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Do Schooling Laws Matter? Evidence from the Introduction of Compulsory Attendance Laws in the United States

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Do Schooling Laws Matter? Evidence from the Introduction of Compulsory Attendance Laws
in the United States

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ABSTRACT

This paper examines the effects of introducing compulsory attendance laws on the schooling of U.S. children for three overlapping time periods: 1880-1927, 1890-1927, and 1898-1927. The previous literature finds little effect of the laws, which is somewhat surprising given that the passage of these laws coincided with rising attendance. Using administrative panel data, this paper finds that laws passed after 1880 had significant effects on enrollment and attendance. Laws passed after 1890, for which both administrative and retrospective census data are available, had significant effects on enrollment, attendance, and educational outcomes. In both cases, the timing of increases in enrollment and attendance is consistent with a causal effect of the laws. For men in the 1898-1927 period who reported positive wage income in the 1940 census, compulsory attendance laws increased schooling and wage income. The OLS estimates of the return to a year of schooling are 8 percent and the IV estimates are 11 to 14 percent.

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1. Introduction

Education provides many individual and societal benefits. On average, more educated individuals are more productive workers, are healthier, have lower fertility, and are more likely to educate their own children. Societies can do a number of things to invest in education including building schools, allowing children to attend school for free, expanding the number of hours of schooling by offering longer school days or more school days, and passing laws requiring children to attend school.

During the nineteenth and early twentieth century, every American state passed a compulsory attendance law that required children, typically children ages 8-14, to attend school. Although the passage of laws occurred during a period of rising school enrollment, attendance, and number of grades completed, the conventional wisdom is that the passage of these laws had no effect on schooling or educational outcomes in the United States before 1915.¹ In a widely-cited paper, Landes and Solmon (1972) concluded “Our analysis of compulsory attendance legislation has clearly indicated that these laws did not cause the observed increases in levels of schooling in the late nineteenth and early twentieth century.”² They attribute the lack of effect of compulsory attendance laws to the weakness of state governments, which were unwilling or unable to enforce attendance of children of specified ages.

This paper uses newly assembled administrative data, together with retrospective data from the 1940 Census of Population, to examine the effect of the passage of compulsory attendance laws passed between 1880 and 1920 on educational outcomes. As we carefully document below, the available historical evidence both suggest that laws passed before 1880 were not effective

¹ See Landes and Solmon (1972). Later scholars such as Lleras-Muney (2002) and Goldin and Katz (2008) refer to this stylized fact.

² Landes and Solmon (1972), p. 86.

while subsequent legislation may have been effective at increasing school attendance. Thus, our focus is on the laws that were adopted after 1880 in 33 states, representing 67 percent of the school-age population in 1880.

The paper considers three time periods: 1880-1927, 1890-1927, and 1898-1927. The three time periods permit examination of different issues. The first time period, 1880-1927, allows us to examine the effects of laws for the largest number of states. Administrative data on enrollment and attendance are used for this period, because census data for 1940 are quite sparse for individuals who would have been affected by laws passed before 1890.³ The second time period, 1890-1927, allows us to examine the effects of the laws on enrollment, attendance, and educational outcomes as measured by highest grade completed. The third time period, 1898-1927, allows us to examine the effect of the laws on schooling and wages for men ages 25-54 who report positive income.

This paper finds that the introduction of compulsory attendance laws had positive and statistically significant effects on schooling in states that passed laws after 1880. For the 1880-1927 and 1890-1927 periods, the laws had positive and statistically significant effects on enrollment and attendance. Depending on the specification and the year, the effects on attendance ranged from 2.6-3.9 percent and on enrollment ranged from 1.1-3.6 percent. For 1890-1927, the laws also increased years of schooling by 0.10-0.14 years and completion of 6th grade by 0.8-1.2 percent. Given the type of student for whom the law was likely to be binding and the fact that social promotion was not the norm, 6th grade is roughly where gains would be expected. Comparisons of our results with Landes and Solmon (1972) suggest that their results were driven by their use of cross-sectional identification or time series identification with data

³ These individuals would have been at least 63 years old in 1940.

for just two years.

For men ages 25-54 with positive wage income in the 1940 census, compulsory attendance laws had causal effects on educational attainment and wages. The estimated return to schooling using OLS is 0.08, and the IV estimate for the returns to schooling is 0.11. This suggests that those who were induced to attend school longer due to a compulsory attendance law experienced a sizeable return to the additional year of school.

These findings contribute to the literatures on the efficacy of compulsory attendance laws and on the effects of schooling on wages. Four previous papers examine aspects of compulsory attendance during the period 1860-1920.^{4,5} Landes and Solmon (1972) find no effect. Three papers find some evidence that the laws were effective in some states or time periods including: Eisenberg (1988) which finds increases in attendance of 2-3 percent in Iowa and Pennsylvania; Puerta (2009) which finds a 7 percent increase in reported school attendance in the census associated with adoption of compulsory attendance laws in Massachusetts (1852) and Vermont (1867), and Margo and Finnegan (1996) which finds positive but insignificant effects of compulsory attendance laws when comparing reported school attendance in the census of younger and older 14 year olds in states with and without laws in 1900, and positive and significant effects in six states that also had strong child labor laws. Lleras-Muney (2002) examines the period 1915-1939 using the 1960 Census of Population data on retrospective schooling. This period includes the introduction of laws for younger children in the South and expansion of ages during which children were required to attend school in other states. She finds

⁴ A number of other papers in the larger literature examine later periods or examine the South. On the South, see Margo (1990), Greenbaum (2009), Aaronson and Mazumder (2009). On later periods, see Stigler (1950), Edwards (1978), Lang and Kropp (1986), Schmidt (1996), Acemoglu and Angrist (2000) and Lleras-Muney (2002).

⁵ There is also a closely related literature on child labor. Moehling (1999) found no effect of child labor laws on children's employment in manufacturing or overall. Puerta (2007) finds some evidence that child labor laws had an effect child labor between 1900 and 1920. Manacorda (2006) finds evidence that the laws were effective in 1920.

that laws increased educational attainment by 5 percent. Our paper extends these results by showing positive and significant effects of the introduction of compulsory schooling laws for more states using multiple data sets.

Although the literature linking schooling to wages is large, the number of papers covering the introduction of compulsory attendance laws is small. Goldin and Katz (2000) find OLS returns to secondary school from the Iowa data to be 11 percent for all males and 12 percent for young males. Our paper presents further evidence that education was causally linked to wages for cohorts born in the late nineteenth and early twentieth centuries in states that would adopt compulsory attendance laws. Interestingly, our OLS estimates of the return to schooling – 8 percent – and our IV estimates – 11 to 14 percent – fall within the conventional range for the later period (Card 1999).

2. Schooling, Laws, and Politics

This section begins by examining schooling in the period before most states began passing compulsory attendance laws. The discussion then turns to the laws, the politics of passage of the laws, and the states that passed laws during the three time periods of interest.

Schooling in the Absence of Laws

Data on schooling for this period come from the decennial censuses of population, which asked whether individuals had attended school in the past year. Figure 1 provides census enrollment for white children by age for states *without laws* in 1850 and 1870.⁶ (Only three states, Massachusetts, Vermont, and the District of Columbia, had compulsory attendance laws before 1870.) It shows that some type of school attendance was common in 1850, even in the absence of a law. Much of the schooling would have taken place in one-room school houses for

⁶ Black children are excluded, because most blacks were enslaved in 1850. The census data is discussed in more detail in section 5.

fairly short periods of time. Children would get more, and more systematic, instruction in later years, but the stage had already been set.

Enrollment for most ages in these states rose between 1850 and 1870, again in the absence of laws. The increase was largest for children ages 10 to 13. Enrollment at the youngest ages declined, as reformers worked to remove young children from school. The common school reform movement that swept across the country around the 1850's viewed young children as disruptive and likely to derive little benefit from attending school.⁷

A number of factors may have driven rising enrollment for older children.⁸ Access was improving as population density rose. School fees were falling. Local pressures to send children may have increased as more children attended. Part of this may have been changing intergenerational expectations. Adults who attended school as children sent their own children to school. Finally, the perceived value of education may have been rising.

Compulsory Attendance Laws

The first compulsory attendance law was passed in Massachusetts in 1852.⁹ Vermont and the District of Columbia also passed compulsory attendance laws prior to 1870.^{10,11}

⁷ For a discussion of the efforts and success of reformers in removing young children from schools, see Kaestle and Foner (1983).

⁸ Go (2008) and Go and Lindert (2010) discuss the provision of education during this general period. They find that education levels were high in the United States because schools were affordable, female teachers were in large supply, and suffrage was broad. They also discuss the politics of the abolishment of rate bills which left schools free. Goldin and Katz (2008) argue that abolition of rate bills, which typically preceded compulsory attendance laws, had no meaningful impact on school enrollment.

⁹ We differentiate compulsory *attendance* laws from the variety of compulsory *instruction* laws that dated back to colonial times. For example, colonial instruction laws tasked town selectmen to ensure parents were raising literate children but did not mandate school attendance. See Cook (1912) and Ensign (1921),

¹⁰ A number of nations passed laws earlier than Massachusetts including Prussia in 1763, Spain in 1838, and Sweden in 1842. Other nations passed laws during the same time period as the United States including the United Kingdom in 1880 and France in 1882. Canadian provinces, like American states, had individual compulsory attendance laws, beginning with Ontario in 1871 (Oreopoulos 2006). Countries in South and Central America passed laws during this period, although they were passed "more as utopian projects than as any reflection of reality." (Garrido 1986, p. 19). The Low Countries waited until the early twentieth century to initiate compulsory education.

Compulsory attendance laws became more common after 1870 as popular and legislative attention shifted from the Civil War and Reconstruction to other matters. Attention to and debate about schooling heightened in 1871, as the Republican Party kicked off a “public school crusade.”¹² By 1900 almost all states outside the South had schooling laws and by 1920 every state had a compulsory attendance law.¹³ The timing and politics of the passage of these laws is discussed in the next subsection.

Compulsory attendance laws commonly stated an age at which students had to begin attending, an age at which they could leave, and a minimum number of weeks that a child had to attend. The first compulsory attendance law, in Massachusetts in 1852, required attendance of 8-13 year olds for 12 weeks. Michigan’s 1871 law and Oregon’s 1889 law similarly required attendance of 8 to 14 year olds for at least 12 weeks. Appendix A contains the full text of a number of laws.

The initial laws contained many exemptions. Poverty exemptions were common, as were exemptions for children whose “physical or mental condition . . . should be such as to make this attendance or instruction inexpedient or impracticable.”¹⁴ Students could also stop attending school before the nominal leaving age once they had attained a specific level of schooling, typically sixth or eighth grade. In practice, these types of exemptions were rarely used, because few children completed eighth grade before age 14. Those that did tended to go on to high school.¹⁵

¹¹ For a more detailed discussion of schooling in this period, see Cubberley (1919) and Fischel (2009).

¹² See McAfee (1998).

¹³ Although 1918 is the traditional date for the passage of the last compulsory attendance law in Mississippi, it was not until 1920 when Mississippi’s law was not simply a local option. See the Appendix for further notes on county option laws and statewide adoption.

¹⁴ Report of the Commissioner of Education for the Year 1882-83, page xxxii

¹⁵ See for example Public Education in Kentucky (1921). 43 percent of children in city schools, 53 percent in graded schools, and 59 percent in ungraded schools were too old for their grade.

In some states, children could leave school before the specified age, provided that they were employed. The age at which children were allowed to leave school to work was typically 14. Table 1 shows that this age applied in the vast majority of states. A few states had earlier ages, but most of these states later raised the age at which a child was allowed to leave school. The reason for having different work and non-work ages was to prevent children from leaving school simply to spend their time idling on street corners or otherwise getting into trouble. In theory, children who wished to leave at the younger work age had to prove that they were leaving to work.

