

## American Economic Association

---

The Role of Human Capital in Earnings Differences Between Black and White Men

Author(s): June O'Neill

Source: *The Journal of Economic Perspectives*, Vol. 4, No. 4 (Autumn, 1990), pp. 25-45

Published by: American Economic Association

Stable URL: <http://www.jstor.org/stable/1942720>

Accessed: 07/01/2009 14:52

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=aea>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit organization founded in 1995 to build trusted digital archives for scholarship. We work with the scholarly community to preserve their work and the materials they rely upon, and to build a common research platform that promotes the discovery and use of these resources. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).



American Economic Association is collaborating with JSTOR to digitize, preserve and extend access to *The Journal of Economic Perspectives*.

<http://www.jstor.org>

# The Role of Human Capital in Earnings Differences Between Black and White Men

June O'Neill

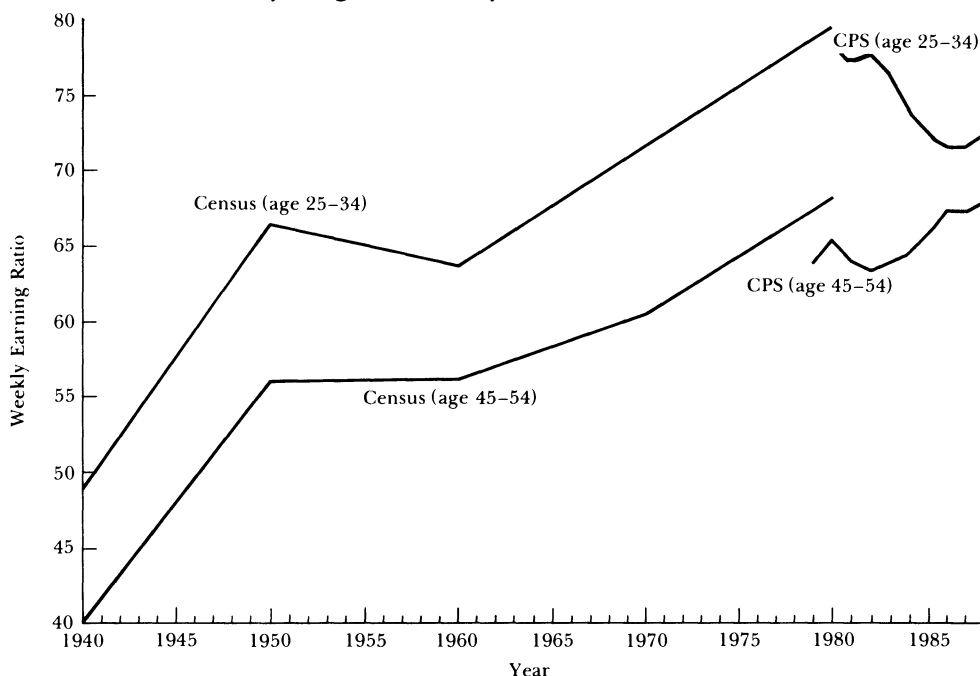
**D**uring the past 50 years, the earnings of black men have increased substantially both in absolute terms and relative to those of white men, as shown in Figure 1. In 1940 the black-white weekly earnings ratio among men ages 25–34 was 49 percent; by 1980 it had increased to 79 percent. During the 1980s, however, the overall black-white earnings gap did not narrow, and at younger ages the gap actually widened. Although the 1980s is not the first decade since 1940 in which black men made little or no gains in relative earnings—the 1950s was another—the lack of progress in the 1980s is nevertheless puzzling and a source of concern.

This article examines the factors underlying the differential in earnings between black men and white men, with a focus on the role of human capital. Since 1940, successive generations of black men entering the labor force have been increasingly more educated relative to white men, both in terms of years of school completed and in the quality of schooling obtained. As the education and income levels of black parents increased, racial differences in the transmission of human capital in the home were also likely to have narrowed. This convergence in educational differences combined with the migration of blacks out of the South contributed to the narrowing in the racial gap in earnings over the 1940–80 period, particularly in the first half of the period.

But human capital factors—education and migration—were not the only source of convergence in black-white differences in earnings. The patterns of change in the earnings gap support the contention that declining labor market discrimination against blacks has also contributed to the rise in the black-white earnings ratio. Moreover, the acquisition of human capital itself has been strongly affected by societal and governmental discrimination, since blacks were long provided with greatly inferior schooling resources.

■ *June O'Neill is Professor of Economics and Finance and Director of the Center for the Study of Business and Government, Baruch College, City University of New York, New York, New York.*

Figure 1

**Black-White Weekly Wage and Salary Ratios for Men**

Although black-white differences in schooling have declined substantially over time, large differences in educational achievement (as measured by achievement test scores) persist. These differences are likely to be related to factors such as remaining differences in the quality of schools attended and in family background. Indeed, current differentials in educational achievement and in work experience are found to account for most of the current black-white gap in earnings among younger men. Moreover, the importance of these skill differentials has been heightened in the 1980s by changing patterns of demand for workers which have shifted in a direction favoring those with the most skill. This development helps explain the lack of relative gains in the wages of black men during the 1980s.

The discussion focusses on men, rather than on all blacks. Because of the dramatic changes in women's labor market activity in the past 50 years and the differences in these patterns between black women and white women, meaningful analysis of racial differences in economic status requires separate treatment by gender. The black-white wage gap has remained considerably larger among men than among women, making racial differences among men an issue of particular concern.<sup>1</sup>

<sup>1</sup>Over the past decade the black-white wage gap among women has been 10 percent or less, depending on the data source. For a comprehensive treatment of black-white differences in women's economic status see Zalokar (1990).

## Historical Background

At the time of emancipation and for several decades thereafter, about 90 percent of blacks lived in the South—largely in rural counties.<sup>2</sup> The disadvantages of their situation were enormous and for many years remained an important impediment to black economic progress. In the antebellum South, the education of slaves had been forbidden by law. Although clandestine schooling did occur, the vast majority of the black population was illiterate at the close of the Civil War. However, schools for black children were established immediately after the war, many under the auspices of the Freedmen's Bureau. By 1870, 10 percent of all black children in the United States were enrolled in school; by 1880 the percentage had increased to 34 percent. Among white children—three-fourths of whom lived outside the South—enrollment rates were 54 percent in 1870 and 62 percent in 1880.

