Land Endowments, Child Labor, and the Rise of Public Schooling: Evidence from Racial Inequality in the U.S. South

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Abstract

Black children born in the U.S. South in 1910 attended inferior schools and received three fewer years of education than their white peers. These racial differences diminished significantly in the following three decades, most notably in the Cotton Belt. Moreover, there was no major federal policy targeted at black schools during this period. I propose that the demand for child labor can explain these trends in racial inequality. To test this explanation, I digitize archival school district data and combine them with data on cotton production. I argue that prior to 1910, the demands of cotton crowded out black schooling in this region because (1) its land endowments were conducive to growing cotton, (2) growing it was particularly child-labor intensive, and (3) black children were more frequently employed than white children. School boards under invested in black schools as a result of the demand for black child labor by both white landowners and black parents. I provide evidence that black-white differences in public school quality in 1910 were larger in cotton-growing regions of the South than in otherwise comparable non-cotton growing regions. I also show that most of these racial differences narrowed during two periods: (1) the early 1920s slowdown of cotton production, and (2) beginning in the mid-1930s when New Deal policy indirectly discouraged cotton share tenancy and consequently suppressed demand for child labor. These results suggest a reinterpretation of how institutions developed during the Jim Crow era by emphasizing land endowments and child labor, which in turn has consequences for black well being during the 20th century.

Keywords: land endowments, cotton, child labor, race, school quality, U.S. South
JEL No.: H7, I2, J15, J7, J82, N32, O1

1 Introduction

Black-white inequality has been a major social issue in the United States since the African slave trade began over 400 years ago (Myrdal, 1944). In particular, racial differences in education are central to explaining many persistent forms of inequality, including income (e.g., Card and Krueger, 1992b), wealth (e.g., Collins and Margo, 2001), and health (e.g., Smith and Kington, 1997). Many federal policies, most saliently Reconstruction (1863-1877), the Civil Rights Movement (1950s-60s), and more recently *Grutter v. Bollinger* (2003), have addressed racial inequality by changing social, political, and economic institutions.

Between 1910 and 1940, the U.S. South witnessed its most significant rise in black attendance and narrowing of racial differences in school characteristics such as class size. As Table 1 details, Southern blacks born in 1910 attended school for an average of six years, compared to nine years for both Southern whites and Non-Southern blacks. Within three decades, this difference in attendance declined to just one year, with the average Southern black child attending school for more than ten years (Collins and Margo, 2006). The quality of African-American children's education also improved both in absolute and in relative terms. For example, the average class size for blacks in 1915 was nearly twice that of whites, and fell by almost half over the next few decades, narrowing most of the gap. In particular, the two periods of largest racial convergence occurred in the early 1920s, and then rapidly starting in the mid-1930s. (Card and Krueger, 1992b, pp. 167-169). The purpose of this research is to explain these trends in public schooling in the U.S. South.

Nevertheless, no major federal policy targeted at black education was implemented during this period. Starting in the late 19th century, Southern blacks were disenfranchised and could not participate directly in school board decisions. Moreover, their children attended separate schools from whites, a practice institutionalized by *Plessy v. Fergusson* (1896). The absence of adequate federal and state intervention enabled school districts to fund white and black children unequally. The federal government did not reverse these institutions for several decades, until *Brown v. Board* (1954) and the Civil Rights Act (1964).

Several studies attribute black-white differences in public school quality to state and federal policies. States allocated funds to school districts based on their school-age child population, independent of race. Bond (1934) shows that the racial gap in expenditures was greater in districts with a greater share of black children. These districts received a greater share of their funds from the state for black children, some of which they diverted to white schools. Bond's thesis, however, does not explain *why* school districts allocated resources unequally nor why inequality declined over time. The narrowing of racial differences in school quality has also been attributed to factors that increased the *costs* of diverting funds, such as potential black migration from the rural South (Margo, 1991); Northern philanthropy (Anderson, 1988; Donohue, Heckman, and Todd, 2002); and law suits against state and local boards of education (Tushnet, 1987; Donohue, Heckman, and Todd, 2002). In this paper, I study how the decreasing *benefits* of diverting funds – in addition to increasing costs – led racial inequality to decline over the two specific periods.

My main contributions are as follows. First, I formalize a model of educational resource allocation based on child labor demand. I apply it to the U.S. South, and show that wealthier whites and blacks preferred to under invest in schooling for black children while they worked regularly. Second, I digitize and assemble a new data set of school district characteristics, which provides detailed, local-level information about students, teachers, and schools annually and separately by race. The data improve upon previous research, which relies on more aggregated or less frequent measures Third, I use this framework and data to show why racial inequality in public schooling was greatest in the Cotton Belt, why it reduced specifically following WWI and the New Deal without any direct federal intervention, and why it differed by characteristics such as school term.

Hypothesis. I assess how well land endowments account for cross-sectional differences in racial inequality in public schooling. These endowments, such as a region's soil quality and climate, affect which crops are most efficient to grow (Engerman and Sokoloff, 2002). For example, the U.S. South was more suitable for growing crops such as cotton and tobacco, whereas the North was more suitable for grains and livestock. These characteristics also account for the evolution of

institutions such as slavery, and more generally, the demand for low-skilled labor. Additionally, in the U.S., land endowments explain literacy and school construction in Puerto Rico (Bobonis, 2008), as well as per capita income differences within the South (Michaels, 2009).

The Southern economy also underwent two significant changes during this period that I use to explain the temporal variation in schooling. Nevertheless, growing cotton remained integral to the economy throughout. First, exports fell substantially around 1920 with the spread of boll weevil, the rise of competing exporters from countries such as Egypt, India, and China, and the rise of synthetic fabrics. This decline in production reduced the demand for low-skilled labor in cotton. Second, the Agricultural Adjustment Act (AAA) of the New Deal in 1933 compensated farmers for leaving land fallow to decrease production and increase prices. Cotton landowners received less compensation if they had shared the land with sharecroppers or tenants. Sharecropping and tenant contracts had routinely required that all children work, and black families were more regularly croppers and tenants. As a result, I use the AAA as a quasi-experiment to study the effects of a fall in the demand for black child labor, in which wage labor was substituted for families.

Cotton production more than any other major economic pursuit imposed an unusually large demand on child labor during the early 20th century. It remained unmechanized and required large labor inputs from children for much of the year. I argue that the demands of growing cotton crowded out education, leading to lower school quality and less regular school attendance.

Black children was more impacted because black children were more regularly involved in the cotton harvest. As a result of slavery, many blacks had a comparative advantage in cotton agriculture. Many former slaves continued to work regularly in growing cotton because they did not receive substantive educational opportunities until several generations following the War, and because many continued without owning any property. I argue that racial inequality in public schooling in the South can be predominantly attributed to the high demand for black child labor. In addition, inequality in schooling narrowed as the demand for black child labor fell.

Empirical Framework. I examine how the demand for black child labor affected public school

quality, first by formalizing the extent to which school boards diverted funds that the state allocated for black schools to white schools. Representing the interests of their constituents, wealthier whites, school boards diverted funds both to provide better educational opportunities for whites and to foster low-skilled, black child labor. Poorly investing in black schools both discouraged black children from spending their time in school instead of working, and kept them low-skilled. However, whites did not want school boards to divert all of the funds. Doing so could induce a law suit as a result of blatant racial differences in schooling. It could also induce black families to migrate to another school district, taking with them their labor and state allocated school funds. I show that school boards diverted funds to satisfy white demand for a low-skilled workforce that blacks could fulfill. This practice persisted until the demand for child labor fell below these costs.

State funds were routinely prohibitive, and school boards could supplement them by raising a local tax. I show that the demand from black parents for this tax to support better quality schools also varied inversely with the extent to which the marginal product of child labor exceeded the returns to education. Whites, however, had a greater preference for the tax because they had more money for the tax and less of a demand for child labor. In sum, by incorporating the incentives of both parents and schools boards, I can determine the total effect of child labor on schooling.

Data. The empirical work relies primarily on a newly assembled data set on school districts in Georgia from archived, annual reports of education. The state collected detailed information about the universe of students, teachers, schools, and local public finance, annually and separately by race for each of its school districts. The data allow me to improve upon previous studies that use state-level data (see, for example, Rosenzweig, 1977), cross-sectional variation (see, for example, Margo, 1987), or fewer public school characteristics.

I assembled the data, first by locating each annual report from library archives. After each table was keyed, I then assigned each school district an identifier, consistent with the Federal Information Process Standards (FIPS). The FIPS codes allowed me to link the data with the census in the present paper, and with other data in related work on health (Greenbaum, 2009). Finally, I

standardized the variables over time, and corrected the data for typographical errors in the reports.

The data are advantageous for this paper because they provide a richer description of the development of public education. Of equal importance, I use local-level data to more precisely match public schools with the crops that were grown in a given school district. For example, I distinguish between schools in the cotton-growing and non-cotton growing counties. Additionally, annual data help to better match temporal changes in schooling and agriculture. The data will have great use for many other research questions in education, such as research on competition across school districts, housing, and taxation and local public finance.

I focus on Georgia because of the high quality of education data, because of its size, and because of its geographical diversity. The land endowments of the Lower and Upper Piedmont regions of Georgia make this area suitable for harvesting cotton, whereas other regions such as Northeast Georgia are mountainous and not conducive to cotton agriculture. My results may generalize to nearby states such as South Carolina that have a similar focus on cotton and a comparable or greater amount of racial inequality in schooling. I am currently assembling the data from other Southern states to confirm this external validity.

The measures of schooling this paper focuses on are attendance rate, pupil-teacher ratio, and school term length. I combine them with data that I have also assembled on annual cotton production. The cotton data provide a greater frequency than the traditional use of quinquennial or decennial federal censuses. Finally, I substantiate and enrich the empirical results with narrative evidence in the form of letters from school boards to the state. Additional variables that I assembled in the schooling data will allow me in the future to study other school features, including teacher certification, local taxation, and school buses.

Empirical Implementation. I use the data to test the predictions of the empirical framework by estimating a difference-in-difference model. The model examines the relationship between crop choice and demand for child labor with public schooling. I demonstrate empirically how changes in the demand for child labor in cotton agriculture narrowed racial differences in schooling, most

sharply in cotton-intensive school districts. This framework is robust to possible confounding factors and different specifications, including fixed effects and the interactions between them.

Although crop choice is controlled for in some previous studies on the rise of black public schooling (see, for example, Johnson, 1941; Margo, 1987; Walters, James, and McCammon, 1997), the evidence is not consistent because they rely only on cross-sectional variation across school districts. My study overcomes this concern by estimating how cotton affects schooling in a 30-year panel data model, and controls for county fixed effects, such as those associated with land terrain. Nevertheless, I do not account for the extent to which poor whites were affected by the same shocks that reduced the demand for black child labor. The data do not distinguish which schools poor whites attended, which understates inequality between blacks and voting whites.

The paper reports three sets of results. First, cotton agriculture affected racial inequality in the provision of public schooling. Racial inequality in public school quality was largest in cotton-growing regions of the South. Second, school attendance rose in response to declines in cotton agriculture, most notably for black children. Third, racial differences in school quality narrowed as the sharecropping and tenancy system declined after the AAA was implemented and black attendance converged with white attendance

These results have important implications for how to interpret the economic history of the Jim Crow South (1880s-1950s). The mid-20th century narrowing of racial differences in wages has been attributed to the relative improvement in black school quality (Card and Krueger, 1992b). The present paper suggests that land endowments and the declining demand for child labor can shed light on the timing of these events. Moreover, education has been linked to other factors of well-being, such as later-life health (Lleras-Muney, 2005; Greenbaum, 2009). At the macroeconomic level, the slow rise of public education in the South can account for the slow economic growth of this region in the century following the Civil War (Wright, 1986; Connelly, 2004). Lastly, the long-standing demand for child labor in the Cotton Belt can also explain the slower diffusion of the high school movement to the South (Goldin and Katz, 2008).

Here, I suggest an additional explanation for racial inequality in the context of investments in black public schools. Economists traditionally explain racial inequality as occurring as a result of inherent racial preferences (Becker, 1957), informational frictions (Aigner and Cain, 1977), and/or negative connotations with respect to minority races (Loury, 2002). However, they do not directly explain why racial inequality has varied across regions and over time. The present paper offers the additional interpretation that economic incentives that arise from land endowments and corresponding industrial production can account for racial inequality.

Developing countries today may have similar incentives for maintaining a poorly educated workforce. The conditions under which child labor demand negatively affects school attendance has been documented in many countries throughout the world (see, for example, Beegle, Dehejia, and Gatti, 2006; Edmonds, 2006; Kruger, 2007). Public schools are also less developed as a result. For example, in India, the rate of child labor is among the world's highest, and school attendance is comparable to those of U.S. Southern blacks during the early 20th century (Barro and Lee, 2001). Most children also work at simple, manual tasks in agriculture (Swaminathan, 1998), where share tenancy is pervasive (Shaban, 1987). India's demand for child labor has led it to reject policies aimed at improving public education such as compulsory schooling for much of its history to maintain a lower social strata (Weiner, 1991, pp. 5-6). The experience of the historical U.S. South suggests public education can receive more public support by implementing policies that provide financial incentives to discourage child labor, such as vouchers and cash transfers (Schultz, 2004).

The remainder of the paper proceeds as follows. Section 2 documents a set of stylized facts about public schools in the U.S. South, and details how modes of production are consistent with them. Section 3 presents an analytic framework for why both school boards as well as white and black parents wanted to under invest in black schools. Section 4 describes the data I digitize to test this framework on school districts and agriculture. Section 5 presents the empirical results and supporting narrative evidence. Section 6 discusses implications of these results for reinterpreting the economic history of the Jim Crow South and for developing countries. Section 7 concludes.

2 Education Trends in the U.S. South

This section documents a set of stylized facts about public schools in the U.S. South. In Section 2.1, I discuss the role of the federal and state government in the provision of black public schooling. The events I outline suggest that they had the greatest impact on improving black public schools before and after the early 20th century. In Section 2.2, I detail trends in education during early 20th century, the period of the greatest convergence of racial differences in attendance and school quality. Events in agriculture are consistent with this narrowing.

2.1 The Limited Role of Federal and State Governments

Public education for blacks originated following the emancipation of slaves in 1863. In most U.S. states, public education dates back to the period from the 1830s to 1860s, but it did not spread through the entire South until after the Civil War (Anderson, 1988, p. 2). In particular, before the Civil War, it was illegal in many Southern states to teach slaves to read or write.[1]

As a part of Reconstruction during the 1860s and 1870s, initiatives by the Freedman's Bureau helped to construct black schools. Additionally, the North helped to supply teachers (Anderson, 1988, p. 2). These efforts spread more slowly in the Rural South, however, where public school systems were only in their inception. Moreover, racial inequality persisted as black children were relegated to separate schools from whites, which relatively, received inadequate funding. In some cases, the resistance of Southern whites to black education went as far as burning schools and lynching teachers (Ransom and Sutch, 1977, pp. 25-31).