The laws generally provided a mechanism for enforcement. The Massachusetts 1852 law required “the school committee in the several towns or cities to inquire into all cases of violation” and stipulated a fine of up to \$20 for violation. The Michigan law was very similar. The Oregon 1889 law stipulated “It shall be the duty of the directors and clerk of each school district to make diligent effort to see that this law is enforced in their respective districts.” The fine had to be “not less than five dollars nor more than twenty-five dollars for the first offense, nor less than twenty-five dollars nor more than fifty dollars for the second and each subsequent offense, besides the cost of the prosecution.”

Compulsory attendance laws were often complemented with child labor laws. This was necessary, because the minimum term lengths were short, and schooling laws were not always enforced. Thus, children – even young children – could easily be working full time or close to full time for most or all of the year. Child labor laws restricted employment in industries for children under a certain age. Industries likely to be targeted were factories and mercantile establishments. Legislation also removed children from dangerous occupations, such as mining

and tight-rope walking, and from morally hazardous occupations, such as jobs in places serving liquor or performing messenger duty to brothels.¹⁶

This paper focuses on compulsory attendance laws, since they had the most direct effect on educational decisions. Indeed, Moehling (1999) finds that child labor laws had little impact over the period 1880-1910.

Politics of Passage

In 1870 most children were attending school. Why, then, were state legislatures passing compulsory attendance laws? In states where Republicans were in the majority some of the impetus was political. There were some common themes: the need for children with foreign-born parents to be assimilated, the need for idle children to put their time to productive use, and the need for citizens to have some education.¹⁷ Compulsory attendance was not universally popular, however. Some legislators felt that parents should be allowed to decide what was best for their children, without governmental intrusion. Educators often resisted, because it meant having to educate children who did not want to be there. And in poorer districts, having more children attend meant that more resources had to be found, typically through tax increases.

Figure 2 shows the timing of passage of compulsory attendance laws.¹⁸ What accounted for the timing of passage? One key factor was enrollment. Figure 3 highlights that enrollment as a share of 5-17 year olds was commonly above 60 percent at the time a compulsory attendance law was passed. The political reality of state politics suggests why legislatures waited to pass a compulsory attendance law until enrollment levels were already fairly high.

¹⁶ See Loughran (1921) and Nardinelli (1980). The states were behind Britain in this regard.

¹⁷ For detailed discussions of the politics of passage, see Eisenberg (1988) and Provasnik (1999, 2006).

¹⁸ For simplicity, the District of Columbia will be referred to as a state.

Early on the state legislature had limited ability to force school districts to do anything. Legislatures would typically put in place a first (weak) law and then revise the law as needed.¹⁹ The laws had numerous exemptions, left enforcement up to localities, and had no punishment for districts that failed to comply. This type of political compromise appeased various interests, since those in favor of the law could claim victory, while those opposed to the law were unlikely to be affected by it.

This political strategy accounts for one of the odd features of compulsory attendance laws passed during the Republican campaign – they were largely ineffective. Both contemporaries and historians have emphasized the ineffective nature of laws passed before 1880.²⁰ Professor Charles Judd of the University of Chicago wrote in 1918 “The records of school operations in the Northern states show that compulsory education was not really enforced until in the early ‘80’s and later.”²¹ The Report of the Commissioner of Education of the United States provided summaries of compulsory attendance in many states in 1890. The compulsory attendance law was declared a “dead letter” in at least eight states that passed laws prior to 1880 and ineffective in a number of other states.²² These pre-1880 laws were eventually revised and enforced.²³

States that passed laws after 1880 seem to have had greater success, perhaps because the passage of laws was driven less by partisan politics and more by an interest in getting children

¹⁹ Some examples of this are Michigan, which passed its first law to little effect in 1871, and revised the law in 1895: “It has had the effect of bringing into school thousands of children who before this had bid defiance to law . . . (Report of the Comm’r, Mich., 1895, p. 4); Missouri, which reported in 1913 that “The compulsory attendance laws were strengthened, increasing the school enrollment, particularly in the rural schools (Report of the Comm’r, 1913, p. 219); and New York, which “undertook enforcement in earnest in 1895 (Public Opinion, 1896, p. 461).”

²⁰ See Stambler (1968) and Tyack et al (1987).

²¹ Judd (1918), p. 38.

²² United State Bureau of Education, Report of the Commissioner of Education for the Year 1888-89, pages 470-527.

²³ United State Bureau of Education, Report of the Commissioner of Education for the Year 1882-83, page lxxviii. New York (State) Bureau of Factory Inspection. (1887), p. 15. Fifty-ninth Annual Report of the Superintendent of Public Instruction of the State of Michigan with Accompanying Documents for the Year 1895, page 5. See also 20th Annual Report of the Board of Education of the State of Connecticut, 1885, page 31 for the effect of compulsory attendance in the 1880s.

into school. In Rhode Island “The immediate effect of the law of 1883 was a gain in total enrollment, and an apparent gain in the percentage of enrollment to school population.”²⁴ In Utah, schools became both free and compulsory in 1890. In 1892, the Governor reported that, “In Salt Lake City the number of pupils seeking admission is beyond the capacity of the school buildings, and the trustees are compelled to rent private buildings.”²⁵ Kentucky passed a law in 1896. The 1897 school report remarked “this largely increased enrollment and attendance . . . were undoubtedly due, in a large measure, to the . . . Compulsory Law.”²⁶ Indiana passed a law in 1897. The law was not notably successful in the rural districts, but Indianapolis saw increases. The laws “have succeeded in placing many children in the Indianapolis schools who probably would otherwise not have been there”²⁷ In North Carolina, “[d]uring the first year of the operation of this compulsory attendance law, the attendance upon the public schools of the state was increased . . . mainly attributable to the compulsory attendance law.”²⁸

3. Coding, Data, and Identification

Coding of Laws

Data on compulsory attendance laws were gathered from the session laws of individual states and cross checked with reports of the United States Bureau of Education (various years), Goldin and Katz (2002), and Eisenberg (1988).

While the age of entry into school attendance is simple to find in the text of the laws, the exit age from compulsory attendance is more complicated. In general, to find the binding age on children, one would need to take several factors into account: the base school exit age,

²⁴ Carroll (1918), pp. 204-205.

²⁵ Report of the Governor of Utah to the Secretary of the Interior, 1892, p. 15.

²⁶ Biennial Report of the Superintendent of Public Instruction of Kentucky, for the Two Years Beginning July 1, 1895 and ending June 30, 1897, p. 17.

²⁷ Indiana Department of Public Instruction (1901), p. 508.

²⁸ Biennial Report of the Superintendent of Public Instruction of North Carolina (1914), p. 41.

exemptions to that age based on number of years in school, the leave-school-to-work exit age, which was frequently lower than the base age, and any years of school or literacy requirements to qualify for the work exit age. Our focus is on the introduction of laws, so we calculate the exit age based as the lower of the base exit age and the leave-school-to-work age.²⁹

States were only coded as having a law once the law covered all counties or required counties to specifically opt-out. This issue arises, because a number of Southern states passed laws permitting counties to pass laws requiring compulsory attendance. Few counties actually made use of this law and passed compulsory attendance laws. These opt-in states later passed universal laws that covered all counties. In a few cases, the laws permitted counties to vote to opt-out of the law. In this coding convention, the year of passage for some states is later than dates conventionally used in the literature. Appendix B provides the dates and references to the session laws in which states passed universal or opt-out laws.

In Figures 4A-4C, states are shaded that adopted compulsory attendance laws during the three periods of interest –1880-1927, 1890-1927, and 1898-1927.³⁰ To better understand the effects of the laws, states were divided into four groups based on their rough geographical alignment and the timing of passage: i) (Early) states that passed laws before 1880; ii) (Western) states that entered the Union after 1867 and passed laws after 1880; iii) (Southern) states that entered prior to 1867 and passed laws after 1880; and iv) (Middle) states that entered prior to 1867, were not in the South, and passed laws after 1880. There are 16, 9, 11, and 11 states in the Early, Western, Southern, and Middle groups.

²⁹ This coding ignores the “leave school after x years of attendance” exemptions to the exit age. Many children were attending school before passage of the law, as shown in Figure 1, but it is uncertain how many children in each state would have completed x years of schooling when the law was passed. Further, students who were ahead in their studies and thus likely to be eligible to leave early were the children most likely to continue on at higher grades.

³⁰ New Mexico is omitted from the 1890 cohort and Oklahoma and Arizona are omitted from the 1898 cohort. New Mexico and Arizona lack sufficient pre-passage data, and Oklahoma is removed as the only remaining Western state in the 1898 cohort.

Administrative Data

Beginning in 1870, states submitted data on enrollment and average daily attendance to the United States Office of Education. These data, which were published in the Report of the Commissioner of Education, were used to construct a biennial panel covering 48 states and the District of Columbia. The panel can provide evidence on the effect of compulsory attendance laws on enrollment and average daily attendance and on the timing of any changes.³¹

Although states reported these outcomes for different age ranges, for comparability enrollment and average daily attendance are measured relative to the population of children ages 5-17 in the state. This normalization should have very little effect on the outcome, since most states reported similar age ranges and attendance of younger and older children was small. Population is taken from the published census numbers and interpolated for intervening years.³² If every child between the ages of 5 and 17 were enrolled, enrollment would equal 1. Similarly, if every child attended every day, average daily attendance would be equal to 1.

The measure for exposure to a compulsory attendance law is defined based on the year in which the law became effective. A year is coded as 1 if a compulsory attendance law is in effect and is 0 otherwise.

Contemporaneous Census Data

Censuses from 1870 to 1920, as well as the two previous censuses, contained a question about school attendance. The question typically was of the form “Did this person attend school

³¹ These reports contain other information of interest, notably term length. The volatility of reported term length and the low match between term lengths in the Report of the Commissioner of Education and data on term lengths in state education reports suggests that the data are not reported in a consistent or reliable manner.

³² Although many states had school censuses, typically biennially, in order to apportion state funding across school districts, the results of these state population counts in many cases included individuals up to age 21 and are not disaggregated by age in published reports.

during the previous __ months?”³³ The contemporaneous census data have a number of limitations. Census data are self-reported and are only available every ten years, making it difficult to assess the immediate effect of laws passed between census years. Margo (1990) finds evidence of an undercount of black school attendance in 1900. Because even one day of school attendance could provide a “Yes” to this question, it is closer to a measure of enrollment than attendance.³⁴ Further, it is impossible to tell from the Census whether a child went to school full-time or part-time.

While not useful for directly analyzing the effects of laws, the census data can help shed light on the administrative data. For example, one would hope that the two measures would be correlated. In early years, the correlations are high. In 1880 and 1900, they were: 0.88 and 0.73. By 1920, the correlation had fallen to 0.46. The reasons for the decline may have to do with differences in the administrative data over time. Plots of the administrative data, however, do not show any significant discontinuities. The Census is the more likely source of the difference. The timing of the 1920 Census differed from previous Censuses, and it asked about schooling over a different time frame. Further, by 1920, there was considerable social and legal pressure for children to be in school. This may have caused parents to report children as having attended, even if they had not.

1940 Retrospective Census Data

The 1940 Census was the first census to ask about years of completed schooling and wages. Individuals were asked to report the highest grade completed. As Goldin (1999) notes, they were not always reporting accurately. “I have recently demonstrated that the 1940 census greatly

³³ The instructions specifically excluded night school attendance in 1870 and 1880 and older teens may have been missed in 1900. See Carter (2011).

³⁴ See Goldin and Katz (2008).

overstates the proportion of Americans who were high school graduates.”³⁵ To anticipate our estimation strategy, assume the proportion of people in a given state overstating their education is either constant or trending linearly or quadratically. In this case, the overstatement should have limited impact on our estimates of the effect of compulsory attendance laws on schooling outcomes. The reason is that estimation focuses on changes in schooling attributable to the law. Goldin (1999) also discusses the implications of the overestimate for the estimated returns to education. We return to this issue in section 5.

In the 1940 census data, the measure for exposure to a compulsory attendance law is defined slightly differently than it is in the administrative data. An individual is considered to have been subject to a law if the individual would have been compelled to attend school for at least one year based on their state and year of birth and is equal to 0 otherwise. For example, if someone is age twelve when their state of birth introduces a law which requires children to attend school from age eight until they turn fourteen, the variable Law equals 1.

