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ABSTRACT

A school finance equalization program established in Mississippi in 1920 failed to help many of the state's Black students – an outcome that was typical in the segregated U.S. South (Horace Mann Bond, 1934). In majority-Black school districts, local decision-makers overwhelmingly favored white schools when allotting funds from the state's preexisting per capita fund, and the resulting high expenditures on white students rendered these districts ineligible for the equalization program. Thus, while Black students residing in majority-white districts benefited from increased spending and standards for Black schools, those in majority-Black districts continued to experience extremely low – and even worsening – school funding. We model the processes that led the so-called equalization policy to create disparities in schooling resources for Black students, and estimate effects on Black children using both a neighboring-counties design and an IV strategy. We find that local educational spending had large impacts on Black enrollment rates, as reported in the 1940 census, with Black educational attainment increasing in marginal spending. Finally, we link the 1940 and 2000 censuses to show that Black children exposed to higher levels of school expenditures had significantly more completed schooling and higher income late in life.

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"When you have poor schools, you have poor teachers. When you have poor teachers, you get a poor education. And when you get a poor education, you are destined to be a poor man or a poor woman the rest of your life." —Malcolm X

1 Introduction

Black Mississippians born a century ago had poor schools—particularly in the Delta region of the state, where most Black families lived as sharecroppers on former plantations. We analyze the combination of programs that produced low and disparate county-level funding for the schooling of Black students in Mississippi circa 1940, and evaluate impacts of these funding choices on students' educational development and lifetime economic well-being.

Public school districts in the state relied on three main sources of revenues: local property taxes; a per capita grant from the state based on the number of 5–21 year olds in the district; and a state equalization fund, introduced in 1920, which provided need-based grants to participating districts. On its surface, the equalization program had progressive elements: the funding formula was designed to incentivize higher school spending, and the state had the authority to set standards for local schools in districts that received equalization funding. Be that as it may, it appears that the program *increased* cross-county disparities in schooling resources allocated to Black students.

The first objective of our paper is to model the processes that led the equalization program to amplify resource disparities among Black students. We start from the premise that local decision-makers were concerned mainly with the well-being of white children, placing little value on marginal spending for Black students.[1] In this setting, the state's per capita grant system converted local Black children into a *resource* for white schools, because the state provided funding based on the total number of children, but local decision-makers disproportionately allocated the funding to white schools. Thus, educational expenditures for white students were highest in majority Black counties. The resulting disparities in resources for white students led to the pressure from the majority-white counties for a need-based grant system, ultimately adopted in 1920. As argued by Bond (1934, p. 285), the goal of the system was "... not to 'equalize' education in the broader sense, but to offset by the provision of new state aid for 'white' counties the old system, so advantageous

[1] In 1940 virtually all voters in Mississippi were white. Local jurisdictions presumably had incentives to provide a minimal level of support for Black schools—either to discourage out-migration of Black citizens or to avoid legal action (Margo 1990). Thus, we focus on any marginal adjustments above such threshold.

to the 'black' counties, by which apportionments were made on a per capita population basis but spent at the the discretion of local authorities."

Despite their abysmal Black schools, counties in the majority-Black Delta region of the state were mostly ineligible for aid, because the existing revenues were judged to provide sufficient funding to meet local educational needs. For the roughly 50% of Black Mississippians living in these "no-equalization" counties, the program was thus irrelevant. In contrast, in "equalization counties," school resources for Black students were impacted in two ways. First, the program provided extra school funding, while promoting higher local taxes. Second, the state set standards for schools receiving equalization funding, including a minimum term length for Black students. While these standards were not rigidly enforced, they appear to have pushed many equalization counties to increase resources for Black schools.

Our second objective is an evaluation—specific to our historical setting—of the effect of school funding on educational development and lifetime economic success. We begin by examining schooling outcomes of Black youth aged 14–18 in 1940, using 100% counts from the 1940 U.S. census. We focus on these children because many were already out of school, but nearly all were still living with their parents, allowing us to estimate models in which we control for parental characteristics such as income, education and home ownership.

We exploit cross-county variation in schooling resources devoted to Black schools, focusing on students in rural areas outside the "special districts" that covered larger towns and cities. Given disenfranchisement, this variation was driven largely by forces beyond the control of Black families, helping to alleviate concerns about endogeneity between spending and parental preferences and resources.[2] Nonetheless, counties with higher levels of instructional spending for Black students plausibly differed from those with lower spending, raising the possibility of omitted variable bias in the correlation between student outcomes and spending.

With this in mind, we narrow our focus to comparisons between Black children living in the border region between counties that received or did not receive equalization funding. These children were exposed to similar local conditions, but had different funding levels for their Black schools set by *county-wide* decision makers. Drawing on the logic set out

[2]Local Black families had some influence on extra-governmental school resources, like the Rosenwald Schools examined by Aaronson and Mazumder (2011) and Aaronson *et al.* (2021). In the case of Mississippi, Moffitt (1931, p. 22) reported that $2.8 million was spent on building Rosenwald Schools from 1919 to 1931 (of which $1.2 came from local school districts, $0.8 from Black donations, $0.3 white donations, and $0.5 from the Rosenwald Foundation). The Rosenwald program ended in the early 1930s.

by Bond (1934) we also implement an IV approach, using county-level variation in the fraction of Black families (measured in 1920) as an instrumental variable for the level of Black educational funding in the county.

Our estimates reveal that higher school resources had a positive effect on Black student educational attainment. This accords with standard reasoning: where schools are better-funded, the expected benefits of attendance are higher and the costs are lower (due to shorter travel times and better school conditions). We find that a $1 increase in annual instructional spending per Black student (from a base of $5 per year) increased the fraction of 14–16 year old Black students completing at least sixth grade by around 1.5 percentage points (from a base of 45 percent) and increased mean completed schooling by around 0.10 years (from a base of 5.28 years). Extrapolating well out of sample, these estimates imply that raising school spending on Black students to the level for white students (about $25 per year) would have raised their completed education by 2 years. We find that the estimates are very similar whether we use OLS or IV models. When we study youth living in the border regions between equalization and no-equalization counties, both OLS and IV models point to larger effects, suggesting that, if anything, the state-level models may understate the effects of school resources, especially in the low-spending counties.

We then turn to an analysis of long-run outcomes, based on matches of respondents in the 1940 and 2000 censuses. Approximately 40% of Black children in Mississippi who were enumerated in the 1940 census can be assigned a personal identification key (PIK) that enables a link to later Census Bureau surveys. One-in-six of those completed the long form of the 2000 census, providing us with a sample of around 6,000 children for whom we can observe family circumstances and local school resources in 1940 *and* education and income information 60 years later. Reassuringly, we confirm that each dollar of additional instructional spending (as of 1940) was associated with a 0.09 year increase in completed education (with a standard error of around 0.02 years), which is very close to our estimate using contemporaneous data in 1940. We also find that higher school resources in 1940 were associated with significantly higher household and family income in 2000; an increase in one dollar of school funding is associated with a 3 percent increase in income. Relative to the size of the effect on completed schooling, this is a large effect, suggesting that higher spending increased both the years of schooling of Black Mississipians and their returns per year of schooling.

Our work contributes to three main areas of the literature. First, we add to the theory of fiscal centralization (e.g., Oates, 1999) by incorporating Bond's (1934) insights on the in-

teraction between centralized funding systems and discriminatory preferences among local decision makers.[3] Second, our work contributes to the literature on the historical development of schooling in the U.S. South and Black-white disparities in educational opportunity and achievement (e.g., Smith and Welch, 1989; Nechyba, 1990; Card and Krueger, 1992b, 1996; Collins and Margo, 2006; and Carruthers and Wannamaker, 2017). Third, we provide new estimates of the long-run effects of school resources, which complement studies of the effects of school finance reforms on more-recent cohorts of lower income children (e.g., Jackson et al., 2016; LaFortune et al., 2018; Jackson and Mackevicius, 2021).

The paper proceeds in four additional sections. In Section 2 we describe the historical setting and Mississippi's equalization initiative. In Section 3 we set out a simple model that shows how the equalization program affected school district choices. In Section 4 we present empirical analyses of both short-term and long-run outcomes of students affected by the funding decisions of Mississippi school districts. Section 5 concludes.

2 Background

2.1 Overview

In the Jim Crow era, resources for Black students in the Deep South were minimal. Figure 1 uses data on teacher salaries and pupil-teacher ratios to construct a measure of teacher salary expenditures per pupil (in 2022 dollars) for white and Black students in Mississippi and three other Deep South states—Alabama, Georgia, and South Carolina—from 1920 to 1950.[4] The figure illustrates two key points. First, throughout the 1920–40 period, instructional spending per Black pupil in Deep South states was only around 25–30% of corresponding spending on white pupils. Second, while spending rose in other Deep South states during the 1930s, spending for Mississippi's white pupils stagnated, and *fell* for Black pupils (by nearly 25%), reflecting the strain of the Great Depression and the decisions of Mississippi politicians to shift more of the burden to Black schools. Thus, even relative to other Deep South states, Mississippi's Black schools were under-resourced in 1940.

While spending on Black students in Mississippi was low relative to whites, there was also considerable variation across the state's 82 counties. One key dimension of this vari-

[3] There are clearly other cases in which fiscal centralization policy potentially shapes incentives of local fiscal jurisdictions to engage in discrimination in the allocation of resources to local public goods and services. Chung et al. (2017) and Largent (2018) consider the case of hospital services.

[4] Underlying data are taken from Card and Krueger (1992) and are shown in Appendix Table 1.

ation is illustrated in Figure 2, which plots Black-white monthly teacher salary ratios for 20 large counties in 1889–90 and 1936–37, graphed against the Black population share in the county.[5] In 1889–90, Black teacher salaries were close to 80% of white teacher salaries in most counties, apart from a handful where Blacks substantially outnumbered whites—including Bolivar county (the Delta county with the state's largest Black population), and Noxubee County (a county on the Alabama border with a large Black sharecropper population). By the late 1930s, Black teacher salaries were still about the same in nominal terms as in 1889–90, but white teacher salaries had risen substantially, particularly in the counties with larger Black populations. Thus, the Black-white salary ratio to fall to around 35% and became strongly negatively correlated with the fraction of Black residents.

2.2 Education Finance in Mississippi

Significant state funding for public education in Mississippi was established in the Constitution of 1890, which created a Common Fund to be distributed on the basis of the number of 5–21 year olds enumerated in a special School Census.[6] The per capita grant was more than many districts were spending per 5–21 year old Black child—a reflection of low enrollment rates, low teacher salaries, and high pupil-teacher ratios—leading to big differences in the resources available *per white student* between the "Black counties" (i.e., those in the Delta region) and the "white counties."[7]

These disparities were amplified by the systematic over-counting of Black children in counties with high Black shares. Moffitt (1931) noted that in many of these counties the number of 5–21 year old Black youths in the 1929 school census was much higher than the number in the 1930 U.S. census. Appendix Figure 1 shows data from Moffitt (1931,

[5]Data are from the State of Mississippi Department of Education (*Biennial Report* for 1935–37), Table II, and ignore differences in the average number of months that teachers were employed (typically 1–2 months longer for white teachers). Teacher salaries were not regularly reported by the State superintendent, but the 1935–37 report contains an unusually detailed section on issues of schooling for Black students, including salaries for selected counties in 1889–90 and 1936–37. A footnote reads: "It is interesting to note that the salaries of negro teachers are practically the same today in Mississippi as they were forty-seven years ago."

[6]See Adams (1980) for a detailed history. The principle of allocating the fund on the basis of the number of children, without regard to race or enrollment status, came from the earlier (reconstruction) constitution, and this practice as adopted in other Southern states, including Alabama.

[7]This fact was noted almost immediately after the per capita grant was established. In a March 17, 1892 letter to the Jackson *Daily Clarion,* the State Superintendent of Education, J. R. Preston wrote: "... thirteen counties, in which the negroes are three to one, will get from the State $61,696 more than is necessary to maintain their schools four months; while thirteen other counties, ten of which are white counties, will receive $50,500 less than they expended last year, to maintain a four month session" (quoted in Adams, 1980, page 79).

Table 36) comparing these two counts. In Bolivar county the 1929 school census reported 35,364 Black residents aged 5–21, while the 1930 census counted only 19,240, providing substantial extra revenue that was used for the white schools. Similar over-counts persisted throughout the 1930s: the 1939 school census counted 64% more children aged 5–21 than were enumerated in the 1940 census (*Biennial Report,* for 1939–1941, Table 11).

Ultimately, pressure from the white counties led to creation of the state equalization fund. By 1929 annual disbursements from this fund equaled those of the Common Fund. The original aim of the equalization program was to provide enough resources to fund a 6 month school term for white schools. In later years this goal was expanded to include subsidizing the transport of white students and financing a minimum term for Black schools.

The equalization program used a formula that (in principle) compared standardized expenses in a district to its available resources, including resources from the Common Fund, local poll taxes, and a hypothetical income steam from property taxes. Appendix Table 2 reproduces the simplified calculations for two anonymous counties in the 1929–30 school year reported in Moffitt (1931, page 235). Instructional expenses were based on the number of "teaching units" required in the county (based on average daily attendance of each race and an assumed 30 pupils in attendance per teacher), multiplied by standardized monthly teacher salaries (specific to each race) and an assumed school term (which also varied by race). The formula for transportation expenses is not reported in Moffitt (1931), but later reports suggest that it was based on the number of white children transported in previous years and an estimated cost per child in the county.[8] The income stream from property taxes was calculated using the total assessed value of property in the district and a *minimum* tax rate that was set at 5 mils (i.e., \$5 per \$1000 in property value) in 1930, and raised to 10 mils in 1936.