Because the South had been devastated by the Civil War, resources available for schools were much more meager in the South than in other regions. Per capita expenditures on schooling in the South Atlantic region, for example, were only one-third of the level in the North Atlantic region during the 1880s. Moreover, the South had a higher birth rate, relatively more children to educate than the North, and a rural, often scattered distribution of the population, all of which combined to make schooling more expensive to provide. Within this poorest of regions, racial hostility and the disenfranchisement of blacks resulted in an even smaller share of resources going to black children in the segregated southern schools. As recently as 1920, the length of the school year for southern whites was three-quarters of that for northern whites; but the school year for southern black children was only three-quarters as long as it was for white southern children. Similar large disparities existed in other indicators of school resources, like pupil-teacher ratios and teacher salaries.

As the southern economy grew, the differences in school resources between the South and the rest of the country narrowed. School resources provided to black children in the South also increased markedly, particularly after 1920. For example, the length of the school term for southern blacks rose from 0.76 of that of southern whites in 1920 to 0.89 in 1940, and to 0.96 in 1953. Over the same period the student-teacher ratio, which was 46 percent larger in black schools in 1920, fell to near equality with white schools; and teacher salaries rose from 55 percent to 90 percent of the white level. Thus, by 1953, on the eve of the Supreme Court ruling that segregated schools are inherently unequal and therefore unconstitutional, black-white differences in tangible school resources had narrowed considerably in the South (*Brown v. Board of Education of Topeka, Kansas*; 347 U.S. 483). Differentials in school resources continued to

<sup>2</sup>This section draws on a study I wrote with James Cunningham, Andy Sparks, and others, published by the U.S. Commission on Civil Rights (1986).

narrow after 1953, and according to the Coleman Report (1966) were negligible by the mid-1960s.

The markedly lower level of school resources publicly provided to black children earlier in the century was likely to have reduced both the amount of schooling they obtained and the quality of that schooling. Schooling attainment of black children was also influenced by the poverty of their parents. In an analysis of the determinants of racial differences in enrollment in four southern states in 1900, Margo (1987) finds that school characteristics, such as the number of months the schools were kept open, could account for only a portion of the differential in attendance. The literacy, occupational status and wealth of parents accounted for more than half of the gap. In cotton-farming areas, the opportunity costs stemming from the possibility of a child being employed rather than attending school also played a role in reducing school attendance. The rise in parental incomes and literacy in the South and migration to urban areas were factors contributing to the increase in school enrollments among black children, which by 1940 were 90 percent of white enrollment rates nationwide.

It should come as no surprise that racial differences in years of school completed were extremely large in the early part of the century. Data collected on World War I recruits show that black southern draftees had completed on average only 3.3 years of school compared to 7.2 years by the native white draftee (National Academy of Sciences, 1921). The black northern draftee, however, had completed 5.6 years of school, slightly more than the white foreign-born draftee. Blacks from the north were more likely to be urban and to have attended better schools; but only about 10 percent of blacks at that time would have been northern-born and educated.

Today, blacks still complete fewer years of school than whites, but Table 1 shows how the differential has narrowed sharply over time. In 1940, the gap in years of school completed was close to four years among men aged 25–34; in 1988, the gap was only .66 years in that age group. Black men are currently about 90 percent as likely to complete high school as white men. But college completion rates are farther apart. Among men ages 25–34 in 1988, 15.4 percent of black men had completed college compared to 27.9 percent of white men.

## **Earnings Differentials from 1940 to 1980**

The differences observed in school completion levels would be expected to generate racial differences in earnings. Therefore, black-white earnings ratios for men with the same level of schooling should be higher than the earnings ratio for all levels of schooling combined. Table 2 uses data from the decennial census to illustrate this pattern for the 1940–1980 period (the 1980s are examined below), detailing the basic relationships between race, earnings,

**Table 1**  
**Changes in the Education Level of Black Men and White Men, 1940–1988**

	<i>Mean Years of School Completed (Men with Earnings)</i>			<i>Percent with 4 years High School or More<sup>a</sup></i>		<i>Percent with 4 years College or More<sup>a</sup></i>	
	White	Black	Difference	White	Black	White	Black
U.S. Census	Ages 25–34			Ages 25–29			
1940	10.04	6.38	3.66	41.4	13.5	9.1	2.4
1950	10.89	7.77	3.12	57.7	25.6	14.2	3.8
1960	11.60	9.22	2.37	67.8	40.8	19.4	6.1
1970	12.54	10.86	1.68	77.7	60.5	24.5	8.9
1980	13.47	12.41	1.05	86.3	75.4	25.3	11.2
CPS	Ages 20–34			Ages 25–34			
1980	13.24	12.22	1.02	90.3	79.0	30.1	12.6
1988	13.25	12.59	0.66	91.1	83.2	27.9	15.4

<sup>a</sup>The Census data on high school and college completion refer to all civilian men, not just earners. The CPS data on school completion refer to men with earnings.  
 Source: U.S. Commission on Civil Rights, October 1986, and Microdata files Current Population Survey, March supplements for 1980 and 1988, microdata files.

schooling and region. For instance, the black-white earnings ratio for men ages 25–34 in 1940 at all levels of schooling combined was 48.9 percent in 1940. Within the same age group, the ratios within specific education levels were 61 to 62 percent. As differences in education diminished over time, the differences between the aggregate ratio and the ratios within schooling levels also narrowed. In 1980, the earnings ratio at ages 25–34 was 79.4 percent for all schooling levels combined, while the ratios within schooling levels ranged from 80.5 percent to 87 percent.

Regional differences also narrowed after 1940. In 1940, the black-white earnings gap was considerably larger in the South than outside the South even within schooling levels. The relative earnings of blacks rose in part because of migration out of the South to other regions. In addition, earnings levels rose generally in the South relative to the North and within the South the earnings gap between blacks and whites also declined.

