



America's Graduation from High School: The Evolution and Spread of Secondary Schooling in the Twentieth Century

Citation

Goldin, Claudia. 1998. America's graduation from high school: The evolution and spread of secondary schooling in the twentieth century. *Journal of Economic History* 58(2): 345-374.

Published Version

<http://www.jstor.org/stable/2566738>

Permanent link

<http://nrs.harvard.edu/urn-3:HUL.InstRepos:2664307>

Terms of Use

This article was downloaded from Harvard University's DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at <http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA>

Share Your Story

The Harvard community has made this article openly available.
Please share how this access benefits you. [Submit a story](#).

[Accessibility](#)

America's Graduation from High School: The Evolution and Spread of Secondary Schooling in the Twentieth Century

CLAUDIA GOLDIN

Secondary-school enrollment and graduation rates increased spectacularly in much of the United States from 1910 to 1940; the advance was particularly rapid from 1920 to 1935 in the nonsouthern states. This increase was uniquely American; no other nation underwent an equivalent change for several decades. States that rapidly expanded their high school enrollments early in the period had greater wealth, more homogeneity of wealth, and less manufacturing activity than others. Factors prompting the expansion include the substantial returns to education early in the century and a responsive "state." This work is based on a newly constructed state-level data set.

An oft-cited statistic demonstrating the importance of human capital to American economic growth comes from the now-familiar decomposition of the growth residual. From 1929 to 1982 national income per worker grew annually at a 1.48 percent average. Conventional factor growth (changes in labor hours, physical capital per worker) can account for a mere 5 percent, leaving the remainder as residual. Of that residual, according to Edward Denison, 28 percent can be explained by increases in years and quality of formal education per American worker.¹ Because much of the remaining residual is likely to have originated in advances in knowledge

The Journal of Economic History. Vol. 58, No. 2 (June 1998). © The Economic History Association. All rights reserved. ISSN 0022-0507.

Claudia Goldin is Professor, Department of Economics, Harvard University, 215 Littauer Bldg., Cambridge, MA 02138 and Research Associate and Program Director, National Bureau of Economic Research.

This research was supported by The Brookings Institution, the National Science Foundation, and the Spencer Foundation (Grant 199600128). The data presented, the statements made, and the views expressed are solely the responsibility of the author. Linda Tuch provided extraordinary research assistance on the project when I was at The Brookings Institution. Jessica Wolpaw very ably assisted with the 1940 PUMS. Helpful comments and suggestions were offered by Richard Easterlin, Edward Glaeser, Lawrence F. Katz, Robert Margo, Stefanie Schmidt, and the participants of the All-UC Conference on Capital Markets, the Greater D.C. Area Economic History Seminar, and workshops at The Brookings Institution, Columbia University, Rutgers University, the University of Texas at Austin, and Yale University. Two anonymous referees and Gary Libecap made the article a better one. An appendix, describing the methods used to produce the state-level public and private school data, is available as NBER-DAE Working Paper No. 57. This article draws on Claudia Goldin, "How America Graduated from High School: 1910 to 1960," NBER Working Paper No. 4762 but differs substantially from it.

¹ See Denison, *Trends*, table 8-3, p. 113. The role of formal schooling in economic growth is virtually the same for most other subperiods of this century for which the calculation has been made, including the 1929 to 1948 period, of particular relevance here. On the subject of economic growth and human capital, see also Barro, *Determinants*, for evidence of a relationship between education and economic growth across more than 100 countries; and Jorgenson, *Productivity*, for the relationship between productivity and education within the United States.

TABLE 1
COMPUTING THE IMPACT OF INCREASED SECONDARY SCHOOLING ON THE
EDUCATIONAL ATTAINMENT OF THREE COHORTS OF MEN, BORN 1886 TO 1950

Cohort Born in Year	Percentage Distribution of Highest Grade Completed by Grade				All Grades
	≤ 8	9–11	12	>12	
1946–1950	6.6	12.5	45.6	35.3	100
1926–1930	17.4	21.2	42.3	19.1	100
1886–1890	72.5	10.7	8.3	8.6	100
	Mean Years in Grade Interval				Overall Mean
	≤ 8	9–11	12	>12	
1946–1950	7.7	11.5	12.0	15.3	12.82
1926–1930	7.2	10.5	12.0	15.2	11.46
1886–1890	5.8	9.8	12.0	15.2	7.58
Counterfactuals			Mean	Mean Without Increase to Eighth Grade	
If the 1886–1890 cohort had high school attainment of the 1926–1930 cohort			10.27	9.81	
If the 1886–1890 cohort had high school attainment of the 1946–1950 cohort			11.36	10.47	

Notes: The counterfactual figure of 10.27 years for the 1886–1890 cohort is computed by assuming that 21.2 percent of the cohort (rather than 10.7 percent) attains grades 9–11; 52.8 percent (rather than 8.3 percent) completes high school but does not continue to college; and 8.6 percent completes high school and continues to college. Increasing those in grades 9 to 12 necessitates decreasing the group below ninth grade. Because 31.3 percent of the 1886–1890 cohort had already completed the eighth grade, 23.7 percent = $[(21.2 + 52.8 - 10.7 - 8.3) - 31.3]$ are required to have their primary-grade education increased to advance them to completion of grade eight. The mean for the lowest group is reduced because those who complete the highest elementary school grades are moved on to high school. Mean years in each interval are: 2.3, 10.5, 12, 15.2, where the 2.3 figure is computed from the 1940 PUMS for the truncated distribution. The mean years per student required to bring the group to ninth grade is 1.944 (calculated using the 1940 PUMS). The increase in primary school years is 0.461 ($1.944 \cdot 0.237$). The column “mean without increase to eighth grade” subtracts this amount from the counterfactual mean. A similar procedure is used to produce the counterfactual using the 1946–1950 high school attainment. It should be noted that the data use all males in 1940, not just the native-born, but that the 1940 census overstates the proportion who complete twelfth grade. See the text.

Sources: Percentage distribution of highest grade completed and mean years in grade interval for cohorts born 1926–1930 are 1946–1950 from Smith and Ward, *Women's Wages*. Data for the cohort born 1886–1890 from the 1940 Public Use Micro-data Sample (PUMS, entire 1/100 sample); see ICPSR, *Census*.

resulting in technological change and its diffusion, the contribution of human capital formation to economic growth must have been even greater than the 28 percent estimated. Although one can quibble with the details of the Denison calculation, its fundamental conclusion is likely to be unaffected. Human capital accumulation and technological change were to the twentieth century what physical capital accumulation was to the nineteenth century—the engine of growth.

Among the possible contributors to the increased educational stock of Americans during the first three-quarters of the twentieth century, changes at the secondary school level were quantitatively the most significant. About 70 percent of the increase, from 1930 to 1970, in the educational attainment of U.S. males 40 to 44-years old was due to the rise in secondary school attendance. This important fact can be demonstrated as follows. Hold the fraction going to college (having more than 12 years of schooling) at the level of an older cohort (in this example, men 40 to 44-years old in 1930, born between 1886 and 1890) but allow high school graduation and attendance to rise to that achieved by a younger cohort (men 40 to 44-years old in 1970, born between 1926 and 1930). This experiment results in an increase of 2.7 years in mean years of schooling (see Table 1 for details). Years of schooling, as measured by the 1940 U.S. population census, increased by 3.9 years between these cohorts. Therefore 70 percent of the increase ($2.7 / 3.9$) in schooling was due to increased high school attendance and graduation.² Thus advances in secondary schooling may provide the single most important *measurable* reason for per capita income growth for much of this century.³

The diffusion of high school education across the entire United States is shown in Figure 1, which graphs total secondary school enrollment as a percentage of 14 to 17-year olds and graduates from public and private high schools as a fraction of 17-year olds. The high school enrollment rate rose from 18 percent to 73 percent and the graduation rate increased from 9 percent to 51 percent during the three decades after 1910. The rate of increase was nothing short of spectacular and the levels attained were unequaled by any other country until much later in the century. However, these aggregate data hide large and important differences across the various states and regions.

Given the generally accepted role of education in economic growth, it is unfortunate that educational *stock* data for the United States were not collected until 1940, when a question on highest grade completed was added

² The figure would decrease to 57.5 percent if the 0.461 years needed to advance those from grades five to seven to grade eight were subtracted. But it would rise to 85 percent if the mean for the primary school (only) group was kept at 5.8 years, rather than falling. (See Table 1 for details.) Note that by computing the educational advance of men 40 to 44-years old between 1930 and 1970, I am capturing men who would have been 17-years old from 1903 to 1947. Because the calculation uses the 1940 census, it understates the role of secondary schooling to the increase in the human capital stock (see the section titled "Contemporaneous and Retrospective Education Data"). But because the foreign-born population is included in the 1886-90 cohort, the calculation may overstate the impact of secondary schooling on the native-born population.

³ By "educational stock" I mean years of education, although the quality of education is also considered in, for example, Denison, *Trends*. If the return to a year of college is greater than that to a year of secondary school, the role of college in augmenting income would be larger than its influence on the stock of human capital. But, for the period considered here, the return to a year of secondary schooling was about as great as that to a year of college (see Goldin and Katz, "Human Capital").

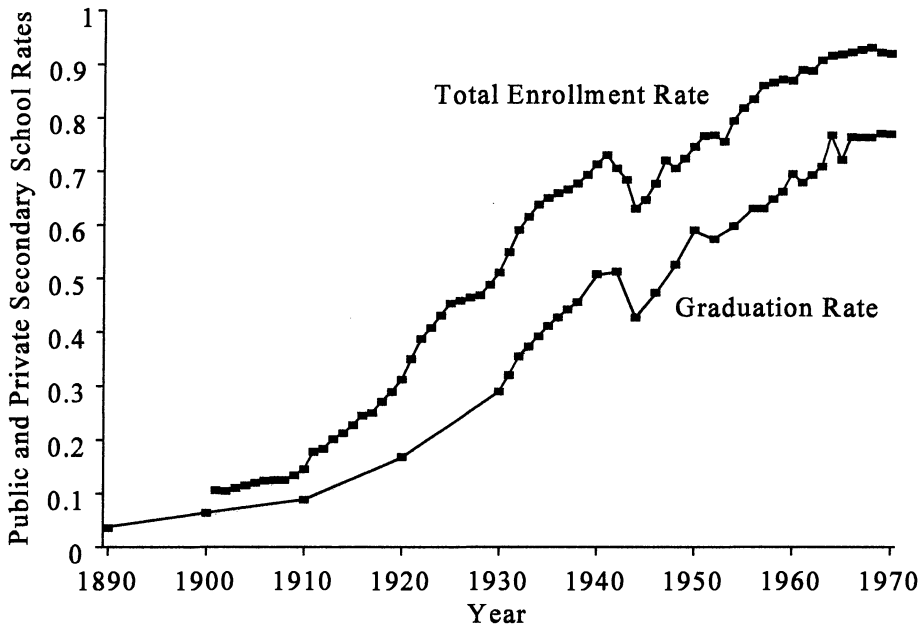


FIGURE 1
SECONDARY SCHOOL ENROLLMENT AND GRADUATION RATES:
ENTIRE UNITED STATES

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. The total includes both males and females in public and private schools.