The equalization grant given to a school district was based on its calculated "need" (i.e., expenses minus revenues, assuming the minimum tax rate), scaled in proportion to the ratio of its actual property tax to a *target* tax rate, which in the years before 1936 was set at a higher level than the minimum rate used for the calculation of need (e.g., 10 mils in 1929–30).[9] As we discuss below, the formula provided a financial incentive for a district

[8]The cost of transportation and its wide variation across counties was a major concern of the legislature throughout the 1930s. A 1938 report, (*State of Mississippi Department of Education,* 1938) devoted 23 pages to this issue, noting that over 40% of equalization funds were used for student transport. In contrast, only two pages of the entire report were devoted to a discussion of issues related to Black schools.

[9]Complicating matters, according to the Brookings Institution (1932), about 10% of the equalization fund was allocated at the discretion of the Superintendent of Education. The distribution of these funds

to raise its tax rate up to the target rate—a feature that was criticized in a review of the program by the Brookings Institution (1932), but that was ultimately retained in a major 1936 revision of school finances, known as the Kyle-Cook budget law. This law set a 10 mil minimum tax rate for calculation of district need, and specified that districts setting a rate of $t < 10$ would receive a proportion $t/10$ of the need. Interestingly, the equalization payments received by different counties before and after the reform were highly correlated, suggesting that the net effects of the reform were relatively minor.

With respect to resources for Black schools, two features of the equalization formula are important. First, district need was calculated using observed student attendance in each county. To the extent that an increase in spending on Black schools could raise enrollment rates, or raise the attendance rates of enrolled students, calculated need under the formula would rise, offsetting some of the extra cost of that spending. (We discuss the magnitude of the implied subsidy below.) Second, after the 1936 reforms, 19 counties were excluded from receiving any equalization payments because their revenues from the Common Fund and property taxes at the minimum tax rate were more than enough to finance their schools—a consequence of low enrollment rates of Black youth, low spending per enrolled Black student, and the over-counting of Black children. In fact, nearly all of these no-equalization counties set a property tax rate *below* the 10 mil target rate, and yet had relatively high spending on white schools.

3 A Model of School Resource Allocation

In this section we present a stylized model of the effects of Mississippi's equalization program on school district choices. Our particular interest is how equalization shaped cross-county disparity in resources allocated to the education of Black children.

We assume that school district choices reflect the preferences of a representative white family in the district. We first describe choices in the absence of equalization, then show how the equalization formula potentially affected these choices.

became a major political issue in the mid-1930s, and Moffitt (Director of the Department of Education's Division of Information and Statistics at the time of the 1929–31 *Biennial Report*) ultimately left the Department and supported the opponent of the long-time superintendent, who lost re-election in 1935. See Adams (1980).

3.1 School Financing in the Absence of Equalization

Consider a representative white taxpayer in a school district who has an annual income y and owns land with an assessed value L. The taxpayer has an objective function that depends on consumption (c), school expenditures per white student (s_W), and school expenditures per Black student (s_B),

$$U(c, s_W, s_B). \tag{1}$$

We assume that the taxpayer has one enrolled school-age child; that there are b Black children per white child in the district, with an enrollment rate of $e_B < 1$; that Black families own no land (and therefore pay no school taxes); and that the district receives a per capita grant g from the state, for both white and Black children. If the local land tax for school finance is t, the district's budget constraint, expressed per white family, is

$$s_W + be_B s_B = tL + g(1 + b). \tag{2}$$

The taxpayer's income is allocated to consumption and property taxes, i.e., $y = c + tL$, so equation (2) implies a budget constraint for the taxpayer of the form:

$$c + s_W + be_B s_B = y + g(1 + b). \tag{3}$$

Assuming that the district's preferences align with the representative taxpayer's, the optimal choices of consumption and school spending maximize (1) subject to (3).

The budget constraint faced by a white taxpayer is affected by the local share of Black families (b) in two ways. First, the "price" of a one dollar per student expenditure on Black students is be_B, compared to 1 for whites students. So, the relative price of spending per Black pupil is higher in districts with a higher Black population share and with higher Black enrollment. Second, state aid per white family is $g(1 + b)$, so there is more funding per white family in districts with a higher share of Black residents.

In the absence of other constraints, and treating e_B as fixed, the optimal choices of the taxpayer will equate the two marginal rates of substitution between school spending and consumption to their relative prices (i.e., $U_2/U_1 = 1; U_3/U_1 = be_B$), implying that in districts with a larger Black population, or with a higher Black enrollment rate, spending

per Black student will tend to be lower.[10] We assume, however, that there is a lower bound m on per-student spending on Black students. This constraint will be binding in counties where voters place relatively little weight on Black schooling, and/or where there are relatively more Black students per white family.

A local equilibrium is illustrated in Figure 3(A), which has consumption on the x-axis and per-student expenditures for white students on the y-axis, and is drawn for the simple case in which the lower-bound constraint on Black expenditure is binding.[11] In this case the budget constraint (3) simplifies to

$$s_W + c = y + g + b(g - e_B m), \tag{4}$$

which has a slope of -1 in Figure 3(A), and an intercept along the x-axis representing total resources per white family, $y + g + b(g - e_B m)$, though $c > y$ is infeasible (i.e., the district cannot impose a negative tax). Assuming that $g > e_B m$ (i.e., the per-capita state grant is higher than minimum spending per Black child, adjusting for enrollment), the presence of local Black children is a *net resource* for white families, as was noted by Bond (1934). So, a higher level of b leads to a budget constraint further from the origin.

We show the equilibria for two districts, one with a share of Black children b_0, and another with a higher relative share $b_1 > b_0$. When $g > e_B m$, local taxes will be *lower* in districts with a higher local fraction of Black children, i.e., $t_0 < t_1$, a prediction that is broadly consistent with observed patterns in Mississippi in the early 1930s. Appendix Figure 2, Panel C, for example, plots county-level tax rates in 1931 against the Black share of the local population in each county.[12] The slope is -0.073 (standard error = 0.014).

3.2 School Financing in the Presence of Equalization

Next we consider the impacts of a stylized version of the Mississippi equalization program. Similar to modern equalization formulas (see, e.g., Lafortune *et al.* 2018) the Mississippi plan defined the district "need" as the gap between a target level of per-student spending

[10] E.g., if $U(c, s_W, s_B) = c^{1-\alpha-\beta} s_W^{\alpha} s_B^{\beta}$, then $s_B^* = \beta g / e_B + \beta(y+g)/b e_B$, which is decreasing in b and e_B.

[11] Note that (contrary to conventional practice) we put the numeraire good on the x-axis. So, the slope of the budget constraint is the inverse of the price of school spending on white students.

[12] The county tax rate applied to properties outside of "special districts"—mostly towns and cities—which typically levied somewhat higher property tax rates.

and the district's ability to raise funds. Per white family, the need can be expressed as

$$N = s_W^* + be_B s_B^* - t^* L - g(1+b), \tag{5}$$

where s_W^* and s_B^* are the target levels of spending on white and Black students, respectively, and t^* is the minimum tax rate (set at 10 mils under the 1936 reform of the state's equalization law). Assuming that t^* is also the target tax rate (as was true after 1936), a district that imposed a tax $t \geq t^*$would receive an equalization grant of N per white student, while a district with a tax $t < t^*$ would receive a grant of $\frac{t}{t^*}N$ per white student.

In principle, receipt of equalization funds required a district to meet minimum standards for both the white and Black schools, including a minimum school term (8 months for white students and 5 months for Black students in 1936–37) and minimum teacher salaries.[13] Our reading, however, is that the minimum standards were not rigidly enforced, even for white schools.[14] Formally, we therefore assume that participation in the equalization formula raised the minimum spending per enrolled Black student to $m^{eq} \geq m$.

The equalization program introduces a kink in the district budget constraint at the target tax rate of t^*. Specifically, the district constraint becomes

$$s_W + be_B s_B = \begin{cases} tL\left(1+\frac{N}{t^*L}\right) + g(1+b), & \text{if } 0 < t < t^*; \text{ and} \\ tL + N + g(1+b), & \text{if } t \geq t^*. \end{cases} \tag{6}$$

Consider the representative (white) voter in a district that participates in the equalization program and chooses the minimum spending standard for its Black schools (i.e., sets $s_W = m^{eq}$). Using (6), and recalling that $y + c = tL$, the voter's budget constraint has two segments—corresponding to regions with t below and above t^*—which can be written as

$$\begin{aligned} s_W + c\left(1+\tfrac{N}{t^*L}\right) = y\left(1+\tfrac{N}{t^*L}\right) + g + b(g - e_B m^{eq}), &\quad \text{with } y - t^*L < c < y; \quad \text{and} \\ s_W + c = y + N + g + b(g - e_B m^{eq}), &\quad \text{with } c \leq y - t^*L. \end{aligned} \tag{7}$$

[13] A 1937 National Education Association report (page 80) noted that the Mississippi Board of Education set a standard teacher monthly salary of \$60 for white teachers and \$20 for Black teachers, which presumably only applied in counties receiving equalization funding. Table II of the State of Mississippi Department of Education 1935–37 *Biennial Report* shows the lowest salary among equalization counties was \$20 per month, whereas the lowest among non-equalization counties was \$15 per month (in Noxubee County).

[14] The *Lexington Advertiser* (Feb. 13, 1936, page 4), e.g., reported: "Taxpayers of Mississippi must have breathed easier the past week end when Governor White said that while still favoring a school term of eight months throughout the commonwealth, he is unwilling to bankrupt the state to make it possible."

In the region with $t < t^*$, the relative price of school expenditures is $t^*L/(t^*L + N) < 1$ per dollar—a feature which obviously incentivizes an increase in t (up to t^*). In order to receive equalization payments, however, the district may have to raise spending on Black students (if $m^{eq} > m$), which leads to a potential downward shift in the budget constraint.

To help clarify the issues, Figure 3(B) shows the new budget constraint in the presence of the equalization program, assuming that $m^{eq} = m$ (i.e., ignoring the possibility that participation in the equalization fund required higher spending on Black students). Starting from the choice of $t = 0$ (with $c = y$ and $s_W = g + b(g - e_B m)$), an increase in the tax rate leads to a movement to the left along the steeper segment of the red budget constraint until the tax reaches a level of t^* (at which point $c = y - t^*L$ and $s_W = t^*L + N + g + b(g - e_B m)$). Thereafter, any further increase in taxes leads to a movement to the left along the flatter segment of the budget constraint. In the graph, the preferences of local tax payers lead to an equilibrium at the kink point where $t = t^*$.

Figure 3(C) shows the budget constraint under equalization assuming that $m^{eq} > m$. In this case, participation in the equalization program leads to an increase in spending on Black children, causing the red budget constraint to drop vertically by the amount $be_B(m^{eq} - m)$. For example, in a district with equal numbers of Black and white children ($b = 1$), an enrollment rate of 60% among Black children ($e_b = 0.6$), and a gap of \$1 per year between m^{eq} and m, the vertical distance is 60 cents per year in spending on white students (equivalent to about 2% of average spending on whites in 1940). For districts with $t = t^*$ (which, by 1940, was the case for nearly all counties that were participating in the equalization program), the equalization grant would cover the extra costs of meeting the standard for Black schools if $N > be_B(m^{eq} - m)$, which we believe was always true.

3.2.1 Eligibility for Equalization

Equation (5) specifies that districts are eligible for equalization if the need is positive. Rewriting that equation, to isolate the effect of b,

$$N = s_W^* - t^*L - g - b(g - e_B s_B^*), \tag{8}$$

we see that if $g > e_B s_B^*$, i.e., if that the per capita grant is larger than the cost per Black child of meeting the assumed spending standard, then districts with a higher share of Black children will be *less likely* to qualify for equalization. This tendency was reinforced by differences in the value of land per white child (L), which was generally higher in

counties with a higher share of Black residents, reflecting the higher value of land in the former plantation areas of the state, and the relative size of properties in those areas. In fact, as we show below, the local fraction of Black children was the key determinant of eligibility for equalization funds in the late 1930s and early 1940s in Mississippi.

3.2.2 Implicit Subsidy on Spending that Raises Enrollment

Equation (5) shows that the need of a district varies positively with the enrollment rate of local Black children.[15] In this situation, a rise in spending on Black schools that leads to a rise in enrollment will generate a rise in the district's need and a rise in equalization payments that offsets some of the cost of the spending.

