
School Desegregation and Educational Attainment for Blacks

Sarah J. Reber

ABSTRACT

This paper assesses the effects of school desegregation on its intended beneficiaries: black students. In Louisiana, substantial reductions in segregation between 1965 and 1970 were accompanied by large increases in per-pupil funding, which allowed funding in integrated schools to be “leveled up” to the level previously experienced only in white schools. Desegregation also brought increased exposure of blacks to whites. Analysis of new data on levels of segregation, resources and educational attainment from 1960–75 suggests that the increase in funding associated with desegregation improved educational attainment for blacks. A 42 percent increase in funding led to a 15 percent increase in high school graduation rates, and the estimated present value of the additional education exceeded the additional cost.

I. Introduction

The Supreme Court’s 1954 decision in *Brown v. Board of Education*—and the desegregation of schools that followed—was perhaps the most important development in U.S. education policy of the last century. Before *Brown*, Southern schools were explicitly and completely segregated by law, and many blacks attended schools that received fewer resources than those attended by their white counterparts.¹ Previous work has shown that desegregation policy reduced segre-

1. The Coleman Report (1966) and Card and Krueger (1992) suggest that black-white school resource gaps had closed substantially over the first half of the 20th century but were still present. According to Card and Krueger (1992), in 1954 the average student-teacher ratio was about 10 percent higher for blacks in Southern and Border states, compared to their white counterparts. Data for Louisiana show that in 1955 the average district’s instructional spending for blacks was only about 71 percent of instructional spending for whites.

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gation and increased blacks' exposure to whites in school. In the case of Louisiana, school desegregation also was accompanied by dramatic changes in the state's system of school finance that, together with large increases in federal funding, substantially increased the average spending for the schools blacks attended. Desegregation in Louisiana eliminated black-white gaps in student-teacher ratios within districts. Historically, those gaps had been largest in districts with high black enrollment shares, so blacks in such districts saw particularly large improvements in resources over the short period when schools desegregated; on the other hand, blacks in those districts saw smaller increases in exposure to whites.

In this paper, I examine the effects of the dramatic changes that desegregation brought to Southern blacks' schools on educational attainment using newly collected data on Louisiana school districts. I use variation in the intensity of school desegregation related to school districts' initial black enrollment share to identify its effects. Because changes in spending and exposure are both so closely tied to the black enrollment share (positively and negatively, respectively), I cannot separately identify the effects of these two factors. Instead, I estimate the net effect of desegregation-induced changes in funding and peers.

The results indicate that the rate of continuing to the 11th and 12th grade and graduating from high school increased more in higher black enrollment share districts after desegregation, suggesting that the additional funding that came with desegregation was more important than increased exposure to whites in increasing black educational attainment.² A 42 percent increase in funding led to a 15 percent increase in high school graduation rates, and a rough cost-benefit calculation suggests that additional spending had positive net present value. The results are consistent with earlier studies suggesting beneficial effects of school desegregation for blacks (Boozer, Krueger, and Wolkon 1992; Guryan 2004; Ashenfelter, Collins, and Yoon 2006).

II. Background and Previous Literature

A. Desegregation Policy and Trends in Segregation

Figure 1 shows trends in black exposure to whites for Louisiana schools, which were similar to trends in other states of the former Confederacy. Black exposure to whites can be interpreted as the white enrollment share of the average black's school. The data reveal three major turning points for segregation corresponding to changes in legislation and the courts' interpretation of the *Brown* decision. There was little desegregation before 1965 (all years refer to the fall of the school year). In 1964, only about 1 percent of black students statewide were in school with any whites, and 64 of 67 districts in Louisiana still had completely segregated schools. Following enactment of the 1964 Civil Rights Act (CRA) and the 1965 Elementary and Secondary Education Act (ESEA), many Louisiana districts took their first steps towards

2. It also would be interesting to estimate the effect of desegregation on educational attainment for white students. Unfortunately, nonrandom migration of white students—in particular, “white flight” from districts with high black enrollment shares to “whiter” districts—precludes conducting a similar analysis for whites.

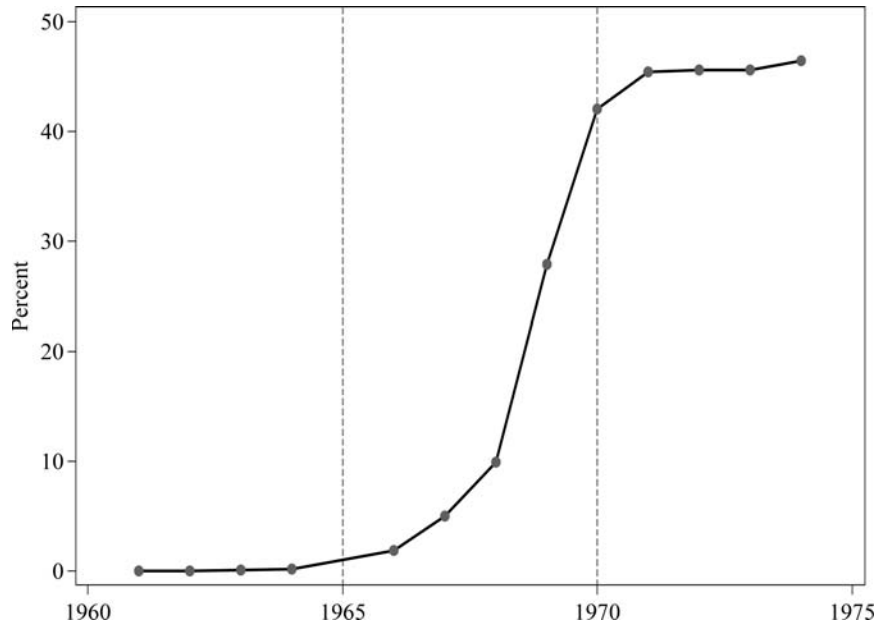


Figure 1
Black Exposure to Whites for Louisiana Counties, 1960–74

Notes: Authors calculations from Southern Education Reporting Service data (1960–66) and Office of Civil Rights Surveys (1967–74).

desegregation.³ By 1968, only one district in Louisiana was still completely segregated but the average black was still in a school that was only about 16 percent white, while the average district was more than 60 percent white. Finally, following a 1968 Supreme Court decision,⁴ larger-scale desegregation plans were required. By 1970, the average black Louisianan was in a school that was more than 30 percent white, and segregation stayed around that level through at least 1976.

B. Desegregation and Black Educational Attainment: Mechanisms

Desegregation could increase the return to schooling—and thus educational attainment—by changing school quality for blacks through two main channels. First, desegregation increased blacks' exposure to whites in schools. White peers are typically assumed to have a positive effect on outcomes, in part because whites tended to have higher socioeconomic status and better scores on achievement tests, but more white peers could be good or bad for school quality from blacks' perspective. Second, desegregation changed average spending—and possibly other, less-tangible aspects of school quality—in schools blacks attended by moving them to higher-

3. See Card and Krueger (1992); Boozer et al (1992); Cascio et al. (2008); Cascio et al. (2010) for more discussion of the role of CRA and ESEA.

4. *Green vs. New Kent County Board of Education*, 391 U.S. 430 (1968).

spending formerly white schools. In the case of Louisiana, desegregation also increased overall average school spending so that spending could be equalized by “leveling up” to the levels previously experienced only in white schools.