Source: U.S. Department of Education, *120 Years*, tables 9 and 19.

to the U.S. federal population census.⁴ But contemporaneous evidence on graduation and enrollment allows one to obtain educational *flow* data for periods when the stock equivalents do not exist, and of equal importance, they enable checks on the stock data for the native-born population. Such data can be obtained from the reports of schools, school districts, and states and are those on which I primarily rely. They reveal that the growth of U.S. secondary schooling from 1910 to 1940, known as the period of the “high school movement,” was considerably faster in certain regions than Figure 1 shows for the entire United States.⁵ They are also used to expose various deficiencies in the stock data derived from the 1940 U.S. population census.

⁴ Only the Iowa (1915, 1925) and South Dakota (1915) state censuses asked questions on the educational stock before 1940.

⁵ The term “movement” might make the increase in secondary schools appear to be a coordinated crusade. Those who use the term today and in the past—it was used in many state school reports in the 1910s and 1920s—may ascribe to such a belief and various national associations (such as the National Educational Association and college associations) did spread the “gospel” of secondary school education and helped coordinate curriculum change. But in 1910 the more than 125,000 school districts in America (U.S. Bureau of the Census, *Historical Statistics*, series H 412) engaged primarily in a grass-roots level change. It was clearly affected by national propaganda and facilitated by various state laws, but its spread was less coordinated than the term “movement” would imply.

Because the United States underwent a rapid increase in education in the several decades after 1910, it might be conjectured that other industrialized countries did as well. But the countries whose per capita incomes were closest to that of the United States in 1910 did not undergo an equivalent transformation at that time. Rather, their high school movements did not materialize for another thirty or more years.⁶ Because each country had (and often still has) a somewhat different educational system, and because even the meaning of "secondary school" varies among them, educational data must be put on a comparable basis by using student ages rather than grades of school. Britain, France, and even Germany had attendance rates in the 14 to 19-year old range that were considerably lower than in the United States for much of the twentieth century.⁷ Thus the "high school movement" in the United States was a unique educational advance for the period.

The modern American high school was born at the turn of this century and matured fully during its next few decades.⁸ Its spectacular growth from 1910 to 1940 was central to the increase in U.S. educational attainment during much of this century. But the subject of secondary schooling has been a much-neglected part of American *economic* history, due to the absence of data on enrollment and graduation at other than the national level.⁹ I have constructed such data for public and private high schools covering the period since 1910. The statistics are the first of their kind to be produced and reveal surprising aspects of the spread of America's high schools. The increase in secondary school education after 1910 was rapid across the entire nation. But large differences even among nonsouthern states appeared early and suggest some of the reasons why educational advance occurred. In 1924, for example, the graduation rate in Nebraska or California was twice that in

⁶ For example, in 1944, as President Roosevelt signed the G.I. Bill of Rights to enable America's returning soldiers to further their education, Prime Minister Churchill and the Labor Party had just achieved passage of a law that guaranteed a tuition-free secondary school education for all British children.

⁷ For estimates of attendance by age for these countries, see Ringer, *Education*. In 1936/38, for example, the attendance rate of 14-year olds in Britain was 38 percent and that of 17-year olds was just 4 percent. For the United States in 1936/38 the enrollment rate of 14 to 17-year olds was 68 percent. If attendance rates were 80 percent of enrollment rates (which is what they were nationally for elementary and secondary students), then the attendance rate for the 14 to 17-year old group in the United States would have been 54.4 percent. That for a comparable group in Britain could not have exceeded 20 percent. Even in 1960/62 the attendance rate for 17-year olds in Britain was just 15 percent. Including enrollment in full-time technical schools in Britain would not serve greatly to close the gap. See Goldin and Katz, "Why the United States."

⁸ See Reese, *Origins*, for an excellent summary of the predecessors of the modern U.S. high school. The first U.S. public secondary school (Boston Latin) was founded in 1635. See Katz, *Irony*, and Vinovskis, *Origins*, on the protest over the early establishment of a public high school in Beverly, MA.

⁹ In the historical literature in general, see, for example, Krug, *Shaping*; Labaree, *Making*; Perlmann, *Ethnic Differences*; Reese, *Origins*; Tyack, *One Best System*; and Ueda, *Avenues*, to mention but a few of the history books on the subject. The sociology literature is equally vast, although less focused on the high school. See, for example, Fuller, "Youth Job Structure"; Walters and O'Connell, "Family Economy"; and the oft-cited Trow, "Second Transformation."

New Jersey or New York. The subject to be explored, therefore, is where and when high school enrollment and graduation rates advanced.¹⁰ The task at hand is to understand the manner in which secondary schooling diffused spatially and over time, and thus unpacking the data in Figure 1 by state and region is a first step in understanding the American high school movement.

A UNIQUELY-AMERICAN INSTITUTION

Not only was the high school movement from 1910 to 1940 a uniquely-American phenomenon, the secondary school as we know it today was a uniquely-American invention. As an institution, it was rooted in egalitarianism and was often a by-product of the extensive state university systems in the United States.

Not until 1902 was there a standard format established and prescribed for America's high schools, requiring fifteen units for graduation.¹¹ The modern form evolved in the early 1900s and diffused so rapidly that the high school of the 1920s bears a far greater resemblance to that of the late twentieth century than it does to that of 1900.

Precollege education in the United States was a very local affair in the period under study and remains so today. Federal legislation plays practically no part in the story of expansion. State funding accounted for a minor fraction of the expenditures on education by localities in the 1910 to 1940 period. In 1925, for example, just 16 percent of all kindergarten through twelfth-grade educational funds came from the states, and it was mainly in the South that the fiscal role of the states was the largest.¹² Whatever decisions led to the increase in secondary schooling, they came primarily, although not exclusively, from a grass-roots movement that was funded by local property taxes and in which school building and curriculum decisions were made in the more than 125,000 school districts nationwide.¹³

In the 1910s about 50 percent of all public high-school graduates said they intended to continue to college or another institution of higher learning without delay, and 55 percent of male public high-school graduates said they intended to (see Table 2). By 1923 the number had slipped to 44 percent, and by 1933 only 25 percent planned to continue their studies upon high

¹⁰ See Goldin and Katz, "Why the United States," on the causes of the high school movement and "Decline," on some of the consequences.

¹¹ A unit was four to five periods, each 45 minutes per week during a 35-week semester. The standard was set by a commission including many college administrators. See Krug, *Shaping of the American High School 1880–1920*, p. 153.

¹² U.S. Bureau of Education, *Biennial Survey, 1924–1926*, p. 593. The percentage means that 16 percent of all revenue receipts for education were received and distributed by state governments. The federal government, which provided funds through the Smith-Hughes Act for vocational education, is included in the state percentage, although it accounts for a very small fraction.

¹³ The degree to which all these school districts were truly independent fiscally is still open to investigation.

TABLE 2
PERCENTAGE OF HIGH SCHOOL GRADUATES CONTINUING TO COLLEGE AND
OTHER INSTITUTIONS, 1901 TO 1937

	Percentage Intending to Continue Education among High School Graduates in Year					
	1901	1910	1914	1923	1933	1937
Continuing to college from:						
Public high schools	31	34	35	31	21	24
Public high schools, males only	40	45	45	37	23	26
Public and private high schools	33	35	35	32	23 ^a	—
Continuing to college and other institutions ^b from:						
Public high schools	—	49	50	44	25	29
Public high schools, males only	—	55	55	49	25	30
Public and private high schools	—	49	50	46	25 ^a	—

^a Private school graduation numbers are for 1932.

^b "Other institutions" probably include normal, nursing, and library schools.

Notes: "Percentage continuing" was reported by the commissioner of education who gathered the information from the reports of school principals. It is the percentage who intended to continue, probably in the immediate future. Some did not eventually do so, others went back to school at a later date having never indicated an intent to continue their education. These figures probably do not include students in the preparatory departments of colleges and universities. Their inclusion would increase the continuation percentages in the earlier years.

Sources: Office of Education, *Report of the Commissioner of Education* (various years); and Office [Bureau] of Education, *Biennial Survey of Education* (various years).

school graduation.¹⁴ The proportion of all American youths entering college had not decreased. It had expanded. Rather, fewer of the new entrants treated high school as a prelude to college. Thus the fraction continuing after graduation declined with the rise in high school enrollments. Only in the 1970s did the fraction continuing reach the levels attained before 1920.¹⁵

Thus a primary reason to attend high school around 1900 was to gain entrance to college and most high schools offered the classical (or Latin-scientific) curriculum, required by many colleges for admission. The courses of the classical curriculum included Latin, possibly Greek, often French or German, English, history, mathematics, and some science. Secondary schools began as preparatory institutions, but as long as they primarily

¹⁴ The proportion of males and females who actually continued to a B.A.-granting institution in 1910 was about 40 percent. The calculation is complicated by deficiencies in the data on higher education enrollments. In 1910 there were about 156,000 public and private secondary school graduates (U.S. Bureau of the Census, *Historical Statistics*, series H 598). There were 174,213 collegiate students in 1910 (U.S. Bureau of Education, *Biennial Survey*, 1928–1930, p. 338). If 35 percent of these students were in their first year, then 39 percent of the graduating class would have continued to a B.A. granting institution. Note that this does not include a host of non-B.A. granting institutions of higher education in 1910 but may include students enrolling in several colleges during the academic year. Thus the figure for the "intent to continue" in 1910 is close to the estimated actual one.

¹⁵ Using data on educational attainment from the federal population census, Smith and Ward show that the fraction of male high school graduates who continued to college did not reach that achieved by the 1886–90 birth cohort until that born 1946–50. See Smith and Ward, *Women's Wages*, p. 39.

trained youths for college entrance they would have limited appeal.¹⁶ The high school movement transformed secondary schools from preparatory institutions to schools that awarded terminal degrees to the vast majority.

