

HUMAN CAPITAL AND SOCIAL CAPITAL:
THE RISE OF SECONDARY SCHOOLING
IN AMERICA, 1910 TO 1940

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ABSTRACT

The United States led all other nations in the development of universal and publicly-funded secondary school education and much of the growth occurred from 1910 to 1940. The focus here is on the reasons for the “high school movement” in America generally and why it occurred so early and swiftly in America’s heartland — a region we dub the “education belt.” At the center of this “belt” was the state of Iowa and we use information from the unique 1915 Iowa State Census to explore the factors, at both the county and individual levels, that propelled states like Iowa to embrace secondary school education very early. Iowa’s small towns, as well as those across the nation, were the loci of the high school movement. In an analysis at the national level, we find that greater homogeneity of income or wealth, a higher level of wealth, greater community stability, and more ethnic and religious homogeneity fostered high school expansion from 1910 to 1930. The pecuniary returns to secondary school education were high — on the order of 12 percent per year in 1914 — providing substantial private incentives for high school attendance. State-level measures of social capital today are strongly correlated with economic and schooling variables from 1900 to 1930. The social capital assembled locally in the early part of the century, which apparently fueled part of the high school movement, continues to contribute to human capital formation.

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“The landlord who lives in town has only a financial interest and must be reached from the financial side. He may well be reminded that when he offers his farm for sale it will be to his advantage to advertise, ‘free transportation to a good graded school.’

Those who have no children to attend school are often indifferent as to school privileges, but they more than others should be interested in securing to the children of the whole community the best educational advantages possible. They may be secure and independent at present, but if they live out their years with no children to depend upon in old age, they must of necessity rely upon someone, they know not whom, who is today in the public schools. Their only safeguard lies in giving the best advantages possible to all.”

On the campaign for consolidated school districts
Iowa Biennial Report, 1912/13 (Des Moines, IA, 1914) 35.

The United States led all other nations in the development of universal and publicly funded secondary school education and much of the growth occurred from 1910 to 1940. The focus here is on the reasons for the “high school movement” in America generally and why it occurred so early and swiftly in America’s heartland — a region we dub the “education belt.” At the center of this “belt” was the state of Iowa and we use information from the unique Census of Iowa for 1915 at both the county and individual level to explore the factors that propelled states like Iowa to embrace secondary school education, an expensive public good.

Our framework emphasizes both individual (private) and community (public) factors. Of the factors generally grouped under the “individual” heading, we find that income or wealth levels and the opportunity cost of education, such as the availability of manufacturing jobs for youths, were most influential in the high school expansion. But we also locate factors, such as homogeneity of community, the distribution of wealth or income, and the fragmentation of social, ethnic, and religious groups that influenced how social capital aided the production of human capital. In our case study of Iowa, as well as in our evidence for the entire United States, small towns and villages experienced the highest levels and the greatest expansion of high school education in the 1910 to

1920 period. Most important was that the pecuniary returns to secondary school education were high — on the order of 12 percent per year. Social capital appears to have been the handmaiden of human capital and was more easily and rapidly drawn on in areas with greater homogeneity and in which communities were more tightly knit.¹

We end with a set of findings on the state-level relationship between *current* measures of social capital, and early twentieth century measures of economic, educational, and social indicators. A stronger correlation exists, at the state level, between an index of social capital today (combining measures of associational activity, social trust, and political/civic participation) and per capita wealth in 1912 or per capita income in 1900 than between the same index for today and per capita income in 1994. A strong correlation exists between the high school graduation rate in 1928 and the index of social capital today. An equally high correlation exists between the graduation rate in 1928 and a current educational performance index (combining measures of test scores at various ages and the high school drop out rate). Thus social capital was not merely the handmaiden of human capital in the past. It appears to have survived many changes in the economy and society and continues to serve a similar function today.

The High School Movement: 1910 to 1940

In the history of U.S. education the period from 1910 to 1940 is often referred to as that of the “high school movement,” and the emergence of the high school has been termed the “second great transformation” of American education. It is for good reason that the period has been singled out as a special one in the history of education. The rise of the public high school was rapid across the entire United States. In 1910 just 9 percent of American youths earned a high school diploma,

but by 1935 40 percent did. The transition was even swifter in certain states and regions. In the three states of the Pacific region, for example, about 10 percent of youths graduated from high school in 1910 whereas 60 percent would by 1935. The American high school movement was truly path breaking for no other country underwent the transformation to virtually universal public secondary education at so early a date. Secondary schooling, moreover, was an expensive undertaking. Putting a youth through four years of high school cost the same as putting the same youth through the first eight years of common or grammar school.²

Because educational decisions are made primarily at a very local level in the United States, the production of human capital depends largely on social capital lodged in small communities. In 1932, when the number of local school districts was first tabulated by the U.S. Office of Education, there were around 130,000. Their numbers were probably even greater earlier in the period. But even as late as 1932 there were about 9,000 in Kansas, 7,000 in Nebraska, and 5,000 in Iowa, the state on which we will focus much of our attention in this paper. In 1925, the states (plus the federal government) supplied just 16 percent of all educational expenditures for grades K-12. States, to be sure, had powers in the educational realm besides those concerning the purse. But after a careful consideration of them, we have concluded that the high school movement occurred at a grass roots level, though state governments and nationally-acclaimed educators served a coordinating function.³

The importance of the rapid move from the grammar (or common) school to that at the secondary level cannot be over emphasized. About 70 percent of the increase in years of education of adults from 1900 to 1970 was due solely to the increase in secondary school attendance and graduation. Without the rapid rise of the high school, America could not have put the G.I. Bill of Rights, as it was formulated, into immediate action after 1944 for American youth would not yet

have graduated high school. The 1950s to 1970s would not have witnessed the enormous expansion of college education. We are not prepared to claim that the rise of the United States to international economic supremacy over the period was due to the greater amounts of human capital held by the average American worker. But we have investigated the importance of secondary schooling to the high-tech industries of the 1910 to 1940 period and find that these industries took advantage of the influx of high-school educated youths in the labor market.⁴

The increased education of America's youth during the high school movement reflected a substantial commitment of the nation's resources to education. Although it is difficult, if not often inadvisable, to quantify "social capital," the commitment by small communities of resources in support of education seems one reasonable measure. Our indicator of social capital, therefore, is the public resources committed to education as a fraction of the total resources of the community, given by income. We graph, in Figure 1, the amount spent on K-12 education by states and localities as a fraction of income by region and nationally from 1910 to 1930 and from 1950 to 1970. We omit the Great Depression and World War II years because the large income fluctuations over these periods make the series less informative.

Our indicator of educational commitment rises steeply during the 1910s and for most of the 1920s. For the United States as a whole it then remains at its 1930 level until the early 1950s when it rises again. In 1970 the level nationally was about 4.5 percent, whereas it was 0.9 percent in 1910. More than half of that increase took place from 1910 to 1925. Some regions (the Pacific and the West North Central) were already committing more than 3 percent of their income to K-12 public education by the early 1920s and they also had large public higher educational expenditures on a per capita basis. Most impressively, these regions were rich, and thus the large fraction of their income

given over to education represented a large absolute amount as well.⁵

The substantial increase in educational expenditures just after World War I was given special notice by the U.S. Bureau of Education which explained it by several factors. The influence of the Great War was emphasized as the factor that both unified and intensified the increase in educational expenditures throughout the country. The war plainly demonstrated to communities that they harbored poorly educated, illiterate, and physically unfit Americans. But in many sections of America the single most important change that affected the resources devoted to education was the increase in high school attendance because each student-year of upper grades cost about twice that of the lower grades. There was, as well, an increase in the school year generally and a rise in the real cost of teacher's salaries in many parts of the country. All of these factors increased the resources devoted to education and, moreover, increased them at a rate faster than that of income.⁶

The rich history of the American high school has been told in many fine books, and by us in previous papers, and we will not repeat the entire discussion here. Of most importance to note is that the modern high school — one that we would today easily recognize — emerged at the beginning of the period considered. Prior to around 1900, secondary schools in much of America often trained youths to gain entry to particular colleges and universities in their locale. But during the period of the high school movement, secondary education was transformed into training “for life,” rather than “for college.” In 1910, 49 percent of high school graduates continued to some form of higher education, but by 1933 only 25 percent did. Secondary schools were granting more terminal degrees, but not because college entry had declined. Rather, it was simply because high school entry had so greatly increased.⁷

What were the reasons for the large influx of students into American high schools and why

did local government respond with the building of schools and the staffing of classes? Education at the secondary level is distinctive for it is almost always publicly funded and supplied, both in the United States and elsewhere, yet it has almost none of the features of a public good and many of the characteristics of a private good. The issue we focus on is one of timing rather than degree, since all communities in the United States, and most countries in the world, have undertaken public funding of secondary school education at some point. The question, then, is why secondary schools *diffused* rapidly at a particular point in time, rather than at all.⁸

In nineteenth century America the high school had been attacked as an “elitist” institution. Local taxpayers were often united against its funding on the grounds that it would serve only a small and wealthy clientele who could afford to send their sons and daughters to college. Such debates continued across America as the high school movement spread. The funding of many early high schools, particularly outside major cities, was justified as strengthening the common school system, for high schools trained teachers. But during the high school movement it was rare to find arguments in favor of high schools that emphasized teacher training. Also rare were arguments proposed during the common school revival that schools produced a literate populace necessary to maintain the great democracy, for that was the job of the lower grades not the high school. Rather, the reasons advanced were often more mundane.⁹

First and foremost in the rationale for secondary education was the financial return to the high school student around 1910 even in the absence of a college education. But because the 1940 U.S. population census was the first to ask questions on education and earnings, concrete evidence in support of this claim has not been easy to locate. In a previous paper we have shown that, from 1890 to 1920, occupations known to employ mainly high school graduates (e.g., ordinary white collar

workers such as secretaries, bookkeepers, and typists) paid twice the monetary amount as did occupations that employed individuals who generally did not have high school training. In this paper we are able to estimate, more directly, the returns to years of schooling by using the manuscripts of the Iowa State Census of 1915. The Iowa census was a unique document both for its time and many years to come because it included information on education and earnings, among other variables. These data reveal that the return to high school in 1915 was substantial. The increment to annual earnings was 12 percent for each year of high school. State school superintendents used such arguments to support the building and staffing high schools. As the headnote suggests, they also maintained that schools were good investments for property owners, for if high schools were good for youths they were also good for property owners in school districts with high schools.¹⁰

Community cohesion was also prominent in the rationale for the building and funding of high schools and for the consolidation of small districts. The argument took several forms. One concerned the possibility of migration from communities that did not provide adequate schooling. So important was the provision of secondary schooling to the children of rural America that youths were often sent to live with relatives in towns and cities when their local district did not provide such education, and entire families moved to the closest town when their oldest child graduated from the local common school. Thus another reason offered for the building of schools in rural America was “to stop the drift of the population to the cities.”¹¹

The second appeal in the headnote concerns a pivotal factor in the expansion of public high schools. If publicly-funded secondary schooling could not be justified on the grounds that it created a literate citizenry, it had to be justified on the basis of another market failure or externality. Capital market imperfections served as one part of this justification, for such markets are particularly

inadequate in the financing of human capital. Communities composed of different generations could solve these capital market failures. Older members of the community could lend to young parents who were in the most stressful portion of their economic life cycle. Not only were large families costly in resources and time, but the head of the household would not yet be at his peak earning capacity. The community could provide the necessary capital with each generation paying back the implicit loan when it, in turn, became the next older generation. But to sell that logic to a current older generation one had to add that an educated community conferred positive externalities as a place where the aged could depend on their neighbors. With this reasoning, the older generation would be convinced to buy into the plan and the younger generation would not defect as it aged.¹²

We should clarify two issues at this juncture. One is that a vibrant and self-replicating community was a blessing to older residents, especially in areas with long and harsh winters, for a host of reasons. Another is that just because good schools retained some young people and families does not mean that extensive out-migrations did not flow from these areas. In many of the states of the Great Plains, for example, it was well known that education was not just good for the existing community. It was also good for those who wanted to migrate from the region and from farming.

