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Mass Secondary Schooling and the State:
The Role of State Compulsion in the High School Movement *

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ABSTRACT

In the three decades after 1910 the fraction of U.S. youths enrolled in public and private secondary schools soared from 18 to 71 percent and the fraction graduating increased from 9 to 51 percent. At the same time, state compulsory education and child labor legislation became more stringent. It might appear from the timing that the laws caused the increase in education rates. We evaluate that possibility using contemporaneous evidence on enrollments and also the micro-data from the 1960 census to examine the effect of the laws on overall educational attainment. Our estimation approach exploits cross-state differences in the timing of changes in state laws. The expansion of state compulsory schooling and child labor laws from 1910 to 1939 can, at best, account for 6 to 7 percent of the increase in high school enrollments and can account for about the same portion of the increase in the eventual educational attainment for the affected cohorts over the period. The “state,” in the form of localities, was already providing educational resources in the United States. Compulsory education laws had larger impacts in other nations where the laws compelled the state to expand educational resources.

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From 1910 to 1940, a period known in U.S. educational history as the high school movement, the fraction of youths enrolled in public and private U.S. secondary schools increased from 18 to 71 percent. The fraction graduating nationwide soared from 9 to 51 percent (see Figure 1) and the increase was even greater in most northern and western states (see Figure 2 for U.S. regional data). Such increases are as large as those achieved in the recent histories of nations undergoing the most rapid of transitions to mass secondary schooling. In South Korea, for example, the fraction graduating from upper secondary school increased from 25 percent to 88 percent in the three decades from 1954 to 1984.¹

An important difference between the experience of the United States in mass secondary schooling from 1910 to 1940 and that of other countries in the post-World War II era is the role played by government, especially the central government. In most nations the central or federal government largely coordinated the transformation. In the United States, it did not.

The U.S. educational bureaucracy was, and largely is, decentralized, diffuse, and diverse. The federal government is a relatively minor player in K-12 education, and within each of the states the various school districts have had considerable freedom regarding regulations, taxes, and expenditures.² School districts, moreover, are exceptionally numerous. Today there are about 15,000 school districts. But in 1932, when the federal government first made a count of the nation's school districts, they numbered almost 130,000. Although the great majority of them were tiny common school districts of the "open country," about 20 percent contained a high school.³ Despite the large number of school districts in the United States and the absence of strong federal control, the "state" (and here we mean the various states) did mandate and coordinate various details concerning secondary school education.

Early in the period of the high school movement various states required that every district provide for the public high school education of its citizens (through the establishment of "free

tuition” laws), just as states in the nineteenth century had required that all districts provide a common school education. States coordinated secondary education across the various districts by setting standards for what constituted a high school, which credentials were required of high school teachers, and what performance was demanded for grade advancement and high school graduation. Each of these laws and regulations compelled districts to take a particular action. Some states even passed legislation compelling the state university to accept the state’s high school graduates without further preparation.

State governments were also involved in a host of ways that effectively decreased the supply price of secondary schooling to certain individuals and districts. Some states gave grants to poorer districts for teacher salaries, high school buildings, textbooks, and transportation. States often offered financial incentives for the consolidation of districts to increase the scale of secondary schools and for high school buildings. But of all the ways in which state legislation might have advanced secondary schooling, compulsory education and child labor laws have received the most attention.

Compulsory education and child labor laws were first passed in the United States in the mid-nineteenth century. Massachusetts, in 1852, was the earliest state to have a compulsory schooling law. By 1890 27 states (out of the 48 that would eventually exist by 1912) had already passed a compulsory schooling law and in 1918, with the passage of a law by Mississippi, all 48 states (plus the territories of Hawaii and Puerto Rico, and the District of Columbia) had a law.⁴

But it was not until the early twentieth century that compulsory education and child labor laws could have had a direct impact on secondary schooling. The ages that the laws were intended to constrain, the bureaucracy allotted to enforce them, and the coordination of the education and labor portions of the laws changed in the early twentieth century and gave the laws new bite to constrain the behavior of youth of secondary school age.

The federal government was removed from legislating against child labor until 1938. The U.S. Supreme Court ruled unfavorably on two federal child labor acts—the Keating-Owen Child Labor Bill of 1916, which it struck down in 1918, and the Child Labor Tax Law of 1918, which was to replace Keating-Owen but which was similarly overturned in 1922.⁵ A child labor constitutional amendment failed to be ratified by the states in 1925. Not until the National Industrial Recovery Act (passed in 1933 but declared unconstitutional in 1935) and later the Fair Labor Standards Act (1938), upheld by the Supreme Court in 1941, did the federal government have a role in legislating against child labor. The states, in the meantime, were quite active.

What was the role of state compulsion in the expansion of secondary schooling from 1910 to 1940? It would appear from the timing of the laws and the high school movement that compulsion mattered a great deal. The laws became more effective and constrained youths in the secondary school ages just as youths were entering and graduating from high schools in considerably greater numbers. This coincidence has led many fine historians to accord compulsory schooling and child labor laws an enormous role in the large increase of school enrollment and attendance during the Progressive Era. For example, in his widely cited volume *The One Best System* David Tyack states: “Attendance in high schools increased [from 1890 to 1918] ... The curve of secondary school enrollment and graduation continued to soar: in 1920, 61.6 percent of those 14 to 17 were enrolled ... in 1930, the [figure was] 73.1 percent ... As these statistics suggest, during the first two decades of the twentieth century compulsory schooling laws were increasingly effective” (Tyack 1974, p. 183).⁶

In previous work we explored the reasons for the expansion of secondary school enrollment and graduation using a simple supply-demand framework for a quasi-public good.⁷ We found, using repeated cross-sections and panel data on states in reduced-form models, that high school graduation and enrollment rates increased with income and wealth per capita,

decreased with greater youth employment opportunities, and increased with greater homogeneity of community. We had relied on the findings of several other researchers to support our sense that changes in compulsory schooling and child labor laws could account for only a small fraction of the increase in high school enrollments and graduation rates. The studies on which we depended (including Acemoglu and Angrist 2000; Lleras-Muney 2002; and Schmidt 1996) used micro-data on educational attainment from the U.S. censuses to explore the impact of compulsory schooling and child labor laws that were in effect in the state of birth of native-born adults when they would have been constrained by the laws (at age 14).⁸

Our primary objective in this paper is to uncover the effects of state compulsory schooling and child labor laws from 1910 to 1939 on secondary schooling rates. In contrast to prior work, we relate the laws to contemporaneous administrative data on secondary school enrollments, which we compiled for our work on the high school movement. In addition, and in a manner similar to others who have addressed these issues, we estimate the impact of the laws on the overall educational attainment of birth cohorts reaching high school age from around 1910 to 1939 (those born from 1896 to 1925) using micro-data from the 1960 Census of Population. We have corrected the coding of the laws and use a somewhat different (and we believe more accurate) set of summary measures of the legal variables to highlight the aspects of the laws most likely to have constrained school attendance choices. Our estimation approach exploits cross-state differences in the timing of changes in state laws and controls for state fixed effects, birth cohort (or year) fixed effects, and other time-varying state level covariates.

We find that changes in state compulsory schooling and child labor laws from 1910 to 1939 had a positive impact on schooling but that the effect was modest, especially in comparison with the increase in high school enrollments and overall educational attainment. The potential endogeneity of law changes to other (unmeasured) determinants of increased schooling suggests

our approach overestimates the “causal” impact of law changes. We also explore the role of enforcement. By 1928 all states had some form of state school census, but it is always possible that enforcement increased in ways that elude measurement.

<A>Compulsory Schooling and Child Labor Laws

What were the laws?

The typical compulsory schooling law set down the ages during which youths had to be in school. That is, the typical law included a minimum age (the required school entry age) and a maximum age (the school leaving age). But the laws began to be more complicated in the early twentieth century when the maximum age of compulsory schooling (the earliest age for school leaving) increased in many states. The typical law was then altered to include a level of education that would exempt a youth from the maximum age of compulsory schooling. The grade needed for exemption, not the maximum age, became the binding constraint in many states. But that was not always the case, particularly for some foreign-born children who did not meet the grade standard before reaching the maximum age. Almost all laws also included exemptions for those with mental or physical impairments and some exempted youths with impoverished parents or who lived far from the closest school.

Child labor laws modified the compulsory schooling laws in various ways. They generally exempted older youths, who were constrained by the compulsory schooling law, so they could work. They set down the method by which youths could obtain a work permit and they often contained a minimum level of schooling required to do so. (The minimum amount of school required to leave school for work was almost always *lower* than the level of schooling that otherwise exempted a child from attending school.) Youths who worked at home and in agriculture were freed from many of the usual constraints concerning work permits.

When the two types of laws are viewed together, as they generally were by the authorities, the child labor laws are almost always the binding constraint, not the maximum age of compulsory schooling or the educational requirement for school exemption. Another important change in the early twentieth century was the better articulation of the two laws and of the inclusion of the child labor laws in the compulsory schooling legislation in some states.

Another important change during the Progressive Era was the addition of statutes mandating or enabling continuation (or part-time) schools. Continuation schools were established to educate the youth who had left school to work but who was still below the maximum age of compulsory schooling.⁹ The legislation typically required that youths attend the continuation school from four to eight hours per week and that these hours occur during the usual workday, not at night or on Sundays. The schools were to be established in municipalities having a sufficient number of school-aged youths (often more than 20) who had work permits. These laws increased the cost to employers of hiring such youths since they would have to be excused from work during part of an afternoon each week or up to an entire day each week.¹⁰

The child labor laws typically were more complex than the compulsory schooling laws. They often listed occupations from which youths were barred and the times of the day they could not be employed. Child labor laws often had complicated procedures to ensure compliance. For example, children who wanted to obtain a work permit had to find employment, have their prospective employer fill out a form, prove that they were above some required age, and be certified by a physician to be healthy. Their work permit remained with their employer who was to surrender it when the youth left voluntarily or was fired.¹¹

Some writers have interpreted the compulsory education and child labor laws as being inconsistent because the binding constraint was often the child labor law rather than the maximum age of compulsory education or the education required for exemption. But the laws

were not in conflict. In fact, the laws were often sections of identical legislation.¹² The so-called inconsistencies were deliberate ways of compelling youths to be either at school or at work. Child labor and compulsory education laws were, in large measure, consistently written and were designed to ensure that youths were not idle.

Consider the modal state law in the 1920s. It had a minimum age of 7 years, a maximum age of 16 years, an educational standard for exemption of 8 years of school, and a work permit age of 14 years, as long as the youth had completed 6 years of school. A youth could drop out of school at 14 years old if he had finished 6 years of school and was legally employed. But an out-of-school 14 year old would be deemed a truant unless he had a job (and a work permit). In order to avoid both school and work, a youth would have to complete 8 years of school, making him 15 years old at the time of school leaving (assuming that such a youth had advanced a grade during each year of school).