The flood of students who entered high school around 1910 to 1940 often sought an education that would lead directly to employment, not college. The economy had begun producing large numbers of white-collar jobs that demanded formal education in excess of that provided by the common school but less than that furnished by college.¹⁷ Even some blue-collar occupations demanded the cognitive skills furnished by a high school education, such as the ability to read manuals, interpret blue-prints, use complex formulas, and understand the fundamentals of geometry, chemistry, and electricity.¹⁸

Increased demand for a high school education by students not bound for college led to a questioning of the classical and Latin-scientific curricula. If high schools were to prepare students for life, rather than for college, the curriculum would have to change from that required by college. The English curriculum was the most popular successor to the classical; it dropped the Greek requirement and gave students more choice in foreign languages. In 1900, 51 percent of all high school students were enrolled in Latin; by 1934 only 16 percent were taking Latin.¹⁹ The new issue was whether high school should train students for employment by offering instruction in a host of practical arts. Vocational (including commercial), technical or manual, and industrial courses were rapidly incorporated into most high school curricula. By 1934, 10 percent of high school students were enrolled in bookkeeping, 17 percent in typing, and 9 percent in shorthand.²⁰

Then, as now, commissions were formed to study the effects of secondary schools on American manufacturing competitiveness. One of these, the Douglas Commission headed by Carroll Wright, the former U.S. Commissioner of Labor Statistics, concluded in 1906 that the current school system was not meeting the needs of industry. Some European countries had extensive industrial and manual training programs. By implication, then, the United States would lose out in world markets unless something was done

¹⁶ See Krug, *Shaping of the American High School 1880–1920*, pp. 62–63, for a discussion of the famous Committee of Ten Report issued in 1893 which advised secondary schools to offer alternatives to the classical and Latin-scientific programs. None of the alternative proposals, however, included the commercial and vocational courses that were to become part of the modern high school.

¹⁷ See Goldin and Katz, “Decline.”

¹⁸ On the increased demand for educated youths in blue-collar occupations, see Goldin and Katz, “Origins” and “Technology.” It has also been claimed that credentialization, or “signaling,” evolved in this period and that a high school diploma was the first credential of that type. See Labaree, *Making*.

¹⁹ U.S. Department of Education, *120 Years*, table 16. Krug, *Shaping of the American High School*, volume 2, notes that the classical curriculum was difficult to dislodge even in the 1920s, possibly because high schools wanted to ensure that some of their students could continue in college. Many secondary school programs were severely criticized as being elitist.

²⁰ Figures on curriculum are all from Department of Education, *120 Years*, table 16.

about training youths for manufacturing jobs.²¹ Many looked to the apprenticeship system in Germany, in which students combined academic subjects and industrial training. Such an industrial track, however, was quickly abandoned, a casualty of a lack of cooperation between firms and unions and a suspicion that tax dollars would support particular firms and industries.

STATE-LEVEL STATISTICS ON SECONDARY SCHOOL ENROLLMENT AND GRADUATION

The widely cited high school enrollment and graduation numbers for the entire United States, given in Figure 1, conceal cross-sectional differences and time-series changes of enormous consequence in understanding the diffusion of secondary school education in America. The South, for example, had meager high school enrollment and graduation rates, for white as well as black youths, early in the century but its high school rates converged on the rest of the country beginning in the 1950s. An illusion is thereby created that secondary schooling rates, from 1910 to 1970, increased gradually and continuously across the United States when, in fact, most nonsouthern regions show a burst of growth from 1910 to 1935 and then little change until the late 1950s.

A time-series compilation of secondary-school data at the state and regional levels has not previously been attempted. The reasons primarily concern the large number of sources required to construct the statistical history of secondary schools. Brief descriptions of the data, the statistical problems, and the methods used to overcome them are given because the data are at variance with the educational stock data in the 1940 U.S. population census, even though they are fully consistent with the flow data for the entire nation. Some information concerning how the data were constructed is needed to understand the reasons for the important differences.

*Construction of State-Level Statistics*²²

The state-level secondary schooling data come from several sources, and among the most important are the annual *Reports of the Commissioner of Education* for the years before 1918, and the *Biennial Surveys of Education* for the years 1917 to 1958. Other sources used include the reports of various state commissioners of education, documents pertaining to Catholic schools, and state and national surveys of colleges and universities regarding their preparatory departments.

²¹ See Massachusetts Commission on Industrial and Technical Education, *Report*.

²² Figures 2 through 6, the regressions reported in Table 3, and the discussion in the article are based on the data set, which is not included due to lack of space. The data are available from the author. A more extensive discussion on the construction of the data set can be found in Goldin, "Appendix."

The secondary school group in the United States has almost always been consistently defined as grades nine through twelve.²³ Two measures of education are developed and discussed here: the proportion of youths enrolled in the four secondary school grades (nine through twelve), and the proportion graduating from high school (as defined by the several states).²⁴ Attendance data do not exist for the states at the national level, but some states, in their separate educational bulletins, reported both enrollment and average daily attendance; and attendance data for youths in cities were collected by the federal government.²⁵ Graduation rate data, as well as enrollment retention rates from year to year, are the most reliable measures of secondary schooling for the entire United States.²⁶

State-level data on the number of individuals enrolled in and graduating from public and private secondary schools have been regularly collected by the U.S. Commissioner of Education since 1909. The commissioner requested such data from each secondary school on record with the U.S. Bureau of Education (later the U.S. Office of Education, and then the Department of Education).²⁷ After 1920, the school surveys were supplemented by the bureau with those undertaken by the various states. Undercounts between 1910 and 1922 required adjustments to the official U.S. Bureau of Education state-level statistics. The preparatory departments of colleges and universities were never included in the bureau's secondary-school surveys and have been added. Missing data, particularly for private schools, required other adjustments.

²³ Each state formulated its own definition of what constituted enrollment in various grades and graduation from secondary school. In most states, secondary school graduation enabled admission to the state university, and, for that reason and others, the state took great interest in the accreditation of secondary schools. Attendance in common schools for more than eight years generally did not constitute secondary-school participation. See Goldin and Katz, "Human Capital," for evidence that common schooling beyond nine years had no pecuniary return.

²⁴ Quality of education is another dimension. Objective measures of educational quality include days per year, hours per day, students per teacher, and resources per pupil. Also important are curriculum and performance measures. On curriculum changes in U.S. high schools from 1928 to 1990 see Angus and Mirel, "Rhetoric."

²⁵ The difference between enrollment and attendance is twofold. First, some students who enroll in September will never attend school, and second, students are absent for various reasons throughout the year. A sampling of various state reports in the 1920s indicates that the ratio of average daily attendance to enrollment exceeded 0.80. The ratio of average daily attendance to enrollment across U.S. cities in the 1920s was 87 percent. The city data are described in Goldin, "How America."

²⁶ The retention rate data are not presented here, but can be produced from the enrollment-by-grade data. Summer school and night school enrollments, it should be noted, are believed to be omitted in all of the state data. I have examined the possibility that the graduation data are understated by the omission of these numbers and find that, if they are, it would entail a trivial bias.

²⁷ The Bureau of Education, the forerunner to today's Department of Education, was established in 1867 and became the Office of Education in 1869, an agency of the Department of the Interior where it stayed for 70 years. It was known as the Bureau of Education for those 70 years, but in 1929 it was renamed the Office of Education. In 1939 it became part of the Federal Security Agency and was, in 1953, included in the new agency of Health, Education, and Welfare (HEW). The Department of Education became a separate cabinet-level agency in 1980.

Sometime in the 1920s, the bureau began to accept the state data and adopted a method for making revisions to the national data from the late nineteenth century. The procedure was never fully described by the bureau. For all years from 1910 to 1962, the total enrollment and graduation data I have produced by state are virtually identical to the national aggregates constructed by the Department of Education and contained in the widely used series in U.S. Bureau of the Census, *Historical Statistics*.²⁸ The difference is that my biennial or annual estimates are by state, sex, and grade; the bureau never published detailed estimates, if indeed it ever produced them. The data presented here begin with 1910 because the proportion of secondary schools responding to the Bureau of Education's request was low in prior years and evidence for all the states would be difficult to obtain.²⁹

Although the adjustments made to the original state-level data are many, most are confined to the years between 1910 and 1922 or concern the inclusion of private-school students and those in the preparatory departments of colleges and universities. Undercounts present the greatest potential problem with the school survey data collected by the U.S. Bureau of Education. Before 1920 the bureau relied solely on its own school surveys. Enrollment data in various state reports exceeded those in the bureau's school survey data. But there is scant commentary in the annual reports of the bureau regarding the possibility of an undercount. Mention was made that the number of responding schools was about 85 percent of the total in the 1910 to 1920 period but that because most were small the undercount of students was far smaller than that of schools.

Beginning in 1920 and continuing to 1938, the U.S. Bureau of Education attempted to reconcile their data with those reported by the states by requesting information from the states and publishing it in a separate section of the *Biennial Surveys*, "Statistics of State School Systems." Thus the *Biennial Surveys* from 1920 to 1938 contain two series for both the public and private schools. One was obtained from the school surveys and contains detail on students, teachers, and schools. The other, from the states, consists of only

²⁸ The adjustments made by the Bureau of Education prior to 1930 were poorly documented in the bureau's reports. So meager was the documentation that extremely able personnel at the current Department of Education made fundamental errors in interpreting them. An otherwise informative publication, U.S. Department of Education, *120 Years*, gives a largely inaccurate historical series on high school graduation rates. The revised data (such as that found in *Historical Statistics*) are used for the total, but graduates from private high schools are computed by subtracting from these the number graduating from public high schools, as given in the original *Annual Reports* and *Biennial Surveys*. This procedure results in an extremely large, and erroneous, figure for the private graduation numbers for the period to the mid-1920s. The public graduation numbers were largely revised by the U.S. Bureau of Education on the basis of state survey data. Therefore the total graduation data in *Historical Statistics* already reflect revisions to the published data of the U.S. Bureau of Education.

²⁹ My data series continues to the present but is used in this article to 1962 to highlight the most important historical period, 1910 to 1940. I include some years in the 1960s to show consistency because the sources change with 1958.

the enrollment numbers by grade. The state data have been treated as more accurate by subsequent researchers at the Bureau of Education. In constructing my series, I combine the evidence, using the school survey data for the detail and the state data for the totals. In the early 1930s the U.S. Bureau of Education began to augment their school survey information with data from the records of the various state departments of education and, in consequence, the enrollment data from the two surveys are virtually identical with that report and after.³⁰

To summarize, the data on enrollments and graduation before 1920 were obtained by the U.S. Bureau of Education through their school surveys. From 1920 to 1938 the bureau obtained data both from schools and from the states. The data obtained from the states contain only enrollments, not graduates, although enrollments are given by grades. Therefore, for the 1920 to 1938 period the state data can be used to revise those from the school surveys, but there are no easily obtainable state-level data for the period before 1920.

