-0.253
	(0.002)	(0.004)	(0.001)	(0.003)	(0.001)	(0.002)	(0.004)	(0.003)	(0.002)

Notes: "Number" refers to number of workers in cohort. "Mn Log Wage" refers to the mean of log average weekly earnings in the cohort. "Std dev" refers to the standard deviation of log weekly earnings in the cohort. Beta-Ed refers to the estimated return to education in a regression that controls for potential experience and its square, marital status, region of residence, and residence in an SMSA. Std(beta) refers to the estimated standard error of the return to education. Entries in the columns labelled "Black - White" refer to differences between means for blacks and whites in the same cohort. "Weight" refers to the ratio of the number of workers in the cohort to the total number of male workers age 21-60 in the relevant Census.

Appendix Table 2

State	Black Schools			White Schools			White-to-Black Ratio		
	Teacher Salary	Pupils/ Teachers	Term Length	Teacher Salary	Pupils/ Teachers	Term Length	Teacher Salary	Pupils/ Teachers	Term Length
				1910-19 Birth Cohort					
Alabama	617	55.5	117.8	1482	35.4	146.9	2.40	0.64	1.25
Arkansas	721	50.4	124.1	1278	37.8	143.8	1.77	0.75	1.16
Delaware	NA	33.2	NA	NA	29.3	NA	NA	0.88	NA
Florida	NA	45.4	NA	NA	30.4	NA	NA	0.67	NA
Georgia	597	52.9	132.0	1520	35.8	147.4	2.55	0.68	1.12
Kentucky	NA	40.1	NA	NA	39.2	NA	NA	0.98	NA
Louisiana	848	56.8	109.8	2046	31.1	170.6	2.41	0.55	1.55
Maryland	1687	37.8	171.5	2636	32.0	186.5	1.56	0.85	1.09
Mississippi	NA	55.8	NA	NA	29.7	NA	NA	0.53	NA
Missouri	NA	29.3	NA	NA	29.4	NA	NA	1.00	NA
North Carolina	837	47.8	135.4	1575	34.4	148.2	1.88	0.72	1.09
Oklahoma	NA	36.2	NA	NA	35.9	NA	NA	0.99	NA
South Carolina	509	60.1	98.0	1740	30.8	160.1	3.42	0.51	1.63
Tennessee	NA	45.9	NA	NA	37.8	NA	NA	0.82	NA
Texas	NA	45.3	NA	NA	31.2	NA	NA	0.69	NA
Virginia	896	43.0	145.7	1590	31.7	165.0	1.77	0.74	1.13
West Virginia	1759	27.7	NA	1778	27.6	NA	1.01	1.00	NA
D.C.	NA	31.1	NA	NA	29.9	NA	NA	0.96	NA
				1920-29 Birth Cohort					
Alabama	869	45.3	136.8	1915	32.8	155.9	2.20	0.72	1.14
Arkansas	826	44.7	132.3	1467	34.5	156.0	1.78	0.77	1.18
Delaware	3165	31.0	182.5	3579	27.1	183.0	1.13	0.87	1.00
Florida	1201	35.9	159.0	2529	29.0	169.5	2.11	0.81	1.07
Georgia	747	43.9	139.6	1934	31.7	159.9	2.59	0.72	1.15
Kentucky	NA	32.5	NA	NA	34.5	NA	NA	1.06	NA
Louisiana	1056	47.5	131.9	2510	29.5	176.3	2.38	0.62	1.34
Maryland	2975	35.4	181.0	3709	32.2	187.6	1.25	0.91	1.04
Mississippi	630	48.5	116.2	1729	31.3	157.3	2.74	0.65	1.35
Missouri	NA	32.0	NA	NA	27.5	NA	NA	0.86	NA
North Carolina	1367	40.9	156.0	2112	34.8	162.0	1.54	0.85	1.04
Oklahoma	2032	30.6	168.9	2324	32.5	172.5	1.14	1.06	1.02
South Carolina	749	45.3	127.3	2105	29.0	173.1	2.81	0.64	1.36
Tennessee	NA	38.8	160.5	NA	31.6	165.2	NA	0.81	1.03
Texas	1553	37.8	150.5	2414	28.5	167.4	1.55	0.75	1.11
Virginia	1297	38.7	166.0	2257	31.9	172.6	1.74	0.82	1.04
West Virginia	2550	27.7	173.2	2539	27.2	172.1	1.00	0.98	0.99
D.C.	5284	33.8	177.7	5263	30.0	177.5	1.00	0.89	1.00

Appendix Table 2 (Continued)

State	Black Schools			White Schools			White-to-Black Ratio		
	Teacher Salary	Pupils/ Teachers	Term Length	Teacher Salary	Pupils/ Teachers	Term Length	Teacher Salary	Pupils/ Teachers	Term Length
				1930-39 Birth Cohort					
Alabama	1880	36.3	165.6	2710	29.8	169.6	1.44	0.82	1.02
Arkansas	1452	38.4	155.4	2156	30.6	168.3	1.48	0.80	1.08
Delaware	3927	27.5	181.8	4214	23.9	181.5	1.07	0.87	1.00
Florida	2582	29.0	173.7	3622	25.6	176.0	1.40	0.88	1.01
Georgia	1594	35.2	169.0	2604	27.9	175.5	1.63	0.79	1.04
Kentucky	NA	26.8	172.9	NA	29.9	164.6	NA	1.12	0.95
Louisiana	2184	37.2	162.8	3594	26.6	178.8	1.65	0.72	1.10
Maryland	4160	32.8	185.1	4501	29.8	184.7	1.08	0.91	1.00
Mississippi	852	41.8	136.7	2244	29.3	168.1	2.63	0.70	1.23
Missouri	NA	31.7	189.4	NA	26.8	179.8	NA	0.85	0.95
North Carolina	2886	34.7	175.7	3085	30.7	176.0	1.07	0.88	1.00
Oklahoma	3225	24.6	175.9	3220	27.0	176.2	1.00	1.10	1.00
South Carolina	1628	34.1	162.3	2718	27.1	177.7	1.67	0.79	1.09
Tennessee	NA	33.8	172.1	NA	29.1	169.8	NA	0.86	0.99
Texas	2776	30.0	168.8	3419	26.7	174.3	1.23	0.89	1.03
Virginia	2505	32.9	179.2	2934	28.2	179.6	1.17	0.86	1.00
West Virginia	3198	26.3	174.3	3223	27.3	173.7	1.01	1.04	1.00
D.C.	5304	31.2	176.0	5367	26.6	176.0	1.01	0.85	1.00
				1940-49 Birth Cohort					
Alabama	3809	31.4	175.8	3959	28.7	175.7	1.04	0.91	1.00
Arkansas	2929	34.5	172.6	3262	28.1	173.4	1.11	0.81	1.00
Delaware	5705	24.0	181.1	5782	21.8	180.0	1.01	0.91	0.99
Florida	5038	27.8	180.0	5298	27.6	180.0	1.05	0.99	1.00
Georgia	3720	31.7	179.4	4012	28.0	179.7	1.08	0.88	1.00
Kentucky	NA	26.0	174.1	NA	27.5	172.2	NA	1.06	0.99
Louisiana	4524	32.2	178.3	5027	26.0	179.4	1.11	0.81	1.01
Maryland	5779	27.4	181.8	5828	26.3	181.6	1.01	0.96	1.00
Mississippi	2261	38.4	163.9	3286	27.2	170.1	1.45	0.71	1.04
Missouri	NA	28.3	185.7	NA	26.4	181.7	NA	0.93	0.98
North Carolina	4427	31.3	180.0	4377	28.7	180.0	0.99	0.92	1.00
Oklahoma	4729	24.7	175.2	4655	25.7	176.3	0.98	1.04	1.01
South Carolina	3380	32.6	178.3	3784	27.5	179.9	1.12	0.84	1.01
Tennessee	NA	30.4	176.6	NA	28.1	175.8	NA	0.92	1.00
Texas	4774	26.6	174.5	5010	25.8	174.6	1.05	0.97	1.00
Virginia	4160	28.8	180.1	4192	26.1	180.1	1.01	0.91	1.00
West Virginia	4113	25.9	174.0	4133	26.9	173.9	1.00	1.04	1.00
D.C.	6572	28.3	177.8	6720	27.1	178.5	1.02	0.96	1.00