To calibrate the size of the offset, consider a unit increase in spending on Black schools. The cost per white student of this increase in spending is be_B. Using (5), the increase in need per white student will be

$$\frac{dN}{ds_b} = bs_B^* \frac{de_B}{ds_B}. \tag{9}$$

If the district has set a property tax rate at or above t^*, it receives the full amount of the need per white student through the equalization program. For such a district, the change in net cost per white student (C) is then

$$\frac{dC}{ds_b} = be_B - \frac{dN}{ds_B} = be_B \left(1 - \frac{s_B^*}{s_B}\varepsilon_B\right), \tag{10}$$

where $\varepsilon_B = \frac{s_B}{e_B}\frac{de_B}{ds_B}$ is the elasticity of Black student enrollment with respect to spending on Black schools. Equation (10) shows that the degree of offset of additional spending depends on two (multiplicative) factors: (1) the enrollment elasticity, ε_B, and (2) the ratio of "standardized" spending on Black pupils to actual local spending. Based on simple models of enrollment fit to 1940 data we estimate that $\varepsilon_B \approx 0.3$. For calibration purposes we also assume that $\frac{s_B^*}{s_B} \approx 1.0$, though we recognize that some districts set term lengths for Black schools below the state minimum (which was used to calculate s_B^*). These numbers imply that the offset factor arising from the endogeneity of need is on the order of 30%. In other words, the net cost per white family of \$1 of extra spending per Black enrolled student was roughly $0.7be_B$, rather than be_B, as would be the case if there was no feedback from enrollment to need.

[15] Technically, the aid formula depended on average daily attendance, which is the product of the enrollment rate and the attendance rate. For simplicity we are ignoring differences in attendance rates.

4 Empirical Analysis

We proceed with an examination of disparities in educational resources for Black Mississippians circa 1940, and then use records from U.S. censuses (in 1940 and 2000) to examine the consequences of that disparity for short- and long-run schooling and economic outcomes.

4.1 School Funding Patterns

We begin with an overview of school spending patterns across Mississippi's 82 counties, using data for the 1939–40 school year. Figure 4, a map of Mississippi, highlights the 19 no-equalization counties in the late 1930s and 1940s. Eighteen of these are clustered along the Mississippi river, between the Mississippi and Yazoo rivers—an area where large plantations were established in the 19th century to exploit the rich Delta soils for growing cotton, and where, in the first half of the 20th century, a large share of the state's Black population still lived as sharecroppers. The nineteenth was Noxubee county, which, despite its location on the eastern border with Alabama, had a large number of former cotton plantations.[16]

Bond (1934) emphasized the interactions between state funding programs and the share of Black children in the local population—a factor that is highlighted in our simple model. Figure 5 shows the relationship between equalization payments per student in each county and the Black population share (measured in 1920). We plot the 19 no-equalization counties with a different color: these counties are all clustered to the far right of the graph. Even among the equalization counties, however, there is a clear negative relationship with the Black share, reflecting the impact of the per capita funding formula and the pattern of land values in the state.

Figure 6 explores the relationship between the Black population share and the levels of spending by race. Panels A and B show instructional spending per enrolled student for white and Black students in 1939–40, plotted against the 1920 Black share. The level of instructional spending for white students is strongly positively associated with the Black population share, while the level of spending for Black students is negatively correlated with the Black share. Panel C shows that the white-Black gap in resources was much wider in the majority-Black counties—consistent with the pattern of relative teacher salaries for the subset of counties shown in Figure 2. Finally, Panel D plots county-average spending for Black students against average spending for whites. This correlation is strongly negative.

[16] In the 1860 census, Noxubee county had 5,171 white residents and 15,496 slaves, 60% of which were held by 138 large slaveholders (Blake, 2001).

Confirmation that no-equalization counties were badly under-funding Black education comes from data on the *additional effort* these counties undertook in response to the threat of litigation in the early 1950s. In 1954 the state introduced a "Minimum Program" to improve resources for Black schools,[17] which led to increases of 100% or more in per capita spending for Black students in many no-equalization counties (see Appendix Figure 3).

4.2 School Resources and Schooling Attainment

Next we study the relationship between school resources and student education outcomes.

4.2.1 Data from the 1940 Census

For this analysis we focus on youth aged 14–18 enumerated in the 1940 census.[18] As shown in column 1 of Table 1, we have a sample of about 117,000 Black youth and 116,000 white youth. Nearly 80% of the Black children and 90% of the white children in this age range were living with at least one parent, with slightly lower rates of co-residency for girls than boys.[19] Around 80% of both racial groups were living in the same county as they resided in 1935. The geographic segregation of white and Black families is revealed by the 33 percentage point (ppt) gap between the average fraction of Black residents in the "enumeration districts" of Black and white families.[20]

In our empirical models we condition on parental education, and assign a measure of school quality based on place of residence in 1940, so for our main analysis we limit attention to children who are living with at least one parent (whose schooling is reported in the census) and who reside in the same county as in 1935. These analysis samples have

[17] A report of a special committee that introduced this program noted: "In the event segregation is declared unconstitutional, the only possibility of maintaining a segregated system in Mississippi is by persuading the Negro to attend of his own volition, schools provided for him; such persuasion can succeed only where adequate, respectable, and equal facilities are provided. The enactment of this program will provide such facilities" (cited in Bolton, 2000). See also Phay (1953) for details on the racial inequality in funding that persisted through the early 1950s.

[18] The 1940 census is unique in that detailed data were collected for all enumerated individuals, including information on their years of schooling. Earlier censuses lack education data, while later censuses only collected such information for a subset of individuals and/or households.

[19] Card *et al.* (2022, Figure 1a) show that the rate of co-residency for Black children in 1940 was about 80% between the ages of 5 and 16 for both genders, then began to fall as children started to leave home. The pattern was similar for white children, but with a co-residency of about 90%.

[20] An enumeration district (ED) was defined by the Census Bureau as a contiguous geographic area that could be surveyed by a single enumerator. According to census documents at the time, rural EDs were to include no more than 1,500 people and 250 farms.

about 76,000 Black youth and 81,000 white youth (see columns 3 and 4).

We note the following features of the children and families in our analysis samples: Most were living on farms (72% of Black youth and 68% of white youth). Black families were relatively large (14–18 year olds had 3.6 co-resident siblings on average), and parents in these families were poorly educated (about 5 years of reported schooling versus 8 for white parents). Only about one quarter of Black families owned their homes (versus more than half of white families). Finally, the average educational attainment of Black children was low. Only 75% of the Black youth had completed 4 grades at the time of the census (in Spring 1940), versus 95% of whites, and only 30% had completed 7 grades (the level expected if 14 year olds were on track) versus nearly 80% of white children.

As discussed below, for some of our analysis we zoom in on a "border sample" of youths who lived in enumeration districts (EDs) along the border between counties that did or did not receive equalization funding in 1940. Specifically, we use Census maps to locate EDs along county borders, and then match EDs across borders to create border pairs. We end up with 36 such pairs, and these locations include about 20% of all Black 14–18 year olds in our main estimation sample (and roughly 9% of whites). As shown in columns 5 and 6, the border EDs are relatively rural, with three quarters of both Black and white youths living on farms. Families in the border region are also somewhat disadvantaged relative to the broader population, e.g., only 16% of Black families in the border sample owned their home (versus 24% in the estimation sample as a whole). The fraction of Black residents in the border EDs is also relatively high (75% for the average ED of a Black youth and 56% for the average ED of a white youth), reflecting the concentration of no-equalization counties in the Delta region where the local share of Black residents was relatively high.

Finally, in columns 7 and 8, we show statistics for the sample for which we have a PIK, potentially allowing matches to 2000 census records (discussed in Section 4.4 below).

4.2.2 Correlation between School Spending and Schooling Attainment

Figure 7 illustrates the cross-county association between instructional spending per student (for the 1939–40 school year) and schooling attainment of children aged 14–18 in our analysis sample. Panel A shows the fraction of Black children with at least 6 grades, and Panel B shows those with at least 8 grades, in both cases plotted against average spending per Black student, using different colored markers for equalization and no-equalization counties. On average about 40% of children had completed at least 6 grades, but there is wide variation

across counties (with a low of 20% and a high of 80%) and a strong correlation (0.71) with the county's instructional spending on Black students. Most no-equalization counties are in the left part of the graph, with low spending and low educational attainment.

An interesting pattern that is evident in Panel A of Figure 7 is the concavity of the relationship between instructional spending and 6th grade attainment. The relationship is relatively steep among counties with spending under $5 per year—which was close to the mean level of spending on Black students—and then flattens somewhat among counties spending more. This pattern suggests that marginal spending increases may have had larger impacts in very-low spending counties than across counties as a whole.

The two lower panels of the figure present comparable plots for white students. Note that the range of the x-axis is much different for the two races: average instructional spending was between $3 and $14 per year for Black students, and between $15 and $50 per year for white students. Comparisons between the scatterplots highlight three additional racial differences. First, levels of educational attainment are much higher for whites. Second, white attainment rates are less strongly correlated; indeed, the correlations are not statistically significant. Third, the no-equalization counties, which had low spending and low educational attainment for Black students, had relatively high spending and (if anything) slightly higher educational attainment for white students.

4.3 Regression Models

To quantify the impacts of school spending on student achievement among Black students, we estimate simple regression models of the form,

$$Y_i = \beta S_{c(i)} + \gamma X_{1i} + \delta X_{2n(i)} + \eta X_{3c(i)} + \epsilon_i, \tag{11}$$

where Y_i is a measure of educational attainment for individual i living in county $c(i)$, $S_{c(i)}$ is the level of instructional spending per student for Black students in county $c(i)$, and three distinct sets of controls are as follows: X_{1i} are individual and family characteristics; $X_{2n(i)}$ are neighborhood/ED characteristics measured using $n(i)$ individuals who reside near individual i; and $X_{3c(i)}$ is a set of county-level characteristics. The individual level controls are gender, age (using a vector of dummies), the number of siblings in the household, whether only the mother or only the father is present in the household, mother's education (or father's, if the mother is not present), the age of the mother (or father if no mother is present) in five-year intervals, whether the family lives on a farm, whether

the family owns their house, and whether the family moved to a new residence (within the same county) in the past five years. At the neighborhood level we control for the average fraction of Black neighbors who are renters,[21] and ED-wide means of the fraction of Black residents and urban residents. Finally, at the county level we control for the average income of white residents aged 25–55, the level of instructional spending in the county for white students, the level of Rosenwald funding for Black schools in the county in the period up to 1931 (from Aaronson and Mazumder, 2011), the number of Black doctors per capita, and the maximum years of high school available for Black students in the early 1930s (from Redclay, 1935, who provides data from a survey commissioned by the John F. Slater Fund).

Although spending on Black schools was largely outside the control of Black families, there is still a concern that $S_{c(i)}$ may be correlated with the error term in equation (11), leading to bias in OLS estimates of β. As one check on this, we include per student spending for whites in the same county as a control. This is motivated by the idea that unmeasured local factors that led to higher spending for Black students in a county may also have led to higher spending for whites. Thus, a finding that spending for whites has no effect on the schooling outcomes of Blacks, controlling for spending on Blacks, can be interpreted as supporting the hypothesis that such unmeasured factors are ignorable.[22] In fact, we find no evidence that white spending levels affect Black student achievement.

Another form of endogeneity may arise because we construct S by dividing total county instructional spending by the number of enrolled Black students in the county. Since the outcome variable Y is a measure of enrollment, there is a potentially negative "division bias" (Borjas, 1980) in the OLS estimate of β. A simple way to address this concern is to use an instrumental variable for S_c. Building on the insights of Bond (1934) and the empirical patterns noted above, we use the fraction Black in the county in 1920 as an instrument. This is a powerful determinant of spending and potentially informative IV.

Finally, there may be unobserved local characteristics—such as the local demand for better-educated Black workers—that affect both spending levels on Black schools and Black families' preferences for acquiring more education. To address this concern we present OLS

[21] This is the share of families that rent their home among the 50 closest families to the individual in the Census roster. See Card *et al.* (2022) for a discussion.

[22] More precisely, let $S^B_{c(i)}$ represent spending for Black students in individual i's county, and let $S^W_{c(i)}$ represent spending on whites. Assume that $E[\epsilon_i|S^B_{c(i)}, S^W_{c(i)}] = \lambda_1 S^B_{c(i)} + \lambda_2 S^W_{c(i)}$, as in Mundlak (1978), where λ_1 and λ_2 have the same sign. The probability limits of the OLS coefficients for Black and white spending in a model for Black student achievement are $\beta + \lambda_1$ and λ_2, respectively. If we find the estimate of white spending is close to zero (i.e., $\lambda_2 = 0$) it gives more credence to the assumption that $\lambda_1 = 0$, particularly because spending decisions were controlled by whites.

and IV estimates of equation (9) using only the subsample of students on the two sides of the border between the no-equalization and equalization counties. By narrowing the sample to the border region we effectively hold constant many of the local factors that might be correlated with differences in Black student outcomes in the Delta region versus other parts of the state, and that are also correlated with spending on Black students.

4.3.1 Results for Black Youth in 1940

Table 2 presents OLS and IV estimates of equation (11) estimated using educational outcomes of 14–18 year olds in all regions of Mississippi (columns 1–4) and in the border regions (columns 5–8). The first row of the table presents the first stage results for our IV procedure, which uses the fraction of Black residents in a county in 1920 as an instrument for instructional spending per student in 1940. The estimates imply that instructional spending per Black student decreases by about 4 to 6 cents for every percentage point increase in Black population share. This means that a county with a 20 ppt higher Black share had \$0.80 to \$1.20 lower annual spending per Black student—a large change relative to the mean spending level of \$4.93 across all counties or \$3.71 in the border counties. The estimates are relatively precise, leading to F-statistics for the first stage model of around 17 in the state-wide analysis, and 33 in the border region analysis.