The bureau, it appears, later adjusted the national enrollment data for the 1910 to 1920 period by a factor of 1.175, under the assumption that their data were 85 percent those of the states. The bureau also applied the same correction to the graduation numbers for both public and private secondary schools.³¹ (The widely used U.S. graduation rate data in *Historical Statistics*, series H-598, contain these numbers.) I have, instead, adjusted the 1910 to 1922 data using the ratio of the enrollment reported by the state to that from the school reports for the first reliable subsequent year, 1924. Any resulting state enrollment and graduation numbers that seemed anomalous were checked, when possible, against the individual state reports, and any differences were reconciled.

It is likely that my procedures, if they err, overstate enrollment in and graduation from public high schools in the early period.³² Because I emphasize the large increase over time in secondary school enrollment and graduation, a bias that increases schooling numbers in the 1910s is preferred to one that lowers such numbers. Particularly in the comparison with the educational attainment data from the 1940 census, the preferred bias in the contemporaneous data is one that creates an upper bound to the actual numbers.

Private school data on enrollments and graduates at the state level also had to be revised for the 1910 to 1922 period. The adjustments employed are

³⁰ Any differences seem due to the exclusion of data from schools with fewer than 10 pupils.

³¹ Although there is no mention that this was the procedure used, one can virtually duplicate the national graduation numbers with such a procedure. But there is no reason that the undercount of enrollment should have been the same as the undercount of schools and, similarly, that the undercount of graduates should have been the same as the undercount of enrollments.

³² The implied undercount of students is almost identical to the percentage of schools not reporting, yet the schools that did not report were smaller than average.

similar to those used for the public school numbers. The final undercount of importance concerns students in the preparatory departments of colleges and universities.³³ The students in these preparatory departments were not included by the Bureau of Education in the high school numbers. Rather, they found their way into the college category because schools, not students, were surveyed by the commissioner.

In 1910, preparatory students in U.S. colleges and universities were 31 percent of all private high school students and in 1920 they were 22 percent. Although private schools were a substantial fraction of all secondary students before 1910, the fraction fell with the expansion of public high schools. By 1910, the year this study begins, the fraction of all secondary school graduates from private schools nationwide was 18.2 percent. It declined further to 12.8 percent in 1920 and then to 10 percent in 1930. Large variations exist in the percentage by region and over time. Whereas the greatest fractions in private secondary schools before 1920 were in the South, the greatest fractions since the 1930s have been in the New England and Middle Atlantic states.³⁴

The data construction just described produces graduation and enrollment statistics by state and, when aggregated, by region. To obtain the more useful graduation and enrollment *rates*, the relevant population (14 to 17-year olds for enrollment; 17-year olds for graduation) is used as the denominator.³⁵

Two other sources could potentially yield national information on both school going and educational attainment for the period under consideration. Both are from the federal population censuses. Prior to 1940, the population censuses gave contemporaneous information on school going, derived from a question concerning whether the individual attended school during the previous year. Although the data correlate well by state with those I have constructed, the levels are considerably higher. The reason concerns the question asked. The census requested information on attendance at any school, for even one day in the previous year. The school could have been a music, technical, vocational, or academic institution and could have operated at night or during the day, for the summer or school year. The other source is the 1940 and subsequent censuses which asked information on highest grade completed. These data have been used by many researchers to

³³ Prior to the expansion of public secondary schools, colleges and universities in many states could not depend on high schools to produce sufficient numbers of properly trained students. When the University of Nebraska opened its doors in 1871, for example, just one public high school existed in the state. Many colleges and universities, therefore, instituted their own preparatory departments and some still exist.

³⁴ Data on private schools are not presented due to space limitations and are available from the author.

³⁵ The convention is to use these age groups. The population data were estimated by a constant growth-rate interpolation between the decennial census years.

calculate completed grades by cohort.³⁶ But the data for many older cohorts produced from this source are at variance with the contemporaneous data from secondary schools. More comments on this topic follow later.

WHERE AND WHEN DID AMERICA GRADUATE FROM HIGH SCHOOL?

Graduation Data

The state-level high school data constructed by the methods just outlined can document educational advances during the period of the high school movement. Even though the procedures produce state-level estimates, there are compelling reasons to aggregate to the standard nine census divisions. Most important is that within-region levels and movements are similar across states and thus that aggregation allows one to summarize the movements of 49 separate series. Another matter for consideration is whether enrollment or graduation rates should be used. For most of the states the two move together, but graduation data are far cleaner in the sense that they contain fewer biases and potential inconsistencies.

The public and private graduation rates (number of graduates/17-year olds) by region are graphed in Figure 2. The upper panel contains the three northern and midwestern regions (New England, Middle Atlantic, East North Central) and the lower panel has the three western regions (West North Central, Mountain, Pacific), all for 1910 to 1962. Figure 3 graphs the same for two regions of the South (South Atlantic, East South Central) and for white youths (in the South Atlantic) for 1930 to 1954, the period of data availability.³⁷

In all nonsouthern regions, the total (public and private) graduation rates were at or below 10 percent in 1910 although each series rose to 50 percent or greater by the mid-1930s. In 1935 the median 17-year old in these regions was a high school graduate, although just 15 years earlier in 1920 the youth stood only a 20 percent probability of having a high school diploma. The increase in graduation rates from 1920 to 1935 was extremely rapid, particularly so during the early years of the Great Depression in the industrial areas of the northeast and Midwest.

Graduation rates, in all regions, were substantially lowered immediately before and during American involvement in World War II, although the G.I. Bill later increased high school rates to abnormally high levels.³⁸ Even when private schools are added to the total, graduation rates in the 1950s are no

³⁶ See, for example, Smith and Ward, *Women's Wages*.

³⁷ For clarity, only two of the three southern regions are graphed.

³⁸ The reason they are increased above normal is because the denominator here is the number of 17-year olds and all returning G.I.'s would have been older than 17. The G.I. Bill granted stipends to returning soldiers and covered high schools, as well as colleges. See Olson, *G.I. Bill*.

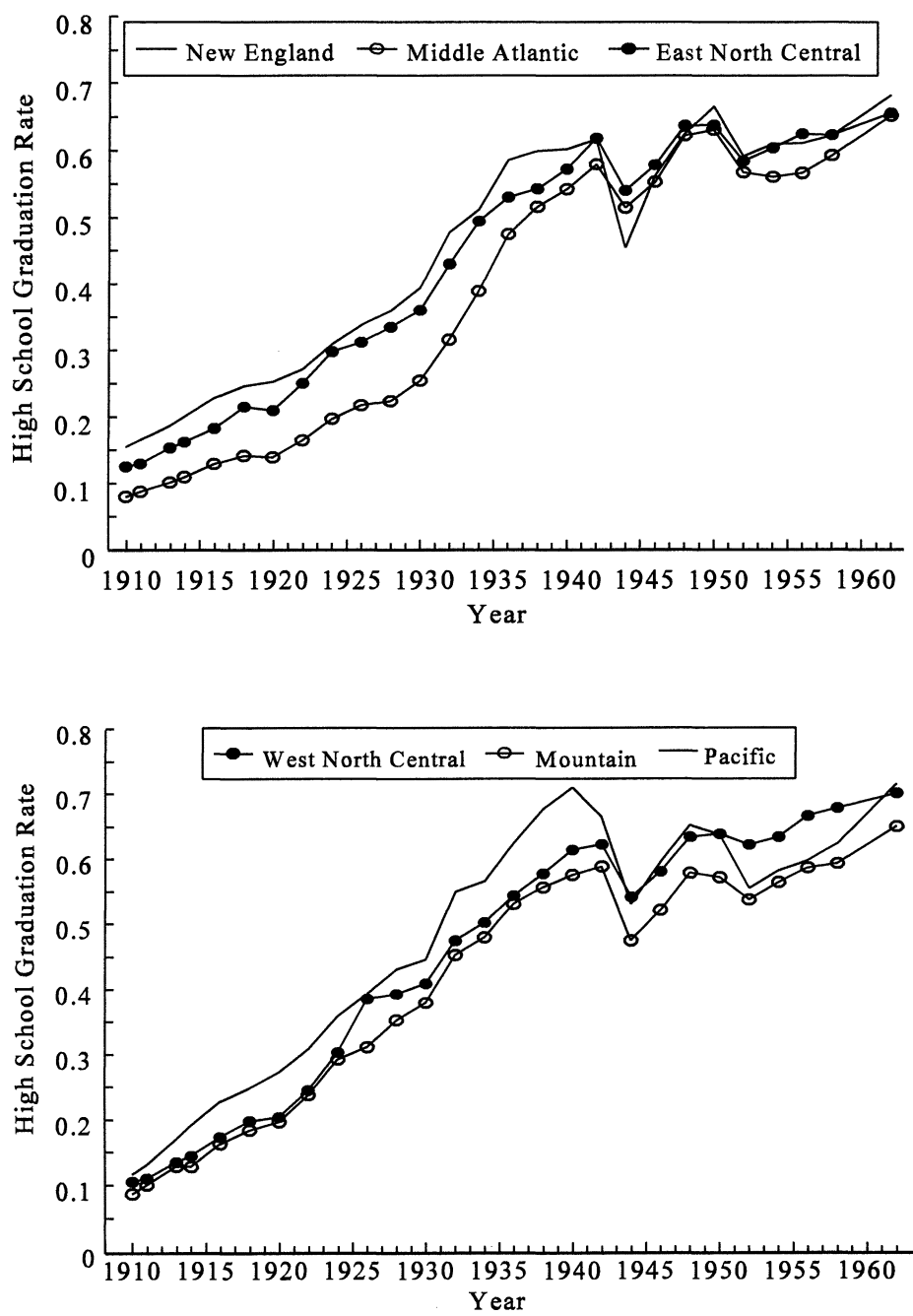


FIGURE 2
TOTAL (PUBLIC AND PRIVATE) HIGH SCHOOL GRADUATION RATES

Notes: Males and females are combined. 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 census years.

FIGURE 2—continued

Sources: U.S. Bureau of Education, *Report*, (various years); U.S. Bureau [Office] of Education, *Biennial Survey*, (various years); U.S. Department of Health, Education, and Welfare, *Statistics of State School Systems and Statistics of Non-Public Secondary Schools*, (various years); and National Catholic Welfare Conference, *Summary*, (various years). See also Goldin, "Appendix." Population data are from the U.S. Population censuses (1910 to 1970).

higher than are those of the late 1930s.³⁹ In most nonsouthern regions, high school graduation rates did not increase, or increased only slightly, during the twenty years after 1938.⁴⁰ The extraordinarily rapid increase in high school graduation rates in the 1930s is probably the reason.