However, progress in black public schooling slowed with disenfranchisement, which began in the late 1870s following Reconstruction. Most blacks stopped participating directly in the political process in much of the rural South, as a result of states initiating literacy, property, residency, and/or tax requirements to vote (Kousser, 1974). These policies were designed to prevent blacks from

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[1]Ransom and Sutch (1977, pp. 16-19) show that many blacks were illiterate because slave owners did not demand any returns from educated labor, not because of these laws or black disinterest in education. Moreover, they demonstrate that slave owners feared potential black upward mobility in the labor force and off of the farm. On the other hand, they showed that free workers pursued education for the additional reason of nonpecuniary benefits such as increased confidence and happiness, which slave owners did not value for their laborers.

voting, but were nevertheless constitutional because they did not explicitly allude to race.[2] Some poor whites were disenfranchised by these policies, as a result. Furthermore, state school boards routinely restricted board members and trustees to the voting population.[3] Racial differences in public schooling widened through at least 1910, as a result (Margo, 1982).[4]

Additionally, the Supreme Court established separate-but-equal schooling through *Plessy v. Fergusson* (1896).[5] This case set the precedent for racially segregating schools provided that the facilities were equal but not necessarily identical.[6] However, the Supreme Court failed to provide a precise and operational definition of equal, which became clearer starting with its 1899 ruling of *Cumming v. Richmond County, Georgia* (Margo, 1990, pp. 68-70).[7] This case and several others at the state-level established that any law that excluded black children from any share of state funds was unconstitutional.[8] Ruling unequal required the course to have evidence that funds for blacks were insufficient, and school boards intended to discriminate (Mangum, 1940, pp. 87-89).

State governments routinely funded school districts based on the amount of school-age children independent of race. However, many school districts diverted the funds allocated for black schools to white schools. Bond (1934, pp. 238-249) argues that school districts with a larger share of black children diverted more funds in the absence of adequate federal and state intervention. Nevertheless, this explanation does not account for why school districts chose to divert funds nor

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[2]Contemporary legal scholar and sociologist, Charles S. Mangum, Jr. (1940), notes that the poll tax, for example, was constitutional but was designed to disenfranchise blacks: the "qualification has been held not to violate the Fourteenth Amendment, although in many instances an unfair administration of the law tended to disenfranchise the Negro. It is certain that more Negroes than whites were so disqualified," (pp. 389-390).

[3]For example, for Georgia, see Joiner (1979, p. 586).

[4]Nevertheless, not all cities implemented disenfranchisement policies (Margo, 1990, p. 35), and their black public schools flourished relative to those of the Rural South in some cases. In fact, black schools in many cities resembled white public schools in many respects within a few decades of Emancipation. See Harris (1985)'s evidence of Birmingham, Alabama for such an example.

[5]Homer Plessy was arrested for violating the Separate Car Act for insisting on boarding a whites-only train. The Supreme Court ruled against the Separate Car Act violating the equal clause of the Fourteenth Amendment, and in fact, cited several cases that had upheld racial segregation in public schools.

[6]Margo (1986) provides evidence on how separate schools by race that were not provided with identical resources reduced black educational attainment.

[7]Richmond County had replaced its black high school with a black elementary school. The Supreme Court supported that the needs of many younger black children outweighed those of fewer older children as there was no evidence of hostility toward the black .

[8]Subsequently, most Southern states mandated separate schools (Mangum, 1940, pp.78-79).

why inequality varied over time.

The time period under investigation in this paper–the first half of the 20th century–is also without any major federal policies aimed to overturn these institutions and improve black education. It was not until *Brown v. Board of Education* in 1954 that the Supreme Court instituted the racial desegregation of public schools.[9] Card and Krueger (1992b, p. 167) argue that this policy, however, did not significantly change racial differences in public schooling: "[t]he convergence in black-white school quality began well before [this decision], and in fact, there is little evidence of a break in the [time] series [of pupil-teacher ratio, school term length, and teacher pay] around the time of the desegregation order."[10] The Civil Rights Act during the following decade provided additional support for black education through policies such as granting blacks the vote.[11]

The present paper analyzes racial differences in public schooling in the eighteen segregated states in the South. I examine the importance of the demand for child labor in agricultural activity to explain racial differences in schooling. Indeed, child labor was prevalent in the South. Sociologists Katherine DuPre Lumpkin and Dorothy Wolff Douglas (1937) conclude from their field work that these states were "virtually a one-crop section. A few states also have a large tobacco crop in which children work, but cotton is by all odds the greatest crop to employ the child 'home' worker," (p. 87). Card and Krueger (1992a) describe aggregate trends in school quality throughout the U.S., and show that these Southern states lagged behind the rest of the U.S. (pp. 12-13).[12]

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[9]In the preceding decade of the 1940s, law suits that the NAACP helped raise against some Southern states contributed to reducing racial differences in teacher pay (Tushnet, 1987; Donohue, Heckman, and Todd, 2002).

[10]School desegregation had significant effects on narrowing other racial differences in the educational experiences of black and white children, such as its impact on local public finance policy and changing peer composition. Reber (2007) presents evidence on how black children received a greater allocation of funds per child in integrated schools than previously during Jim Crow. Additionally, Guryan (2004) estimates the effect of desegregation on increasing relative black high school completion rates.

[11]Cascio, Gordon, Lewis, and Reber (2009) provide evidence that financial incentives tied to Title I of the Elementary and Secondary Education Act (1965)–which required compliance with the Civil Rights Act–further spurred school desegregation.

[12]Wright (1986) describes causes and consequences of these trends.

2.2 Early 20th Century Cotton and Racial Convergence in Public Schooling

For the eighteen segregated Southern states, Figure 1 maps racial differences in pupil-teacher ratios in both 1920 and 1950.[13] First, the black-white gap was substantially large at the beginning of this period and declined significantly between 1920 and 1950. Second, these declines were most concentrated in the Cotton Belt, and the racial gap almost completely narrowed by 1950. This figure is a first suggestion that events in cotton agriculture could have been important in accounting for racial differences in public school quality.

To better understand the temporal variation in school quality, Figure 2 presents both pupil-teacher ratio and school term length in North and South Carolina over time and separately by race. South Carolina was significantly more cotton-intensive, although the two are contiguous and similar along many other characteristics that could be relevant for public schooling, such as per capita income. The remainder of this section details the events in cotton that could account for the racial differences across these two states, the narrowing of racial differences within each state over time, and differences in school characteristics that are conducive to better school quality. Table 2 summarizes these events.

First, consistent with Figure 1, inequality was larger in the more cotton-intensive state of South Carolina than that of North Carolina. Demand for child labor in these two states can possibly account for their different allocations of school resources by race.[14] Indeed, child labor was prominent in agriculture into the 1930s, and was primarily important for cotton production, particularly in sharecropping and tenancy (Lumpkin and Douglas, 1937, pp. 3-4): "The great majority of [child laborers] are the children of the sharecroppers and tenants...working in cotton in our south-

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[13]I thank David Card for sharing his data from Card and Krueger (1992b). Card and Krueger (1992b) finds that pupil-teacher ratio was the characteristic that was most correlated with later-life wages, followed by school term.

[14]Both North Carolina and South Carolina grew tobacco to a smaller degree, which was grown more in North Carolina. Tobacco was labor-intensive, but most of the year required skilled labor (Reid and Gregory, 1996, p. 90-96). Additionally, Harriet A. Bryne (1926) conducted surveys for the Children's Bureau of child labor in tobacco, and found that most children worked for at most three months. Moreover, children under the age of 12 were not regularly involved in growing tobacco, and tobacco placed similar demands on the labor of white and black children.

ern states."[15] In fact, many school-age children worked in cotton.[16]

Additionally, black school quality was greater in North Carolina, while white school quality was greater in South Carolina. A greater proportion of black children worked in harvesting cotton (Lumpkin and Douglas, 1937, p. 87): "It is apparent that the problem of child labor on the 'home' farm is not only a southern problem, but that, far out of proportion to the number of Negro children in the population, it is a problem of the southern Negro child." The demand for black child labor was conducive to under investing in black public schools because school attendance varies directly with school quality (Margo, 1987), both of which in turn affect human capital accumulation (Orazem, 1987). The demand for black child labor in South Carolina cotton agriculture can account for its greater racial differences in schooling.

Second, the first significant narrowing of racial differences in public school quality occurred starting around 1920. For example, in South Carolina, average black pupil-teacher ratio decreased from 75 in 1920 to 49 in 1930 and from 35 to 29 for whites. Also during this time, the diffusion of the boll weevil limited the maturity of the cotton boll, and the Cotton Belt experienced soil depletion and erosion. In addition, the international demand for U.S. cotton declined as a result of an increase in suppliers from Egypt, China, and India , while synthetic fibers began to substitute for cotton (Holley, 2000, pp. 14, 55). This decline in cotton production caused the demand for both low-skilled child and adult labor to decline, which in turn, enabled households to place a greater demand on public schooling and adults to work as teachers.[17]

This narrowing occurred significantly in pupil-teacher ratio, potentially to prevent black out-

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[15]Share tenants were above sharecroppers in the hierarchy of farming. Both received land and a furnished house or cabin from the landlord. The share tenant supplied his own tools and materials, and typically paid one-fourth to a third of the crop grown as rent. Sharecroppers, on the other hand, received tools and materials from the landlord. However, sharecroppers only kept one-half of the crop grown, and paid rent (Holley, 2000, pp. 3-7).

[16]Nettie P. McGill (1929) of the Children's Bureau reported from her fieldwork that "for example, in the Texas cotton-growing counties...nearly all the children enrolled in school who had reached the age of 10, and many even younger...had worked in the field. In the southern tobacco districts from a third to almost half the rural school children...had worked on the tobacco crop (p. 21)." Moreover, children in cotton averaged 10-11 hours of work per day (p. 24).

[17]The short school term had enabled men to work year-round by combining teaching with farming. For example, J.M. Schakelford, Perry County, Arkansas, County Examiner noted that "Almost all of our male teachers are also farmers," (Doyne, 1900, p. 84).

migration. Despite being disenfranchised, school boards supported black schools was to discourage black households from migrating to another school district with better educational opportunities (Margo, 1991). Whites feared the potential loss of funds per child from the state to divert to white schools, and also did not want to lose blacks as a source of labor. If school boards continued to fear this cost following the decline in cotton production, then they may improve black public schools to the extent that doing so did not interfere with the benefits of inequality – the demands for black child in agriculture. Because children continued to work during the same months of the year, a characteristic of public schools such as class size rather than the school term could more effectively address only the costs of inequality.

Third, the narrowing of racial differences in public school quality slowed down in the decade starting in 1924. This year also coincided with the Immigration Exclusion Act, which placed substantial restrictions on European immigration, a key source of low-skilled labor in Northern manufacturing. This ban spurred the Northern migration of Southern blacks (Collins, 1997). However, it was more educated blacks who migrated (Vigdor, 2002), rather than families from the Cotton Belt. Moreover, younger children were better suited for cotton picking than for the demands of manufacturing (Goldin and Sokoloff, 1984). I thus argue that the demand for low-skilled labor in the North that followed immigration quotas cannot by itself account for reducing the demand for black child labor in cotton nor the rise of black public schooling.[18] Nevertheless, as the demand for labor in cotton fell, Donohue, Heckman, and Todd (2002, pp. 257-261) find that most of the migration during this period in Georgia occurred within school districts.[19] Potentially, households pursued other economic opportunities such as in cotton textiles, for which production costs decreased as the price of cotton fell.

Fourth, racial differences in school term length narrowed almost completely starting in the

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[18]In fact, some school districts justified not investing more in black schools as a result of black out-migration. For example, Supervisors, I.S. Smith and Geo. D. Godard observed at this time in Dodge County that "We have not found the negro schools in very good condition. This is due, perhaps, very largely to the fact that there has recently been a great exodus of the negroes from the county thereby disorganizing the schools," (Ballard, 1924, p. 7-21).

[19]Migrating within a school district did not cause the school to lose any funds from the out-migration of blacks.

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mid-1930s. Additionally, in 1933, the New Deal's Agricultural Adjustment Act sought to restore commodity prices to their levels before WWI by paying landowners to leave some of their land fallow. The AAA helped to reduce the demand for child labor because it provided incentives for cotton landowners to replace sharecroppers and tenants with wage laborers.[20]

Sharecropping and tenancy were pervasive in the Cotton Belt, and routinely contracted children to work.[21] Landowners routinely preferred to work with larger families because the expected returns to family-labor increased with the amount of children (Van Auken, 1950, p. 366). In fact, contemporaries noted that landlords often went to school to pull out subversive children who tried to attend (Roberts, 1945, p. 193).

The Agricultural Adjustment Act (AAA) encouraged the decline of sharecropping and tenancy because landowners were compensated the most if their land was worked instead by wage laborers (Nourse, Davis, and Black, 1937, pp. 341-353).[22] Indeed, these financial incentives generated a rapid decline in sharecropping and tenancy and a rise in wage labor during the mid-to-late 1930s (Whatley, 1983). As tenants were evicted, the supply of available wage labor increased and planters often hired laborers irregularly (Wiener, 1979, pp. 989-991). Land owners thus relied less on the family-model of share tenancy, including the more regular and contracted use of all of the household's children. These incentives, in turn, decreased the demand for child labor, not only because fewer acres of land were harvested during AAA but also because landowners no longer contracted all of the children in a household. Therefore, more black children were available to

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[20]The AAA operated programs for other crops including wheat, rice, and hogs for similar reasons (Holley, 2000, p. 59). The child labor argument in this section, however, applies to cotton because of its unique agricultural and payment set-up.

[21]Lumpkin and Douglas (1937, pp. 88-90) argue that most children working in cotton were in share tenancy: "While few precise figures on this can be shown, the indirect data are such as to make us know that children in unpaid family work are predominantly from tenant homes (p. 89)." Moreover, it was common practice that all children of at least 6 years old worked: "It is the common assumption in the agricultural South, in allotting a piece of land to a [cotton] tenant, that all children of working age (6 or 7 years and up) will go to work (p. 88)."

[22]These contemporary economists argue that policy makers were aware of these incentives. Nevertheless, policy makers chose to sign up land owners to ensure that those with the most property participated in the program. Landlord were required to share payments with sharecroppers and tenants for any of their land and work. However, landowners received the full payment on land harvested only by wage labor. As a result, it was common practice that landowners displaced tenants and kept the payments for themselves, but in practice, reported that both they and the tenants reduced their acres to secure and receive both payments.

attend school during months in which they had been previously working.

Fifth, the mechanization of cotton in the Deep South occurred after most of the racial narrowing of public school quality converged.[23] The tractor first spread to the Deep South during the late 1930s, partly in response to the decline in sharecropping and tenancy (Whatley, 1985). Subsequently, the mechanization of the more child-intensive components of the harvest spread during the 1940s and 50s (Holley, 2000, pp. 13-14).[24]

Finally, black school term length in South Carolina was less than 120 days before the Agricultural Adjustment Act reduced the demand for child labor in cotton during the mid-1930s. Before the mechanization of cotton, growing it was child-intensive for approximately six months of the year. That left approximately six months or 120 days of school, which was the upper bound for South Carolina through the mid-1930s. This amount stems from the cycle of the cotton season varying minimally from year to year, and consisting of plowing and planting in the spring, thinning and weeding in the summer, and picking in the fall, with the winter fairly idle.[25] The farmer's wife and children were crucial in growing cotton during the late spring, early summer, and more so throughout picking in the fall (Holley, 2000, pp. 5-10).[26]

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[23]Several factors delayed the mechanization of growing cotton in the Deep South. First, the distinct requirements of each component of growing cotton necessitated a different technology. Hand labor could only be eliminated with distinct technologies for each part of growing cotton. Second, cotton matured differently throughout the South, and it was difficult to invent a machine that could simulate the motion of hand-picking (Holley, 2000, pp. 35-36). Whatley (1985) further shows that the size of farms in the Deep South led to the wide use of tenant contracts, which discouraged the mechanization of cotton. Finally, Holley (2000, p. 101) argues that the labor shortage owing to WWII during the 1940s encouraged the transition to capital-intensive production in the Deep South.