A Framework of High School Expansion: Public and Private Concerns

The rationale for the high school was, therefore, in two parts. One, directed to the individual and the family, was that there were potential private returns to attending and graduating high school. But communities were also crucial for them, and only they, could provide the means by which all children could attend secondary school. Our implicit model of the expansion of high schools concerns both decision-making bodies.

We will summarize the framework, developed more extensively elsewhere, to motivate the

inclusion of the variables in our empirical work. At the family or individual level, consider the private decision of investing in educating in a two-period framework. In period 1 the individual earns a wage of w_1 and does not attend school and in period 2 the same individual earns a wage of w_2 . Alternatively, the individual can attend school in period 1, pay C in direct costs (e.g., tuition, transportation, books), and earn nothing. In period 2, however, the individual with schooling earns $E_2 > w_2$. Given a one period discount rate of r , the decision to attend school in period 1 will depend on whether:

$$\frac{\frac{E_2}{w_2} - 1}{1 + r} > \frac{C + w_1}{w_2}$$

which simply says that the individual will go to school if the discounted returns to education (left side) exceed the first period costs (right side).¹³

Thus the simple framework leads us to consider the high school wage premium (E_2/w_2), the costs of education (direct, C/w_2 , and indirect, w_1/w_2), and the discount rate (r), which is a measure of capital market constraints facing individuals and families, as affecting the private demand for education. High school enrollment decisions are positively affected by the high school wage premium and negatively related to the costs of education and the discount rate. The private demand for high school is also likely to depend positively on family wealth (or income) through an income effect on the consumption demand for education and by the easing of capital market constraints (i.e., increased wealth effectively lowers r).

But the simple human capital framework has said nothing about one of the most obvious facts of education — its almost-ubiquitous public provision. Why do communities at the local, state,

and national level tax their citizens to provide education for other people's children? We offered, above, a rationale that we believe operated during the high school movement. Public funding was part of an intergenerational loan. Communities that were more homogeneous, in which individuals remained for most of their lives, and in which people took more interest in each other would be more likely to provide intergenerational loans. In a manner similar to Coleman's notion of "closure," the degree to which community members saw themselves as part of generational succession would increase their support for the high school especially during its formative years.¹⁴

On the other hand, communities in which wealth or income was unequally distributed would encounter substantial opposition to the high school movement. Because schooling is a private good and because, before the 1930s, there were few legal constraints that compelled youths to attend high school, those at the bottom of the distribution could "opt out" entirely. Those at the top of the distribution might have wanted to "opt out" by purchasing private schooling. Thus the wider the distribution of income, the more chance of encountering a political equilibrium in which the poor and the rich join to defeat the public provision of a high school, an equilibrium aptly termed "the ends against the middle."¹⁵

The "social capital" needed to produce human capital is thus a function of factors that create "closure": those that bind generations to each other and create a belief that educated youth will later benefit older community members in some manner. Recent work has shown that communities fragmented by ethnicity or language and those consisting of persons who migrated to the community in their older age tend to be less supportive of educational expenditures. In our empirical work we use proxies for these variables: the percentage foreign born, the percentage Catholic, the fraction of the population over 65 years old, and the distribution of wealth, itself proxied by another variable.¹⁶

Our exploration of the factors influencing high school expansion takes place at four levels of aggregation. First at the national level, we look at variation in high school graduation rates for a cross section of states and in attendance rates across different-sized cities and towns. We then focus on a leading state in the high school movement — Iowa. The Iowa study is located first at the county level and then at the family and individual level, using the Iowa State Census of 1915.

Factors Influencing High School Expansion at the State Level

The expansion of secondary schooling in certain areas of the United States can be seen in Figure 2 which graphs the percentage of youths in various regions who graduated from high school in the year given. The contemporaneous graduation rate, rather than enrollment or attendance, is used for it is a “cleaner” variable in the sense that there is less ambiguity in its meaning. Because we summarize our previous work in this section, we do not give data on all regions in Figure 2. Rather, the figure shows the regions that included many of the leading states (New England, West North Central, and Pacific) and one region containing some of the non-southern laggards (Middle Atlantic). Although New England led the country in the proportion of its youth passing through secondary schools in 1910, it was soon eclipsed by many of the states in the West. By the mid-1920s, more than 40 percent of youths in the Pacific states were graduating from high school. Other leading states in the high school movement were those in the nation’s heartland, and prominent among them were Iowa, Kansas, and Nebraska. The states of the Middle Atlantic lagged for some time but then closed much of their gap with the leading states in the 1930s, when the Depression shut down the employment route for many youths.¹⁷

The maps of Figure 3 tell much the same story but highlight various areas of the country that will figure prominently in our later discussion. In 1910 the darkest areas of the map, those with the

highest rates of high school graduation, were in New England although some were scattered in the mid-section of the nation. But by 1928 the highest graduation rates were found clear across the mid-section of the United States in a zone we have termed “the education belt,” stretching from the Pacific states through Utah, Colorado, Nebraska, Kansas, Iowa, Indiana, and then jumping to New England. The southern states, it is no surprise, lagged in all periods of the high school movement. Although we do not show this information in the graph, the South lagged not simply because blacks were less educated. High school graduation rates for southern white youths also lagged the nation’s.

In a previous study we analyzed the factors that encouraged high school graduation and thus sought to explain why certain parts of the country led in the high school movement whereas others lagged. We employed both state-level data at various points in time from 1910 to 1938, and city-level data in 1910, 1920, and 1930. In the state-level analysis we looked both at a series of cross sections and at changes from 1910 to 1928 and 1928 to 1938. Some of the analysis is reproduced in Table 1. These and our other results can be summarized as follows.¹⁸

In keeping with the framework discussed above, the explanatory variables we use can be divided into two main types: the variables that influence the individual or private choice of education and the variables that affect the public or social choice of group action. Put another way, there are variables that alter whether individuals invest in human capital and there are those that indicate whether social capital can be drawn on for the same investments. Some of the variables can be located in both arenas, whereas many are more clearly in one and not the other.

Table 1 presents cross-section regressions for 1910 and 1928 and a regression to explain the change in high school graduation rates from 1910 to 1928 as a function of initial conditions by state at the start of the high school movement in 1910. Because the regressions are cross-state, there are

only 48 observations, and many of the variables of potential interest are rather collinear. The percentage Catholic, for example, is highly correlated both with percentage foreign born and percentage urban; per capita income is similarly collinear with wealth per capita and agricultural income per farm worker. We have, therefore, chosen a set of variables that can be viewed as standing in for many others.

In both 1910 and 1928 the high school graduation rate is positively related to various measures of wealth (or income) and negatively related to the opportunity cost of education (as proxied by the percentage of the labor force in manufacturing and the wage of manufacturing workers). Because educated labor was highly mobile, the wage relevant for those deciding whether to go to high school, exhibited little cross-state variation. Thus we do not include a measure of white-collar wages in the regressions. But we do find that states where a larger fraction of youth attended public colleges and universities in 1910 experienced faster growth in high graduation rates from 1910 to 1928. Greater access to public universities is likely to have increased the private returns to high school, and it may also have been a reflection of the commitment of state residents to public education in general. Higher wealth in 1910 also hastened the growth of high schools from 1910 to 1928, and a larger share of manufacturing employment in 1910 modestly retarded it.

Of most importance for the issues raised in this paper, high school graduation is positively related to the proportion of the state's population over 64-years old and negatively related to the proportion Catholic in both 1910 and 1928. In the 1928 regression we are also able to include a variable that we believe captures important aspects of both the level and distribution of wealth. Automobile registrations per capita in 1930 can be thought of as a count of those rich enough to afford a car. Therefore automobile registrations per capita summarizes mean wealth and its

distribution in a form particularly relevant for public good provision decisions, since it proxies the share of voters likely to favor financing an expensive public good such as high schools. At a high enough level of mean wealth, higher automobile registrations per capita are likely to indicate a more equal distribution of wealth. No other variable has as large an effect on the high school graduation rate in the late 1920s and early 1930s as does automobile registrations per capita. The states with the highest automobile registrations per capita in 1930 — California, Nevada, Kansas, Nebraska, and Iowa — were also leaders in the expansion of high schools, as seen in the bottom panel of Figure 3. The strong positive effect of automobile registrations per capita on high school graduation rates in 1928, as shown in column (2) of Table 1, is apparent even when state mean per capita wealth is also included as a regressor.

We conclude that the distribution of wealth is an important input to the political and social decisions to fund high schools. Thus we find that stability and homogeneity of community, as well as many of the more usual and better understood variables thought to affect human capital decisions, were important in the diffusion of the high school across America during the period of the high school movement.

The state-level analysis has pointed to many of the public and private factors that propelled the high school movement and has revealed the types of states that led in secondary education. Because many of the leading states were rich agricultural areas they were also thickly dotted with small towns and villages that served the agricultural hinterland. It was in these small towns and villages that the high school movement appears to have found its greatest support.

We give, in Table 2, the “full time” school attendance of 16 and 17 year olds by size and type of place in both 1910 and 1920 for all non-southern states. The attendance rates in the smallest

towns were more than double those in the largest cities in 1910 and, in both years, attendance rates declined monotonically as the size of place increased for incorporated areas. Even the unincorporated rural places of the United States, that were mainly farming areas of the open country, had higher attendance rates than did the larger cities. The site of the early high school movement, therefore, appears to be small communities in which social capital may have been the greatest. Many of the leading states in the high school movement through the early 1930s — such as Nebraska, Kansas, South Dakota, and Iowa — were also those having large numbers of school districts relative to population (few people per school district), a further indication that the decisions made by small, wealthy, homogeneous communities facilitated expensive collective investments in high schools. We will return to the role of the small town in our analysis of the Iowa data.¹⁹

Secondary Schooling in the Heartland: Case Study of Iowa, 1915

Iowa was both an early leader in the high school movement and part of the “education belt” that formed in the 1920s. It was also among the richest states in the union on a per capita basis in both 1912 and 1922. In 1912 it ranked second behind Nevada, and in 1922 it ranked fourth, behind Nevada, Wyoming, and South Dakota in per capita wealth. It pioneered in the standardized testing of its youth, had a widespread system of private colleges and universities, established leading research centers in its public universities, and was the birthplace of agricultural extension in America. In the early twentieth century, Iowans wanted to make the superiority of their educational system known to the rest of the country. They wanted to prove that their state was just as respectable as those of the northeast, from which many of their ancestors had come.²⁰

With its 1915 population census Iowa became the first state to request information from its citizens on their educational attainment and current school attendance. The responses, not

surprisingly, allowed the state proudly to note that “for the first time there has been secured information showing the extent of education of the entire population and the results confirm the general belief that Iowa people rank very high in educational matters.”²¹

The Iowa state census of 1915, like most other censuses, was a 100 percent sample of the citizens of the state, and the volume, *Census of Iowa, 1915*, contains detailed tables on aspects of the population by county. Its manuscript census, which consists of a three by five index card per person, was subsequently stored by county, arranged alphabetically by last name. In 1986 the Church of the Latter Day Saints microfilmed all the cards. Several researchers have collected samples from this unique census, but because of the idiosyncratic nature of these data sets, we have collected our own. Ours is a cluster sample consisting of three large cities (Davenport, Des Moines, Dubuque) and eight “rural” counties. Several medium-sized cities are also in our “rural” sample as are a large number of smaller towns and villages. We have also assembled a county-level data set using published data from the Iowa state census of 1915 and various federal censuses.²²

Even though schooling rates were high in Iowa, there was considerable variation across the state in the percentage currently attending high school and in the percentage who ever-attended high school among teenaged youth. Across Iowa’s ninety-nine counties in 1914, the proportion of 10 to 20 year olds with any high school ranged from 0.11 to 0.31, and the proportion of 10 to 18 year olds currently attending high school varied from 0.086 to 0.32. In 1914, high school enrollment rates (measured by the ratio of students in high schools to the population aged 14 to 17 years) by region ranged from a low of 0.143 in the South Atlantic to a high of 0.351 in New England. Thus Iowa’s counties spanned a range similar to that of all U.S. regions at the same time. To understand the reasons why communities did or did not invest in high schools in the early period of the high school

movement, we first explore, in Table 3, county-wide variation in high school education.