It is worth noting that individuals who were foreign born and individuals who were Native American from the retrospective data are excluded from the sample. For the former group, it is impossible to determine where they were educated. For the latter group, they may or may not have been affected by state compulsory attendance laws, depending on whether they lived on or off of a reservation. State laws only applied if they lived off the reservations. Both groups may be present in the administrative data, although their numbers are likely to have been small. In 1880, foreign born children comprised approximately 4 percent of the school-age population, and this dropped to 3 percent by 1920. Native Americans comprised around 0.2 percent of the school-age population in both years.

³⁵ Goldin (1999), p. S67.

Table 2A presents summary statistics for the administrative, contemporary census data, and 1940 census data. Enrollment, average daily attendance rose over time, as did the share of individuals who reported completing fourth, sixth, and eighth grade and the total years of schooling.

Table 2B presents summary statistics by race and region. Early, Western, and Middle states were nearly all white during the sample periods. The Southern states were 68 percent white and 32 percent black. The vast majority, 85 percent, of blacks were born in the Southern states.

Identification

The effects of law are identified based on variation within state over time. The baseline specification for the effect of a law is:

$$y_{st} = \alpha_0 + \alpha_1 \text{Law}_{st} + \beta_1 \text{state}_s + \beta_2 \text{state}_s \times \text{time}_t + \varepsilon_{st}$$

where y is the outcome of interest, s is state, and t is time. Law is equal to 0 prior to passage of a compulsory attendance law and becomes 1 in the year that the state passes a law.³⁶ The specification includes state fixed effects and state-specific linear time trends. The specification does not include year fixed effects. It is difficult to argue that national events were having a significant and constant effect on schooling, above and beyond those already accounted for by the inclusion of state-specific trends, given that most schooling decisions were made at the state or local level. All estimates have standard errors clustered at the state level.

An alternative specification allows the state time trends to be quadratic. This addresses the fact that the maximum percentage is 100, and enrollment and attendance are likely to rise more slowly as they approach 100 percent. This specification is:

$$y_{st} = \alpha_0 + \alpha_1 \text{Law}_{st} + \beta_1 \text{state}_s + \beta_2 \text{state}_s \times \text{time}_t + \beta_3 \text{state}_s \times (\text{time}_t)^2 + \varepsilon_{st}$$

³⁶ If a state passed a law that took effect in a later year, the later year is treated as the date of passage. See the appendix for details on the coding of the year of passage.

The specifications using 1940 census data are analogous, but state is state of birth and time trends are based on year of birth and not calendar year. Some specifications include indicator variables for covariates: race, gender, father or mother foreign born, and native English speaker.

The counterfactual is that in the absence of the passage of a law, outcomes would have continued to follow the state-specific time trends. The historical literature suggests that many laws affecting education, such as child labor laws and free school laws had limited effect on outcomes.³⁷ To the extent that these and other policy changes did have effects, these effects are assumed to be captured by the state time trend.

4. The Effects of Compulsory Attendance Laws on Schooling

Outcomes for 1880-1927

The top panel of Table 3 demonstrates that the laws had positive effects on average daily attendance and enrollment. The effect was statistically significant in three of the four specifications. Following passage of a law, average daily attendance increased by 0.026 to 0.029 and enrollment increased 0.011 to 0.036. Average daily attendance was 0.41 in 1880 and 0.66 in 1927, so the laws accounted for 10-12 percent of the increase. Enrollment was 0.64 in 1880 and 0.82 in 1927, so the laws accounted for 6-20 percent of the increase.

The bottom panel indicates that the laws led to statistically significant increases in attendance and enrollment in the western and the southern states, but not the middle states. The Western states were experiencing expansion in their school systems coincident with the passage of their laws. Thus, the effects are generally large. In contrast, the South already had an established school system and so generally experienced more modest effects.

³⁷ Moehling (1999) finds no effect of child labor laws during this period and Goldin and Katz (2008) find that the abolition of rate bills had little impact on enrollment.

It is worth noting that the quadratic specifications generally provide better fits according to a number of criteria. The R-squareds are higher. Wald tests of the joint significance of the quadratic terms are statistically significant, and the likelihood ratio tests also suggest that the quadratic specification is superior.

Outcomes for 1890-1927

Table 4 shows that effects of laws passed between 1890 and 1927 were larger and more likely to be statistically significant than for the period 1880-1927.³⁸ The effects on attendance ranged from 0.034-0.038, as compared to 0.026-0.029 for the earlier period. The law accounted for 15-17 percent of the change between 1890 and 1927. The effects on enrollment ranged from 0.029-0.036, as compared to 0.011-0.036 for the earlier period. The law accounted for 22-28 percent of the change. The effects on attendance and enrollment are generally larger in the Western and Southern states during the later time period.

Table 5 examines the timing of the effects of the law on attendance and enrollment. The omitted period is 1-5 years before passage. All of the coefficients on attendance and enrollment were positive, and three of the four were statistically significant 0-5 years after the passage of a law. The magnitudes of the effects are similar to the magnitudes in Table 4. And the coefficients 6+ years before were small and insignificant. The effects in years 6-10 are generally similar in magnitude to 0-5 years after passage, but are not very precisely estimated. These results support the argument that the compulsory attendance laws were causing the increases in attendance and enrollment.

³⁸ The effects are generally similar if the 1880-1927 sample is used and changes in laws from 1880-1889 are estimated separately from changes in laws adopted from 1890 to 1920.

The 1940 census retrospective data tells a similar story about outcomes. To the extent that a compulsory attendance law was binding, it was likely to be keeping low-performing students in school for an extra year or possibly two.

The top panel of Table 6 is analogous to Table 4 and omits covariates. In all of the specifications the effect of the law are positive, and in three of the four they are statistically significant. Years of schooling increased by 0.056 in the linear specification and 0.141 in the quadratic specification. As is discussed further below, the linear specification is heavily influenced by the negative effects in the Middle states. 6th grade completion increased 0.010 to 0.012. Reported completion was 0.783 in 1890 and 0.910 in 1927, so the laws accounted for 8-9 percent of the increase.

The next panel of Table 6 shows that the effects varied regionally. For the Western and Southern states, the laws had positive and statistically significant effects on years of schooling and completion of 6th grade. Following passage of a law years of reported schooling increased 0.41-0.50 years in Western states and 0.19-0.20 years in Southern states. This was accompanied by gains in completion of 6th grade, which is consistent with the law affecting the targeted population. In Middle states, the effects on completion were small and not significant. The exception is the large negative coefficient on years of schooling in the linear specification. This is explored further below.

The bottom half of Table 6 (columns 7-12) presents the same regressions controlling for covariates. The covariates are race, gender, whether the individual's father or mother was foreign born, and whether the individual was a native speaker of English. Including covariates reduces the magnitudes of the coefficient on law by roughly 40 percent. Although the linear

specifications are less likely to be statistically significant, the coefficients in the quadratic specifications that were significant in the top panel remain significant in the bottom panel.

The effects of covariates on schooling are of interest. Males had slightly lower attainment than females as measured by years of schooling and completion of 6th grade. Whites had much higher years of schooling and rates of completion of 6th grade than blacks. Appendix C explores black-white differences in Southern states further. Individuals with one or more foreign-born parents had slightly better outcomes than individuals with native-born parents. But individuals that were not native English speakers, presumably because their parents spoke another language at home, had fewer years of schooling and lower rates of completion of 6th grade than native English speakers.

Figure 5 plots the effect of the law on the CDF of the highest grade completed using the linear and quadratic specifications. The patterns differ significantly across regions and specifications. In particular, the linear specification suggests that the law had large negative impacts on high school attendance in the Western and Middle states. In contrast, the quadratic specification yields statistically insignificant and generally positive effects on high school.

Figure 6 indicates why the effects differ in the two specifications. It plots the reported completion rate by birth year for the sample, and the fit lines for the linear and quadratic specifications. The quadratic specification better captures the trends in completion of 10th and 12th grade. Because of the curvature in the data, in the linear specifications, the effects for states that pass laws in the middle years are negative. That is, it will be captured as a shift downward. Similarly, for states that pass laws in later years, the effects are positive.

Having identified the source of the disparity, it is worth returning to the results of the quadratic specifications in Figure 5. In Western states, the laws had a positive and statistically

significant effect on completion of 4th to 8th grade. In Southern states, the laws had a positive and statistically significant effect on completion of 1st to 9th grade. The law had little effect on grade completion in the Middle states.

Outcomes for 1898-1927

Table 7 examines the effects of compulsory attendance laws on school outcomes for all individuals and for men ages 25-54 with wage income in the 1940 Census. These individuals were age 13 in the years 1898-1927. Restricting the sample to men with wage income reduces the number of observations from 478,414 to 173,157 (by first restricting to men, reducing the age range to 25-54, and then including only those with positive wages and weeks worked). Twenty-seven percent of men in the sample did not report wage income and weeks worked in the census. Of these men, the largest occupational categories of these men were farmers (40%), no reported occupation (16%), and officials and proprietors (13%).

For the full sample, the average effects of adopting a law are positive, slightly larger than the quadratic estimates in Table 6, and somewhat more precisely estimated. The laws increased years of schooling by 0.111-0.169 years and completion of 6th grade by 1.0-1.6 percent. The increase appears to have been occurring in primarily in the Southern states, although the effects are positive in the Middle states.³⁹

For men who reported positive wage income in 1940, the effects of the law on years of schooling and completion of 6th grade were positive and larger than for the full sample. The effect of the law was statistically significant in three of the four specifications. The passage of a compulsory attendance law increased years of schooling by 0.160-0.223 years and completion of 6th grade by 1.4-2.1 percent.

³⁹ Recall that we do not use any Western states in the 1898-1927 sample since New Mexico and Arizona lack sufficient pre-passage data and Oklahoma is removed as the only remaining Western state in the 1898 cohort.

Figure 7 plots the effect of the law on the highest grade completed for men with wage income ages 25-54. In Southern states in the quadratic specification, the laws had a positive and statistically significant effect on completion of 5th to 8th grades. Interestingly, for this group of Middle States, the law has positive and significant effects on completion of 6th and 7th grades. This is in contrast to the larger group of Middle States in Figure 5, where the law had no effect.

Comparison with Landes and Solmon

While some previous studies have found positive effects for some states or time periods, Landes and Solmon's (1972) famous study of compulsory attendance laws concludes that the laws had no effect on either enrollment or attendance. Landes and Solmon use administrative data for the years 1870, 1880, and 1890 and restrict attention to the 38 states that had achieved statehood by 1880. Much of their analysis is cross-sectional, but in columns (3) and (4) of Table 5 in their paper, they examine changes from 1870 to 1880 and from 1880 to 1890. Their regressions include controls for *changes* in: per capita income, state expenditures on schooling per enrollee, foreign-born persons as a percent of the population, population density, and non-white population as a percentage of the total population. They also control for a state being in the South and for passage of a child labor law.

Their results and our replication results are presented in Table 8. The replication results do not attempt to reproduce their controls for changes in income, expenditures, foreign-born, population density, or non-white. They do, however, control for whether the state was in South and for whether it had a child labor law, as reported in Landes and Solmon, Table 1. Even without most of their controls, their results are largely replicated, particularly for the 1880-1890 period.

Our conclusions differ from theirs for the period after 1880. Landes and Solmon may have reached different conclusions for a variety of reasons, including the fact that they examine laws passed in 6 of 38 states over a ten-year period using data for just the endpoint years. This approach makes it difficult to identify an effect.

Landes and Solmon (1972) are particularly concerned about endogeneity.⁴⁰ As Figure 3 shows, states that passed laws usually had relatively high outcomes prior to the passage of the law. Our use of state fixed effects and state-specific time trends is designed to address precisely these concerns. The counterfactual is that the state would have continued on the state trend in the absence of the law.