Clearly, the narrowing in years of school completed and regional differences between blacks and whites contributed to the convergence in earnings. However, these factors cannot explain a large portion of the change. Within each specific age, region and education group, the black-white earnings ratio rises between 1940 and 1980 and these within group increases are substantial. For example, at the high school graduate level within the South, the earnings

Table 2

**Black-White Weekly Earnings Ratios, for Male Wage and Salary Workers, by Region, Age, and Education: 1940, 1960, 1980**

	Ages 25–34			Ages 45–54		
	1940	1960	1980	1940	1960	1980
All Regions:						
8–11 Years	62.3	71.6	81.6	56.4	69.1	79.1
High School	61.9	69.8	80.5	42.4	65.7	78.5
College	61.2	69.9	87.0	26.4 <sup>b</sup>	52.8	78.5
All Levels <sup>a</sup>	48.9	63.7	79.4	40.3	56.2	68.2
South:						
8–11 Years	59.8	64.4	80.4	48.0	61.0	72.3
High School	53.1	63.2	79.5	-- <sup>c</sup>	55.1	72.1
College	55.7	68.4	83.5	-- <sup>c</sup>	58.6	66.8
All Levels <sup>a</sup>	42.4	57.6	77.1	36.5	50.2	63.4
Non-South:						
8–11 Years	70.1	80.8	87.3	62.2	76.8	87.4
High School	70.6	75.6	85.5	51.3 <sup>b</sup>	69.4	84.2
College	-- <sup>c</sup>	73.3	91.4	-- <sup>c</sup>	50.4 <sup>b</sup>	73.9
All Levels <sup>a</sup>	66.9	74.0	84.9	51.9	68.1	75.1

<sup>a</sup>Includes 0–7 and 13–15 years, not shown separately.

<sup>b</sup>Based on less than 100 observations, but more than 50 observations.

<sup>c</sup>Based on fewer than 50 observations.

*Note:* Earnings are for wage and salary workers only. Data on 0–7 and 13–15 years of school is included in the totals, but not shown separately.

*Source:* Census of Population, 1940–1980; Public Use Sample. Reported in U.S. Commission on Civil Rights, October, 1986.

ratio for 25–34 year-olds rose from 53 percent in 1940 to 79.5 percent in 1980—an increase of 26.5 percentage points.

What other factors can account for the rise in the relative earnings of black men during these decades? I discuss two key factors: a rise in the skills of blacks relative to whites within education categories because of higher quality schooling or parental inputs, and a decline in labor market discrimination against blacks.<sup>3</sup>

<sup>3</sup>A third explanation originating with Richard Butler and James Heckman (1977) is that rising black male earnings partly reflect a selection factor since the labor force participation of black men has declined relative to that of white men. If lower-wage black men withdrew disproportionately from the labor force, the earnings of remaining black wage earners would show an apparent wage gain, but the increase would be illusory. These selection factors would only be relevant for the period since the mid-1960s when black male market activity began to decline relative to that of whites. The analysis in this article includes detailed adjustments for schooling, age and other factors on which selection would be based. It is possible that selection factors explain some of the unexplained rise in black male earnings, particularly in the period after 1960. However, even under extreme assumptions about the earnings of labor force dropouts, they cannot explain a major portion of the earnings rise (U.S. Commission on Civil Rights, 1986).

## Quality of Schooling

The argument that the education of blacks became relatively more productive over time because of improvements in school quality has been elaborated in several important papers (Welch, 1966, 1973a, b; Smith and Welch, 1977; Smith, 1984). These authors have associated school quality with tangible school resources such as expenditures per pupil, student/teacher ratios, length of the school term and teacher salaries. The reduction and virtual elimination of racial disparities in these measures of school resources has been cited as evidence that relative school quality for blacks increased.

There is certainly a correspondence in timing between the narrowing of the differential in school resources and the subsequent reduction in the earnings differential. Successive cohorts of black men have had very different exposure to school resources. The cohort of workers who were 25–34 years of age in 1940 would have received their schooling between 1912 and 1929 if they attended for eight years; the cohort ages 25–34 in 1980 would have been in school between 1952 and 1969 for the first eight years. As noted, school resources provided to black children in the South increased dramatically between 1920 and 1953.

But do increased school resources actually lead to more of the kind of learning that increases market productivity and earnings? In answering this question it is important to distinguish between time periods, because the black-white gap in basic school resources was extremely large around World War I, and then fell to relatively small magnitudes by the mid-1950s. For example, in 1920 in Louisiana the number of pupils per teacher was close to 50 in the segregated black schools compared to 30 in the white schools, and the school term was only 126 days in black schools—50 days shorter than in white schools (Card and Krueger, 1990). Such large differentials seem likely to generate real differences in educational outcomes and the elimination of these differentials might be expected to improve the school learned skills and the productivity and earnings of blacks relative to those of whites.

A recent paper (Card and Krueger, 1990) does find a link between increases in measured school resources in a person's state of birth and in the monetary return to schooling as an adult. (The monetary return is the increase in earnings associated with an additional year of schooling.) Card and Krueger relate school inputs to earnings for cohorts born in 1920–29, 1930–39, and 1940–49. They find that the black-white convergence in the pupil-teacher ratio can account for most of the convergence in the rate of return to schooling when men born in the 1920s are compared with those born in the 1930s, but a smaller share (one-half) of the convergence in returns when the 1930s and 1940s birth cohorts are compared. These findings support the view that relative gains in school resources account for much of the otherwise unexplained narrowing in the black-white earnings gap between cohorts who would have been in their twenties in 1950, 1960, and 1970. However, the effect is likely to be negligible for cohorts reaching their twenties in 1980 and beyond



because racial differences in school resources had been substantially eliminated by the time they were in school.

Another line of research relates differences in school resources to educational outcomes as measured by achievement test scores. These scores are correlated with earnings and presumably the skills that they try to measure are the route by which school resources affect earnings. The large volume of research in this area (reviewed by Hanushek, 1986) has found little relation between school resource measures and student performance on tests of academic achievement and, therefore, would appear to contradict the findings of Card and Krueger. However, almost all of the studies reviewed by Hanushek relate to the effects of differences in class size, teacher salaries and other school characteristics during the years since 1970. The range of differences in these characteristics is likely to be much smaller than that which existed between blacks and whites in the South and the North in the earlier periods analyzed by Card and Krueger.<sup>4</sup>

Historical evidence on the change over time in black-white differentials in academic achievement can be obtained from results of achievement tests administered by the military since World War I. These results can be roughly compared with the historical changes in school resources. The Armed Forces Qualifications Test (AFQT) has been used by the armed services for many years to test individuals for fitness for military service. It is an achievement test of verbal and mathematical skills and reflects the quality of schooling received as well as the effects of parental background. As I show below, AFQT scores are highly correlated with earnings for both blacks and whites.

Most of the cohorts whose earnings are measured in the 1940–80 censuses received their schooling well in the past, when data on military test scores are more fragmentary than for later cohorts. Evidence from the testing of recruits for the World War I draft suggests that test score differentials between blacks and whites, even at the same education level, were much larger around 1918 than they became several decades later when schools attended by black children had greatly improved. Memoir XV of the National Academy of Sciences (1921) which analyzes the results of the army “alpha” test (a predecessor of the AFQT) shows that among fourth-grade graduates the median score of southern black draftees was only 36 percent of the median score of white native-born draftees.<sup>5</sup> But the median score of northern blacks at the fourth grade level

<sup>4</sup>It should also be recognized that the absence of an effect of school resources does not mean that schools do not matter. The characteristics of schools that do matter, however, do not seem to be related to the inputs that public schools typically spend their money on.