[24]Margo and Finegan (1993) shows that the decline in black teenage labor in cotton began in the decades before the 1950s diffusion of the picker. This finding is consistent with the decline in child labor following the earlier decline of cotton exports and the AAA.

[25]The first season generally began in the late winter with farmers driving a plow on the land to make a new seedbed ready for planting, and then planted the cotton between late April and early May. The cotton plants blossomed approximately one month later, upon which children helped thin the original stand. Thinning fosters the ideal spacing between plants, as many seeds fail to germinate. Children also weeded the plants to assure they matured optimally. Thinning and weeding usually ended by July, although farmers often continued to plow the cotton until August to loosen the surface and destroy any further weeds (Holley, 2000, pp. 5-8).

The last part of the cycle entailed picking the cotton, which was the most labor-intensive task. After the cotton plant bloomed mid-summer, the plants would leave the bolls, which contained the maturing cotton. The boll would split open at maturity, inside which were the lint, long white seed hairs, that covered a large number of seeds. Children also helped separate the boll's lint from the seeds, and farmers would earn greater profits for picking more lint over the season (Holley, 2000, pp. 8-10).

[26]Children were sometimes engaged in less-intensive work outside of these peak seasons, both in cotton and ad-

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Moreover, school terms operated discontinuously for black children to cater to these peak seasons. The terms for white schools were less often discontinuous because they worked less regularly in cotton. For example, Georgia's Morgan County's Superintendent of Schools, E.S. Bird reported that "we give them [negro schools] six months - one before Christmas, three after - until hoeing time - and two in the summer. They have to work, and we have to arrange for it that way. They prefer theirs all [continuously], like the whites," (Brittain, 1911, pp. 148-149).[27]

The demands cotton placed on children crowded out their schooling more than any other mode of economic production did in other regions. Other work was more conducive to attending school for part of the day and/or for a longer part of the year.[28] For example, school terms could be longer in regions that grew other crops like tobacco because growing them demanded full-time labor for a shorter part of the year.[29] In fact, many crops no longer had a significant demand for child labor because they had already mechanized.[30] Children worked during the school year often divided their day between work and school, either by working earlier in the morning, later in the evening, or attending school at night. (Lumpkin and Douglas, 1937, pp. 76-79).[31]

3   Empirical Framework

In this section, I formalize the mechanism by which child labor affected school quality and school attendance. School boards distribute state funds to white and black schools and can raise a local

ditionally in growing and picking corn (Lumpkin and Douglas, 1937, pp. 6-8). McGill (1929, pp. 6-8) confirms this observation.

[27]The evidence attributed to Ballard, Brittain, and Pound come from the Annual Reports of Education in Georgia, which are described in Section 4.

[28]Sociologist, Rupert B. Vance (1929), confirmed this unique position for cotton: "It is true that the women and children, white and black, of the small cotton growers are more accustomed to work in the fields than those of any other farming group in the United States (p. 161)."

[29]For example, in the fruit-growing districts of the Pacific Coast, demand for child labor increased significantly during October. As a result, many schools opened in August and implemented two- or three-week "apple vacation" in October to enable children to work full-time during the peak harvest season (Lumpkin and Douglas, 1937, p.78).

[30]Wheat and hay, which were also harvested in the South, had already mechanized during the 19th century (Holley, 2000, pp. 11-13). They were generally harvested outside of the Deep South, and these regions also tended to have better quality black public schools and less racial inequality.

[31]For example, Lumpkin and Douglas (1937, pp. 50-51) describes how children as young as 8 years old in New York City worked delivering newspapers after school, until sometimes as late as 1 AM.

tax, and do both to increase the likelihood of reelection. Taken together, I show how both white and black households prefer to under invest in black schools while the demand for child labor was significant, although for different latent reasons. In the empirical work, I observe only the total effect of child labor on the black-white gap in public school quality, which reflects the demands of both races.

First, in Section 3.1, I develop a principal-agent, supply-side framework in which school districts allocate state funds by race. Only wealthier whites can vote, and as a result, school districts directly represent their demands. In doing so, the school board allocates funds to maximize resources for white schools to increase white returns to better school quality. School boards also minimize funds for black schools to restrict black school quality. Doing so discourages black children from attending school and instead encourages them to continue working for wealthier whites in low-skilled labor, such as cotton agriculture. Nevertheless, whites do not want blacks to receive no funding. A law suit could result from blatant racial inequality in schooling (Mangum, 1940). Additionally, blacks could vote with their feet by migrating to another school district (Margo, 1991). I demonstrate that the demand for child labor determines the extent to which the school board recognizes that wealthier whites value the benefits of inequality relative to these costs that mitigate inequality.

In Section 3.2, school boards can raise a local tax to supplement state funds. This tax enables me to explicitly account for both white and black demand for better schools. Although blacks do not vote, the school board seeks to impose the tax so that they are satisfied with school quality to prevent their out-migration. However, the school board represents black only insofar as their preferences do not conflict with those of whites. I show that the representative black household is less interested in raising this tax while black children are working more regularly than whites. In so doing, I account for race by reinterpreting the parameters of the model such as initial wealth wherein average wealth for whites was substantially greater than for average blacks. I also show why the inverse relationship between returns to child labor and school attendance was stronger for

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black children.

Finally, in Section 3.3, I detail the empirical strategy for implementing these two frameworks. Both white and black household preferences for the provision of black public schooling are consistent, and I examine the total effect of child labor on public schooling. I first discuss how the predictions of the economic model lend to a difference-in-difference strategy. In response to potential concerns of endogeneity, I then present strategies for how to address them.

3.1 Supply: School Board's Allocating State Funds to Satisfy Whites

I first formalize how school boards allocate funds between white and black schools in a principle-agent setting. I do so by applying the political economy models on regional transfers in which each race corresponds with a region. Bolton and Roland (1997) is theoretical treatment of when the wealthier region secedes rather than supports the poorer region in a democratic society. Wintrobe (1998) analyzes nondemocratic societies including those under apartheid. I apply these models to the context of the U.S. South in which only wealthier whites were directly represented in the political process and also determined school policy for disenfranchised blacks.

School boards allocate state funds between white and black schools to maximize their likelihood of reelection. Historically, their constituency consisted of wealthier whites because blacks and poorer whites were disenfranchised during the early 20th century. School boards thus allocated funds to directly represent wealthier whites.[32] While poor whites contributed to the agricultural child labor force, most child labor in cotton agriculture was performed by blacks (Lumpkin and Douglas, 1937, p. 87). For simplicity, only black children work.

Timing. I account for three specific interests that school boards consider. Figure 3A illustrates the sequence of events:

First, school boards seek to maximize the returns to education for whites. To do so, they maximize funds allocated to white schools because the funds help improve school quality. For example,

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[32]Alston and Ferrie (1993) discuss the influence of white landowners on the political process and the provision of public goods such as schools.

school boards can lengthen the school term, reduce class size, or recruit better quality teachers. These policies are positively associated with increased student human capital accumulation (Card and Krueger, 1992b).

Second, School boards help provide a low-class working force of blacks for wealthier whites. The separation of schools by race allowed school boards to do so by providing minimal educational opportunities for blacks. School boards thus minimized funds for black schools, which limited the quality of education provided. For example, insufficient funds reduced the number of schools, classrooms, and desks that could be provided for black children, and consequently, discouraged their school attendance (Margo, 1987). Blacks who did not attend school remained low-skilled. Because school boards did not directly represent black households, I do not account for any school board interest in the returns to black education.

Nevertheless, school boards indirectly represent blacks to an extent to the benefit of whites, and do not divert all of the funds to white schools. School districts sought to avoid the cost of a law suit, which could arise if blatant racial differences in public schooling were detected (Margo, 1990).[33] Another source of tension was the possible threat of black out-migration to a better funded school district. If blacks migrated to another school district and thereby voted with their feet, they took with them the funds allocated to their original school district that could be used for whites (Margo, 1991). Additionally, they took themselves as a source of labor.[34] I focus on the law suit because it is the more general case in terms of the partial equilibrium. To forestall a potential law suit, the school board must either decrease funds to white schools and/or increase funds to blacks.

In sum, at time equals zero, the school board allocates the funds between white and black schools. In the first period, black children work, and allocate their time between attending school

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[33]Mangum (1940) details numerous court cases throughout this period. The NAACP helped draw attention to racial inequality starting in the mid-1920s (Tushnet, 1987), and increasingly so starting in the 1940s (Donohue, Heckman, and Todd, 2002).

[34]Implicitly, black out-migration hinged upon weighing the costs and benefits between potential labor market opportunities and schools available. Better schools could increase the long-term returns to education, but worse labor market opportunities could reduce the short-term returns to child and adult labor. Carrington, Detragiache, and Vishwanath (1996) model black migration based on endogenous moving costs, and argue that regional wage differences and changes in cotton spurred the first wave starting around 1920.

and working as a result of available school quality. In the second period, white children realize the returns to education from the quality of the schools they attended. Additionally, school boards can face a law suit for which the costs are borne during the second period.

Set-Up. The school board maximizes a function based on the representative trustee, who considers these three interests of wealthier whites. The maximization is the utility of its representative constituent, which stems from its lifetime consumption. I consider a two-period function of a one-parent and one-child household as follows:

$$U(c_1, c_2) = u(c_1) + \beta q(\cdot)u(c_2 - \gamma) + \beta(1 - q(\cdot))u(c_2) \tag{1}$$

where $u(\cdot)$ is increasing and concave in consumption. c_1 denotes first-period consumption, and c_2 is that of the second-period consumption. γ is the cost of a law suit and $q(\cdot)$ is the probability of a law suit. Second-period consumption is discounted by $\beta \in [0, 1]$.

In determining white consumption, I consider only the money that children earn because they primarily affect the demand for schooling.[35] Additionally, everything earned is consumed in that period. For first-period consumption, $c_1 = wt_L$ where w is the child's wage, and t_L is the share of time spent working. Time spent working is subject to the following time constraint: $t_S + t_L = 1$ where t_S is the share of time spent in schools.[36] Finally, for ease of exposition, I make the assumption for black children that time spent in school is a linear function of school quality: $t_S(B) = B$ where B is per capita funding for black children, and is a proxy for school quality. Taking these constraints together, $c_1 = w(1 - B)$.

In the second period, consumption varies based on the earnings of white children, which is a function of the amount of time she spent in school during the first period. I denote this function as $\rho(t_S)$ where $\rho(\cdot)$ is increasing and concave in time spent in school, which is consistent with the

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[35]In terms of the wealthier household whose children do not work, only black children's earnings and the white returns to education are directly relevant. The next section deals with the household and accounts for the parent's earnings and wealth.

[36]Adding leisure to the model does not change any results from the model qualitatively.

returns to education literature (Card, 1999). As in the case of black children, I make the assumption that $t_S(W) = W$ where W is per capita funding, which is a proxy for school quality.[37]

Additionally, for the probability of a law suit, let $q(\cdot) = q(W - B)$. This function is increasing and convex in its argument so that a lawsuit arises only under extreme racial differences.[38] These two assumptions are consistent with the narrative evidence because law suits arose and were ruled against the school district only when there were blatant differences in resources.

The school board maximizes this utility function subject to the budget constraint, $W + B = Z$ where Z is total school expenditures. I normalize Z to be 1 by dividing the equation through by the total budget, which restricts $W \in [0, 1]$ and $B \in [0, 1]$.[39] Assuming that the school board is maximizing expected utility, it maximizes

$$U(W, B) = u(w(1 - B)) + \beta q(W - B)u(\rho(W) - \gamma) + \beta(1 - q(W - B))u(\rho(W)) \quad (2)$$

subject to the constraints on the domain on W and B. Additionally, there are no rents, and so the budget constraint binds. In this analysis, $W \geq B$ because school districts allocate funds either identically by race or divert from black to white schools.

Results. I examine the effect of child labor on whether school districts are likely to divert funds from black to white schools. I model the returns to child labor through the wage, w. See Appendix A for a proof of the following proposition:

Proposition 1. *School districts divert less money away from black schools as the returns to child labor fall.*

Landowners earned more money if sharecropper and tenant children produced more crop. This proposition suggests that as the returns to child labor fall, school districts are more concerned with

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[37]Implicitly, the time while children are not in school is devoted to leisure because the model does not provide any returns to this time.

[38]The probability of migration varies inversely with B, independent of W. Determining the partial equilibrium also entails adding a constraint based on the threshold utility of blacks that is directly or indirectly a function of schooling.

[39]Wages can be interpreted in a comparable unit by making a similar normalization.

the threat of a law suit. This change could also occur as a result of an increase in the expected cost. The innovation of this model is that the legal environment (or threat of migration) is not sufficient by itself to assess when school districts do not divert funds.

3.2   Demand: Racial Differences in Public Schooling through Local Tax

I consider the extent to which school boards supplement state funds by raising a local tax. Many states permitted school districts to raise such a tax.[40] In fact, states such as North Carolina institutionalized through disenfranchisement that white tax dollars went to white public schools (Pritchett, 1985).[41] Nevertheless, in some states such as Georgia, the state provided a substantial share of funds for many school districts during this period. These funds were hardly sufficient to fund more than a few months of the school year (Joiner, 1979, p. 149).[42] In North Carolina, on the other hand, the state provided less than 10%.

Modeling this tax enables me to assess both white and black demand for education. School boards continue to represent whites directly but again represent blacks only insofar as their interests affect and do not conflict with wealthier whites. Although many black children were contracted to work rather than attend school by sharecropping and tenant contracts, this framework illustrates that black parents also valued their child's labor over schooling.

I develop this framework by drawing upon models from the child labor literature: Basu and Van (1998), Baland and Robinson (2000), and Cigno and Rosati (2005). I apply their models to the U.S. South in which I explicitly account for race. I do so by reinterpreting some of the parameters, such as wealth, where I exploit that whites have more wealth than blacks. This framework extends that of the supply-side to the household by allowing white children to work. Additionally, black

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[40]In Georgia, for example, the law was passed in 1905 (Joiner, 1979, pp. 148-157).

[41]For example, in North Carolina, "[statutes] were enacted which directed that the funds to be raised by taxation on the property of white persons were to be devoted to the support of the white schools, while the funds raised by taxation on the property of Negroes were to go to the support of the Negro schools," (Mangum, 1940, p. 120).

[42]During the early 1900s, "[w]ithout the payment of tuition, the income was barely enough to support a free [white] school for more than 100 days. School buildings were of the poorest quality, and the few teachers who could be recruited were poorly paid. Often their academic training was litle beyond that of the children they taught. Such were the schools attended by over three-fourths of the children in Georgia," (Joiner, 1979, p. 149).

household consumption is indirectly represented, by accounting for the black returns to education.

First, I use this framework to develop comparative statics about racial differences in school attendance. Treating school quality as exogenously determined, I find that white children attend school more regularly all else equal. Additionally, attendance decisions for black children are more sensitive to the returns to child labor.