It is worth noting that the relationship between time exposed to the treatment and the size of the treatment effect may be different depending on whether the outcome is attainment or achievement (measured, for example, by test scores). Effects on achievement are likely to be cumulative in nature and larger for cohorts that are exposed to the new policies longer, whereas effects on attainment may not increase over time. If the policies considered here increased the return to education for blacks in all grades, we should see immediate changes in attainment for cohorts at risk of dropping out, regardless of how long they have been treated. Consider an 11th grader who is deciding whether to attend 12th grade. Postdesegregation, the quality of education in 12th grade is improved, so the return to 12th grade is higher. How the “treatment effect” relates to total exposure to the treatment is ambiguous: On the one hand, having been exposed to better schools in the past may make 12th grade more valuable; on the other hand, it may mean that diminishing marginal returns have set in and 12th grade is less valuable.

C. Previous Literature: The Effects of Desegregation on Education Outcomes

A number of large-scale studies have examined the relationship between the racial composition of students’ schools or classes and educational outcomes. But these studies have not focused on changes in racial composition due to desegregation policy, as opposed to self-selection into districts with different racial composition. The *Equality of Educational Opportunity* study, also known as the Coleman Report (1966), was the first to document a negative relationship between being in predominantly black schools and lower student test scores. Rivkin (2000) similarly finds that students who went to schools with higher black enrollment shares had lower test scores, educational attainment, and earnings.

A number of studies have examined the effects of desegregation policies in a particular district or a small number of districts, and have come to varying conclusions about its benefits.⁵ Boozer et al. (1992) focus on policy-induced changes in racial composition, instrumenting for the racial composition of schools with an interaction of the state where an individual grew up and whether they went to high school after 1964. They show that blacks who attended segregated high schools had lower educational attainment and lower wages; the samples are small, however, and the estimates are imprecise. Guryan (2004) provides the best-identified effects of desegregation *plans*, exploiting variation in the timing of implementation of plans across districts to assess the effects of desegregation on black high school dropout rates for a national sample of large school districts implementing court-ordered desegregation plans. He estimates that implementation of a desegregation plan reduced dropout rates for blacks by about three percentage points. This paper complements Guryan’s by using a different methodology and source of variation to examine the effects of desegregation on educational outcomes.

5. See St. John (1975), Crain and Mahard (1981), Cook (1984), and Armor (2002) (also reviewed in Guryan 2004).

A related literature examines the effects of changes in resources in blacks' schools for the period before desegregation. Card and Krueger (1992, 1996a) conclude that improvements in resources in the black schools relative to white schools in the pre-*Brown* years helped narrow the black-white wage gap. This paper shows that black-white school quality gaps persisted in Louisiana after the period examined by Card and Krueger and examines the effects of the virtual elimination of these gaps due to desegregation in the late 1960s.

III. Mechanisms: Effects of Desegregation on Peers and Resources

Desegregation had dramatic effects on the characteristics of black Louisianans' schools. The two major classes of inputs—peers and resources—changed significantly statewide, but blacks in high black enrollment share districts saw *smaller* increases in exposure to whites but *larger* increases in resources in their schools. That changes in blacks' exposure to whites upon desegregation would vary with the black enrollment share is straightforward, as even if schools within districts are integrated, blacks will not be exposed to as many whites if there are not many whites in their district.

The positive relationship between black enrollment share and changes in resources arose due to the pre-desegregation system of school finance in the South. State governments distributed aid on a roughly per-pupil basis, without regard to race; but whites in districts with large black populations directed state money allocated for black students to white schools, generating large black-white resource gaps (as measured by the student-teacher ratio, for example). Figure 2a shows the positive relationship between black-white student-teacher ratio gaps and black enrollment share before desegregation.⁶ Figure 2b shows that those gaps were largely eliminated after desegregation, and the relationship with black enrollment share disappeared. Because preexisting black-white gaps were larger in higher black enrollment share districts, blacks in those districts saw larger improvements in the student-teacher ratios as a result of equalization due to desegregation.

Figure 3 summarizes how changes in educational inputs around the time of desegregation related to initial black enrollment share graphically; regressions presented below show that these relationships are robust to the inclusion of controls for preexisting district characteristics. Panels A and B show two measures of resources: current expenditure and student-teacher ratios. As schools desegregated, blacks in high black enrollment share districts saw bigger reductions in student-teacher ratios and larger increases in current expenditure compared to their black counterparts in low black enrollment share districts.⁷ Panel C shows the strong, negative relationship between initial black enrollment share and the change in exposure to whites.

6. See Bond (1934) and Margo (1990) for a detailed discussion of Southern school finance before *Brown*.

7. Reber (Forthcoming) argues that the observed changes were *caused* by, not just coincident with, desegregation policy. For this study, it is not critical that the changes in resources and exposure to whites were caused by desegregation as it is that they were large and rapid. Some readers may rather interpret the results as the effect of increased spending and changes in peers, rather than the effects of desegregation policy, per se.

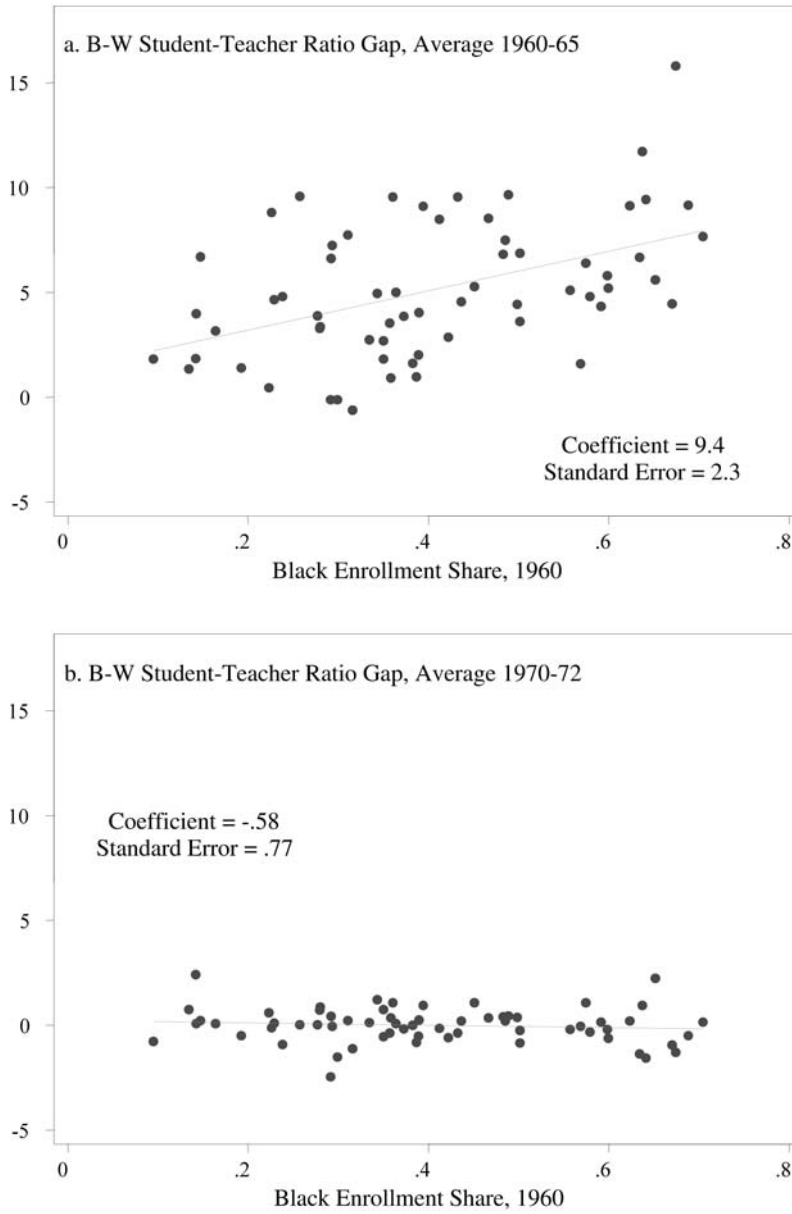


Figure 2
Black-White Student-Teacher Ratio Gaps vs. Black Enrollment Share, Before and After Desegregation

