Returns to Education for Women in the Mid-Twentieth Century: Evidence from Compulsory Schooling Laws *

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Abstract

Women had a similar level of schooling to men during the mid-twentieth century United States, but research on the returns to education for women is scarce. Using compulsory schooling laws as instrumental variables, this paper examines the causal effect of education on women's labor market and marriage market outcomes. I show that an additional year of education increased women's probability of gainful employment by 7.1 pp. and being in a skilled occupation by 1.2 to 3.3 pp. The positive returns in the labor market were larger for women from lower socioeconomic backgrounds and women from rural areas. On the other hand, education surprisingly did not affect women's probability of marriage, but it increased their probability of divorce and separation by 1.4 pp. Conditional on marriage formation, there is evidence of assortative mating and a positive effect of women's education on the husband's employment and wage earnings, which suggests an increasing level of education for women led to a better match in the marriage market. Women from lower socioeconomic backgrounds also benefited more in the marriage market.

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1 Introduction

Women and men had similar educational attainment during the early 20th-century United States. Although the returns to education for men during this period have been well-studied (Goldin and Katz 2000; Feigenbaum and Tan 2020; Clay et al. 2021), the returns to education for women have been neglected. Women's case is particularly interesting because they might experience positive returns in the labor market and in the marriage market. On the one hand, a woman with higher educational attainment "could secure a position as a clerk, stenographer, or, better yet, a secretary," and on the other hand, women would also have "a better chance of securing a higher income husband" (Goldin and Katz 2008).

To establish the causal effect of education, I instrument years of education completed with state-level legislation on compulsory schooling, child labor, and school continuation following Clay et al. 2021. The instrumental variable approach explores cohort-by-state variations in the length of compulsory attendance required. The validity of the IV strategy is well-established for men (Stephens and Yang 2014; Clay et al. 2021), but this is one of the few papers to document the positive and significant relationship between required years of compulsory attendance and women's educational attainment. I show that laws requiring children to attend school for seven, eight, and nine years or above positively affected women's educational attainment, and the magnitudes of the effects are comparable with those of men.

I use the complete-count decennial census data from 1940 to study birth cohorts born between 1885 and 1912 that were affected by state compulsory schooling laws (Ruggles et al. 2021).[1] I further restrict the sample to native-born White women since they were more likely to be affected by compulsory attendance laws than foreign-born women and Black women. In addition, I also use the census tree linked data to examine the returns to education for women by their socioeconomic backgrounds (Price et al. 2021; Buckles et al. 2023a). Women's socioeconomic backgrounds are measured by their father's occupational scores, whether their fathers worked on the farm, and whether they lived in urban or rural areas.

First, I show that women experienced large returns to education in the labor market and women from lower socioeconomic backgrounds benefited more. In particular, the two-stage-least-square (2SLS) estimate indicates that an additional year of schooling increased women's

[1] I only use the 1940 census data because education is not reported in previous censuses.

probability of having a gainful occupation by 7.1 percentage points, which is a large effect since only 25% of women in the sample were gainfully employed in 1940. The effect is 8.2 pp. for women of lower socioeconomic backgrounds and 4 pp. for women of higher socioeconomic backgrounds, despite that the share of women from lower economic class working in 1940 is smaller (16.3% versus 24.5%). Furthermore, conditional on earning positive wages, an additional year of schooling increased working women's wage earnings by 16.9%. This large effect could be due to women entering higher-paying skilled occupations since an additional year of schooling increased the probability of a stenographer/clerical worker/bookkeeper by 1.2 to 3.3 pp.

Next, I present positive returns to education for women regarding their marriage market outcomes. The outcomes include women's decision to marry/divorce and the match quality between the wife and the husband. I first show that an additional year of education did not affect the women's probability of marriage on average, but it increased the probability of being never married in 1940 for those of lower socioeconomic backgrounds. This could imply that education allowed women of lower socioeconomic backgrounds to search in the marriage market for longer. On the other hand, an additional year of education increased women's probability of divorcing or separating by 1.4 pp., a large increase relative to the average share of 2.5% of women who had been divorced or separated. This finding suggests that more education helped women leave marriages, possibly because educated women could support themselves financially.