Notes: Entries are weighted averages of school quality variables for men born in each state. Weights are based on the distributions of educational attainment from samples of working men in the 1970 Census. NA means not available.

Figure 1

Relative School Quality in 18 Segregated States, 1915–1966

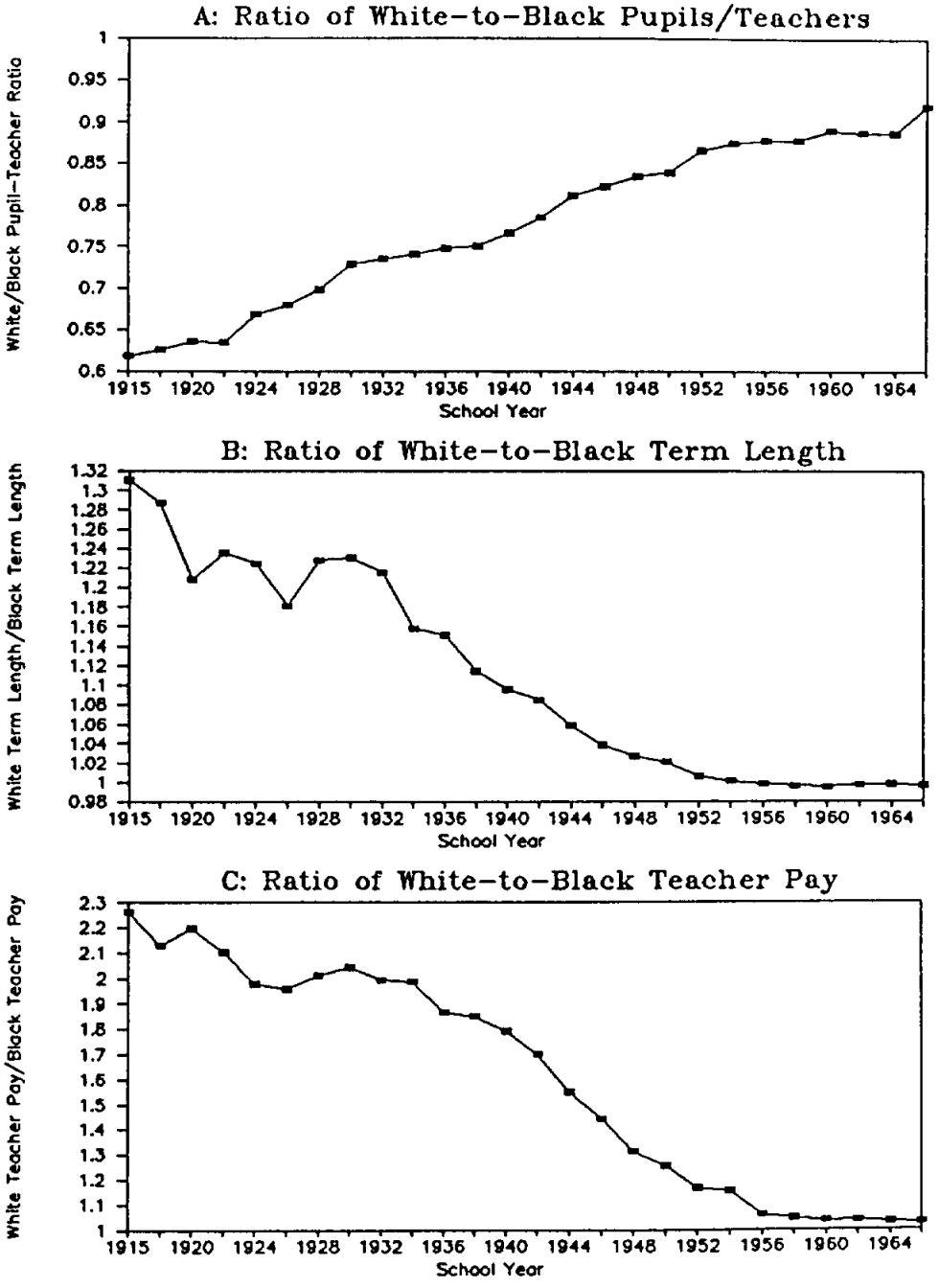
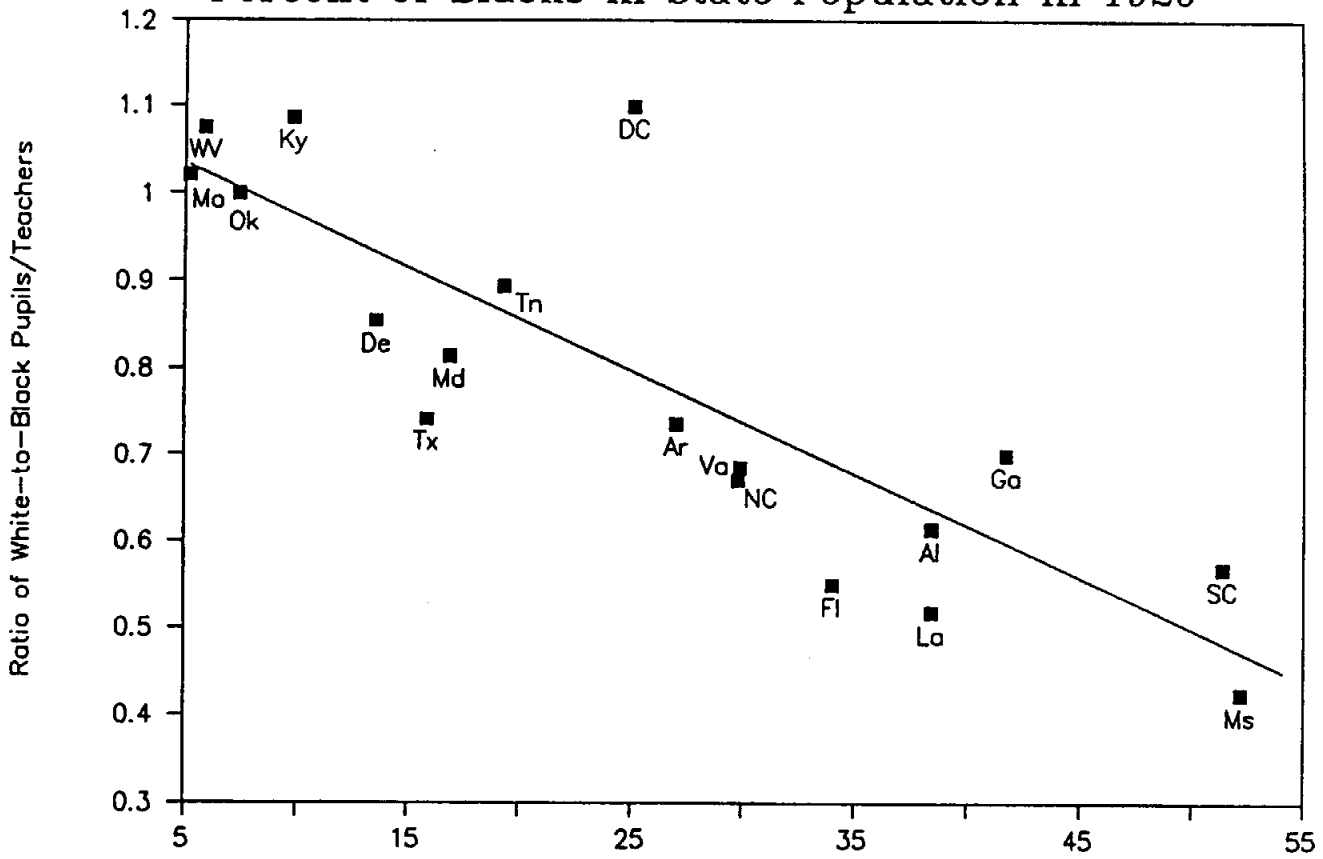