<sup>5</sup>The black-white differentials in army alpha scores are likely to underestimate what the actual differential would be for a more representative group. Those who were administered the test were prescreened for literacy and those who could not read and write were given the army “beta” test which is not primarily a test of school learned skills. The “Memoirs” report that only 35 percent of the Southern black draft took the alpha test compared to 86 percent of the native white draft and 67 percent of the northern black draft.

Table 3  
**Mean AFQT Percentile Test Scores of Men Ages 19–21  
 by Race and Education**

Years of school completed	1953–58		1980		Difference	
	Black	White	Black	White	1953–58	1980
Elementary						
5–6	7.7	15.4	4.5	7.3	7.7	2.8
7–8	12.4	28.1	9.4	14.9	15.7	5.5
High school						
1–2	19.1	40.4	14.0	30.4	21.3	16.4
3–4	32.2	57.2	19.4	46.5	25.0	27.1
College						
1–2	46.3	70.9	39.2	65.8	24.6	26.6
3–4	50.6	76.9	49.7	80.2	26.3	30.5

Note: Mean percentile scores on the Armed Forces Qualification Test (AFQT) for 1953–58 are based on data obtained from a 50 percent sample (0.75 million men) of the records of all individuals called up for the draft or attempting to enlist between 1953 and 1958. Scores are reported for all tested, including those rejected. Scores for 1980 are based on the results of the AFQT administered by the Defense Department to a national sample of youth.

Sources: 1953–58, D. O'Neill (1970). 1980 National Longitudinal Survey of Youth, microdata files (U.S. Commission on Civil Rights).

(who presumably had attended superior northern schools) was 85 percent of the native white score.

To be sure, problems of sample and test comparability arise between the World War I results and those of later periods. In recent times, however, national samples of black men of draft age appear to have scored closer to whites of the same age and schooling level. For example, among high school graduates ages 18 to 22 in 1980 the black median AFQT score was 65 percent of the white median.<sup>6</sup>

The relative rise in achievement test scores of black men seems to have occurred largely in the period between 1918 and the mid-1950s since differentials in AFQT scores are surprisingly similar in the 1950s and in 1980.<sup>7</sup> Table 3 provides mean AFQT scores for two cohorts of men who took the AFQT in these two time periods. The first group consists of a 50 percent sample of all men tested for the draft or enlistment during the 1953–58 period. The second group consists of a large, nationally representative sample of men participating

<sup>6</sup>These comparisons of median scores are calculated from the National Longitudinal Survey of Youth (NLSY) results discussed below.

<sup>7</sup>Both data sources are based on results of the AFQT administered to large nationally representative samples of young men and both provide information on age and education level of those tested. I do not know of any other test score results that have been released by the armed forces that contain the required detail by race and schooling.

in the National Longitudinal Survey of Youth (NLSY) who were administered the AFQT in 1980. The NLSY data have been tabulated for the same age group (19–21 years) as the 1950s data and for the same educational levels. At levels of education below the third year of high school the differential in scores narrowed between the 1950s and 1980. But at all other levels of education the differentials widened slightly.

The admittedly sparse historical data point to a narrowing of black-white differences in academic achievement when the World War I draft is compared with men tested in the 1950s. The World War I draft would have received their schooling around 1905–1915 while the men tested in the 1950s would have been in school during the 1940s and early 1950s. Between the two points in time the initially large black-white differential in school resources was greatly diminished. Although differences in school resources continued to narrow after the forties and early fifties and were eventually eliminated, black-white differences in AFQT scores do not show any further decline. These test score comparisons suggest that relative improvements in academic skills are not likely to account for the continuing rise in black-white earnings ratios for cohorts reaching their twenties between 1960 and 1980 (although they are consistent with such an explanation for earlier cohorts).

Additional evidence for this point can be found in Table 2, which reveals that earnings ratios not only increased between cohorts, but also rose for the cohort as it aged. For instance, the black-white earnings ratio for 25–34 year old high school graduates was 69.8 percent in 1960; in 1980 when this cohort reached ages 45–54, the ratio was 8.7 percentage points higher.<sup>8</sup> Since school quality is essentially fixed for a cohort as it ages, forces other than school quality must have produced the rise.

## **The Role of Declining Discrimination**

Declining labor market discrimination is a likely candidate for explaining some of the rise within cohorts in black-white earnings ratios. By this I do not mean that specific affirmative action policies were necessarily responsible for the change, although they may have contributed. Market discrimination appears to have declined even before 1960, since black-white earnings ratios rose for cohorts as they aged over the 1940–1960 period. These increases, however, were smaller in the South before 1960 than they were after 1960. Undoubtedly

<sup>8</sup>At a moment in time (that is, in the cross-section) black-white earnings ratios tend to decline with age. This reflects the fact that older groups are from earlier cohorts who went to school and received their training during a time when opportunities for blacks were more limited. Cohort profiles might also show a decline in the ratio if blacks gained less from work experience than whites.

the Civil Rights Act, by repealing legally enforced segregation, had particularly profound effects in the South.

Of course, the effects of declining market discrimination need not be confined to changes within age cohorts. It is also plausible that reduced discrimination contributed to the relative rise in black men's earnings between successive cohorts entering the labor force. As barriers to entering occupations, industries, and specific firms are removed, blacks entering the labor force are likely to have a wider choice of jobs and training opportunities that provide cumulative career benefits.

There is also likely to be considerable interaction between discrimination and the acquisition of human capital. If a group perceives that the return to additional training will not be rewarded, they are less likely to invest in the training. It will always be difficult, therefore, to distinguish the effects of human capital from the effects of declining discrimination on the earnings gap.

### **The Wage Gap in the 1980s**

In a break with the pattern of rising relative wages of the preceding two decades, the average weekly earnings of black men declined slightly relative to those of white men during the years 1977 to 1988. The decline, illustrated in Table 4, is largest among younger black men (ages 25–34) with twelve years or more of education—particularly college graduates—and among men ages 35–44 who had completed high school or one to three years of college. The black-white earnings ratio was stable, or rose, however, among men with less than twelve years of schooling at all ages and among men ages 45–54 at all education levels.