The reduction in graduation rates during World War II occurred in all regions but was largest in the New England and Pacific states, the sites of many war-time industries. The decrease was not primarily due to the military recruitment of high school boys for most would have been below draftable age. Rather, high school youths moved into civilian jobs as wages rose disproportionately at the lower end of the wage distribution. World War I had a similar impact, although it is barely noticeable in Figure 2 because the levels are lower. Female youths also left high school during World War II, although less than did males (see Figure 4). Teenaged girls were attracted by many of the same factors that enticed boys to leave high school—the increase in the relative wage of unskilled labor.⁴¹

The three western regions—West North Central, Mountain, and Pacific—had greater increases in graduation rates during 1910 to 1940 than did the regions of the East and the increases were more continuous. Rather than getting off to a slow start and then having a large spurt from 1920 to 1940, as did the industrial states of the East and Midwest, the states of the West and the Plains had high school graduation rates that grew more rapidly during the pre-Depression period.⁴²

The regions of the South are distinguished from the others in the considerably lower initial secondary schooling levels and their more continuous increase to the end date (see Figure 3). Nor are the data much altered when only the white population is considered, as it can be for the years from 1930

³⁹ Private school graduation data are available after 1934 for only a few years in the 1940s and 1950s. The data for the 1950s have been constructed from Catholic school reports (National Catholic Welfare Conference, *Summary*), not readily available for the late 1930s.

⁴⁰ The Office of Education recognized in the 1950s that their method of collecting enrollment data led to numbers that were inflated by about 2 percent because students could be enrolled any time during the school year. They switched to a fall enrollment basis in the 1960s, thus reducing the potential for double-counting. The change does not affect the graduation data.

⁴¹ Young, high-school aged women were also enticed to leave school by the chance to work in jobs they could not have entered before the war.

⁴² Graduation and enrollment rates in the Pacific region increased so greatly during the 1930s that they exceeded levels attained in the early 1950s. The reason does not appear to be the inclusion of part-time students but may, instead, be due to the effects of the Depression combined with the generosity of its public education system.

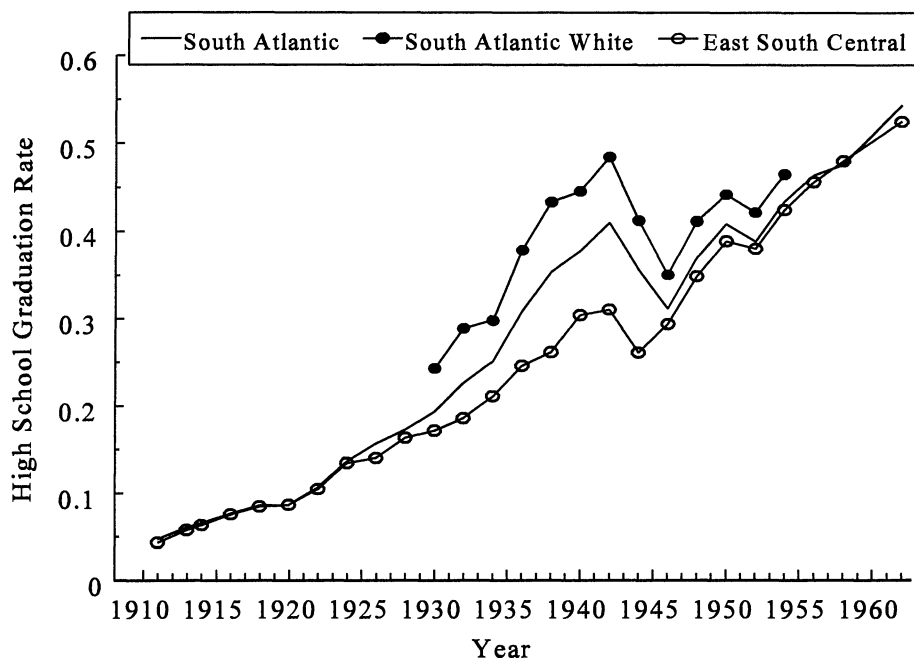


FIGURE 3

TOTAL (PUBLIC AND PRIVATE) HIGH SCHOOL GRADUATION RATES FOR THE SOUTH ATLANTIC (TOTAL AND WHITE) AND EAST SOUTH CENTRAL REGIONS

Notes: Males and females are combined. 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 census years.

Sources: See Figure 2.

to 1954. There is a discernible increase during the Depression, but the timing is different from that in other parts of the nation. The revolution in high schools did not take place in the South during the 1920s and 1930s but was drawn out over a much longer period of time. But even though the South lagged the rest of the nation in educational attainment, its rates of secondary school enrollment and graduation were still higher than were those of many nations at the time.

In all years and regions, although just two (Middle Atlantic and East North Central) are shown in Figure 4, the female graduation rate was higher than that for males.⁴³ It was considerably higher in New England, the West North Central, and the Mountain states. That differences by sex are found in all states suggests that the return to high school education, relative to grammar school, was greater for female than male youths. A high school education for a young woman meant entree to office jobs, whereas its ab-

⁴³ The data in Figure 4 are for public high schools only because the data for private schools are not always separated by sex. The fraction in private schools declined in the 1930s and rose in the 1950s, accounting for the apparent decrease in Figure 4 in graduation rates after 1950.

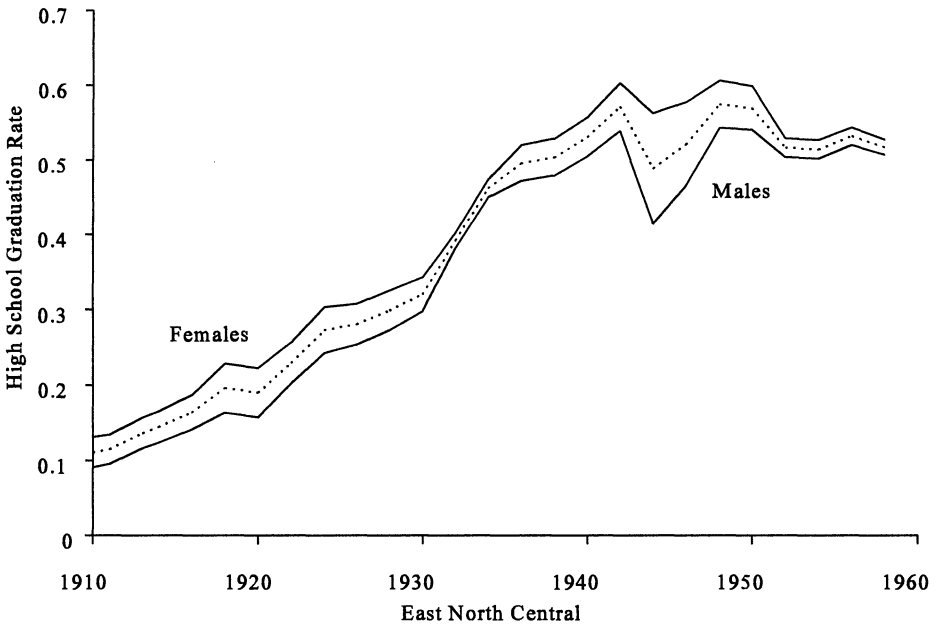
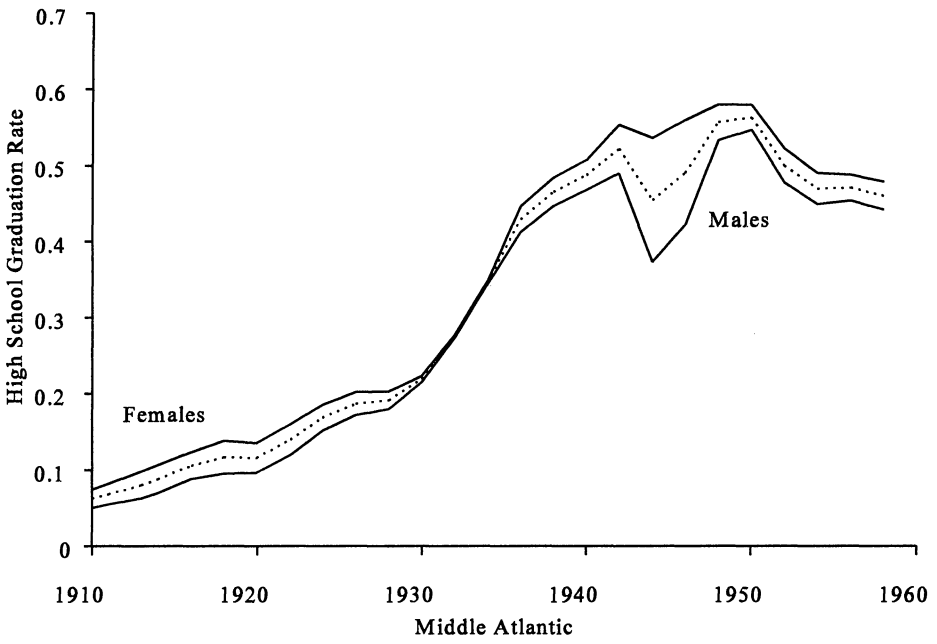


FIGURE 4
PUBLIC HIGH SCHOOL GRADUATION RATES BY SEX:
MIDDLE ATLANTIC AND EAST NORTH CENTRAL REGIONS

FIGURE 4—continued

Notes: The number of public-school graduates is divided by the approximate number of 17-year olds in the state. Constant growth rate interpolations of population data are made between census years. The dotted line is the public-school graduation rate for both sexes.

Sources: See Figure 2.

sence meant a low-wage manufacturing job as an operative.⁴⁴ At a time when physical strength still mattered and jobs in various crafts were strictly limited to males, secondary schooling for girls had a higher relative return than for boys.⁴⁵ It should be realized, however, that the internal rate of return was lower for girls because of their lesser life-time labor force participation.

Enrollment Rates

Another measure of high school participation and attainment is the enrollment rate. Figure 5 contains public and private secondary-school enrollment data for the New England, Middle Atlantic, East North Central, and Pacific regions. The enrollment rate divides the enrollment number by youths 14 to 17-years old.⁴⁶ The graph shows similar trends to those using graduation rates.⁴⁷

All nonsouthern regions experienced substantial increases in secondary school education during the 1910 to 1940 period, although those of the industrial North initially lagged. Certain regions, mainly in the West and the Plains, underwent the most rapid expansion and in those areas both graduation and enrollment rates were high even before the onset of the Great Depression. Most northern states experienced an expansion in secondary schooling during the 1930s that was far greater than that experienced by other regions. Growth was so rapid in all non-South regions that rates of enrollment and even graduation in the 1930s remained in place for more than twenty years. Finally, teenaged girls enrolled in and graduated from high school at far greater rates than did boys.