Compulsory schooling and child labor acts in most states were anti-truancy and anti-vagrancy laws rather than strongly pro-active education laws. The laws were, nevertheless, “pro-child” and made youth employment more costly through limitations on their hours, industries, and occupations. The political opposition to state compulsory schooling laws tended to emphasize that such laws interfered with the personal liberty and rights of parents, although some anti-compulsion advocates argued that education was not valuable and was irrelevant to many youths (Deffenbaugh and Keesecker 1935; Reed 1927).

Specific aspects of the laws from 1910 to 1939

We have compiled information on seven aspects of these laws for all states for each year between 1910 and 1939 (see Data Appendix) and have extended some variables back to 1900 to compute the analysis data. The variables are:

1. Minimum age of compulsory schooling, known as the school entrance age (also compiled for 1900 to 1909);
2. Maximum age of compulsory schooling, known as the school leaving age (also compiled for 1900 to 1909);
3. Education for exemption from maximum age rule;
4. Age at which youth can obtain a work permit (for work during normal school hours);
5. Education required to receive a work permit (for work during normal school hours);
6. Whether state has mandatory continuation schools; and
7. Maximum age of continuation school attendance (and whether the state permitted municipalities to mandate continuation schools).

These details of the laws do not exhaust all possible variables pertaining to child labor and compulsory schooling laws. They are, however, the most important and are among those that can be obtained for most of the years under consideration.¹³

Figure 3 contains graphical depictions of the seven legal variables. The maximum age (2) continued to increase to around 1930 when 42 states set their maximum age at 14 years or higher. The minimum age (1), on the other hand, decreased throughout the period.¹⁴ At the start of the period shown, 60 percent of the states with compulsory schooling laws had a minimum age of entry set at 8 or more years. At the end, however, almost 75 percent had a minimum age of 7 or fewer years. The minimum age of entry served to constrain school districts to provide classrooms and teachers for youngsters and may have enabled teenagers to accumulate an additional year or two of schooling before they exited from the system, often around puberty.

The level of completed schooling required to be exempt from the maximum age of compulsory education (3) is somewhat complicated because it had to be consistent with the maximum age. At the start of the period, 31 or almost two-thirds of the states did not have such a provision in their laws and only 13 states required 8 years or more for the exemption. By 1925 only six states did not have such a provision and 35 states required 8 years or more. As states

increased the education required for exemption, they generally increased the school leaving age. Because the maximum age of compulsory education in most the states with an 8-year exemption had increased to 16 years, the requirement that youths remain in school for 8 years meant that most would have been 15 or 16 years old at the time of school leaving anyhow.

The age at which youths could get a work permit (4) contains two periods of change: around World War I and after 1935. The eight states that did not have work permit regulations in 1910 adopted them from 1915 to early 1920s, and by 1925 all states had at least a 14-year old rule for work permits. The slow early movement to later ages for work permits rapidly changed around 1935 with 11 states increasing the age to at least 16 years. Complementing the work permit age is the education required to obtain the permit (5). Sometimes expressed in years of schooling and other times as a grade, it increased primarily in the 1920s. By 1930 18 states had a requirement of eighth grade (or 8 years of school) and 31 had at least a sixth grade (or a 6 year) requirement. But seven states still had no requirement in 1930 and seven others had only a basic literacy requirement. In 1939 ten states still had no requirement or simple literacy.

The final two variables (6 & 7) depicted concern continuation or part-time school. Continuation schools—generally housed within the community's public high school—were intended to educate the youth who had exited the system to work before the maximum age of compulsory schooling or in some cases the legal age of majority. These schools were similar to other types of continuing education schools, such as night, adult, and vocational schools, but they differed in requiring the youth to attend school during the usual workday. In this respect, mandating attendance at these schools increased the cost to an employer of hiring a youth below the maximum age of compulsory schooling. Wisconsin, the home of the Progressive Party's Robert LaFollette, was the first state to approve mandatory continuation schools in 1911. As is obvious in Figure 3 (6 & 7), the vast majority of states joined the continuation school bandwagon

during or directly following World War I.¹⁵ By 1921 21 states had mandatory continuation school attendance and an additional four states allowed municipalities to establish compulsory attendance at continuation schools.

How could compulsory education and child labor laws have impacted secondary school enrollments? The most obvious way is by increasing the school leaving age to at least 15 or requiring 9 years of school. In 1920 31 states had a school leaving age of 16, but only one paired that law with 9 years of required school; all others were less. By 1925 six states had the 9 year or more exemption and by 1935 eight did. Given the additional exemptions from the child labor law, only two states had legislation from 1925 to 1934 that would have compelled youths to attend a secondary school. But there are other ways that the legislation could have had an effect. We have already mentioned the potential effects of a mandatory continuation school law. In addition, junior high schools were established in most large cities by the 1920s and gave youths a compelling reason to remain in school to age 15 to obtain a diploma. Laws that compelled youths to attend school to age 14, therefore, could have had further impacts to age 15 for this reason and because of indirect effects that showed youths the gains from further education.

<A>Impact of Compulsory Schooling and Child Labor Laws on Schooling and Educational Attainment

Previous findings and empirical strategies

Our work is most closely related to that of Lleras-Muney (2002) and Schmidt (1996), both of whom link the eventual schooling of individuals to the laws that existed in their state of birth when they were 14 years old. Both authors exploit the complexity of the laws and focus on the 1915 to 1939 period.¹⁶ Lleras-Muney uses the 1960 U.S. census micro-data files to estimate the impact of the laws on educational attainment, whereas Schmidt uses the 1940 census.

Acemoglu and Angrist (2000) also estimate the impact of the laws using fewer features of the laws, but expanding the time period to cover youth cohorts educated through the 1960s. These and other studies of compulsory schooling laws in the United States find impacts on educational attainment that are positive but modest at best and small in comparison with the enormous increases in educational attainment during the period studied.

All three studies, as well as ours, use an empirical strategy that includes state and cohort (year of birth) fixed effects, thereby taking out main levels and trends and thus identifying the effect of the laws off law changes within states.¹⁷ The identification strategy has virtues, but it also has some drawbacks. The cohort effects, for example, will absorb factors that are common shocks to all states. For example, the reduction in the labor force in agriculture and domestic service and the decrease in industrial homework should have strengthened the impact of compulsory schooling laws by reducing employment in uncovered sectors and in workplaces that had costly surveillance. Furthermore, changes in enforcement, not changes in the laws, may have mattered, and we (as well as the others mentioned) have not yet secured a variable that captures enforcement expenditures and efforts for all states during the period of interest.¹⁸ We have compiled some relevant information on enforcement that we report at the end of this paper.

Although we have not yet circumvented the problems just mentioned, we can sidestep several others in the literature. In previous studies, the linkage of individuals to their state of birth probably caused attenuation bias because of geographic mobility. Similarly, linkage to state of birth has meant that the foreign born had to be excluded, although their children should not have been if they attended U.S. schools.

Our contribution to this literature is to analyze the effects of the state laws using contemporaneous data on secondary school enrollments that we have collected for our study of the high school movement.¹⁹ By doing so, we do not have to restrict the analysis to the native

born and we do not have to rely on matching individuals to their state of birth.²⁰ The contemporaneous data we use include enrollments in grades 9 to 12 in both public and private schools, including the preparatory divisions of colleges and universities, and grade 9 when a public junior high school was in existence.

Another contribution of ours concerns the coding of the laws. We have compared several independent compilations of the laws (including our own), reconciled differences among them, and corrected various coding errors.²¹ We have, in addition, extended all aspects of the laws back to 1910 and the minimum age back to 1900. We did the latter to correct the definition of two key variables in most of the studies—the difference between the age at which a youth could obtain a work permit and the minimum age of compulsory school attendance and the analogous difference between the maximum and minimum ages of compulsory school attendance. The minimum age (that is the relevant required school entry age) should reflect the laws in existence about 8 years prior to when the youth could drop out of school to work, although previous studies mistakenly used the same year for both laws. Because of our changes to the laws and the definitions of some variables, we have also re-estimated the effects of the laws on educational attainment using 1960 micro-level census data.

Compliance and constraints, 1910 and 1920

Before we examine the effects of compulsory schooling and child labor laws, it is useful to ask what fraction of youths would have been constrained by the laws and what fraction were in compliance with existing laws. We can address these questions for 1910 and 1920 using the micro-level data of the U.S. population censuses.

Both the 1910 and 1920 censuses requested information on the school attendance (for any length of time) of children and youths during the preceding academic year.²² The included group could, in addition, have listed an occupation. We define “full-time” school attendance as

attending school but not listing an occupation and “part-time” attendance as attending school and listing an occupation. The information in the census does not reveal when the youth worked during the year. Therefore, it is impossible to determine whether the work was done in the summer, after school hours, or during vacation, all of which were legal work periods even within the constrained ages (often requiring a work permit, however). It is also impossible to know whether the youth attended school at the start of the school year and then dropped out to take a job. For youths older than ten years we give the results both for any school attendance and for full-time attendance.

Table 1 contains the fractions of youth attending school at various ages arrayed by the ages given by the laws existing in their current state of residence. We examine two laws: the minimum compulsory schooling age (Part A) and the age at which a youth could obtain a work permit (Part B). We also give the number of states in each category.

About 85 percent of children aged 7, in states having a minimum age of 7 years, attended some school, and between 85 and 90 percent did at age 8, in states having a minimum age of 8. Although the fraction of children attending school in 1910 and 1920 by state was rarely above 95 percent, the shortfall was likely due to small rates of misreporting and exemptions for children due to distance to the closest school and disabilities. Compliance, by and large, appears to have been the norm. Moreover, the fraction who would have been constrained had the law been more stringent is relatively low for states with a minimum age of 8. In 1910 the fraction attending school at age 7 in states with a minimum age of 8 was just 9 percentage points lower than it was at age 8 (0.775 vs. 0.865). In 1920 it was just 6 percentage points lower (0.847 vs. 0.904).

In both 1910 and 1920 the vast majority of states granted work permits to 14 year olds. In both years the fraction of youth who attended school at all (“full-time” plus “part-time” attendance) was extremely high. Decreased attendance between ages 13 and 14 was about 7

percentage points. Put differently, only about 7 percent of all youths who attended school at age 13 dropped out by age 14. The effect is somewhat greater using the “full-time” definition of school attendance, for which about 10 to 12 percent of 13 year olds dropped out between ages 13 and 14 in states that granted work permits to 14 year olds.