After analyzing school attendance, I consider the extent to which the representative household seeks to improve school quality. Taking the allocation of state resources as exogenously determined, I consider whether the school district wants to raise a local tax to supplement these resources. Although black households neither vote nor serve on the school board, I consider whether the school board is interested in eliciting their preferences to prevent them from migrating to another school district if the outcomes of these preferences are consistent with those of whites. I show that black households support the tax less than white households all else equal. They cannot afford as much of the tax and are more sensitive to the returns to child labor.

3.2.1 School Attendance with School Quality Exogenously Determined

Households make school attendance decision by maximizing a lifetime utility function of consumption. Utility increases in the short-term from child labor and from the returns to schooling only in the long-run. I consider a two-period household model of one parent and one child, in which the parent makes all decisions for the household pertaining to education, finances, and work.

In period one, the parent works full-time and the child allocates her time between working and attending school. In period two, the parent relies on savings from the first period and the child receives income proportional to her returns to education. The parent decides during the first period how much schooling his child should receive and how much money to save for the second period.

The utility function the household maximizes is additively separable across time and between parent and child during the second period:

$$\max_{c_1,c_{2a},c_{2c}} U(c_1, c_{2a}, c_{2c}) = \max_{c_1,c_{2a},c_{2c}} u(c_1) + \beta_0 u(c_{2a}) + \beta_0 \alpha_0 u(c_{2c}) \tag{3}$$

where $u(\cdot)$ is increasing and concave in consumption. c_1 denotes total household consumption in the first period, c_{2a} is that of the adult's in the second period, and c_{2c} is that of the child's in the second period. Second-period consumption for both the adult and child are discounted by $\beta_0 \in [0,1]$. The adult weighs the importance of his child's second period utility by a factor of $\alpha_0 \in [0,1]$, which reflects pure-capture or altruism as $\alpha_0 \to 1$.

First-period household consumption is derived from wealth:

$$c_1 + s = w_0 + wt_L \tag{4}$$

where s the amount of wealth saved for the second period, w_0 measures the parent's assets and first-period earnings, w the returns to child labor, and t_L the time the child spends working. Children earn wt_L, but the amount of time spent working is subject to a time constraint in which she can also go to school, t_S:

$$t_S + t_L = 1 \tag{5}$$

Each variable is interpreted as the share of time spent in each activity, and takes on the values $t_S \in [0,1]$ and $t_L \in [0,1]$.

In period two, the parent consumes all of his savings. Only the child works, and her earnings are based on how much schooling she has obtained during the first period: $\rho(t_S)$. As in the supply-side framework, $\rho(t_S)$ is increasing and concave in time spent in school (Card, 1999). Second-period consumption is represented as

$$c_{2a} = rs \tag{6}$$

$$c_{2c} = \rho(t_S) \tag{7}$$

where $r = \frac{1}{1+i}$ and i denotes interest.

Finally, I suppose that both the parent and child live through the first period, but the likelihood of the adult surviving into the second period is denoted by $p_a \in [0,1]$ and that of the child is $p_c \in [0,1]$. The parent maximizes expected utility, and define $\beta = p_a\beta_0$ and $\alpha = p_c\alpha_0$. Substituting

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the constraints for time, (5), and consumption, (4), (6), and (7), into the utility function, the parent maximizes (3) with respect to the choice variables, s and t_S, and the constraints:

$$\max_{s,t_S} U(s, t_S) = \max_{s,t_S} u(w_0 + w(1 - t_S) - s) + \beta u(rs) + \beta \alpha u(\rho(t_S)) \tag{8}$$

3.2.2 Accounting for Racial Differences in School Attendance

I incorporate race into this framework to understand why whites and blacks made different decisions about schooling. Black households retained the human capital they had accumulated as slaves working in cotton agriculture. Fundamentally, decisions about schooling differed by race as a result of significant black-white differences in human capital, health, and wealth that persisted well after the Civil War (Ransom and Sutch, 1977). This work experience provided them with a comparative advantage in this low-skilled form of work that got passed down to future generations.

I argue that three parameters in the model are good proxies for race: w_0, α, and β. A parameter is a good proxy for race if has a substantially different value for whites and for blacks. Furthermore, the comparative static with respect to each proxy should provide the same sign.

First, w_0, which represents wealth, is greater for whites. One reason it is greater for whites is because of the considerable racial differences in property (Collins and Margo, 2001). For example, during the early 20th century, home ownership rates remained steady, and the share of whites owning property was approximately 25% greater than the share of property-owning blacks. Furthermore, as late as 1940, the average property value for blacks was nearly 36% of the average Southern white.[43]

Second, I argue that β, the discount factor, is greater for whites. Whites had greater life expectancies and lower rates of mortality, and as a result, a greater probability of surviving into the second period, p_a. For instance, South Carolina whites born in 1920 had a life expectancy of 55.5 years, as compared to 44.4 years for blacks (Ewbank, 1987).

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[43]See Higgs (1982) and Margo (1984) for additional evidence, specifically for Georgia.

Lastly, I argue that α was greater for whites. White children were more likely to survive into the second period in light of significant racial differences in childhood mortality (Collins and Thomasson, 2004). Moreover, black children were more likely to migrate out of the rural South (Collins, 1997; Wiener, 1979). Black parents were more likely to discount their children's second period utility if they were separated from their children.

In the following three propositions, I formalize the relationship between race, the returns to child labor, and school attendance. I show that black children attend school less regularly by using each of the three proxies.[44] The final two propositions analyze the effects of the returns to child labor. See Appendix A for proofs of the following propositions:

Proposition 2. *White children spend more time in school, all else equal.*

Proposition 3. *Households send their children to school more when the returns to child labor fall only if the income effect is less than the price effect.*

Proposition 4. *Black families are more likely to keep their children out of school as the returns to child labor increase.*

3.2.3 Demand for School Quality by Race through Local Taxation

I endogenize investing in school quality by enabling households to pay a local tax that school raise only if their constituents demand it. Whites can vote explicitly on the tax. School boards additionally tax blacks to the extent that doing so does not conflict with white interest in child labor, but also does not encourage their out-migration to school districts with better educational opportunities.

Timing. Figure 3B summarizes the sequence of events. Suppose school districts tax households, $T \in \{W, B\}$, where T is the per capita tax rate for each school age child by race.[45] This tax

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[44]In fact, sociologist, Rupert B. Vance(1929, p. 168) suggests that sharecroppers and tenants acknowledged the importance of their children's labor as a result of the requirements of their contracts: "On the rented farms the tenants and croppers must pick their own crop or pay the labor bill. Consequently, they and the small owners draft their wives and children. All go to the fields early and work late, always ten hours, and often twelve a day."

[45]Recall that each household has only one child.

is deducted from the household's first-period wealth. I consider a school board that responds to the representative white household directly and to the black household indirectly. It allocates funds to schools based on their preferences for being taxed.

School quality is a direct function of the amount of money spent on schools. For example, a greater tax can help a school district construct another school, which can reduce average class size. Returns to education is an increasing and concave function in school quality (as proxied by T). Time spent in school is also a linear and increasing function of school quality, as motivated by the empirical results in Margo (1987).

Result. In terms of T, I show how each race prefers to be taxed. Whites and blacks have different preferences as a result of differences in wealth. This difference in wealth affects the demand for black children to work and their capabilities of paying the tax.[46] See Appendix A for the proof of the following proposition:

Proposition 5. *The average white family wants to invest more in improving school quality. Black families increase public school investments as the returns to child labor fall.*

The two frameworks lead to similar predictions about race, demand for child labor, and investments in public school quality. Both wealthier whites and black parents account for the returns to child labor in their decisions to fund black schools. When the returns to child labor decline, both recognize that the benefit of poorly funding black schools declines.

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[46]A source of evidence for the low demand for black public schooling by black families and school districts is the Rosenwald program. The Rosenwald Fund, which sought to help construct schools, operated as a matching program. Black residents had to apply for the Fund's support and guarantee the labor to help construct the school and the financial assistance of the local school district for at least one-half of the total cost (McCormick, 1934, pp. 610-611).

Data on the location of the Rosenwald schools, however, show that approximately one-third of Georgia counties never used the funds and approximately another one-fourth only had one such school (Fisk University, 2001). Moreover, several Georgia Rosenwald schools were located in wealthier towns that had established independent school districts. Although the Rosenwald program set high standards for the quality of the land on which schools were constructed and the quality of the buildings, the standards for school term length were effectively comparable to that set by the state while many other school inputs such as curriculum and salary were left unspecified (McCormick, 1934, pp. 616-622). Undoubtedly, the Rosenwald Fund and other philanthropies played a significant role in helping southern black schools. Nevertheless, the question remains open why many rural and cotton-growing districts did not participate in the Rosenwald program.

3.3 Empirical Implementation

Taken together with the historical context, these propositions suggest that black children attended school less regularly and attended lower quality schools, all else equal. The demand for child labor in cotton has relatively more of a negative effect on black public schooling. Moreover, black public schooling was of lower quality in regions growing cotton before the Agricultural Adjustment Act reduced the demand for child labor. Exploiting the regional and temporal variation in the demand for child labor, I estimate the effect on racial differences in public schooling by using a difference-in-difference framework.

3.3.1 Addressing Potential Endogeneity

A rise in public school quality could help increase attendance and decrease the demand for child labor. As an attempt to address this potential reverse causation, I develop instrumental variables for child labor demand. Specifically, I instrument demand for child labor in cotton with local weather and cotton prices.

First, in harvesting cotton, a favorable temperature leads to both a longer harvest season and to yielding more cotton. A particular temperature can enable the cotton boll to mature to greater capacity (Reddy, Davidonis, Johnson, and Vinyard, 1999). Weather can have the short-term effect of altering the months during which children were most helpful in agriculture, without providing enough time to significantly adjust the months during which schools opened. I argue that black school attendance was more sensitive to weather shocks because their families were, on average, more concerned with earning additional wealth in the short-run.[47] C.S. Maddox, County School Commissioner of Butts County, Georgia in 1910, for instance, confirmed this relationship by race and inferred that "...on account of the unusual wet summer last year, and other unavoidable conditions, which delayed the farmers from 'laying by' their crops, ...the enrollment of the white children was reduced by 3 per cent, and that of the colored 26 per cent, as compared with last year's enrollment [in Butts County, Georgia]," (Brittain, 1911, pp. 67-68).

[47]For similar reasons, Boozer and Suri (2001) use rainfall to instrument for the effect of child labor on schooling in Ghana.

Second, the international price of cotton can help farmers develop expectations about the demand for child labor in the upcoming harvest season. Similarly, demand for black child labor in cotton is to the extent that families are interested in acquiring wealth immediately. Georgia's Ware County's County Commissioner of Schools, J.R. Bourn confirmed this behavior:

> "In some of our schools there are not more than ten per cent of the children attending schools...They are kept in the fields at work...These conditions are getting worse as the price of cotton advances. The attendance is actually less when we have prosperity than in times of panic. Our people are caring more for money than for all else, and as the children can add to their bank account by saving the small amount they can earn in the fields, they say that they cannot spare them," (Brittain, 1911, pp. 113-114).

Finally, I account for the falling demand in child labor in cotton as a result of the Agricultural Adjustment Act. I do so by estimating a trend-break model around the time of the act's passage. I test for whether racial differences in school attendance and school quality narrowed substantially in the years following its passage. I also examine whether these changes were more pronounced in cotton-growing regions. Furthermore, these effects should increase with the extent to which cotton was harvested by sharecroppers or tenants.

4 Data

4.1 Education

Georgia is an ideal candidate for testing the relationship between labor-intensive local economic activity and the development of public schooling. In addition to it harvesting a significant amount of the country's cotton, both economic activity and public school quality varied considerably throughout the state and over time. Moreover, Georgia school districts and borders changed minimally over the early 20th century. For empirical purposes, Georgia consistently collected a wide-array of characteristics on its public schools annually and separately by race (Joiner, 1979).

This paper uses new detailed data on Georgia school districts, which I gathered by digitizing annual reports on public schools between disenfranchisement and Civil Rights, from 1902 to 1964. Focusing on more local-level data than previous econometric work enables me to better match

public schools with local economic activity. Additionally, I create an annual panel data set (as compared to decennial data assembled in other work) to more precisely identify the timing of public school changes.

Georgia formalized public education in 1871, and established the county as the school district for tax purposes. Nevertheless, a handful of cities, that were typically engaged in manufacturing and more industrial activities, established independent school districts. Doing so enabled them to collect a distinct tax on their residents, separate from that of the state-tax (Joiner, 1979).

At the end of each academic year, county- and city-superintendents were required to submit a report to the state about the public schools in their district. These reports generally included replies to a survey in which superintendents provided aggregate information about their students, teachers, schools, and financial statements. If a county had a city that established an independent school district, then the county superintendent reported only the remaining part of the county because the city provided its own information.[48] Some reports also provided superintendents with the opportunity to add any additional comments, which the state published in a separate section.

The state compiled these local reports into an annual state report. I use the state reports to assemble data about students on the amount school-age children from ages 6 to 18,[49] the amount enrolled each year, and the amount that attended school on the average day. I also collect data on teachers to compute pupil-teacher ratios as well as data on school term length. Future research will incorporate additional data that I have nearly finished digitizing, such as information about its expenditures and revenues, the quality of its school buildings, and teacher certification.

The ideal data set would include information about *when* schools operated and not just *how long*. In some of the annual reports, the state published editorial comments of the county superintendents. Specifically, in some of these qualitative accounts, county superintendents comment on the months schools operated, their rationale for the choice of the school term, and the importance

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[48]The reports contain several typographical errors upon inspection. See Appendix B for the method used to correct the data.

[49]The amount of school-age children is collected from a separate 5-year census. Before 1918, the 5-year census was published in a separate document, which I have also digitized.

of cotton and child labor in this decision. In the next section, I present this evidence following the quantitative results. I also enrich the qualitative evidence from Georgia with accounts I read in the annual reports from other states.

Specifically, I expect to find that superintendents in cotton-growing regions tailored the black school term to the harvest season while demand for child labor remained strong. Although cotton was harvested throughout most of the year, superintendents most likely wanted to close schools down during the picking season of the fall and weeding during the late spring. On the other hand, children were inherently less likely to attend during the winter because it was harder to find reliable transportation.

4.2 Agriculture

Two data sets on agriculture are combined with the education data. First, decennial and quinquennial census of agriculture data provides detailed information about land-use and crop production at the county-level. Since cotton in the crop of primary interest, I digitize a second data set that provides annual, county-level information only on cotton.[50]

Specifically, beginning in 1910, the Census Bureau collected data on the amount of cotton ginned in each county. Cotton ginned can be interpreted as a proxy for the amount of cotton produced, to the extent that the cotton was ginned where it was produced. In fact, comparing the cotton ginning data with that from the Census on production or on land-use shows that it is indeed a good proxy. For the years 1910 and 1920 in Georgia, the correlation between cotton ginned and both the amount of farmland devoted to cotton and the amount of cotton produced are 0.99.

In matching the agriculture data with that of the education data, I assume that a county's rural activity occurred exclusively in the parts of the county in which independent school district cities did not exist. The unit of analysis is the rural part of each county. This assumption is plausible because there were only a handful of wealthier, more industrialized cities that had established

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[50]The digitization of this source occurred concurrently by Lange, Olmstead, and Rhode (2009). Paul Rhode generously provided the data to cross-check against mine.

independent school districts.