Conditional on marriage formation and the husband's education, an additional year of the wife's education reduced the probability of the husband being unemployed by 3.16 pp. This is a large effect since the unemployment rate was still high in 1940, several years after the Great Depression. In addition, I also show that an additional year of education attained by the wife increased the husband's wage earnings by 8.5%. The combined results suggest a higher level of education might allow women to get a better match in the marriage market. Finally, examining the heterogeneous effects suggests women of lower socioeconomic backgrounds benefited more from education in the marriage market as well.

I advance the literature in several directions. My findings add new insights into the large literature on returns to schooling in the United States (Angrist and Krueger 1991; Card 1993; Goldin and Katz 2008; Oreopoulos and Salvanes 2011; Stephens and Yang 2014). What differentiates my paper from others is that I take advantage of the complete-count census data and the linked census data to examine the returns to schooling among women. I quantify the mag-

nitude of returns to education for women regarding their labor market and marriage outcome outcomes, and I also examine returns to education by women's socioeconomic backgrounds.

In addition, I study how legislation helped people achieve higher educational attainment and, in turn, affected future labor market and marriage market outcomes. Even though I only study the effect of compulsory schooling laws (Angrist and Krueger 1991; Schmidt 1996; Margo and Finegan 1996; Lleras-Muney 2002; Goldin and Katz 2008; Stephens and Yang 2014; Gihleb and Lang 2016; Clay et al. 2021), my paper is also related to research studying the effect of the G.I. Bill on educational attainment and earnings (Bound and Turner 2002; Angrist and Chen 2011; Lennon 2021). My estimates of returns to schooling on earnings are similar to Lennon 2021, which studies the effect of the G.I. Bill on annual earnings among female veterans.

Lastly, I contribute to the growing literature on women's marriage during the historical United States (Craig et al. 2019; Olivetti et al. 2022; Lafortune et al. 2022; Bailey and Lin 2022; LaGuardia and Niemesh 2023). While past research focuses on assortative mating by education and socioeconomic background often suggests a positive correlation between women's education and the probability of never marrying, I show that the effect might not be causal. Instead, I find that additional education obtained because of compulsory schooling laws did not affect women's probability of marriage. I also examine additional outcome variables, such as the husband's labor market outcomes and household income.

2 Background

2.1 State Laws on Compulsory Attendance, Child Labor, and Continuation

State-level legislation on compulsory attendance, child labor, and school continuation was enacted between the 1850s and the 1910s to keep children in school. Compulsory attendance laws were established at the earliest, which often set a minimum school entry age, maximum school leaving age, and a minimum period that children should be in school. Massachusetts was the first state to enact compulsory attendance laws in 1852, and other states in the Northeast region followed suit. States in the South were the last to establish compulsory attendance laws. Enforcement and penalties for violating such laws also varied by state. Several states had enforcement officers and visiting teachers with supervising authorities, and most states established

a fine for parents whose children did not follow such laws.[2]

Child labor laws were enacted as a complement to the compulsory attendance laws. Most laws specified the minimum age at which children could start working. Child labor laws enacted before 1900 had weak enforcement, and child labor activists noticed an increase rather than a decrease in child labor between 1880 and 1900 (Moehling 1999). Between 1900 and 1910, however, more states established child labor laws and committees to enforce these laws, and the share of young children working (13 years old and under) declined below 5 percent by 1930 (Feigenbaum and Russo 2020). Like compulsory attendance laws, variations in child labor laws across different states were large.

State governments also enacted school continuation laws, which required children who were already working but still under maximum school leaving age to attend school in their spare time. The required school time was short, usually only a few hours per week, but it increased the opportunity cost of hiring children under the maximum school leaving age since they could often be excused from work (Goldin and Katz 2011).