Although these data afford only a rough sense of compliance, they appear to indicate that the vast majority of youth were in compliance. Furthermore, a large fraction of youths in the unconstrained ages were already attending school. Changes in the laws could have made a difference, but the effects could not have been as large as they were in countries, like Great Britain, where youths in the unconstrained ages were largely not attending school at all.²³

Effects of law changes using contemporaneous evidence on enrollment

We examine the effects of state child labor and compulsory schooling laws on contemporaneous high school enrollment during the period of the high school movement using data on public and private enrollments in grades 9 to 12 (divided by the number of 14 to 17 year olds in the state) for even numbered years from 1910 to 1938.²⁴ A standard panel data model is estimated including state and year fixed effects, state law variables, and other state time-varying economic and demographic control variables. The state fixed effects capture unmeasured time-invariant state characteristics that could have affected the adoption of schooling laws and enrollment rates. The year effects capture aggregate trends (and birth cohort effects) driving high school enrollment rates. Thus, our identification of the effects of state child labor and compulsory schooling laws is driven by differential law changes across states conditional on a range of time varying state controls.

Our regression specifications are of the form

$$ENR_{st} = L_{st}\delta + Z_{st}\beta + \alpha_s + \gamma_t + \varepsilon_{st},$$

where ENR_{st} is the high school enrollment rate for state s in year t , L_{st} is a vector state child

labor and compulsory schooling law variables, Z_{st} is a vector of state time-varying covariates, α_s are state fixed effects, and γ_t are year fixed effects. The state control variables include those found by Goldin and Katz (1999, 2009) to have substantial effects on high school enrollment and graduation rates during the time period considered here. We include basic demographic controls for age structure (fraction young, fraction old), nativity (fraction foreign born), and race (fraction black). We also include several time varying economic controls: automobile registrations per capita and manufacturing employment per capita. Automobile registrations per capita, in this early period in the history of the car, represent a crude proxy for state wealth (or income) and their distributions. The variable is a measure of the “middle class” share of the state population (the fraction able to afford a car) after conditioning on state demographics and urbanization. We include, as well, a full set of census division linear time trends in our basic specification, and we assess the sensitivity of our results to the inclusion of state-specific linear time trends. We report robust standard errors clustered by state to account for serial correlation in the residuals (as suggested by Bertrand, Duflo, and Mullainathan 2004, and Kézdi 2001). All regressions are weighted by the contemporaneous number of 14 year olds in the state.²⁵

Regression estimates for different specifications of the state child labor and compulsory schooling law variables affecting high school age youth are presented in Table 2. The national high school enrollment rate (for the 48 states in the sample) increased by more than 50 percentage points during the sample period, rising from 18.7 percent in 1910 to 69.1 percent in 1938. In all the specifications, we include a dummy variable for a “permissible” state continuation school law, meaning one that mandated municipalities establish continuation schools or permitted them to do so. Both types of continuation school laws set a maximum age below which working youths, who had not met the educational standard, could be required to attend. The number of states with “permissible” continuation school laws increased from 2 in

1910 to 28 in 1938. The share of the high school age population covered by continuation school laws increased from 9 percent to 69 percent from 1910 to 1938.

The first column of Table 2 follows Lleras-Muney (2002) who summarized the effects of the laws using a variable defined as the number of years a child would be compelled to attend school had he entered school at the compulsory entry age, given in year t , and had he left precisely when he could obtain a work permit, also given in year t . Since youths of secondary school age would have been affected by age of entry laws when they were about 7 or 8 years old, we construct our variable in a slightly different way. We use the difference in the work permit age at time t and the school entrance age prevailing in their state in year $t - 8$. The variable ranges from 0 to 10 years with a (population weighted) mean that increases from 4.0 years in 1910 to 7.5 years in 1938; the most stringent school attendance requirement in 1910 using this definition was 7 years and by 1938 14 states required 8 or more years.

The estimates in Table 2, col. (1) show noticeable and statistically significant positive effects of the continuation school law indicator. The adoption of a continuation school law is associated with a 2.4 percentage point increase in the high school enrollment rate. An increase of a year in our initial summary variable of child labor laws (i.e., work permit age – school entrance age) raises the high school enrollment rate by a modest (and not quite statistically significant) 0.3 percentage point.²⁶

The summary variable of the laws that we just defined, (work permit age – school entrance age), does not account for other potentially important constraints that were part of the state child labor and compulsory school laws. Many state laws mandated a minimum amount of schooling, in addition to the age requirement, to receive a work permit. In some cases the mandated number of years was greater than the difference between the work permit age and the age of school entry. Thus, following Acemoglu and Angrist (2000), we define a more accurate

measure of the mandated number of school years as follows:

$$\text{Child Labor School Years}_{st} = \max \{(\text{education required for work permit})_{st}, (\text{work permit age}_{st} - \text{school entrance age}_{s, t-8})\}$$

A read and write requirement for a work permit is coded as the equivalent of requiring 4 years of completed schooling.²⁷ The (14-year old weighted) mean of child labor school years increased from 4.5 years in 1910 to 7.8 years in 1938. Only one state (Washington) required 8 years of schooling for a work permit in 1910 and no state required more. By 1938, the majority of states required 8 to 10 years of schooling for a work permit.

The estimates in Table 2, col. (2) include this more accurate variable for measuring the constraints on schooling of child labor laws. The impact of our the modified child labor law measure is both positive and statistically significant with each a one-year increase in “child labor school years” associated with a 0.5 percentage point increase in the secondary school enrollment rate. The continuation law indicator remains significant and is associated with a 2.7 percentage point increase in the enrollment rate, similar to the col. (1) estimate.

We next examine the impacts of state compulsory schooling laws as well as child labor laws. The specification in col. (4) includes a summary measure of the minimum number of school years required by the state’s compulsory schooling laws:

$$\text{Compulsory School Years}_{st} = \min \{(\text{education for exemption})_{st}, (\text{maximum age of compulsory schooling}_{st} - \text{school entrance age}_{s, t-8})\}$$

In constructing this variable, we follow the procedure mentioned before and code an education exemption for read and write as 4 years of schooling. If state s at year t had no educational exemption, then Compulsory School Years_{st} is given by (maximum age of compulsory schooling_{st} – school entrance age_{s, t-8}).²⁸ The mean of “compulsory school years” is 6.9 over the sample and ranges from 0 to 12. The estimates in col. (4) show a small and statistically insignificant effect of “compulsory school years” on high school enrollments with the same child

labor and continuation school controls as in the core specification in col. (2). A one-year increase in “compulsory school years” is associated with only a 0.03 percentage point rise in the high school enrollment rate as compared with a 0.50 percentage point rise from a one-year increase in “child labor school years.”

The effects of “child labor school years” and continuation laws on secondary school enrollment rates are robust to controlling for state and census division (or region) trends and to a wide range of control variables. For example, in col. (5), we replace the census division trends with a full set of state-specific linear time trends. The impacts of the “child labor school years” and continuation law variables are only slightly reduced in magnitude and the effect of “compulsory school years” remains insignificant.

We have also examined the discrete effects of child labor and compulsory schooling law requirements that were sufficiently stringent to directly impact high school enrollment decisions. We focus on state child labor law requiring 8 or more years of schooling to get a work permit and compulsory schooling law provision requiring 8 or more years to leave school. In col. (3), we include dummy variables for 8 years and 9 or more years (fewer than 8 years is the omitted category) for both “child labor school years” and “compulsory school years.”

The estimates in col. (3) reveal a substantial positive effect of child labor laws that mandated 9 or more years of schooling. The high school enrollment rate increases by 5.3 percentage points when 9 or 10 years of school are required to leave school with a work permit. The coefficients on the “compulsory school years” indicators are small and insignificant.

In summary, changes in state child labor and compulsory schooling laws appear to have had some impact on high school enrollment rates from 1910 to 1938. But the impacts are modest relative to the rapid rise in secondary schooling rates during the era of the high school movement.²⁹ Continuation school laws, possibly because they imposed costs on the employers

of high school age youth, have the most consistently positive effects on enrollment rates. Other child labor law requirements had some impact, especially those that required 9 or more years of schooling for a work permit since permit rules typically undermined compulsory schooling laws.

How large was the contribution of child labor and compulsory schooling laws to the 50.4 percentage point increase in the high school enrollment rate from 1910 to 1938? We take the coefficients from the specification in col. (4) of Table 2, which includes controls for continuation laws, child labor laws, and compulsory schooling laws, to predict the effects of the laws on high school enrollment rates using the change in the mean of the law variables from 1910 to 1938.

The share of youth in states with continuation school laws increased by 60 percentage points from 1910 to 1938, and that increase that can explain a 1.6 percentage point increase in the high school enrollment rate. The combined effects of changes in child labor and compulsory schooling laws adds 1.8 percentage points driven almost entirely by the effects of the mean increase of 3.4 in “child labor school years.” About 3.4 percentage points or 6 to 7 percent of the overall increase in the high school enrollment rate from 1910 to 1938 can therefore be accounted for by changes in child labor and compulsory schooling laws. In contrast, the estimates in col. (4) imply that the crude proxy from improved economic status represented by the increase in automobiles per capita from under 0.01 in 1910 to 0.22 in 1938 can explain a 21 percentage point rise in the high school enrollment rate.

Effects of law changes using census data on educational attainment

We next examine the effects of state compulsory schooling and child labor laws on the eventual educational attainment of the birth cohorts who were of high school age during the high school movement era. We focus on the 1896 to 1925 birth cohorts since they reached high school entry age between 1910 and 1939. Overall educational attainment increased rapidly for the cohorts affected by the high school movement in the first half of the twentieth century.

Estimates from the 1960 federal population census for U.S.-born individuals indicate an increase of 2.45 in mean years of schooling, rising from 8.59 years for the birth cohort of 1896 to 11.04 years for the birth cohort of 1925. The increase in the high school grades (9 to 12) accounts for the majority (1.42 years or 58 percent) of the rise in schooling over this time period.

Our empirical approach is to link our data on state laws and other state-level covariates to individual level data on educational attainment, state of birth, and individual demographics (race, sex, and parent's nativity) for the U.S.-born in the birth cohorts of 1896 to 1925 from the 1960 Census of Population IPUMS. We match each individual to the state child labor and compulsory schooling requirement that prevailed in their state of birth at the relevant ages. Thus, we use the school entrance age law existing in their state of birth when they were 7 years old and the other components of the laws prevailing when they were 14 years old.