Figure 4 plots a cross-section of the data for Georgia. Most of the state's cotton was harvested in the Upper and Lower Piedmont regions, which are the strip running from the northeast through southwest. Racial inequality in school term length is also greatest in this region and smallest in the remaining parts of Georgia.

Moreover, the weather instrument relies on the mean temperature[51] of the average day in November of that academic year.[52] Each school district is assigned the temperature to the closest weather station.[53] Finally, the second instrumental variable is the previous year's wholesale price of cotton.[54]

4.3   Summary Statistics

Figure 5 plots school term length for two school districts in Georgia for white and black schools per this division of the sample. The top figure is of Morgan County, which harvested 42% of its land in cotton in 1910, the greatest amount in Georgia. The bottom figure on the other hand plots Campbell County, which harvested 0.3% of its land in cotton in 1910, the least amount in Georgia for a school district that operated both white and black schools.

Morgan County exhibited greater racial inequality than Campbell for almost the entire period. In fact in Campbell, black and white schools operate almost the same term length throughout, both at 180 days. Morgan black schools, on the other hand, operated at 120 days, which is approximately 6 months and also the amount of months cotton was less child labor-intensive.

The temporal patterns are also consistent with the state-level data. In Morgan County, black school term length does not begin to converge to that of white schools until the mid-1930s. With the exception of a fall in 1940 as a result of reasons pertaining to WWII, black school term length converged rather rapidly. The timing of this convergence is consistent with the Agricultural Adjustment Act, which provided plantation owners with an incentive to employ fewer children.

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[51] Source: U.S. Department of Commerce, National Climatic Data Center (2008). "U.S. Climate Normals."
[52] The quality of the instrument is qualitatively similar to other plausible definitions.
[53] Google Maps is used to estimate the distance of the nearest weather station.
[54] Source: National Bureau of Economic Research (2008). "NBER Macrohistory Database."

Figure 6 plots the amount of cotton ginned in Georgia from 1910 to 1940. As the demand for U.S. cotton exports declined, Georgia's production into the 1920s fell by more than half of what it had been producing in the 1910s. This decline was uneven throughout Georgia, however, and the rise of boll weevil during the late 1910s caused some counties' cotton to mature more poorly (Brown, 1918).

5 Results

5.1 Quantitative Evidence

The empirical analysis is based on comparing outcomes by race in school districts that experienced different demands for child labor. I first consider school attendance, which would vary as a result of both short-term and long-term shocks to the demand for child labor. I take the decision to grow cotton as exogenous as a result of the particular land endowments it required (Engerman and Sokoloff, 2002). Examining cotton before its harvest completely mechanized, I use cotton ginning as a proxy for child labor wherein a decline in cotton ginning signifies a decreased demand for children to produce cotton.

I model school participation as:

$$y_{crt} = \beta_0 black_{crt} + \beta_1 cotton_{ct} + \beta_2 black_{crt} * cotton_{ct} + \mu_c + \delta_t + \varepsilon_{crt} \tag{9}$$

where c tracks rural-county school districts, r race, and t school-year. y_{crt} is the outcome of interest, in this case is the percentage of school-age children attending school on the average school day. $black_{crt}$ is an indicator for black schools, and $cotton_{ct}$ measures the amount of cotton produced per acre of farmland. μ_c and δ_t are school district- and year- fixed effects. In the absence of a rich set of annual controls, the fixed effects are important for robustness. ε_{crt} is an error term. Standard errors are clustered by school district.

Tables I and II present the results for school attendance. I consider the attendance rate which

is the amount of school-age children attending school on the average day relative to the amount of school-age children that year. Enrollment results are not presented because they are more difficult to interpret; it was not unusual for children to enroll but attend school for only one day.

The OLS results suggest a clear negative relationship between school attendance and child labor, as proxied by cotton production. Black children attend less school, all else equal, and child labor has a larger negative effect on black children. Although child labor has only a marginal effect on white school (which is not statistically significant), Proposition 3 predicts that the effect of child labor on white schooling would simply be less negative than that of black schooling. The results remain robust to the inclusion of fixed effects.

Next, I instrument for cotton ginned with weather and prices. I choose November weather because schools typically operated during this month. Additionally, cotton-picking occurred during November, and was the season most sensitive to the boll's maturity. In particular, the boll matures directly with temperature in the range of $17^0 C$ to $32^0 C$ (Viator, Nuti, Edmisten, and Wells, 2005).

Moreover, I assume that the previous year's price affects expected profitability of cotton agriculture with the likelihood that current prices are well predicted by last year's.[55] Consistent with the model, an expected increase in earnings from cotton agriculture can motivate parents to keep their children home to increase the yield of cotton produced. In addition, use of this instrument presumes the exclusion restriction that short-term changes in public school attendance and quality are affected by last year's cotton prices only through their effect on current cotton production.

The 2SLS results yield a more negative point estimate for both white and black public schooling. Again, black children attend less schooling all else equal, and child labor has a stronger effect on blacks. The local average treatment effect of the instrument centers on less wealthy households because they are most sensitive to a more favorable harvest as well as a swing in cotton prices. I expect these students have below average school attendance. It follows that the point estimates for the local average treatment effect are more negative than that of the average treatment effect.

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[55]The price instrument varies only temporally. As a result, I cannot used year fixed effects and instead use a time trend.

Similarly, it is not surprising that I find a well-estimated, negative local average treatment effect for white children.

Table III presents the results of pupil-teacher ratio and school term length. Both measures of black schooling are sensitive to cotton production. However, the white schooling is less negatively affected by cotton.

Specifically, I interpret the AAA as a closed-economy quasi-experiment on child labor. It affects school term length because plantation owners no longer needed black children to work during peak harvest seasons. The decline in production is more of an open economy quasi experiment because it relates to textile mills, to the extent that cotton is input in textiles. Moreover, I expect its impact to be relatively greater on pupil-teacher ratio because a decline in cotton production can also affect the labor of adults.

Representing the event as occurring in year t^*, I estimate the model:

$$y_{crt} = \alpha_{0r}t + \alpha_{1r}(t - t^*)\mathbb{1}(t > t^*) + \eta_{cr} + \varepsilon_{crt} \tag{10}$$

where y is a measure of schooling such as school term length; t is a pre-t^* time-trend that is allowed to vary by race; $\mathbb{1}(t > t^*)$ allows for a shift in the trend; and η_{cr} are county-by-race fixed effects. I am interested in $\alpha_{1b} - \alpha_{1w}$ and $\alpha_{0b} - \alpha_{0w}$ to see how the timing of AAA, for example, corresponded with a narrowing of racial differences in public schooling.

As such, I expect that cotton-growing districts were most affected by the incentives of the AAA. As a result, I include interactions of the time trend with cotton intensity. I expect to find that cotton-growing districts has a larger trend-break.

5.2 Narrative Evidence and Discussion

This section presents narrative evidence from superintendents. First, I look for evidence on the relationship between cotton agriculture and school attendance. Second, I assess how cotton agriculture affected investments in school quality. I focus on school term, and enrich the quantitative

results by analyzing when schools operated.

The editorial comments of superintendents indeed verify that child labor had clear negative enrollment and attendance effects. This effect varied over the harvest season with the fall requiring some of the greatest demands on children's time. Many county commissioners, such as R.C. Sanders of Georgia's Pulaski County noted: "I find that the enrollment has not been as full as it should be. This is attributable to the fact that during the last fall term many children have been detained at home to assist in harvesting the crops. Labor has been scarce and the parents have, in a measure, been compelled to use many children in the fields," (Brittain, 1911, p. 155).

Specifically, this finding can be extrapolated to weaker attendance during peak harvest seasons. N.H. Bullard, County School Commissioner of Georgia's Baldwin County depicts attendance for the approximately 6-month school-term in his county. This variation is more pronounced for African-American children: "The public school term began on October 25th. In January, [there was] a slight increase in the attendance of the white schools and a considerable increase in that of the colored. [In April, there was] a decrease since January in the white and the colored attendance of approximately 88 and 87 per cents, respectively. At time when farm work isn't pressing the colored schools are crowded, many of them, almost to overflowing, while at no time the attendance of the white schools as a whole, what it should be," (Pound, 1910, p. 65).

In light of these findings, the narrative evidence strongly suggests the theoretical framework proposed wherein parents decide the extent of children attendance. In addition where parents keep children out of school, these parents think more of the short-term economic returns. J.B. Wright, Georgia's Grady County School Commissioner noted: "The consideration of the child as a source of revenue, rather than as the future man or woman, is too often given precedence. The effects of this are seen in a large attendance during the time when there is no work to do; but when the busy season on the farm comes, the attendance is often pitifully small (Pound, 1909, pp. 136-137).

In particular, African-American children were working in cotton more disproportionately, and often felt the greater burden of unpredictable weather conditions. Georgia's Morgan County School

Commissioner, F.L. Florence connects the harvest season and weather conditions to attendance and when schools are in session:

> "The attendance of the colored schools have been more variable. The total attendance for 1908 is affected by the comparatively small attendance during the months of November. In this county the cotton crop was large, and late. The children were kept out of school to gather it. The attendance for this month was less than it has ever been for the same month in previous years. Had we run more of the schools for four months in the spring rather than two in the fall, the attendance would show a decidedly larger percentage," (Pound, 1909, pp. 177-178).

Moreover, the counties in which children were working at home were disproportionately African-American. This finding is consistent with the hypothesis that more uneducated African-Americans lived in places where the economy made widespread use of unskilled labor. For example, E.J. Browne, South Carolina's Clarendon County Superintendent expressed:

> "In many of the agricultural sections of the County the white population is very sparse, and especially so as regards the school population. In many of the schools which I visited during the early parts of the school term I found only from twenty-five per cent to fifty per cent of the usual enrollment in attendance, the remainder being at home engaged in picking cotton or not attending at all, through indifference or other frivolous causes. Many of our rural schools do not open until the rush of the cotton picking season is over, and the adverse conditions this year are due to the late season and bad labor conditions," (Swearingen, 1910, p. 45).

As a result of this relationship between school attendance and the demand for child labor in cotton, some of the county superintendents admitted that their county altered school terms in response to enrollment and harvest concerns. Although school terms may have been discontinuous or shortened, the narrative evidence suggests that such occurred more frequently for black schools. For example, Georgia's Morgan County's County Superintendent of Schools, E.S. Bird reported that "we give them [negro schools] six months - one before Christmas, three after - until hoeing time - and two in the summer. They have to work, and we have to arrange for it that way. They prefer theirs all [continuously], like the whites," (Brittain, 1911).

Poor black school attendance led many cotton-growing school districts to have found it not worthwhile to extend the length of their school term. For example, Georgia's Sumter County

School Commissioner explained: "It has not been found practicable to continue the colored schools more than six months, inasmuch as the attendance does not justify the same, under the rules regulating our schools. We open our schools in the fall, giving the whites three months in the fall and four in the spring term. Our colored schools open in July and continue through two months, discontinuing until January, when they open again for fourth months," (Pound, 1909, p. 215). Similarly, in Jones County, County School Commissioner E.W. Sammons explained:

> "[T]he Board agreed to pay one-half where patrons would agree to supplement in order to have an eight or nine months term....The [twelve] white schools were all well attended, but the [five] negro schools were so indifferently attended that several of them were discontinued for failure to average ten pupils, the number required by the Board.
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> From our experience we are assured that it is useless to try to have a longer term than five or six months for the negroes. In this county there are no towns for them to congregate in; they are entirely agricultural, and need their children to chop and pick cotton, and will not send regularly longer than the normal time mentioned. But we propose to run the white schools full nine months without requiring any private supplement, which generally falls upon a few," (Pound, 1909, p. 156).

However, the winter months are inherently problematic and not ideal for the majority of schooling because poor weather makes traveling to school more difficult. With schools not always nearby, school transportation limited, and the roads being worse during the winter, winter terms naturally suffered. South Carolina's E.J. Browne, Clarendon County Superintendent described the winter problem: "[It] is seen that if country schools open too early, such children lose several weeks at the opening of the term, attending only during the winter months, during which time bad roads and bad weather prevent full and regular attendance. Consequently the pupils "mark time" to a large extent, and often leave school altogether before completing the fifth grade," (Swearingen, 1912, p. 54).

I.S. Smith, County Commissioner of Georgia's Tattnall County describes the dilemma of when to set the school term in order to best serve its white children who had been working intensely in the farm. In advocating for white public schools, Smith proposes a continuous school term with

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regards to when children are least assisting with the harvest. Moreover, Smith implies that older boys are least likely to attend school as a result of their parents needing the labor they can offer:

"Many of the farmers throughout the county, on account of the scarcity of labor and other conditions, find it necessary to work part of their children, both in making and harvesting their crop. This being true the old plan of having a spring school fails to reach a large per cent of the children between ages of six and eighteen. Many of the white boys who have to help their parents make the crop never again enter school after they get large enough to plow, for the simple reason the spring school usually begins from the fifteenth of January to the fifteenth of March. They must begin work on the farm not later than from the first to the fifteenth of March, and could not possibly attend longer than two months. The result is they do not enter at all.

If we should begin our schools on the first Monday in November, those children who were out of school in the spring helping on the farm, together with those not needed or who are too small to be of assistance to their parents in harvesting, could enter promptly. By the first of December practically all the crop will be gathered, those children who had been helping to harvest could enter, all remain in school till the first of fifteenth of March. Then let those who are to help make the crop drop out and begin work and the others remain in till the close of the term, which will be about the first of May. By doing this, all the children in Tattnall County will have the opportunity of attending her public schools practically for the full term, and until they all have this privilege our public schools will fail to perform their most important function – the preparation of all the people for true citizenship.

There is never a time when the child can be sent to school without some sacrifice on the part of the parents, and if we wait till we have nothing for them to do to send them, they will never enter. The progressive parent never finds such time, but every man knows that he owes his children at least a practical education, and that he can't give it to them without sending them to school," (Brittain, 1911, pp. 162-163).

Poor school attendance, a shorter term length, and minimal funding affected numerous other school inputs that are conducive to better school quality. Most importantly, a short and/or discontinuous school term length and inadequate salary made it difficult to employ and retain the best possible teachers. Especially with a discontinuous school term, the district may have had to employ a different teacher for each set of few months. C.S. Maddox, County School Commissioner of Georgia's Butts County, for example expressed the dilemma: "No competent man or woman can afford to teach school four or five months in the year at the meager salaries now offered and then be turned out to graze the remainder of the year," (Pound, 1909, p. 97).

6 Implications and Discussion

The relationship that I find in this paper between land endowments, child labor, and public schooling suggests a reinterpretation of institutional development during the Jim Crow South (Woodward, 1955). Black public schools improved significantly in the absence of any federal education policy aimed at blacks, such as *Brown v. Board* (1954) and the Civil Rights Act. I find that economic incentives that ensued from land endowments and the corresponding demand for child labor prompted school boards to invest additional resources in black schools during the early 20th century. The importance of economic incentives in accounting for racial inequality complements traditional explanations that economists provide, such as innate racial preferences (Becker, 1957), informational frictions (Aigner and Cain, 1977), and acquired negative connotations with respect to minority races (Loury, 2002).