Notes: Author's calculations. Sample includes 63 Louisiana counties. Upper panel shows the average gap between the student-teacher ratio for blacks and whites for 1960 to 1965 versus 1960 black enrollment share (based on Annual Financial and Statistical Report). Bottom panel shows the average gap between the student-teacher ratios for blacks and whites for 1970 and 1972 (based on Office of Civil Rights Survey).

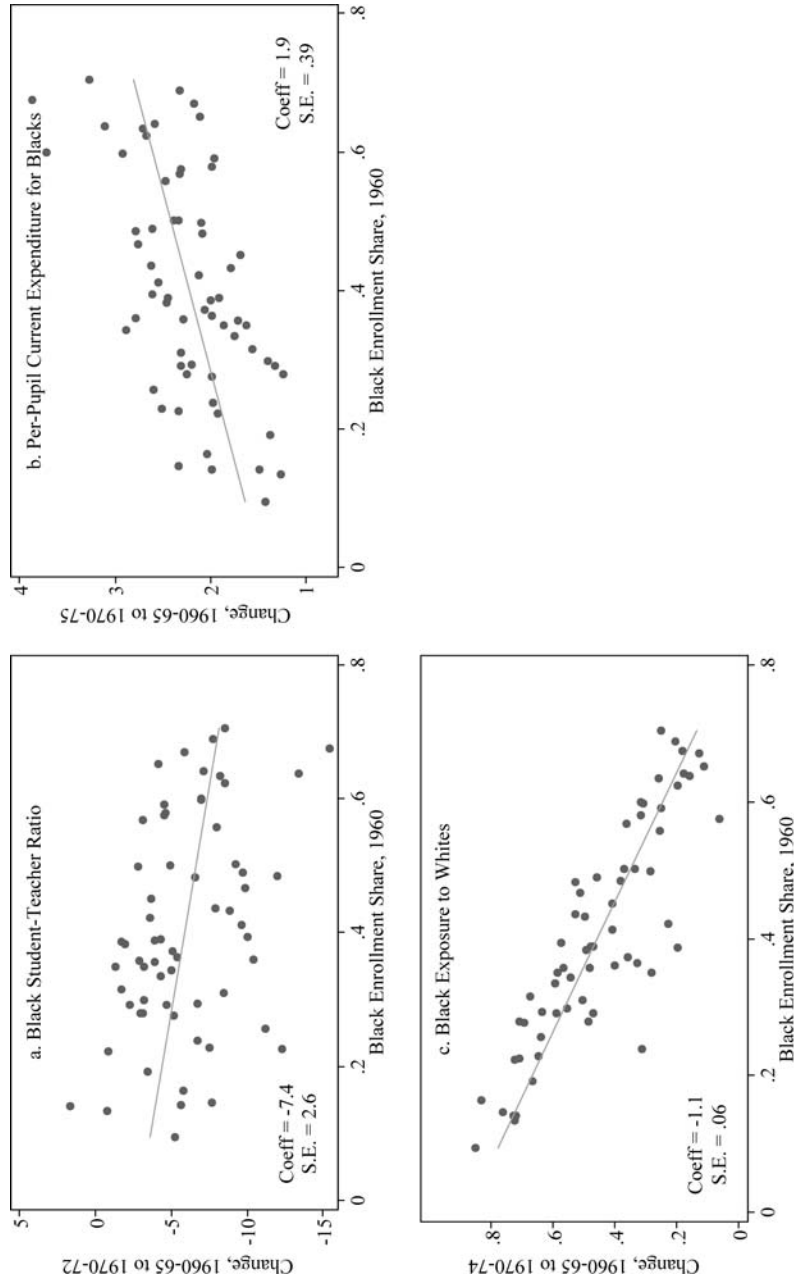


Figure 3
Changes in Resources and Peers vs. 1960 Black Enrollment Share

Notes: Author's calculations. Sample includes 63 Louisiana counties. Per-pupil current expenditure values are in hundreds of CPI-adjusted 2007 dollars.

IV. Methods and Data

A. Empirical Approach

Changes in outcomes are expected to depend on changes in resources in blacks' schools and changes in blacks' peers, suggesting an estimating equation with the following basic form:

$$(1) \quad \Delta outcome_c = \alpha_0 + \alpha_1 \Delta resources_c + \alpha_2 \Delta peers_c + \varepsilon_c,$$

where c indexes county⁸ and $\Delta outcome$ is the change in the outcome of interest around the time of desegregation, $\Delta resources$ is a measure of the change in resources (for example, the change in student-teacher ratios), and $\Delta peers$ is a measure of the change in peers, such as the exposure of blacks to whites; ε_c is an error term.⁹ In practice, because both the change in resources and the change in peers are so closely tied to the initial black enrollment share, I cannot separately identify their effects.¹⁰ This is an important limitation of the analysis. Still, examining the reduced-form relationship between outcomes and initial black enrollment share can shed some light on the effects of desegregation policy overall and the potential mechanisms.

I therefore examine how changes in educational attainment relate to initial black enrollment share. Whether blacks in higher black enrollment share districts are expected to increase their educational attainment more or less as a result of desegregation depends on whether exposure to whites (who probably also had higher achievement) or exposure to more resources is more important.¹¹ The simplest specification relates the change in attainment from before to after desegregation to the initial black enrollment share. In this case, the dependent variable of interest is simply the average outcome for 1970–75, less the average outcome for 1960–65

$$(omitting the transition years): \Delta outcome_c = \frac{1}{6} \sum_{t=1970}^{1975} outcome_{ct} - \frac{1}{6} \sum_{t=1960}^{1965} outcome_{ct}.$$

The most basic specification is a univariate regression (the regression analog to the graphs presented for changes in inputs in Figure 3):

$$(2) \quad \Delta outcome_c = \beta_0 + \beta_1 1960fractionblack_c + \varepsilon_c,$$

8. Because the Census and voting data are available only at the county level, I aggregate district-level data on enrollment, teachers, and finances for the three city districts with their respective counties and conduct the analysis at the county level. Results are similar if these districts are instead excluded. Cameron Parish had substantial revenue from oil reserves and is an extreme outlier in funding and student-teacher ratios; the district is excluded from the analysis.