The small decline in the relative earnings of black men at all education levels combined is perhaps not surprising in view of the kinds of changes that have occurred in the structure of earnings in the 1980s. As several authors have documented, the earnings of less skilled workers—whether defined in terms of education or occupation—declined in the 1980s both absolutely (in real terms) and relative to those of skilled workers. (See, for example, Blackburn, Bloom and Freeman, 1990; Kosters, 1989; Murphy and Welch, 1989.) Moreover, the relative decline in earnings of less skilled workers has been most pronounced at younger ages. Because black workers have less schooling and are in less skilled occupations than white workers, the economy-wide decline in demand for less skilled workers and the rising premiums to highly skilled workers would be expected to increase the black-white wage gap.

A more puzzling question, however, is why the black-white wage gap increased sharply within certain age and schooling levels as it did among high school and college graduates under the age of 35. One hypothesis is that structural changes in employment by industry had a disproportionately large

*Table 4*  
**Black-White Weekly Earnings Ratios among Men,  
 by Age and Schooling, Three Year Averages 1977–79 through 1986–88.**

<i>Age and years of school completed</i>	<i>1977– 1979</i>	<i>1980– 1981</i>	<i>1983– 1985</i>	<i>1986– 1988</i>
<i>Ages 25–54</i>				
0–11	74.0	72.8	75.4	78.2
12	76.7	77.6	73.0	73.6
13–15	82.2	79.0	78.3	79.6
16 +	82.5	75.2	78.7	77.8
Total	71.2	70.2	69.0	69.6
<i>Ages 25–34</i>				
0–11	74.5	75.9	70.6	81.6
12	79.6	80.9	73.6	75.5
13–15	85.4	83.7	80.1	82.1
16 +	96.4	84.8	85.1	74.4
Total	78.1	77.7	72.4	72.4
<i>Ages 35–44</i>				
0–11	76.0	72.1	73.6	80.4
12	79.5	78.0	76.7	74.4
13–15	84.3	81.4	77.2	81.3
16 +	77.1	73.6	83.5	81.0
Total	70.5	68.2	69.4	70.3
<i>Ages 45–54</i>				
0–11	72.8	71.8	78.8	72.5
12	72.0	74.3	73.0	74.0
13–15	74.0	73.6	78.3	82.0
16 +	73.6	71.9	73.6	81.7
Total	63.9	63.5	65.8	67.9

*Note:* Earnings are for wage and salary workers who worked at least twelve weeks during the calendar year and were full-time for at least half of the time they worked. Earnings ratios are based on averages over the three years indicated. Age and schooling are as of the survey week which is in the following year.

*Source:* U.S. Bureau of the Census, *Current Population Survey*, March Supplements, 1978–1989, Microdata files.

effect on black men. For example, there has been a decline in the employment of men in durable goods manufacturing and those who were displaced may have had to settle for employment in less well paid industries. Possibly blacks were in this situation more often than whites.

To investigate the effects of changes in workers' industrial attachments and other characteristics on the change in the wage gap, I used regression analysis

to estimate the change in the black-white differential in earnings from 1977 through 1987 controlling for industry, geographic location, marital status, individual year of age and education, and the skill level and blue collar identity of the person's occupation.<sup>9</sup> This regression analysis shows that among younger workers (ages 20–34) who have completed one year of college or more, the black-white weekly earnings gap increased sharply—by about 1.4 percent a year over the decade. Among younger workers with 0–12 years of schooling the earnings gap widened at a rate of only 0.4 percent a year. At older ages (35–54 years), the earnings differential decreased in both of the broad education categories but the change is not significant.

The analysis also reveals that compositional shifts have had little effect on these rates of change. That is, the black-white earnings differential widens almost as much within industry, occupation and detailed education and age groups, as it does when these additional factors are not taken into account. Shifts in industrial composition over the decade did tend to have a more negative impact on blacks than on whites, particularly at the high school level and below, but the effects were small and were offset by other compositional changes.<sup>10</sup>

What does have a significant impact on the change in the earnings gap are changes in the wage structure associated with the monetary return to skill. Most important are the increases in the premiums associated with additional years of schooling at the college level and with higher occupational skill levels. For example, among whites and blacks ages 20–34, with one or more years of college, the return to an additional year of college increased by 0.3 percent a year, and the earnings increment associated with an occupation requiring an additional year of training increased by 0.2 percent a year.<sup>11</sup> However, the earnings of blue collar workers declined sharply, by 0.6 percent a year. Since blacks in this group (ages 20–34, with one year or more of college) have fewer

<sup>9</sup>In these regressions, data from the Current Population Survey (March supplements) on earnings and the different explanatory variables were pooled over the years from 1977 through 1987 for blacks and whites combined. A variable interacting the year and race estimates the annual rate of change in the black-white differential over the period. Separate regressions were run for the two education and age categories. Separate models were also estimated, each of which contains different specifications of the independent variables. In this way the effect of adding variables—such as a set of industry dummies—is obtained by observing the change in the race/year interaction term when the additional variables are included.

<sup>10</sup>When individual years of schooling within the broader educational categories are held constant, the wage gap increases somewhat more rapidly since the continuing rise in the relative education of blacks was a force reducing the wage gap. When controls are added for industry and occupation the rate of increase in the gap is again narrowed somewhat. At most, shifts in industry and occupation can account for 14 percent of the widening in the wage gap among younger college educated men. Among younger men who completed only high school or less, industry and occupational shifts can account for about one-third of the widening in the gap. But the magnitude of the change in the gap is relatively small for the latter group.

<sup>11</sup>The skill level of an occupation was estimated by using the Dictionary of Occupational Titles (DOT) rankings of the years of Specific Vocational Preparation (SVP) required to perform the occupation (3-digit level).

years of schooling and are in less skilled occupations, they benefitted less than whites from the increases in the skill premium. Blacks are also more likely to hold blue collar jobs than whites in this age-schooling group and therefore were also more negatively affected by the relative decline in blue collar wages. The effects of these changes in the wage structure on the change in the black-white wage gap were more substantial among younger men at the college level than among other groups largely because the relative wage changes associated with skill were larger for this group. In addition black-white differences in years of schooling, occupational skill level and blue collar attachment were larger for this group than for the other age and education categories.

My analysis indicates that overall changes in the premia for skills can account for more than one-third of the decline in the black-white wage gap among younger men with college training. The remainder is linked to the finding that the wage premium for an additional year of college training increased significantly faster for white men than for black men over the decade. Of course, this explanation is not satisfactory in itself, since it immediately raises the question why the schooling and occupational skill premiums did not increase as fast for blacks as for whites at the college level.

