Black–White Achievement Differences and Governmental Interventions

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Human-capital differences have provided a common explanation for racial earnings differences, although for data reasons most attention has focused just on differences in school quantity and has left out quality considerations. Patterns of quality change, however, fill in an important dimension of human-capital movements and at the same time relate directly to major governmental policies.

Trends in cognitive achievement scores compiled by the National Assessment of Educational Progress (NAEP) provide consistent quality data since roughly 1970 for a representative sample of students across mathematics, reading, and science. Figure 1 shows the difference in white–black average performance of 17-year-olds in standard-deviation units. Although the pattern and magnitudes differ slightly by subject, the gap was roughly constant in the 1970's, fell significantly in the 1980's, and leveled off or increased slightly in the 1990's. Even though the average gap remains around one standard deviation in the 1990's, this gap is 0.3 standard deviations less than in the 1970's. The lessening of the gap over the past three decades also appears in most other databases that allow such comparisons over time (Larry Hedges and Amy Nowell, 1998).

Changes in black–white achievement gaps, particularly the narrowing in the 1980's, have been the subject of recent investigations (Christopher Jencks and Meredith Phillips, 1998). Much of the discussion focuses on the optimistic story that can be generated by the experiences of the 1980's and does not get to the mounting evidence of a continued sizable and unchanging gap in the 1990's.

While a variety of objective and subjective factors have been suggested, three major systematic factors offer clear possibilities for explaining the changes in black–white performance on the NAEP tests. Over the past three decades two major governmental interventions with significant racial dimensions have had enormous effects on school operations: legal actions to promote school desegregation and legislative and legal actions to change the level and distribution of school funding. However, these governmental interventions have taken place against a backdrop of significant relative changes in schooling and family size between blacks and whites.

Clearly it is not possible to disentangle these influences from direct analysis of the few aggregate observations of test performance provided by the NAEP scores. The alternative approach taken here is to review evidence about the relationship between the major hypothesized factors and student performance. This evidence on marginal impacts is then combined with data on the magnitude and pattern of changes in each factor to see if the projected outcomes are roughly consistent with the aggregate changes in scores. Since changes in schooling factors operate with a lag, changes during the 1970's have their full impact on the scores of 17-year-olds during the 1980's, and similarly, changes during the 1980's are felt most during the 1990's.

I. School Spending

David Grissmer et al. (1998) point to added resources focused on blacks, a result of spending increases and more equalized spending across districts. Michael Cook and William Evans (2000), on the other hand, find that the narrowing of NAEP scores between blacks and whites cannot be any simple reflection of school funding levels, since three-quarters of the gap lies within schools. Thus, if resources were a prime factor behind the narrowing of test-score
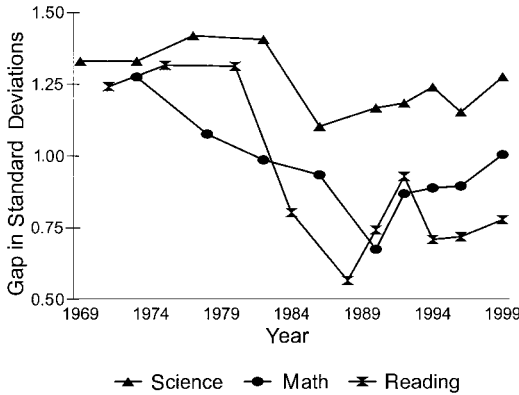
FIGURE 1. WHITE–BLACK SCORE DIFFERENCES ON THE
NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS
FOR 17-YEAR-OLDS, BY TEST YEAR

TABLE 1—ESTIMATED EFFECTS OF STATE SCHOOL
SPENDING AND PARENTAL EDUCATION ON GROWTH IN
STUDENT TEST PERFORMANCE, NATIONAL ASSESSMENT OF
EDUCATIONAL PROGRESS BETWEEN FOURTH
AND EIGHTH GRADE, BY RACE

Independent variable	Mathematics 1992–1996		Reading 1994–1998	
	White	Black	White	Black
<HS	−0.012	−0.058	−0.030	−0.031
	(−1.22)	(−3.04)	(−1.82)	(−1.90)
$/ADA	−0.006	−0.016	−0.019	−0.009
	(−0.64)	(−0.97)	(−1.12)	(−0.56)
Constant	0.302	0.575	0.452	0.447
	(3.31)	(3.18)	(2.80)	(2.65)
R^2:	0.05	0.26	0.12	0.05
N:	36	30	32	27

Notes: All variables are in natural logarithms. Test performance is the change in the log of the average student score on the National Assessment of Educational Progress (NAEP) between fourth and eighth grade in the years identified for each racial group and subject. Regression estimates are weighted by the average daily attendance (ADA) in each racial group in the state in 1995. <HS = percentage of the black or white population age 25 and older with 11 or fewer years of education in 1990; $/ADA = the geometric average of real state current expenditure per ADA between 1992 and 1996.

differences by race, it must be the case either that minorities are more sensitive to resource differences than white students or that resources are narrowly targeted to blacks within schools.