Summary

Compulsory attendance laws had positive and statistically significant effects on schooling in Western and Southern states. In Western states, the school system was in process of being established and so the effects of the laws reflected both increases in access and increases due to the law. The effects of laws on school outcomes were positive, statistically significant and large. In Southern states, the school system was more established, although access in some areas may have been limited. The effects of laws on school outcomes were positive, often statistically significant and more modest in magnitude. The effects for Middle states were confined to states where the laws took effect relatively late, specifically after 1898.

5. The Long-Run Effects of a Compulsory Attendance Law

How did schooling affect labor market outcomes? Any examination for this period needs to proceed with caution, because self-reported educational attainment was likely to be inflated. Although our interest is in completion of lower grades, it is worth quoting Claudia Goldin's

⁴⁰ In part, they were following work by Stigler (1950) and Folger and Nam (1967), which suggested that the laws were endogenous.

(1999) discussion of the 1940 Census for high school and college. She notes, “The estimated return to high school and college education is likely to be biased because of the overstated educational attainment. But the direction of the bias is not known. The return would be biased upward if the successful more often overstated their high school graduation. It would be biased downward if the overstatement in years of schooling arose from in-grade retardation or attendance in common or ungraded schools for more than eight years.”⁴¹

The estimation strategy follows Acemoglu and Angrist (2000) and later studies.⁴² The sample is limited to men who were ages 25-54 at the time of the 1940 Census. Younger men may not have completed their schooling and older men may have already exited the labor market. The dependent variable is log of weekly wages. The weekly wage is the ratio of annual wage and salary income to annual weeks worked, both of which are measured for the prior calendar year (1939). Annual wages are censored at the 98th percentile, and values above the 98th percentile are replaced with 1.5 times 98th percentile value. Weeks worked in the 1940 Census are reported as “equivalent full-time weeks.”⁴³

Figure 8 motivates the use of a quadratic specification for OLS and IV. Log wages are plotted by year at which individuals were age 13, the modal last year of required attendance. The oldest individuals are on the far left hand side of the graph and the youngest individuals are on the far right hand side of the graph. The relationship in 1940 between age and log wages was nonlinear. The highest wages appear to have been for the cohort that was 13 in 1906-1912.

⁴¹ Goldin (1999), p. S67.

⁴² Puerta (2011) implements an alternative identification strategy with the 1940 Census to examine the impact of compulsory schooling laws passed between 1850 and 1920. His analysis focuses on individuals residing in locations near state borders where schooling laws had previously changed on one side of the border but not the other. He finds increased educational attainment for those residents in age groups that would have been affected by the law had they resided in the area as a child.

⁴³ In order to report “equivalent full-time weeks”, respondents were asked to convert the weeks in which they worked less than full-time into full-time equivalents.

The first two columns of Table 9 investigate the effects of completing grades 4-9, where individuals who completed higher grades are censored at 9th grade. Column (1) shows the effect without covariates, and column (2) shows the effects with covariates. Not surprisingly, more schooling is associated with higher wages. In columns 1-2, the effects of an additional year of schooling for grades 4-8 range from 5 to 13 log points per year. The much larger estimate found in the last row is the average effect for all individuals who completed 9th grade or higher.

Columns (3) and (4) show the effects of years of schooling on wages. The effects of one more year are smaller over the full range, 8.0-8.6 log points per year. This suggests that the returns to completing a grade were somewhat higher for grades 1-8 than for all grades. This point estimate is well within the conventional range for the OLS relationship between schooling and wages (Card 1999).

Table 10 presents the IV estimates of the returns to schooling. The first stage is shown in columns (1) and (2) and the IV results are shown in columns (3) and (4). Two specifications are shown, with and without covariates. Although the first stage F-statistics are below the conventional weak instrument threshold of 10, the magnitudes of the estimated effects of an additional year of schooling on wages, 0.114-0.138, are quite close to the magnitude of the effects found in samples from later time periods (Card 1999).⁴⁴ This is striking for at least two reasons. First, compulsory attendance laws were commonly believed to have had no effect on

⁴⁴ We performed additional analysis to address concerns about weak instruments. First, while it is suggested that researchers report limited information maximum likelihood (LIML) estimates rather than IV estimates when using weak instruments due to finite sample bias (Staiger and Stock 1997), LIML and IV estimates are exactly the same when using a single instrument as we do in our analysis. Second, the standard IV confidence intervals are biased when instruments are weak which requires alternative methods for computing the confidence intervals be used in order for inference to be correct. We compute Chernozhukov and Hansen's (2008) Anderson-Rubin confidence intervals using version 1.0.7 of the `-rivtest-` command for Stata (Finlay and Magnusson 2009). The resulting confidence interval is (-0.03, 0.42) for the IV estimate in column (3) with a p-value of 0.086 for the test of the null hypothesis that the coefficient equals zero. The analogous confidence interval for column (4) is (-.18, .59) with a p-value of 0.27. These confidence intervals are slightly larger than the standard confidence intervals based on the results found in Table 10 of (-.009, 0.285) and (-0.084, 0.311), respectively.

schooling outcomes before 1915. Yet, effects on schooling outcomes were positive on average and in most states. Second, researchers have been concerned about the self-reporting of schooling in the 1940 Census and the effect this might have on estimated returns to education. One might also worry that only 73 percent of men report wage income. While these two factors may be affecting estimates of returns to schooling, the relationship between schooling and wages is positive and estimated values are similar to those found in other time periods.

6. Conclusion

The adoption of compulsory attendance laws positively affected educational outcomes over the periods 1880-1927, 1890-1927 and 1898-1927. Western and Southern states and selected Middle states experienced higher enrollment and attendance. Further, passage of these laws increased years of schooling and completion of specific grades. The gains were largest in the Western states, where the passage of laws coincided with the expansion of the school system. Gains were more modest in Southern states and in Middle states that passed laws after 1898. They were, however, positive and statistically significant. This suggests that on average the laws were effective, although the high pre-law rates of enrollment, attendance, and grade completion limited the potential effects of a law.

The returns to increased education were positive for men ages 25-54 with wage income in 1940. The OLS returns to a year of school were positive and significant, and the magnitudes of the returns – 8.0 to 8.6 percent – are quite close to OLS returns using data from later periods. The passage of a law is a natural instrument to examine the relationship between schooling and wages. The IV returns range from 0.114 to 0.138 depending on the inclusion of covariates.

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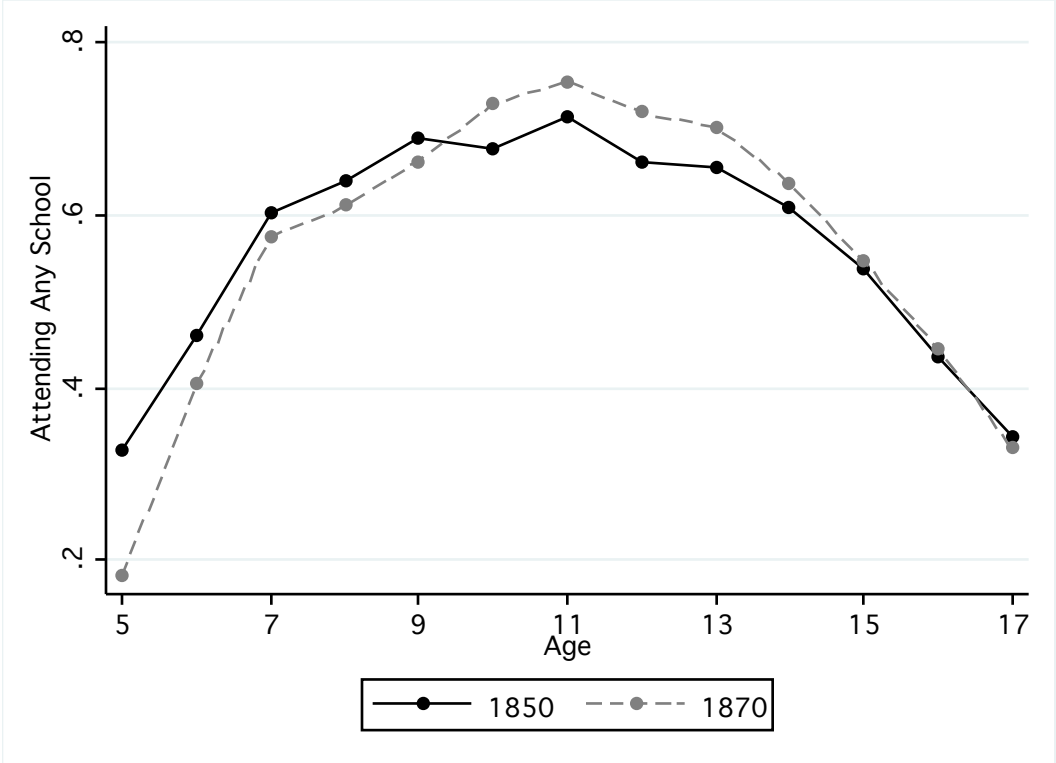
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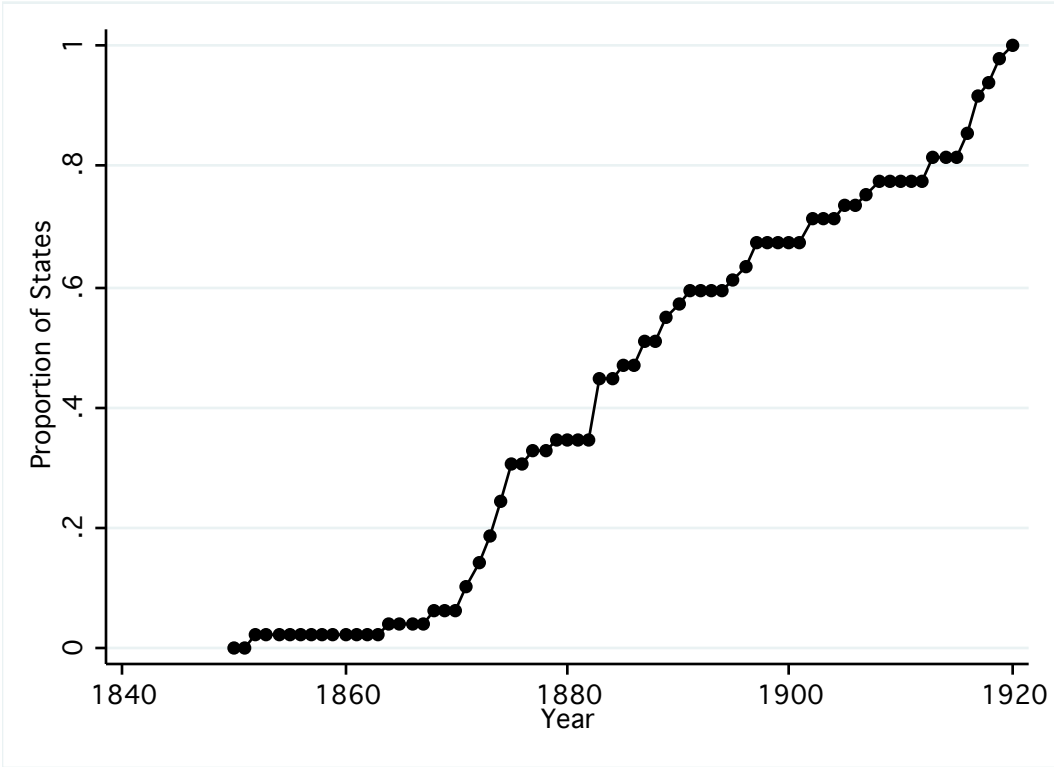
Figure 1: Share of White Children Who Attended School in Previous Year, 1850 and 1870



Notes: States with laws in 1870 are omitted (Massachusetts, Vermont, and the District of Columbia). The sample includes the 34 states with data in both years. The average levels are higher in the 23 states that remained in the Union and lower in the 11 states that were members of the Confederacy.