The next three rows of Table 2 present estimation results for models in which the dependent variable is a dummy for having completing 6, 7, or 8 grades as of the census date, while rows 5–7 show results for a simple measure of being "on track to attain G grades." Specifically, we classify individuals as "on track to attain G grades" if they are enrolled at the census date and have completed at least $G - 2$ grades. Using this measure, the fraction of youth who are on track to complete $G = 6,\ 7$, or 8 grades is about 20 ppts higher than the fraction who have actually attained that level of education. Finally, the bottom rows of the table present estimates for models in which the outcome is completed years of education among 14–18 year olds. Since this outcome is censored for students who are still in school, we might expect OLS to yield attenuated effects relative to estimates from a sample with completed education (e.g., Chung and Goldberger, 1984). We therefore include a Tobit-style model which treats observed schooling for enrolled students as censored.

In the all-county sample, the OLS estimate for 6th grade completion (column 2) implies that each dollar of instructional spending is associated with a 1.6 ppt increase in the

probability of 6th grade attainment—a 3.5 percent rise, given the mean of the dependent variable is 44.6%. Estimated impacts on the other measures of enrollment range between 0.009 and 0.014 and are all highly significant (t-ratios in the range of 3). IV estimates (column 4) are generally slightly larger than the OLS estimates but less precise, suggesting that there might be modest division bias in OLS estimates. Turning to the estimated effects on years of education, the OLS and Tobit estimates are similar, about 0.10, and are significant at conventional levels. Here again, the associated IV estimates are close to the baseline estimates, but relatively imprecise.[23]

Based on estimates that use variation across all of Mississippi's counties, we conclude that each dollar of additional annual spending on Black education would lead to a roughly 1.5 ppt increase in the share of students with at least 6 years of schooling, and a 0.1 increase in years of completed schooling. To put these estimates in perspective, note that in 1940 average annual spending per Black student was $4.93, versus $25.59 per white student—a gap of more than $20. Extrapolating well outside the range of observed spending for Black students, an increase of $20 in spending would be predicted to increase the share of Black students with at least a 6th grade education by 30 ppt and increase completed education by 2 years, thereby closing the Black-white gap in completed schooling by about $\frac{2}{3}$.

When we narrow the sample to the border region (columns 7 and 8 of Table 2), OLS estimates of the effect of spending on grade completion are larger in magnitude than the corresponding estimates from the all-county sample (though they also have relatively large standard errors, so we cannot reject effects in the 1 to 2 ppt range). OLS and Tobit estimates of the effects of spending on years of completed education for the border sample are also somewhat larger, but are relatively imprecise. IV estimates for the border sample are even larger in magnitude than OLS estimates, and suggest that division bias caused by endogenous enrollment may be a bigger concern when making comparisons between the lower-spending no-equalization counties and the higher-spending equalization counties. Overall, the border design results suggest that if anything the spending effects from the all-county sample may be conservative.

As we have already noted, Figure 7 suggests a nonlinear relationship between instructional spending and 6th grade attainment, with a smaller effect of spending once spending exceeds roughly $5.00. This nonlinearity may be one explanation for the relatively larger

[23]For the Tobit model we use the control function approach suggested by Smith and Blundell (1986) to address endogeneity of spending per enrolled pupil. Specifically, we include the residual from the first stage model as an additional control variable.

effects of spending estimated for the border sample. To investigate, we used OLS to estimate a variant of equation (11) on the all-county sample, allowing a change in the effect of spending at the $5.00 point. Results are shown in Appendix Table 3. Interestingly, we see that the effect of spending on actual or potential grade completion is around 2–3 ppts per dollar for spending levels under $5.00 per student, but around 1 ppt per dollar for spending levels over $5.00. The estimated change in slope is uniformly negative across the six grade completion outcomes (and typically significantly different from zero). The same is true for the OLS and Tobit models of the effect of spending on years of completed schooling.

Since spending levels in most non-equalization counties were under $5.00, we suspect that this flattening effect is at least part of the explanation for the larger estimates of β from our baseline (no-kink) specification in the border sample. And, indeed, when we compare the estimated slope effects from the kink specification for spending levels up to $5 in the all-county sample and the border sample, we see that these are quite similar. We therefore conclude that the estimated spending effects on enrollment and completed schooling obtained from our baseline specification fit to the all-county sample may *understate* the causal effects of higher spending at the very low levels of spending that prevailed in the Delta counties.

4.3.2 Robustness

To explore robustness of the estimates in Table 2, we re-estimate our models, adding a sequence of additional county-level control variables. The results, with the dependent variable "6th grade attainment," are summarized graphically in Figure 8, which shows the estimates of β when each of nine possible control variables is added one-at-a-time to the specification. (Estimates for the other dependent variables behave similarly, so we focus just on 6th grade attainment.) The four panels in the figure show OLS and IV estimates for models estimated with the all-county sample and with the border sample. The extra control variables we add are: county population density (based on the 1940 population and area); county Black infant mortality, 1936–44 (from Michael Haines); the county's average number of children per female aged 21–30; the percentage change in county population between 1930 and 1940; the share of farms with electricity in 1940; the share of farms with running water in 1940; a measure of access to railroads by Black residents in the county (from Black et al., 2015); the percentage change in the county's Black population, 1920–1940 (a measure of out-migration); and the change in the county's cotton production,

1920–1940 (a measure of the collapse in demand for field labor).

We find that the magnitude of $\hat{\beta}$ is robust across these specifications: the OLS and IV estimates based on the all-county sample are centered around 0.015-0.020, while the OLS and IV estimates based on the border sample are centered around 0.04-0.06.

To summarize: we interpret the estimates in Table 2 as showing that there is a statistically significant and quantitatively important relationship between per student spending on Black schools and the educational attainment of Black students. The estimated effect is robust to adding controls for a wide variety of local factors, and is larger when we narrow the sample to the subset of Black children living along the borders between the equalization and no equalization counties, where spending levels were relatively low. This latter finding is consistent with evidence of a concave effect of spending in the broader sample.

4.3.3 Results for White Youth in 1940

Though our main focus is on schooling outcomes of Black youth, it is interesting to compare the effects of spending on Black and white youth—particularly in light of the very large difference in spending levels for the two race groups. Table 3 presents a set of specifications parallel to the ones in Table 2 but fit to samples of 14–18 year old white children. Given the higher schooling attainment levels of whites, we expand our outcome variables to include attainment of 9 or 10 grades, and on-track for 9 or 10 grades. Inspection of the table reveals that all the estimates of β—for both the statewide sample and the border sample—are close to zero. This may not be too surprising given the patterns in Figures 7(C) and 7(D), which, as noted above, show little correlation between spending and the educational attainment of white children in different counties.

Many of the counties with high spending on white children were in the Delta region of the state, and did not participate in the equalization system. White teacher salaries in these counties were generally much higher than in the state's other counties. For example, in 1936–37, average monthly salaries of white teachers in Bolivar, Coahoma and Leflore counties were around $100, while salaries in most other counties were closer to $60. These salary differences contributed to higher spending in the Delta region, but do not seem to have been associated with significantly better outcomes for the white children there.

We have investigated several explanations for the higher salaries of white teachers in the Delta region. In one check, we used 1940 Census data on teachers to see if they were better-educated than white teachers in other counties, and found that their education levels were

generally similar. We also used 1940 Census data to construct a county-specific wage index for white workers, outside of the educational sector, with at least some college. This index is slightly higher in the Delta counties (suggesting a higher cost of living or some other form of equalizing differential for better-educated whites in the Delta region) but when we used the index to construct adjusted instructional spending per student, we found results very similar to those in Table 3.

Interestingly, when we estimate equation (11) separately for white students in the equalization and no-equalization counties, we find estimated effects of spending for the equalization counties that are uniformly positive, though very small in magnitude, whereas for the no-equalization counties most estimates are negative. See Appendix Table 4. We also estimated models using data for counties with instructional spending in the bottom tercile of the spending-level distribution, and find estimates of β comparable to those for the equalization counties: positive but small in magnitude.

Overall, we conclude that cross-county variation in instructional spending per student was not significantly correlated with the educational attainment of white students in Mississippi in 1940. The contrast with the relatively large impacts of spending on Black students is revealing: our estimates suggest that a redistribution of funding from the relatively well-funded white schools in the Delta counties to the very poorly funded Black students in these counties would have had substantial benefits for Black students with relatively small costs for whites.

4.4 Impacts on the Lifetime Well-Being of Black Students

Having established that higher spending on the education of Black students led to higher levels of schooling at ages 14–18 year olds, in this section we turn to longer run effects.

4.4.1 Merging 1940 Census Respondents to the 2000 Census

We carry out this research by matching Black respondents in the 1940 census to respondents in the 2000 census and fitting variants of equation (11) using late-life measures of schooling and income. The match is based on Protected Identity Keys (PIKs), which are a set of personal identifiers that allow matches to the NUMIDENT system, other census surveys, and Social Security and tax records.[24] More details on the method of assignment of PIKs

[24] Unfortunately, we do not have access to Social Security records or income tax records, which could in principal be linked to 1940 census respondents.

to youth in the 1940 census is provided in Card *et al.* (2022).

About one third Black youth and half of white youth in our main estimation sample can be assigned a PIK. Characteristics of the "PIK subsample" are shown in columns 7 and 8 of Table 1, and are broadly similar to the characteristics of our main estimation sample, though youth who can be assigned a PIK have slightly better-educated parents, and their families are slightly more likely to own their own homes.

To test whether the PIK assignment process leads to sample selection biases that affect the relationship between spending and school outcomes, we re-estimated the county-design models in Table 2, using only the PIK sub-sample. Results are summarized in Appendix Table 5 and are quite similar to the results in columns 1–4 of Table 2.[25] We conclude that potential selection biases arising from the PIK assignment process are likely to be small.

Information on education and income in the 2000 census is only available for the one-in-six subset who filled out the long form version of the 2000 questionnaire. In addition, only about two thirds of the children interviewed in the 1940 census lived to year 2000, and some respondents to the 2000 census cannot be assigned a PIK. In the end, of the roughly 27,000 Black 14–18 year olds in the 1940 Census who have a PIK, only about 2,000 have long-form data from the 2000 census.

To address this concern, we expand the set of children in 1940 who we match to year 2000 to include all children aged 4–16 who were enumerated in Mississippi and who meet the criteria for our estimation sample, i.e., were living with at least one parent in 1940 (who provided education information), and did not move between 1935 and 1940.[26] Of this group, about 5,800 Black children can be assigned a PIK and matched to 2000 census long form responses.[27] Broadly speaking, family and neighborhood characteristics in 1940 are similar to those of the sample of 14–18 year olds with PIKs in Table 1. At the time of the 2000 census these individuals are aged 64–76.

[25] Because of disclosure issues, the specification used for these models is slightly different than the one used in Table 2, and excludes three county-level controls—the doctor/population ratio, the indicator for the presence of a city in the county, and the fraction of the enumeration district that is urban. Since the presence or absence of these variables has little effect on the estimates in Table 2, we believe that their addition would have little or no effect on the models for the PIK subsample.

[26] We drop 17 and 18 year olds to help alleviate concerns that some people in this age group have already left their parents' home. For our main analysis we re-estimated the models in Table 2 dropping 17 and 18 year olds and found results that were very similar to those in Table 2 (which uses 14–18 year olds). See Appendix Table 5.

[27] Characteristics of this sample will be included in a subsequent version of this paper, but were not disclosed for this draft.

4.4.2 Results on Education and Income in 2000

We estimate a version of equation (11) that has as outcome variables education and income (as reported in the 2000 census) for our working sample of Black Mississippians. Given the modest sample sizes available, we focus only on results using all 82 counties in Mississippi (i.e., we do not try the border analysis).

Table 4 shows OLS and IV estimates of the effect of educational spending, circa 1940, on five outcomes measured in later life: years of completed schooling, and four measures of income (all set to "missing" when the corresponding income measure is reported to be 0). These four measures are log of household income; log of household income per household member; log of family income; and log of family income per family member. Note that family income is only available for people who are living with at least one other related family member, whereas household income is available for everyone (including people who live alone or with non-family members). As individuals we study are aged 64–76 at the time of the 2000 census, the vast majority are no longer working. Thus, our income measures are largely a reflection of Social Security and any other retirement income—a reasonably good indicator of lifetime income. For reference, we also show for each of the four income measures the observational "return to education" that one would obtain by regressing that income measure (e.g., log of household income) on observed schooling and the other controls included in our specifications.

The first set of estimates in Table 4 have completed education as the dependent variable. We find that the OLS estimated coefficient on per capita instructional spending is highly significant; each $1 increase in spending is associated with 0.09 years of additional schooling. This estimate is very close to the estimates in Table 2 (0.10) and to the estimates for the PIK subsample in 1940 (Appendix Table 5). As noted above, our estimates imply that a $20 increase in spending for Black students—which would close the racial spending gap—would have increased educational attainment among Black Mississippians by about two years. The associated IV estimate is larger in magnitude, but relatively imprecise.

Turning to the estimated effects on various income measures, OLS estimates are in the range of 0.023 to 0.032 and are quite precise (with t-ratios of around 3). These estimates imply that $20 of additional spending would have led to gains in income on the order of 50 percent or more—very large impacts that are indicative of serious under-investment in the education of Black Mississippians in the late 1930s and early 1940s. IV estimates are generally similar in magnitude to OLS estimates, but again are imprecise.