Additionally, the results have important implications for understanding the causes and consequences of the rise of black well being in the 20th century. To the extent that the black-white wage gap narrowed around the mid-20th century as a result of higher quality black public schools (Card and Krueger, 1992b), the present paper suggests that the demand for child labor affected the timing of this convergence. The rise of black public schooling can also account for the racial convergence of other aspects of well-being that are a consequence of human capital accumulation, such as health (Smith and Kington, 1997) and wealth (Collins and Margo, 2001).

There are also important macroeconomic implications from the present research in reinterpreting the economic history of the U.S. South. The findings can help explain why the South failed to achieve the same rate of economic growth as the rest of the country over the century following the Civil War. Many children in the South did not attend school for as long as or in similar conditions to children in the rest of the U.S. for much of this time. Given the importance of human capital accumulation to per capita income and economic growth, under-investing in public education in the South delayed its conditional convergence to the rest of the U.S. (Wright, 1986; Connelly, 2004). The importance of child labor in cotton for much of this century can thus account for the timing

by which the South conditionally converged to the rest of the U.S.

The findings also shed light on the spread of high schools across states within the U.S. Goldin and Katz (2008, Ch. 6) find that the high school movement diffused more slowly in the rural South than in comparably dense parts of the North or Midwest.[56] The demand for child labor in the rural Midwest also declined significantly earlier than that of the rest of the U.S., while the corresponding decline occurred much later in the South. The fact that capital-skill complementaries arose in other crops such as in wheat in the Midwest can help to account for this spatial variation.

This explanation for the provision of public goods also differs from traditional ones that focus on social capital. Theories pertaining to social capital have been applied to public education in the more contemporaneous U.S. (Alesina, Baqir, and Hoxby, 2004) as well as rural Kenya (Miguel and Gugerty, 2005). The importance of land endowments and child labor may not apply as directly to other public goods that are less relevant to children, such as infrastructure.

Moreover, my results lend further support to a growing literature that challenges whether social reform legislation follow, and in fact, are a response to the corresponding social change having already occurred. Evidence from the historical U.S. is consistent with this position in which policies encouraging children to attend school are not implemented and enforced until the demand for child labor declines. For example, child labor laws were implemented in manufacturing regions only after technological changes and immigrant in-flows supplanted the demand for child labor (Moehling, 1999).[57] Similarly, many Southern states did not apply compulsory schooling laws to black children while they were integral to harvesting cotton (Lleras-Muney, 2002). Additionally, the quasi-experiments that I examine which reduced the demand for black child labor during the first half of the 20th century are consistent with Margo and Finegan (1993)'s results on aggregate trends in black teenage labor.[58] Just as the present paper argues that black child labor declined

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[56]Galor, Moav, and Vollrath (2009) argue that land inequality, rather than wealth inequality or other measures of social capital, can explain the geographical diffusion of the high school movement.

[57]Doepke and Zilibotti (2005) model the decision to implement child labor laws.

[58]Manacorda (2006) analyzes the within-family school attendance and child labor in cities, the latter of which had declined significantly by 1920.

during the 1920s through 1940s, they document that black teenage labor force participation had already declined significantly in the decades before the 1950s mechanization of the cotton picker.

Finally, the relationship between child labor in cotton and public schooling in the historical U.S. South can possibly explain the development of public schooling in other regions of the historical U.S. and in developing countries today. The empirical framework and the decision to raise a local tax can be generalized by reinterpreting the variables to reflect another region with two disparate demographic groups, at least one of which relies on child labor. As a result, the incentives that I study in the present paper can arise in other modes of economic production such as harvesting wheat,[59] in addition to other types of inequality such as with Chinese and Mexicans.[60] For example, Fishback (1989) analyzes the effect of the labor market for coal on racial differences in public schooling in West Virginia.

Research in developing countries suggests a similar mechanism to the one formalized in the current paper. For example, India is the country in which the largest number of children work in the world, and as much as 75% of those children work in agriculture (Swaminathan, 1998) and as much as 25% of children in agriculture work in sharecropping (Shaban, 1987). Weiner (1991) provides evidence that the demand for child labor led policy makers to leave public education undeveloped. Moreover, during South African apartheid, black-white differences in school characteristics such as

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[59]Most regions outside of the South no longer relied substantially on child labor during the 20th century (Lumpkin and Douglas, 1937). Consequently, the results in this paper suggest that school terms–or at least regular school attendance–could have catered to the demands of the harvest season until child labor was no longer needed by the end of the 19th century. For example, William A. Kelly, Pennsylvania's Jefferson County Superintendent, noted that, "Most of our rural schools are open only five months in the year, and then the attendance is irregular, so that the entire schooling of many pupils, from the time they enter until they leave school, hardly amounts to four years of continuous school attendance. Thus, you see, the average attendance of school life is very short. Much as our people appreciate our free schools, still too many parents regard schools as a place to send their boys and girls when the fall work is finished, and in the spring the large pupils are withdrawn from school to begin work at home," (Wickersham, 1881, p. 88).

[60]Mangum (1940, pp. 83-84) provides evidence that school segregation was not limited to blacks. For example, in California, children of Chinese parents were refused access to schools in California. Subsequently, the state legislature established separate schools for Mongolian children as well as Indian children, which continued through the mid-20th century. Additionally, states had codified separate schools for Indians in North Carolina, North Dakota, Rhode Island, South Dakota; Mexicans in Texas, Moors in Delaware, and Mulattoes in South Carolina (Mangum, 1940, pp. 84-86). On the other hand, several states outside of the South explicitly prohibited segregating public schools by race 20th century (Mangum, 1940, pp. 113-115).

pupil-teacher ratio significantly affect racial differences in enrollment, educational attainment, and test scores (Case and Deaton, 1999). The lessons of the historical U.S. South suggest that regions begin investing substantially in their public schools after the demand for child labor declines, which can thereby improve human capital accumulation.

To spur public schooling in developing countries today, the results in this paper have policy implications that entail designing incentives to reduce child labor. Financial incentives that discourage child labor could be sufficient to encourage parents and thereby school boards to invest more in public school quality. In the historical U.S. South, the Agricultural Adjustment Act only indirectly discouraged the demand for black child labor through its indirect effect on sharecropping and tenancy. It did so by changing the incentives for both the landowners and the parents of the children working. Similar change could also be achieved in developing countries today through conditional cash transfer programs such as Mexico's Progressa program, which has been found to have decreased child labor and increased schooling (Schultz, 2004). Similarly, Angris, Bettinger, Bloom, King, , and Kremer (2002) provide evidence from Colombia that vouchers for private school increaed decreased child labor, and increased years of attendance and test scores.

The experience of the historical U.S. renders less support for legislation aimed at curbing child labor or compulsory school attendance. In fact, Goldin and Katz (2008, pp. 217-221) finds that child labor laws and compulsory schooling legislation explain at most 5% of the rise in high school attendance in the U.S. The experience of countries like the U.K., on the other hand, show that compulsory schooling laws can be effective when they are combined with policies to provide more educational resources. Policies should thus aim to change the financial incentives to effectively decrease the use of child labor rather than only changing the legal environment.

7   Conclusion

This paper revisits the classic question of why school districts under invest in public schooling, and makes several contributions. First, I develop a novel framework for analyzing how land en-

dowments, crop choice, and demand for child labor affect schooling decisions. The framework is applied to the U.S. South to account for why school districts chose to divert funds allocated for black children to white schools. Second, the paper draws upon a newly assembled data set from archival reports of education. The tables in the reports provide a wide range of characteristics on schools, teacher, and students for each school district, annually and separately by race. The reports also include letters from school boards that I use as narrative evidence. The data improve upon previous research that relies on either more aggregated or less frequent measures, are crucial for matching schools with crops grown nearby, and can help address a wide array of research questions pertaining to education. Third, the paper uses the data to explain why racial inequality in school quality varied across school districts, differed by school characteristics, and narrowed most rapidly during the early 1920s and starting in the mid-1930s. Taken together, the historical, theoretical, empirical, and narrative evidence indicates that demand for child labor is a root cause for these racial differences in public schooling.

The paper formalizes an explanation for the rise of black public schooling that is evident in the narrative and qualitative accounts. It thus enriches the scholarship on black public schooling by providing quantitative evidence for the importance of land endowments and the demand for child labor. Nevertheless, this paper does not preclude the role of forces outside of the South, such as philanthropy, the NAACP, and the pull of Northern manufacturing.

I find that the demand for child labor in cotton agriculture was important for explaining racial differences in public schooling in the U.S. South during the early 20th century. Black children satisfied the significant demand for child labor in cotton agriculture into the 2nd quarter of the century, which led them to attend school less regularly. The demand for black child labor in cotton also led school districts in the Cotton Belt to under invest in black public school quality to discourage their attendance and human capital accumulation. Racial differences in public school characteristics were largest in these school districts, and declined as the demand for black child labor fell during the 2nd quarter of the century.

The evidence draws upon data and narrative evidence that I assembled and digitized from archival reports. The empirical evidence comes from Georgia, which is advantageous as a result of its diversity in land endowments, size, and quality of data. Both the state-level data and the narrative evidence across multiple states suggest that the incentives for racial inequality in Georgia could have existed in nearby states with a similar diversity of crops and amount of racial inequality. The additional evidence implies the externality validity of this paper based on Georgia in generalizing the explanation of racial inequality in public schooling to the Deep South. Future research will examine additional school characteristics from Georgia, and will apply the data to questions related to education such as housing, school competition, and local public finance.

Specifically, I formalize through the school board's distribution of state funds to schools by race and its option to raise an additional tax locally the direct relationship between the demand for black child labor and racial inequality in schooling. Both wealthy whites and black parents placed a substantial weight on black child labor demand in determining how much to invest in public school quality. State funds were diverted in proportion to the returns to black child labor. Additionally, black interest in the local tax varied inversely with returns to black child labor. School boards allocated funds unequally to the extent that wealthy whites wanted them to do so. In doing so, they indirectly satisfied the interests of blacks insofar as it benefited whites. Factors such as the threat of a law suit and the threat of out-migration imposed costs on policies fostering racial inequality. At the same time, the benefits of diverting funds allocated for black children to white schools fell with the decline in cotton production, which followed from the boll weevil and a decrease in demand for U.S. cotton exports. The benefits of diverting funds fell further when sharecropping and tenancy declined following the passage of the AAA.

The results have important implications for reinterpreting the causes and consequences of institutional development in the Jim Crow South (1880s - 1950s). They suggest the importance of economic incentives in the existence of and eventual narrowing of racial differences in public school quality. The improvement of black public schools helps account for the racial narrowing

of earnings during the mid 20th century. Moreover, in on-going research (Greenbaum, 2009), I examine the extent to which this narrowing of racial differences in public school quality can account for the narrowing of racial differences in later-life health during the 2nd half of the 20th century. Racial differences in adult health–which have narrowed significantly over the past few decades (Harper, Lynch, Buris, and et al., 2007)–are related to racial differences in education (Smith and Kington, 1997). More generally, human capital accumulation improves later-life health through mechanisms such as increased wealth (Lleras-Muney, 2005).

Finally, the incentives underlying the rise in public schooling in the U.S. South can explain the development of public schools in other regions of the historical U.S. as well as in developing countries today. I plan to study empirically the generalizability of the relationship between the demand for child labor and investments in public school quality. I am collecting the data for other states in the historical U.S. from archival reports. After assembling the data, I plan to test the extent to which the same incentives I study in the present paper arose in other modes of economic production and other forms of inequality. For developing countries, the results in the present paper have policy implications for designing financial incentives to discourage child labor, and in turn, encourage the development of public education.

Table 1: School Quality in U.S. South

	Years in School*		Pupil-Teacher Ratio**	
	White	Black	White	Black
1915	9	6	37	62
1945	11	10	28	34

Note: Averages of state-level averages of Southern states.
*. Source: Collins and Margo (2006).
**. Source: Card and Krueger (1992b). Author's calculations.

Table 2: Events Relating to School Quality

Event	Year	Adult Labor	Child Labor	School Characteristic
Hookworm Eradication	1910	Yes	Yes	–
Fall in Cotton Production*	1920	Yes	Yes	Pupil-Teacher Ratio
Immigration Exclusion Act	1924	Yes	No	–
Agricultural Adjustment Act*	1933	No	Yes	School Term Length
Cotton Mechanization	1940s	No	Yes	–
Brown v. Board	1954	No	Yes	–
Civil Rights Act	1966	No	Yes	–

Note: * Signifies an event responsible for narrowing racial differences in public schooling. The final three events occurred after racial differences in public schooling had already significantly narrowed. Moreover, the first affected school attendance before occurred after racial differences in public schooling had already significantly narrowed. Moreover, the first affected school attendance before racial differences in school attendance had significantly narrowed (Bleakley, 2007).

Table 3: Attendance Rate

	I	II	III
Black * Cotton Ginned Per Acre	-0.583***	-0.342***	-0.338***
	[0.165]	[0.106]	[0.106]
Cotton Ginned Per Acre	-0.092	0.157	0.085
	[0.202]	[0.115]	[0.102]
Black	-10.5***	-11.9***	-11.9***
	[1.37]	[1.22]	[1.22]
Year Trend			0.582***
			[0.042]
Constant	62.7***	65.0***	-1070***
	[1.10]	[0.856]	[81]
School District Fixed Effects	No	Yes	Yes
Year Fixed Effects	No	Yes	No
Number of observations	9,184	9,184	9,184
R^2	0.26	0.53	0.51

Note: *** Significant at 1%.

Table 4: School Quality

	Pupil-Teacher Ratio		School Term Length	
	I	II	III	IV
Black * Cotton Ginned Per Acre	0.527***	0.403***	-0.66***	-0.17**
	[0.11]	[0.12]	[0.20]	[0.09]
Cotton Ginned Per Acre	0.173**	0.085**	-0.40***	-0.15
	[0.08]	[0.07]	[0.15]	[0.10]
Black	11.8***	13.0***	-15.0***	-25.0***
	[0.93]	[1.0]	[1.5]	[0.8]
Constant	36***	28***	145***	120***
	[0.7]	[2.5]	[1.0]	[2.1]
School District Fixed Effects	No	Yes	No	Yes
Year Fixed Effects	No	Yes	No	Yes
Number of observations	9,262	9,262	9,112	9,112
R^2	0.38	0.57	0.14	0.69

Note: *** Significant at 1%.

Table 5A: Cotton Ginned Per Acre, First-Stage

	I	II
November Weather	0.194***	0.087***
	[0.02]	[0.02]
Previous Year's Cotton Price	0.171**	0.092**
	[0.01]	[0.01]
Year Trend		-0.149***
		[0.01]
Constant	3.57***	292***
	[0.21]	[24]
School District Fixed Effects	Yes	Yes
Number of observations	4,592	4,592
R^2	0.60	0.65

Note: *** Significant at 1%.