Figure 2

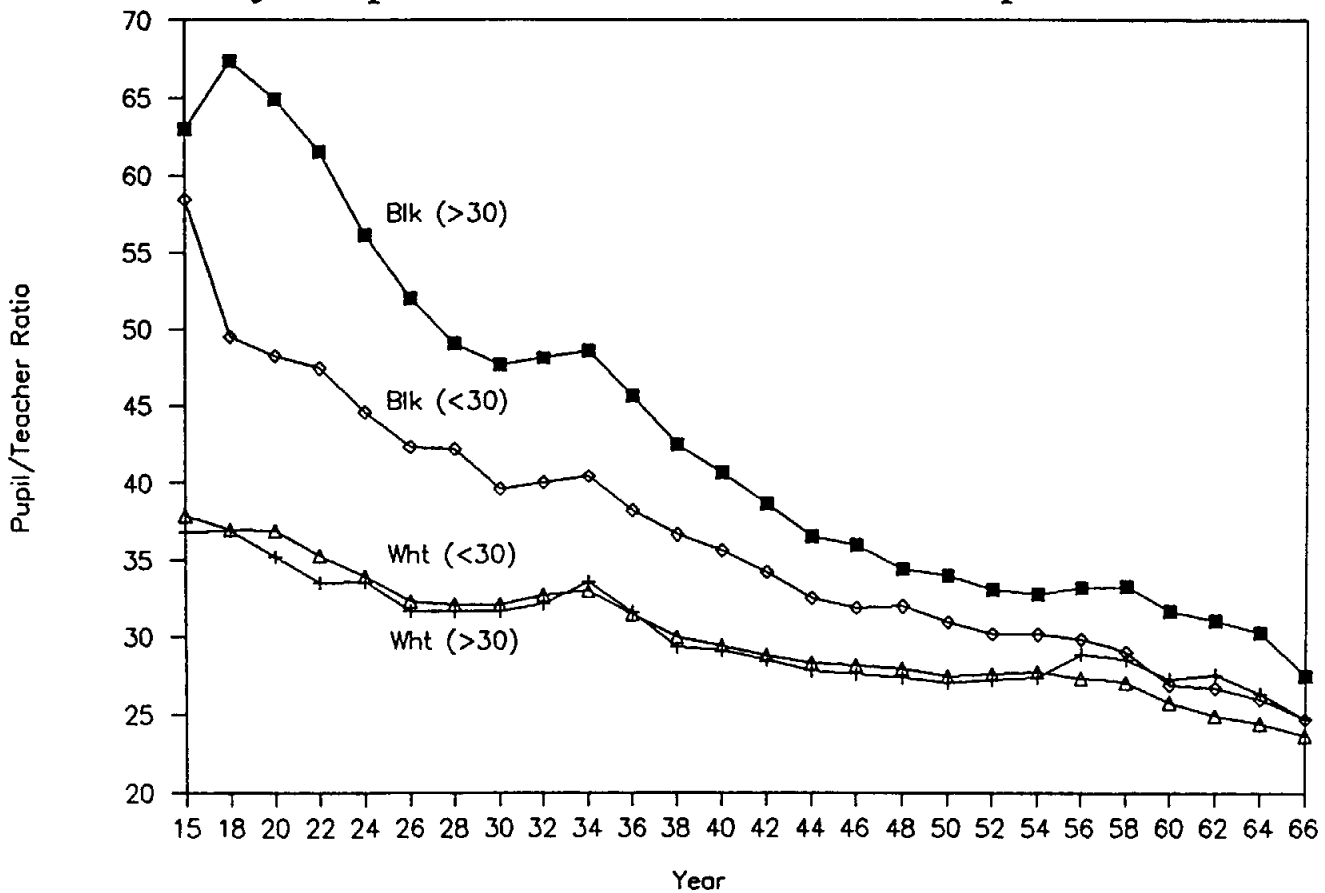
White/Black Pupil-Teacher Ratio vs.
Percent of Blacks in State Population in 1920



Note: The fitted OLS line is shown on the plot.

Figure 3

Pupil/Teacher Ratio in Black and White Schools By Proportion of Blacks in State Population



Note: The figures in parentheses indicate whether the propotion of blacks in state in 1920 is more than 30 percent or less than 30 percent.