9. The district-level data for the analysis were taken primarily from annual administrative reports of the Louisiana Department of Education and county tabulations of the Census. More details on construction of the data are available from the author.

10. The problem is exacerbated by the fact that the change in peers is better measured than the change in resources so that the relationship between initial black enrollment share and outcomes loads onto the change in peers (change in black exposure to whites).

11. This assumes that exposure to whites and resources both have nonnegative effects.

where $\Delta outcome$ is described above, $1960fractionblack$ is the black share of enrollment for county c in 1960.¹² If changes in resources were more important than changes in exposure to whites, β_1 is expected to be positive and vice versa if exposure to whites is more important than funding. If blacker districts had systematically different initial continuation rates, the share of students on the margin to be affected by the policy might differ. Fortunately, blacks' initial educational attainment as measured by continuation rates in the early 1960s was not significantly related to black enrollment share.¹³

If initial black enrollment share is correlated with other factors related to changes in continuation rates, differential changes in attainment for high and low black enrollment share districts cannot be attributed to desegregation. Indeed, some district characteristics were related to black enrollment share: Blacks in blacker districts had lower median income and were significantly less likely to be registered to vote; blacker districts also had higher poverty rates (proxied by the share of households without complete plumbing) and were more rural.

To address these concerns, I include controls for key characteristics of counties that might be related to both $1960fractionblack$ and *changes* in attainment in some specifications. To account for the possibility that changes during the period of desegregation are simply a continuation of past trends, I control for the change in per-pupil instructional expenditure for blacks from 1955 to 1959. To account for the possibility that blacks with different socioeconomic status might be on different educational attainment trajectories, I control for several proxies for SES of blacks and the population of the county as a whole from the 1960 Census (nonwhite median income, nonwhite median education, percent of households with complete plumbing, and the percent of population living in urban areas). Because black participation in politics increased following the passage of the Voting Rights Act, I also control for the share of the black voting age population registered to vote in 1960 and the change from 1964 to 1968.¹⁴ Finally, the availability of employment may influence school enrollment decisions, so I control for the log change in total employment from 1963 to 1970–75. These controls generally do not affect the coefficient of interest.¹⁵

If differential changes in attainment by black enrollment share are *caused* by changes in schools related to desegregation, we would expect the changes in attainment to be closely timed with the observed differential changes in black exposure to whites and funding. To observe the timing of differential changes in attainment by black enrollment share, I estimate equations of the following form:

$$(3) \quad outcome_{ct} = \theta_t + 1960fractionblack_c \times \gamma_t + v_{ct},$$

12. Results are similar if the black enrollment share from another year is used. I use data from 1960 because it is early enough that it is unlikely to have been influenced by desegregation.

13. This is somewhat surprising in light of the inequities in spending before desegregation.

14. I am grateful to Jim Alt for providing the voting data; see Alt (1995).

15. Card and Lemieux (2001) also point to the potential role of tuition costs, interest rates, returns to schooling, and cohort size in educational attainment; changes in these factors are unlikely to vary with black enrollment share. Louisiana compulsory schooling laws did not change during this period (personal communication with Ann Huff Stevens and Marianne Page; data collected for Oreopoulos, Page, and Stevens 2006).

where $1960fractionblack$ is the 1960 black enrollment share (as above) and separate intercepts (θ_t) and coefficients (γ_t) are estimated for each year between 1960 and 1975. If γ_t is increasing with t , this indicates that attainment grew faster in higher black enrollment share districts over time, and vice-versa if γ_t is declining with t .¹⁶ Two factors limit my ability to assess the timing of changes in black educational attainment precisely. The annual attainment data are noisy, so year-to-year changes are not as precisely estimated as the differences in averages over longer periods. In addition, exactly how the policy is expected to affect trends in attainment is not clear *ex ante*. Outcomes may *lag* changes in schools, but changes in outcomes should not *lead* desegregation. I do not, therefore, impose a particular functional form on trends in the fraction black coefficient over time. I present the results graphically after the main findings.

B. Measuring Educational Attainment

High-frequency individual-level data with county identifiers on completed attainment or school enrollment status are unavailable for this period. A proxy for the dropout rate for each cohort-district-year can be created using Louisiana administrative data on the number of students enrolling in school by grade, district, year, and race. To check the validity of the attainment estimates, I first present estimates of state-wide trends in the educational attainment variables for 1960–75 based on the Louisiana administrative data and compare these to trends estimated from the 1980 Census IPUMS. I use the same methodology to estimate educational attainment variables at the district level using the administrative data.

If families did not move into or out of the state (and there were no mortality), I could infer the share of each cohort continuing to each grade by following a cohort through its entire school career, estimating dropout rates at every grade. For example, for the cohort entering first grade in the fall of 1961, first grade data would be taken from the 1961 report, second grade data from the 1962 report, and so on; the share of the cohort reaching at least 12th grade would be the ratio of 12th grade registration in 1972 to first grade registration in 1961. To reduce the scope for movements in and out of state to affect the estimated 12th grade enrollment rates, I divide 12th grade registration by eighth grade registration four years prior, assuming that there is no “true” dropping out until after the fall of eighth grade.¹⁷ I refer to the share of a cohort that registers for 12th grade as the 12th grade “continuation rate,” and similarly for tenth and 11th grade; the estimated share of a cohort completing high school is referred to as the graduation rate.¹⁸

16. Similar to Equation 2, controls for preexisting characteristics of counties could be included by estimating a separate coefficient on each characteristic for each year (or groups of years). Because the control variables have little substantive effect on the coefficients, I do not present the results.

17. Dropping out before eighth grade was relatively rare for blacks in the affected cohorts: Three percent of black Louisianans born between 1942 and 1957 report a highest grade attained of less than eight years in the 1980 Census. This also assumes that patterns of grade repetition are not changing over time.

18. The continuation rates for tenth, 11th, and 12th grades are calculated as follows: $contrate_t^{10} = \frac{reg_t^{10}}{reg_{t-2}^8}$, $contrate_t^{11} = \frac{reg_t^{11}}{reg_{t-3}^8}$, and $contrate_t^{12} = \frac{reg_t^{12}}{reg_{t-4}^8}$, where reg_t^g is total black registration for grade g in year t .

Figure 4 compares trends in continuation rates calculated from the administrative data to trends in the fraction of blacks born in Louisiana who attended *at least some* 10th, 11th, and 12th grade or graduated from high school according to the 1980 Census IPUMS.¹⁹ The two sources track reasonably well at the state level, especially for 12th grade continuation rate and the high school graduation rate.²⁰ County-level continuation rates are likely more subject to error associated with migration, compared to the state-wide trends. However, if those movements are *not correlated with initial black enrollment* share, migration will not bias estimates of the coefficient on *1960fractionblack*, but will simply introduce classical measurement error to the dependent variables.

If there is no true dropping out among younger children and families with younger and older children migrate similarly, continuation rates for younger children can be used to assess whether mobility is correlated with black enrollment share.²¹ Figure 5 show that changes in continuation rates and initial black enrollment share are not correlated for lower grades. Estimating Equation 2 with changes in the low grade continuation rates, the coefficients on initial black enrollment share are not significantly different from 0 for any of the grades or specifications. The results for lower grade continuation rates do not show evidence of differential mobility by black enrollment share, suggesting this is an appropriate method for measuring educational attainment in this context.