Soaring enrollments of the magnitude experienced—increasing by three to four times in the 15 years from 1920 to 1935—meant that school districts, across the United States, had to contend with vastly increased expenditures and corresponding tax burdens. Each high school student cost twice as much to educate per year, in terms of variable costs, than did each elementary

⁴⁴ See Rotella, *From Home*; and Goldin, *Understanding*.

⁴⁵ Goldin and Katz, "Human Capital," estimate that the return to a year of high school was 12.5 percent for (unmarried) females and 11.9 percent for males 18 to 34 years old. The return to a year of grammar school was just 6.0 percent for females but 10.1 percent for males. Thus the only way that a young woman could reap a reasonable return from schooling was to continue with high school.

⁴⁶ Enrollments are probably "fall," although each state was allowed to employ its own definition, such as enrollments throughout the year. The U.S. Department of Health, Education, and Welfare systematized the data in the 1960s to make them all fall enrollments.

⁴⁷ Data on enrollments are not given due to lack of space.

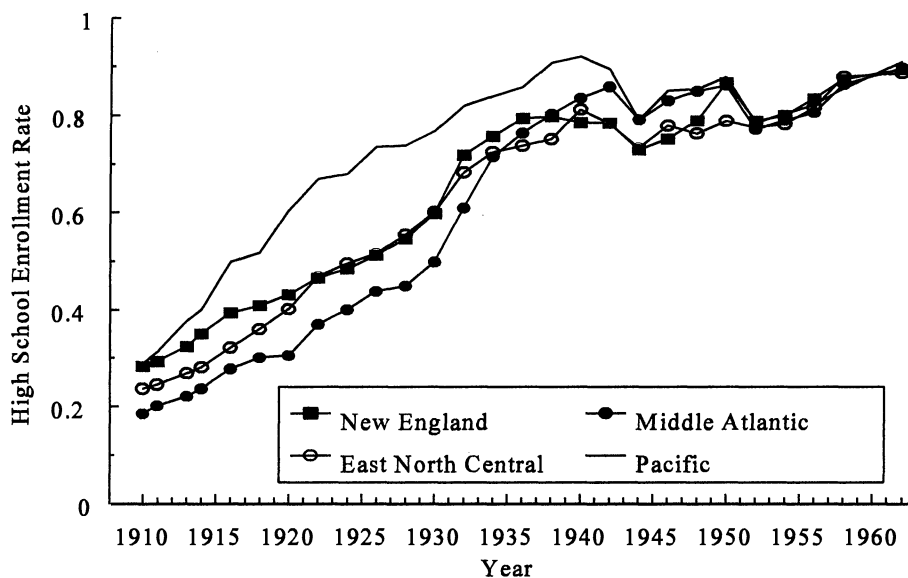


FIGURE 5
TOTAL (PUBLIC AND PRIVATE) SECONDARY SCHOOL ENROLLMENT RATES
IN FOUR REGIONS

Notes: Males and females are combined. 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 census years.

Sources: See Figure 2.

school student, and more high-school youths also meant the building of more schools.⁴⁸ It should not be surprising, therefore, that the states with the greatest wealth per capita—those of the Far West and Great Plains—were those with the earliest and most rapid increases in secondary education rates.

Contemporaneous and Retrospective Education Data

The data just discussed are contemporaneous flow data, whereas the growth calculation that I began with uses educational stock data. The stock data can be built up from flow data or, alternatively, can be directly estimated using the U.S. federal population census ever since 1940. But the educational stock data for certain cohorts are largely inconsistent with the flow data, often included in the same statistical reference sources (such as U.S. Bureau of the Census, *Historical Statistics*). The numbers I have produced allow the differences to be further explored by sex, geographic area, and secondary school grade and thereby point to the factors that may ac-

⁴⁸ The estimate of the ratio of high school to elementary school variable costs comes from various state reports. It can also be calculated indirectly from the data on pupil-teacher ratios in U.S. Bureau of the Census, *Historical Statistics* (series H 423, 428) and teachers' wages. The city-level data from Goldin, "How America," produce a similar estimate.

count for the disparities. In brief, the stock data from the 1940 federal population census for individuals older than 35 years greatly overstate the educational attainment of the U.S. population, particularly high school graduation. The contemporaneous flow data show that there were insufficient spaces in high schools to have accommodated the large numbers of Americans who claimed, in their older years, to have completed twelve years of schooling, a claim that has been, at times, erroneously translated into high school graduation.

In comparing educational attainment by cohort across censuses, many researchers have noticed that cohorts gain schooling over time even if they did not go back to school.⁴⁹ People, it is claimed, simply inflate their educational attainment, and, moreover, this inflation is larger during periods of substantial gains in schooling.⁵⁰ It should be apparent from Figures 2, 3, and 5 that educational attainment increased enormously from 1920 to 1940. If there were ever a census when older cohorts would have seen reason to inflate their educational attainment, 1940 would have been it.

There are also other reasons why the 1940 educational stock data might not be consistent with the flow data. Many older Americans, particularly those who grew up in rural areas, had been students in ungraded elementary schools. Others were left back, and thus attended school for more years than grades. Although the census question was framed in terms of grades and not years, it may not have been fully understood. Because the 1940 census was the first to request information on educational attainment, census takers may have been insufficiently trained to elicit accurate responses in a population with so many who had attended ungraded schools.

Large differences are apparent between the 1940 census data on high school graduation and those from the contemporaneous series in Figure 6, either for all males (upper panel) or those born in nonsouthern states (lower panel). The graduation rate computed from the 1940 census is the fraction of males at each birth year who claimed to have *completed* twelve grades, translated in the 1940 census as graduating high school. The contemporaneous data are lined up with the 1940 census data by assuming that graduation occurred at age 18, but the results are largely unaffected if graduation occurred at seventeen or nineteen.

The top two lines in each panel of Figure 6 are derived from the 1940 census. One gives the graduation rate for males born in the given area (either

⁴⁹ See Denison, *Trends*; and Folger and Nam, *Education*, for comments that the retrospective schooling data from the 1940 federal population census do not agree with the contemporaneous data from the Commissioner of Education reports.

⁵⁰ Consider an individual who finished tenth grade in 1910 but who did not graduate high school because no school in his district went through grade 12. If five years later there was such a high school and individuals five years younger, but identical to him in other ways, had graduated, he could legitimately feel that he did as well.

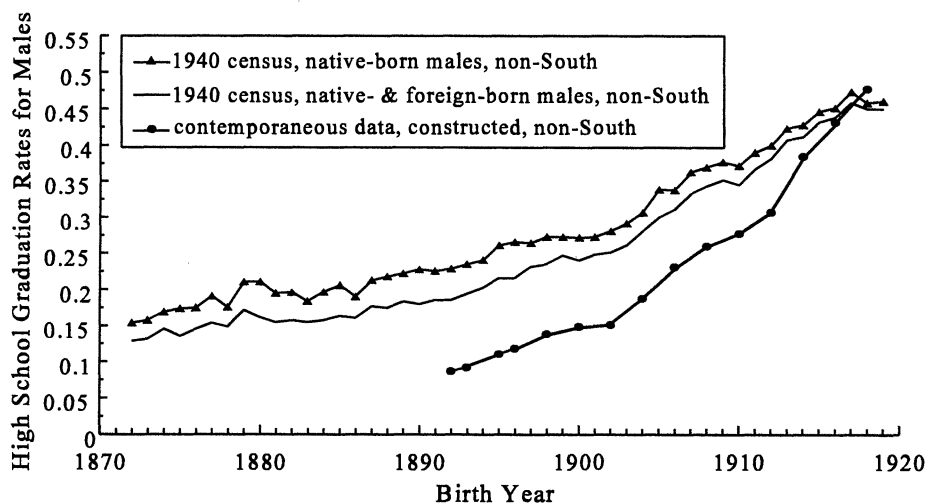
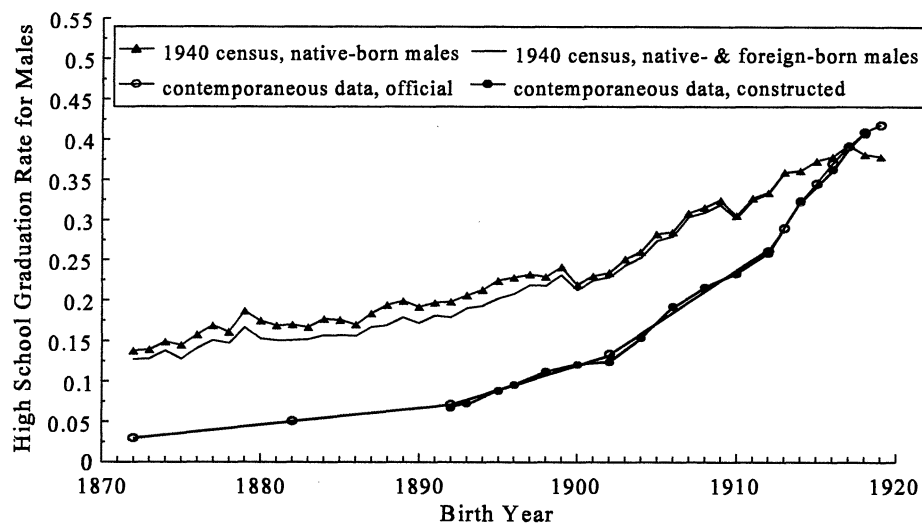


FIGURE 6

CONTEMPORANEOUS AND RETROSPECTIVE HIGH SCHOOL GRADUATION DATA
FOR COHORTS BORN 1872 TO 1919, ENTIRE UNITED STATES
AND NON-SOUTHERN STATES

Notes: 1940 census, native-born males is the proportion of men born in the United States (or born in nonsouthern states) who reported twelve or more years of education and who had completed the twelfth grade. The birth year is (1940 minus age). Southern states are those in the census regions South Atlantic, East South Central, and West South Central and include the District of Columbia. 1940 census, native- & foreign-born males is the same as above except that the foreign-born are included and are assigned to their area of current residence. Contemporaneous data, constructed are the number of male graduates from public and private high schools divided by the number of 17-year olds.