The OLS-estimated effects of educational spending on income in Table 4 are high—about one third as large as the OLS-estimated effect of spending on completed education. A plausible explanation is that higher spending led to an increase in the *return* per year of education, in addition to its effect on the years of schooling attained. This is consistent with Card and Krueger (1992a, 1992b), who present evidence, based on cross-state differences in teacher wages and pupil teacher ratios, that returns to each year of schooling for Black men born in the Southern U.S. were strongly affected by school spending.

To calibrate the implied effects of the estimates in Table 4 on the return to education for Black Mississipians born in the 1930s, assume, as in a standard Mincerian model, that log income ($\log I$) depends on the product of years of education (E) and the return to each year of education (r). In that case, the derivative of log income with respect to school spending (S) is

$$\frac{d\log I}{dS} = r\frac{dE}{dS} + E\frac{dr}{dS}. \tag{12}$$

Let $\frac{d\log I}{dS} = 0.03$, using the OLS estimate for log family income per capita in Table 4; let $\frac{dE}{dS} = 0.09$, using the OLS estimate in Table 4; and suppose the return to schooling (holding quality constant) is around 10%. Then the effect of a \$1 increase in school spending on the return per year of schooling, evaluated at the mean level of schooling ($\bar{E} = 10.2$), is

$$\frac{dr}{dS} = \frac{[0.03 - (0.10 \times 0.09)]}{10.2} \approx 0.002. \tag{13}$$

Given per capita spending of about \$5, the corresponding semi-elasticity with respect to spending is $\bar{S}\frac{dr}{dS} \approx 0.01$; in our context a one percent increase in school spending leads to a one percentage point increase in the return to education. This estimate is quite close to the semi-elasticity of the return to schooling with respect to teacher wages estimated by Card and Krueger (1992b, Table 3 column 9).

5 Concluding Remarks

This paper provides new evidence on the mechanisms that led to low levels of school funding for Black students in Mississippi in the late 1930s and early 1940s—particularly in the state's majority-Black Delta region—and shows how inter-county differences in resources in Black schools were associated with differences in educational attainment and income much later in life.

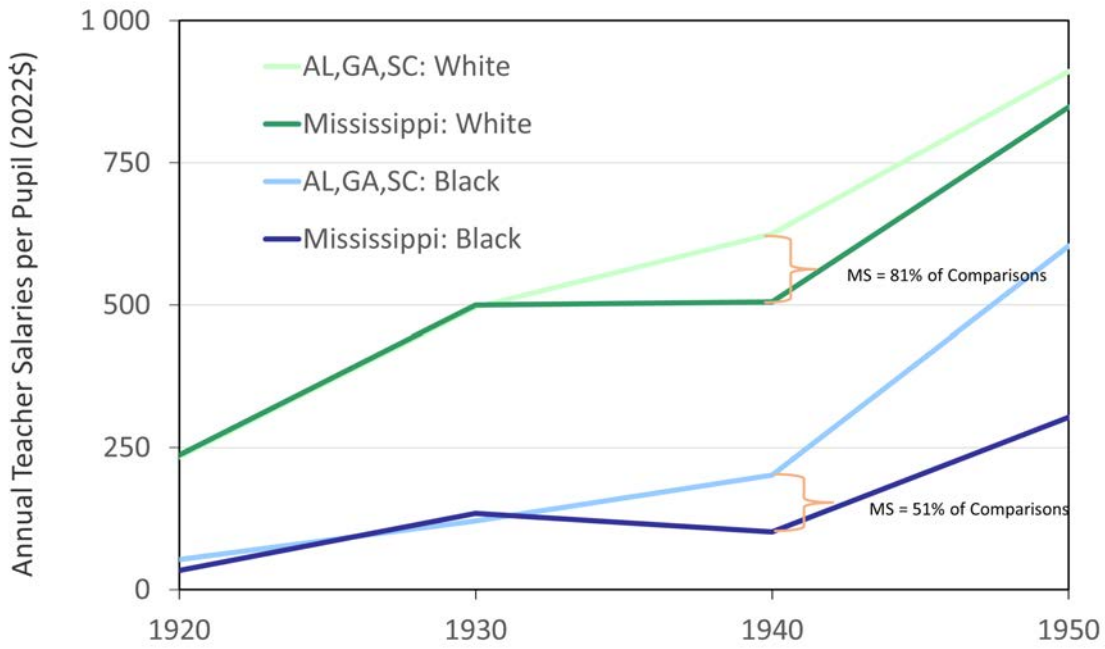
In 1940 Mississippi had a school funding equalization program that resembled the minimum foundation plans used in many states today. In the Jim Crow South, however, the calculation of funding needs used lower values of minimum spending for Black students than white students. More importantly, the equalization program was overlaid on a per capita grant system that provided a fixed amount per person aged 5–21 in the county. Given low enrollment rates of Black youth, low teacher salaries, and high pupil/teacher ratios, this grant was far more than the Delta counties were spending per Black child, providing excess resources for the white schools and making these counties ineligible for equalization funds. Mississippi's educational finance programs thus, in combination, created high disparity across counties in resources devoted to the education of Black children.

Our examination of patterns of spending and student educational attainment, using 1940 census data, leads to two main conclusions. On the one hand, higher spending on Black schools led to higher education levels for local Black children. The estimated effect of spending is robust to a wide variety of local controls, and is as large, or larger, when we narrow the sample to include only families on either side of the county borders between counties that did and did not participate in the equalization program. On the other hand, higher spending on white schools—and in particular the remarkably higher levels of spending in the Delta counties—had no measurable effect on schooling attainment.

Using linked 1940 and 2000 census records, we estimate long run impacts of county-level funding disparities for Black Mississippians. Our first key finding is reassuring: estimated effects on educational attainment measured late in life are the same size as those estimated in childhood. The second key finding is that educational spending has large and precisely-estimated impacts on lifetime income—effects that are two to three times larger than one would expect based on the increase in years of schooling for children who attended better-funded schools. This implies, importantly, that increased school funding led to both increased educational attainment *and* higher returns per year of schooling.

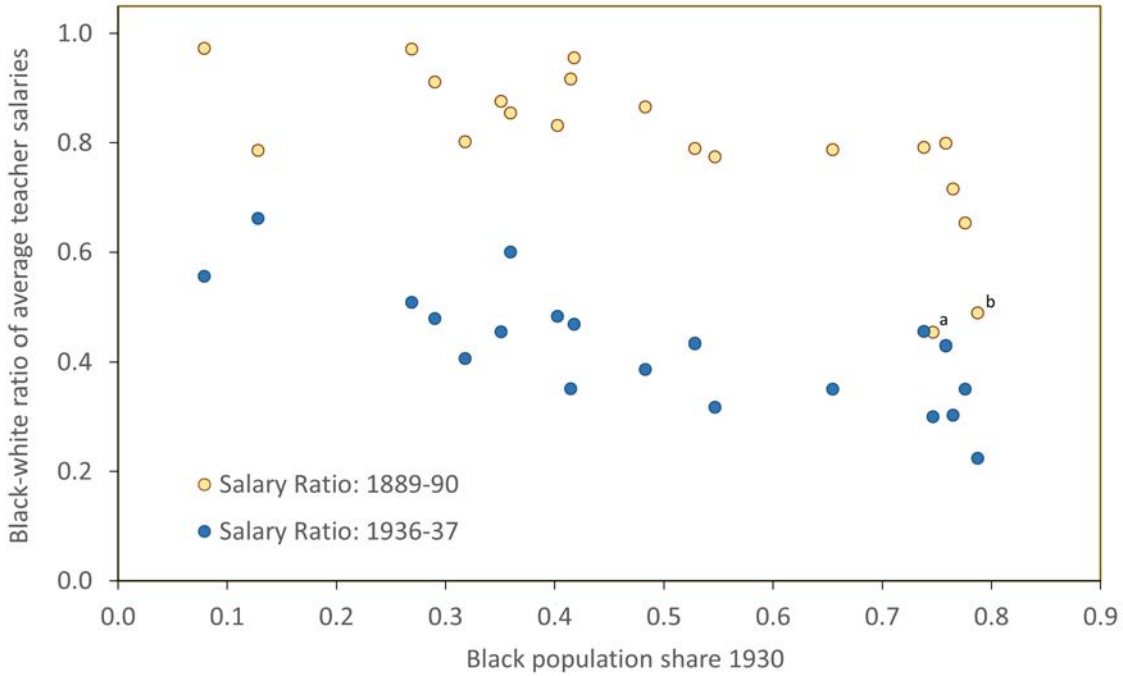
Our work documents a tragedy in racist public policy. In 1940 Mississippi's public schools spent $5 per year per Black student, versus $26 per white student ($107 versus $557 in today's dollars). Our evaluation suggests that from this low base, marginal increases in educational spending on Black students had large effects: if spending for Black students had been raised to the level of whites, these students would have had two additional years of schooling, on average, and an increase in lifetime income of 50% or more. And the low estimated impacts of marginal spending on white students suggest that much of this re-allocation of spending could have been accomplished at little cost to white students.

Figure 1: Average Teacher Salaries per Pupil by Race, Mississippi vs. Three Comparison States (AL, GA, and SC)



Notes: Data are from an unpublished appendix to Card and Krueger (1992), and are reproduced in Appendix Table 1 below.

Figure 2: Black Population Share and Relative Teaher Salaries, 1889–90 and 1936–27



Notes: [a]Bolivar County (1889–90). [b]Noxubee County (1889-90). Data from State of Mississippi Department of Education (*Biennial Report* for 1935–37), Table II.

Figure 3: School District Taxation Choices

Figure 3(A). The Effect of Higher Share of Black Children (b) on the Optimal Tax

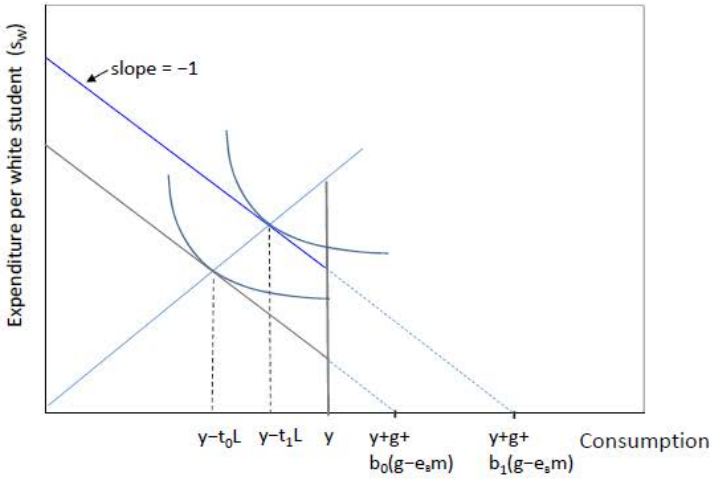


Figure 3(B). Optimal Tax with the Equalization Program

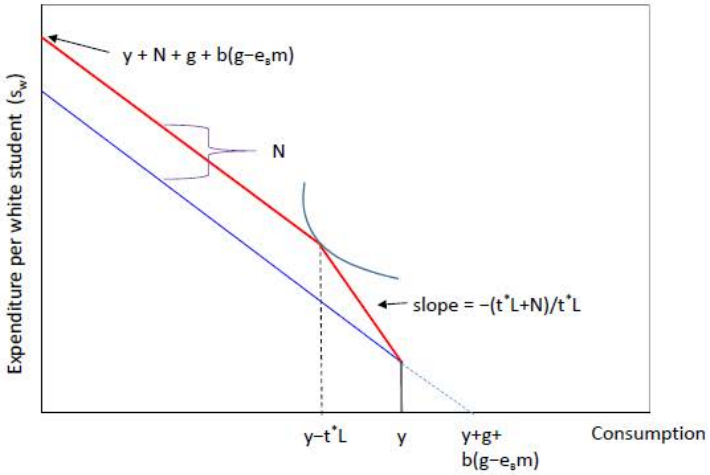


Figure 3(C). Optimal Tax when Equalization Program Requires Higher Spending for Black Students