Figure 4

Pupil–Teacher Ratio by Race
North Carolina vs. South Carolina

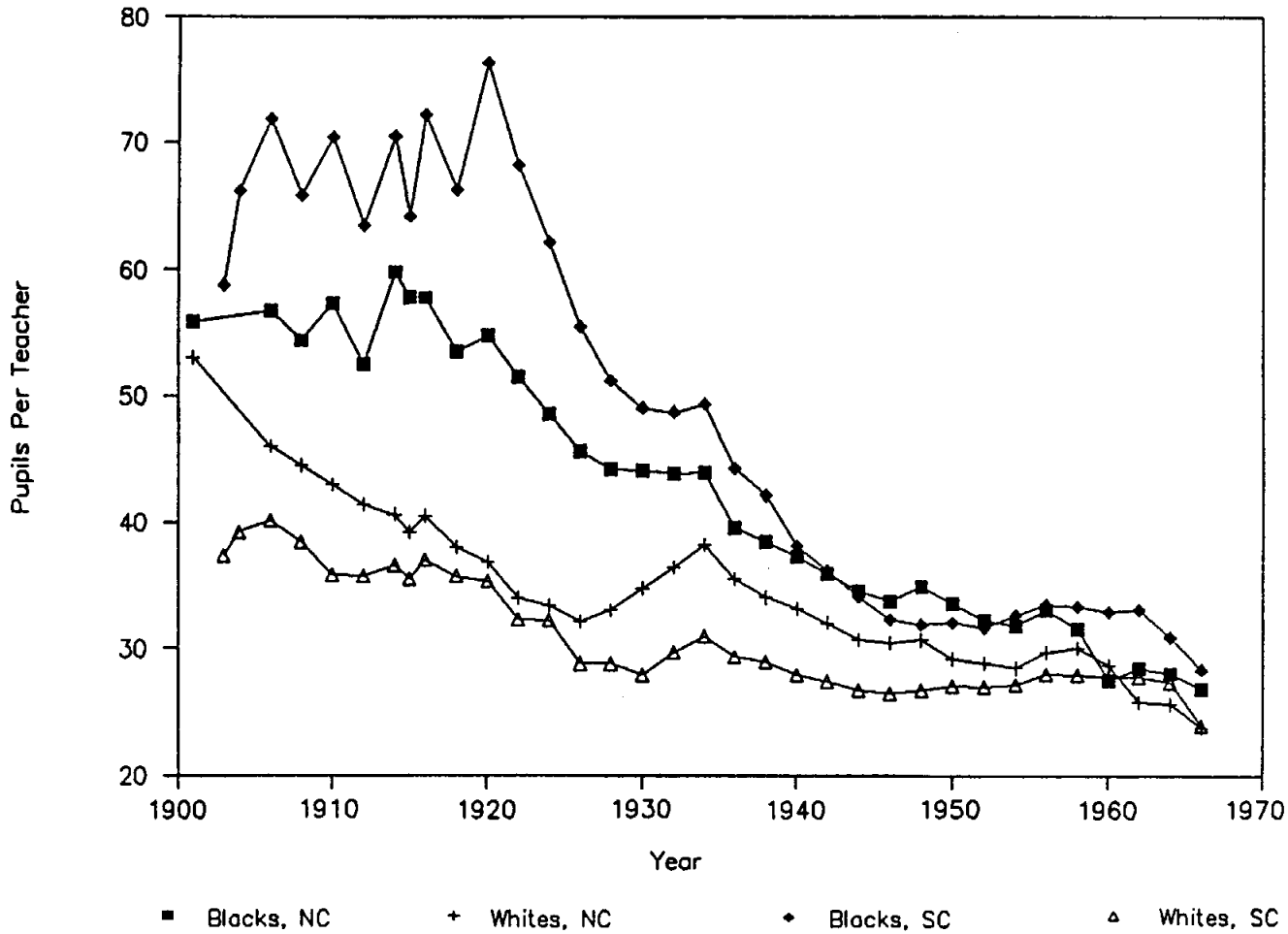


Figure 5

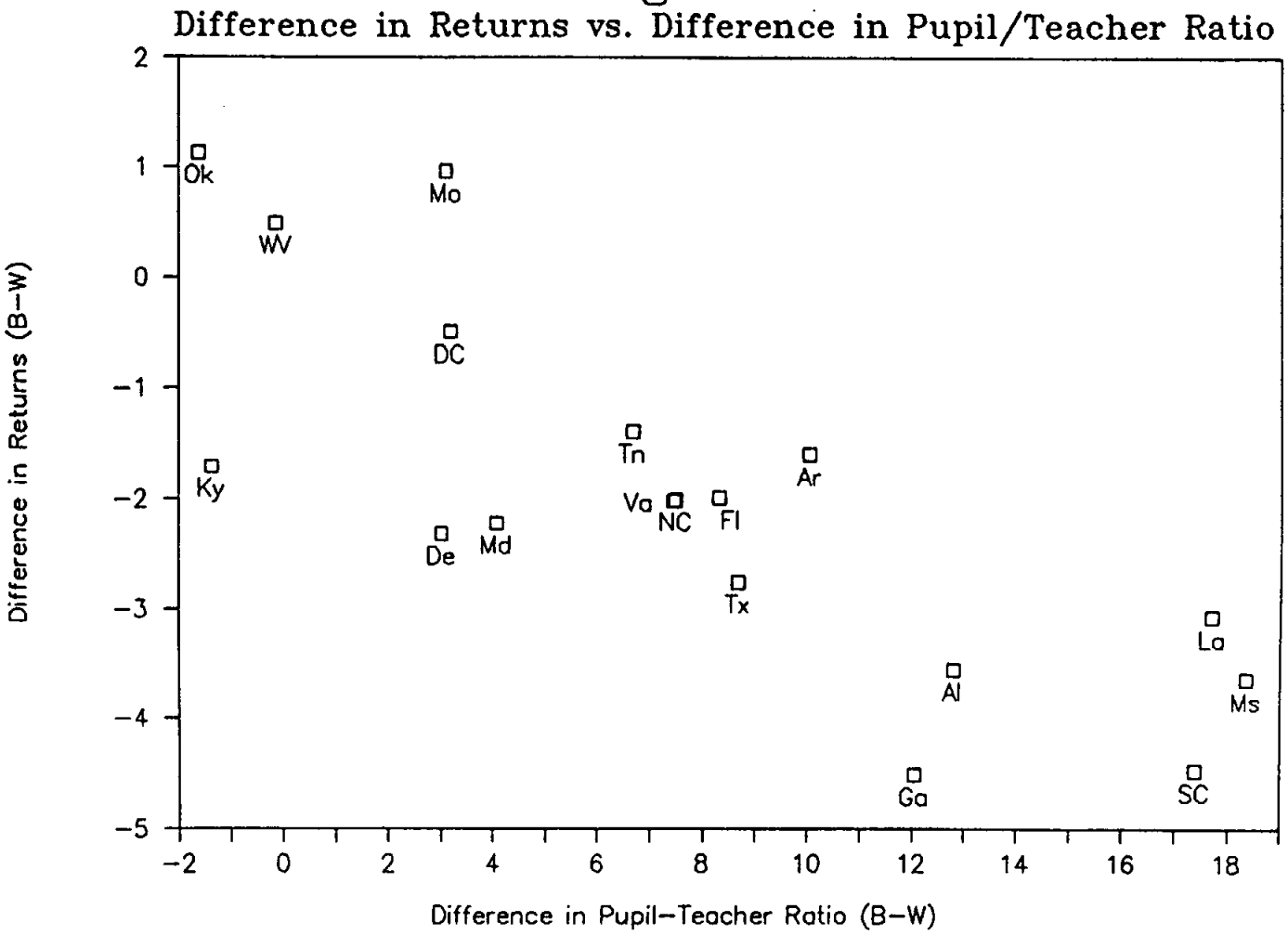

Difference in Returns vs. Difference in Pupil/Teacher Ratio
Difference in Returns (B–W)
Difference in Pupil–Teacher Ratio (B–W)
2
1
0
−1
−2
−3
−4
−5
−2
0
2
4
6
8
10
12
14
16
18
Ok
WV
Mo
DC
Ky
De
Md
Tn
Va
NC
Fl
Tx
Ar
Al
Ga
La
Ms
SC

Figure 6
Mean Log Wages by State vs. Pupil/Teacher Ratio
Data for Cohorts born 1910–19, 1930–39