V. Results

A. Changes in Resources and Peers

Table 1 shows the results of estimating Equation 2, with and without controls, with changes in black exposure to white, the black student-teacher ratio, and the change in per-pupil current expenditure for blacks as dependent variables. The estimates confirm that the results shown in Figure 3 are robust to including controls. The first column shows the mean and standard deviation for the control variables. The regression of the change in black exposure on *1960fractionblack* shows a strong neg-

The 10th grade continuation rate is the share of eighth graders who registered for tenth grade in the fall, so this is a proxy for the share who *completed at least* ninth grade, the 11th grade continuation rate proxies the share who completed at least 10th grade and so on.

19. To reduce noise in the data, the continuation rates plotted in Figure 4 are net of the average continuation rate for fifth through eighth grades. For example, the 12th grade net continuation rate is $netconrate_t^{12} = \frac{reg_t^{12}}{reg_{t-4}^8} - \frac{1}{4} \sum_{g=5}^8 \frac{reg_t^g}{reg_{t-4}^{g-4}}$.

20. It is worth noting that the state-wide average trends in educational attainment for blacks in Louisiana shown in Figure 4 do not appear to be well explained by the timing of desegregation policy. Attainment rose through about 1968, leveling off or declining slightly in the early 1970s. Other factors may have influenced these trends, however, potentially masking improvements due to desegregation. The causes of the stagnation in educational attainment in the 1970s are not well understood (Card and Lemieux 2001).

21. White mobility, on the other hand, was significantly related to black enrollment share, as white enrollment shifted from higher to lower black enrollment share counties during the period of desegregation (Reber Forthcoming). This precludes using a similar methodology to assess the effects of desegregation on white educational attainment.

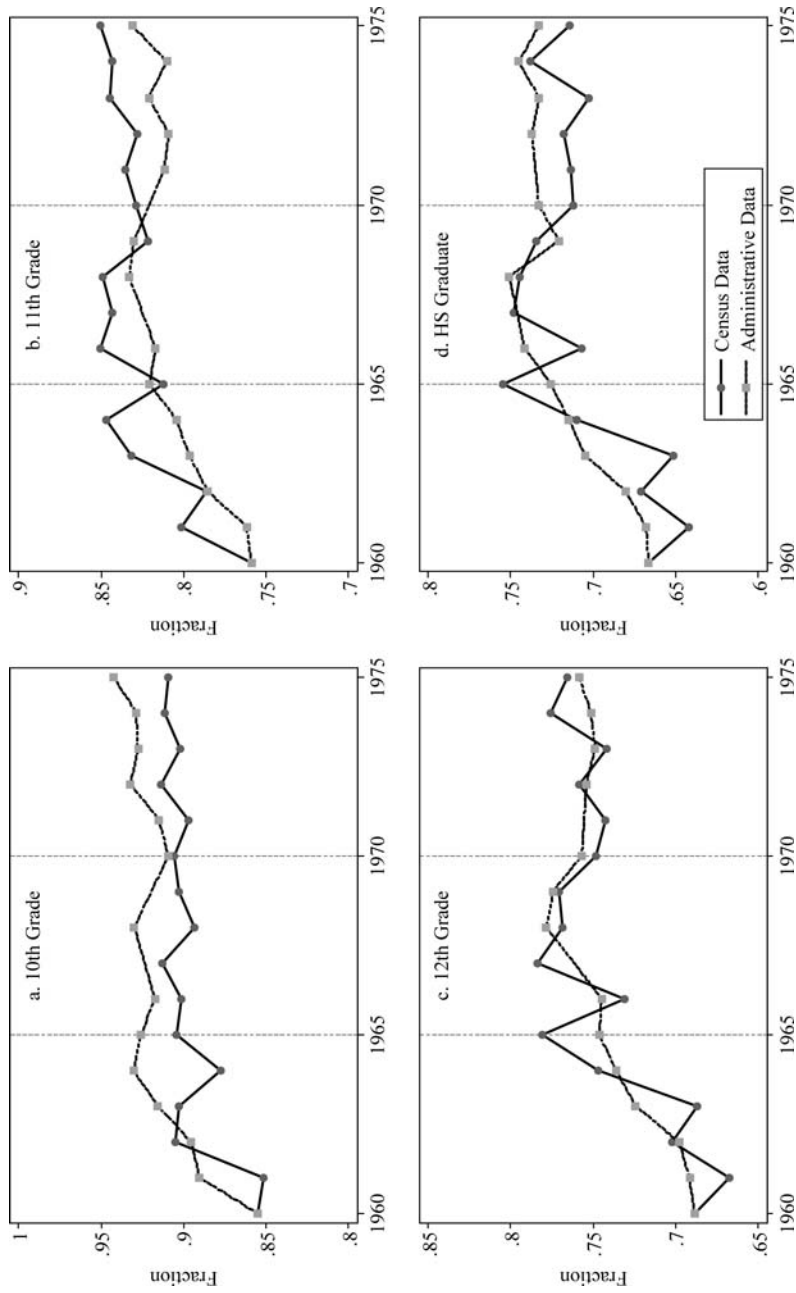


Figure 4
Trends in Black Educational Attainment in Louisiana from Administrative and Census Data
 Notes: Author's calculations. Census series is the share of Louisiana-born blacks who reported attaining the specified level of education. Individuals are assigned to the year in which they would have attained the specified level. Series for administrative data are rescaled to be equal to Census series in 1960.