The High School Movement in Iowa: County-level Analysis

The county-level data that we have at our disposal contain a rich set of variables. Many wealth and income variables are available, including per capita (or per farm) values for land and crops, and the assessment of property for taxes. Detailed information exists on church going, the number of congregations, the demographic and ethnic composition of the population, and the occupational distribution, of those in Iowa's counties circa 1915. The regressions presented in Table 3 are illustrative of a broader set of results using alternative wealth and income measures. Measures of county wealth and agricultural income have strong positive effects on high school and college attendance. We do not find that any of the ethnic composition variables matter once the proportion of the population with native parentage is included. The share of Catholics in the county population is negatively correlated with youth high school attendance, but the variable is highly collinear with the share of the population with foreign-born parents. The dependency ratio (fraction less five years old) matters negatively for high school attainment and attendance rates, and indicators of the presence of a college in the county are positively related to the high school attendance of youth.

Of most interest to the issues raised in this paper is that the proportion attending, or ever-attending, high school reached a peak in counties having the largest share of their population in the smallest of Iowa's towns — incorporated areas with fewer than 1,700 persons. In the case of “ever-attended high school,” there is a 10 percentage point difference between the effects of county population share in the largest cities and in the smallest towns, and in the case of “currently attending” the difference is more than 4 percentage points even in the reported regression models in Table 3 with controls for the income, wealth, and demographic composition of the population.

The finding is similar to that, discussed above, derived from somewhat less reliable school attendance data in the 1910 and 1920 Public Use Micro-data Sample of the U.S. population census, and it appears to be robust to the inclusion of wealth or income measures as controls. There appears to be compelling evidence that the early high school movement was most strongly felt in the small towns and villages of the West and Midwest.²³

Why these small places had the highest rates of high school attendance is not entirely clear at this point in our work. One possibility is that small-town America offered a young person virtually nothing else to do during much of the year. In the open country, youth could work on the farm and had limited access to secondary schools in any event. In the larger cities, youth could be hired in a host of employments. But the smaller towns may have had neither.

Another, potentially complementary, reason is that small town America was a locus of associations (religious, fraternal/sororal, business, and political organizations) that could have played an important role in galvanizing support for the provision of local publicly provided goods including high schools. There is compelling evidence that towns and villages across America were teeming with associations. These associations may not have provided the direct impetus for the high school movement, but they provide another indicator of community cohesion.²⁴

We have attempted to assess the extent to which the differences in educational attainment by size of place reflect the density of such associations by adding a variable measuring the number of church congregations per capita to the regression specifications shown in Table 3. Church congregations per capita for Iowa counties circa 1915 were positively related to the share of the population in small towns and negatively related to the share in larger cities. Church congregations per capita has a positive but insignificant relationship to the fraction of youth who ever attended high

school, and the inclusion of this variable only slightly reduces the substantial gap in high school attainment between the smallest towns and largest cities found in column (1) of Table 3. In contrast, church congregations per capita has a rather strong positive and statistically significant relation to the fraction of youth currently attending high school and attenuates the weaker differences by size of place when it is added to the specification in column (2) of Table 3. Thus there is some evidence that part of the greater high school attendance rates in small towns is partially mediated by a thicker density of community and religious associations.

Even if associations were not the glue that bound the residents of small town America closer together, other aspects of the small town may have been. Small towns simply had greater ethnic, religious, cultural, and economic homogeneity. Whatever the underlying reasons, we have uncovered convincing evidence that the smaller towns of Iowa had the highest rates of secondary school attendance.

Who Gained from the High School Movement in Iowa, c.1915?

We have, thus far, explored differences in high school (and college) attendance among youths by county and showed that county-specific factors, that could reflect differences in social capital, were of importance. The smallest towns and villages, literally at the edge of the prairie, had higher levels of school attendance than did the larger towns and cities. We now move to an analysis of the impact of individual factors, those generally reflecting family background. Social and group factors, however, will remain integral to the analysis.

The data we use are a sample of the individual records from the Iowa State Census of 1915, the published version of which formed the basis of the county analysis. The sample was drawn for three major cities (Davenport, Des Moines, and Dubuque) and eight counties, each without a city

containing more than 25,000 people. The two parts of the sample are termed “three large cities” and “counties without large cities.” It should be emphasized that these counties were not simply farming areas but contained many of the towns and villages that featured in the previous discussion. The samples together contain more than 53,000 observations, almost equally divided between the cities and “rural” counties. Although the records were not arranged in family units, we have, with much success, used information on last name, birth place, address, and “card number” to reconstitute families. We describe the sample and our family reconstitution procedure in the Appendix.

The variable of interest is the school attendance of fifteen to eighteen year olds, for they would have been most affected by the high school movement. We consider two variants: whether the youth attended *any* school in 1914 and whether the youth attended high school or college in 1914. In the larger cities and towns, schooling between the ages of fifteen and eighteen would generally have taken place in a secondary school. Some in the younger ages could have still been in grammar school, and it is also possible that the assessor simply did not differentiate between high school and regular school. In the more rural areas, however, youths had often remained in the common schools to their mid-teens, especially if their district did not contain a secondary school. But by 1914 rural Iowa youths no longer had to attend the common schools to receive education beyond the usual eight years.

By an act of the 34th Iowa General Assembly, passed in 1913 after numerous attempts, all Iowa youths had the right to attend high school free of charge even if their district did not have one. The tuition would be paid by their home district. This “free tuition” law, as it was termed, was one of many passed in the 1910s and 1920s by states with large populations in the “open country.” The response to the “free tuition” law in Iowa was an increase in high schools throughout the state, for

if taxpayers had to pay tuition, they would just as well build their own schools. By 1914, according to the Iowa State Census of 1915, secondary school attendance equaled 31 percent of all fourteen to seventeen year olds.²⁵

Why did some youths attend high school whereas others did not? We look within counties and cities in Table 4 to observe the effects of family background and individual characteristics on school attendance. In the fifteen to eighteen year old group considered, and among those whom we could match to household heads, 31 percent attended high school (or college) in the large cities and 24 percent did in the eight “rural” counties. Almost 57 percent attended “any school” in the large cities and 55 percent did in the “rural” counties. We will focus our attention on columns (3) and (6) in Table 4, which contain some determinants of attendance in high school (or college).²⁶

Among the determinants we can include are characteristics of the youth, such as sex, church affiliation, and own and parental birthplace. Features of the household head, such as occupation, years of schooling, and whether a home or farm were owned, are also included. We find, not surprisingly, that youths from more privileged families had a far higher probability of attending high school. The son or daughter of a household head who was a white-collar worker and had graduated from secondary school was 30 percentage points more likely to attend high school in the large cities than was the child of a blue-collar worker with eight years of school. A similarly large gap in the “rural” counties is apparent between youths living with a head who was a white-collar worker and those living with a head who was a farmer. Foreign birth, for the child or the parents, was far less important, once education and occupation of the household head are included. Girls were more likely to attend school in the “counties without large cities” but not in the “three large cities.” Sex differences in secondary school education, particularly in industrial settings, have been reported by

many, but the Iowa data reveal smaller differences.²⁷

Of enormous interest here are the coefficients on “church affiliation.” The 1915 Iowa State Census is the earliest document we know of that gives information for the United States on education and religion, as well as various economic variables. Affiliation with any of the New England Protestant churches, including Congregational, or with a Jewish synagogue increased the probability of attending high school by 20 to almost 30 percentage points above that of a person with no church affiliation in the city sample. The effect in the “rural” counties was highest for Congregationalists but remained substantial for the other New England Protestants. Those with “no church affiliation” in the city sample had the lowest school attendance. Certain religious denominations, such as Congregational and Quaker, founded liberal arts colleges and universities and had long histories of attending to education. But the difference between the “no church affiliation” group and the others may be due to something else. Church affiliation may have been associated in 1915, as it is today, with sociability in other dimensions and thus with parental pressure to keep children in school.²⁸

Family characteristics were undoubtedly important in determining high school attendance. But even though the more privileged took a greater advantage of the public school system, the vast majority of the children in Iowa’s high schools had more humble backgrounds. In the city sample, 64 percent of the fifteen to eighteen year old youths in households having heads who were high school graduates were attending high school (or college) in 1914, while 27 percent of those with heads who were not high school graduates were. But even though those from more privileged backgrounds disproportionately attended high school, just 20 percent of high school students came from a family in which the household head was a high school graduate. Similar results are obtained in the “rural” counties (even excluding the farm population). That differences existed by parental

background is not surprising. The important point is that despite these differences, the vast majority of public high school students in Iowa had parents who did not have a high school diploma and were not white-collar workers. The non-elites were sufficiently numerous to have easily voted for the greater expenditures to support the high schools.²⁹

What Were the Returns to High School in Iowa, c.1915?

We began this paper with a description of the high school movement across America and noted that many of the reasons for the expansion of secondary education could be traced to the pecuniary returns to attending high school. The problem for those researching the subject has been that there are no national data on education and earnings before the U.S. federal census of 1940. In a previous study, we compared earnings for occupations that generally demanded secondary schooling with earnings in occupations that did not, and found a substantial wage premium at the start of the high school movement. The Iowa State Census sample enables a more direct estimation of the returns to high school for the employed population reporting occupational income for 1914. We report, in Table 5, results from estimating log (annual earnings) equations for three groups of non-farm workers: males 18 to 70 years old, males 18 to 34 years old, and unmarried females 18 to 34 years old. The specifications include measures of schooling attainment, and controls for potential labor market experience, nativity, and years in the United States for the foreign born.³⁰

The schooling attainment measures given in the Iowa State Census allow us to differentiate among various types of schools. Most Iowans living in the “open country” would have attended a common school for their elementary years, whereas their urban counterparts would have gone to a grammar (or graded) school. Either could have continued to high school, college, business or another type of school. Many individuals in the early part of this century went to common and

grammar schools for more than eight years. In some cases, as we discussed above, common schools took up the task of educating rural teenagers who did not have high schools to attend. In other cases, however, common school attendance beyond eight years meant that the youth had been “retained” or held back. We can compute the returns to years of common and grammar school education beyond the usual number to see whether the added years substituted for secondary school or were simply remedial. We do this by entering the schooling variables as a linear spline function.³¹

Most important to our understanding of the high school movement is that the return to a year of secondary school is substantial in all three estimations. It is 10 percent for males of all ages, 12 percent for the younger group, and 12.5 percent for the younger group of females. The returns per year of high school are, moreover about equal to those for each year of college.³²

Since it was not unusual in the nineteenth and early twentieth centuries for individuals to have attended college without having gone to high school, either because they went to a preparatory department of a college or because they were tutored at home, we must include variables accounting for returns to years of college when years of high school are zero. Three college variables are entered: one interacts years of college with a dummy variable when years of high school are greater than zero, one interacts years of college with a dummy variable when there is no high school, and one is a dummy variable for college when there is no high school. The results suggest that the returns to a year of college, in the absence of high school, for the younger group are about the same as for high school. That is, young men who did not list any high school but who went on to college, most likely attended the preparatory department of their college or university. The business school dummy is substantial for both men and women.³³

The returns to the lower grades show that extra years of either common or grammar school

education had scant returns, if any. That is, there is no reason to believe that extra years at the elementary school level substituted in any way for years in high school. The return to a year of high school was considerably higher than for the extra years at the lower grades. Only for the older men in the sample was the return to more than ten years of grammar school of a nontrivial magnitude and even then it was one-third of that earned for a year of high school.