Compulsory schooling, child labor, and continuation schooling laws together generated large variations in school attendance across birth cohorts and states.[3] Children born in different birth years and birth states faced different lengths of compulsory attendance, ranging from below five years to above nine years. Figure 1 shows the variations in state laws for birth cohorts born from 1880 to 1910. States in the South introduced compulsory attendance laws later than states outside of the South, but all states had established such laws by the early 1910s. The number of years required for attendance also increased over time.

The length of compulsory attendance varies by one's birth cohort and birth state. As a result, the cohort-by-state variations in compulsory attendance can be used as instrumental variables for years of schooling completed (see more details in Section 4).

2.2 Women's Education during the Late 19th and Early 20th Centuries

The American education system embraced the virtue of gender neutrality starting from the early 19th Century, offering to educate female and male students to similar levels for those under

[2]See more details and a timeline on these laws in Steinhilbe and Sokolowski 1966.

[3]For a more in-depth review of the variations generated by state laws, see Moehling 1999, Goldin and Katz 2011, Clay et al. 2012, Clay et al. 2021.

15 years old (Goldin and Katz 2008). Publicly funded schools helped to achieve such a goal since parents of poorer households did not have to choose between sons and daughters to receive an education. State laws on compulsory schooling, child labor, and school continuation also had a moderately positive effect on educational attainment and enrollment (Margo and Finegan 1996, Lleras-Muney 2002, Goldin and Katz 2008).

Figure 2 shows that women and men had similar educational attainment, and the share of women completing 8th and 12th grade is slightly higher than the share of men.[4] However, most women did not go to school to pursue a career. Instead, they went to school to learn skills, knowledge, and morals to become good wives and mothers (Rury 1991). Only a small share of women attended school to work, usually at the cost of marriage, and they would be able to support themselves without a husband (Harris 1978).[5] The returns to education for women in both markets are expected to be positive. Specific benefits of women's education in the labor market and the marriage market are outlined below.

2.2.1 The Benefits of Education in Employment

Although education was not offered to women for the purpose of having a career after leaving school, skills transmitted in school that aimed to make women better homemakers also may have made them better workers. For example, courses in bookkeeping and accounting were offered to women so that they could improve household management efficiency after getting married, but bookkeeping skills also provided women the option to become bookkeepers, which generated income. Many women took courses in typewriting and stenography, entered the labor force briefly, and worked as stenographers and secretaries before marriage (Rury 1984).

Because of new skills gained through education, education made a difference in the types of occupations women engaged in, and the returns to education are expected to be positive because educated women could work in skilled occupations that paid more (Goldin and Katz 2008). On the other hand, women who worked as factory workers and domestic servants engaged in tasks

[4]Since some people born in the late 19th Century might have died by 1940, the educational attainment reported for older birth cohorts in the 1940 census is not as accurate as the younger cohorts. To address the issue, I plot the educational attainment of birth cohorts born between 1885 and 1895 as reported in the 1915 Iowa State Census (Goldin and Katz 2010). The gender differences in schooling reported in the 1940 Decennial Census and the 1915 Iowa State Census are similar.

[5]Many occupations and industries established marriage bars that prevented married women from working and fired women after marriage during this period (Goldin 1988, Goldin 2021).

similar to those performed at home, such as sewing and cleaning, making formal industrial education unnecessary for them.

In addition, demand-side factors, such as occupation segregation, also made education more beneficial for women in the labor market. For example, education often prepared men for management and administrative roles, leaving vacancies in other lower-ranked jobs for women to fill (Rury 1991).

2.2.2 The Benefits of Education in Marriage

Educators and domestic feminists argued that education made women more efficient homemakers and knowledgeable mothers. Education could improve women's performance in the household in several ways. First, women were able to acquire practical skills in school. For example, many schools offered courses on sewing and cooking for women, making it possible for women to mend and alter clothes for men and children in their families. With sewing skills, women could also make clothes for sale and support their families with additional income (Rury 1991). In addition, women learned about moral values and character development through education, which were essential in child-rearing. Raising children was a sacred responsibility, and "women needed all the intellectual and moral ballast they could get" (Nash 2005). Mothers were responsible for developing "both the skills and the character in future generations necessary for continued social and economic development" (Rury 1991). Finally, educated women could directly contribute to household income by participating in the labor market, which might be extremely useful if the husband was out of a job.