Part of the explanation may be related to affirmative action considerations. In a study of the effects of affirmative action, Smith and Welch (1984) conclude that young college-educated blacks were the major beneficiaries of affirmative action as firms under scrutiny by the federal government bid up their wages as they sought to comply with federal regulations. Smith and Welch attribute the high relative wage of young black college graduates in the early 1970s to an "affirmative action bubble" and a decline in the mid-1970s to the difficulty of sustaining the bubble. The black/white wage ratio among young college graduates was close to parity in the late 1970s according to the data shown in Table 4, which may reflect a rekindling of affirmative action pressures which could not be sustained.

Another hypothesis is that the return to unmeasured components of skill—such as educational achievement—increased just as the premium associated with completing an additional year of college increased. A recent paper by Juhn, Murphy, and Pierce (1990) reaches this conclusion. Black-white differences in educational achievement are wider at the college level than at lower levels of schooling. An increase in the return to achievement would therefore have a larger impact at the college level.

### **The Effect of Achievement on Earnings in the 1980s**

As shown in Table 3, blacks score lower than whites within given educational levels on the AFQT test. A natural question is whether these substantial differences in scores explain any of the differential in earnings between blacks and whites at the same level of schooling. Earnings are bound to be influenced

by a wide range of skills that are not measured by achievement tests, like managerial skills, artistic talent, and physical dexterity. However, in an era where higher levels of schooling are commanding a premium, it might be expected that those who score high on achievement tests, which reflect cognitive skills of the kind developed in school, might also command a premium. Test scores, of course, reflect more than the value added in schools, since they reflect human capital acquired in the home as well.

The National Longitudinal Survey of Youth (NLSY) contains observations on earnings and AFQT scores as well as a considerable amount of detail on actual work experience, schooling and other characteristics. Black-white differences in AFQT are larger at the college level than at the high school level. Among men with 0–12 years of schooling the difference in scores is 0.96 of the white standard deviation. Among those with one or more years of college the black-white difference in AFQT scores is 1.35 times the white standard deviation. The actual years of work experience of blacks is lower than that of whites, particularly at the high school level, and it is lower while attending school as well as after leaving school. However, blacks have more experience in the armed forces. Blacks also work in occupations with a lower skill level (measured as the years of specific vocational preparation required, or SVP).

Using regression analysis to explain wages I find that a person's score on the AFQT in fact shows a strong positive correlation with the wage, holding schooling constant.<sup>12</sup> The effect of an increase in the AFQT scores on the hourly wage is larger at the college level than at the high school level, which is consistent with the findings of Hause (1972). Moreover, the effect of AFQT scores is larger for blacks than for whites. When schooling, age and region are held constant, an increase of one standard deviation in the AFQT score of black men increases their wages by 10.6 percent, while the comparable increase in scores among whites increases their wages by 7.0 percent.<sup>13</sup>

Consistent with the studies reviewed by Hanushek, standard measures of school quality have no effect on the wages of young men in the NLSY sample. Information from school records was available on the student/teacher ratio, the percentage of teachers with advanced degrees and other measures of the resources of the youth's high school. When substituted for AFQT or entered

<sup>12</sup>The AFQT test was administered to the NLSY sample in 1980 when the group was 15–22 years of age. Therefore, many had not yet completed their schooling. In an effort to control for potential bias in the AFQT coefficient, following Griliches and Mason (1972) who faced the same problem, I distinguished between years of schooling completed at the time of the AFQT test (1980) and years completed after taking the test.

<sup>13</sup>Regression results for blacks and whites separately (all levels of schooling combined) are given in the Appendix. The model specification shown includes a large number of explanatory variables including industry, occupational skill and years of work experience. The AFQT coefficients, while still large and significant, are smaller than in a regression holding constant only schooling, region, and age. The addition of the explanatory variables indicated somewhat dilutes the effect of AFQT because the additional variables are themselves influenced by changes in AFQT scores, or the educational achievement they reflect.



into the regression as additional variables (alone or in combination) these school resource measures were never significant and often as not had the wrong sign.<sup>14</sup>

To estimate the effect of differences in AFQT scores on the black-white earnings gap I utilized the regression coefficients, estimated separately for blacks and whites, to construct two kinds of predicted wages. In one, the mean characteristics of whites were substituted into the black regressions. (See the Appendix for examples of the black and white regressions and for more detailed findings.) The result should predict what black wages would be, on average, were blacks to be given the mean characteristics of whites while continuing to be remunerated according to the parameters of the black labor market. There is, however, an index problem since the remuneration of job-related characteristics in fact differs for blacks and whites; for example, the effect of AFQT scores on wages differs by race, as noted. Therefore, in a second exercise the mean characteristics of blacks were substituted into the white regressions, thus predicting what pay whites would receive if they were given the job related characteristics of blacks but continued to be remunerated for these characteristics according to the white pay structure.

Table 5 presents two sets of predicted wage ratios, given this tool. Part A of the table shows the predicted black wage (given average white characteristics) as a percentage of the white wage. Part B of the table shows the actual wage of black men as a percentage of the predicted white wage (given average black characteristics). Five different model specifications were used because of differences in the interpretation that might be placed on the results. The different model specifications are numbered by columns across the top of the page, and then identified by what combination of factors are being held constant by the “yes” indicated under the five columns. Schooling, AFQT scores, region, and potential experience are not likely to be the consequences of direct discrimination in the labor market. However, actual work experience, industry and the occupation’s skill level may reflect both choice and elements of discriminatory treatment.

The black-white hourly earnings ratio is 82.9 percent before adjusting for any characteristics. In Panel A, after adjusting for region, schooling and potential work experience—which are the standard variables used in analysis of Current Population Survey data—the ratio rises to 87.7 percent. The addition of AFQT raises the ratio to 95.5 percent, at which point close to three-quarters of the gap is explained. Adding actual work experience virtually closes the gap. Industry and occupational skill level do not add very much to the explanation of the gap.

The unadjusted black-white earnings ratio is similar at the high school and college levels. However, separate analyses conducted for the group with one

<sup>14</sup>I also find that these school resource measures have no effect on AFQT scores for either blacks or whites, which is entirely consistent with the studies reviewed by Hanushek. Black and white youth in the NLSY sample are, however, shown to attend schools with nearly identical school resource measures.