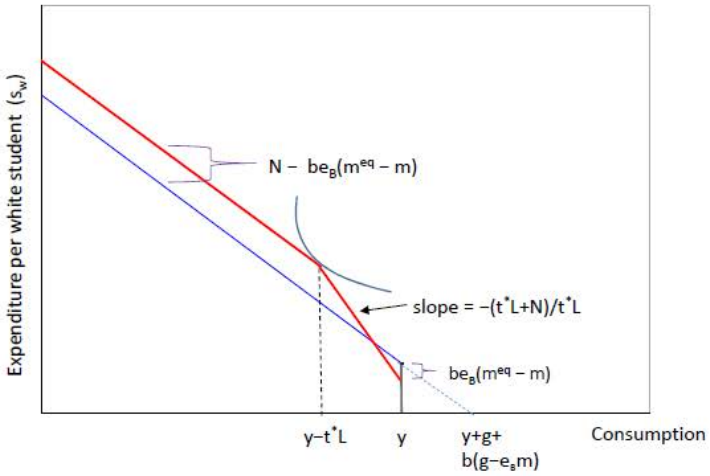
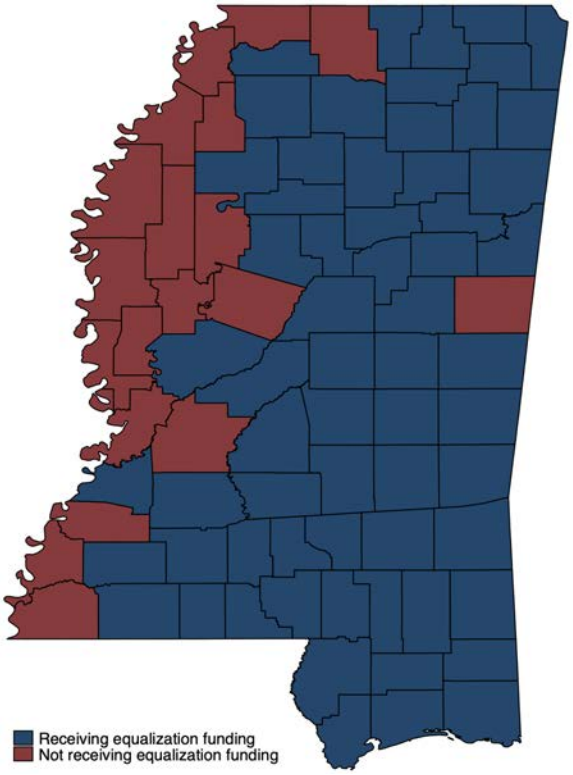
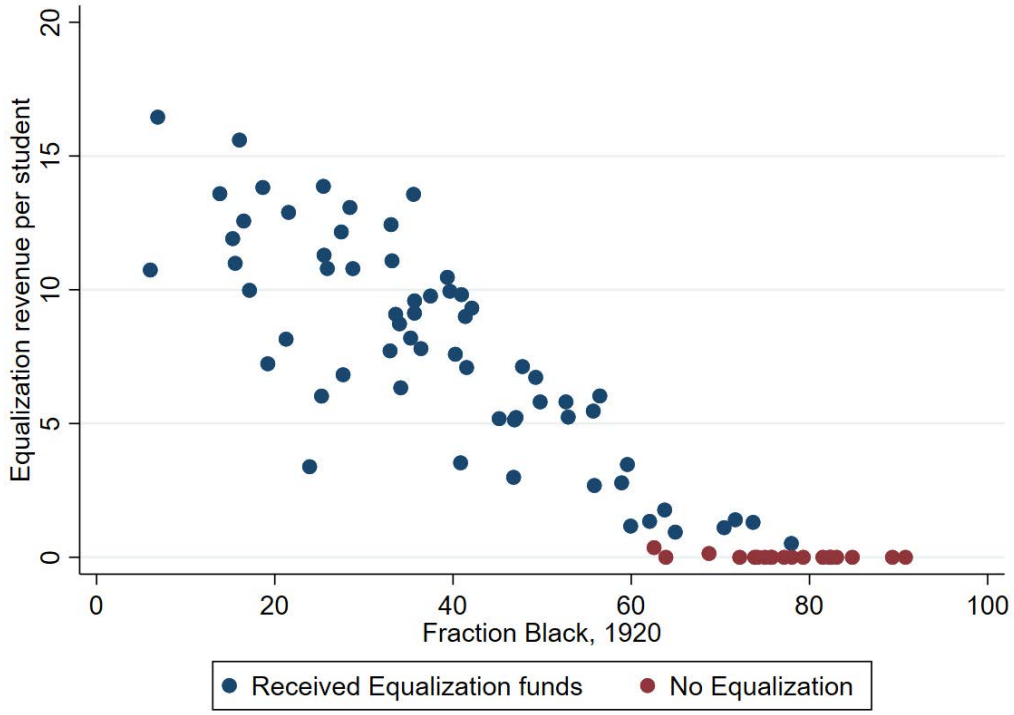


Figure 4: Participation in Equalization Funding, Mississippi Counties, 1940



Notes: Equalization funding status according to the State of Mississippi Department of Education (*Biennial Report* for 1939–1941).

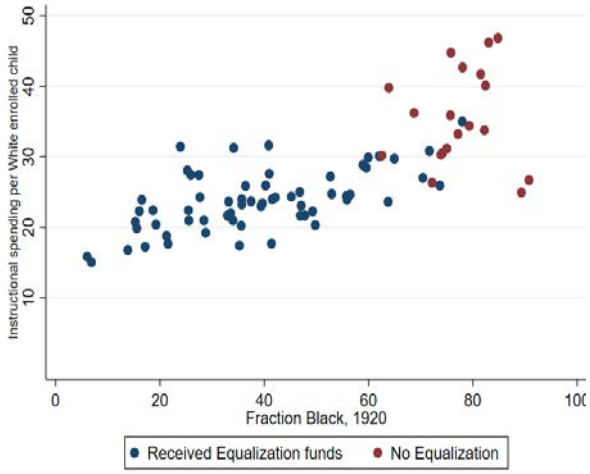
Figure 5: Equalization Funding Per Capita and Fraction Black in the Population



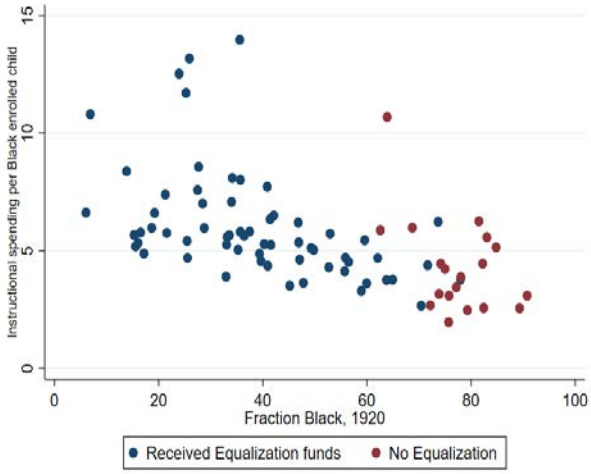
Notes: Equalization revenue is from the State of Mississippi Department of Education for 1940. Population Fraction Black is calculated using the 1920 U.S. census.

Figure 6: Instructional Spending per Capita and Fraction Black in the Population

(A) White children

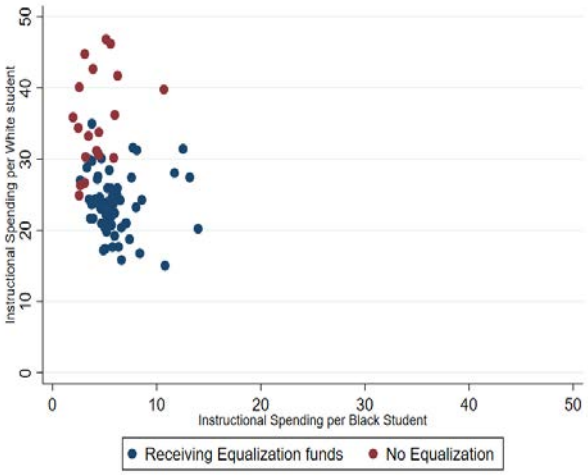


(B) Black children



(C) White-Black gap

(D) Correlation between Black and White instructional spending per capita

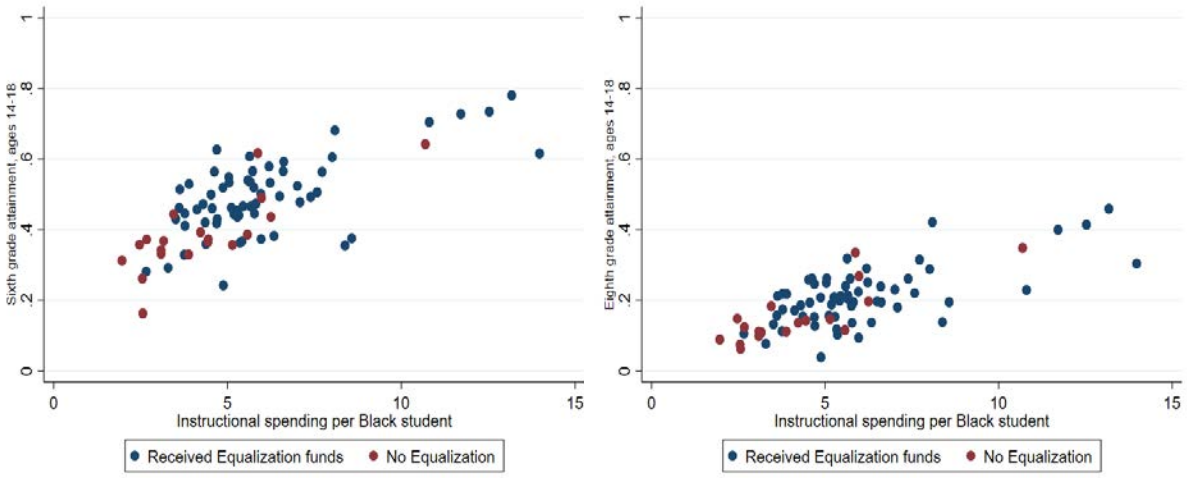


Notes: Instructional spending per capita and equalization status are from the Mississippi State Department of Education for 1940. Population Fraction Black is calculated using the 1920 U.S. census.

Figure 7: Grade Attainment for Youth Aged 14–18 and Instructional Spending per Capita, by Race

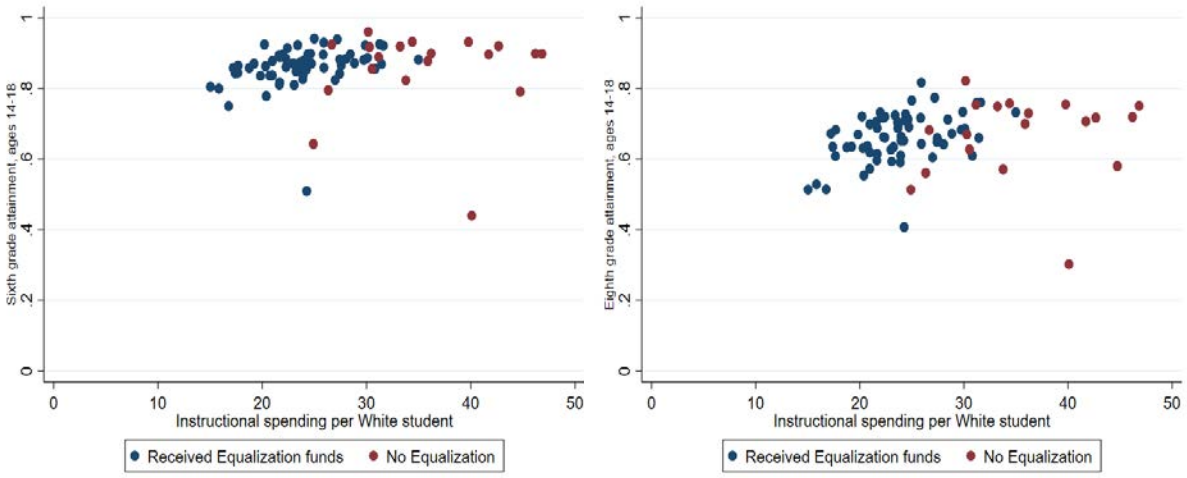
(A) 6th grade attainment, Black

(B) 8th grade attainment, Black



(C) 6th grade attainment, White

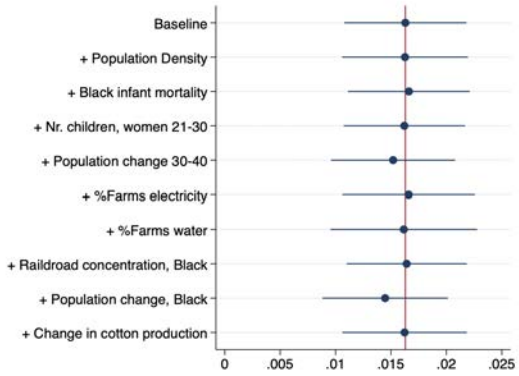
(D) 8th grade attainment, White



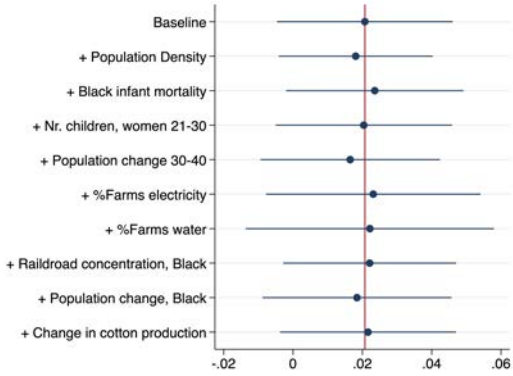
Notes: Grade attainment is calculated from the 1940 U.S. census.