In sum, the returns to education by type of schooling for non-farm occupations show that secondary schooling had a substantial payoff in Iowa around 1915. A return on the order of 12 percent per year is one and one-half times the return to a year of college in 1980 and about the same as that to a year of college in 1995, a moment in U.S. educational history when returns are considered very high.³⁴

Concluding Remarks

The high school movement, which picked up steam around 1910 in the Great Plains, Far West, and parts of New England and the Mid West, was an enormous undertaking for local government. The cost of moving a generation of young people through four years of high school was equal to, if not more, than the value of the resources used to educate them to the eighth grade. Yet community after community swiftly built high schools and hired qualified teachers.

The reasons why parents wanted their children educated and why their teenagers readily flocked to the schools are clear. First and foremost, was that there were extremely high returns to secondary schooling around 1915 for both males and females. Some of the returns were garnered by those who left their rural homes and moved to towns and cities. But even in the state of Iowa the returns were substantial. One did not have to leave even this largely farm and small-town state to profit from the human capital acquired in high school in 1915. Our estimates, derived from a unique

set of manuscripts — the Iowa State Census of 1915, reveal that the return to a year of high school was about 12 percent. But why did the public take up this expensive burden? What rationale was there for the public provision of relatively private good?

We find by analyzing a cross section of states in 1910 and 1928, that greater homogeneity of residents in terms of ethnicity, religion, and income, a higher level of wealth or income, and greater stability of community in terms of more older people increase the apparent support for the high school in the early to middle years of the movement. We also find that the smaller towns and villages in the United States were the locus of the movement's activity for it was there that high school attendance was the greatest. We suspect that these small towns and villages were reservoirs of social capital drawn on to fuel the high school movement. The only consistent rationale for the public provision of this essentially private good was that it was an intergenerational loan to be repaid by each generation to the next. Although we cannot fully disassociate the roles of alternative activities for teenagers from the existence of social capital, the evidence we present is more consistent with the latter than the former. The areas of the country with the greatest tangible wealth and with what may have been the highest amount of intangible wealth or social capital had the earliest and the most rapid diffusion of the high school movement.

Many of the leading states of the high school movement continue to score high on various social capital indicators today. The state-level correlation of the 1928 high school graduation rate with a current social capital index combining five factors (measuring associational activity, social trust, and political/civic participation) is 0.64 (see Figure 4, upper panel). In the absence of two outliers (North Dakota and Nevada which are two of the least populous states), the correlation is 0.81. Current measures of social capital are more highly correlated with various economic indicators

of the early twentieth century that they are with those more recently. For example, the correlation with the log of per capita wealth in 1912 is 0.73 (excluding Nevada), the correlation with the log of agricultural income per farm worker in 1900 is 0.71 (0.86 without California and Nevada), and the correlation with per capita income in 1900 is 0.61 (0.72 without California and Nevada). In contrast, the correlation with a current income measure — the log of per capita income in 1994 — is 0.22.³⁵

States that led in the high school movement continue to lead in educational quality indicators, as can be seen in Figure 4, lower panel. The correlation between a current index of educational performance and the high school graduation rate in 1928 is 0.60 (0.73 without California and Nevada). The social capital assembled in the early part of this century, which apparently fueled part of the high school movement, appears to survive today in some form and to contribute to human capital formation.³⁶

1. There are many notions of social capital. The one we employ in this paper is as follows and is similar to that in James S. Coleman, "Social Capital in the Creation of Human Capital," *American Journal of Sociology*, XCIV (1988). Like physical capital and human capital, social capital is a stock of productive matter that can be called upon to facilitate an action. But unlike human capital, social capital does not belong to or inhere in or reside in any one individual. Rather, it is part of a community, a network, a neighborhood, a country, a clan, a family. It is more public, than it is private; it is more social, than individual; at times more intangible than tangible for it exists in the relations among individuals.

2. Martin Trow, "The Second Transformation of American Secondary Education," *International Journal of Comparative Sociology*, II (1961), 144-166 places the "high school movement" in historical perspective. For sources to the various data cited on secondary school education see Claudia Goldin, "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 (1994), and Claudia Goldin, "America's Graduation from High School: The Evolution and Spread of Secondary Schools in the Twentieth Century," *Journal of Economic History* (forthcoming 1998). For comparative data see Claudia Goldin and Lawrence F. Katz, "Why the United States Led in Education: Lessons from Secondary School Expansion, 1910 to 1940," National Bureau of Economic Research Working Paper, No. 6144 (1997), and Fritz K. Ringer, *Education and Society in Modern Europe* (Bloomington, IN, 1979).

On the relative cost of primary and secondary education see, for example, U.S. Bureau of Education, *Biennial Survey of Education, 1920-22* (Washington, D.C., 1924), 5. "In 1918 the average cost in the United States per elementary school pupil enrolled was \$31.65; per high-school pupil enrolled, \$84.48." The difference would have been a bit less if weighted by states not individuals, because states with the most support to education would have had more students in high school.

3. Not all of the 130,000 school "attendance" districts were fully independent "fiscal districts" with control over their property taxes and spending. Iowa school districts appear to have had fiscal independence. Although the counties were responsible for the collection of school district taxes and arranged for the exchange of "tuition" payments among the state's school districts, the county appears to have been simply the fiscal agent for the districts. The districts seem to have set tax and tuition rates, within the bounds of the various state laws and regulations. On the number of school districts, see U.S. Office of Education, *Biennial Survey of Education, 1930/32* (Washington, D.C., 1935); also U.S. Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970* (Washington, D.C., 1975), series H 412. For data on the share of various levels of government in school finance, see U.S. Bureau of Education, *Biennial Survey of Education, 1924/26* (Washington, D.C., 1928), table 18.

4. On the role of secondary school advances in increasing the stock of education, see Goldin, "America's Graduation from High School," table 1. The World War II G.I. Bill of Rights is the subject of Keith W. Olson, *The G.I. Bill, the Veterans, and the Colleges* (Lexington, KY, 1974) which, on the basis of a simple extrapolation, concludes that the bill had a negligible net impact on the number of men who went to college. Marcus Stanley, "The Impact of the World War II G.I. Bill on the College Graduation of Men," unpublished paper Harvard University (1997), using more sophisticated tools and cohort-specific data, finds that the bill increased the numbers of men graduating from college in the affected cohorts (born 1921 to 1927). Other possible effects of the G.I. Bill, for example the distribution of college students across universities, have not yet been examined thoroughly.

On the use of high school graduates by industry, see Claudia Goldin, and Lawrence F. Katz, "The Origins of Technology-Skill Complementarity," *Quarterly Journal of Economics* (forthcoming, 1998).

5. For an analysis of public expenditures on higher education per capita, see Claudia Goldin and Lawrence F. Katz, "Public and Private Provision of Higher Education: An Exploratory Study of 1890 to 1940," Harvard University Working Paper, December 1997. See also Fred J. Kelly and John H. McNeely, *The State and Higher Education: Phases of Their Relationship* (Carnegie Foundation, New York, 1933), 257. Of the top fourteen states in 1930 by "receipts from state, county, or city of publicly supported higher education per [non-black] inhabitant 21 years of age and over" all but six are in the Pacific or West North Central regions and four of the six are in the Mountain region. One of the remaining two is South Carolina, because Kelly and McNeely exclude blacks from the denominator. The other is Oklahoma.

6. See the lengthy discussion in U.S. Bureau of Education, "Biennial Survey, 1920-22," 1-9, on the increase in educational expenditures directly following the Great War.

7. Our contributions to the literature on high schools include Goldin, "America's Graduation from High School," and Goldin and Katz, "Why the United States Led." Among the most-cited volumes are Edward A. Krug, *The Shaping of the American High School: 1880-1920*, (Madison, WI: 1964), Edward A. Krug, *The Shaping of the American High School: Volume 2 1920-1941*, (Madison, WI, 1972), and William J. Reese, *The Origins of the American High School*, (New Haven, CT, 1995). In the current paper we pay less attention to the special subject of secondary schooling in America's big cities than we have done in previous work. These issues have been the focus of many fine works, among them David Tyack, *The One Best System* (Cambridge, MA, 1974). David F. Labaree, *The Making of an American High School: The Credentials Market and the Central High School of Philadelphia, 1838-1939* (New Haven, CT, 1988), and Joel Perlmann, *Ethnic Differences: Schooling and Social Structure among the Irish, Italians, Jews, and Blacks in an American City, 1880-1935* (New York, 1988). For data on the numbers of secondary school graduates continuing to higher education, see Goldin, "America's Graduation from High School," table 2.

8. In this manner, the question we ask is similar to that in work on the diffusion of technological processes. See, for example, Zvi Griliches, "Hybrid Corn: An Exploration in the Economics of Technological Change," *Econometrica*, XXVI (1958), 501-522.

9. Michael B. Katz, *The Irony of Early School Reform: Educational Innovation in Mid-Nineteenth Century Massachusetts* (Cambridge, MA, 1968) and Maris A. Vinovskis, *The Origins of Public High Schools: A Reexamination of the Beverly High School Controversy* (Madison, WI, 1985) have different interpretations of the opposition of one community to the building of a high school. Katz sees the opposition as one based on class, whereas Vinovskis interprets it more pragmatically in terms of which individuals lived closer to the proposed school. Early controversy on state and local financing of high schools is also taken up in Reese, "Origins." See also I. L. Kandel, *History of Secondary Education: A Study in the Development of Liberal Education* (Boston, MA, 1930), particularly on the important Kalamazoo case (MI, 1874). After the Kalamazoo case, states no longer questioned whether localities had the authority to tax citizens to establish a high school. Kalamazoo thereby served to legalize the spread of the public high school in America by attaching its importance to that of the common school. For a discussion of the establishment of early high schools in Iowa to produce teachers for the common school system, see Clarence Ray Aurner, *History of Education in Iowa*, I and III (Iowa City, IA, 1915). Although the early high schools charged tuition, through the "rate bill," individuals who promised to teach received a tuition waiver. As early as 1858 scholarships and stipends were offered by the state of Iowa to students in the top half of their high school class provided that they became teachers and served for the length of time they had received the scholarship (I, 52-53).

10. For data on the wage structure by occupation, see Claudia Goldin, and Lawrence F. Katz, "The Decline of Noncompeting Groups: Changes in the Premium to Education, 1890 to 1940," National Bureau of

Economic Research Working Paper No. 5202 (1995).

11. State of Iowa, *Iowa School Report, 1911/12* (Des Moines, IA, 1912), 12. In Willa Cather's *My Antonia*, which takes place in south-central Nebraska in the 1890s, Jim Burden's grandparents retire from farming and move to town so that he can attend the local high school.

12. For a similar argument see Gary S. Becker, and Kevin M. Murphy, "The Family and the State," *Journal of Law and Economics*, XXXI (1988), 1-18.

13. On the human capital model, see Gary S. Becker, *Human Capital* (New York, 1964).

14. By "closure" Coleman means the results of any mechanism that links social relationships to facilitate the drawing on social capital. For example, assume that school children do better when their parents take an interest in them and that parents are "shamed" when others see that they do not do homework with their children. "Closure" may be facilitated by having parents get together and discuss how they help their children with homework. The parental meeting is a "social structure that facilitates social capital" (Coleman, "Social Capital in the Creation of Human Capital," S105). See also James S. Coleman, *Foundations of Social Theory* (Cambridge, MA, 1990), chap. 12.

15. In 1917, for example, although thirty states had a maximum age of compulsory school of sixteen years, all but four granted labor permits at or before age fourteen and the remaining four granted them at age fifteen. The education required for a labor permit was nowhere more than eight years and was exactly eight years in just five states. In 1928 the maximum age of compulsory schooling had increased to eighteen in five states and to seventeen in another five states. But labor permits were still issued to those under sixteen years of age in all but two states and the education required for a labor permit was no where greater than eight years. The laws, therefore, do not appear to have constrained youths to remain in high school, let alone to have graduated from high school. See Ward W. Keesecker, *Laws Relating to Compulsory Education*, U.S. Bureau of Education Bulletin No. 20 (Washington, D.C., 1929).