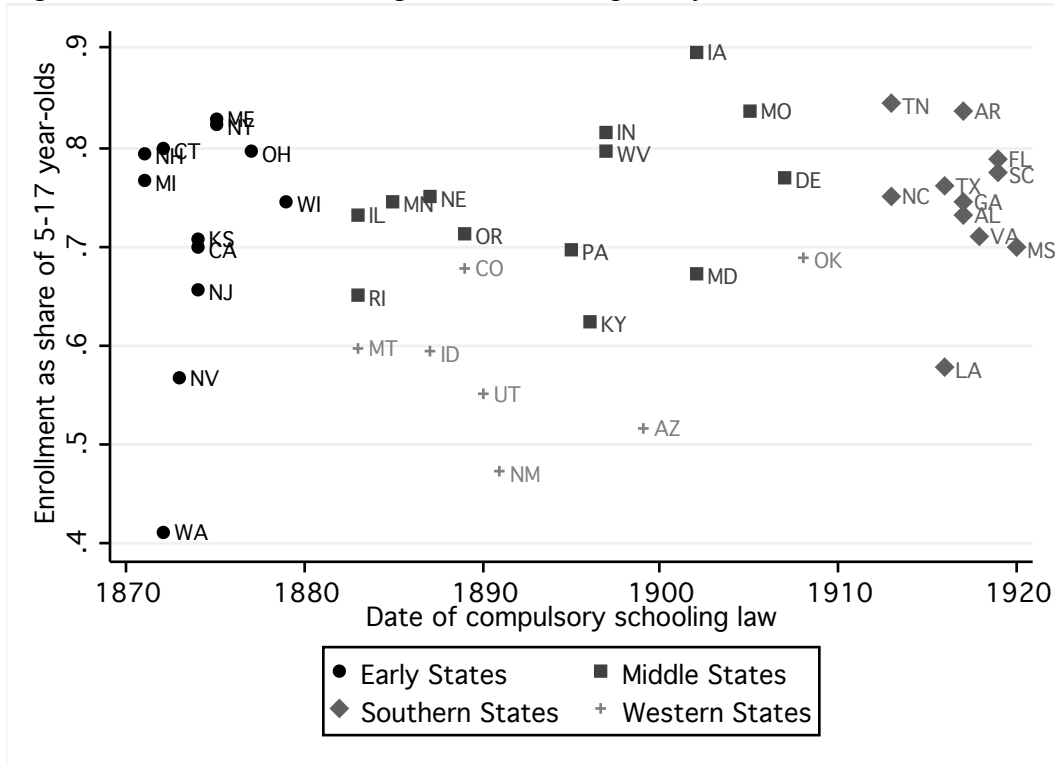
Source: IPUMS public use samples of the United States Census (Ruggles et al., 2010)

Figure 2: Passage of Initial Compulsory Attendance Laws



Sources: Date statewide laws went into effect. See Appendix B for sources and discussion of the laws.

Figure 3: Enrollment at Passage of Initial Compulsory Attendance Law, 1870-1920



Notes: Dates are year statewide attendance law went into effect. States that passed laws prior to 1870 (Massachusetts, Vermont, and Washington, DC) are not shown. Three states are also missing data at time of passage (North Dakota, South Dakota, and Wyoming). Enrollment is calculated as a share of 5-17 year olds from the Census of Population. The population of 5-17 year olds is interpolated between census years. Since the education data we collected were for even years, enrollment rates in the year of passage were interpolated if the law was passed during an odd-numbered year.

Source: Report of the Commissioner of Education for the Year [various years], United States Bureau of Education

Figure 4A: Compulsory Attendance Laws Passed 1880-1920



Figure 4B: Compulsory Attendance Laws Passed 1890-1920

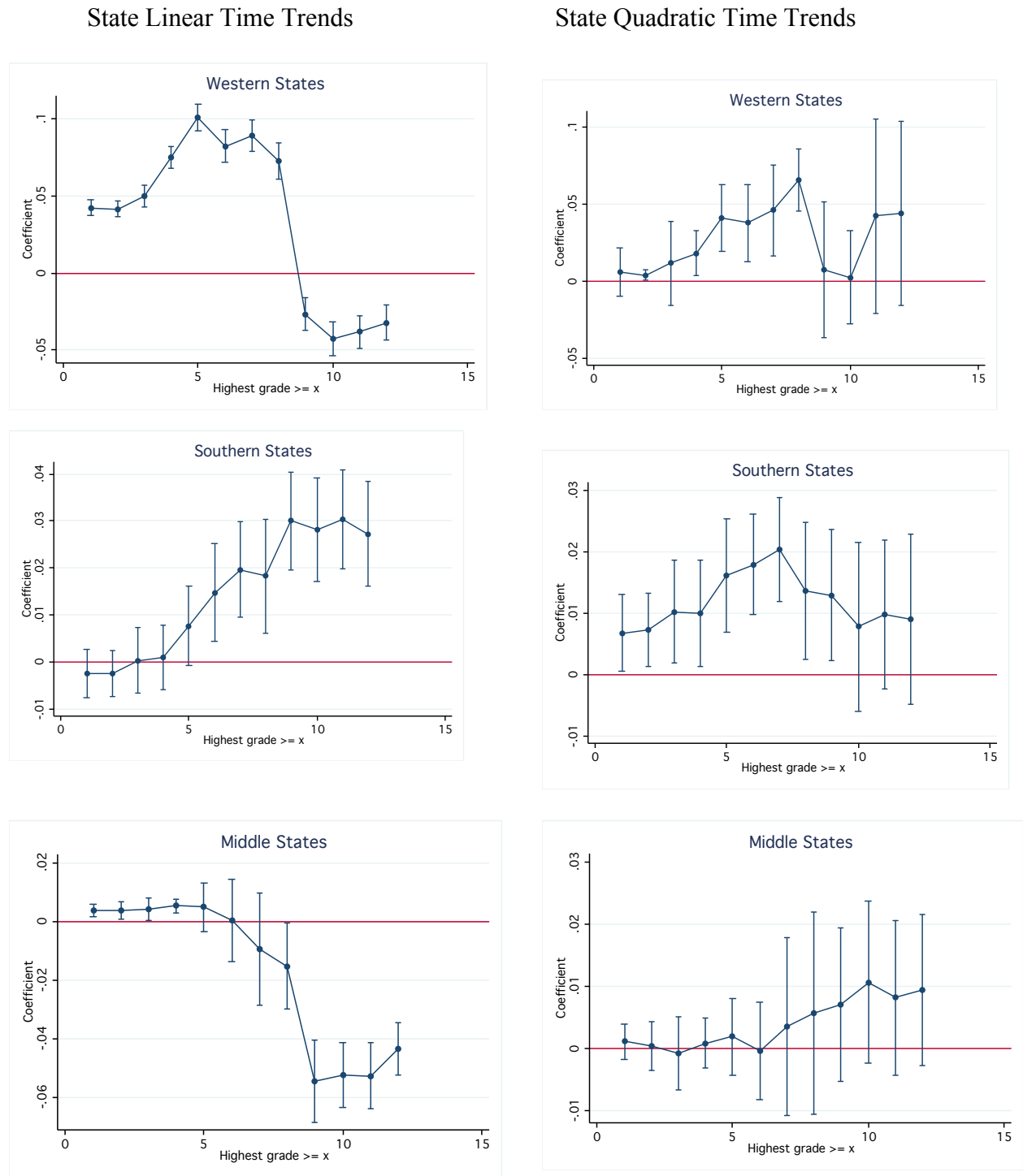


Figure 4C: Compulsory Attendance Laws Passed 1898-1920



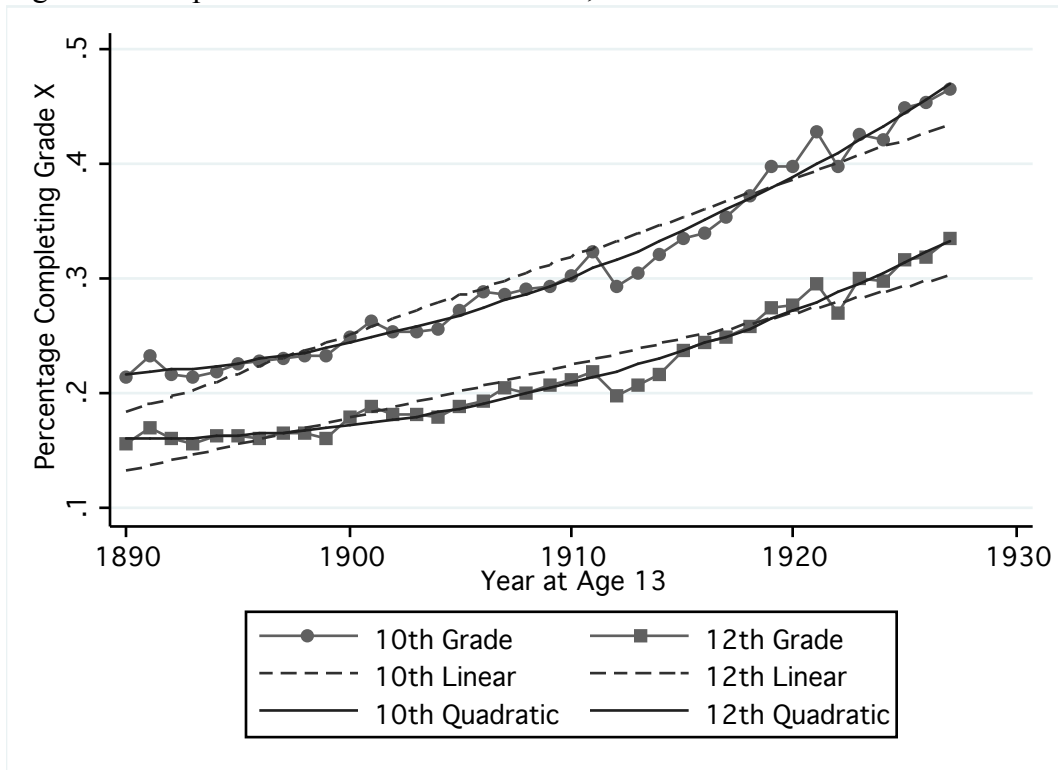
Notes: States with white shading that do not pass a law during the period (or, in the case of the Dakotas, passed when a single territory). Middle states have the lightest gray shading, Southern states have medium gray shading, and Western states have the darkest gray shading. Figure A includes 33 states. Figure B includes 21 states. New Mexico is omitted because it lacks sufficient pre-passage data. Figure C includes 15 states. Oklahoma and Arizona are omitted. Arizona lacks sufficient pre-passage, and Oklahoma is removed, because it is the only remaining state in the Western cohort.

Figure 5: Effect of Laws on Highest Grade Achieved in the 1940 Census, 1890-1927



Notes: For men and women ages 25 to 62 (age 13 in 1890 to 1927, assuming most birthdays fell after the April enumeration date). This matches the years observed in the administrative data for 13 year olds (the modal highest age affected by a law). Each point shows the regression coefficient and 95 percent confidence interval of the effect of the laws on the given grade without covariates. Standard errors are clustered by state of birth.