3 Data

3.1 Compulsory Attendance Laws

Data on compulsory attendance, child labor, and school continuation laws are obtained from the replication package of Clay et al. 2021. The data provide cohort-by-state level variation in years of compulsory attendance required for those born between 1885 and 1912.

3.2 Complete Count Censuses

Data on women's labor and marriage market outcomes are based on the 1940 complete-count census (Ruggles et al. 2021). I restrict the sample to native-born White women between 1885 and 1912. This is because foreign-born individuals might not have completed schooling in the US and, as a result, might not be subjected to state-level compulsory schooling laws. In addition, since the US South was late in introducing state schooling laws, and enforcement was weak after the laws were established, I do not include Black women in the sample (Margo 1990, Lleras-Muney 2002, Stephens and Yang 2014).

I only use the 1940 complete-count census data here because education is not reported in previous censuses. In addition, I also plan to use the 1950 complete-count census to replicate the analysis in the future.

3.3 Census Tree Data

The Census Tree Project provides linked data for women and thus allows me to examine the heterogenous returns to education based on family socioeconomic background (Price et al. 2021, Buckles et al. 2023a). In particular, I am using the 1900-1940, 1910-1940, and 1920-1940 linked data (Buckles et al. 2023b, Buckles et al. 2023c, Buckles et al. 2023d).

The linked data provide information on the father's occupation and occupational score, which are used as measures of socioeconomic background. Father's occupation can be categorized as skilled and others based on occupational codes in the census, which indicates high and low levels of socioeconomic background.[6] Occupational score is a numerical number assigned to an occupation, and a higher occupational score indicates a higher socioeconomic background.[7]

4 Identification: Instrumental Variables

Since education is an endogenous choice, OLS estimates of years of schooling on the outcome variables are likely biased. For example, women of higher socioeconomic backgrounds might complete more years of schooling but are less likely to work after graduation, biasing the

[6] Skilled occupations, such as professors and managers, contain occupational codes 0 to 690 (except 100 and 123). Other occupations, such as guards and farm laborers, contain occupational codes 700 to 970 and 100 and 123.

[7] Read more about occupational score here: IPUMS USA variable OCCSCORE

estimates downwards.

As a result, I instrument years of schooling with laws on compulsory schooling, child labor, and continuation of school. Compulsory attendance laws are plausibly exogenous, and the IV estimates can establish the causal effect of education (Lleras-Muney 2002).

4.1 Compulsory Attendance Laws As Instruments

Almost 90% of women aged 28 to 55 in 1940 had been affected by compulsory attendance laws while they were young. As shown in Figure 3, among those who were required to attend school, the vast majority were required to attend school for at least six years and at most ten years, while very few were required to attend school for only one to five years.

Due to this non-linearity in the number of required years of attendance, I use a group of dummy variables (instead of a continuous variable) that indicate different lengths of compulsory attendance as instruments for years of schooling completed. In particular, the instruments consist of four dummy variables, which are equal to 1 if the required number of years of attendance is six, seven, eight, and nine years or above.

The positive effect of compulsory attendance on years of schooling completed is illustrated in Figure 4 and Table A1. The results show that requiring children to attend school for six, seven, eight, and nine years or above increased their probability of completing sixth, seventh, eighth, and ninth grade respectively, which suggests that compulsory attendance laws are effective in increasing years of education. Among these estimates, requiring children to attend school for nine years or above has the largest effect, which increased the probability of finishing the ninth grade by 4.1%, although it did not affect the probability of finishing high school.