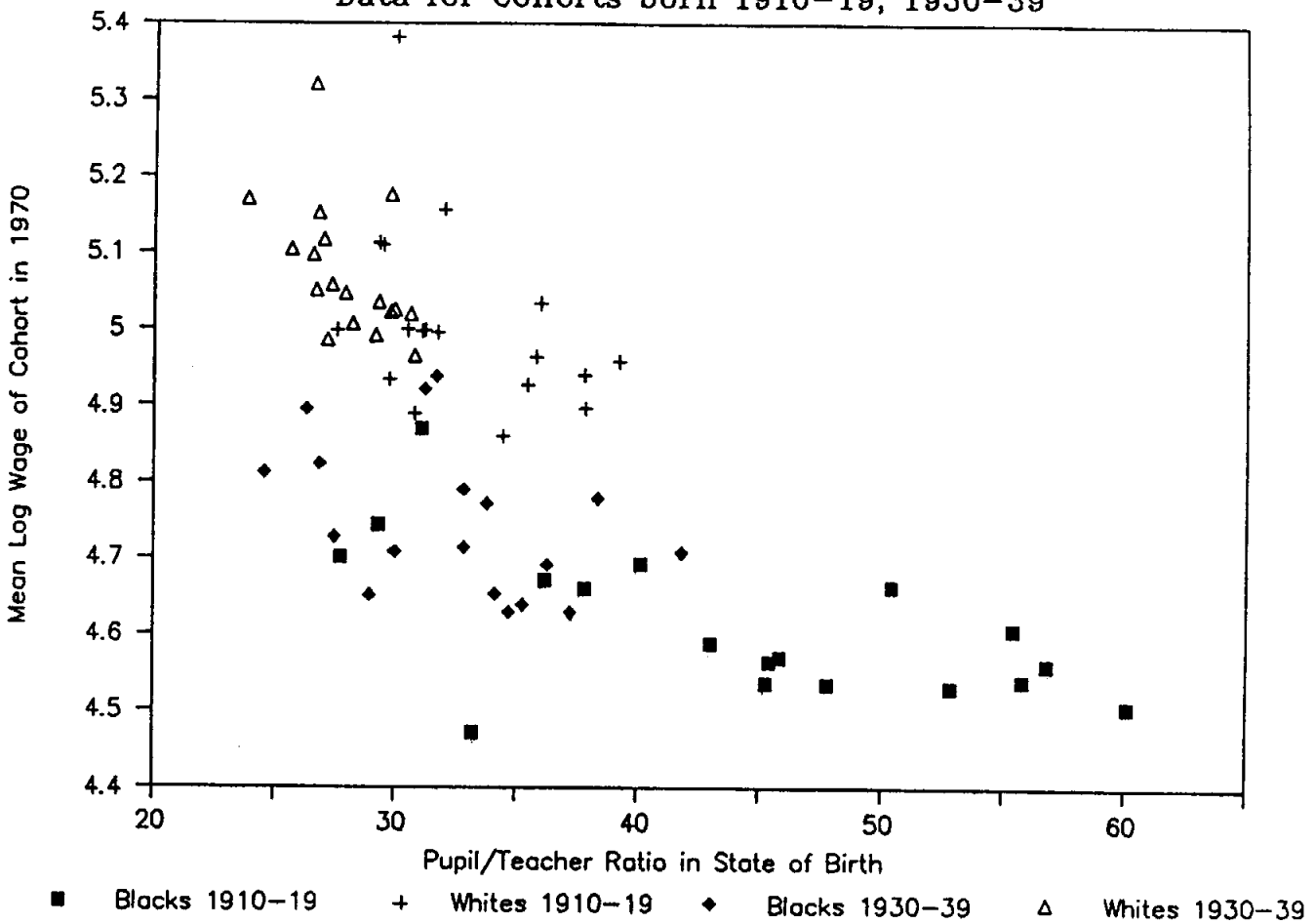


Table 1

Mean Log Wages and Wage Differentials By Cohort in 1960, 1970, and 1980

Cohort:	1960 Whites	1960 Blacks	1970 Whites	1970 Blacks	1980 Whites	1980 Blacks	Log Wage Differential Black - White 1960	1970	1980
1900-1909									
Mean Log Wage	4.617	4.085					-0.532		
Std Error	(0.003)	(0.008)					(0.009)		
Share	0.177	0.173							
1910-1919									
Mean Log Wage	4.680	4.152	5.123	4.613			-0.528	-0.510	
Std Error	(0.002)	(0.007)	(0.002)	(0.006)			(0.007)	(0.006)	
Share	0.254	0.250	0.199	0.180					
1920-1929									
Mean Log Wage	4.667	4.170	5.209	4.726	5.921	5.548	-0.498	-0.483	-0.373
Std Error	(0.002)	(0.006)	(0.001)	(0.005)	(0.002)	(0.004)	(0.006)	(0.005)	(0.005)
Share	0.297	0.301	0.248	0.243	0.177	0.146			
1930-1939									
Mean Log Wage	4.311	3.931	5.163	4.747	5.959	5.615	-0.379	-0.416	-0.344
Std Error	(0.002)	(0.006)	(0.001)	(0.004)	(0.002)	(0.004)	(0.007)	(0.005)	(0.004)
Share	0.272	0.276	0.242	0.259	0.190	0.189			
1940-1949									
Mean Log Wage			4.759	4.541	5.858	5.576		-0.218	-0.282
Std Error			(0.001)	(0.004)	(0.002)	(0.003)		(0.005)	(0.003)
Share			0.311	0.318	0.281	0.279			
1950-1959									
Mean Log Wage					5.416	5.213			-0.203
Std Error					(0.001)	(0.003)			(0.003)
Share					0.353	0.385			
All Age 21-60									
Mean Log Wage	4.564	4.085	5.041	4.652	5.732	5.439	-0.480	-0.388	-0.293
Std Error	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.003)	(0.002)
Mean Wage	111.2	69.5	183.3	122.9	369.1	276.4			
Ratio of Arithmetic Means of Blacks/Whites		0.624		0.671		0.749			

Notes: Based on tabulations of weekly earnings of men born in the 48 mainland states in Public-Use Extracts of the 1960, 1970, and 1980 Censuses. See Data Appendix for sample selection criteria. The entries in rows labelled "Share" give the relative size of the birth cohort among all men age 21-60 in the respective Census sample.

Table 2

Decomposition of the Change in the Black-White Relative Wage Gap: 1960-1980

	1960 to 1970	1970 to 1980
1. Reduction in Relative Wage Gap	0.091	0.095
2. Component Attibutable to Change in Wage Gap of Continuing Cohorts	-0.002	0.025
3. Component Attributable to Replacement of Oldest Cohort with Yougest Cohort	0.055	0.058
4. Component Attributable to Re-weighting of Wage Gaps for Continuing Cohorts	0.037	0.026
5. Residual Component	0.001	-0.014

Note: The data are based on differences in log wages for men age 21-60 in the 1960, 1970, and 1980 Census. Cohorts are weighted by the relative size of the cohort in the combined workforce of black and white workers.