See Dennis Epple and Richard E. Romano, "Ends Against the Middle: Determining Public Service Provision When There Are Private Alternatives," *Journal of Public Economics*, LXII (1996), 297-326, and Raquel Fernandez and Richard Rogerson, "On the Political Economy of Education Subsidies," *Review of Economic Studies*, LXII (1995), 249-262, for the role of income distribution in public-choice models of education.

16. James Poterba, "Demographic Structure and the Political Economy of Public Education," *Journal of Policy Analysis and Management* XVI (1997), 48-66, finds that the greater the growth in the proportion of older people, among U.S. states from 1961 to 1991, the lower the growth in funding for K-12 education. Alberto Alesina, Reza Baqir, and William Easterly, "Public Goods and Ethnic Divisions," National Bureau of Economic Research Working Paper No. 6007 (1997), finds a negative relationship between ethnic fractionalization and spending on "productive" public goods including education in a cross-section of U.S. localities circa 1990.

17. Graduation rates are "cleaner" in the sense that most states accredited high schools and set standards for graduation, whereas enrollment rates could have been overstated for many reasons, including the method of funding of local education by the state. There remains, however, some ambiguity with regard to the quality of education and how it changed over time. The graduation rate is equal to the number of high school graduates (including those from private schools and the preparatory departments of colleges and universities) divided by the number of 17-year olds in the state in a particular year. It should be noted that the data in

Figures 1 and 2 are described in detail in Goldin, "Appendix," and were built up from state-level data on public high schools, private high schools, and the preparatory departments of universities and colleges. Although they were built up separately from the national graduation data given, for example, in U.S. Bureau of the Census, *Historical Statistics*, they track those national totals very well. In all cases, they are contemporaneous data reflecting graduation from high school at a point in time and as a fraction of the youths in a state.

18. We have also estimated longitudinal models with state fixed effects pooling data from 1910, 1920, and 1930. The results for the key variables are quite similar to those in the levels regressions presented in Table 1. But the effects of some variables (e.g., percent Catholic and manufacturing employment share) cannot be estimated precisely when state fixed effects are included and coefficients are constrained to be constant over time because of the strong persistence in state differences in these variables. For details see Goldin and Katz, "Why the United States Led."

19. "Full time" attendance means that the youth attended school for at least one day since September 1 in the previous year and did not list an occupation. We include only non-southern states to avoid conflating rural and small town with the South in the simple cross-tabulations. The attendance data in Table 2 probably overstate the proportion of youths in secondary schools, because the U.S. federal population censuses of 1910 and 1920 inquired whether an individual had attended school at least one day during the preceding year. Attendance could have been at a night, correspondence, industrial, music, commercial, private, parochial, or regular-day school, among others. Furthermore, many young people, especially in the open country, could have been attending common schools at age 16 and 17, and not state accredited high schools.

Margaret E. Greene, and Jerry A. Jacobs, "Urban Enrollments and the Growth of Schooling: Evidence from the U.S. 1910 Census Public Use Sample," *American Journal of Education*, CI (1992), 29-59, report similar results, for 1910, regarding the role of small towns.

The cross-state correlation of school districts per capita in 1932 and the high school graduation rate in 1928 is 0.49. This significant positive relationship of the density of school districts and high graduation rates remains in high school graduation regressions that control for population density or the urban share of the population and is apparent even when examining only states outside the South. But the number of school districts per capita is closely related to wealth, automobile registrations per capita, and agricultural income per farm worker; it is not statistically significant in such regressions that include proxies for wealth.

20. On per capita wealth data see the sources in Table 1; also Goldin and Katz, "Why the United States Led." The city of Des Moines used its local commercial magazine, *Des Moines Wealth*, to broadcast the superiority of its school system in comparison with all others in the United States. "Des Moines therefore equals all and excels most cities in ... school attendance in proportion to population, high school enrollment, number of teachers in proportion to the size of the school system, and salaries paid to the teachers ... Des Moines is recognized the country over as a grand school city" (*Des Moines Wealth*, II, June 1910, 15).

21. State of Iowa, *Iowa State Census, 1915* (Des Moines, IA, 1916), xxxvi.

Only one other state (South Dakota in 1915) asked a question on educational attainment before the federal population census did in 1940. Iowa repeated the question on educational attainment in its 1925 state census.

22. Richard Jensen and Mark Friedberger, "Education and Social Structure: An Historical Study of Iowa, 1870-1930," Newberry Library, (Chicago, IL, 1976), collected a sample from the original cards stored in Des Moines and linked it to both the 1925 Iowa State Census and the federal population manuscripts. Daniel Scott Smith, "'The Number and Quality of Children': Education and Marital Fertility in Early Twentieth-Century

Iowa,” *Journal of Social History*, XXX (1996), 367-393, collected another sample designed for a fertility project.

23. These findings are also corroborated in an analysis, not presented here, using the individual-level data from our “rural” sample. We have matched the post-office addresses or town given in the Iowa census to information on the size of the town. Among 15 to 20 year olds, those residing in towns of between 1,000 and 3,500 population attained the greatest number of years of high school and college. We also include controls for county, Iowa City, sex, church affiliation, nativity of parents, whether the household head was a farmer, and an indicator variable for whether the individual could be matched to a household head.

24. Gerald Gamm, and Robert D. Putnam, “Association-Building in America, 1840-1940,” Harvard University Working Paper (1997), find that the smallest towns in their sample had the largest number of associations per capita and that the largest cities had the smallest number. The towns in their study, however, are somewhat larger than those we are able to identify in the Iowa data.

25. The “free tuition” laws are not well known and we have been unable to find a source documenting when each was passed. We gather, from state education reports, that Nebraska’s, passed first in 1895 but declared unconstitutional, was the earliest. A bill that met constitutional objection was enacted in 1907 after two more unsuccessful tries. Some states (e.g., California, Kansas, Oregon, Washington) passed “free tuition” laws at the county level. By the mid-1920s virtually every state with a large rural population had a “free tuition” law on its books. See William R. Hood, *Legal Provisions for Rural High Schools*, Bulletin No. 40, Bureau of Education (Washington, D.C., 1925).

The high school enrollment rate computed from the Iowa State Census of 1915 using the ratio of the number of individuals of all ages who indicate they attended high school in 1914 to the total number of 14 to 17 year olds is almost identical to an analogous one computed from a set of contemporaneous records from high schools. The former estimate is 31.1 percent, whereas the latter estimate is 31.5 percent. We compute the former estimate by weighting the figures derived from the two parts of our sample (large cities and counties without large cities) where the weights are chosen to produce estimates representative of the overall state population in large cities and in counties without large cities in 1915. The procedure for latter estimate, derived from a completely different set of data, is in Goldin, “Appendix.”

26. It should be noted that the rural attendance rates are lower than those in the three large cities because the rural data include those in the “open country.” The data from the Iowa State Census of 1915 enable a more accurate calculation of the percentage of youths attending school than do the federal population censuses of 1910 and 1920, as explained above. School attendance in the Iowa State Census is given in months and few attended school for fewer than six months; most attended for nine and some for eight.

All the regressions in Table 4 have also been estimated using logits and probits with no important change in the underlying coefficients. We report the easier to interpret linear probability models with appropriately adjusted robust standard errors.

27. Headship was inferred using a simple algorithm that bestows head status to a married male in the household who meets various age criteria with respect to the children, or to a widowed or divorced male in the household, in the absence of a married women. In the rural sample, 86.3 percent of the household heads were male and 9.4 percent were widowed (or divorced) women. In the large-city sample, 84.4 percent were male and 10.5 percent were widowed (or divorced) women. Thus, only 5 percent of household heads, in both samples, were married women who either did not correctly state their marital status or whose husbands were not found in the census. The inclusion of head’s income and country of origin dummies does not alter the main results.

On sex differences in high school enrollment and graduation see Goldin, "America's Graduation from High School," and on co-education in general see David Tyack and Elisabeth Hansot, *Learning Together: A History of Coeducation in American Schools* (New Haven, CT, 1990).

28. See Edward Glaeser and Spencer Glendon, "The Demand for Religion," Harvard University Working Paper (1997) for the relationship between economic success and religion using modern data. They find that individuals claiming no religious belief have similar amounts of education than those with religious beliefs, but have far lower incomes. Note that the Iowa State Census asked "church affiliation," whereas Glaeser and Glendon use a question on religious belief. The variable in the 1915 Iowa State Census is thus an associational measure rather than one concerning beliefs.

29. Educational differences by family background would be also be large if we, instead, considered elite occupations rather than the schooling of the household head. George S. Counts, "The Selective Character of American Secondary Education," Supplementary Educational Monographs, *The School Review and The Elementary School Journal* No. 19 (May 1922), 40, made similar points about differences in school attendance by father's occupation in Mt. Vernon, NY. But in Count's data, by the senior year of high school, almost 88 percent of all students were the children of white-collar workers, whereas 49 percent were in sixth grade.

30. On earnings for different occupations and the educational wage premium, see Goldin and Katz, "Non-competing Groups."

31. See Goldin, "America's Graduation from High School," on the importance of figuring out whether the added years should be considered as secondary or grammar school. Older Americans in 1940, the first year the federal census inquired of educational attainment, appear to have vastly overstated their years of education in comparison with data, from secondary schools, contemporaneous with their possible attendance in them. One possibility is that many Americans did grades nine through twelve in the common schools.

32. The estimated returns to high school are similar in specifications that also include controls for church affiliation, county, city, and parents' nativity.

33. The returns we calculate do *not* net out the direct costs of education, which would have been substantial for many business schools but close to zero for public high schools. Most individuals who stated that they attended a business school went for very few years, if that. Thus the returns to business school, even netting out the costs, are enormously high. Many of the younger males with business school training were bookkeepers and many of the females were stenographers. The high returns in 1915 indicate why high schools began to offer commercial courses and why young people flocked to commercial schools in the 1910s and 1920s.

34. David H. Autor, Lawrence F. Katz, and Alan B. Krueger, "Computing Inequality: Have Computers Changed the Labor Market?," NBER Working Paper No. 5956 (1997), table 1, report that a year of college in 1995 had a 12 percent return whereas it had just an 8 percent return in 1980.

35. We thank Robert Putnam for providing us with his indices of social capital and educational performance. See Jay Braatz and Robert D. Putnam, "Families, Communities, and Education in America: Exploring the Evidence," Harvard University Working Paper (July 1997). The social capital index is defined in the notes to Figure 4. The reported correlation coefficients, in this paragraph and that following, cover the "lower forty-eight" states except where indicated. State per capita income data in 1900, and state agricultural income per farm worker data in 1900, are from Simon Kuznets, Ann Ratner Miller, and Richard A. Easterlin, *Population Redistribution and Economic Growth: United States, 1870-1950, II Analyses of Economic Change*

(Philadelphia, PA, 1960). State per capita wealth data for 1912 are from U.S. Department of Commerce, *Statistical Abstract of the United States* (Washington, D.C., 1925). State per capita income data in 1994 are from U.S. Department of Commerce, *Statistical Abstract of the United States* (Washington, D.C., 1996).

36. The state educational performance index combines three factors. See Braatz and Putnam, "Families, Communities, and Education in America." The educational performance index is defined in the notes to Figure 4.