Approximately two-thirds of the variation in school spending comes from differences across states (Sheila Murray et al., 1998), and this coupled with state NAEP data offers a way to investigate racial performance differences. Simple cross-state educational production-function estimation tends to confuse the different state policy environments with the effects of resources (Hanushek et al., 1996), but test-score-gain models reduce this problem. NAEP tests separated by four years have been given to the same cohort of students in fourth and eighth grade (math in 1992 and 1996 and reading in 1994 and 1998). If the policy environment in a state is roughly constant over the four years, estimates of the flow resources on achievement gains should provide clean estimates (except for the imprecision of the highly aggregate data). Consistent with Hanushek (1997), Hanushek and Julie Somers (2001) show that state spending does not provide an explanation for scores across states (but that parental schooling level does). To test for differential sensitivity of minorities to spending, similar race-specific value-added models are estimated. With the NAEP state data, the log growth models are estimated separately for blacks and whites. While possibly reflecting the inadequacies of state level data, Table 1 suggests that resources have no more effect on black scores than on white scores.

An alternative estimation relies on the estimates of class-size effects from Hanushek et al. (2001), discussed below. While blacks appear more sensitive than whites to class size, the effects are small (0.01 and 0.004 standard deviations per student reduction, respectively). Applying these estimates even to the declines in pupil–teacher ratios (not class sizes) from Jeffrey Grogger (1996) suggests at most a narrowing of 0.016 standard deviation. In sum, the between-state differences in resources are at best a minor explanation of the distribution of student outcomes.

Within-state variations in spending could have an impact if more equalized spending tends to favor black students. Estimation of educational production functions (Hanushek, 1997) would not suggest a systematic effect, although again an interaction with race may be important. The one direct analysis of school-finance reform on test scores (Thomas Downes, 1992) does not support equalization of outcomes, but it does not investigate the racial pattern of outcomes. Hanushek and Somers

(2001) considers how variations in labor-market outcomes are related to prior within-state variations in spending. The estimation, divided by race and gender, suggests that smaller variations in school spending are actually associated with larger variations of labor-market outcomes for all but black females.

Finally, the pattern of funding shifts over time does not map easily into the pattern of achievement results. Real spending per pupil has risen steadily over this entire time period. Direct federal spending on compensatory programs (Title 1) is a small portion of total spending, varying up and down between 2 percent and 3 percent of revenues for public K–12 education. The variance of total school funds, driven by both judicial and legislative actions, falls during the 1970's but increases some in the 1980's, with interstate differences being the driving force (Murray et al., 1998). Only the pattern of distribution of funds tends to track the narrowing then flattening of the achievement-gap profile, but the interstate variance in spending offers little explanation of student performance (Table 1).

II. Desegregation and Integration

One of the largest interventions of government into schooling has come through efforts to desegregate the schools. While there is information about the effect of these efforts on the racial composition of schools (e.g., Finis Welch and Audrey Light, 1987; David Armor, 1995), there is much less information about the impact on student performance. Part of this uncertainty reflects the difficulty of separating racial integration effects on achievement from other characteristics of a student's background, including family and peer characteristics, and from pure student sorting across schools.

Preliminary estimates of the effects of school integration are found in Hanushek et al. (2001). Our analysis of Texas students in the primary grades involves estimation of value-added models with individual and school fixed effects for several entire cohorts of students. The integration results reflect the pure effect of racial composition on student achievement. That analysis indicates that, ceteris paribus, black elementary students would score a statistically significant 0.024 standard deviations higher each year when placed in a class with 10-percent fewer black students. By contrast, the comparable estimate for nonblacks is a statistically insignificant −0.03 standard deviations.

In 1968 the national average for the percentage white classmates for blacks is 22.3, rising to 36.2 in 1980 and staying at 35.1 in 1992. These changes reflect offsetting movements: an increased integration of schools within districts as a result of legislative and court actions offset by more segregation between districts (Steven G. Rivkin, 1994). Armor (1995) further suggests that much of the change actually occurred by the mid-1970's.