4.2 Instrumental Variables Specification

The instrumental variables specification used to estimate the returns to education for women is the following:

$$Y_{icsr} = \beta_0 + \beta_1 Educ_{icsr} + \gamma_s + \gamma_{cr} + \epsilon_{icsr}$$

$$Educ_{icsr} = \alpha_0 + CA'_{icsr}\Omega + \theta_s + \theta_{cr} + u_{icsr}$$

Y_{icsr} is the outcome variable in the 1940 census (that measures labor market returns and marriage market returns) for individual i who was born in birth cohort c, state s, and region r, and $Educ_{icsr}$ is the years of schooling completed. CA_{icsr} is a vector of instruments consisting of four dummy variables, which are equal to 1 if the required number of years of attendance is six, seven, eight, and nine years or above. The specification also includes birth state fixed effects γ_s and birth year by birth region fixed effects γ_{cr}. With both fixed effects, β_1 captures changes within the state over time and variations across states but within the same region and birth cohort. This is similar to the specification used by Stephens and Yang 2014 and Clay et al. 2021.

4.3 First Stage Results

Table 1 presents the first stage estimates of the instruments on years of schooling completed for several groups of women. Column 1 includes all native-born White women born between 1885 and 1912. The results first show that women required to attend school for six years did not experience a large positive effect on years of education relative to women who were not required to attend school and women who were required to attend school for one to five years.[8] On the other hand, requiring women to attend school for seven, eight, and nine years or above increases women's educational attainment by 0.069, 0.078, and 0.153 years, respectively. A higher number of required years of attendance seems to be more effective at increasing educational attainment among women. The joint F-statistics in Column 1 is around 16.

The magnitudes of all these estimates in Column 1 are slightly smaller than those of men (shown in Stephens and Yang 2014 and Clay et al. 2021), indicating that the laws might have a weaker effect on increasing women's education. This could be because women's labor during their teenage years was valued less than men's labor in the industry, and women were more likely to attend school than men in the first place.

In addition, I further restrict the sample to currently married women in 1940, working women who earned positive wages in 1940, sample-line women in the 1940 census (which is less than 5 percent of the female population), and women born outside the south in Columns 2, 3, 4, and 5. Using various samples allows me to examine the returns to education among different groups.

The first-stage results from Columns 2, 3, 4, and 5 are similar to those of Column 1, suggesting

[8]The results are similar if we include compulsory attendance for one to five years as an instrument in the first stage. See more details in Table A2.

that compulsory attendance laws have a positive effect on years of schooling for married women, working women, sample-line women, and women born outside the South as well. Note that the results for working women in Column 3 are slightly different because the coefficients do not increase monotonically with the increasing number of required years of attendance, which could be due to the selection of women who were earning positive wages (which consists of less than 25% of the female population in the analysis). In addition, the joint F-statistics among sample-line women is smaller than 10, suggesting that the instruments are weak in this case, which could be due to the much smaller sample size of sample-line women.

4.4 First Stage Results By Socioeconomic Background

It is important to study whether children from lower socioeconomic backgrounds benefited more from compulsory attendance laws relative to other children. As a result, I additionally examine the effect of compulsory attendance laws on years of education by household socioeconomic background using the linked Census Tree sample of women. The household socioeconomic background is measured by (1) the father's occupational score (a higher score indicates a higher occupational status) or (2) the father's occupation category, which can be skilled (such as managers, carpenters, and motormen), and others (such as guards and farm laborers).

Since the linked sample of women likely differs from the complete-count sample of women,[9] we might be concerned that the selection into the linked sample of women could bias the results. To address this issue, I show that the first stage results from the linked sample of women are similar to those of the complete-count sample of women aged 28 to 55 in 1940 (see the comparison between Columns 1 of Table 2 and Table 1). This indicates that compulsory attendance laws positively affected education attainment for women in the linked sample, which is reassuring.

Columns 2 to 5 of Table 2 show that compulsory attendance laws affected children from high and low socioeconomic backgrounds differently. For children of high socioeconomic backgrounds, compulsory attendance laws that required students to attend school for 6, 7, 8, and 9 years or above increased their education. However, for children of low socioeconomic backgrounds, only compulsory attendance laws that required students to attend school for nine years or above increased their education. Further analysis of children from different households by

[9]For example, Table A3 suggests women in the linked sample were more likely to have been married/be in farming households in 1940.

farm/urban status suggests compulsory attendance laws were less effective in increasing education among children from farm households relative to non-farm households, but they were similarly effective in increasing education attainment of children from rural and urban households (see Columns 6 to 9 of Table 2). The combined results suggest requiring children to attend school for fewer than nine years had little effect on the education attainment of children from lower socioeconomic backgrounds, especially children from households that engaged in manual labor (e.g. farming).