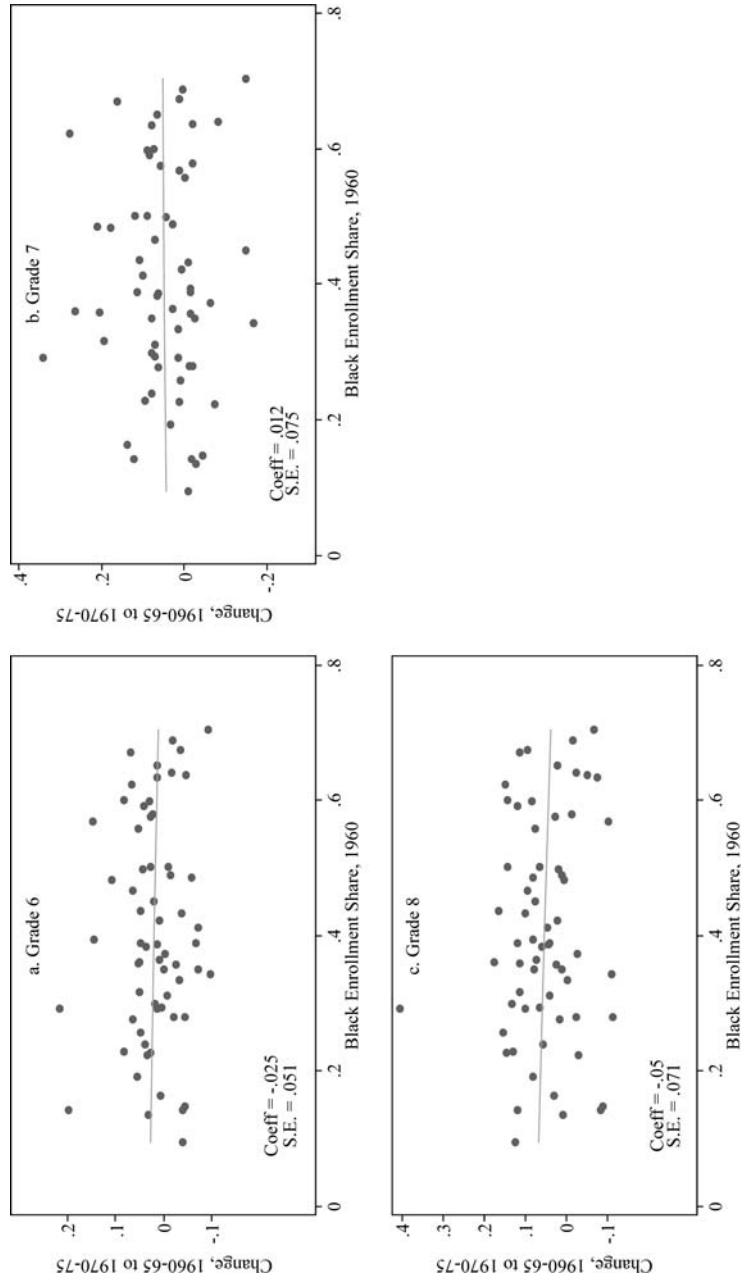


Figure 5
Changes in Continuation Rates vs. 1960 Black Enrollment Share, Louisiana Counties
Notes: Author's calculations. Sample includes 63 Louisiana counties. See text for more detail on how changes in continuation rates were constructed.

Table 1
Determinants of Changes in Educational Inputs for Blacks

	Mean (standard deviation)	Black Exposure to Whites	Black Student- Teacher Ratio	Per-Pupil Current Expenditure
Black share of enrollment, 1960	0.405 (0.162)	-1.051 (0.064) ^c	-7.434 (2.622) ^c	1.925 (0.390) ^c
Percent black VAP	0.359 (0.282)	0.049 (0.053)	1.859 (1.187)	0.253 (0.207)
Registered to vote, 1960	8.952 (1.938)	-0.010 (0.009)	0.123 (0.259)	0.000 (0.031)
Nonwhite median	3.365 (1.082)	0.003 (0.015)	1.301 (0.360) ^c	-0.062 (0.045)
Years of education, 1960	0.519 (0.135)	-0.152 (0.125)	3.471 (3.877)	-1.373 (0.534) ^c
Percent of households with complete plumbing	0.341 (0.241)	-0.111 (0.061) ^a	-1.341 (1.823)	0.467 (0.268) ^a
Change in per-pupil instructional spending for blacks, 1955-59	0.258 (0.089)	-0.100 (0.132)	16.724 (3.612) ^c	-1.808 (0.444) ^c
Change in percent of VAP blacks registered to vote, 1964-68	0.299 (0.178)	-0.164 (0.077) ^c	0.204 (2.365)	-0.418 (0.394)
Ln change in employment	0.353 (0.206)	0.059 (0.048)	1.150 (1.747)	0.075 (0.280)
Constant		0.878 (0.031) ^c	-2.924 (1.155) ^c	1.448 (0.157) ^c
N	63	63	63	63
R-squared		0.74	0.13	0.33

Notes: Huber-White heteroskedasticity-adjusted robust standard errors in parentheses.
a. Significant at the 10 percent level.
b. Significant at the 5 percent level.
c. Significant at the 1 percent level.

ative relationship between black enrollment share and black exposure to whites, with an estimated coefficient of -1.05; controls for preexisting characteristics have little effect on the coefficient. The second set of results show that a ten percentage point increase in *1960fractionblack* is associated with an additional reduction in black student-teacher ratio of 0.74 (first column); the inclusion of controls reduces the estimates (in absolute value) by about a quarter. A ten percentage point increase in *1960fractionblack* is associated with an additional increase in per-pupil current expenditure of about \$200. (The standard deviation of black enrollment share is about 16 percentage points.)

B. Main Results: Continuation Rates for Older Grades

To test the hypothesis that the continuation rates rose differentially by *1960fractionblack*, I estimate Equation 2 for the upper grades; I also plot the change in continuation rates against initial black enrollment share in Figure 6. The results, with and without controls are presented in Table 2. Figure 6 and the point estimates in Table 2 indicate that black educational attainment increased more in districts with higher *1960fractionblack*. Without controls, the coefficients on *1960fractionblack* indicate that a ten percentage point increase in *1960fractionblack* was associated with a 1.4, 1.9, and 1.8 percentage point larger increase in the continuation rates for 11th grade, 12th grade, and high school graduation, respectively; the estimated coefficients are statistically significantly different from zero at the 10 percent level for 11th grade and at the 5 percent level for 12th grade and high school graduation. The coefficient for the 10th grade continuation rate is relatively small and statistically insignificant. The controls reduce precision but do not substantially affect the coefficient estimates.²² High black enrollment share districts saw larger increases in educational attainment during the period of desegregation.

C. Timing

Closer examination of the timing suggests that the differential improvements in educational attainment among blacks in high black enrollment share districts were concentrated between 1967 and 1971, consistent with a causal effect on attainment of increased funding around the same time. The first panel of Figure 7 shows the results of estimating Equation 3 for the 10th grade continuation rate and plotting the interactions of *1960fractionblack* with the year dummies. For comparison, I also plot the results for the sixth grade continuation rate (sixth grade registration divided by fourth grade registration two years prior). The remaining panels of Figure 7 show the results for the 11th and 12th grade continuation and high school graduation rates, with the relevant low-grade comparison groups. First, Figure 7 shows that for none of the younger grade continuation rates is a trend in the coefficients evident, confirming that blacks' mobility was not correlated with initial black enrollment share. Figure 7 also shows that the coefficient on black enrollment share in the predesegregation period is close to zero for the upper grade continuation rates; that is, blacks

22. The increase in the standard errors appears to be due to the high correlation between the initial black enrollment share and the change in the share of blacks registered to vote.

Table 2
Determinants of Changes in Upper Grade Continuation Rates, 1960–65 to 1970–75

	Grade 10	Grade 11	Grade 12	HS Graduation
Black share of enrollment, 1960	0.045 (0.066)	0.136 (0.078) ^a	0.152 (0.119)	0.182 (0.076) ^b
Low-grade continuation rate	-0.004 (0.098)	0.185 (0.075) ^b	0.189 (0.097) ^a	0.188 (0.114)
Percent black VAP registered to vote, 1960	-0.416 (0.280)	0.015 (0.250)	0.259 (0.218)	0.100 (0.227)
Nonwhite median income, 1960	-0.031 (0.065)	-0.030 (0.071)	-0.010 (0.068)	-0.005 (0.065)
Nonwhite median years of education, 1960	0.002 (0.008)	-0.001 (0.010)	-0.003 (0.009)	0.000 (0.009)
Percent of households with complete plumbing	-0.019 (0.013)	-0.017 (0.016)	-0.012 (0.015)	-0.002 (0.014)
Percent of population in urban areas	-0.152 (0.158)	-0.115 (0.157)	-0.002 (0.145)	-0.062 (0.154)
Change in per-pupil instructional spending for blacks, 1955–59	0.108 (0.064) ^a	0.156 (0.078) ^a	0.083 (0.070)	0.087 (0.074)
Change in percent of VAP blacks registered to vote, 1964–68	0.081 (0.114)	0.137 (0.129)	0.197 (0.126)	0.223 (0.119) ^a
Ln change in employment	0.024 (0.110)	-0.034 (0.131)	0.035 (0.119)	0.018 (0.124)
Constant	-0.032 (0.078)	-0.073 (0.071)	-0.025 (0.069)	0.008 (0.067)
N	0.037 (0.029)	-0.013 (0.034)	-0.026 (0.033)	-0.016 (0.033)
R-squared	63	63	63	63
	0.01	0.05	0.09	0.10
				0.20

Notes: Huber-White heteroskedasticity-adjusted robust standard errors in parentheses.
 a. Significant at the 10 percent level.
 b. Significant at the 5 percent level.
 c. Significant at the 1 percent level.