Figure 8: Sensitivity of Regression Estimates to the Inclusion of Additional Covariates

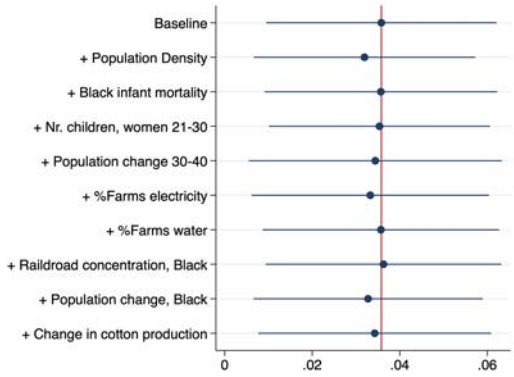
(A) County design OLS



(B) County design IV



(C) Border design OLS



(D) Border design IV

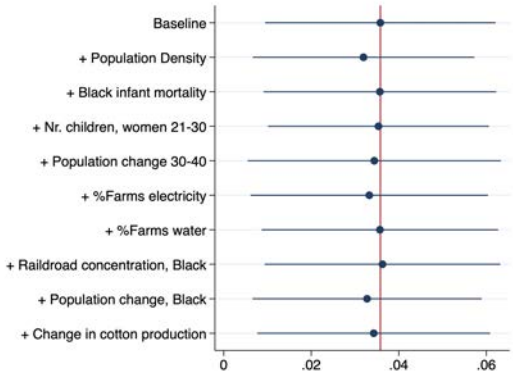


Table 1: Summary Statistics, Individuals Aged 14–18 in Mississippi, 1940

	All		Estimation sample		Border sample		PIK sample	
	Black	White	Black	White	Black	White	Black	White
Living with parents	0.78	0.90	1	1	1	1	1	1
Same county as in 1935	0.83	0.79	1	1	1	1	1	1
Female	0.51	0.5	0.48	0.47	0.48	0.46	0.43	0.47
Age	16.00	16.01	15.87	15.92	15.87	15.91	15.87	15.92
Home ownership	0.21	0.5	0.24	0.56	0.16	0.51	0.26	0.58
Parental schooling	4.95	8.12	4.98	8.22	4.84	8.45	5.30	8.62
Number of siblings	2.86	2.63	3.59	2.9	3.72	3.06	3.8	2.8
Only mother present	0.16	0.10	0.20	0.11	0.17	0.10	0.17	0.10
Only father present	0.04	0.03	0.05	0.03	0.05	0.04	0.04	0.03
Fraction urban	0.14	0.18	0.14	0.19	0.01	0.03	0.16	0.23
Fraction living on farm	0.72	0.68	0.72	0.67	0.76	0.77	0.71	0.66
Fraction black in ED	0.66	0.33	0.66	0.33	0.75	0.56	0.68	0.34
In school	0.54	0.71	0.60	0.77	0.59	0.75	0.61	0.79
Highest grade attained	5.17	8.06	5.28	8.21	5.02	8.21	5.55	8.54
Attained grade ≥ 4	0.75	0.94	0.76	0.95	0.75	0.96	0.79	0.97
Attained grade ≥ 6	0.43	0.84	0.45	0.86	0.40	0.87	0.48	0.89
Attained grade ≥ 7	0.29	0.76	0.30	0.78	0.25	0.78	0.33	0.82
Attained grade ≥ 8	0.18	0.64	0.19	0.66	0.14	0.66	0.22	0.71
Observations	117,262	115,973	76,149	81,019	15,242	7,003	27,000	39,500

Notes: Statistics are for individuals aged 14–18 in the U.S. census. The "estimation sample" is IPUMS (public use) data, restricted to individuals living in the parental household and in the same county as in 1935, and is further restricted to observations with nonmissing education, parental education, fraction of neighbors who are renters (nearest 50 individuals) and fraction population Black in the enumeration district. The "border sample" further restricts the sample to those living in enumeration districts (EDs) along the border between a county that accepted equalization funding and a county that rejected it. The "PIK sample" refers to observations assigned a Protected Identification Key (PIK), and are confidential (restricted use) census data.

Table 2: The Effect of Instructional Spending Per School-Age Child on Schooling Attainment, Black Students Aged 14–18

		County design				Border design		
	Mean dep var	First stage	OLS	IV	Mean dep var	First stage	OLS	IV
Instructional spending	4.928	-0.043			3.710	-0.060		
		(0.011)				(0.010)		
F-stat		17.04				32.96		
6th grade attainment	0.446		0.016	0.021	0.397		0.036	0.060
			(0.003)	(0.011)			(0.013)	(0.021)
7th grade attainment	0.303		0.013	0.015	0.250		0.035	0.061
			(0.002)	(0.011)			(0.011)	(0.019)
8th grade attainment	0.194		0.009	0.008	0.144		0.022	0.031
			(0.002)	(0.008)			(0.010)	(0.013)
On track for 6th grade	0.630		0.014	0.022	0.607		0.028	0.053
			(0.004)	(0.015)			(0.017)	(0.019)
On track for 7th grade	0.488		0.013	0.019	0.444		0.033	0.068
			(0.003)	(0.014)			(0.016)	(0.021)
On track for 8th grade	0.360		0.014	0.017	0.310		0.037	0.062
			(0.003)	(0.012)			(0.014)	(0.020)
Years for schooling	5.280		0.099	0.085	5.020		0.125	0.264
			(0.031)	(0.103)			(0.069)	(0.099)
Years of schooling Tobit estimates			0.098	0.099			0.175	0.219
			(0.041)	(0.126)			(0.159)	(0.140)
Observations	76,149	76,149	76,149	76,149	15,242	15,242	15,242	15,242

Notes: IPUMS (public use) census data for Black Mississippians aged 14–18. Instructional spending is the county or city administrative instructional spending divided by number of enrolled children. Dependent variables labeled "on track for Gth grade" are coded 1 for a student who has attained G grades or who is currently enrolled and has attained at least $G-2$ grades, and is 0 otherwise (e.g., "on track for 8th grade" = 1 for an enrolled student who has attained at least 6 grades). County design standard errors are clustered at the county level ($n = 82$) while the border design regressions are clustered at the border pair level ($n = 36$). Tobit standard errors are obtained through a wild bootstrap.

Table 3: The Effect of Instructional Spending per School-Age Child on Schooling Attainment, White Students Aged 14–18

		County design				Border design		
	Mean dep var	First stage	OLS	IV	Mean dep var	First stage	OLS	IV
Instructional spending	25.585	0.209			29.182	0.364		
		(0.028)				(0.075)		
F-stat		57.64				23.69		
6th grade attainment	0.859		-0.001	-0.001	0.865		0.000	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
7th grade attainment	0.780		-0.001	-0.001	0.778		0.000	-0.002
			(0.001)	(0.001)			(0.001)	(0.001)
8th grade attainment	0.665		-0.001	-0.002	0.656		0.001	-0.003
			(0.001)	(0.001)			(0.001)	(0.001)
9th grade attainment	0.493		0.000	-0.001	0.481		-0.002	-0.001
			(0.001)	(0.001)			(0.001)	(0.002)
10th grade attainment	0.331		0.000	0.000	0.318		-0.002	-0.001
			(0.000)	(0.001)			(0.001)	(0.001)
On track for 6th grade	0.907		-0.001	-0.001	0.911		0.001	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
On track for 7th grade	0.864		-0.001	-0.001	0.865		0.000	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
On track for 8th grade	0.806		-0.001	-0.001	0.808		0.000	-0.001
			(0.001)	(0.001)			(0.001)	(0.001)
On track for 9th grade	0.716		0.000	-0.001	0.709		0.000	0.000
			(0.001)	(0.001)			(0.001)	(0.002)
On track for 10th grade	0.606		0.000	-0.001	0.594		- 0.001	-0.001
			(0.001)	(0.001)			(0.001)	(0.002)
Years of schooling	8.208		-0.005	-0.011	8.212		-0.007	-0.011
			(0.005)	(0.009)			(0.004)	(0.007)
Years of schooling Tobit estimates			0.000	0.006			0.007	0.015
			(0.008)	(0.015)			(0.010)	(0.022)
	81,019	81,019	81,019	81,019	7,003	7,003	7,003	7,003

Notes: IPUMS (public use) census data for white Mississippians aged 14–18. See notes to Table 2 for additional details.

Table 4: Effect of *per capita* County Instructional Spending on Outcomes in 2000, Black Children Living in Mississippi in 1940

	Mean dep var	Estimated effect of 1940 instructional spending OLS	IV	Returns to education OLS
Years of schooling reported in 2000	10.22	0.090	0.139	
		(0.020)	(0.101)	
Log household income	10.07	0.027	0.024	0.061
		(0.009)	(0.028)	(0.004)
Log household income per capita	9.71	0.023	0.021	0.072
		(0.008)	(0.023)	(0.004)
Log family income	10.32	0.032	0.054	0.054
		(0.011)	(0.031)	(0.005)
Log family income per capita	9.81	0.030	0.040	0.076
		(0.011)	(0.028)	(0.005)
Observations		5,800	5,800	5,800

Notes: The sample is composed of Black Mississippians aged 4–16 in 1940 who are matched in the 2000 long form census data using protected identification keys (PIK). These are confidential (restricted use) data. "Returns to education" indicates the coefficient on years of schooling in regressions in which the dependent variables are one of the income indicators.

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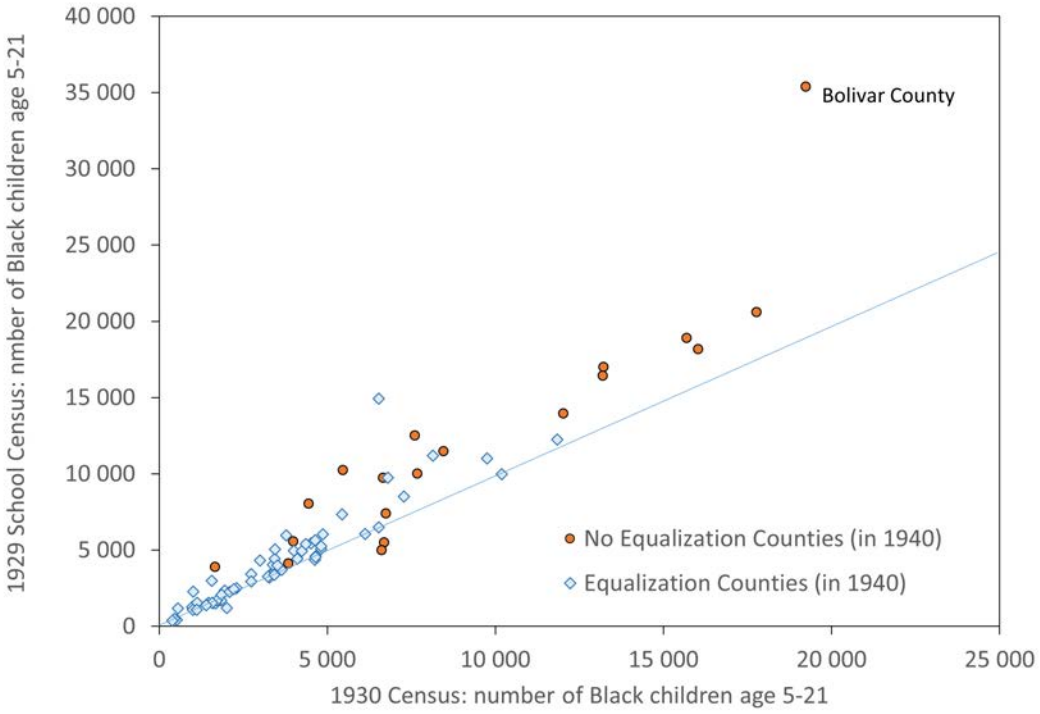
A Appendix: Additional Tables and Figures

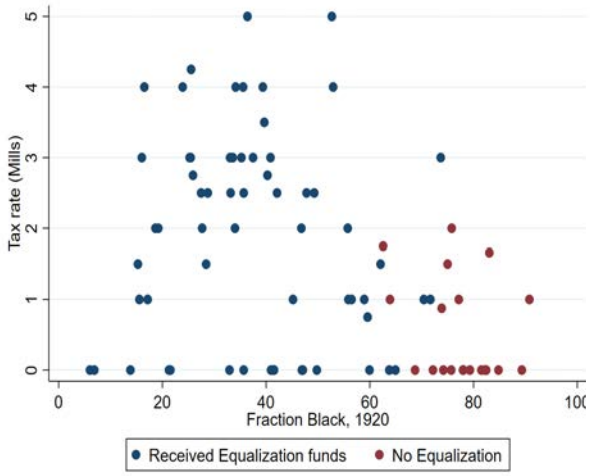
Figure A.1: Overcount of Black children in 1929 School Census



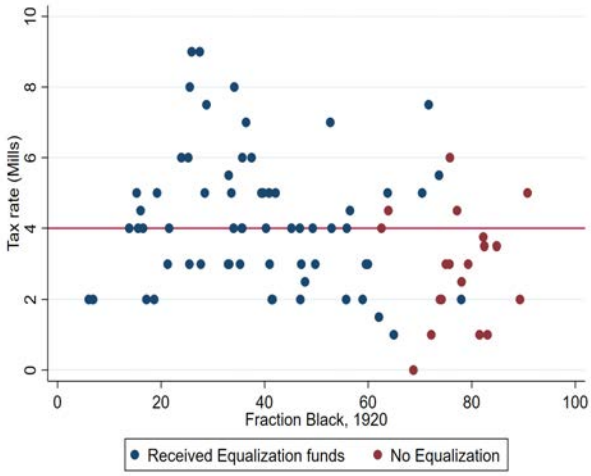
Source: Statistics from Moffitt (1931), Table 36.