Figure 1
 State and Local Elementary and Secondary Educational Expenditures
 as a Fraction of Regional Income or U.S. Personal Income

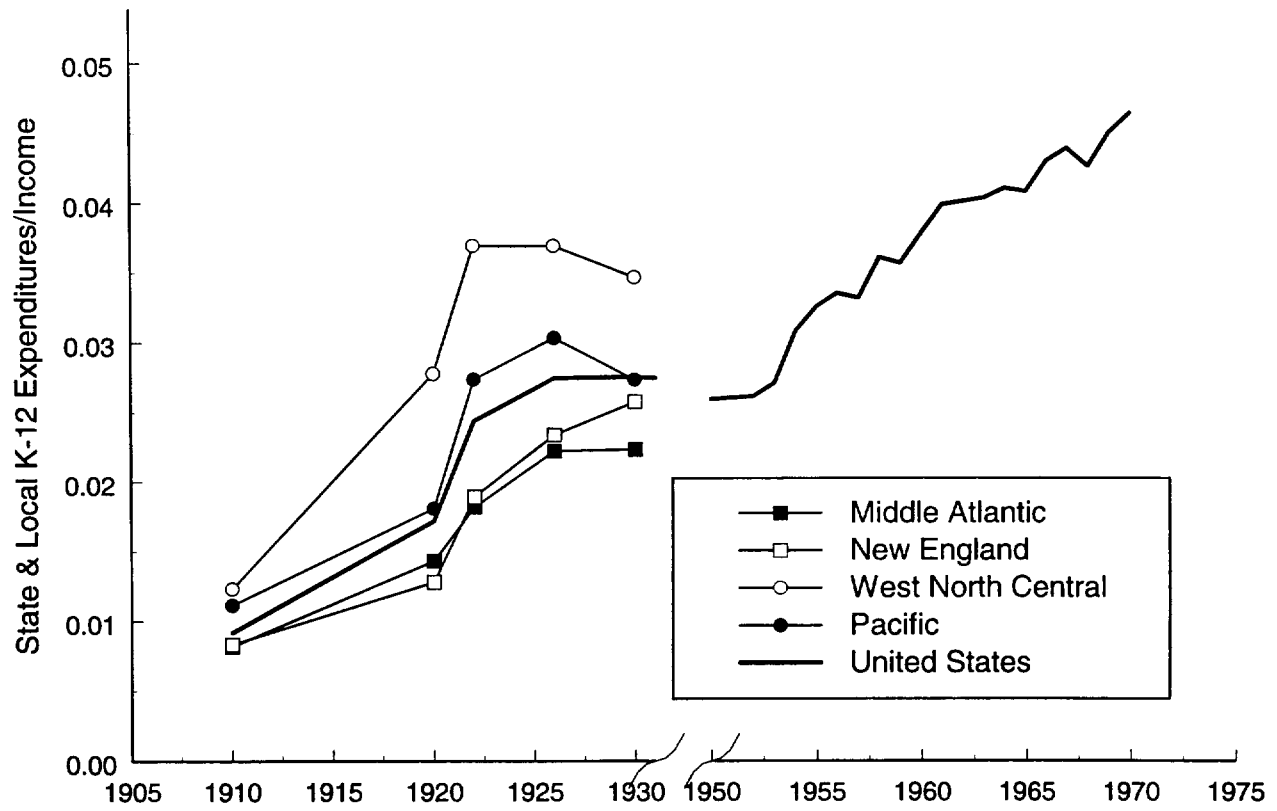


Figure 1, continued

Notes: The periods of the Depression and World War II are omitted because of large changes in the denominator — income. Although the income measures for 1910, 1920, and 1929 differ from that for the post-1950 period, the national number, derived from the state figures, for 1929 is close to that in the national series used for the post-1950s. State income and population figures for 1922 and 1926 were interpolated from the data for 1920 and 1930 (1929 for the income data). Population figures were necessitated because the 1920 and 1929 income data are per capita. The K-12 expenditure data include current expenses and “outlays, new buildings, sites and new equipment” for public day schools. The data by separate states used to construct the regional data for 1910 to 1930 contain virtually the same U.S. totals as in U.S. Bureau of the Census, *Historical Statistics*, series H 492, used for the post-1950s national series.

Sources:

K-12 expenditures

1920, 1922, 1926, 1930: U.S. Bureau (or Office) of Education, *Biennial Survey of Education* [for year] (Washington, D.C., [year]).

post-1950: U.S. Bureau of the Census, *Historical Statistics*, series H 492.

Income

1920: Simon Kuznets, Ann Ratner Miller, and Richard A. Easterlin, *Population Redistribution and Economic Growth: United States, 1870-1950, II Analyses of Economic Change* (Philadelphia, PA, 1960).

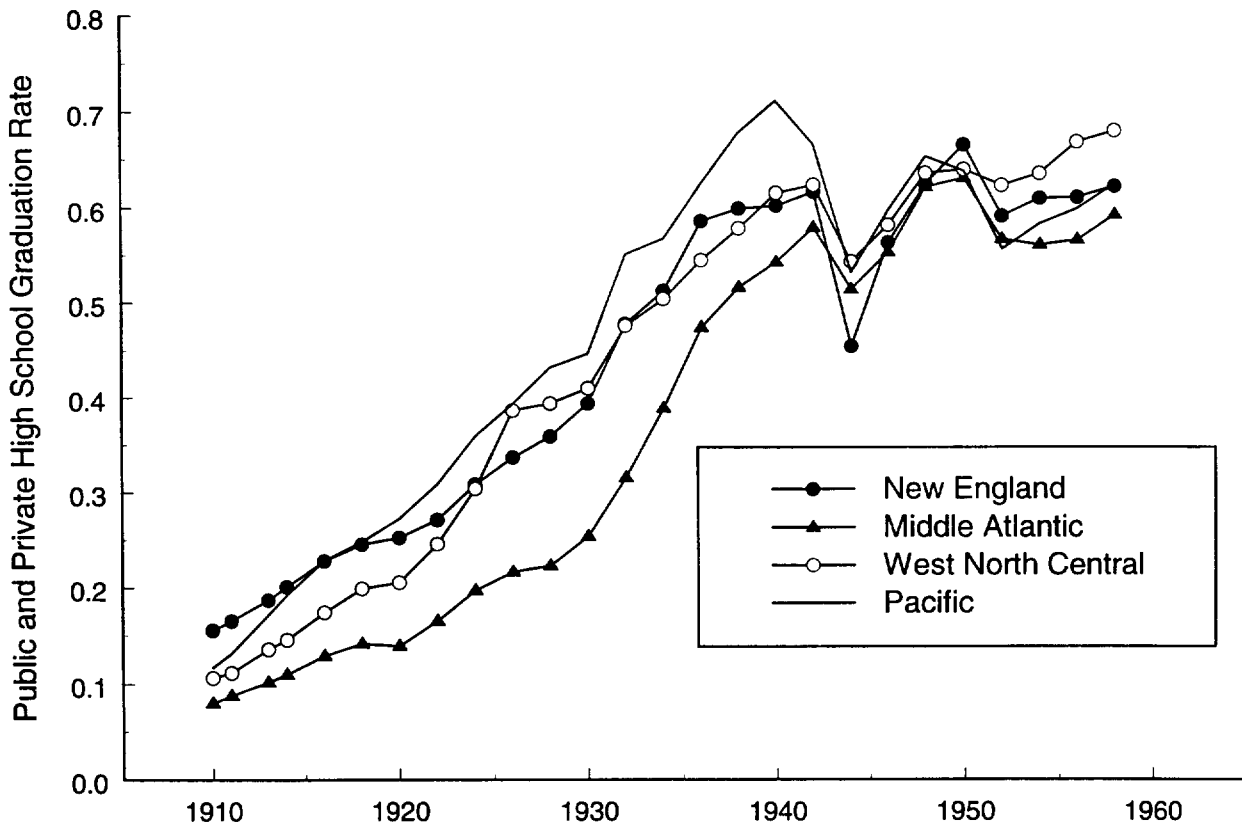
1929: U.S. Department of Commerce, Bureau of Economic Analysis, *State Personal Income by State: Estimates for 1929-1982* (Washington, D.C., 1984).

post-1950: U.S. Bureau of the Census, *Historical Statistics*, series F 8, personal income.

Population

1910, 1920: U.S. Bureau of the Census, *Historical Statistics*, series A 195.

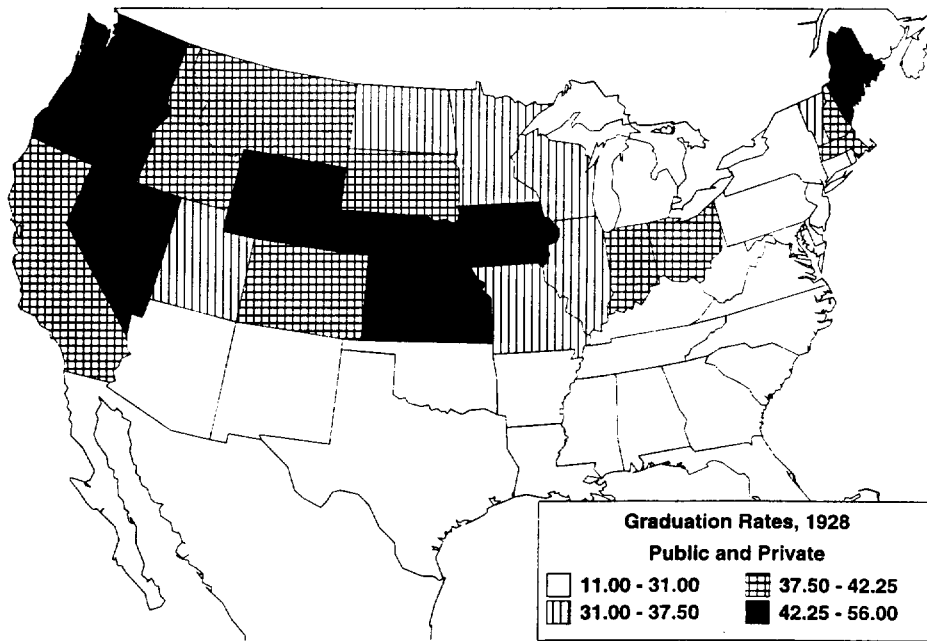
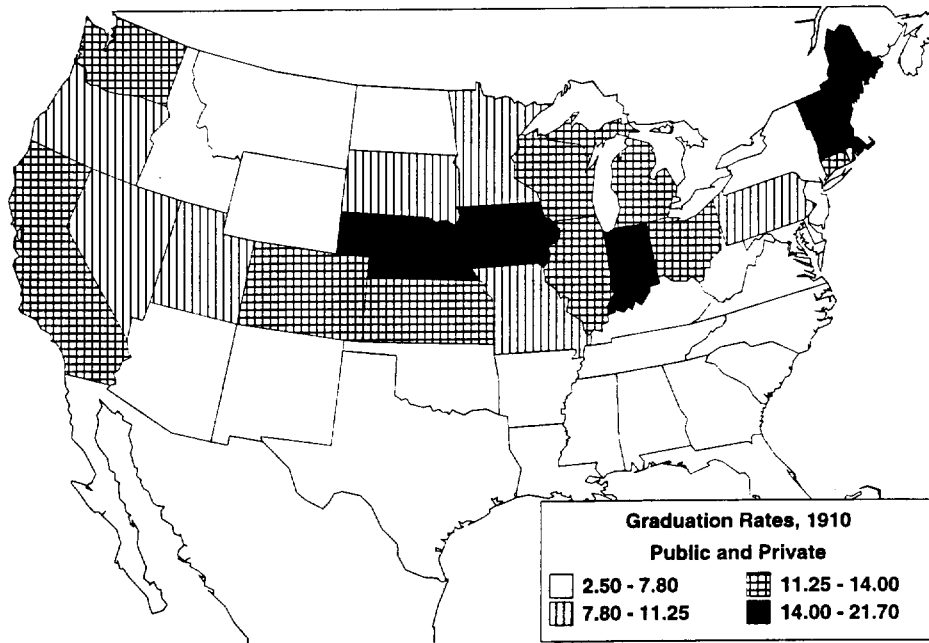
Figure 2
Public and Private High School Graduation Rates for Four Regions, 1910 to 1958



Notes: The public and private graduation rate is the number of individuals graduating from high school in a state (summed here to the regional level) divided by the number of seventeen year olds in a particular year. High school graduates include those in public, private non-sectarian, and private-denominational schools, as well as individuals in the preparatory departments of colleges and universities.