The estimates of how integration affects achievement are combined with the changes in racial exposure over time to project how NAEP scores are affected by school integration. The overall racial composition of the public-school population changes over time. Between 1970 and 1997, the percentage white falls from 79 percent to 63 percent, with most of the change reflecting increased percentages of Hispanics and other groups; the percentage black increases from 15 percent to just 17 percent over the period. The calculations bound the relevant change of black exposure for the average black student over the 1968–1980 period by the 14 percent that mirrors white-exposure changes and by the 17-percent change in just percentage black (which ignores Hispanic concentrations). Using the estimates of integration impacts in the 1990's, the predicted change in the achievement gap (which would be felt mostly in the 1980's if the impacts operate across all 12 grades) would be a decrease in the racial gap of 0.4–0.5 standard deviations. The leveling off of school integration through the 1980's corresponds to the constant achievement gaps of the 1990's. This estimated independent effect of racial integration for the 1980's is nonetheless larger than the total reduction in the NAEP gap of 0.3 standard deviations, suggesting either that the estimated effects on achievement are too large or that there are offsetting effects in the opposite direction. The contemporaneous Texas results may overstate historical desegregation impacts or may just apply to elementary schools. John F. Kain and Daniel M. O'Brien (2000) find similarly large impacts from black moves to more integrated schools, although their estimates also incorporate school quality changes.

III. Family Factors

The final aspect of the racial gap to be considered is the differential impact of family background changes. Probably the most important potential influence is the equalization of black and white parental schooling levels. While the difference in high-school completion rates (for the population aged 25 and over) was 25 percent in 1959, it dropped to 14 percent in the mid-1980's and remained there into the 1990's. As Table 1 underscores, student achievement, particularly of blacks, appears to be related to parental education.

Combining the relative increases in black parental schooling with the impacts of parental education on performance from Table 1 provides an estimate of the impact on the racial performance gap, similar to the approach used to consider the role of integration.[1] From this, black parental-schooling gains account for 1.7 percent of the gap in black–white performance, or 0.02 standard deviations from the original gap of 1.3 standard deviations, during the 1980's. Even though the schooling levels of blacks and whites continue to grow at similar rates so that the gap remains roughly constant in the late 1980's, the differential sensitivity of black achievement nonetheless implies that there should be further narrowing in test scores. Thus, the relative impact of later schooling growth would account for an additional narrowing of 0.025 standard deviations showing up in the 1990's.

The other significant family change over this three-decade period is the dramatic fall in average family sizes. The pattern of family-size changes shows declines from the mid-1960's through the early 1980's with a subsequent leveling off. Importantly, while blacks have had more children in their families (a negative for achievement), the decline in family sizes was larger for black families. Hanushek (1992) provides estimates of the magnitude of the benefi-

cial impact on achievement of smaller families (although, since these estimates are derived just for black children, they do not provide any information on possible differential impacts by race). The estimates of the overall effect suggest that the fall in family size could explain only 0.005 standard deviations of the gap, with a pattern that mirrors the aggregate fall and then stabilization of NAEP gaps.

IV. Summary of Results

The estimates here have considered whether any of the governmental or family factors individually could explain the magnitude and pattern of black–white achievement gaps. Neither the level nor the distribution of school spending appears to provide much explanation for the gaps. School spending levels show little consistent impact with any indication of differential impact on blacks being small. Direct analyses of the effects of spending equalization on performance similarly show little impact.

On the other hand, governmental intervention through integration programs appears potentially more important. The pattern of integration and preliminary estimates of the magnitude of effects suggest that this by itself could explain both the narrowing and the subsequent leveling off of gains.

Family changes, notably increases in schooling of parents and family-size declines, also appear to contribute some to the relative gains of black students. These combined effects could explain perhaps 15 percent of the narrowing in the 1980's, but they would also suggest continued narrowing in the 1990's, which did not occur.

Interestingly, there are two facets to the estimated impacts of both integration and parental education. The evidence suggests that blacks are more sensitive than whites to each of these factors. Furthermore, the patterns of change in the factors (more integrated schools and improvements in parental education) have both favored blacks.

These estimates, however, remain suggestive, not definitive. The standard of evidence is rough consistency with the measured student performance over time. Even matching timing of expected outcomes is difficult, because it requires assumptions about the evolution of impacts on

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[1] The schooling-completion levels for blacks and whites aged 25 or older for 1959 are compared with those for 1975 to get the estimated effect for the 1980's. The calculations use coefficients of 0.044 and 0.02 to reflect average effects on log schooling from Table 1, for black and white students respectively. The Table 1 estimates reflect changes from grade 4 to 8, and these are multiplied by 3 to obtain estimates for total school years.

performance across grades. The application of cross-sectionally estimated impact parameters with the evolution of the major factors also requires strong assumptions about the stability of effects over different time periods.

The largest reservations revolve around the magnitude of the integration effects. The predicted closure of the racial gap due just to integration is somewhat larger than the actual closure. Because the identified family effects also operate to close the achievement gap, the combined influences tend to go even further in overexplaining the magnitude of the narrowing of achievement differences.

Moreover, the improvements in the family factors considered would also suggest some improvement in the overall levels of performance for both whites and blacks in the 1990's compared to the 1970's. Such improvement did not occur, and levels of aggregate scores in the 1990's were virtually identical to those in the 1970's. These aspects of the analysis suggest that some other, unidentified factors were also operating to depress overall scores and, to some extent, to maintain black–white achievement gaps.

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