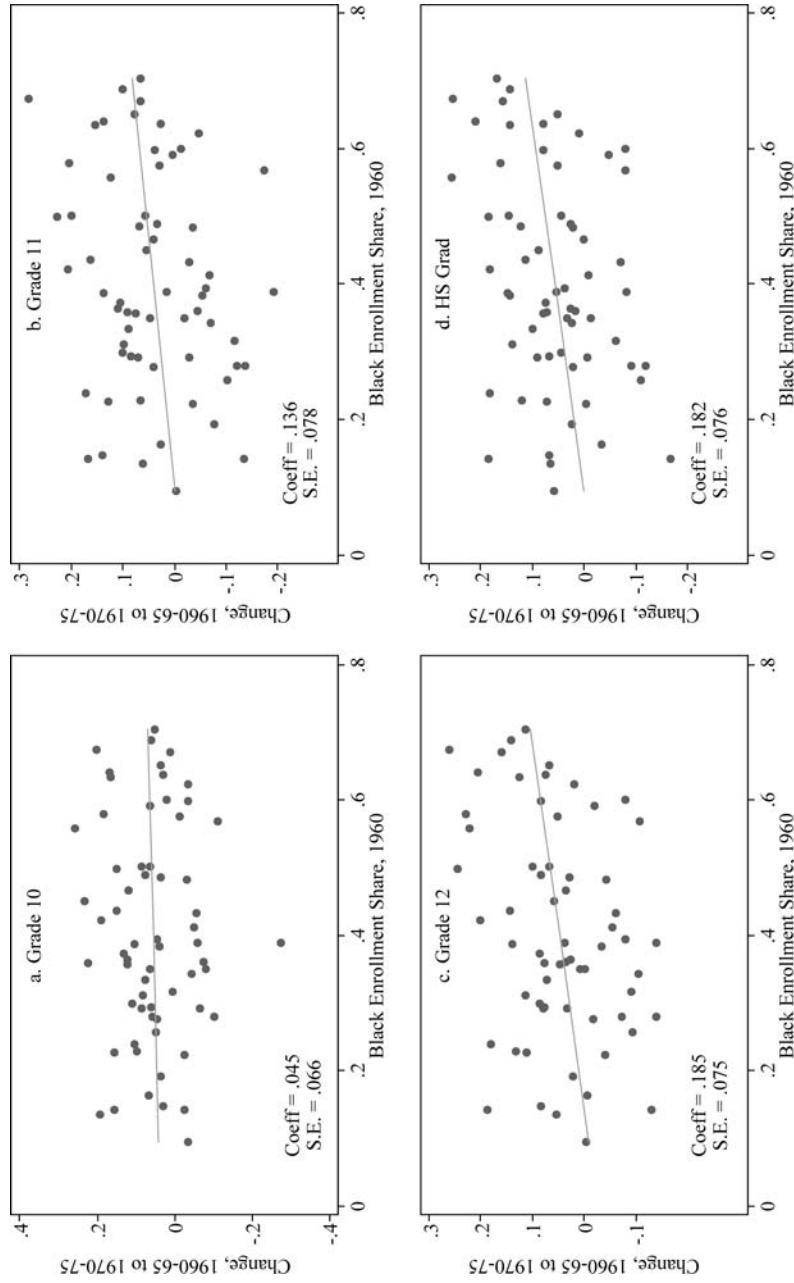


Figure 6
Changes in Continuation Rates vs. 1960 Black Enrollment Share, Louisiana Counties
 Notes: Author's calculations. Sample includes 63 Louisiana counties. Graphs correspond to regressions reported in the first column for each grade in Table 2.

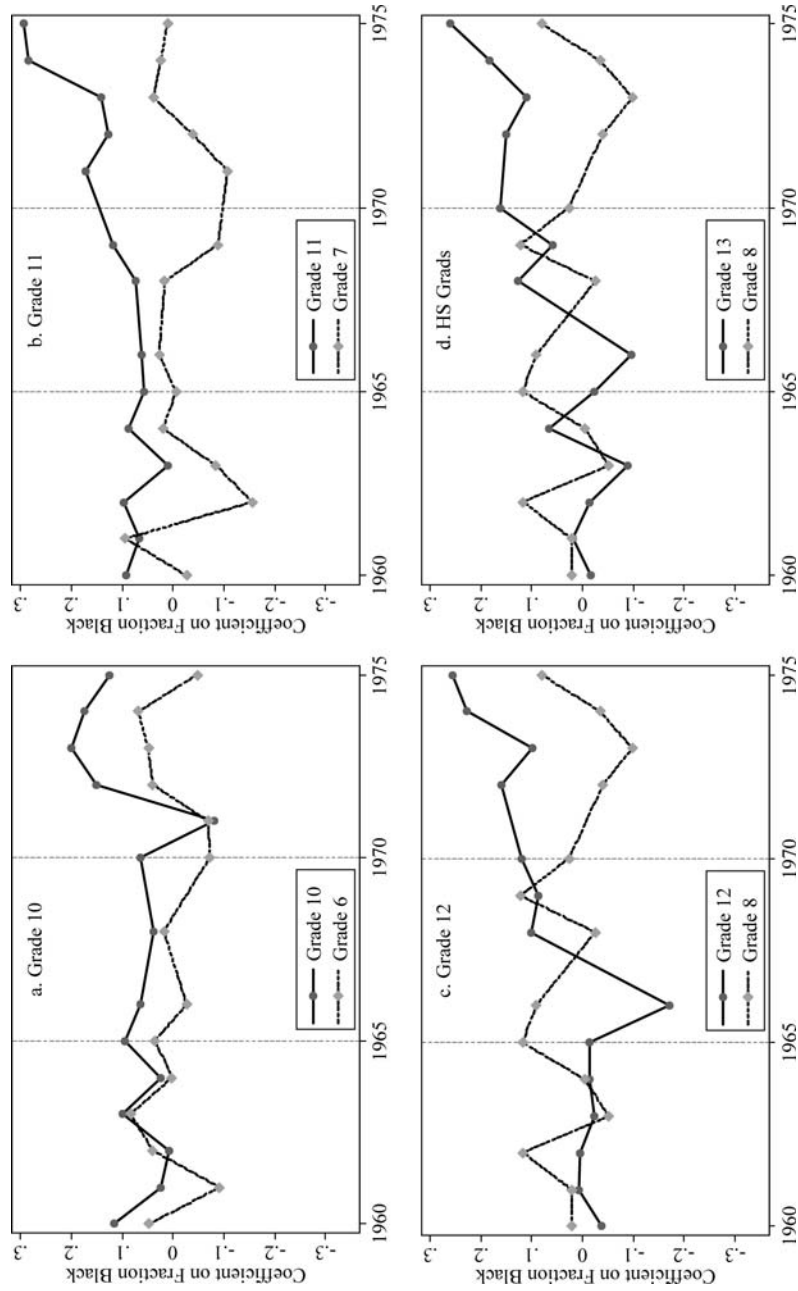


Figure 7 Trends in Correlation between Initial Black Enrollment Share and Continuation Rates by Grade
 Notes: Author's calculations. Each point represents the coefficient on $1960fractionblack$ from a regression of the continuation or high school graduation rate on $1960fractionblack$. Trends in the coefficient for lower grade continuation rates are presented for comparison.

in higher and lower black enrollment share counties did not have systematically different continuation rates before desegregation.