Table 5

**Effect of Adjusting for Differences in AFQT Scores and Other Characteristics on the Black-White Hourly Wage Ratio, Men Ages 22–29, 1987, National Longitudinal Survey of Youth.**

	Actual black / white ratio	Predicted black / white wage ratios				
		(1)	(2)	(3)	(4)	(5)
A. Predicted black wage (given white characteristics) as percent of actual white wage:						
All Schooling Levels	82.9	87.7	95.5	99.1	101.2	91.2
0–12 years	84.5	85.0	90.4	93.8	96.7	87.7
13 years and over	85.9	95.6	108.0	110.4	107.5	97.9
B. Actual black wage as percent of predicted white wage (given black characteristics)						
All Schooling Levels	82.9	85.2	90.4	94.7	97.3	88.7
0–12 years	84.5	84.2	88.8	93.6	96.3	88.2
13 years and over	85.9	89.0	103.9	100.5	100.6	90.9
Factors held constant:						
Region		yes	yes	yes	yes	yes
Schooling		yes	yes	yes	yes	yes
Potential work experience		yes	yes	yes	yes	yes
AFQT Score			yes	yes	yes	
Actual work experience				yes	yes	
Industry					yes	yes
Skill of 3-digit occup. (SVP) and whether blue collar					yes	yes

Note: Predicted wages were estimated as follows: Separate hourly wage regressions were estimated for black and white men. A predicted wage for blacks (whites) was estimated by substituting white (black) mean characteristics into the regression results for black (white) men. The predicted wage varies depending on the explanatory variables in the model. Five model specifications are shown. The analysis is restricted to full-time workers who are not self-employed. See Appendix for samples of the regressions.

Source: National Longitudinal Survey of Youth

year of college or more and the group with less than 12 years of school does produce different results. As one would expect based on the sizable black-white difference in scores and the large size of the AFQT coefficient, the adjustment for AFQT differences for the college group raises the black-white ratio to over 100 percent. At the high school level, adjusting for AFQT differences raises the black-white earnings ratio to 90 percent. Work experience, industrial attachment and occupational skill level raise the ratio to 96.7 percent. Thus, racial differences in labor market experience at the high school level tend to have a larger influence on the outcome than at the college level.

The results in Panel B differ from those in Panel A largely at the college level. The reason is that at the college level, the white coefficients on schooling

and AFQT scores are generally lower than the black coefficients. Since white coefficients weight the results in Panel B while black coefficients weight the results in Panel A, variables with large black-white differences in characteristics—in particular, the AFQT coefficient—make a bigger difference in Panel A.

To address the question whether the skills measured by AFQT are commanding a higher premium in 1987 than they did earlier in the decade, I compared the results of wage equations for men ages 22–25 in 1983 with those for men reaching the same age in 1987. I found that the AFQT coefficient (showing the effect on the log of the hourly wage of a one point increase in the AFQT score) did rise for the combined group of men of all races and for whites and blacks separately. The coefficient for all men ages 22–25 was .0023 in 1983 and .0032 in 1987. For black men, the increase was somewhat larger: from .0026 to .0039. There are problems associated with this comparison due to the fact that we are not comparing individuals who took the test at the same age and education level. The results, however, can be taken as a bit of evidence that the returns to the qualitative dimension of education rose during the 1980s, just as the return to an additional number of years of schooling increased.

## Concluding Comments

Several years ago, Richard Freeman (1981) commented that “background differences appear to have become a more important impediment than market discrimination to attainment of black-white economic parity among the young.” Freeman was referring to an analysis of racial differences in earnings and other economic indicators among young men in 1969. This same conclusion can be applied to the black-white earnings gap among young men today. In 1987, differences in background factors, as summarized by differences in years of school completed and in AFQT scores, explained three-quarters of the hourly earnings difference between black men and white men under age 30. Differences in work experience accounted for most of the remaining gap.<sup>15</sup>

Black-white earnings ratios have fallen slightly during the 1980s. The erosion is not attributable to widening differences in levels of schooling; in fact, differences in years of school completed have actually narrowed somewhat. The problem seems more to do with the increasing premium in the market to high levels of skill of the sort learned in school. As a result, differences in school quality or family and socioeconomic background that lead to differences in the acquisition of human capital are highlighted and now have an even greater impact on economic outcomes than they did in the past.

<sup>15</sup>Differences in the work experience of young men are also related to differences in family background and neighborhood factors (Hill and O'Neill, 1990).

## Appendix Wage Regressions

Underlying the “adjusted” black-white wage ratios shown in Table 5 are a series of wage regressions estimated separately for blacks and whites at all schooling levels combined and again separately by education level (0–12 years and 13 years and more of schooling). Regression coefficients and sample means are shown in the accompanying table for blacks and whites, all schooling levels combined. The specification shown contains the maximum number of independent variables utilized which is regression model #4 in Table 5.

The analysis is restricted to those who worked 35 hours or more in a week. The variables are defined in the Appendix Table on the following page. The basic data source is the National Survey of Youth (NLSY) 1987 microdata file. The “SVP” of an occupation refers to the years of specific vocational preparation required for average performance on the occupation, as measured by the Dictionary of Occupational Titles (DOT). The DOT measure for occupations at the 3 digit level was added to the data set.

### *Appendix Table*

#### **Regressions of the Log of Hourly Wages of Black Men and White Non-Hispanic Men, Ages 22–29 in 1987, National Longitudinal Survey of Youth (*t*-stats in parentheses)**

	<i>Black Men Coefficient</i>	<i>White Men Coefficient</i>	<i>Black Men Mean</i>	<i>Variable Means</i>		<i>St. Dev.</i>
				<i>St. Dev.</i>	<i>White Men Mean</i>	
Dependent variable: Log hourly wage			1.91	0.46	2.13	0.48
Independent variables:						
Years of schooling, 1980	0.0465 (4.65)	0.0511 (7.39)	10.82	1.80	11.35	1.87
Years of schooling since 1980	0.0425 (3.14)	0.0403 (4.18)	1.56	1.79	1.83	2.05
AFQT score in 1980	0.0039 (5.31)	0.0019 (4.14)	47.99	20.65	73.09	23.20
Currently enrolled (0, 1)	-0.1245 (-2.07)	-0.1227 (-3.16)	0.05		0.07	
Potential wk exp. (Years since age 18 not enrolled in school or in armed forces)	-0.0206 (-2.00)	-0.0228 (-2.74)	6.61	2.61	6.16	2.84
Years worked 26 weeks or more since age 18	0.0392 (4.85)	0.0482 (6.92)	4.15	2.66	4.73	2.80