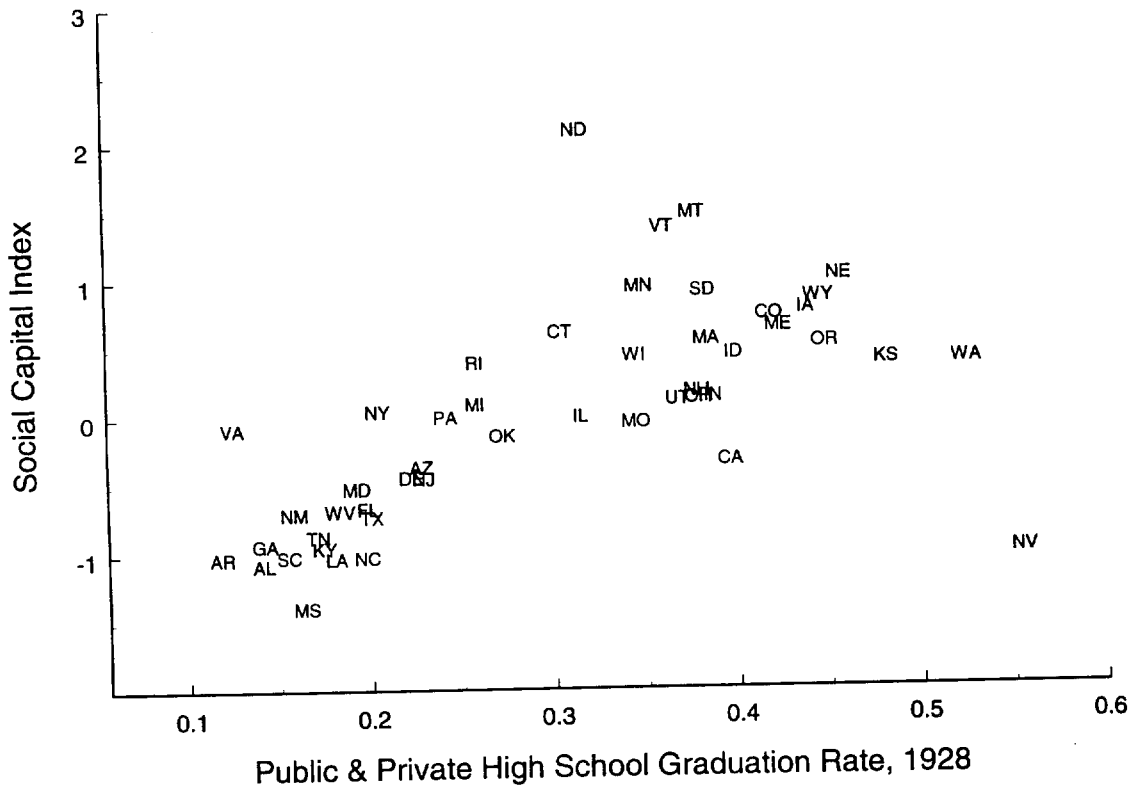
Sources: See Goldin, "Appendix" for details concerning the construction of the series.

Figure 3
Public and Private Graduation Rates by State, 1910 and 1928



Notes and Sources: See Figure 2. The shadings of the two maps allow an equal number of states to fall into each of the three shaded categories in the two years.

Figure 4
 Recent Social Capital and Educational Performance Indices,
 and the 1928 High School Graduation Rate



Notes and Sources:

Social Capital Index: Braatz and Putnam, "Families, Communities, and Education." The index is an unweighted mean of the Z-scores of five components: (1) 501 (c)(3), that is non-profit, organizations per capita in 1989; (2) daily newspaper circulation per capita in 1991 capped for three states (Massachusetts, New York, and Virginia) to avoid bias from nationally circulated newspapers; (3) mean voter turnout in the Presidential elections of 1988 and 1992; (4) the average number of associational memberships per capita from the General Social Survey, all available years from 1974 to 1994; and (5) the social trust measure from the General Social Survey, all available years from 1972 to 1996.

Educational Performance Index: Braatz and Putnam, "Families, Communities, and Education." The index averages three components: (1) a combination of seven National Assessment of Educational Progress scores; (2) the average Scholastic Aptitude Test score adjusted for participation rate differences among states; and (3) a measure of the high school dropout rate that combines four factors.

1928 High School Graduation Rate: Goldin, "Appendix." The rate is computed as the ratio of public and private graduates to the number of seventeen year olds in the state.

1928 High School Graduation Rate: Goldin, "Appendix." The rate is computed as the ratio of public and private graduates to the number of seventeen year olds in the state.

Table 1
Explaining Total (Public and Private) Secondary School Graduation Rates by States,
1910 and 1928

| | (1) | (2) | (3) |
|--|----------------------|---------------------|---------------------|
| | <i>1910</i> | <i>1928</i> | <i>1928 - 1910</i> |
| Log per capita wealth, 1912 or 1922, $\times 10^{-1}$ | 0.236 (0.0901) | 0.852 (0.368) | 0.857 (0.260) |
| Fraction ≥ 65 years, 1910 or 1930 | 2.13 (0.260) | 1.423 (0.788) | -1.749 (0.737) |
| Fraction of labor force in manufacturing, 1910 or 1930 | -0.0673 (0.0335) | -0.144 (0.0972) | -0.0495 (0.0947) |
| Fraction Catholic, 1910 or 1926 | -0.0913 (0.0305) | -0.377 (0.0867) | -0.265 (0.0900) |
| South | -0.0449 (0.00932) | -0.0935 (0.0272) | -0.0735 (0.0267) |
| New England | 0.0444 (0.0121) | 0.100 (0.0310) | 0.0811 (0.0333) |
| Males in public colleges/17-year olds, 1910 | | | 1.09 (0.384) |
| Auto registrations per capita, 1930, $\times 10$ | | 0.0568 (0.0230) | |
| Constant | -0.136 (0.0709) | -0.468 (0.273) | -0.324 (0.199) |
| R ² | 0.895 | 0.874 | 0.758 |
| Root mean squared error | 0.0172 | 0.0451 | 0.0474 |
| Mean (unweighted) of dependent variable | 0.0882 | 0.291 | 0.212 |

Table 1, continued

Notes: Standard errors are in parentheses; ordinary least squares regressions, unweighted. Weighting by state population does not substantially affect the results. Number of observations is 48 for all regressions; the District of Columbia is not included. Arizona and New Mexico were territories until 1912 but are included in the data for 1910 states. The dependent variable in column (3) is the change in the total (public and private) high school graduation rate from 1910 to 1928; the independent variables in column (3) are measured in 1910 or the closest year possible.

Sources: *Dependent variable: Total (public and private) graduation rate by state:* See Goldin, "Appendix"; graduation rate divides by seventeen year olds in the state.

Independent variables: Unweighted means are given in parentheses.

Per capita wealth, 1912 (\$1934) or 1922 (\$2966): Taxable wealth/population, U.S. Department of Commerce, *Statistical Abstract of the United States* (Washington, D.C., 1925).

Fraction \geq 65 years, 1910 (.0414) or 1930 (.055): U.S. Bureau of the Census, *Historical Statistics*, (Washington, D.C., 1975), series A 195-209.

Fraction in manufacturing, 1910 (.248) or 1930 (.254): U.S. Bureau of the Census, *Thirteenth Census of the United States: 1910, Population* (Washington, D.C., 1912); U.S. Bureau of the Census, *Fifteenth Census of the United States: 1930, Population III* (Washington, D.C., 1932).

Fraction Catholic, 1910 (.150) or 1926 (.151): U.S. Department of Commerce, *Religious Bodies: 1926, I* (Washington, D.C., 1930), table 29. The 1910 numbers are derived from those from 1906 and 1916. All are expressed per state resident.

South (0.354): South includes the census divisions South Atlantic, East South Central, and West South Central.

New England (0.125): census division New England.

Males in public colleges/17-year olds, 1910 (.0316): U.S. Department of the Interior, *Report of the Commissioner of Education* (Washington, D.C., 1910), table 31, 850. Military academies receiving public support are excluded. The denominator is both males and females and is thus about equal to half the 18 to 21-year old group of males.

Auto registrations per capita, 1930 (0.224): U.S. Bureau of Commerce, *Statistical Abstract of the United States* (Washington, D.C., 1940), table 467.

Table 2
 “Full Time” School Attendance Rates for 16 and 17 Year Olds:
 U.S. Non-South, by Size and Type of Place, 1910 and 1920 (in percent)

| <i>Size and type of place</i> | <i>1910 (percent)</i> | <i>1920 (percent)</i> |
|--|-----------------------|-----------------------|
| Rural (unincorporated or < 1,000 population) | 37.7 | 38.7 |
| unincorporated | 36.3 | — ^a |
| incorporated and < 1,000 population | 48.1 | — ^a |
| Town (1,000 < 10,000 population) | 40.5 | 43.9 |
| 1,000 < 2,500 population | 45.7 | 47.3 |
| 2,500 < 10,000 population | 37.7 | 42.0 |
| Small city (10,000 < 25,000 population) | 36.9 | 35.1 |
| City (> 25,000 population) | 26.1 | 31.7 |
| 25,000 < 100,000 population | 31.5 | 35.9 |
| 100,000 < 500,000 population | 28.8 | 33.8 |
| ≥ 500,000 population | 21.3 | 28.2 |
| Number of Observations | 9,607 | 11,955 |

^a The 1920 data do not separate the unincorporated areas from the small incorporated villages.

Notes: “Full time” school attendance means that the youth attended school at some point since September 1 of the previous year and was not currently working during the census year (meaning no occupation was given in the census). The pattern of results displayed in this table for both 1910 and 1920 are quite similar (but modestly attenuated) in logit models or linear regressions of full time school attendance on a full set of indicator variables for size of place as well as detailed controls for race, foreign born status, parents’ foreign born status, household head’s occupation, and region.

Sources: 1910 Public Use Micro-data Sample (PUMS) of the U.S. federal population census of 1910, and 1920 Integrated Public Use Micro-data Sample (IPUMS) of the U.S. federal population census of 1920.

Table 3
Determinants of High School and College Attendance
at the County Level: Iowa, 1915

| | (1) | | (2) | | Mean |
|---|----------------------------------|-------------|--|-------------|---------|
| | <i>Ever-attended High School</i> | | <i>Currently Attending High School</i> | | |
| | $\hat{\beta}$ | <i>s.e.</i> | $\hat{\beta}$ | <i>s.e.</i> | |
| <i>Proportion of 10 to 20 year olds with some high school, col. (1)</i> | | | | | 0.196 |
| <i>Proportion of 10 to 18 year olds currently attending high school, col. (2)</i> | | | | | 0.163 |
| Value of cereals per farm $\times 10^{-3}$, 1910 | 0.0524 | 0.0113 | | | 1.063 |
| Per capita tax assessment $\times 10^{-2}$ | | | 0.0212 | 0.00481 | 4.36 |
| Proportion population native born, native parentage | 0.103 | 0.0201 | 0.118 | 0.0251 | 0.613 |
| Proportion of population < 5 years old | -1.092 | 0.360 | -1.069 | 0.459 | 0.104 |
| Whether college or university is in county (dummy variable) ^a | 0.0256 | 0.00861 | | | 0.111 |
| College students as a proportion of the population | | | 0.650 | 0.169 | 0.00597 |
| Whether county is on the Missouri or Mississippi (dummy variable) | -0.0222 | 0.00678 | -0.0113 | 0.00902 | 0.192 |
| Proportion of population in incorporated towns with: ^b | | | | | |
| population > 10,000 persons in 1915 | 0.130 | 0.0327 | 0.148 | 0.0361 | 0.104 |
| population 2,500 \leq 10,000 persons | 0.169 | 0.0404 | 0.155 | 0.0491 | 0.126 |
| population 1,700 \leq 2,500 persons | 0.222 | 0.0679 | 0.178 | 0.0859 | 0.030 |
| population \leq 1,700 persons ^c | 0.237 | 0.0508 | 0.191 | 0.0642 | 0.208 |
| Constant | 0.0438 | 0.0922 | 0.0270 | 0.0678 | |
| R ² | 0.661 | | 0.516 | | |
| Root mean squared error | 0.0236 | | 0.0313 | | |
| Number of observations | 99 | | 99 | | |

Table 3, continued

^a College or university with a 1915 student population > 200.