The census micro-data allow us to estimate the impact of the laws on the long-run educational attainment of the affected cohorts, although there are some disadvantages with this approach as previously mentioned. For example, we have information on each individual's state of birth and not on their state of residence when they were of school age. Interstate migration (about 14 percent of 14 year olds in 1920 were living in state different from their state of birth) can lead to modest attenuation bias from standard measurement error, but it could also generate more subtle biases from non-random migration from states with different patterns of law changes. In addition, we cannot measure the effects of the laws on foreign-born children, who were about 5 percent of high school age youth in 1920.³⁰ We focus our analysis on the 1960 census because it contains large samples for all the relevant cohorts with a consistent measure of years of schooling.³¹

Our basic regression specification for analyzing the effects of state laws on years of schooling is:

$$E_{ics} = X_{ics}\beta + L_{cs}\delta + Z_{cs}\pi + \alpha_s + \gamma_c + \mu_{ics},$$

where E_{ics} is the years of completed schooling of individual i from birth cohort c and state-of-birth s , X_{ics} are individual level demographic controls (race and sex dummies and an indicator variable for foreign born parents), L_{cs} is the vector of state child labor and compulsory schooling law variables affecting those born in state s from cohort c , Z_{cs} are time-varying state covariates, α_s are state fixed effects, and γ_c are birth cohort fixed effects. We also include census division linear time trends.³² The state law variables are the same as those from our core specification for high school enrollment rates from Table 2, col. (4). We report robust standard errors clustered by state of birth to account for any state-level serial correlation in the residuals.

The key results on educational attainment for the entire sample and for various subsamples (whites versus blacks, males versus females) are presented in Table 3. The core specification for the full sample is shown in col. (1). The introduction of a continuation school law is associated with a 0.15-year increase in schooling for the affected cohorts. Similar to our findings for contemporaneous high school enrollment rates, we estimate larger effects for child labor school years than for compulsory schooling law years, but the impacts of both variables are small and statistically insignificant. State manufacturing employment tends to have a depressing effect on educational attainment possibly reflecting higher opportunity costs of schooling due to youth employment in certain industries.³³

Our qualitative findings with respect to the effects of state laws on educational attainment are similar to Lleras-Muney (2002). But we estimate somewhat larger effects of continuation school laws and modestly smaller effects of child labor school years.³⁴ The estimates in col. (2) restrict the sample to the same birth cohorts in Lleras-Muney's sample (born from 1910 to 1925) but use our more accurate measure of child labor laws. The estimates on the restricted sample without the oldest cohorts in col. (2) imply that a one year increase in "child labor school years"

increases completed schooling by 0.04 years, similar to Lleras-Muney's baseline estimate of 0.05 years of completed schooling for each additional year required from child labor laws.

The estimates in col. (3) to (6) of Table 2 show statistically significant, substantial, and rather similar effects of continuation school laws on educational attainment of whites and blacks and males and females. The other aspects of child labor and compulsory schooling laws do not have individually significant effects on any of the groups. The negative effect of manufacturing employment on educational attainment is more substantial for blacks than whites and larger for males than females.

The central message from the estimates in Table 3 is that state compulsory schooling and child labor laws, despite their expansion, appear to have played only minor roles in the growth of educational attainment for youths from 1910 to 1939 (the birth cohorts of 1896 to 1925). For youths born in 1896, 9 percent lived in states with continuation school laws at age 14, 33 percent faced no compulsory schooling law at age 7, 14 percent faced no child labor law at age 14, and mean years of schooling required by child labor laws and compulsory schooling laws were 4.6 and 4.9 years respectively. In contrast, for youths born in 1925, 69 percent lived in states with continuation school laws, all states had child labor and compulsory schooling laws, and the mean years of binding schooling requirements from child labor and compulsory schooling laws had both risen to 8 years.

Our core estimates in Table 3, col. (1) imply that changes in state laws can explain an increase in educational attainment of 0.145 years with 0.088 years coming from the adoption of continuation laws and 0.057 years coming from the strengthening of other child labor and compulsory schooling law requirements. Thus, about 6 percent of the 2.45-year increase in schooling from the 1896 to 1925 birth cohorts can be attributed to changes in child labor and compulsory schooling laws. The estimated proportional contribution of these laws to the growth

of overall educational attainment is almost identical to our estimate of their contemporaneous effects on the high school enrollments for these same cohorts.

<A>Enforcement of Compulsory Schooling Laws

We have, thus far, used the details of compulsory schooling and child labor laws but not information on their enforcement. The extent of law enforcement, as we previously noted, is difficult to measure and scant information on enforcement procedures is available in the many volumes and documents we have used to compile the laws. One reason is that enforcement often resided in municipalities, whereas the laws were passed at the state level. Expenditures on enforcement, moreover, were not always part of one agency or governmental unit. Rather, the expenditures on enforcing compulsory schooling laws were occasionally at the school district level or in other entities such as the courts. The same was true of child labor laws.

Deffenbaugh and Keesecker, two noted contemporaries of the period who together and separately produced many government documents about compulsory schooling from 1914 to the mid-1930s, noted that school censuses are found in places where compulsory education laws are enforced (1935, pp. 23-24). Thus, to get a sense of the change in enforcement over the high school movement era we have gathered information on which states had laws requiring a school census be taken and with what frequency. The “school census” was a survey, generally taken by the attendance officer (also known as the “truant” officer) of the school district or in small districts by the teachers themselves, which was intended to include all children within the ages of compulsory education and often those younger and those older up to the age of majority.³⁵ By knowing which children should be in school within the district, the enforcement of compulsory education laws was made more likely.

We have found four fairly comprehensive lists of school censuses covering much of the period we explore: 1913, 1928, 1935, and 1945 (listed by the approximate last year of the laws reported). Because every state had a school census by 1928, we compare 1914 and 1928.³⁶ These years are interesting for our purposes because they cover much of the period of the high school movement prior to the Great Depression and they also cover the years of the greatest expansion of compulsory education laws (see the various parts of Figure 3).

The 1913 compilation (U.S. Office [Bureau] of Education 1914, table II, p. 39) of compulsory school laws reported that, among states with a compulsory education law, all but four required a school census. Some required the census only of the larger cities and some may have not required an annual census.³⁷ The four states that did not have a census (California, Illinois, Louisiana, and Michigan) are a mixed group and contain several that were leaders in education. Michigan may actually have required a census since the Office of Education report (1914) noted that teachers' reports of absence in Michigan required that "the last school census shall be compared with the enrollment."

The 1928 compilation (Keesecker 1929, part I, p. 20) reported that 39 states required an annual school census, five states required one biennially, one state required one every four years, three states required a census quinquennially, and one (Nevada) required a school census at the judgment of the State board.³⁸ By 1928 the vast majority of states had an annual school census and all had some type of census.

From 1913 to 1928 the largest change in states having a school census was for those that did not previously have a compulsory education law. Among the states with a law predating 1913, enforcement was potentially enhanced by having a state-wide mandate rather than one covering only the larger cities and a requirement to have an annual census. Increased enforcement through the provision of a school census does not appear to have been as great as

some have presumed. To the extent that the experts, Deffenbaugh and Keesecker, are correct, there was enforcement of compulsory education laws.

<A>Conclusions

The secondary school enrollment rate of U.S. youth expanded enormously (by over 50 percentage points) during the period of the high school movement, from 1910 to 1940. Changes in child labor laws and compulsory schooling laws motivated by Progressive Era campaigns to reduce child labor, eliminate youth idleness and delinquency, and expand schooling have been credited by many as playing a major role in the rapid rise of U.S. secondary schooling during the first half of the twentieth century. This paper finds that changes in child labor and compulsory schooling laws had statistically detectable but relatively modest effects on U.S. secondary schooling rates. Continuation school requirements, which were intended to increase the costs to employers of teen labor, had somewhat larger effects on schooling than did other components of child labor and compulsory schooling laws. Our estimates imply that increases in the restrictiveness of state continuation school, child labor, and compulsory schooling laws can account for only about 6 to 7 percent of the increase in secondary school enrollments and ultimate educational attainment of U.S. youth from 1910 to 1939.

If compulsory schooling and child labor legislation had small effects in the United States, why were they passed? The laws had some positive effect on schooling and may have been more effective for certain targeted groups, such as the children of the foreign born in large cities. But as we have noted, many of the laws were not pro-education. They were, instead, anti-truancy, anti-vagrancy laws designed to make certain that teens were either employed or at school and not loitering.

Why does the evidence for the United States differ from that for some other nations? Compulsory schooling laws were expanded and increasingly enforced in many countries in the mid-twentieth century and were apparently effective in increasing enrollment rates. Their effectiveness was greatest when they were accompanied by large increases in educational access and spending, often when the laws bound the state to provide more educational resources. One of the most studied cases is that of Great Britain.

The historic 1944 Education Act increased the age of compulsory education (the school leaving age) in England, Scotland and Wales from 14 to 15 in 1947 and appears to have been rigorously enforced (Ringer 1979). The fraction of those leaving school at age 14 declined from 57 percent in 1945 to less than 10 percent in 1948 and then to about 5 percent by 1950 (Oreopoulos 2006). The act also included a guarantee that secondary schooling would be free of charge.³⁹ The compulsory schooling age in Britain was extended only when the educational system had recovered from the war and teachers and schools were available for the increased number of 14 year olds, accounting for the delay to 1947. Large numbers of British school children could not have gone to school past age 14 in the absence of the act because the resources were not in place before the state was committed to providing them.

In the United States, on the other hand, schools (even secondary schools) were already largely available and free for most students who could have been affected by compulsory schooling laws. The impact of the constraints imposed on youths, employers, and local governments by child labor and compulsory schooling laws were far less important in the rise of the U.S. secondary school. The enormous expansion of U.S. secondary school enrollment was largely due to factors such as the substantial pecuniary returns to a year of school, increased family wealth, and greater school access.