Table 3

Contribution of Region of Birth to Inter-Cohort Differences in the Black-White Wage Gap

	1930 Cohort - 1920 Cohort		1940 Cohort - 1930 Cohort	
	1930 Cohort in 1970 -1920 Cohort in 1960	1930 Cohort in 1980 -1920 Cohort in 1970	1940 Cohort in 1970 -1930 Cohort in 1960	1940 Cohort in 1980 -1930 Cohort in 1970
1. Intercohort Difference in Wage Gap	0.082	0.139	0.161	0.134
2. Fraction Blacks Born in South (Base Cohort)	0.837	0.795	0.808	0.778
Wage Growth Relative to Whites:				
3. Southern-Born Blacks	0.072	0.157	0.156	0.156
4. Non-Southern-Born Blacks	0.044	0.068	0.109	0.037
Intercohort Change Attributable to:				
5. Wage Growth of Southern-Born Blacks	0.060	0.125	0.126	0.122
6. Wage Growth of Non-Southern Born Blacks	0.007	0.014	0.021	0.008
7. Residual Effects	0.015	0.000	0.014	0.004
Proportion of Intercohort Change Attributable to Southern-Born:				
8. Total Southern-Born Effect (Row 3 / Row 1)	0.733	0.901	0.781	0.908
-Component Due to Narrowing of Southern-Born Wage Gap	0.633	0.641	0.602	0.604
-Component Due to Relative Wage Growth of Southern Born Whites	0.079	0.247	0.186	0.316

Notes: See equation (2) of text for decomposition. Wage gaps and changes are measured as differences in mean log wages. Black wage growth in rows 3 and 4 is measured relative to all (Northern and Southern-born) whites.

Table 4
Contribution of Education to Changes in the Black-White
Wage Differential Among Southern-Born Men

	1960 to 1970				1970 to 1980			
Age Group:	21-30	31-40	41-50	51-60	21-30	31-40	41-50	51-60
1. Actual Change in Wage Gap	.120	.062	.007	.000	.007	.104	.112	.079
Contribution of Changes in Years of Schooling								
2. Change in Blk. Educ x Return in Base Year	.101	.083	.054	.025	.096	.121	.087	.066
3. Change in Wht. Educ x Return in Base Year	-.094	-.079	-.071	-.063	-.062	-.112	-.086	-.075
4. Subtotal	.007	.004	-.017	-.038	.034	.009	.001	-.009
Contribution of Changes in Return to Schooling								
5. Change in Blk. Return x Educ in Final Year	.237	.155	.074	.084	.005	.145	.150	.021
6. Change in Wht. Return x Educ in Final Year	-.054	-.083	-.049	.002	.318	-.036	.001	.071
7. Subtotal	.183	.072	.025	.086	.323	.109	.151	.092
8. Total Change Attributable to Education	.190	.076	.008	.048	.357	.118	.152	.082

Notes: See text for decomposition. The calculations in the first column, for example, are based on a comparison of individuals born during 1930-39 in 1960 with those born during 1940-49 in 1970. Returns to schooling are obtained from a linear regression of log weeky wages on schooling, experience and its square, and indicator variables for marital status, residence in an SMSA, and residence in each of four Census regions.

Table 5

Rates of Return to Schooling By Region of Residence and Region of Birth in 1980
(estimated standard errors in parentheses)

	Blacks				Whites			
	Region of Residence:				Region of Residence:			
Region of Birth:	North Central	South	West	North East	North Central	South	West	North East
1920-29 Cohort								
Southern-Born	1.97	3.81	2.86	3.09	4.09	5.30	3.27	6.67
	(0.32)	(0.21)	(0.46)	(0.36)	(0.29)	(0.15)	(0.33)	(0.53)
Non-Southern Born	4.88	7.91	5.60	5.22	4.91	6.74	4.18	6.28
	(0.55)	(0.85)	(1.00)	(0.56)	(0.15)	(0.27)	(0.19)	(0.16)
1930-39 Cohort								
Southern-Born	4.24	5.75	5.36	4.45	5.14	6.69	5.40	7.62
	(0.32)	(0.19)	(0.43)	(0.35)	(0.28)	(0.14)	(0.34)	(0.64)
Non-Southern Born	5.47	5.65	6.24	6.60	6.04	9.02	6.15	7.97
	(0.50)	(0.80)	(0.80)	(0.50)	(0.15)	(0.25)	(0.16)	(0.16)
1940-49 Cohort								
Southern-Born	6.09	7.69	7.65	6.41	6.42	7.99	7.35	8.39
	(0.33)	(0.18)	(0.47)	(0.38)	(0.33)	(0.15)	(0.37)	(0.57)
Non-Southern Born	6.86	9.49	7.13	7.96	6.85	10.00	7.24	8.43
	(0.42)	(0.63)	(0.59)	(0.43)	(0.15)	(0.24)	(0.18)	(0.15)
Change in Rate of Return 1940-49 Cohort - 1920-29 Cohort								
Southern-Born	4.12	3.88	4.79	3.32	2.33	2.69	4.08	1.72
	(0.46)	(0.28)	(0.66)	(0.52)	(0.44)	(0.21)	(0.50)	(0.78)
Non-Southern Born	1.98	1.58	1.53	2.74	1.94	3.26	3.06	2.15
	(0.69)	(1.06)	(1.16)	(0.71)	(0.21)	(0.36)	(0.26)	(0.22)

Notes: Entries in table are rates of return to education (times 100) from linear regressions of log weekly earnings on potential experience and its square, indicators for residence in an SMSA and being married, region-of-residence indicators (for 3 major regions) and interactions of years of completed education with 4 region-of-residence indicators. Regressions are estimated separately for each cohort of birth and for southern or non-southern region-of-birth.

Table 6

Average School Quality By Race in the Segregated States, 1915-1966

Year	Black Schools			White Schools		
	Teacher Salary	Pupils/ Teachers	Term Length	Teacher Salary	Pupils/ Teachers	Term Length
1915	$ 589	60.8	105.8	$1,333	37.6	138.7
1918	563	59.1	113.4	1,199	37.0	146.0
1920	557	57.3	116.4	1,224	36.4	140.7
1922	696	54.9	119.4	1,464	34.8	147.5
1924	817	50.6	125.6	1,616	33.8	153.8
1926	904	47.4	130.1	1,771	32.2	153.6
1928	913	45.8	130.8	1,836	32.0	160.6
1930	1,006	43.9	132.0	2,055	32.0	162.5
1932	1,053	44.3	134.2	2,099	32.6	163.0
1934	1,122	44.8	141.7	2,231	33.2	164.1
1936	1,190	42.1	145.3	2,222	31.5	167.3
1938	1,272	39.7	152.7	2,354	29.8	170.2
1940	1,390	38.3	155.8	2,491	29.3	170.8
1942	1,479	36.6	156.7	2,516	28.7	170.9
1944	1,691	34.7	163.7	2,621	28.2	173.4
1946	2,037	34.1	168.7	2,942	28.0	175.2
1948	2,591	33.3	171.5	3,407	27.8	176.2
1950	2,962	32.6	173.4	3,721	27.4	177.1
1952	3,279	31.7	176.3	3,827	27.5	177.5
1954	3,631	31.6	177.0	4,192	27.6	177.3
1956	4,009	31.6	177.3	4,250	27.8	177.1
1958	4,407	31.3	177.4	4,611	27.5	176.7
1960	4,789	29.4	177.9	4,955	26.2	177.1
1962	5,293	29.0	178.2	5,489	25.7	177.8
1964	5,591	28.1	178.4	5,758	25.0	178.0
1966	6,067	26.1	178.3	6,236	24.0	177.7
Avg.	2,635	38.7	156.1	3,391	29.6	169.4

Notes: Each entry is the enrollment-weighted average of the school input variable among the 18 Segregated states. The teacher wage has been deflated by the CPI and is reported in 1967 dollars. The term length variable is measured in days. The average in the last row is the unweighted average over all years, 1915-1966.