^b The omitted group is rural, unincorporated.

^c Includes individuals living in incorporated towns and villages with less than about 1,700 people.

Notes: Dependent variable for col. (1) is the number of persons < 21 years of age who ever attended high school (or college) divided by the number of persons 10 to 20 years old in the county. It should be noted that because colleges and universities often had preparatory departments, some people would have claimed to have attended college but not high school. Dependent variable for col. (2) is the number of persons 10 to 20 years old currently attending high school divided by the number of persons 10 to 18 years old in the county. Also included in the col. (1) regression is the fraction of 10 to 20 year olds who were 18 to 20 years old, to account for the age composition of the group. Value of cereals per farm is the total value of cereal crops produced in the county divided by the total number of farms in the county.

Sources: U.S. Bureau of the Census, *Thirteenth Census of the United States, Agriculture VI* (Washington, D.C., 1913) for farm data; all other information is from State of Iowa, *Census of Iowa for the Year 1915* (Des Moines, IA, 1915).

Table 4
 Determinants of School Attendance of 15 to 18 Year Olds,
 Youths Matched to an Adult Household Head: Iowa State Census, 1915

| | <i>Counties without large cities^a</i> | | | <i>Three large cities^b</i> | | |
|--|--|-------------------|----------------------|---------------------------------------|-------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | <i>Means</i> | <i>Any school</i> | <i>HS or college</i> | <i>Means</i> | <i>Any school</i> | <i>HS or college</i> |
| Female | .476 | .021 (.022) | .037 (.019) | .502 | .001 (.024) | .009 (.024) |
| Foreign born | .020 | -.209 (.086) | -.129 (.052) | .040 | -.247 (.068) | -.112 (.064) |
| Native born, with foreign born father | .290 | -.089 (.034) | -.097 (.029) | .274 | .050 (.033) | .045 (.034) |
| Native born, with foreign born mother | .232 | -.051 (.035) | .017 (.029) | .218 | -.134 (.036) | -.101 (.036) |
| Church affiliation of youth | | | | | | |
| Catholic | .195 | -.054 (.033) | -.059 (.029) | .241 | .080 (.037) | .065 (.036) |
| Lutheran | .095 | -.030 (.047) | -.008 (.0351) | .082 | .067 (.050) | .072 (.045) |
| Congregationalist | .031 | .255 (.064) | .283 (.072) | .022 | .107 (.084) | .237 (.086) |
| New England Protestant ^c | .049 | .108 (.054) | .124 (.053) | .056 | .213 (.054) | .280 (.061) |
| Methodist | .088 | .058 (.043) | .100 (.043) | .101 | .137 (.045) | .139 (.047) |
| Baptist | .024 | .006 (.077) | -.055 (.067) | .027 | .270 (.070) | .021 (.081) |
| Other Christian religion | .102 | -.003 (.041) | .063 (.035) | .127 | .070 (.044) | .119 (.043) |
| Jewish | .000 | — | — | .029 | .124 (.082) | .210 (.089) |
| Head occupation, white collar | .123 | .043 (.037) | .095 (.041) | .271 | .153 (.031) | .185 (.033) |
| Head occupation, farmer | .544 | -.118 (.026) | -.183 (.023) | .011 | -.053 (.130) | .012 (.149) |

Table 4, continued

| | (1) Means | (2) Any school | (3) HS or college | (4) Means | (5) Any school | (6) HS or college |
|----------------------------|--------------|-------------------|----------------------|--------------|-------------------|----------------------|
| Head years of schooling | 8.15 | .009 (.004) | .017 (.004) | 8.32 | .019 (.005) | .028 (.005) |
| Family owns farm or home | .662 | .104 (.025) | .085 (.021) | .469 | .046 (.026) | .048 (.025) |
| R ² | | .200 | .160 | | .234 | .157 |
| Sample size | | 1,806 | 1,806 | | 1,413 | 1,413 |
| Mean of dependent variable | | .545 | .243 | | .566 | .306 |

^a A large city is one with more than 25,000 people.

^b The three cities are: Davenport, Des Moines, and Dubuque.

^c New England Protestant, other than Congregational, includes: Presbyterian, Quaker, and Unitarian.

Notes: The dependent variable in columns (2) and (5) equals 1 if the youth reported attending any school (common, grammar, high school or college) during 1914; it equals 0 otherwise. The dependent variable in columns (3) and (6) equals 1 if the youth reported attending high school or college during 1914; it equals 0 otherwise. The base group for religion is “no church affiliation reported.” Each regression also includes an intercept, three year-of-age dummies, and a dummy variable for “missing” head’s years of schooling. The regressions in columns (2) and (3) also include seven dummy variables for counties. Those reported in columns (5) and (6) include two dummy variables for cities. The numbers in parentheses are Huber-White robust standard errors that account for both correlated errors within households, because there can be more than one child in a household, and heteroscedasticity. The regressions in columns (5) and (6) are weighted by city sampling weights to reflect the different rates of our sampling Davenport, Des Moines, and Dubuque.

Source: Iowa State Census of 1915 urban and rural samples. See Appendix.

Table 5
 Estimates of the Returns to Education by Type of Schooling for Non-Farm Occupations
 from Log(Annual Earnings) Regressions: Iowa State Census, 1915

| | <i>Males</i> | <i>Males</i> | <i>Females, unmarried</i> |
|---|-----------------------|-----------------------|-------------------------------|
| | <i>18 to 70 years</i> | <i>18 to 34 years</i> | <i>18 to 34 years</i> |
| Linear spline function in education | | | |
| Years of common school ≤ 9 | .046 (.004) | .070 (.006) | .016 (.012) |
| Years of common school ≥ 10 | .007 (.011) | .009 (.018) | .022 (.027) |
| Years of grammar school ≤ 9 | .071 (.004) | .101 (.006) | .060 (.011) |
| Years of grammar school ≥ 10 | .032 (.019) | .027 (.024) | -.002 (.062) |
| Years of high school | .104 (.005) | .119 (.006) | .125 (.008) |
| Years of college \times (years of HS > 0) | .098 (.006) | .122 (.009) | .145 (.014) |
| Years of college \times (years of HS = 0) | .047 (.017) | .102 (.035) | .026 (.047) |
| College but no high school, dummy | .281 (.053) | .172 (.085) | .414 (.113) |
| Business school, dummy | .403 (.074) | .281 (.088) | .474 (.100) |
| Native born | .206 (.027) | .129 (.035) | -.011 (.081) |
| (Years in U.S. $\times 10^{-2}$) \times foreign born | .488 (.095) | .261 (.258) | -.004 (.006) |
| R ² | .233 | .270 | .310 |
| Standard error (root mean squared error) | .580 | .526 | .554 |
| Number of observations | 10,734 | 5,169 | 1,897 |

Table 5, continued

Notes: The dependent variable in each regression is log (total annual earnings for 1914 from occupation). Each regression also includes an intercept, a quartic in potential experience (age - total years of schooling - 6), a non-white dummy, and a dummy for whether years in the United States is missing. The samples consist of all individuals in the appropriate age-sex-marital status group in non-farm occupations reporting positive 1914 earnings, without missing data for age, schooling, race, or nativity. The regression pools the sample containing counties without large cities and that with the three large cities (Davenport, Des Moines, and Dubuque). Observations are weighted to reflect the different sampling rates in the two samples to make the regressions representative for the entire population of Iowa (except for individuals in the rural areas of counties containing large cities).

Source: Iowa State Census of 1915 urban and rural samples. See Appendix.

APPENDIX: THE 1915 IOWA STATE CENSUS PROJECT

The 1915 State Census of Iowa is a unique document. It was the first state or federal census to include information on education and income prior to the U.S. federal census of 1940 and it contains considerable detail on other aspects of individuals and households, e.g., church affiliation, which was never asked in a federal census; wealth; years in the United States and in Iowa. The Iowa state census of 1915 is a complete sample of the residents of the state and the returns were written by census takers (assessors) on index cards, one for each individual. These cards were kept in the Iowa state archives in Des Moines and were microfilmed in 1986 by the Genealogical Society of the Latter Day Saints (Mormons).

The census cards, now on microfilm, are grouped by county although the large cities (those having more than 25,000 residents) are grouped separately. Within each county or large city, all records are alphabetized by last name and within last name by first name (although there are occasional errors in alphabetizing). The current project has sampled the records for three of the largest Iowa cities (Davenport, Des Moines, Dubuque; we had planned to sample Sioux City, but the microfilms are too light). Counties that did not contain a city of more than 25,000 population in 1910 have also been sampled. The counties were chosen by grouping the 99 counties in Iowa in four equal sized units by education and then randomly taking three from each of the four groups. This procedure produced twelve counties and eight (Adair, Buchanan, Carroll, Clay, Johnson, Lyon, Marshall, and Wayne) have, thus far, been sampled. They conveniently span much of the geography of the state: Clay and Lyon in the northwest, Johnson and Buchanan in the east, Wayne in the south central, Marshall in the central portion, Carroll in the west central, and Adair in the southwest.

(1) Sampling strategy for the urban and rural samples

Urban Sample: In each of the cities about one-fourth of the films were purchased, distributed throughout the alphabet. We sampled every other name on each roll of microfilm chosen for the sample and entered only completed last names, e.g., the first name on a roll was not taken. If the cards did not go in alpha order and we attempted to re-alpha order

Rural Sample: In each of the counties, one film (out of from four to seven, depending on the county) was purchased. We sampled all names on each roll of microfilm chosen for Buchanan, Carroll, Lyon and Marshall, and one-half of the names for Adair, Clay, Johnson, and Wayne.

(2) Variables included

All variables on the census cards were taken for the data collection. These included (in order of recording on the card): card number, sex, color, marital status, months of schooling in 1914 by type of school (public elementary, private elementary, high school, college), whether individual could read and/or write, whether handicapped (blind, insane, deaf, idiot), if foreign born whether naturalized, years in Iowa and years in the United States, full name, age, address (county, post office, town or township, ward), occupation, months unemployed and total earnings from occupation for 1914, extent of education (years in common, grammar, high school, college), birthplace, whether person owned home or farm, incumbrance on and value of the same, military service, church affiliation, father's and mother's birthplaces, the assessor's name, and any remarks on the card.

(3) Family reconstitution

Entire households were surveyed, but because the cards were boxed alphabetically we can reconstitute only nuclear families in which all members have the same last name. Our interest was in grouping parents with their dependent children. The assessors numbered each of the cards, almost always in sequential order within a household. Additional information was provided by the address (of particular importance in the cities, although P.O. address was not given in Davenport), the places of birth of parents, and the assessor's name. We used all these pieces of information to reconstitute the families, although we primarily used card number, last name, and address. Of those aged fifteen to eighteen in the rural county sample we matched 89.1 percent to an adult household head; we matched 78.7 percent in the large-city sample.

There are several reasons why we could not match all teenaged children to parents or guardians. Most important is that children and their guardians need not have had the same last name. Some children had been orphaned, some boarded with relatives to advance their education, and others boarded for reasons of work. The card of the parent could have been alphabetized incorrectly or the last name could have been misspelled. In two of the cities we also had complete addresses and the problem of misspelling would have been less important there. But because we skipped every other name, we could have missed parents whose last names were alphabetized differently from that of their children. The point is that there are many reasons, some pertaining to early twentieth century life and others having to do with late twentieth century data collecting, why all families could not be reconstituted.

(4) Duplicate cards

Because the census was taken over a period of time (although we do not know how long), individuals can appear more than once in the sample and we term these the "duplicates." In some cases, the origin of the "duplicate" is clear: the individual was in an asylum or at school and was counted in both places. In other cases, it seems evident that the individual moved or went through some other life transition, such as marriage. Certain ethnic groups (Russian Jews, for example) and blacks were most frequently counted twice, a likely result of their greater frequency of moving. We coded one record as the original and one as the "duplicate," and do not use the duplicated information in our sample. About 2 percent of the urban sample were "duplicates." Practically none of the "rural" sample was.