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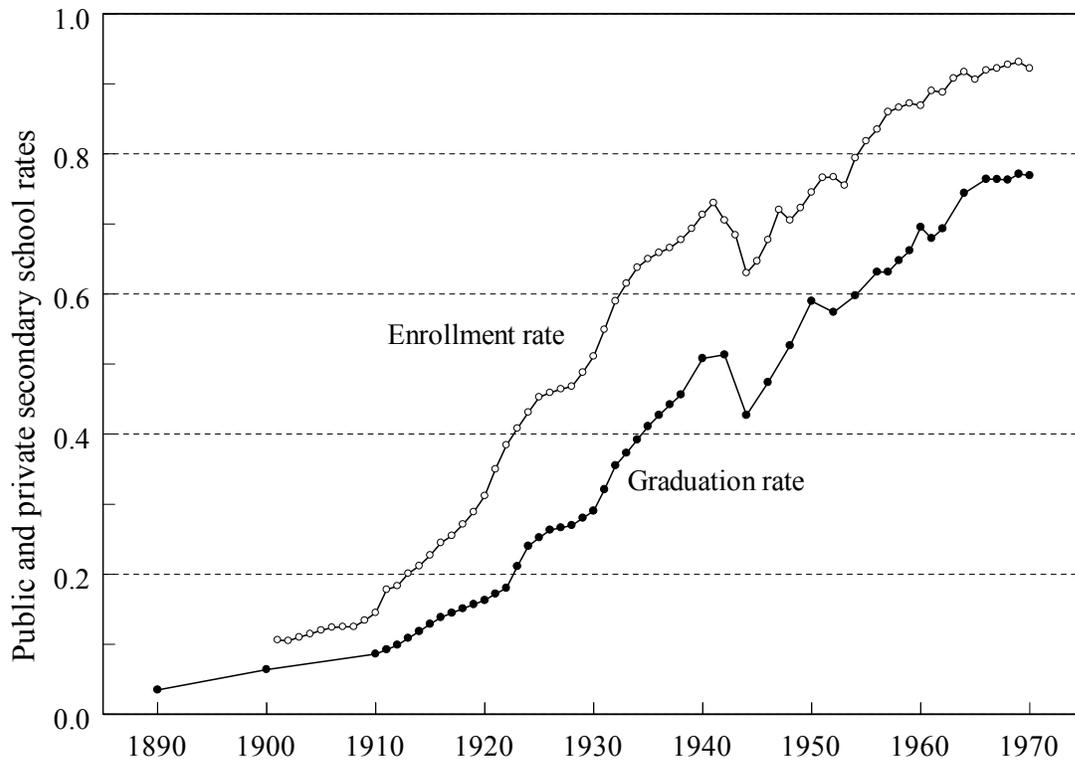
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- § Major compilation of compulsory education and/or child labor laws.
- * Reference used to construct the Appendix materials, in addition to those with §, or mentioned in the Appendix. Some references used in the Appendix are also mentioned in the text.

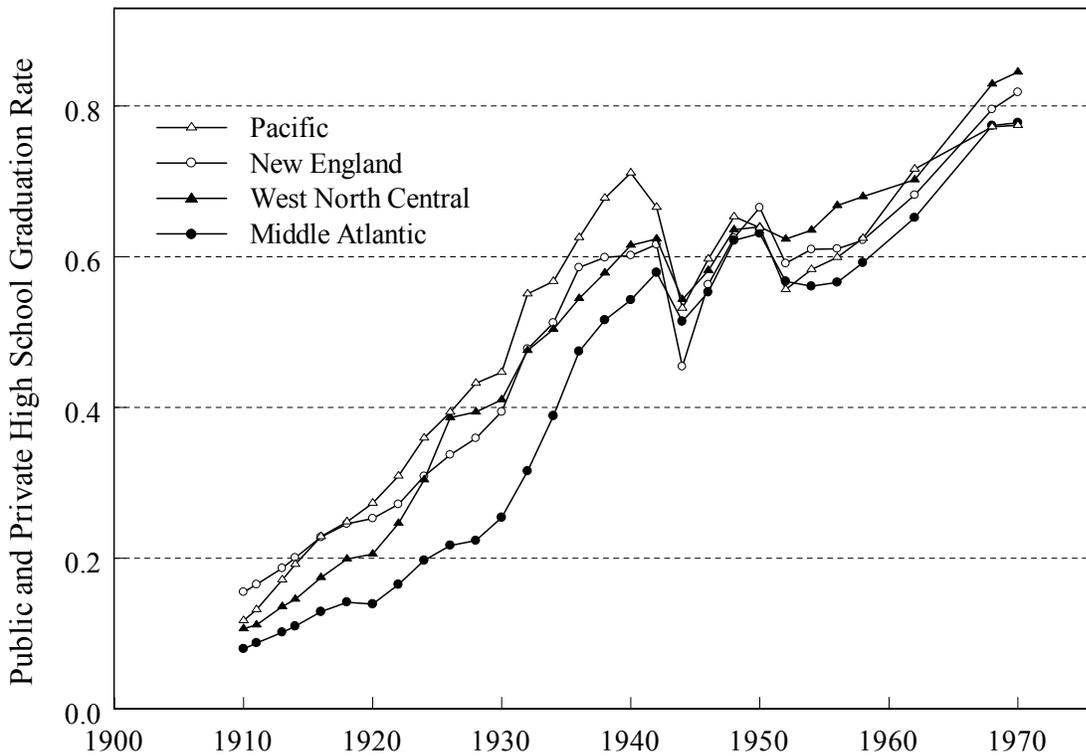
Figure 1
Public and Private Secondary School Enrollment and Graduation Rates, 1890 to 1970



Source: U.S. Department of Education (1993) and Goldin (1994, 1998) for graduation rates from 1910 to 1930.

Notes: Enrollment figures are divided by the number of 14 to 17 year olds; graduation figures are divided by the number of 17 year olds. Data include males and females in public and private schools (excluding preparatory departments of colleges and universities). Year given is end of school year.

Figure 2
Public and Private High School Graduation Rates for Four Regions, 1910 to 1970

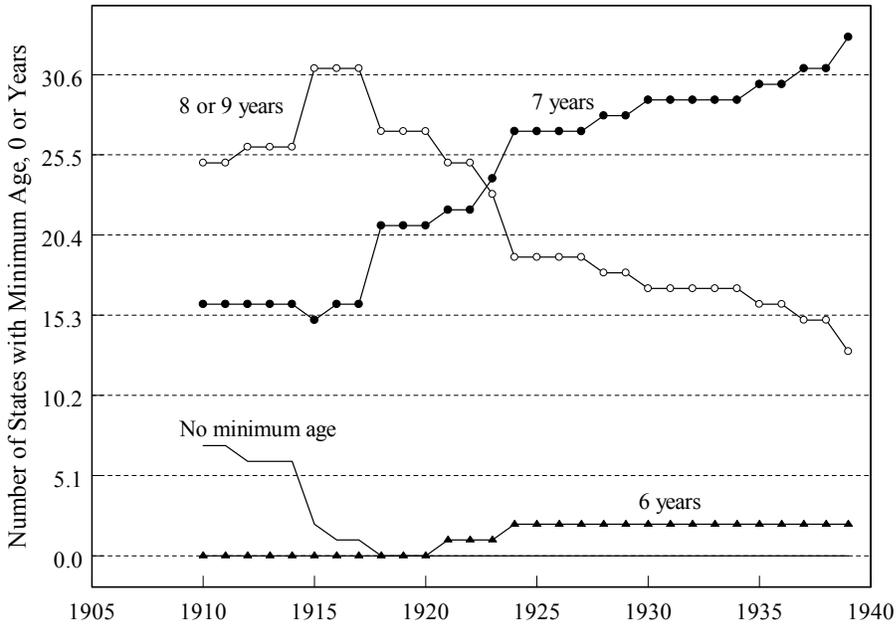


Sources: State-level high school graduation data set from various sources; see Goldin (1994, 1998).

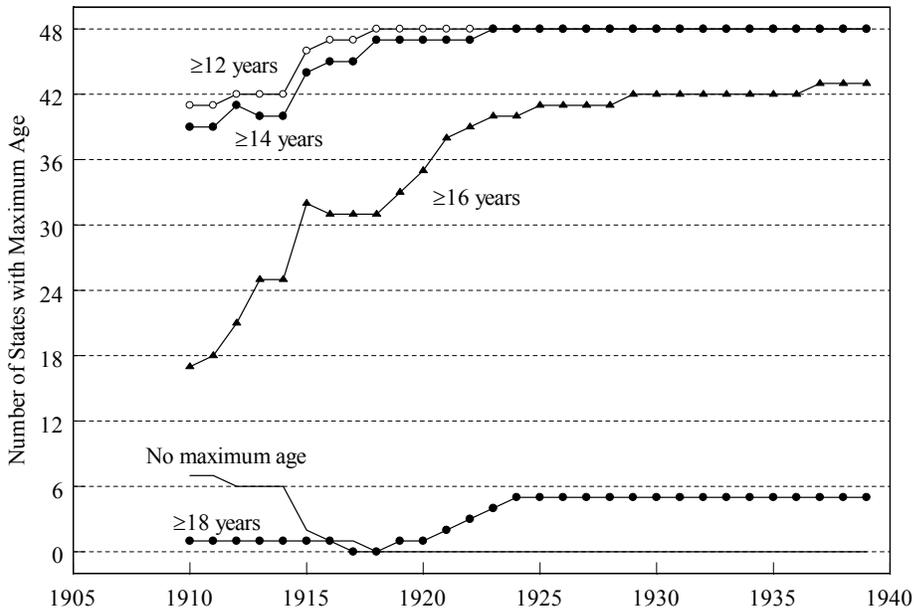
Notes: Includes males and females in public and private schools (including preparatory departments of colleges and universities). The number of graduates is divided by the approximate number of 17 year olds in the state. Constant growth rate interpolations of population data are made between decennial census years.

Figure 3
Aspects of Compulsory Schooling and Child Labor Laws: 1910 to 1939

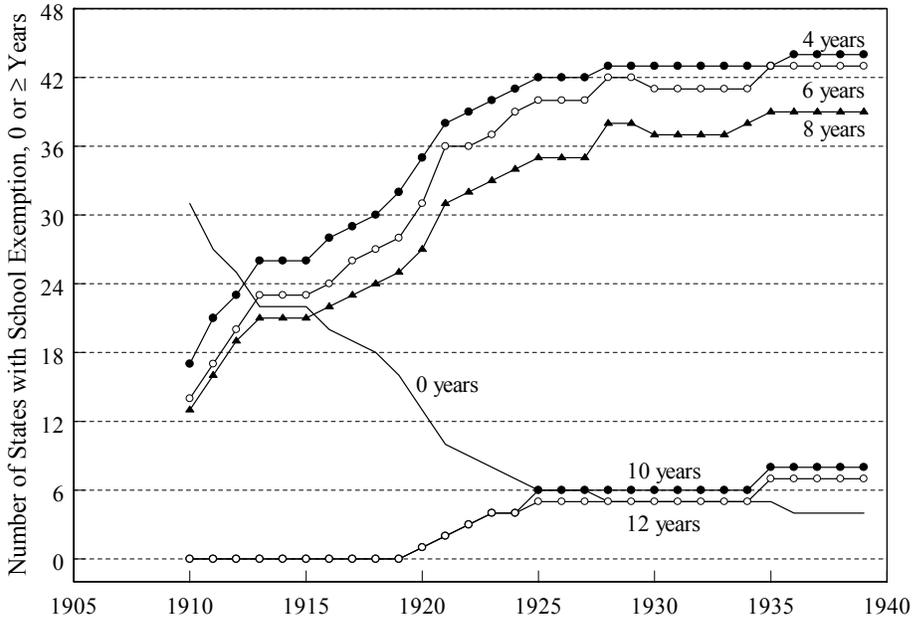
1. Minimum age of compulsory schooling (0 or number of years)