The coefficient for the tenth grade continuation regressions increased around 1972, and for 11th grade continuation, it increased around 1969 or 1970. The coefficient for the 12th grade continuation and high school graduation rate regressions rose slightly earlier around 1968. The results are consistent with a larger increase in black continuation rates for high *1960fractionblack* districts around the time of desegregation, when those districts experienced larger increases in per-pupil funding but smaller increases in exposure to whites.²³

D. Assessing the Magnitude of the Effects

The results suggest that increased funding associated with desegregation improved educational attainment for blacks, but the magnitudes of the coefficients presented in Table 2 and 4 are not easily compared to the existing literature. I therefore provide two “back-of-the-envelope” calculations of the effects of school funding on educational attainment implied by the estimates.²⁴ In this discussion, I assume that the relationship between 1960 fraction black and attainment operated entirely through differential changes in per-pupil spending; that is, the causal effect of black exposure to whites is zero. This is a strong—but conservative—assumption. To the extent that there is also a positive effect of exposure to whites on attainment, this approach will underestimate the effect of spending on attainment. The estimates provide a useful benchmark for evaluating the results.

First, I estimate the elasticity of high school graduation rates with respect to school spending. I am not aware of existing literature estimating the cost of programs that increase high school graduation rates, however, so it is not clear with what this estimate should be compared. I therefore also conduct a simple cost-benefit analysis: I compare the net present value of additional wages induced by desegregation-related increases in school spending to the net present value of additional school spending for the affected cohorts.

To estimate the increase in high school graduation rates *per additional dollar spent*, I divide the coefficient on *1960fractionblack* from the regression with the change in attainment as the dependent variable by that from the regression with the change in per-pupil current expenditure as the dependent variable. A \$1,000 increase in funding (in 2007 dollars) during the period of desegregation was associated with a roughly ten percentage point increase in the black high school graduation rate.²⁵ Average per-pupil current expenditure in the predesegregation period (1960–65) was \$2,400, and the average high school graduation rate for predesegregation cohorts was 68 percent according to the 1980 Census. Thus, a 42 percent increase in per-

23. I test separately for trends in the coefficients on initial black enrollment share in the pre- and post-desegregation periods: I do not reject that all the coefficients for 1960 to 1964 are the same (no trend) for any grade. For the upper grades, the postdesegregation trend is statistically significant, as I reject equivalence of the coefficient on initial black enrollment share for 1965 to 1975.

24. See Hanushek (1986) and Card and Krueger (1996a, 1996b) for a summary of the existing literature on the effects of school spending on outcomes.

25. For this calculation, I use central estimates of two (in thousands of 2007 dollars) for the per-pupil expenditure regression coefficients (Table 1) and 0.19 for the high school graduation regression (Table 2).

pupil current expenditure corresponded to a 15 percent increase in high school graduation rates or an elasticity of high school graduation rate with respect to expenditure of 0.36.

To account for increases in educational attainment below high school graduation, I use the coefficients from the tenth, 11th, and 12th grade continuation rate and high school graduation rate regressions. For the average cohort in the “after” period, exposure to \$700 of additional spending corresponded to 0.053 additional years of educational attainment. Estimates from the literature on returns to schooling suggest that an additional year of education raises wages by 8–12 percent; I use an intermediate value of 10 percent. According to the 1970 Census, black Louisianans between the ages of 20 and 50 with 10–12 years of education (but no high school degree) had annual average wages around \$9,700 (in CPI-adjusted 2007 dollars).²⁶ Based on these assumptions and assuming a 5 percent discount rate, the net present value of additional wages surpasses the \$700 increase in spending after 20 years in the labor force.²⁷

The benefits of desegregation policy are potentially significantly underestimated, primarily because higher wages due to increased educational attainment were not the only benefits of the policy, and there may have been costs not captured here (for example, to whites). Still, the additional spending appears to have been “worth it.”

VI. Conclusion

The analysis presented above shows that, during the five years of the most intensive desegregation activity in Louisiana, districts with higher black enrollment shares saw substantially larger increases in per-pupil funding. Blacks in those districts saw large reductions in student-teacher ratios as black-white school quality gaps closed but also smaller increases in exposure to whites. The finding that blacks in higher black enrollment share districts experienced significantly larger increases in educational attainment during this period suggests that the increased funding that came with desegregation was more important than the increased exposure to whites. The findings are consistent with earlier work by Boozer, Krueger, and Wolkon (1992), Guryan (2004), and Ashenfelter, Collins, and Yoon (2006) suggesting that desegregation improved educational attainment for blacks and contribute to the growing literature suggesting that the policies designed to equalize educational opportunities of blacks and whites around the middle of the century—including desegregation—contributed to improved outcomes for their intended beneficiaries.

A rough cost-benefit calculation suggests that the return to the additional years of schooling was likely larger than the additional cost incurred. However, this calculation is far from a complete accounting of the potential costs and benefits of de-

26. This estimate includes blacks with 0 wages; the average wages among those who are working is nearly \$15,000.

27. Further details on the cost-benefit calculation are available from the author.

segregation. Evidence is mounting that education has beneficial effects on outcomes other than wages, in particular, health and criminality.²⁸ In addition, the quality of education for blacks likely rose as well, so blacks who did not change their attainment also may have seen benefits. On the other hand, this study has not been able to account for the effects of desegregation on whites. Reber (Forthcoming) shows that funding and student-teacher ratios were “leveled up” to the level previously experienced by whites; this is suggestive that whites were “held harmless” in resources allocated to their schools, and we would not expect large effects on educational attainment and quality for whites through that channel. Still, the overall effect of desegregation on whites is unknown.

Little is known about how desegregation affected school finances in other states, so it is difficult to assess whether the mechanism that operated in Louisiana to bring up school spending and black educational attainment after desegregation operated in other parts of the country. Margo (1990) estimates that Louisiana had one of the largest state-wide black-white school spending gaps among Southern states in 1950. This suggests that by the time of desegregation, other states may not have had as large a black-white quality gap to close, so there may have been less scope for improvement in blacks’ outcomes through the mechanisms shown here.

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28. See, for example, Lochner and Moretti (2004), Currie and Moretti (2003), and Lleras-Muney (2005).

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