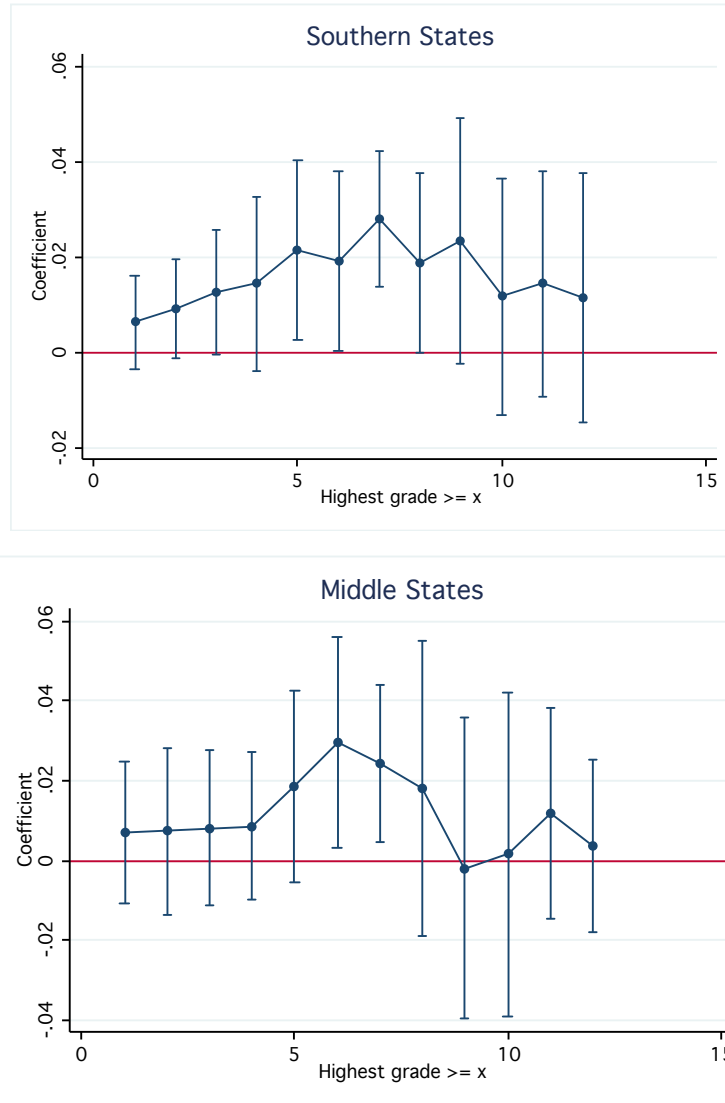
Figure 6: Completion of 10th and 12th Grade, 1940 Census



Notes: Data are for states that adopted laws between 1890-1927.

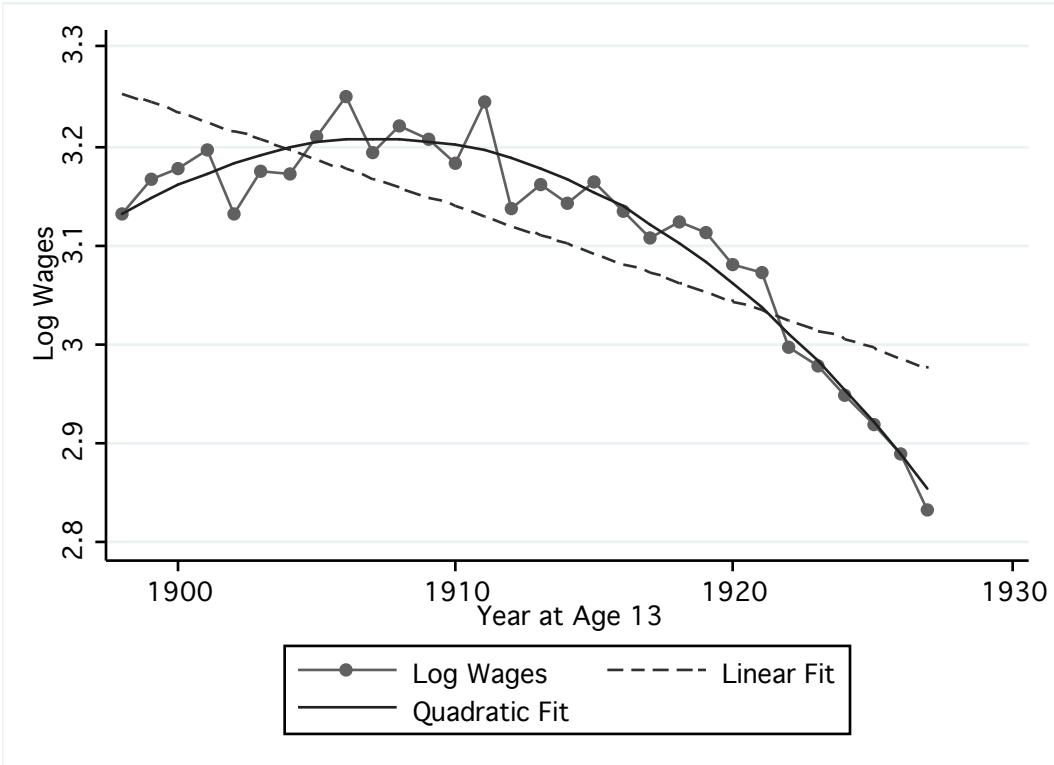
Figure 7: Effect of Laws on Highest Grade Achieved in the 1940 Census, Men with Wage Income, Ages 25-54

State Quadratic Time Trends



Notes: For men and women ages 25 to 54 (age 13 in 1898 to 1927, assuming most birthdays fell after the April enumeration date). This matches the years observed in the administrative data for 13 year olds (the modal highest age affected by a law). Each point shows the regression coefficient and 95 percent confidence interval of the effect of the laws on the given grade without covariates. Standard errors are clustered by state of birth.

Figure 8: Wages by Year at Age 13, Men with Wage Income Ages 25-54



Notes: Wages are for men in the 1898-1927 cohort. Following the regressions, wages are censored at the 98th percentile.

Table 1: Age at Which Children Were Permitted to Leave School to Work

	1860	1880	1900	1920
None	48	32	16	
12			1	1
13			1	
14	1	13	22	26
15		2	4	10
16		2	5	11
17				1

Notes: Each cell shows the number of states with the given age of compulsory attendance law or school dropout age, as described in the text. In 1920 many states also had continuation schooling laws, which modified the exit age by requiring additional years of attendance in some cases. These ages are not shown. Data is for the 48 continental states and the District of Columbia.

Sources: See sources for compulsory attendance laws in Appendix B.

Table 2A: Summary Statistics for 5-17 Year Olds

Year	Enrollment	Average Daily Attendance	Completed 4th Grade (1940)	Completed 6th Grade (1940)	Completed 8th Grade (1940)	Years schooling (1940)
1880	0.65	0.41				
1890	0.69	0.44	0.91	0.79	0.64	7.93
1900	0.72	0.50	0.92	0.81	0.66	8.24
1910	0.73	0.53	0.95	0.86	0.72	8.82
1920	0.78	0.58	0.96	0.90	0.78	9.56
1927	0.82	0.66	0.96	0.91	0.81	9.89

Notes: Data represent weighted national averages. Enrollment and attendance are as a share of 5-17 year olds in the state. For 1940, statistics were calculated for those who were age 13 in the given year. For 1927, enrollment and attendance data are from the 1926 school year.

Table 2B: Summary Statistics, Share of Sample by Race and Region of Birth

Sample	Race	Early	Western	Southern	Middle
1890-1927	White	0.99	0.97	0.69	0.98
	Black	0.01	0.03	0.31	0.02
1898-1927	White	0.99	0.97	0.68	0.98
	Black	0.01	0.03	0.32	0.02

Notes: Data represent weighted national averages of cohorts ages 25-62 and 25-54, respectively, in 1940.

Table 3: Effect of Compulsory Attendance Laws on Attendance and Enrollment, 1880-1927

Outcome	(1) Attendance	(2) Attendance	(3) Enrollment	(4) Enrollment
Law	0.026*** (0.010)	0.029*** (0.010)	0.011 (0.010)	0.036*** (0.013)
Law * Western States	0.037** (0.017)	0.078*** (0.027)	0.120*** (0.018)	0.141*** (0.045)
Law * Southern States	0.051*** (0.009)	0.053*** (0.013)	0.014 (0.011)	0.057*** (0.020)
Law * Middle States	-0.007 (0.009)	0.002 (0.008)	-0.010 (0.015)	0.006 (0.010)
State TT	Y	Y	Y	Y
State TT Sqrd		Y		Y
Observations	1,121	1,121	1,121	1,121
R-squared	0.915	0.930	0.890	0.928

Notes: All specifications include state fixed effects. Standard errors are clustered by state. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 4: Effect of Compulsory Attendance Laws on Attendance and Enrollment, 1890-1927

Outcome	(1) Attendance	(2) Attendance	(3) Enrollment	(4) Enrollment
Law	0.038*** (0.013)	0.034*** (0.010)	0.029** (0.013)	0.036** (0.015)
Law * Western States	0.062*** (0.023)	0.129*** (0.019)	0.139*** (0.032)	0.215*** (0.036)
Law * Southern States	0.069*** (0.011)	0.032** (0.015)	0.047*** (0.014)	0.037* (0.021)
Law * Middle States	-0.008 (0.007)	0.031** (0.012)	-0.005 (0.010)	0.021 (0.014)
State TT	Y	Y	Y	Y
State TT Sqr		Y		Y
Observations	892	892	892	892
R-squared	0.919	0.939	0.903	0.930

Notes: All specifications include state fixed effects. Standard errors are clustered by state. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 5: Timing of the Effects of a Compulsory Attendance Law, 1890-1927

Outcome	(1) Attendance	(2) Attendance	(3) Enrollment	(4) Enrollment
6+ years prior to passage	0.004 (0.009)	0.005 (0.007)	-0.003 (0.010)	0.001 (0.009)
0-5 years after passage	0.034*** (0.010)	0.030** (0.012)	0.027** (0.013)	0.030 (0.018)
6-10 years after passage	0.049* (0.026)	0.032 (0.023)	0.023 (0.021)	0.025 (0.027)
11+ years after passage	0.035 (0.031)	0.010 (0.025)	-0.003 (0.028)	0.006 (0.034)
State TT	Y	Y	Y	Y
State TT Sqr		Y		Y
Observations	892	892	892	892
R-squared	0.914	0.939	0.900	0.928

Notes: All specifications include state fixed effects. Standard errors are clustered by state. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 6: Effect of Compulsory Attendance on Grade Completion, 1890-1927

Outcome	(1) Years of School	(2) Years of School	(3) 6th Grade	(4) 6th Grade
Law	0.056 (0.054)	0.141*** (0.040)	0.010** (0.005)	0.012*** (0.004)
Law * Western States	0.498*** (0.181)	0.407* (0.210)	0.082*** (0.014)	0.038*** (0.012)
Law * Southern	0.198*** (0.047)	0.191*** (0.055)	0.015*** (0.005)	0.018*** (0.004)
Law * Middle States	-0.167*** (0.042)	0.040 (0.041)	0.000 (0.007)	-0.000 (0.004)
State TT Sqrd R-squared	0.132	Y 0.132	0.142	Y 0.142
Outcome	(5) Years of School	(6) Years of School	(7) 6th Grade	(8) 6th Grade
Law	0.007 (0.042)	0.102*** (0.031)	0.005 (0.004)	0.008** (0.003)
Law * Western States	0.378** (0.166)	0.367* (0.203)	0.069*** (0.012)	0.034*** (0.012)
Law * Southern	0.107** (0.043)	0.126*** (0.041)	0.005 (0.005)	0.011*** (0.004)
Law * Middle States	-0.153*** (0.036)	0.048 (0.045)	0.002 (0.007)	0.001 (0.005)
Male	-0.304*** (0.057)	-0.303*** (0.057)	-0.029*** (0.005)	-0.029*** (0.005)
White	2.726*** (0.192)	2.725*** (0.192)	0.300*** (0.023)	0.300*** (0.023)
Parent Foreign Born	0.137*** (0.038)	0.136*** (0.038)	0.010*** (0.004)	0.011*** (0.004)
Non-Native English Speaker	-0.996*** (0.073)	-0.998*** (0.073)	-0.060*** (0.009)	-0.060*** (0.009)
State TT Sqrd R-squared	0.181	Y 0.182	0.198	Y 0.198

Notes: All specifications have state fixed effects and state time trends. The sample has 544,422 observations. “6th Grade” indicates completion of at least sixth grade. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Table 7: Effect of Compulsory Attendance on Grade Completion, 1898-1927

<i>Full Sample</i>				
Outcome	(1) Years of School	(2) 6th Grade	(3) Years of School	(4) 6th Grade
Law	0.169*** (0.052)	0.016*** (0.004)	0.111*** (0.037)	0.010*** (0.003)
Law * Southern	0.195*** (0.056)	0.018*** (0.004)	0.124*** (0.040)	0.011*** (0.003)
Law * Middle States	0.022 (0.069)	0.001 (0.003)	0.036 (0.069)	0.003 (0.003)
State TT Sqrd	Y	Y	Y	Y
Covariates			Y	Y
R-squared	0.127	0.141	0.177	0.198
<i>Men with Wage Income</i>				
Outcome	(5) Years of School	(6) 6th Grade	(7) Years of School	(8) 6th Grade
Law	0.223** (0.088)	0.021** (0.008)	0.160** (0.072)	0.014 (0.009)
Law * Southern	0.250** (0.095)	0.019** (0.009)	0.167** (0.077)	0.010 (0.009)
Law * Middle States	0.052 (0.165)	0.030** (0.013)	0.116 (0.192)	0.036** (0.016)
State TT Sqrd	Y	Y	Y	Y
Covariates			Y	Y
R-squared	0.124	0.145	0.170	0.201

Notes: The sample in the top panel includes men and women ages 25 to 54. The sample in the bottom panel includes men who report wage income ages 25 to 54. All specifications have state fixed effects and state time trends. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels. The effects of the law are not estimated for Western states, as Oklahoma was the only Western state to pass a law after 1898 with sufficient pre-passage data. Covariates are white, parent foreign born, non-English speaking native, and (for Columns (3)-(4)), gender. There are 478,414 observations in the full sample and 173,157 in the sample of men with wage income.