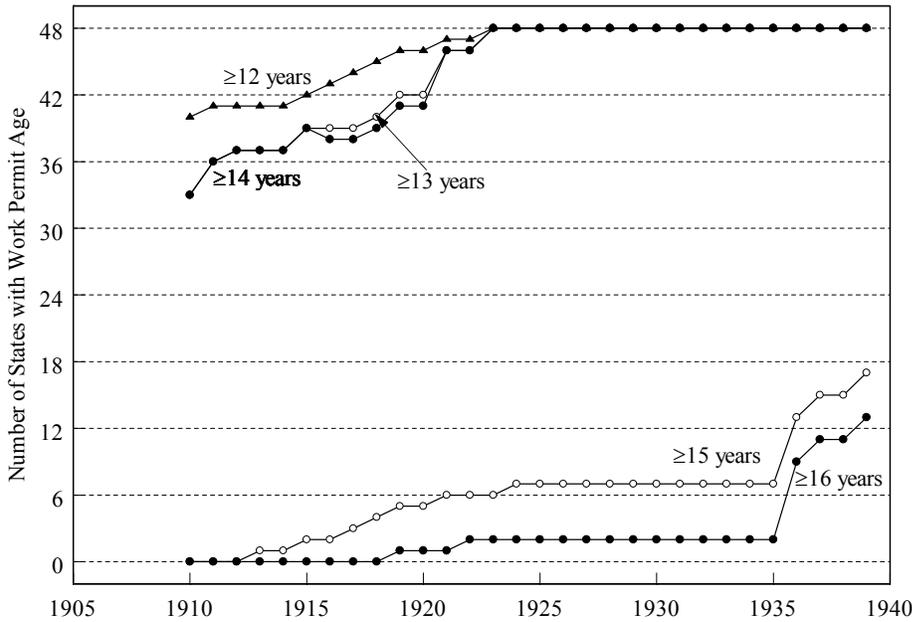
2. Maximum age of compulsory schooling (0 or greater than or equal to given number of years)



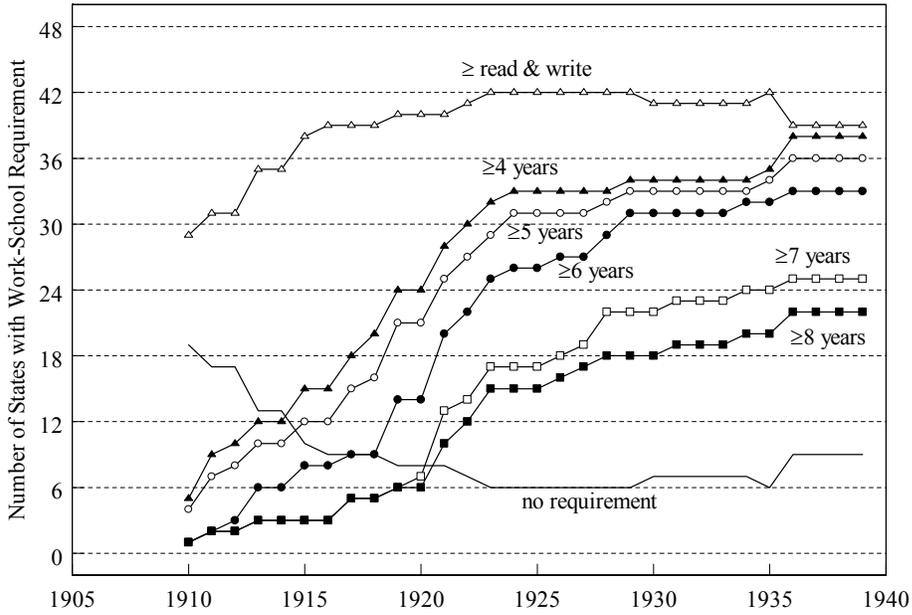
3. Education for exemption from maximum age rule (greater than or equal to given number of years)



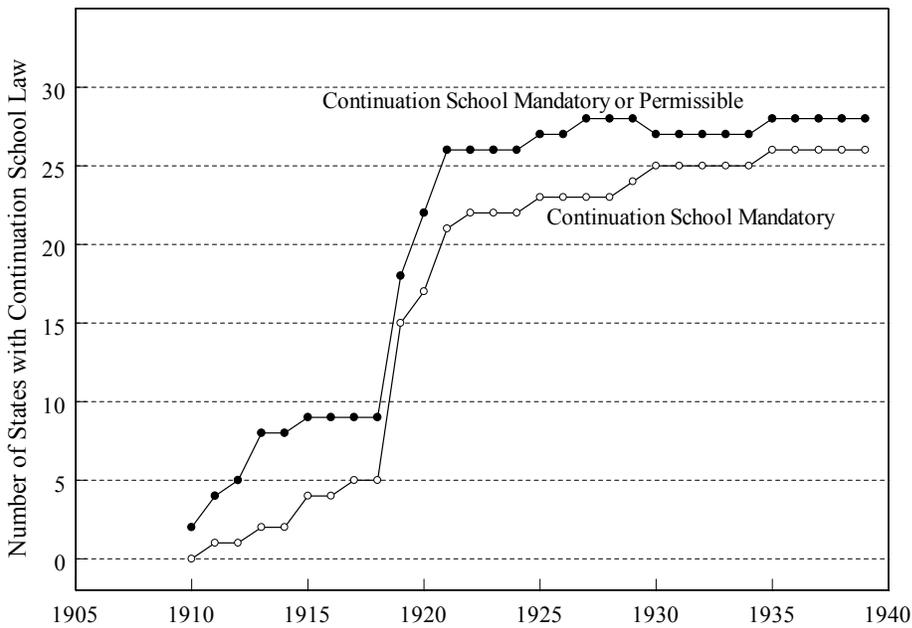
4. Work permit age (greater than or equal to given number of years)



5. Education required to obtain a work permit (none or greater than or equal to years given)



6. and 7. Continuation School Mandatory or Permissible



Sources: See Data Appendix.

Table 1
 School Attendance by Age for White Youths,
 by State Compulsory Schooling and Child Labor Law Ages: 1910 and 1920

A. Minimum Compulsory Schooling Age

Child's Age	Minimum Age, 1910				Minimum Age, 1920		
	None	7	8	9	7	8	9
6	0.334	0.675	0.523	0.417	0.738	0.624	0.644
7	0.611	0.844	0.775	0.741	0.886	0.847	0.867
8	0.747	0.902	0.865	0.886	0.921	0.904	0.974
9	0.819	0.925	0.897	0.976	0.941	0.926	0.948
# states	7	16	24	1	21	26	1

B. Work Permit Age

Youth's Age	Work Permit Age, 1910			Work Permit Age, 1920					
	None	12	14	None	12	13	14	15	16
Full-Time or Part-Time School Attendance									
11	0.894	0.925	0.958	0.932	0.904	0.986	0.965	0.976	0.915
12	0.847	0.901	0.943	0.929	0.902	0.964	0.961	0.973	0.893
13	0.854	0.893	0.934	0.946	0.877	0.925	0.953	0.972	0.912
14	0.803	0.828	0.868	0.846	0.843	0.820	0.883	0.938	0.882
15	0.723	0.704	0.721	0.793	0.736	0.611	0.739	0.806	0.778
16	0.617	0.568	0.517	0.586	0.588	0.329	0.506	0.526	0.646
17	0.454	0.384	0.354	0.476	0.441	0.263	0.345	0.358	0.445
Full-Time School Attendance									
11	0.661	0.825	0.923	0.932	0.841	0.973	0.950	0.969	0.870
12	0.606	0.789	0.900	0.912	0.810	0.959	0.938	0.959	0.843
13	0.583	0.713	0.874	0.913	0.782	0.890	0.921	0.953	0.830
14	0.494	0.637	0.759	0.838	0.727	0.775	0.825	0.912	0.792
15	0.467	0.504	0.589	0.724	0.620	0.578	0.671	0.760	0.677
16	0.360	0.354	0.400	0.560	0.482	0.276	0.433	0.467	0.550
17	0.280	0.249	0.263	0.427	0.352	0.220	0.287	0.315	0.370
# states	8	7	33	2	4	1	36	4	1

Sources: See Data Appendix for sources on compulsory schooling and child labor laws. School enrollment data are from the IPUMS of the U.S. federal population census for 1910 and 1920.

Notes: "School attendance" in the U.S. censuses of 1910 and 1920 means that the youth had been in a school for at least one day during the previous year. Respondents could list an occupation in addition to school attendance. We define "full-time school attendance" as attendance but no occupation. "Full-time and part-time school attendance" means that the youth was listed as attending school but also could have an occupation. Youths who listed an occupation and stated that they had attended school during the year could have worked during the summer, school vacation, or after school hours. But they also could be youths who dropped out of school to work during the year or worked and attended school on a limited basis.

Table 2
Impact of State Compulsory Schooling and Child Labor Laws
on Secondary School Enrollment Rates, 1910 to 1938 (Biennially, 48 States)

Dependent variable: Fraction of state's 14 to 17 year olds enrolled in public and private secondary schools (mean = 0.441)					
	(1)	(2)	(3)	(4)	(5)
Continuation school law	0.0244 (0.00899)	0.0271 (0.00917)	0.0245 (0.00846)	0.0271 (0.00917)	0.0247 (0.0110)
Child labor school years ^a		0.00522 (0.00192)		0.00498 (0.00231)	0.00422 (0.00243)
Compulsory school years ^b				0.000324 (0.00170)	-0.000890 (0.00171)
(Work permit age _t) – (school entrance age _{t-8})	0.00297 (0.00223)				
Child labor school years = 8			0.00630 (0.0102)		
Child labor school years ≥ 9			0.0533 (0.0190)		
Compulsory school years = 8			-0.000112 (0.00759)		
Compulsory school years ≥ 9			0.00987 (0.0100)		
Autos per capita	0.987 (0.208)	0.979 (0.204)	0.856 (0.184)	0.978 (0.201)	1.011 (0.268)
Manufacturing employment per capita	-0.0349 (0.412)	0.0123 (0.409)	0.0482 (0.398)	0.0224 (0.412)	-0.0355 (0.465)
Fraction ≥ 65 years	2.44 (1.55)	2.67 (1.54)	2.69 (1.35)	2.69 (1.54)	3.58 (2.72)
Fraction ≤ 14 years	-1.83 (0.601)	-1.74 (0.591)	-2.01 (0.605)	-1.75 (0.596)	-2.04 (0.915)
Other state demographic controls ^c	Yes	Yes	Yes	Yes	Yes
State dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Census division trends	Yes	Yes	Yes	Yes	No
State trends	No	No	No	No	Yes
R ²	0.977	0.977	0.978	0.977	0.984
Standard error	0.0326	0.0325	0.0318	0.0325	0.0286
Number of observations	720	720	720	720	720

^a Child labor school years_t = max{(education required for work permit_t), (work permit age_t – school entrance age_{t-8})}

^b Compulsory school years_t = min{(education for exemption_t), (maximum age of compulsory schooling_t – entry age_{t-8})}

^c Includes fraction black, fraction foreign born, fraction urban.