FIGURE 6—continued

Sources: 1940 census, native-born males and 1940 census, native- & foreign-born males are from 1940 Public Use Micro-data Sample (entire 1/100 sample). See ICPSR, *Census. Contemporaneous data, official* are from U.S. Department of Education, *120 Years*, table 19. *Contemporaneous data, constructed* are from Bureau of Education, *Report* (various years); and Bureau [Office] of Education, *Biennial Survey* (various years). See Figure 2 for additional sources.

the entire United States or the non-South) and thus excludes the foreign born. The other line (that directly beneath it) includes the foreign born currently living in the area. If the foreign born did not continue their formal education once they entered the United States, then the upper line is correct for comparison with the contemporaneous data. If, instead, all the foreign born in an area received their high school education there, the lower line is correct. The true line is probably closer to the top one. The third and fourth lines (upper panel only) come from the contemporaneous graduation data just discussed.

In sum, the graduation rate data from the 1940 population census for cohorts that were 18-years old in the 1910 to 1920 period are overstated, possibly by a factor of 1.5 or 2.⁵¹ The implication of the finding for the growth calculation with which I began is that it is underestimated. The growth of the actual educational stock is greater than that given by the population census stock estimate. The implication for estimates of the returns to education for the older cohorts is more complicated.⁵² The new state-level data on graduation and enrollment suggest caution in using the stock estimates of schooling for the older cohorts of this century derived from the 1940 U.S. population census.⁵³

EXPLAINING VARIATION IN SECONDARY SCHOOLING ACROSS STATES

That a unique and major educational change swept much of the United States in the period from 1910 to 1940 is clear. Also apparent is that it was very much a grass-roots movement, albeit with some coordination through state legislation and the prompting of various national educational associa-

⁵¹ The results also hold for females and for each region. The differences are less, however, for the higher-education regions, as can be seen in Figure 6 in the comparison between the entire United States and the non-South.

⁵² The bias in the return to education in the 1940 census, for example, could go in either direction. If the more economically successful inflate their educational status, then the return to education will be biased upward. But if the bias in reporting is independent of economic success, the return to a year of education will be biased downward.

⁵³ Similar calculations with regard to grade ten completion show that it was mainly high school graduation that was overstated. The percentages completing grade ten in the stock and flow data are much closer. Because the high school completion data are overstated in the 1940 census, it is likely that the college data are as well. The 1950 population census probably also contains the same bias for older cohorts, but by then various cohorts had returned to school under the G.I. Bill and, furthermore, the G.E.D. (General Educational Development) examination existed.

tions. Why the movement occurred and what explains how it was differentially received across America is a long and involved tale.⁵⁴

Although the United States was unique in the developed world in embracing universal and free (nonvocational) secondary school education in the early part of this century, there were vast differences across America in the timing of change (see Figures 2, 3, and 5). One of the most intriguing aspects of the state-level enrollment and graduation data is that the areas of the United States that embraced the high school movement earliest and in which it grew the fastest were often farming, ranching, and mining states. But they shared much in common for they were relatively wealthy and more homogeneous in this respect than were most of the eastern states.

Even though educational advances, up to the early twentieth century, were most rapid in New England, the high school movement in the 1920s spread clear across the nation tracing out what I will term the "educational belt." Maine and Massachusetts, and some other states of New England, had high rates of secondary school enrollment by 1910. But by the early 1920s the states with the highest rates were those of the Far West and the Plains. It was to Indiana, Iowa, Kansas, Nebraska, California, Washington, and Oregon that the high school movement next spread, literally leaping across the country from its birthplace in New England. The western states had high levels of wealth per capita and their citizens were often more homogeneous in their income and wealth than were those in the industrialized East and Midwest. They were also states in which vast distances would have to be traversed to bring students to high schools.

High schools were generally more than four times larger than rural elementary schools and often required the consolidation or union of that many districts. The automobile, the school bus, and improved roads were of critical importance to secondary school education in America and may account for why the movement took off so rapidly in the 1910s and 1920s.

High levels of income and wealth, and its relative homogeneity across families, were not the only factors that led to differences in secondary schooling across states. Industrial employment is another. Many types of manufacturing employment served to reduce the level of high school education by increasing the opportunity cost of schooling. I do not mean to imply that high school education did not have a substantial rate of return for youths faced with manufacturing job opportunities close to home. But I do want to suggest that young people and possibly their parents had a shorter time horizon when jobs for teens were close at hand. The role of manufacturing jobs in slowing the high school movement meshes with the fact that the onset of the Great Depression produced a large increase in secondary

⁵⁴ For further discussion see Goldin and Katz, "Why the United States."

schooling in the more industrial states and that World War II decreased graduation rates in all regions.

The variables that are thought to determine educational outcomes involve both the individual (the demand side) and the educational jurisdiction (the supply side). For the individual, the factors are generally summarized in the expected returns from schooling. Returns should incorporate the costs of education, most importantly opportunity costs. Parental resources will also determine schooling decisions, to the extent that the capital market is imperfect, which it presumably was for these youths.⁵⁵ Finally, the financial resources of the school district will determine its ability to tax and to borrow. Two sets of economic factors, other than the North-South divide, are of overwhelming importance in explaining cross-state variation in secondary schooling just before the Great Depression. They are per capita wealth or income (or agricultural income per agricultural worker), and the manufacturing wage and the extent of manufacturing employment. The following analysis is offered as suggestive of the factors that encouraged the high school movement to spread and it should be thought of as an exploration in reduced-form mode.⁵⁶

The high school graduation rate by state is regressed on the two sets of variables and some characteristics of the states' population (percentages foreign born and urban) as well as a South dummy. One set of variables includes the percentage of the work force in manufacturing, the manufacturing wage, and an interaction between the two. The other set is either per capita wealth or agricultural income per agricultural worker. The year chosen for the graduation rate data is 1928, although most any other year in the 1920s will do just as well; the years available for independent variables range between 1920 and 1930.⁵⁷ The results are given in Table 3.

There are two defensible assumptions in the estimation. One is that manufacturing wages were largely unaffected by the labor supply decisions of youths. Youths were but a small percentage of the manufacturing labor market. The second assumption is that the wage of educated workers (say, that of office workers) did not vary significantly across states. Evidence indicates that non-production-worker earnings varied far less than did production-worker wages.⁵⁸ Given the two assumptions, the regressions in

⁵⁵ See Parsons and Goldin, "Parental Altruism," for a model of educational investment. Also see Goldin and Katz, "Why the United States" on incorporating public choice into such models.

⁵⁶ The robustness of these results is demonstrated in Goldin and Katz, "Why the United States," which also includes factors accounting for state wealth distribution, religion, community stability, and public university availability, among others. Similar results are shown to hold at the city level.

⁵⁷ A full panel cannot be assembled because there are too few variables that are time variant at the same frequency as the education data. But see Goldin and Katz, "Why the United States" for various regressions explaining the change in graduation rates between 1910 and 1928, and 1928 and 1938.

⁵⁸ Data assembled from the census of manufactures for 230 non-South cities reveal that although manufacturing wages did vary substantially across regions, the wages for more-educated workers (cler-

Table 3 can be viewed as tracing out a demand curve for schooling as a function of the opportunity cost of school (the manufacturing wage) holding the tax base (wealth or agricultural income) and other factors constant.

Both the manufacturing wage and per capita wealth (or, alternatively, agricultural income per farm worker) have positive coefficients, as does the percentage of the work force in manufacturing. But the interaction term between the two variables (manufacturing percentage and wage) shows that when the percentage in manufacturing is somewhat greater than its mean (when it exceeds 0.272, using column 1), the relationship between the graduation rate and the wage is negative. Similarly, when the manufacturing wage is a bit larger than its mean (when it exceeds \$1,241 using column 1), the relationship between the graduation rate and the percentage of the labor force in manufacturing is also negative.

The findings can be interpreted in the following manner. Wealth per capita and agricultural income per agricultural worker are reasonable measures of the tax base for most states in the period.⁵⁹ But as the proportion of the work force in manufacturing increased and as the wages of manufacturing workers did, the opportunity cost of schooling rose. Thus when the manufacturing sector was large enough, an increase in its wage served as a potent drag on the education of youths. When the manufacturing sector is sufficiently large, the two sets of variables produce effects akin to the classic ones of income and substitution. Thus states with high levels of education were those that were wealthy (income effect), but were also those without large manufacturing sectors (substitution effect).

But because agriculture was a declining sector by employment, states rich in agriculture, yet poor in manufacturing, schooled their youth to become educated migrants.⁶⁰ States with moderate to high, agricultural income per capita yet small urban and manufacturing sectors (for example, Kansas, Nebraska, Nevada) eventually exported their educated populations to some other states. States at the other end of the income spectrum, such as those in much of the South with poor agricultural and manufacturing sectors, were

ical workers) did not. The ratio of the highest to lowest mean clerical earnings across the six non-South census regions was 1.089 in 1915, but was 1.366 for production workers (both weighted by the relevant number of workers). For a description of the data see Goldin and Katz, "Decline."

⁵⁹ Total per capita income is less strongly related to education than is income from agriculture or wealth. The reason may have something to do with the role of homogeneity of income rather than its level and the negative impact of income from certain sources, such as manufacturing.

⁶⁰ Many state education reports openly acknowledged that the educated children of the farm population would leave rural areas. That for Kansas c.1917 noted: "One theory holds that . . . rural high school [youth] . . . should be given chiefly such work as will best fit [them] for rural vocations and for citizenship in a rural community. The other holds that . . . the chief reason for establishing high schools in the country communities is to enable the boys and girls . . . to enjoy the same sort of high-school advantages as are enjoyed by those who live in the larger centers. The latter point of view seems to be the prevailing one" (Kansas Superintendent of Public Instruction, *Biennial Report*, 1916–1918, pp. 61–63).

also net exporters of their populations. But in this case, the populations, in comparison, were less well-educated. States somewhere in the middle (for example, California, Ohio, Wisconsin, Michigan) were the net receivers, and thus the relationship between education and net migration, across all states, is an inverted U-shaped one.⁶¹

CONCLUDING REMARKS

The period from 1910 to 1940 witnessed the second great transformation of American schooling: the rise of the public high school. The first transformation was the spread of the common school in the mid-nineteenth century and the third was the rise of college education in the post-World War II period. Neither was as spectacular in its increase as was the rise of the public high school. In 1938 the median eighteen-year-old in the East North Central region, for example, was a high school graduate, although in 1920 he had stood a 15 percent chance of having a diploma.

Much of the gain in educational attainment from 1900 to 1970 came from increased high school, not college, attendance. High-school enrollment and graduation rates in the North and West rose rapidly between 1920 and 1935. Rates achieved by the mid-1930s were maintained for the next 15 to 20 years before increasing again to recent levels.

At the state level, higher per capita wealth or income (or agricultural income per worker) had a strong positive effect on secondary schooling, a likely result of the richer tax base and higher income parents. Manufacturing labor demand, primarily the availability of operative positions in certain industries, was a drag on education, and the Great Depression provided an ironic fillip to schooling through its elimination of many jobs, particularly those for teenage males.