Table 7
Percentage Return to Education by State of Birth for Men Living in Metropolitan Areas of 9 States
(Standard errors in parentheses)

State of Birth:	Whites (1)	Blacks (2)	Difference (1) - (2)
Lousiana	5.72	2.65	3.07
	(0.69)	(0.54)	(0.88)
Mississippi	6.44	2.80	3.64
	(0.66)	(0.38)	(0.77)
South Carolina	6.55	2.07	4.47
	(0.88)	(0.46)	(0.99)
Georgia	7.19	2.68	4.51
	(0.61)	(0.41)	(0.74)
Alabama	6.24	2.69	3.55
	(0.51)	(0.40)	(0.65)
Arkansas	5.32	3.72	1.60
	(0.41)	(0.56)	(0.70)
Texas	6.47	3.71	2.76
	(0.25)	(0.59)	(0.64)
North Carolina	6.03	4.01	2.02
	(0.55)	(0.49)	(0.74)
Virginia	6.42	4.40	2.02
	(0.46)	(0.55)	(0.72)
Florida	5.22	3.23	2.00
	(0.80)	(0.90)	(1.20)
Oklahoma	5.49	6.61	-1.13
	(0.35)	(1.27)	(1.31)
Tennessee	4.55	3.16	1.39
	(0.35)	(0.61)	(0.70)
Maryland	7.33	5.11	2.22
	(0.61)	(1.18)	(1.33)
Delaware	7.96	5.64	2.31
	(1.37)	(4.12)	(4.34)
West Virginia	5.91	6.40	-0.49
	(0.35)	(1.37)	(1.41)
Kentucky	4.99	3.28	1.71
	(0.26)	(0.92)	(0.95)
Missouri	6.21	7.17	-0.96
	(0.31)	(1.24)	(1.28)
D.C.	7.19	6.71	0.49
	(1.11)	(3.09)	(3.28)

Note: Entries in columns (1) and (2) are coefficients of education (times 100) from a regression of log weekly wages on education, potential experience and its square, an indicator for marital status, 9 state-of-residence dummies, and 18 state-of-birth dummies. Regressions are fit separately by race for men born 1910-39 and living in one of 9 Northern states. Data are from the 1970 Census.

Table 8

The Effect of the Pupil-Teacher Ratio on the Return to Education for Southern-Born Migrants

Variable	Blacks and Whites 1960 - 1980			Blacks 1960 - 1980		Whites 1960 - 1980		Blacks 1960	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Intercept	5.58	8.08	8.04	5.47	5.81	8.81	6.86	4.38	8.40
	(0.25)	(0.64)	(0.91)	(1.06)	(2.47)	(1.13)	(2.06)	(2.05)	(5.94)
2. Pupil-Teacher Ratio ($\frac{P}{T}$ 100)	--	-7.45	-5.91	-6.38	-5.85	-9.62	-3.13	-4.15	-10.42
		(1.77)	(2.39)	(2.03)	(4.96)	(3.26)	(5.56)	(4.02)	(12.12)
3. Dummy for Born 1920-29	0.22	0.03	0.08	0.33	0.36	-0.03	0.16	0.60	0.14
	(0.26)	(0.26)	(0.25)	(0.35)	(0.50)	(0.28)	(0.29)	(0.59)	(1.11)
4. Dummy for Born 1930-39	1.57	1.17	1.27	1.92	1.98	1.05	1.42	1.71	0.75
	(0.27)	(0.28)	(0.28)	(0.45)	(0.83)	(0.33)	(0.40)	(0.92)	(2.03)
5. Dummy for Born 1940-49	3.80	3.31	3.37	3.59	3.69	3.16	3.54	--	--
	(0.29)	(0.31)	(0.32)	(0.54)	(0.99)	(0.37)	(0.46)		
6. Black x Born 1910-19	-3.31	-2.08	-2.38	--	--	--	--	--	--
	(0.41)	(0.49)	(0.53)						
7. Black x Born 1920-29	-2.73	-1.86	-2.09	--	--	--	--	--	--
	(0.37)	(0.41)	(0.42)						
8. Black x Born 1930-39	-2.02	-1.49	-1.66	--	--	--	--	--	--
	(0.42)	(0.43)	(0.42)						
9. Black x Born 1940-49	-2.37	-1.99	-2.06	--	--	--	--	--	--
	(0.49)	(0.48)	(0.47)						
10. Dummy for 1970	-0.18	-0.18	-0.20	0.01	-0.00	-0.18	-0.20	--	--
	(0.23)	(0.22)	(0.22)	(0.29)	(0.29)	(0.24)	(0.22)		
11. Dummy for 1980	-1.74	-1.74	-1.75	-0.62	-0.64	-1.73	-1.75	--	--
	(0.23)	(0.23)	(0.22)	(0.31)	(0.31)	(0.24)	(0.23)		
12. Black x 1970	0.20	0.19	0.19	--	--	--	--	--	--
	(0.40)	(0.39)	(0.37)						
13. Black x 1980	1.12	1.09	1.12	--	--	--	--	--	--
	(0.41)	(0.40)	(0.39)						
14. 17 State Dummies	No	No	Yes	No	Yes	No	Yes	No	Yes
15. R-Square	0.71	0.72	0.75	0.59	0.64	0.67	0.74	0.20	0.44

Notes: Sample sizes are 360 for columns 1-3, 180 for columns 4-7, and 54 for columns 8-9. Equations are estimated by weighted least squares, with weights equal to the inverse sampling variances of the estimated returns. The mean and standard deviation of the dependent variable in columns 1-3 are 5.663 and 3.671, respectively.

Table 9

The Effect of School Quality on the Return to Education for Southern-Born Migrants