Table 8: Comparison with Landes and Solmon (1972)

Outcome Years	(1) Attendance 1870-1880	(2) Enrollment 1870-1880	(3) Attendance 1880-1890	(4) Enrollment 1880-1890
<i>A. Landes and Solmon (1972) Original Results</i>				
Passed law 1870-1880	0.001 (0.04)	-0.014 (0.27)		
Passed law 1880-1890			0.001 (0.04)	0.054 (1.11)
<i>B. Replication Results</i>				
Passed law 1870-1880	-0.009 (-0.038)	-0.068* (-2.00)		
Passed law 1880-1890			0.000 (0.02)	0.052 (1.38)
Observations	38	38	38	38
Number of states adopting law	11	11	6	6

Notes: T-statistics are shown in parentheses. The results in Panel A are from Landes and Solmon (1972), p. 76, Table 5, columns (3) and (4). Their sample only includes the 38 states that reached statehood by 1880 and does not include the District of Columbia. The Landes and Solmon results in Panel A include controls for changes in per capita income, state expenditures on schooling per enrollee, foreign-born persons as a percent of the population, population density, and non-white population as a percentage of the total population as well as a dummy variables for the South and passage of a child labor law. Our replication in Panel B only includes controls for whether a state is located in the South and has passed a child labor law.

Table 9: OLS Estimates of Returns to Schooling, Men with Wage Income Ages 25-54

	(1)	(2)	(3)	(4)
	Ln(Wage)	Ln(Wage)	Ln(Wage)	Ln(Wage)
Four years of school	0.132*** (0.017)	0.105*** (0.017)		
Five years	0.134*** (0.014)	0.113*** (0.014)		
Six years	0.118*** (0.011)	0.096*** (0.010)		
Seven years	0.073*** (0.012)	0.052*** (0.012)		
Eight years	0.131*** (0.017)	0.127*** (0.016)		
Nine years +	0.322*** (0.014)	0.311*** (0.014)		
Years of School			0.086*** (0.004)	0.080*** (0.003)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
Covariates		Y		Y
Observations	173,157	173,157	173,157	173,157
R-squared	0.223	0.234	0.244	0.256

Notes: Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels. All specifications include state fixed effects. Covariates are race, nativity, and native English speaker.

Table 10: IV Estimates of Returns to Schooling, Men Ages 25-54

	(1)	(2)	(3)	(4)
	Years of School	Years of School	Ln(Wage)	Ln(Wage)
	<i>First Stage</i>		<i>2SLS</i>	
Law	0.223** (0.088)	0.160** (0.072)		
Years of School			0.138* (0.073)	0.114 (0.098)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
Covariates		Y		Y
R-Squared	0.124	0.170		
F Stat	6.40	4.99		
Observations	173,157	173,157	173,157	173,157

Notes: All specifications include state fixed effects. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels. All specifications include state fixed effects. Covariates are race, nativity, and native English speaker.

Appendix A: Examples of compulsory attendance laws

*Massachusetts's law of 1852*⁴⁵

SECT. 1 Every person who shall have any child under his control, between the ages of eight and fourteen years, shall send such child to some public school within the town or city in which he resides, during at least twelve weeks, if the public schools within such town or city shall be so long kept, in each and every year during which such child shall be under his control, six weeks of which shall be consecutive.

SECT. 2 Every person who shall violate the provisions of the first section of this act shall forfeit, to the use of such town or city, a sum not exceeding twenty dollars, to be recovered by complaint or indictment.

SECT. 3 It shall be the duty of the school committee in the several towns or cities to inquire into all cases of violation of the first section of this act, and to ascertain of the persons violating the same, the reasons, if any, for such violation, and they shall report such cases, together with such reasons, if any, to the town or city in their annual report; but they shall not report any cases such as are provided for by the fourth section of this act.

SECT 4. If, upon inquiry by the school committee, it shall appear, or if upon the trial of any complaint or indictment under this act it shall appear, that such child has attended some school, not in the town or city in which he resides, for the time required by this act, or has been otherwise furnished with the means of education for a like period of time, or has already acquired those branches of learning which are taught in common schools, or if it shall appear that his bodily or mental condition has been such as to prevent his attendance at school, or his acquisition of learning for such a period of time, or that the person having the control of such child, is not able, by reason of poverty, to send such child to school, or to furnish him with the means of education, then such person shall be held not to have violated the provisions of this act.

SECT 5. It shall be the duty of the treasurer of the town or city to prosecute all violations of this act [*Approved by the Governor, May 18, 1852.*]

*Michigan's law of 1871*⁴⁶

SECTION 1. *The People of the State of Michigan enact*, That every parent, guardian, or other person, in the State of Michigan, having control and charge [of] any child or children between the ages of eight and fourteen years, shall be required to send any such child or children to a public school for a period of at least twelve weeks in each school year, commencing on the first Monday of September, in the year of our Lord one thousand eight hundred and seventy-one, at least six weeks of which shall be consecutive, unless such child or children are excused from such attendance by the board of the school district in which such parents or guardians reside,

⁴⁵ 1852 Mass. Acts 170.

⁴⁶ 1871 Mich. Acts 251.

upon its being shown to their satisfaction that his bodily or mental condition has been such as to prevent his attendance at school or application to study for the period required, or that such child or children are taught in a private school, or at home, in such branches as are usually taught in primary schools, or have already acquired the ordinary branches of learning taught in the public school: *Provided*, In case a public school shall not be taught for three months during the year, within two miles by the nearest traveled road of the residence of any person within the school district, he shall not be liable to the provisions of this act.

Sec. 2. It shall be the duty of the director of every school district, and president of every school board within this State, to cause to be posted three notices of this law in the most public places in such district, or published in one newspaper in the township, for three weeks, during the month of August in each year, the expense of such publication to be paid out of the funds of said district.

Sec. 3. In case any parent, guardian, or other person shall fail to comply with the provisions of this act, said parent, guardian, or other person shall be liable to a fine of not less than five dollars or more than ten dollars for the first offense, nor less than ten or more than twenty dollars for the second and every subsequent offense. Said fine shall be collected by the director of said district, in the name of the district, in an action of debt or on the case, and when collected shall be paid to the assessor of the district in which the defendant resided when the offense was committed, and by him accounted for the same as money raised for school purposes.

Sec. 4. It shall be the duty of the director or president to prosecute any offence occurring under this act, and any director or president neglecting to prosecute for such fine within ten days after a written notice has been served on him by any taxpayer in said district, unless the person so complained of shall be excused by the district board, shall be liable to a fine of not less than twenty or more than fifty dollars, which fine shall be prosecuted for and in the name of the assessor of said district, and the fine when collected shall be paid to the assessor, to be accounted for as in section three of this act.

Approved April 15, 1871.

*Oregon's law of 1889*⁴⁷

Section 1. Every parent, guardian, or other person in this State having control or charge of a child or children between the ages of eight and fourteen years shall be required to send such child or children to a public school for a period of at least twelve weeks in each school year, of which at least eight weeks' school be consecutive, unless the bodily or mental condition of such child or children has been such as to prevent his or her or their attendance at school or application to study for the period required, or unless such child or children are taught in a private school or at home in such branches as are usually taught in primary schools, or have already acquired the ordinary branches of learning taught in the public schools; *provided*, in case a public school shall not be taught for the period of twelve weeks, or any part thereof during the year, within two

⁴⁷ 1889 Ore. Acts 111.

miles by the nearest traveled road of the residence of any person within the school district, he or she shall not be liable to the provisions of this Act.

Section 2. Any parent, guardian or other person having control or charge of any child or children failing to comply with the provisions of this Act shall be liable to a fine of not less than five dollars nor more than twenty-five dollars for the first offense, nor less than twenty-five dollars nor more than fifty dollars for the second and each subsequent offense, besides the cost of the prosecution.

Section 3. It shall be the duty of the directors and clerk of each school district to make diligent effort to see that this law is enforced in their respective districts.

Section 4. Justices of the peace shall have concurrent jurisdiction with the circuit court in all prosecutions under this Act.

Section 5. Inasmuch as many children are now permitted to remain away from school without cause and to their great detriment, this law shall take effect and be in force from and after its approval by the Governor.

Approved February 25, 1889.

Appendix B: Data Appendix

Sources for census and administrative data

Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]. Minneapolis: University of Minnesota, 2010.

Report of the Commissioner of Education for the Year [various years], United States Bureau of Education.⁴⁸

Biennial Survey of Education [various years], United States Bureau of Education

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Eisenberg, M. J. (1988). *Compulsory attendance legislation in America, 1870-1915*. PhD Dissertation. University of Pennsylvania

Goldin, Claudia and Katz, Lawrence (2002). Data Appendix to *Mass Secondary Schooling and the State: The Role of State Compulsion in the High School Movement*, 2002. Revised 2007.

Report of the Commissioner of Education for the Year 1882-1883, page xxx-xxxvi

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Report of the Commissioner of Education for the Year 1899-1900, page 2596-2602

Report of the Commissioner of Education for the Year 1910-1911, page 148-153

State session laws for the year of passage in each state

U.S. Department of Education, Department of the Interior, Bulletin, 1917, No. 44, Educational Conditions in Arizona

U.S. Department of Labor, Children's Bureau, Chart Series No. 2, State Compulsory School Attendance Standards Affecting the Employment of Minors, January 1, 1921

Notes on coding of laws

As noted in the text, for states that passed a law that became effective in a later year, the year the law took effect is used rather than the year of passage. Some states also passed, repealed, and

⁴⁸ In some cases, when data in later years of the Commissioner's Report varied from the data in the original report, the later data were assumed to be more accurate.

then re-passed compulsory attendance laws. These states were: Arizona, which repealed in 1883 and passed a new law in 1898; Michigan, which repealed in 1881 and re-passed in 1882; Texas, which repealed in 1876 and re-passed 1914; and Washington, which repealed in 1873 and re-passed in 1876. For Arizona and Texas, where the initial law was in place for a relatively short time and not re-passed for decades, the later re-passage is treated as the first year. For the other states, the short periods of repeal are ignored.

Finally, some states passed laws that made counties responsible for passing compulsory attendance or compelled attendance only in certain areas. These states are counted as having a law when a statewide law was passed. See the table below for details on specific states.