Figure A.2: Relationship between School Taxes Levied and the Fraction Black in the Population

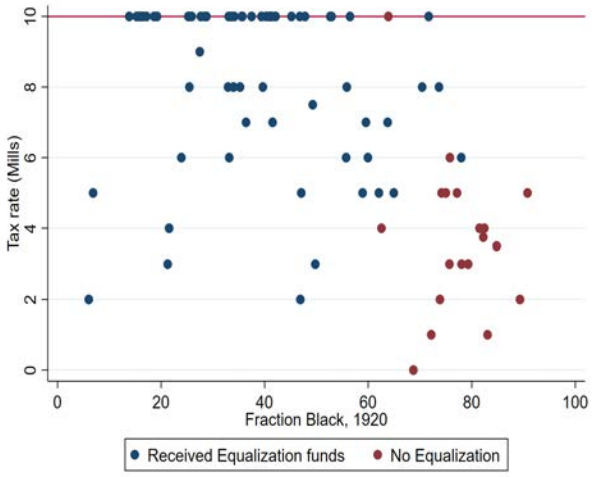
(A) 1918: Before the Equalization Program



(B) 1928: 4 Mill Tax Required for Full Participation in the Equalization Program

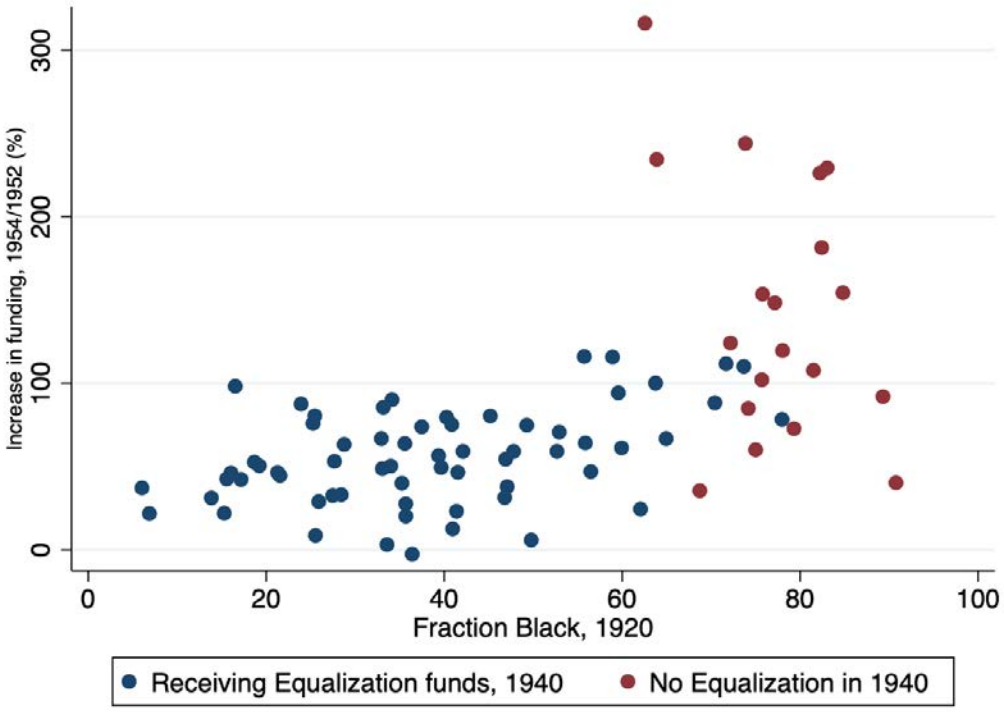


(C) 1931: 10 Mill Tax Required for Full Participation in the Equalization Program



Notes: Tax data are from Mofitt (1936), page 16. Horizontal red lines indicate the tax levy needed for full participation in the Equalization Program.

Figure A.3: Increase in Per Capita Funding for Black Students, 1954 Compared to 1952



Notes: Data from the State of Mississippi Department of Education (1953–55).

Table A.1: School Quality Measures in Selected Southern States

	Black Schools:			White Schools:		
	Pupils/Teacher	Term Length (days/year)	Teacher Wage (dollars/year)	Pupils/Teacher	Term Length (days/year)	Teacher Wage (dollars/year)
	(1)	(2)	(3)	(4)	(5)	(6)
Mississippi						
1920	68	114	164	29	158	486
1930	49	99	388	29	164	856
1940	46	124	232	31	167	776
1950	40	141	1,035	28	163	2,025
Average of Alabama. Georgia, and South Carolina						
1920	65	106	244	37	133	616
1930	47	128	336	32	162	947
1940	40	150	396	30	166	918
1950	33	176	1,699	28	178	2,148
Alabama						
1920	63	115	221	39	127	542
1930	46	130	400	35	159	969
1940	42	147	412	32	157	878
1950	33	177	1901	29	176	2214
Georgia						
1920	55	130	316	38	140	705
1930	46	136	292	34	154	843
1940	39	155	404	29	166	924
1950	34	176	1680	27	179	2080
South Carolina						
1920	76	73	196	35	132	602
1930	49	117	315	28	173	1030
1940	38	147	371	28	176	953
1950	32	174	1515	27	180	2149

Notes: Data are from Card and Krueger (1992b), unpublished appendix materials.

Table A.2: Resources and Expenditures: Example for Three Counties

RESOURCES AND EXPENDITURES COUNTY A—1929-30

Resources

State Treasury:	
(a) Per Capita Fund	$ 17,532.27
(b) Equalizing Fund	64,034.04
Total State Treasury	$ 81,566.31
County Sources:	
(a) Chickasaw School Fund	3,292.74
(b) 10 Mill Advalorem Tax	36,261.74
(c) Polls	6,811.50
(d) Other County Funds	456.71
Total County	$ 46,822.69
Total State	81,566.31
Grand Total	$125,389.00

Expenditures

Administration	$ 2,925.00
White Teachers Salaries 8 Months	98,001.00
Colored Teachers Salaries 8 Months	6,360.00
Transportation of Pupils	20,778.00
Other Items	325.00
Total	$128,389.00
Total Expenditures	$128,389.00

The County has a tax rate of ten mills.
Its rank is 3 in relative ability to pay.

RESOURCES AND EXPENDITURES COUNTY B—1929-30

Resources

State Treasury:	
(a) Per Capita Fund	$ 17,884.95
(b) Equalizing Fund	31,804.42
Total State Treasury	$ 49,689.37
County Sources:	
(a) 10 Mill Advalorem Tax	27,701.55
(b) Polls	4,693.38
(c) Other County Funds	966.70
Total County	$ 33,361.63
Total State	49,689.37
Grand Total	$ 83,051.00

Expenditures

Administration	$ 2,000.00
White Teachers Salaries 8 Months	41,840.00
Colored Teachers Salaries 6 Months	13,620.00
Tuition	6,320.00
Transportation of Pupils	18,946.00
Other Items	325.00
Total	$ 83,051.00

The County has a tax rate of ten mills.
Its rank is 37 in relative ability to pay.

RESOURCES AND EXPENDITURES COUNTY C—1929-30

Resources

State Treasury:	
(a) Per Capita Fund	$ 60,252.00
(b) Equalizing Fund	000.00
(c) State and Federal Funds	5,600.00
Total State	$ 65,852.00
County Sources:	
(a) 5 Mill Advalorem Tax	85,356.00
(b) Other County Funds	1,574.00
Total County	$ 96,580.00
Total State	65,852.00
Grand Total	$162,432.00

Expenditures

Administration	$ 4,940.69
White Teachers Salaries 8 Months	65,080.00
Colored Teachers Salaries 5 Months	32,550.00
Tuition	14,200.00
Transportation of Pupils	38,644.00
Other Items	325.00
Total	$155,739.69

The county has a tax rate of 5 mills.
Its rank is 62 in relative ability to pay.

Notes: Moffitt (1931), pages 234–235.

Table A.3: The Effect of Instructional Spending Per School-Age Child on Schooling Attainment, Black Students Aged 14-18, Trend Shift at 5 Dollars per Capita

		County design			Border design	
	Mean dep var	Instructional Spending	Instructional Spending > 5	Mean dep var	Instructional Spending	Instructional Spending > 5
6th grade attainment	0.446	0.030	-0.020	0.397	0.036	-0.001
		(0.006)	(0.007)		(0.013)	(0.031)
7th grade attainment	0.303	0.022	-0.012	0.250	0.038	-0.016
		(0.005)	(0.006)		(0.013)	(0.030)
8th grade attainment	0.194	0.013	-0.006	0.144	0.023	-0.002
		(0.005)	(0.005)		(0.010)	(0.021)
On track to 6th grade	0.630	0.040	-0.038	0.607	0.034	-0.034
		(0.010)	(0.011)		(0.022)	(0.044)
On track to 7th grade	0.488	0.034	-0.030	0.444	0.039	-0.030
		(0.008)	(0.008)		(0.024)	(0.048)
On track to 8th grade	0.360	0.030	-0.024	0.310	0.045	-0.037
		(0.006)	(0.007)		(0.019)	(0.038)
Years of schooling	5.280	0.248	-0.212	5.020	0.125	0.004
		(0.074)	(0.075)		(0.081)	(0.198)
Years of schooling		0.375	-0.397		0.291	-0.593
Tobit estimates		(0.089)	(0.095)		(0.223)	(0.487)
Observations	76,149	76,149	76,149	15,242	15,242	15,242

Notes: IPUMS (public use) census data for Black Mississippians aged 14–18. Instructional spending is the county or city administrative instructional spending divided by number of enrolled children. Dependent variables labeled "on track for Gth grade" are coded 1 for a student who has attained G grades or who is currently enrolled and has attained at least $G-2$ grades, and is 0 otherwise (e.g., "on track for 8th grade" = 1 for an enrolled student who has attained at least 6 grades). County design standard errors are clustered at the county level ($n = 82$) while the border design regressions are clustered at the border pair level ($n = 36$). Tobit standard errors are obtained through a wild bootstrap.

Table A.4: The Effect of Instructional Spending Per School-Age Child on Schooling Attainment, White Students Aged 14-18, Equalization vs. No Equalization Counties

	Equalization Counties			No Equalization Counties		
	Mean dep. var	OLS	IV	Mean dep. var	OLS	IV
6th grade attainment	0.856	0.001	0.001	0.875	-0.001	-0.01
		(0.001)	(0.002)		(0.001)	(0.006)
7th grade attainment	0.775	0.001	0.001	0.805	-0.001	-0.008
		(0.001)	(0.002)		(0.001)	(0.005)
8th grade attainment	0.659	0.001	0.000	0.698	-0.001	-0.009
		(0.001)	(0.003)		(0.001)	(0.005)
9th grade attainment	0.485	0.001	0.001	0.535	-0.001	-0.005
		(0.001)	(0.003)		(0.001)	(0.003)
10th grade attainment	0.322	0.001	0.001	0.372	-0.001	-0.002
		(0.001)	(0.003)		(0.001)	(0.003)
On track to 6th grade	0.905	0.000	0.001	0.917	-0.001	-0.007
		(0.001)	(0.001)		(0.001)	(0.005)
On track to 7th grade	0.860	0.001	0.002	0.879	-0.001	-0.008
		(0.001)	(0.001)		(0.001)	(0.005)
On track to 8th grade	0.802	0.001	0.002	0.831	-0.001	-0.01
		(0.001)	(0.002)		(0.001)	(0.006)
On track to 9th grade	0.708	0.001	0.001	0.754	0.000	-0.008
		(0.001)	(0.002)		(0.001)	(0.005)
On track to 10th grade	0.597	0.001	-0.001	0.652	0.000	-0.004
		(0.001)	(0.003)		(0.001)	(0.004)
Years of schooling	8.165	0.007	0.005	8.427	-0.007	-0.052
		(0.006)	(0.014)		(0.008)	(0.03)
Observations	67,606	67,606	67,606	13,413	13,413	13,413

Notes: IPUMS (public use) census data for Black Mississippians aged 14–18. Instructional spending is the county or city administrative instructional spending divided by number of enrolled children. Dependent variables labeled "on track for Gth grade" are coded 1 for a student who has attained G grades or who is currently enrolled and has attained at least $G-2$ grades, and is 0 otherwise (e.g., "on track for 8th grade" = 1 for an enrolled student who has attained at least 6 grades). County design standard errors are clustered at the county level ($n = 82$).

Table A.5: Effect of *per capita* County Instructional Spending on Educational Outcomes: Black Children in Mississippi, 1940, PIK Sample

	Mean dep. var.	County design, age 14–16 First stage	OLS	IV	Mean dep. var.	County design, age 14–18 First stage	OLS	IV
Instructional spending	5.35	-0.046 (0.010)			5.37	-0.045 (0.010)		
F-stat		23.12				20.6		
6th grade attainment	0.42		0.017 (0.003)	0.018 (0.012)	0.48		0.014 (0.003)	0.016 (0.010)
7th grade attainment	0.28		0.014 (0.003)	0.010 (0.011)	0.33		0.013 (0.002)	0.010 (0.009)
8th grade attainment	0.16		0.008 (0.003)	0.002 (0.008)	0.22		0.008 (0.002)	0.003 (0.007)
Years of schooling	5.19		0.091 (0.038)	0.102 (0.140)	5.55		0.078 (0.032)	0.090 (0.010)
Observations		17,500	17,500	17,500		27,000	27,00	27,000

Notes: Confidential (restricted use) census data for Black Mississippians aged 14–18 for whom a PIK is available. Instructional spending is the county or city administrative instructional spending divided by number of enrolled children. Dependent variables labeled "on track for Gth grade" are coded 1 for a student who has attained G grades or who is currently enrolled and has attained at least $G-2$ grades, and is 0 otherwise (e.g., "on track for 8th grade" $= 1$ for an enrolled student who has attained at least 6 grades). Standard errors are clustered at the county level ($n = 82$). This Table shows that results for the PIK sample are quite close to the larger sample (in Table 2) and also shows that results are similar if we use youth aged 14–16 rather than those aged 14–18.