Sources: Secondary school enrollments, see Goldin (1994, 1998); compulsory school and child labor laws, see Data Appendix; data on percent black, percent foreign born, and percent urban were provided by Adriana Lleras-Muney, see <http://www.econ.ucla.edu/alleras/papers.htm>, and are from the 1910, 1920, 1930, and 1940 Censuses of Population (linearly imputed in intervening years); for other variables, see Goldin and Katz (2009).

Notes: All regressions have been weighted by the number of 14 year olds in the state. The numbers in parentheses are robust standard errors clustered by state. The 1912 enrollment rate is the average of that in 1911 and 1913.

Table 3
The Impact of State Compulsory Schooling and Child Labor Laws on Educational Attainment,
1896 to 1925 U.S. Born Cohorts

Dependent variable: Completed Years of Schooling (Mean for All = 10.01)						
	(1)	(2)	(3)	(4)	(5)	(6)
	All	1901-1925 Cohorts	Whites	Blacks	Males	Females
Continuation school law	0.147 (0.0552)	0.140 (0.0524)	0.134 (0.0579)	0.220 (0.0977)	0.162 (0.0624)	0.131 (0.0549)
Child labor school years ^a	0.0148 (0.0124)	0.0396 (0.0130)	0.0162 (0.0141)	-0.00549 (0.0145)	0.00913 (0.0136)	0.0219 (0.0144)
Compulsory school years ^b	0.00225 (0.00757)	-0.0121 (0.00796)	-0.00630 (0.00763)	0.00670 (0.00957)	-0.00654 (0.00860)	0.00996 (0.0105)
Autos per capita	0.725 (0.760)	0.497 (0.695)	0.753 (0.710)	1.92 (2.32)	0.582 (0.853)	0.875 (0.793)
Manufacturing employment per capita	-3.32 (1.63)	-4.26 (1.72)	-2.45 (1.56)	-6.42 (2.63)	-4.29 (1.86)	-1.12 (1.71)
State demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Person demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
State of birth dummies	Yes	Yes	Yes	Yes	Yes	Yes
Birth cohort dummies	Yes	Yes	Yes	Yes	Yes	Yes
Census division trends	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.160	0.150	0.099	0.160	0.172	0.151
Standard error	3.19	3.17	3.14	3.53	3.36	3.01
Number of observations	536,628	478,591	483,993	50,912	260,884	275,744

^a Child labor school years_t = max{(education required for work permit_t), (work permit age_t – school entrance age_{t-7})}, where *t* is the year at which the individual is 14 years old

^b Compulsory school years_t = min{(education for exemption_t), (maximum age of compulsory schooling_t – entry age_{t-7})}, where *t* is the year at which the individual is 14 years old

Sources: IPUMS of the 1960 federal population census. See Data Appendix for state compulsory schooling and child labor laws. The sources of the other variables are given in the notes to Table 2.

Notes: State demographic controls are fractions foreign born, black, urban, greater than 64 years old, and less than 15 years old. Individual demographic controls include dummy variables for female, black, other race, and parents foreign-born. Robust standard errors are in parentheses clustered by state of birth. The school entrance law refers to that in existence in the individual's state of birth at age 7, whereas all other law variables are for age 14.

Data Appendix: Construction of State-Level Compulsory Education and Child Labor Laws, 1910 to 1939. (Data are posted at: <http://www.economics.harvard.edu/faculty/goldin/data>)

The compilation of state-level compulsory education and child labor laws, from 1910 to 1939, contains the following seven variables:

1. Minimum age of compulsory schooling, know as the school entrance age (also compiled for 1900 to 1909);
2. Maximum age of compulsory schooling (also compiled for 1900 to 1909);
3. Education for exemption from maximum age rule;
4. Age at which youth can obtain a work permit (for work during normal school hours);
5. Education required to receive a work permit (for work during normal school hours);
6. Whether state has mandatory continuation schools; and
7. Maximum age of continuation school attendance (the state permit municipalities to establish continuation schools).

These variables summarize complex laws. The first three variables concern compulsory education laws and the last four are child labor laws. Compulsory education and child labor laws were often two sides of the same coin. They have appeared to latter-day observers to have been inconsistent because the maximum age of compulsory education was often higher than the age at which a work permit could be obtained. But the laws were generally part of the same piece of legislation and had a set of similar goals.

The binding constraint for much of the period we consider was the age at which a youth could obtain a work permit or the education required to receive a work permit. Take, for example, a state with a maximum age of compulsory education of 16 years, but in which a youth of 14 can receive a work permit for work during normal school hours if the youth had already completed 8 years of school. In that case, the binding constraint would be, most likely, the age needed for the work permit. But if the education required were no more than being able to “read and write,” the binding constraint would be the education required to get a work permit. Many states also had a minimum education level to excuse a youth from the maximum age of compulsory education. In certain states and times, this would have been the binding constraint.

Finally, many states adopted laws requiring school districts to establish “continuation schools.” The continuation school idea caught on after World War I, although it was first adopted in 1911 by Wisconsin. A mandatory state continuation school law (variable 6) meant that school districts, with a large enough number of working youths under some age, had to establish a continuation school. Youths who did not meet a minimum education standard were required to attend the school for some number of hours per week (for example, one afternoon of four hours) and the employers were often responsible to excuse the youths from work during their school time. Many states, however, did not have a mandatory law but, rather, had a law setting the maximum age for youths to be in such a school if one existed. That is, variable (6) would be 0 but variable (7) would be some age. If a municipality had a continuation school, the maximum age given in the state law would be binding.

The compulsory education and child labor laws contain numerous complexities that make their coding difficult. Most states, for example, had several exemptions for compulsory education and a detailed knowledge of court decisions is required to assess their importance. For example, “mental defectives” were almost always exempt from compulsory education laws. Similarly, children of impoverished families were often exempt from the education requirement for a work permit. The definition of “defective” and “impoverished” was up to the courts. There is also the difficult issue of enforcement.

Another complexity is that state laws occasionally had different ages for cities and towns than for the rest of the state or for the largest city versus all other places. Our coding used that for the majority of the population. In other cases, the state left the details of compulsory education laws to the school districts and municipalities. Finally, these seven variables omit the details concerning child labor laws, such as the number of hours they could labor and the occupations that were banned for youths of various ages and by sex.

The data on these laws are derived primarily from more than a dozen contemporaneous compilations (see References with §), often commissioned by the U.S. Office of Education or the Children’s Bureau of the U.S. Department of Labor. When a law changed between two of the compilations, the state laws were consulted to find the precise date of change or, when available, information on changes to state laws published by the U.S. Office of Education.⁴⁰ In some cases

we could not locate the precise date of change. In such cases, the law is generally extrapolated back in time (e.g., if a law changed between 1921 and 1924, the 1924 details are assigned to 1922 and 1923). Because we have major compilations for 1910, 1914, 1915, 1917/18, 1921, 1924, 1927, 1928, 1929, 1935, 1939, and 1945, as well as minor compilations for several other dates, the change dates that we have imputed are probably not too different from the actual ones.

The interpretation of the state laws was often difficult and some compilations were wrong in some of the details. In certain cases, the state laws are difficult to code because they did not apply in uniform ways throughout the state. For example, in some cases the law applied to just the largest city (e.g., Wilmington DE, New Orleans LA, Baltimore MD). In these cases, we have coded the state law rather than that of the city because the majority of the state's population did not live in the largest city. But when the law applied to all cities and town (say above 2,500 people) we have coded the city laws rather than those applying to only rural areas in the state. In some cases, there was no state law and localities were given discretion to write their own law. In these cases, we coded the state as not having a law. In a few instances the law applied differently to boys than to girls and we have used the restrictions that applied to the former.

The data set is the result of many individual labors. It was begun independently by Claudia Goldin (in 1993) and by Adriana Lleras-Muney (in her Ph.D. dissertation). Stefanie Schmidt took Goldin's initial coding and added others. Stefanie Schmidt's work covered almost the same years that Lleras-Muney's did (1915 to 1935 for Schmidt and 1915 to 1939 for Lleras-Muney). Both used similar sources in most years, but there were some differences. Schmidt relied on state legal documents for the years between the compilations to pinpoint state law changes. Lleras-Muney used more published compilations than did Schmidt and thus encountered fewer changes that had uncertain dates.

We cross-checked these two compilations (and another by Angrist and Acemoglu, which also covers years after 1940 but contains less detail for the 1915 to 1940 period), checked them against the original documents used, and rectified the differences, as best we could. In addition we extended the Lleras-Muney and Schmidt series back to 1910.

ENDNOTES

* We gratefully acknowledge financial support from the Spencer Foundation (Major Grant no. 200200007) on parts of our book, *The Race between Education and Technology* (Harvard Press 2008), which includes material on compulsory schooling in chapter 6. Adriana Lleras-Muney generously provided her data on compulsory schooling and child labor. Joshua Angrist and Daron Acemoglu kindly made available their coding of the laws, as did Stefanie Schmidt. We thank them all. We are grateful to Damon Clark, Edward Glaeser, Robert Willis, participants in the Harvard Labor Workshop, and especially our discussant, David Card, for helpful comments.

¹ The increase for males was from 41 to 90 percent, but that for females was 10 to 86 percent. See OECD (1998), tables A1-2a and A1-2b. The figures are for individuals in two age groups in 1996: 55 to 64 years old and 25 to 34 years old. If graduation occurred around 18 years old, these data would approximately refer to the years from 1954 to 1984. A U.S.-style educational system was imposed in 1949 in Korea. Schooling was of the 6-3-3 variety, with six-year elementary schools, three-year middle schools, and three-year senior high schools. Compulsory education in Korea was six years until 1969 when it was expanded to nine years.

² The fraction of total public K-12 revenues accounted for by the federal government has never exceeded 10 percent in any year. In the 1920s less than 0.5 percent of total revenue came from the federal government. With the passage of the National Defense Education Act of 1964, the federal role increased from 4.4 in 1964 to 8.8 percent in 1968. The federal share of public K-12 revenues peaked at 9.8 percent in 1980, declined throughout the 1980s, and has risen since to 9.2 percent in 2005. See U.S. Department of Education (2008, table 162).