Notes on Post-1880 Laws

State	Traditional Date of First Law*	Date Used in Paper	Notes	References
Alabama	1915	1917	Went into force October 1917	1915 Ala. Acts 534
Arizona	1899	1899	Arizona briefly had a law passed in 1875 and repealed in 1883	1875 Ariz. Sess. Laws 40; 1883 Ariz. Sess. Laws 46; 1899 Ariz. Sess. Laws 14
Arkansas	1909	1917	The 1909 law exempted 44 counties, the 1911 law exempted 40 counties, and the 1917 law was statewide	1909 Ark. Acts 701; 1911 Ark. Acts 203; 1917 Ark. Acts 59
Colorado	1889	1889		1889 Colo. Sess. Laws 59
Delaware	1907	1907		1907 Del. Laws 213
Florida	1915	1919	The 1915 law was optional at the county level, the 1919 law was statewide	1915 Fla. Laws 51; 1919 Fl. Laws 59
Georgia	1916	1917	Went into effect in 1917	1916 Ga. Laws 101
Idaho	1887	1887		1887 Idaho Sess. Laws 131
Illinois	1883	1883		1883 Ill. Laws 167
Indiana	1897	1897		1897 Ind. Acts 248
Iowa	1902	1902		1902 Iowa Acts 78
Kentucky	1896	1896		1896 Ky. Acts 67
Louisiana	1910	1916	1910 law applied to the parish of Orleans. 1916 law was statewide	1910 La. Acts 366; 1916 La. Acts 59
Maryland	1902	1902		1902 Md. Laws 377
Minnesota	1885	1885		1885 Minn. Laws 261
Mississippi	1918	1920	1918 law was locally optional. Counties could still opt-out in 1920	1918 Miss. Laws 312; 1920 Miss. Laws 216
Missouri	1905	1905		1905 Mo. Laws 146
Montana	1883	1883		1883 Mont. Laws 53

Nebraska	1887	1887		1887 Neb. Laws 613
New Mexico	1891	1891		1891 N.M. Laws 59
North Carolina	1907	1913	Laws for specific counties were passed as early as 1904, the 1907 law was local option, and in 1913 a statewide law was passed	1913 N.C. Sess. Laws 267
Oklahoma	1907	1908	Passed in 1908 during the 1907-1908 legislature	1908 Okla Sess. Laws 393
Oregon	1889	1889		1889 Ore. Acts 111
Pennsylvania	1895	1895		1895 Pa. Laws 72
Rhode Island	1883	1883		1883 R.I. Acts & Resolves 146
South Carolina	1915	1919	1915 law was local option, 1919 law was statewide	1915 S.C. Acts 118; 1919 S.C. Acts 205
Tennessee	1905	1913	1905 law applied to specific counties 1913 law was statewide	1905 Tenn. Pub. Acts 1040; 1913 Tenn. Pub. Acts 19
Texas	1915	1916	Texas briefly had a law in the 1870s. The 1915 law went into force in 1916	1870 Tex. Gen. Laws 113; 1915 Tex. Gen. Laws 92
Utah	1890	1890		1890 Utah Laws 135
Virginia	1908	1918	1908 law was local option, 1918 law was statewide	1908 Va. Acts 640; 1918 Va. Acts 752
West Virginia	1897	1897	Counties could opt-out	1897 W. Va. Acts 205

* According to Department of Education, National Center for Educational Statistics, Digest of Education Statistics, 2004, available at <http://www.infoplease.com/ipa/A0112617.html#ixzz1yM61Yb1P>.

Appendix C: Black-White Differences in Southern States

One question is whether whites or blacks benefitted more from the laws. Appendix Table 1 explores black-white differences in years of school and the completion of 6th grade in Southern states for 1890-1927. The top and bottom panels estimate the specifications separately for whites only and blacks only. The effects of a law on whites are generally positive and significant for both years of school and sixth grade. The effects of a law for blacks are positive but are not statistically significant.

Appendix Figure 1 plots the effect of the law on the highest grade completed for whites and blacks using the linear and quadratic specifications. The quadratic specification suggests the effect of the law was to increase completion of 5th, 6th, and 7th grades for whites.

Appendix Table 2 examines the effects of compulsory attendance laws on school outcomes for all individuals and for men with wage income in 1898-1927. For men with wage income, the effect of the law on years of schooling is positive and statistically significant. The effect on completion of 6th grade is positive, but not significant. For blacks, the coefficients are again positive but insignificant.

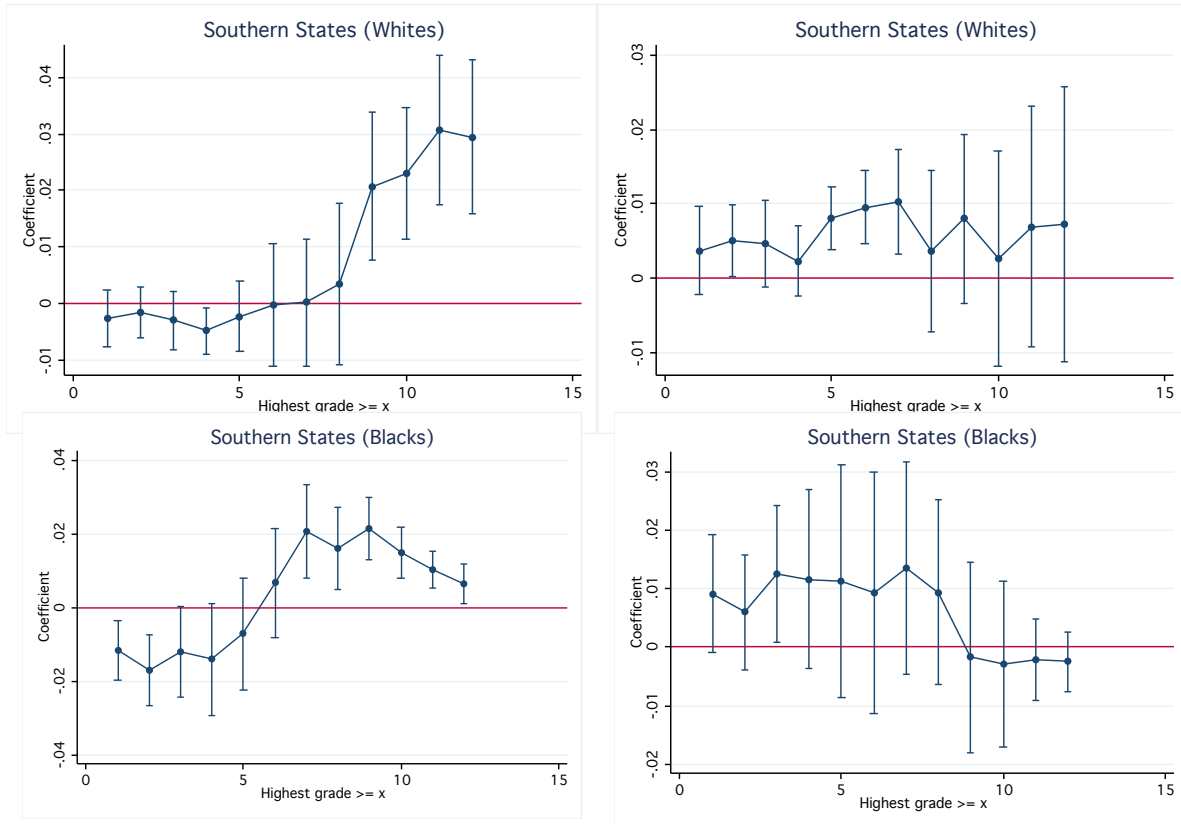
Appendix Table 3 presents the returns to schooling by race. Although both groups have positive and statistically significant returns to schooling, the gains are higher for whites than for blacks. The returns to an additional unrestricted year of schooling are 6.7 log points for blacks and 9.9 log points for whites.

Appendix Table 4 shows results from instrumenting wages with years of schooling in the South, by race. The F-stats are low, especially for blacks where the presence of a law has little effect on school attendance. Although the coefficient is insignificant for whites, the magnitude of the coefficient for whites is consistent with the results in Table 10.

Appendix Figure 1: Black-White Differences in the Southern States in the Effect of Laws on Highest Grade Achieved, 1890-1927

State Linear Time Trends

State Quadratic Time Trends



Notes: For men and women ages 25 to 62 (age 13 in 1890 to 1927, assuming most birthdays fell after the April enumeration date). This matches the years observed in the administrative data for 13 year olds (the modal highest age affected by a law). Each point shows the regression coefficient and 95 percent confidence interval of the effect of the laws on the given grade. Standard errors are clustered by state of birth.

Appendix Table 1: Black-White Differences in the Southern States of the Effect of Compulsory Attendance on Grade Completion, 1890-1927

	(1)	(2)	(3)	(4)
	Years of School	Years of School	6th Grade	6th Grade
Law	<i>Whites only</i> 0.120** (0.050)	<i>Whites only</i> 0.132** (0.052)	<i>Whites only</i> -0.000 (0.005)	<i>Whites only</i> 0.010*** (0.002)
State TT	Y	Y	Y	Y
State TT Sqrd		Y		Y
Observations	107116	107116	107116	107116
R-squared	0.041	0.042	0.032	0.032
Law	<i>Blacks only</i> 0.032 (0.049)	<i>Blacks only</i> 0.078 (0.072)	<i>Blacks only</i> 0.007 (0.007)	<i>Blacks only</i> 0.009 (0.010)
State TT	Y	Y	Y	Y
State TT Sqrd		Y		Y
Observations	49219	49219	49219	49219
R-squared	0.069	0.069	0.054	0.054

Notes: All specifications include state fixed effects. "6th Grade" indicates completion of at least sixth grade. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels

Appendix Table 2: Effect of Compulsory Attendance on Grade Completion in the South, 1898-1927

<i>Full Sample</i>				
	(1)	(2)	(3)	(4)
Outcome	Years of School	6th Grade	Years of School	6th Grade
	<i>Whites only</i>	<i>Whites only</i>	<i>Blacks only</i>	<i>Blacks only</i>
Law	0.131** (0.051)	0.009*** (0.003)	0.074 (0.069)	0.011 (0.011)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
Observations	94,385	94,385	44,242	44,242
R-squared	0.033	0.025	0.055	0.044
<i>Men with Wage Income</i>				
	(5)	(6)	(7)	(8)
	<i>Whites only</i>	<i>Whites only</i>	<i>Blacks only</i>	<i>Blacks only</i>
Law	0.197* (0.102)	0.009 (0.009)	0.058 (0.113)	0.006 (0.023)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
Observations	31,239	31,239	14,599	14,599
R-squared	0.030	0.020	0.042	0.034

Notes: The sample includes men and women ages 25 to 54 (age 13 in 1898 to 1927, assuming most birthdays fell after the April enumeration date). All specifications include state fixed effects. Standard errors are clustered by state. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Appendix Table 3: Black-White Differences in the Southern States in OLS Estimates of Returns to Schooling, Men with Wage Income Ages 25-54

	(1)	(2)	(3)	(4)
	Ln(Wage)	Ln(Wage)	Ln(Wage)	Ln(Wage)
	<i>Blacks only</i>	<i>Whites only</i>	<i>Blacks only</i>	<i>Whites only</i>
Four years of school	0.134*** (0.031)	0.078* (0.035)		
Five years	0.104*** (0.032)	0.167*** (0.025)		
Six years	0.066* (0.037)	0.104*** (0.026)		
Seven years	0.064** (0.022)	0.077** (0.028)		
Eight years	0.194*** (0.024)	0.196*** (0.025)		
Nine years +	0.052** (0.018)	0.331*** (0.033)		
Years of School			0.067*** (0.003)	0.099*** (0.004)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
Observations	14,599	31,239	14,599	31,239
R-squared	0.114	0.178	0.114	0.207

Notes: All specifications include state fixed effects. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.

Appendix Table 4: IV Estimates of Returns to Schooling in the South, Men Ages 25-54

	(1) Years of School	(2) Years of School	(3) Ln(Wage)	(4) Ln(Wage)
	<i>Blacks Only</i>	<i>Whites Only</i>	<i>Blacks Only</i>	<i>Whites Only</i>
	<i>First Stage</i>		<i>2SLS</i>	
Law	0.058 (0.113)	0.197** (0.102)	0.073 (0.414)	0.120 (0.110)
State TT	Y	Y	Y	Y
State TT Sqrd	Y	Y	Y	Y
R-Squared	0.042	0.030		
F Stat	0.26	3.70		
Observations	14,599	31,239	14,599	31,239

Notes: All specifications include state fixed effects. All specifications include state fixed effects. Standard errors are clustered by state of birth. *, **, and *** denote significance at the 10 percent, 5 percent, and 1 percent levels.