Table 5B: Attendance Rate, 2SLS

	I	II	III
Black * Cotton Ginned Per Acre	-0.477***	-0.431***	-0.919***
	[0.258]	[0.211]	[0.205]
Cotton Ginned Per Acre	-0.858***	-1.11***	-1.173***
	[0.209]	[0.177]	[0.296]
Black	-11.0***	-11.8***	-11.9***
	[1.64]	[1.2]	[1.22]
Year Trend			0.582***
			[0.042]
Constant	67.1***	55.0***	-1070***
	[1.32]	[1.15]	[81]
School District Fixed Effects	No	Yes	Yes
Number of observations	9,184	9,184	9,184
R^2	0.20	0.38	0.39

Note: *** Significant at 1%.
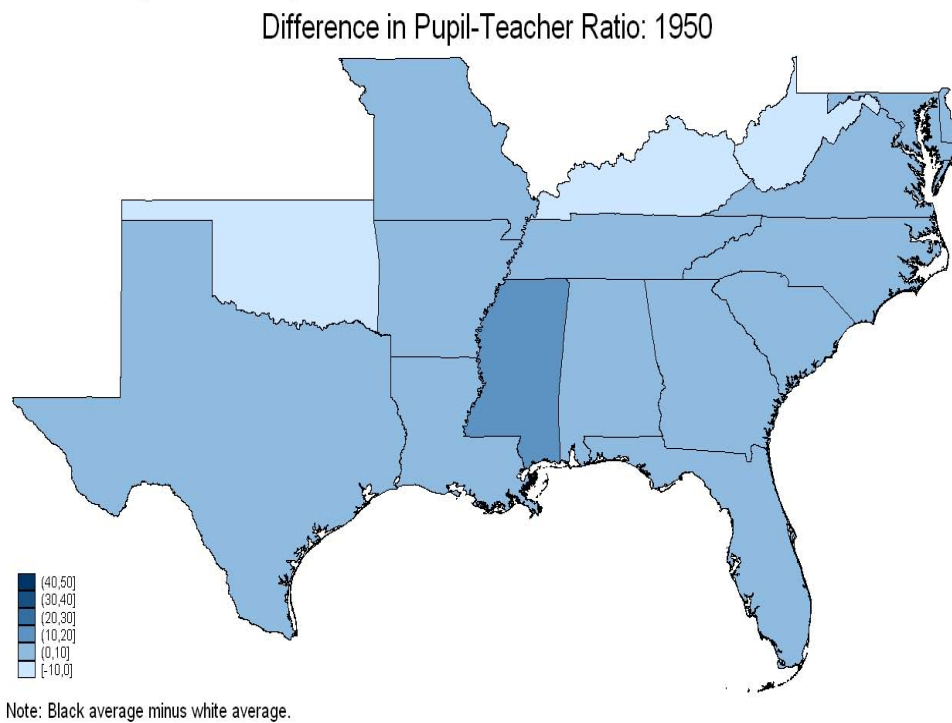
Figure 1: Pupil-Teacher Ratio in U.S. South

Difference in Pupil-Teacher Ratio: 1920

Note: Black average minus white average.

Difference in Pupil-Teacher Ratio: 1950

Note: Black average minus white average.
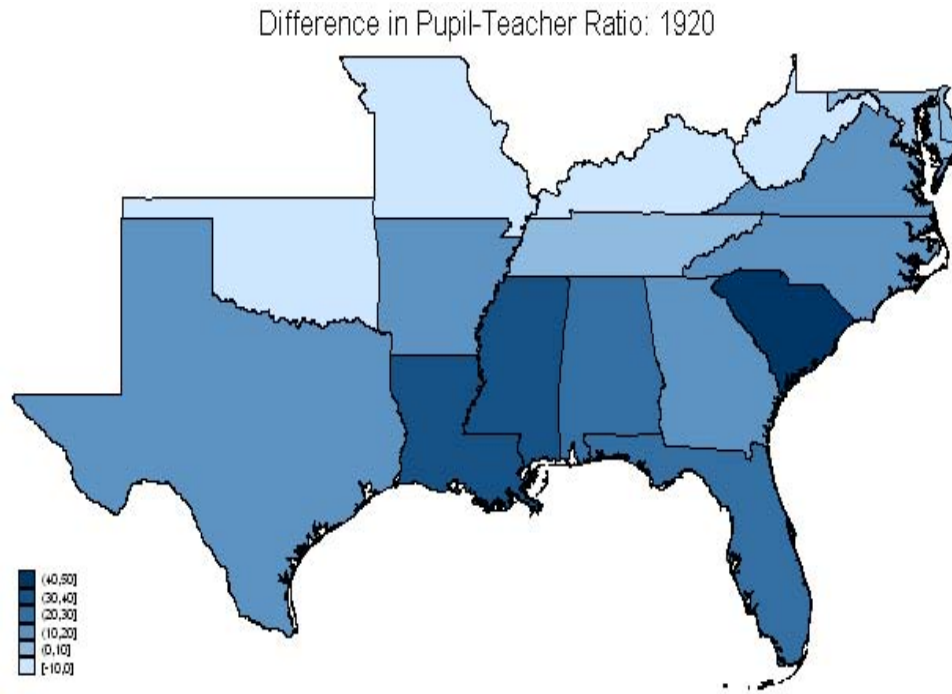
Figure 2: School Quality in the Carolinas

Pupil-Teacher Ratio in the Carolinas

Source: Card and Krueger (1992b).

School Term Length in the Carolinas

Source: Card and Krueger (1992b).
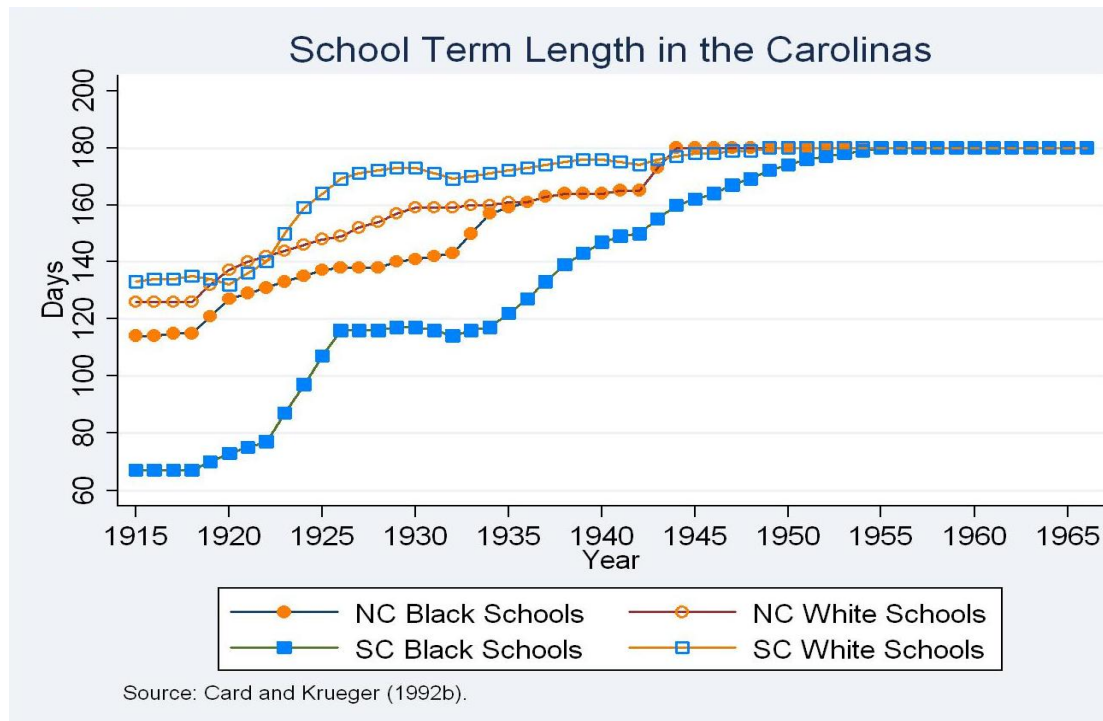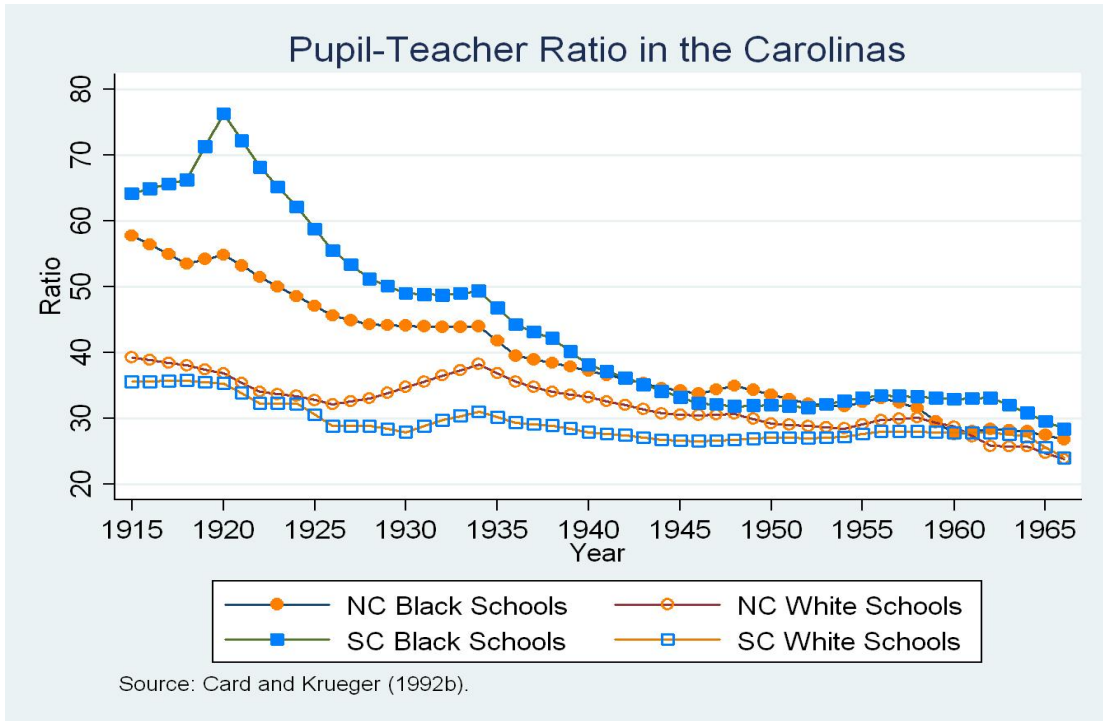
Figure 3A: Timing of the Supply-Side - Allocating State Funds

t_0 t_1 t_2

t_0	t_1		t_2
School Board allocates state funds by race: W and B	Blacks choose t_S: time children are in school and not working	Racial inequality monitored: $W - B$	White children earn income from returns to school quality: $\rho(W)$
W: per capita funds for whites	+ Profits from black child labor realized: $w(1 - B)$, w: wage		+ Law suit realized: $\gamma q(W - B)$, γ: cost, $q(W - B)$: probability
B: per capita funds for blacks	+ White children attend school		

Figure 3B: Timing of the Demand-Side - Raising Local Tax by Race

t_0 t_1 t_2

t_0	t_1		t_2
School Board raises local tax by race: $T \in [W, B]$	Children attend school: $t_S(T) = T$	Wealth saved accumulates interest $s = w(1 - T) + w_0 - T$	Child earns income from returns to to school quality: $\rho(W)$
W: per capita funds for whites	+ Profits from child labor: $w(1 - T)$, w: wage	w_0: initial wealth and adult earnings	+ Parent lives off of savings: rs, $r = \frac{1}{1+i}$, i: interest
B: per capita funds for blacks	+ Adult save from total wealth: s: saving		
	+ Household pays tax: T		

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Figure 4: Georgia Cotton and Public School Quality

Cotton Agriculture: 1910

(40,50]
(30,40]
(20,30]
(10,20]
(1,10]
[0,1]

Note: Share of farmland on which cotton is harvested.

Difference in School Term Length: 1920

(40,50]
(30,40]
(20,30]
(10,20]
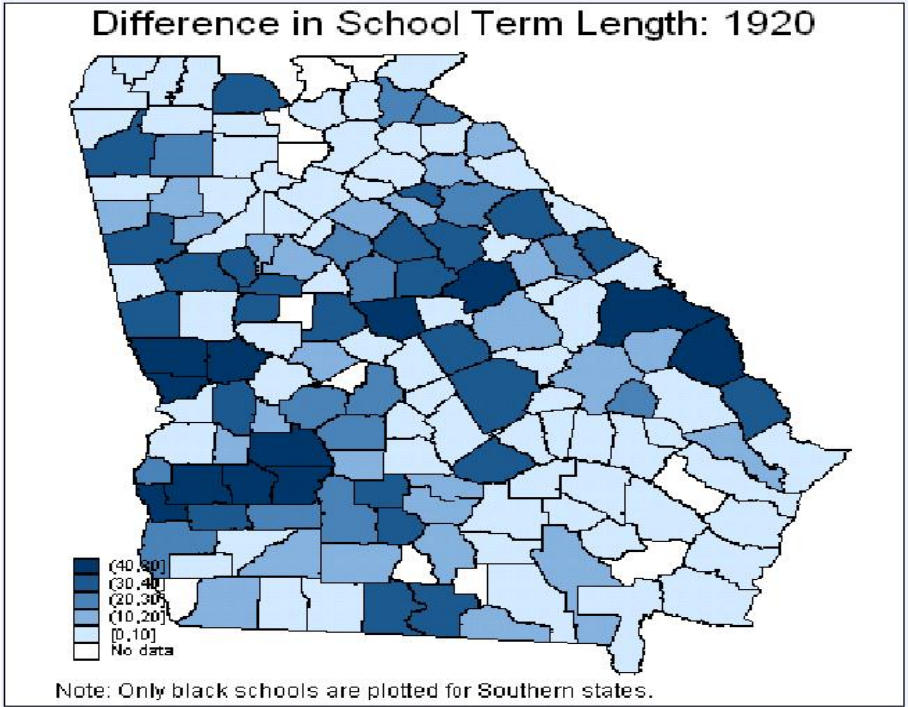[0,10]
No data

Note: Only black schools are plotted for Southern states.
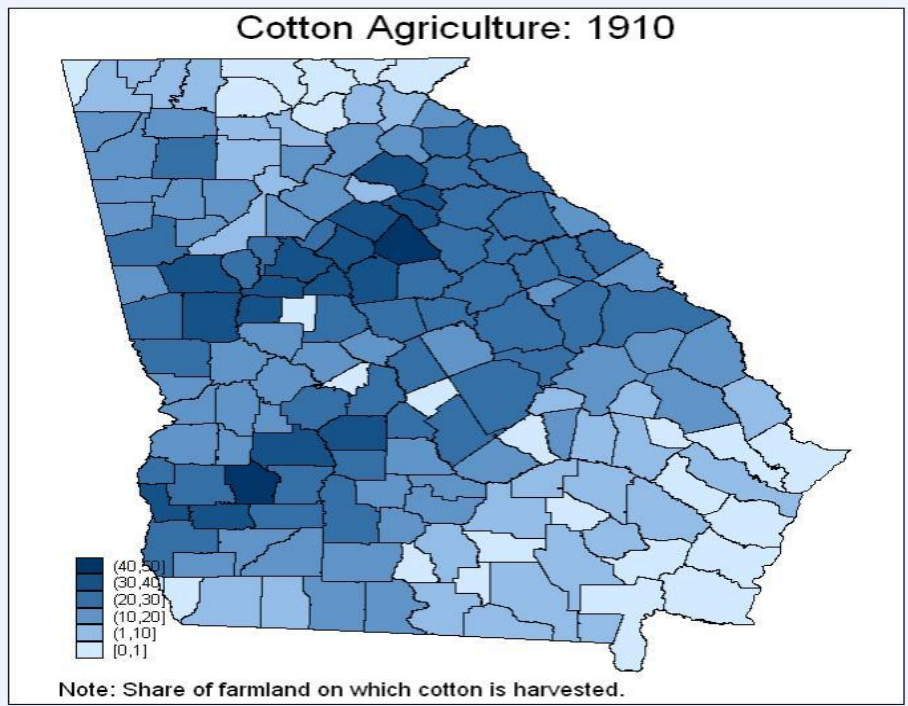
Figure 5: School Term Length in Georgia

School Term Length in Morgan County, Georgia

Note: Cotton was harvested on 42% of its farmland in 1910.
Source: Annual Reports of the Georgia Department of Education.