*Appendix Table (continued)*

	<i>Black Men Coefficient</i>	<i>White Men Coefficient</i>	<i>Black Men Mean</i>	<i>Variable Means</i>		<i>St. Dev.</i>
				<i>St. Dev.</i>	<i>White Men Mean</i>	
Years in armed forces	0.0434 (3.75)	0.0274 (2.13)	0.36	1.13	0.15	0.68
Years worked while enrolled	0.0280 (2.09)	0.0255 (2.96)	0.87	1.09	1.44	1.43
Tenure on current job (yrs)	0.0304 (5.12)	0.0310 (8.07)	2.17	2.41	2.78	2.73
Blue collar occupation (0, 1)	0.0429 (1.39)	0.0010 (0.04)	0.55		0.50	
SVP of occupation	0.0394 (5.12)	0.0342 (6.99)	1.56	1.72	2.42	1.97
SMSA (0, 1)	0.1108 (3.33)	0.1196 (5.84)	0.84		0.75	
Northeast (0, 1)	0.1479 (4.33)	0.0863 (3.39)	0.20		0.22	
West (0, 1)	0.1750 (3.42)	0.0825 (3.02)	0.06		0.16	
Midwest (0, 1)	0.0158 (0.45)	-0.0100 (-0.44)	0.16		0.32	
Industry dummies						
Agriculture	0.0189 (0.21)	-0.1104 (-1.74)	0.02		0.03	
Mining, construction	0.3194 (5.42)	0.2434 (5.69)	0.13		0.13	
Manufacturing	0.2302 (4.39)	0.1902 (4.95)	0.21		0.25	
Trans., Util.	0.3000 (4.96)	0.2605 (5.58)	0.10		0.08	
Fin, ins, rl. est, bus. serv.	0.1497 (2.61)	0.1994 (4.53)	0.11		0.12	
Professional services	0.0568 (0.93)	-0.0468 (-0.96)	0.09		0.08	
Public administration	0.2900 (4.17)	0.2515 (4.52)	0.06		0.04	
Retail trade	0.0065 (0.12)	-0.0293 (-0.71)	0.15		0.15	
Wholesale trade	0.0907 (1.25)	0.0981 (1.86)	0.04		0.04	
Intercept	0.6423 (4.71)	0.7894 (8.73)				
R-Sq. adj.	0.3631	0.328				
Sample size	902	2055				

■ *The author is grateful to Terry Koh and Hengzhong Liu for their programming assistance and to a grant from the Baruch College Fund for financial support. I am also indebted to Carl Shapiro, Joseph Stiglitz and Timothy Taylor for their unusually detailed and helpful comments.*

## References

- Blackburn, McKinley L., David E. Bloom, and Richard B. Freeman.** "The Declining Economic Position of Less Skilled American Men." In Burtless, Gary, ed., *A Future of Lousy Jobs? The Changing Structure of U.S. Wages*. Washington, D.C.: The Brookings Institution, 1990.
- Butler, Richard, and James J. Heckman,** "The Government's Impact on the Labor Market Status of Black Americans: A Critical Review." In Hausman, Leonard J., et al., eds., *Equal Rights and Industrial Relations*. Madison: Industrial Relations Research Association, 1977, pp. 235–81.
- Card, David, and Alan Krueger,** *Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States*, mimeo, February 1990.
- Coleman, James, et al.,** *Equality of Educational Opportunity*. Washington, D.C.: Government Printing Office, 1966.
- Freeman, Richard B.,** "Black Economic Progress after 1964: Who Has Gained and Why?" In Rosen, Sherwin, ed., *Studies in Labor Markets*. Chicago, University of Chicago Press, 1981, 247–94.
- Griliches, Zvi, and William M. Mason,** "Education, Income and Ability," *Journal of Political Economy*, May/June 1972, 80, S75–S103.
- Hanushek, Eric A.,** "The Economics of Schooling: Production and Efficiency in Public Schools," *Journal of Economic Literature*, September 1986, 24, 1141–77.
- Hause, John C.,** "Earnings Profile: Ability and Schooling," *Journal of Political Economy*, May/June 1972, 80, S108–S138.
- Hill, M. Anne, and June O'Neill,** *Underclass Behaviors in the United States: Measurement and Analysis of Determinants*, mimeo, March 1990.
- Juhn, Chinhui, Kevin M. Murphy, and Brooks Pierce,** "Accounting for the Slowdown in Black-White Wage Convergence," Conference Paper, Wages in the 1980s, American Enterprise Institute for Public Policy Research, 1990.
- Kosters, Marvin H.,** *Wages and Demographics*, American Enterprise Institute, November 1989.
- Margo, Robert A.,** "Accounting for Racial Differences in School Attendance in the American South, 1900: The Role of Separate But Equal," *Review of Economics and Statistics*, November 1987, 69, 661–666.
- Murphy, Kevin, and Finis Welch,** "Wage Premiums for College Graduates: Recent Growth and Possible Explanations," *Educational Researcher*, May 1989, 18, 17–26.
- National Academy of Sciences, Memoir XV,** *Psychological Examining in the United States Army*. Yerkes, Robert M., ed., Washington, Government Printing Office, 1921.
- O'Neill, Dave M.,** "The Effect of Discrimination on Earnings: Evidence from Military Test Score Results," *Journal of Human Resources*, 1970, 4, 477–86.
- Smith, James P.,** "Race and Human Capital," *American Economic Review*, September 1984, 4, 685–98.
- Smith, James P., and Finis Welch,** "Black-White Male Wage Ratios: 1960–1970," *American Economic Review*, June 1977, 67, 323–38.
- Smith, James P., and Finis Welch,** "Affirmative Action and Labor Markets," *Journal of Labor Economics*, April 1984, 2, 269–302.
- U.S. Commission on Civil Rights,** *The Economic Progress of Black Men in America*, Clearinghouse Publication 91, October 1986.
- Welch, Finis,** "Measurement of the Quality of Education," *American Economic Review*, May 1966, 56, 379–392.
- Welch, Finis,** "Black-White Differences in Returns to Schooling," *American Economic Review*, December 1973a, 63, 893–907.
- Welch, Finis,** "Education and Racial Discrimination." In Ashenfelter, Orley, and Albert Rees, eds., *Discrimination in Labor Markets*. Princeton: Princeton University Press, 1973b, pp. 43–81.
- Zalokar, Nadja,** *The Economic Status of Black Women: An Exploratory Investigation*, Staff paper, U.S. Commission on Civil Rights, January 1990.