Variable	Excluding State Effects					Including 14 State Effects				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Pupil-Teacher Ratio ($\frac{s}{s}$ 100)	--	-8.50 (2.28)	--	--	2.36 (3.55)	--	-7.34 (3.15)	--	--	-3.27 (5.00)
2. Term Length ($\frac{s}{s}$ 100)	--	--	3.21 (0.69)	--	0.44 (1.27)	--	--	1.95 (1.07)	--	-1.34 (1.77)
3. Ln Teacher Wage	--	--	--	1.45 (0.25)	1.51 (0.45)	--	--	--	1.65 (0.56)	1.76 (0.88)
4. Dummy for Born 1920-29	0.02 (0.42)	-0.28 (0.42)	-0.32 (0.41)	-0.45 (0.41)	-0.44 (0.41)	0.06 (0.41)	-0.08 (0.41)	-0.14 (0.43)	-0.33 (0.43)	-0.28 (0.43)
5. Dummy for Born 1930-39	1.19 (0.43)	0.65 (0.45)	0.63 (0.43)	0.27 (0.44)	0.30 (0.44)	1.22 (0.42)	0.88 (0.44)	0.89 (0.46)	0.33 (0.51)	0.35 (0.52)
6. Dummy for Born 1940-49	3.43 (0.45)	2.79 (0.47)	2.80 (0.45)	1.97 (0.49)	2.00 (0.51)	3.39 (0.44)	2.97 (0.47)	3.30 (0.48)	1.92 (0.66)	1.89 (0.72)
7. Black x Born 1910-19	-3.76 (0.57)	-2.23 (0.69)	-2.72 (0.59)	-2.54 (0.58)	-2.77 (0.68)	-3.67 (0.55)	-2.37 (0.78)	-3.07 (0.64)	-2.34 (0.70)	-2.09 (0.80)
8. Black x Born 1920-29	-2.87 (0.42)	-1.81 (0.50)	-1.99 (0.44)	-1.65 (0.45)	-1.77 (0.49)	-2.72 (0.41)	-1.94 (0.52)	-2.27 (0.48)	-1.58 (0.55)	-1.48 (0.57)
9. Black x Born 1930-39	-2.00 (0.47)	-1.33 (0.49)	-1.62 (0.46)	-1.23 (0.46)	-1.33 (0.49)	-1.83 (0.46)	-1.41 (0.49)	-1.70 (0.46)	-1.24 (0.49)	-1.11 (0.52)
10. Black x Born 1940-49	-2.23 (0.55)	-1.76 (0.55)	-2.19 (0.53)	-1.91 (0.52)	-2.02 (0.55)	-1.99 (0.53)	-1.74 (0.53)	-2.07 (0.53)	-1.93 (0.52)	-1.76 (0.56)
11. Dummy for 1970	0.07 (0.30)	-0.07 (0.30)	-0.09 (0.29)	-0.09 (0.29)	-0.09 (0.29)	-0.10 (0.29)	-0.10 (0.29)	-0.10 (0.29)	-0.11 (0.28)	-0.09 (0.29)
12. Dummy for 1980	-1.67 (0.30)	-1.67 (0.29)	-1.69 (0.29)	-1.69 (0.28)	-1.69 (0.28)	-1.70 (0.28)	-1.70 (0.28)	-1.70 (0.28)	-1.70 (0.28)	-1.70 (0.28)
13. Black x 1970	0.05 (0.47)	0.04 (0.45)	0.05 (0.45)	0.05 (0.44)	0.05 (0.44)	0.06 (0.44)	0.05 (0.44)	0.06 (0.44)	0.05 (0.44)	0.05 (0.44)
14. Black x 1980	1.08 (0.47)	1.08 (0.46)	1.10 (0.45)	1.09 (0.44)	1.10 (0.44)	1.12 (0.45)	1.10 (0.44)	1.11 (0.44)	1.11 (0.44)	1.10 (0.44)
15. Prob-Value for State Effects	--	--	--	--	--	0.001	0.001	0.066	0.260	0.261
16. R-Square	0.72	0.73	0.74	0.75	0.75	0.75	0.76	0.76	0.77	0.77

Notes: Sample size is 272. Equations are estimated by weighted least squares, with weights equal to the inverse sampling variance of the estimated returns. The mean and standard deviation of the dependent variable are 5.436 and 2.154, respectively. Each equation also includes an intercept.

Table 10

Average Black-White Wage Gap by State-of-Birth
Men Born 1910-1949
(standard errors in parentheses)

Average Black-White Wage Gap (x100):			
Alabama	27.78 (0.58)	Missouri	22.62 (1.08)
Arkansas	23.29 (0.82)	North Carolina	28.11 (0.53)
Deleware	38.53 (2.67)	Oklahoma	27.80 (1.23)
Florida	35.58 (0.84)	South Carolina	31.27 (0.64)
Georgia	32.75 (0.55)	Tennessee	20.24 (0.79)
Kentucky	22.63 (1.18)	Texas	32.31 (0.57)
Louisiana	38.01 (0.65)	Virginia	29.30 (0.63)
Maryland	33.53 (0.91)	West Virginia	17.73 (1.52)
Mississippi	28.75 (0.65)	District of Columbia	34.22 (1.34)

Overall Wage Gaps by Year:

1960	36.19 (0.45)	1970	31.90 (0.31)	1980	26.36 (0.25)

Note: The data are based on differences in log wages for men age 20-59 in the 1960, 1970, and 1980 Census. Entries represent weighted averages of black-white wage gaps for cohort and Census observations.

Table 11

The Effect of School Quality on the Black/White Gap in Wages and Education:
Reduced Form Estimates for All Southern Born Men
(standard errors in parentheses)

	Variable	Wage Gap Full Sample		Wage Gap Subsample with Complete Data					Education Gap Full Sample	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Intercept	-0.388 (0.016)	-0.345 (0.022)	-0.390 (0.019)	-0.360 (0.028)	-0.373 (0.023)	-0.373 (0.026)	-0.361 (0.030)	-2.407 (0.176)	-0.727 (0.164)
2.	Pupil-Teacher Ratio Gap (+ 100)	--	-0.278 (0.099)	--	-0.169 (0.117)	--	--	-0.239 (0.264)	--	-0.107 (0.007)
3.	Term Length Gap (+ 100)	--	--	--	--	0.056 (0.045)	--	0.017 (0.086)	--	--
4.	Log Teacher Wage Gap	--	--	--	--	--	0.020 (0.021)	-0.023 (0.041)	--	--
5.	Dummy for Born 1920-29	0.013 (0.017)	-0.004 (0.018)	0.006 (0.020)	-0.006 (0.020)	0.002 (0.020)	0.004 (0.020)	-0.009 (0.024)	0.430 (0.187)	-0.205 (0.132)
6.	Dummy for Born 1930-39	0.066 (0.017)	0.038 (0.020)	0.059 (0.020)	0.039 (0.024)	0.047 (0.022)	0.050 (0.022)	0.038 (0.025)	0.996 (0.186)	-0.069 (0.144)
7.	Dummy for Born 1940-49	0.137 (0.018)	0.103 (0.021)	0.131 (0.021)	0.107 (0.026)	0.115 (0.024)	0.116 (0.026)	0.109 (0.027)	1.269 (0.194)	-0.056 (0.158)
8.	Dummy for 1970	0.007 (0.014)	0.007 (0.014)	0.008 (0.015)	0.008 (0.015)	0.008 (0.015)	0.008 (0.015)	0.008 (0.015)	0.073 (0.154)	0.069 (0.103)
9.	Dummy for 1980	0.037 (0.015)	0.038 (0.014)	0.035 (0.015)	0.035 (0.015)	0.035 (0.015)	0.035 (0.015)	0.035 (0.015)	0.242 (0.157)	0.249 (0.105)
10.	R-Square	0.517	0.538	0.546	0.553	0.551	0.549	0.554	0.358	0.713

Notes: Sample size is 180 for columns 1-2 and 8-9, and 136 for columns 3-7. The dependent variable in columns 1-7 is the difference in mean log wages between black and white men born in the same 10-year interval and state. The dependent variable in columns 8-9 is the difference in mean years of education between black and white men born in the same 10-year interval in the same state. The mean and standard deviation of the dependent variable in columns 1-2 are -29.723 and 8.556, respectively. The mean and standard deviation of the dependent variable in columns 3-7 are -30.338 and 8.001, respectively. The mean and standard deviation of the dependent variable in columns 8-9 are -1.419 and 0.801 respectively.