³ The Office of Education also reported in 1932 that there were 26,409 public secondary schools. At most, therefore, 21 percent of all school districts had a public secondary school, whereas the rest contained only elementary or common schools.

⁴ For a timeline of compulsory education laws see, for example, Steinhilber and Sokolowski (1966).

⁵ The ages covered by federal legislation before 1938 were those to 14 years. The Keating-Owen Bill, for example, prohibited the interstate commerce of the products of children under 14 years and those of older children in specific industries.

⁶ Selwyn Troen, in his well-received history of the St. Louis public school system, gives the fraction of youths at various ages who attended school at some time during the census year. The

fractions attending from 7 to 13 years old increased from 1880 to 1930 (although it is unlikely that all fractions were 97.7 percent in 1930, as Troen reports). Troen concludes: “the legislation was very effective. Due to vigorous enforcement, nearly all children were in school continuously from age six or seven until fourteen by the 1910s” (Troen 1975, p. 202; table 12). Because Troen uses decennial census data, his evidence does not necessarily indicate that children were at school “continuously” in the ages considered. More important is that there is no evidence that the laws caused enrollment to increase.

⁷ See, for example, Goldin and Katz (1999; 2009).

⁸ A large related literature uses U.S. state compulsory schooling and child labor laws as instruments for years of schooling in attempts to estimate the causal impacts of education on a wide range of outcomes. See Angrist and Krueger (1991) and Oreopoulos (2009) on earnings, Lleras-Muney (2005) on mortality, Lochner and Moretti (2004) on crime, and Moretti, Milligan, and Oreopoulos (2004) on citizenship.

⁹ Continuation schools often gave a combination of academic and vocational courses.

¹⁰ Emmons (1926, p. 134) contains a summary of the required attendance each week in continuation schools. Of the 23 states having a mandatory continuation school law in 1925, eight required up to 8-hours per week, nine required 4-hours, and six were at the 5- or 6-hours level.

¹¹ Bermejo (1923) has a step-by-step description of how youths could obtain employment status in states with effective child labor laws.

¹² See, for example, Stambler (1968) and numerous contemporaneous studies, often by advocates, including Clapp and Strong (1928) on Massachusetts and Gibbons (1927) on Indiana. In California, for example, the 1931 general laws of the states included Act 7519 (“school code”), which contained separate articles on compulsory education and on work permits. Other states had separate laws passed by the legislature often at separate times. One reason for the greater connection in some states is that the superintendent of schools was responsible for issuing work permit to certain minors.

¹³ Other variables of importance are: excluded occupations and industries, restrictions on hours of work for minors, exemptions for other factors and court interpretations of them, the state (or municipal) apparatus for enforcing the laws (e.g., number of attendance officers, quality of the school census).

¹⁴ In our estimation of the impact of the laws on school enrollment, graduation, and educational attainment we use minimum ages to 1902 because a youth who was 14 years old in 1914, for example, would have, most likely, entered school in 1908 if the minimum age of school entry were 8.

¹⁵ In Britain, which long had various types of continuation schools, the Education Act 1918 (known as the Fisher Act) and the Education Act 1921 mandated part-time attendance at continuation schools by those who left school between ages 14 and 18 (Ringer 1979).

¹⁶ Margo and Finegan's (1996) study of compulsory education laws using the 1900 census micro-data files also uses the complexity of the laws to uncover why youths in certain states were more constrained by compulsory schooling laws. They find that the combination of child labor laws with compulsory education laws made the latter more effective. See also Eisenberg (1988) on the complexity of nineteenth century compulsory schooling laws. Other previous studies on the effects of U.S. compulsory schooling laws on educational outcomes include Landes and Solmon (1972), who explore the impact of late nineteenth century compulsory schooling laws using state cross-section differences and decadal changes for the 1870 to 1890 period; Edwards (1978), who examines the impact of compulsory schooling laws on enrollment from 1940 to 1960; Lang and Kropp (1986), who analyze compulsory schooling laws and the enrollment of 16 and 17 year olds using population census data from 1910 to 1970 in an attempt to test signaling versus human capital models of educational investment; and Angrist and Krueger (1991, 1992), who exploit the differential effects of U.S. compulsory schooling laws by quarter of birth to estimate the impacts of age of school entry on completed schooling. Stigler (1950) presents suggestive evidence (see appendix B) that compulsory education laws did not causally affect schooling in 1940.

¹⁷ Oreopoulos (2003) uses a similar methodology in a parallel study of the impact on educational attainment in Canada of changes in provincial compulsory schooling laws. Oreopoulos finds a larger impact on years of schooling from changes in Canadian compulsory schooling laws than we, and others, do for the United States.

¹⁸ On the impact of enforcement resources on the effectiveness of compulsory schooling laws in New York State, see Schmidt (1996).

¹⁹ Goldin (1994, 1998) and Goldin and Katz (2008). The public school data are drawn from the annual reports from 1910 to 1918 and then from the biennial reports of the Office of Education,

but the coverage in the early period is incomplete and the data set can best be described as being biennial.

²⁰ See also Schmidt's (1996) work on New York State using administrative enrollment data.

²¹ See Data Appendix.

²² Specifically, the schooling question in both the 1910 and 1920 censuses focused on persons 5 to 21 years of age and asked about any school attendance since the previous September 1.

Census enumerators were instructed to write a "Yes" for anyone of any age attending school and a "No" only for those aged 5 to 21 years who had not attended school since the previous September 1.

²³ See Oreopoulos (2006, 2007) on compulsory schooling law impacts in the Britain and Ireland.

²⁴ Goldin (1998) constructs state public and private secondary school enrollment rates for 1910, 1911, 1913, and even years from 1914 to 1950. We impute the 1912 rates using the average of 1911 and 1913.

²⁵ The regression results are not sensitive to weighting. In all cases, unweighted regressions yield estimates that are quite similar to the reported estimates. The results are also almost identical if, for each year, a state's share of all 14 year olds in the United States is used as the weight.

²⁶ We also find (consistent with Goldin and Katz 1999, 2009) a substantial and positive effect of auto registrations per capita and significant impacts of the state's age structure at the upper and lower ends.

²⁷ If there is no law regarding the school entrance age or the work permit age, then the "child labor school years" variable is set equal to zero or to the education required for a work permit, if such a requirement exists. The inclusion of a separate dummy variable for a read and write requirement yields a small and statistically insignificant coefficient and does not impact the other coefficients in any detectable manner.

²⁸ If there is no law in place, setting a maximum age of compulsory schooling or a school entrance age, then the "compulsory school years" variable is set to zero. If there is no education for exemption statute, then the compulsory school variable is set equal to maximum age of compulsory schooling minus the school entrance age. Almost all states with no educational exemption in 1910 later added that clause to their compulsory education laws. Enforcement of the maximum age was probably lax in the absence of the exemption.

²⁹ In our NBER working paper version (Goldin and Katz 2003) we allow for nonlinear effects of child labor and compulsory schooling laws by including dummy variables for no child labor law and no compulsory school law. The conclusions from that analysis are almost identical from those presented here.

³⁰ Estimates of the interstate migration rates of families with youth and of the share foreign born of 14 to 17 years olds in 1920 are from the 1920 Census of Population IPUMS.

³¹ We have also performed a similar analysis for the educational attainment of the same birth cohorts measured at similar ages (from 40 to 49 years of age) using data from the 1940, 1950, 1960, and 1970 censuses. The results are similar but less precisely estimated than the estimates using the 1960 census. The disadvantage of this approach is smaller sample sizes for the earlier cohorts since the 1940 census only provides information on parents' nativity (a key control variable) for sample-line individuals and the 1950 census only provides educational attainment information for sample-line individuals. There are also some differences in the measures of educational attainment available in the different census years. The educational variable in the 1940 census does not distinguish whether the highest grade attended was actually completed, and the 1940 and 1950 census educational attainment data are top coded at 17 years as opposed to 18 years in the 1960 census.

³² Estimates are similar, but slightly attenuated, including a full set of census region-year fixed effects.

³³ Also, the "automobiles per capita" variable that has large effects on contemporaneous high school enrollment rates has small and statistically insignificant effects on overall years of schooling. But we do find (in unreported regressions) that the automobiles per capita variable has large and statistically significant positive effects on years of high school and the probability of completing nine or more years of education using the same sample. In contrast to the findings in Table 3 and to our cross-section findings using the high school graduation rate (Goldin and Katz 2009), the manufacturing variable in Table 2 is not consistently negative.

³⁴ The differences in the estimates from Lleras-Muney (2002) arise from our expansion of the sample to cover earlier cohorts (those born 1896 to 1900), our improvements in the coding of and specification of the effects of state laws, slight differences in treatment of regional trends, and some small data entry errors affecting the control variables for several observations in Lleras-Muney's published regressions.

³⁵ School censuses were also used by various states, both before and after the passage of compulsory schooling laws, to apportion state school funds.

³⁶ The lists that we have not used here are: Deffenbaugh and Keesecker (1935, p. 25) and Proffitt and Segel (1945, table 1). Between these two dates the following states curtailed their state school censuses: Arizona (annually), California (every third year), Delaware (biennially), Indiana (annually), Nevada (annually or as deemed necessary by the superintendent), and New Jersey (quinquennially), where the mandate as of 1935 is in parentheses. Most other states kept the requirement the same as in 1935.

³⁷ The 1913 compilation does not list whether the census had to be annual, biennial, or on another timetable.

³⁸ The states include the District of Columbia. California, included by Keesecker in the “annual” group, did not require a census but, rather, that parents register children of school age with the authorities. The tabular material appears to contain an error: D.C. and Florida should be “annual” not “biennial.”

³⁹ Oreopoulos (2006) discounts the role of guarantees in the 1944 Act for free secondary schools because there was little change in the schooling of 15 year olds around 1947 and for many years after. But the lag in the enrollment of 15 year olds probably had more to do with the paucity of educational resources than the lack of initiative on the part of British teens. The state had been forced to provide places for 14-year olds by the act, but it was not bound to make school accessible to older youths even though the act made secondary school free. Descriptions of the schools and curriculum for the 14-year olds from *The Times Educational Supplement* in 1947 (generously provided by Damon Clark) reveal that classes, particularly in rural areas, were held in temporary structures and were intended for only one additional year of schooling – the year the youths were 14 years old.

⁴⁰ State law documents include titles such as “School Codes of [State],” “Act of [State] Legislature,” “[State] Board of Education,” and “Biennial Reports of [State].”