School Term Length in Chatham County, Georgia

Note: Cotton was harvested on 0.3% of its farmland in 1910.
Source: Annual Reports of the Georgia Department of Education.
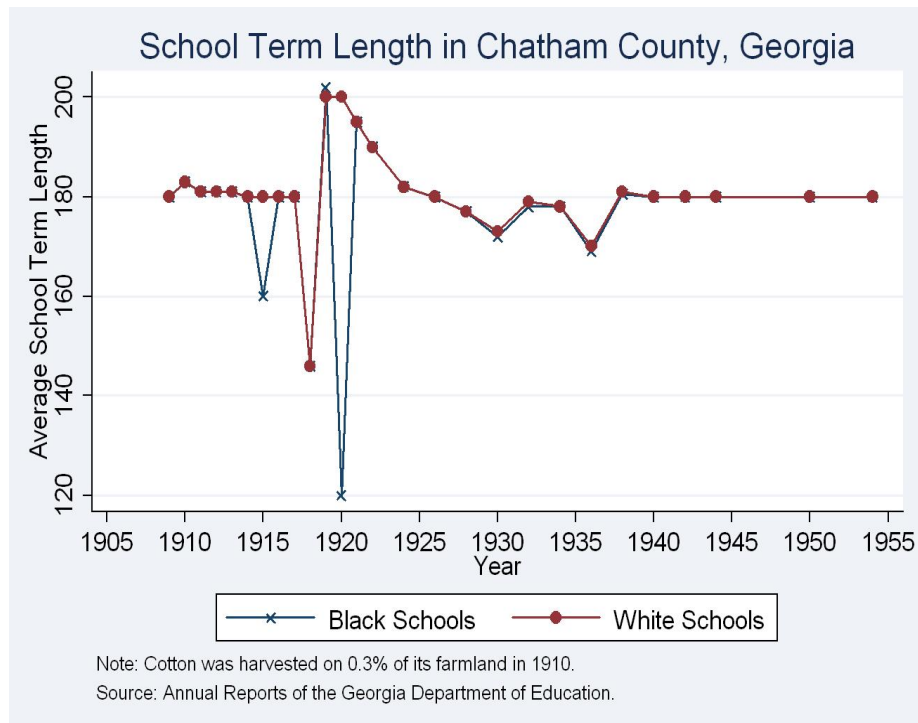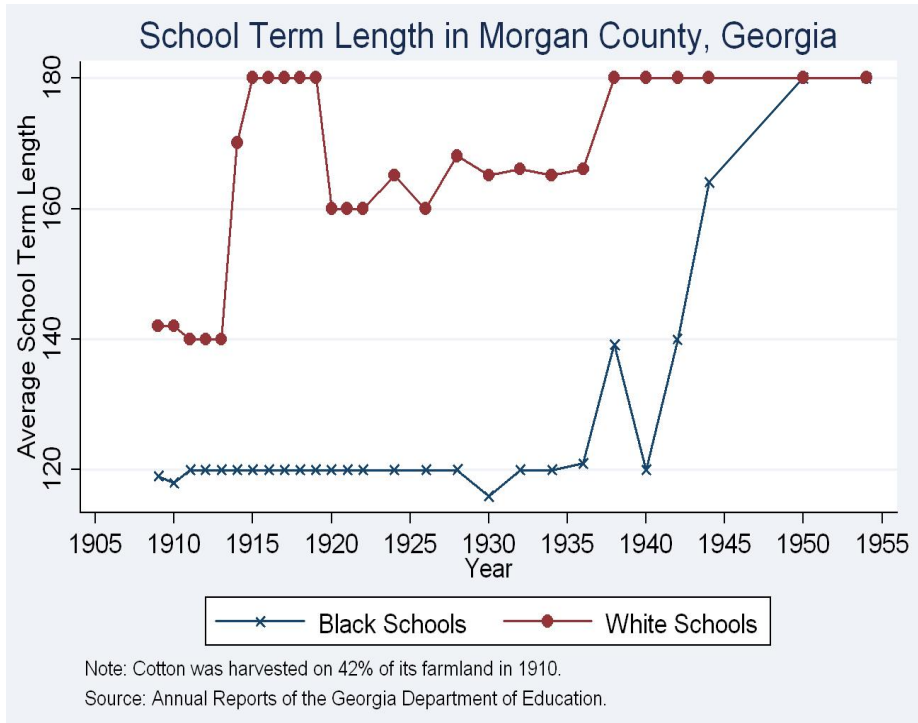
Figure 6: Cotton Ginning in Georgia

Figure IV –

Cotton Ginned in Georgia: 1910-40

Source: U.S. Census Bureau.
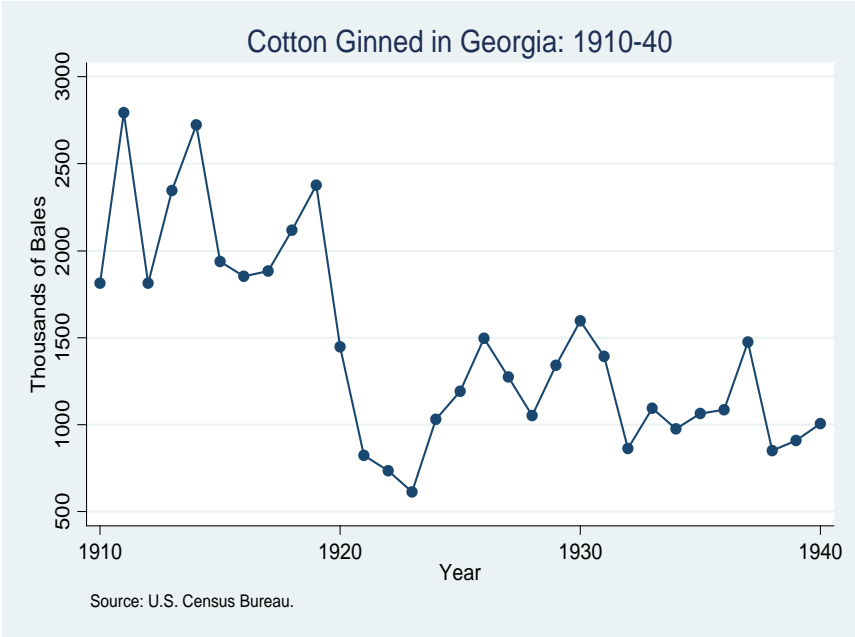
Appendix

A   Comparative Statics

Proof for Proposition 1.

Substituting the budget constraint, $B = 1 - W$, into (13), I maximize $U(W) = u(wW) + \beta u(\rho(W) - \gamma q(2W - 1))$. Maximizing yields $wu'(wW) + \beta u'(\rho(W) - 2\gamma q'(2W - 1)) = 0$. Applying the implicit function theorem, I find that

$$\frac{dW}{dw} = \frac{u'(wW) + wWu''(wW)}{-w^2 u''(wW) - \beta u''(\rho(W))(\rho'(W) - 2\gamma q'(2W - 1))^2 - \beta u'(\rho(wW))(\rho''(W) - 4\gamma q''(2W - 1))}$$

For utility functions such that $|u'(.)| \geq |u''(.)|$, this derivative is positive.

The maximization problem in (6) produces the following first-order conditions:

$$\frac{\partial U}{\partial s} : - u'(c_1) + \beta r u'(c_{2a}) = 0 \tag{11}$$

$$\frac{\partial U}{\partial t_S} : - wu'(c_1) + \alpha\beta\rho'(t_S)u'(c_{2c}) = 0 \tag{12}$$

(7) is the standard Euler equation. Combining (7) and (8) indicates the relative prices of consumption in the denominators:

$$\frac{u'(c_1)}{\frac{\alpha\beta\rho'(t_S)}{w}} = \frac{u'(c_{2a})}{\frac{\alpha\rho'(t_S)}{wr}} = \frac{u'(c_{2c})}{1} \tag{13}$$

As w increases, the relative price of second-period child consumption decreases.

Proof for Proposition 2.

I separately compute the comparative static of t_S with respect to each of the three proxies for race: w_0, α, and β. I seek to find whether each derivative has the same sign. I first define that

$$\phi^{-1} = (\beta\rho''(t_S)u'(c_{2c}) + \alpha\beta\rho'(t_S)^2 u''(c_{2c}))(u''(c_1) + \beta r^2 u''(c_{2a})) + \beta^2 w^2 r^2 u''(c_1)u''(c_{2c}) > 0.$$

Indeed, all three derivatives are positive. First, $\frac{dt_S}{dw_0} = wr^2\beta\phi u''(c_1)u''(c_{2a}) > 0$. Second, $\frac{dt_S}{d\beta} = -wr^2\phi u'(c_1)u''(c_{2a}) > 0$. Finally, $\frac{dt_S}{d\alpha} = -\beta\phi\rho'(t_S)u''(c_1)u'(c_{2c}) - \beta^2 r\phi\rho'(t_S)u'(c_{2c})u''(c_{2a}) > 0$.

Proof for Proposition 3.

Recall that w reflects the returns to child labor. w was larger in cotton agriculture than in other forms of agriculture, and yet also declined during the early 1920s with the fall in cotton production and the mid-to-late 1930s decline in sharecropping and tenancy. I find that

$$\frac{dt_S}{dw} = \overbrace{\phi u'(c_1)u''(c_1) + \phi\alpha\beta r^2 u'(c_1)u''(c_{2a})}^{\text{price effect: } \leq 0} + \overbrace{w(1-t_S)\phi\alpha\beta r^2 u''(c_1)u''(c_{2a})}^{\text{income effect: } \geq 0} \qquad (14)$$

Whether a decline in the returns to child labor causes a rise in the demand for schooling depends on whether the price effect is larger than the income effect. The sum of the first two terms represents the price effect, which is unambiguously negative. An increase in the returns to child labor makes the combined first period and second period adult consumption relatively more attractive than second period child consumption as reflected by (9). As a result, demand for schooling falls.

The third term in (10) corresponds with the income effect, which is unambiguously positive. As the returns to child labor fall, children must work more and attend school less to maintain the same level of first period household wealth. If the income effect is larger than the price effect, (10) produces the perhaps surprising result that children will attend more schooling when the returns to child labor rise.

Proof for Proposition 4.

Equation (10) suggests that black and white households could respond differently to changes in the returns to child labor based on their relative differences in their price and income effects. This proposition makes no claim about the sign of $\frac{dt_S}{dw}$ for whites, but only that it is more negative for blacks. I proceed by assuming that the first and second derivatives of the utility function and returns to education function are bounded.

Recall that a smaller value of α corresponds to black households. As $\alpha \to 0$ and the parameter is more likely to correspond with black households, only the first of the three terms remains non-

zero and finite. In particular, this term is negative as previously signed, and $\frac{dt_S}{dw} < 0$. This argument suggests that the derivative takes on more negative values for black households.

Proof for Proposition 5.

For simplicity, I assume that time spent in school is a linear function of school quality: $t_S(T) = T$.[61] This assumption produces the following household maximization problem:

$$U(s, T) = u(w_0 + w(1 - T) - s - T) + \beta u(rs) + \beta \alpha u(\rho(T)) \tag{15}$$

The comparative statics follow similarly to that of the previous section. Specifically, scale the returns to child labor in (6) additively by one.

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[61]This assumption is consistent with Card (1999).

B   Correcting Education Data

The annual reports contain several typographical errors, and I correct them to the best of my ability by taking advantage of the many totals provided. In some years, the reports aggregate the data by county when it has at least one city as an independent school district, in addition to by race. State-level totals are always available to aggregate the county- and city- totals.

Additionally, the reports often divide the data into its components, and report the aggregate as well. For example for teachers, the reports typically list both the total amount of teacher as well as the amount of male and female teachers. In some cases the reports provide more than one level of disaggregation, such as dividing total enrollment once by gender and then separately by grade. Finally for space constraints, when many categories existed such as in sources of revenue, the reports often aggregated some of them and listed them as *Other* to ensure that the total could be checked against all of the sources of funding.

I check the accuracy of the reported data by computing totals for all of these levels of disaggregations. I consider a typographical error as potentially arising when a discrepancy exists between my computation and the state report's computed total. I also check the report's computed totals using the same sets of checks to assess whether the typographical error is with the raw data.

I can correct typographical errors by exploiting all of these different checks at once by identifying which cell is consistently causing my totals to not correspond with that of the report's. If there is one cell that is a typographical error but every other cell involved in each of the sums is correct, then I can identify the problematic cell by noting that it appears in multiple checks. The amount it should be corrected by reflects by how much the amount that each check is consistently incorrect.

For example, suppose a county's amount of black male teachers is misreported, but all other information about its teachers are correctly reported. Figure 1 provides such an example. There are 3 race totals and 3 gender totals, and all 6 sum correctly except for that of black teachers and that of male teachers. Both are 1 less than what is reported, so I change black male teachers from

11 to 12.

In a few cases where it was difficult to identify the incorrect cell, it was clearly the case that either a decimal or a number's digit was inadvertently omitted. These typographical errors are relatively straight-forward to identify if they are not in the ones place because they produce discrepancies that are large in magnitude.

Finally, I classify some numbers as typographical errors if they change drastically in one year and then return to their original value in the following for a category that is unlikely to vary so much. For example, in Figure 2, I do not expect that number of black students attending public schools in Stewart County increased by 7,002 from 1,760. Instead, the number for 1915 is most likely 1,762, given a total enrollment of 3,356.

The amount of typographical errors is not trivial, though they generally improve with each year's report. Moreover, there are generally more delineations provided over time, which helps to identify typographical errors more easily. It is not clear whether some county superintendents provided incorrect accounts to the state superintendent or simply the state superintendent's office incorrectly presented some of the county's data.

		$Male$	$Female$	$Total$
			Gender	
	$White$	22	45	67
Race	$Black$	11	11	23
	$Total$	34	56	90

Figure 1: Teachers in Berrien County, 1909

		1914	1915	1916
			Year	
District	$Stewart$	1760	8762	1954

Figure 2: Average Daily Attendance for Black Children

C Definition of Variables

Attendance Rate: ratio of the number of children attending school on the average school day divided by the universe of school age children. Source for local-level data: *Annual Reports of the Georgia Department of Education*.

Pupil-Teacher Ratio: number of school-age children divided by the number of teachers employed. Source for state-level data: Card and Krueger (1992a, 1992b). Source for local-level data: *Annual Reports of the Georgia Department of Education*.

School Term Length: number of days during which schools operated. Source for state-level data: Card and Krueger (1992a, 1992b). Source for local-level data: *Annual Reports of the Georgia Department of Education*.

Cotton Ginned: amount of cotton ginned in the county or state. Source: U.S. Census Bureau.

November Weather: average temperature in November. Source: U.S. Department of Commerce, 2008.

Cotton Price: wholesale market price. Source: National Bureau of Economic Research, 2008.

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