The rapid increase in high-school enrollments and graduation rates was the response of a latent demand for more schooling to the building of public high schools, a decrease in transport costs, and a change in the curriculum. School propaganda campaigns cannot be ruled out as an influence, but they probably operated more like informative, rather than deceptive, advertising. The returns to education at the start of the high-school movement were high, although the rewards mainly accrued to those who shifted from manual jobs, in manufacturing and agriculture, to white-collar positions.⁶² The demand

⁶¹ A regression of the net migration rate, between 1920 and 1930 or between 1930 and 1940, on the graduation rate in 1928 (and its square) shows the quadratic relationship. The relationship is unaffected by the inclusion of per capita income in 1929 and the share of the labor force in manufacturing in 1930. When estimated across only the northern and Midwestern states the relationship is negative. States with higher levels of education earlier in the twentieth century had a larger out-migration or smaller in-migration. The migration data are from Lee, Miller, Brainerd, and Easterlin, *Population Redistribution*.

⁶² Male clerical (office) workers in the Northeast and Midwest earned 1.5 times what male production workers did in both 1910 and 1915. The ratios were higher for females. Male clerical and su-

for juveniles in manufacturing declined substantially just prior to the rapid increase in high schools and the demand for white-collar workers, particularly in offices, rose.⁶³ A decade or two later, in the 1920s, the demand for high school-educated blue-collar workers would increase in the more capital-intensive and higher-technology industries of the day.⁶⁴

States that pulled ahead of the pack in secondary schooling were most often in rich agricultural areas with high, and narrowly distributed, per capita income but moderate manufacturing activity. Income convergence among the states was exceptionally strong in the 1929 to 1947 period.⁶⁵ But the states with higher secondary-school graduation rates in the 1920s achieved income levels significantly greater than a simple convergence process would predict.⁶⁶ Education mattered at the individual level and at that of the state. That higher levels of education caused the United States to grow more rapidly than other countries is a more difficult proposition to prove. One fact is certain, however. In the 1910 to 1940 period America pulled far ahead of other industrial economies in both education and income. America had graduated from high school; the people in virtually no other country had.

pervisory workers earned about twice what male production workers did from 1890 to 1915. See Goldin and Katz, "Decline," for wage series by sex for ordinary white-collar workers, 1890 to 1939.

⁶³ The demand for juveniles decreased in the early 1900s, particularly in those industries that mechanized and substituted adult foreign-born labor plus capital for craft workers plus juveniles. See Osterman, *Getting Started*. One piece of evidence in support of this claim is that the proportion of all employed male teenagers working in the manufacturing sector declined from 1900 to 1910 relative to the same proportion for male workers of all ages. See Goldin, "How America," table 7.

⁶⁴ See Goldin and Katz, "Origins."

⁶⁵ See, for example, Barro and Sala-I-Martin, "Convergence."

⁶⁶ See Goldin, "How America," table 8.

REFERENCES

- Angus, David, and Jeffrey Mirel. "Rhetoric and Reality: American High School Course Taking, 1928–1990." In *Learning from the Past: What History Teaches Us About School Reform*, edited by Diane Ravitch and Maris A. Vinovskis, 295–328. Baltimore, MD: Johns Hopkins University Press, 1995.
- Barro, Robert. *Determinants of Economic Growth: A Cross-County Empirical Study*. Cambridge, MA: MIT Press, 1997.
- Barro, Robert, and Xavier Sala-I-Martin. "Convergence across States and Regions," *Brookings Papers on Economic Activity*, Vol 1. Washington, DC: The Brookings Institution, 1991: 107–82.
- Denison, Edward F. *Trends in American Economic Growth, 1929–1982*. Washington, DC: The Brookings Institution, 1985.
- Folger, John K., and Charles B. Nam. *Education of the American Population*. A 1960 Census Monograph. Washington, DC: GPO, 1967.
- Fuller, Bruce. "Youth Job Structure and School Enrollment, 1890–1920," *Sociology of Education* 56, no. 3 (1983): 145–56.

- Goldin, Claudia. *Understanding the Gender Gap: An Economic History of American Women*. New York: Oxford University Press, 1990.
- _____. "How America Graduated from High School: 1910 to 1960," National Bureau of Economic Research Working Paper No. 4762, June 1994.
- _____. "Appendix to How America Graduated from High School: An Exploratory Study, 1910 to 1960," National Bureau of Economic Research-Development of the American Economy Working Paper No. 57, June 1994.
- Goldin, Claudia, and Lawrence F. Katz. "The Decline of Non-Competing Groups: Changes in the Premium to Education, 1890 to 1940," National Bureau of Economic Research Working Paper No. 5202, August 1995.
- _____. "Technology, Skill, and the Wage Structure: Insights from the Past," *American Economic Review* 86, no. 2 (1996): 252–57.
- _____. "Why the United States Led in Education: Lessons from Secondary School Expansion, 1910 to 1940," National Bureau of Economic Research Working Paper No. 6144, August 1997.
- _____. "The Origins of Technology-Skill Complementarity," *Quarterly Journal of Economics*, forthcoming.
- _____. "Human Capital and Social Capital: The Rise of Secondary Schooling in America, 1910 to 1940," *Journal of Interdisciplinary History*, forthcoming.
- Goldin, Claudia, and Robert A. Margo. "The Great Compression: The Wage Structure in the United States at Mid-Century," *Quarterly Journal of Economics* 107, no. 1 (1992): 1–34.
- Inter-university Consortium for Political and Social Research (ICPSR). *Census of Population, 1940 (United States): Public Use Microdata Sample*. Ann Arbor, MI: ICPSR, 1984.
- Jorgenson, Dale W. *Productivity*. 2 volumes. Cambridge, MA: MIT Press, 1995.
- Kansas Superintendent of Public Instruction. *Biennial Report of the State Superintendent of Public Instruction*. Topeka, KS, 1916–1918.
- Katz, Michael B. *The Irony of Early School Reform: Educational Innovation in Mid-Nineteenth Century Massachusetts*. Cambridge, MA: Harvard University Press, 1968.
- Krug, Edward A. *The Shaping of the American High School: 1880–1920*. Madison: University of Wisconsin Press, 1964.
- _____. *The Shaping of the American High School: Volume 2 1920–1941*. Madison: University of Wisconsin Press, 1972.
- Kuznets, Simon, Ann Ratner Miller, and Richard A. Easterlin. *Population Redistribution and Economic Growth: United States, 1870–1950*. Vol. 2. *Analyses of Economic Change*. Philadelphia, PA: The American Philosophical Society, 1960.
- Labaree, David F. *The Making of an American High School: The Credentials Market and the Central High School of Philadelphia, 1838–1939*. New Haven, CT: Yale University Press, 1988.
- Lee, Everett S., Ann Ratner Miller, Carol P. Brainerd, and Richard A. Easterlin. *Population Redistribution and Economic Growth: United States, 1870–1950*. Vol. 1. *Methodological Considerations and Reference Tables*. Philadelphia, PA: The American Philosophical Society, 1957.
- Massachusetts Commission on Industrial and Technical Education. *Report of the Commission of Industrial and Technical Education*. New York: Teachers College, Columbia University, 1906.
- National Catholic Welfare Conference, Department of Education. *Summary of Catholic Education* [various years]. Washington, DC: National Catholic Welfare Conference, various years.

- Olson, Keith W. *The G.I. Bill, the Veterans, and the Colleges*. Lexington: The University Press of Kentucky, 1974.
- Osterman, Paul. *Getting Started: The Youth Labor Market*. Cambridge, MA: The MIT Press, 1980.
- Parsons, Donald, and Claudia Goldin. "Parental Altruism and Self Interest: Child Labor among Late-Nineteenth Century American Families," *Economic Inquiry* 27, no. 4 (1989): 637–59.
- Perlmann, Joel. *Ethnic Differences: Schooling and Social Structure among the Irish, Italians, Jews, and Blacks in an American City, 1880–1935*. Cambridge: Cambridge University Press, 1988.
- Reese, William J. *The Origins of the American High School*. New Haven, CT: Yale University Press, 1995.
- Ringer, Fritz K. *Education and Society in Modern Europe*. Bloomington: Indiana University Press, 1979.
- Rotella, Elyce. *From Home to Office: U.S. Women at Work, 1870–1930*. Ann Arbor, MI: UMI Research Press, 1981.
- Smith, James P., and Michael P. Ward. *Women's Wages and Work in the Twentieth Century*. Santa Monica, CA: The Rand Corporation, 1984.
- Smith, William A. *Secondary Education in the United States*. New York: MacMillan Co., 1932.
- Trow, Martin. "The Second Transformation of American Secondary Education," *International Journal of Comparative Sociology* 2, no. 2 (1961): 144–66.
- Tyack, David. *The One Best System*. Cambridge, MA: Harvard University Press, 1974.
- Ueda, Reed. *Avenues to Adulthood: The Origins of the High School and Social Mobility in an American Suburb*. New York: Cambridge University Press, 1984.
- U.S. Bureau of the Census. *Fifteenth Census of the United States: 1930. Population*. Vol. 3. Washington, DC: GPO: 1932.
- _____. *Historical Statistics of the United States*. Washington, DC: GPO, 1975.
- U.S. Bureau of Education. *Report of the Commissioner of Education* [for the year]. Washington, DC: GPO, various years.
- U.S. Bureau [Office] of Education. *Biennial Survey of Education* [years]. Washington, DC: GPO, various years.
- U.S. Department of Commerce. *Statistical Abstract of the United States, 1925*. Washington, DC: GPO, 1926.
- _____. *Statistical Abstract of the United States, 1938*. Washington, DC: GPO, 1939.
- _____. Bureau of Economic Analysis. *State Personal Income by State: Estimates for 1929–1982*. Washington, DC: GPO, 1984.
- U.S. Department of Education. *120 Years of American Education: A Statistical Portrait*. Washington, DC: GPO, 1993.
- U.S. Department of Health, Education, and Welfare. *Statistics of State School Systems* [years]. Washington, DC: GPO, various years.
- _____. National Center for Education Statistics. *Digest of Education Statistics* [year]. Washington, DC: GPO, various years.
- _____. *Statistics of Non-Public Secondary Schools* [years]. Washington, DC: GPO, various years.
- Vinovskis, Maris A. *The Origins of Public High Schools: A Reexamination of the Beverly High School Controversy*. Madison, University of Wisconsin Press, 1985.
- Walters, Pamela B., and Philip J. O'Connell. "The Family Economy, Work, and Education Participation in the United States, 1890–1940," *American Journal of Sociology* 93, no. 5 (1988): 1116–52.