The lack of benefits of some compulsory attendance laws for children from lower socioeconomic backgrounds is surprising since conventional wisdom might suggest that compulsory attendance laws would make educational resources more equal between children of different class backgrounds.[10] One reason behind this result could be that states have different enforcement of compulsory attendance laws and stronger enforcement is positively correlated with more years of compulsory attendance. According to Deffenbaugh and Keesecker 1935, there are ten different types of provisions a state can impose to enforce the compulsory attendance laws (see more details in Figure A1). The data suggest the Midwest region had the highest average number of provisions regarding enforcement (Figure A2), and the Midwest also had more states enacting laws requiring children to attend school to nine years or above.[11] That said, it is difficult to examine the effect of enforcement of compulsory attendance on years of education accomplished since the data on enforcement were only available in 1935, and many states strengthened their laws between 1915 and 1935 (Schmidt 1996).

5 Returns to Education on Women's Labor Market Outcomes

5.1 Positive Returns on Gainful Employment and Occupational Status

In this section, I present evidence on the positive effect of education on women's gainful employment and occupational status. While past literature on returns to schooling mostly focuses on the effect on earnings when studying men, I argue that studying the effect on the probability of gainful employment and labor supply is more important for women because women's labor

[10] Rauscher 2016 finds compulsory attendance laws improved inequality in school attendance among white male children using data from 1850 to 1920.

[11] Illinois, Indiana, Ohio, and Nebraska required some birth cohorts to attend school for nine years or above. The other states with similar laws were New Mexico, Utah, Wyoming, and New Jersey.

supply was much more elastic (Goldin 2006).

The first outcome variable of interest is gainful employment, which is defined as having a gainful occupation that does not include working as a housewife, helping with chores at home, or being a student.[12] I prefer using gainful employment as the outcome variable because it captures women's work more comprehensively, which was often part-time and temporary.[13]

The effect of compulsory attendance on women's gainful employment is shown in Column 1 of Table 3. The OLS estimate suggests that an additional year of schooling increases women's probability of having a gainful occupation by 2.2 pp. On the other hand, the IV estimate suggests a much larger 7.9 pp. effect. The OLS estimate might be biased downward if women from higher socioeconomic backgrounds obtained more years of education but were less likely to work outside the household. The IV estimate suggests that an additional year of schooling increases women's employment substantially, given that only 25 percent of women had a gainful occupation in 1940.

In addition, an additional year of schooling also increases women's labor supply, as suggested by positive OLS and IV estimates. In particular, the IV estimates suggest an additional year of schooling increases weeks worked per year by 3.4 weeks and hours worked per week by 2.3 hours. The increase in labor supply is sizeable, considering that most women in the sample were not working and the average labor supply was 11 weeks per year and 9 hours per week.

Conditional on the sample of working women who earned positive wages in 1940, I show that an additional year of schooling substantially increased women's earnings. The OLS and IV estimates suggest an additional year of schooling increases wage earnings by 11.2 to 16.9 percent. One reason behind the large returns on wage earnings might be that education allowed women to enter higher-paying and skilled occupations, such as clerical workers or bookkeepers. To test this hypothesis, I examine some additional outcome variables that are dummy variables equal to one if the woman was a stenographer, a clerical worker, a bookkeeper, or a housekeeper. The

[12] "Gainful occupation" is not a formally defined term, but census enumerators were instructed to mark down a gainful occupation if the occupation is income-generating. For example, a housekeeper is not considered a gainful occupation if the woman works in her home as the housekeeper but is considered a gainful occupation if the woman works for other households and gets paid for the housework done. See more details here: https://www.census.gov/library/publications/1929/dec/monograph-9.html

[13] Gainful employment is different from the "employment" variable recorded by the census enumerator since being employed requires the person to work for pay in the specific reference period. In the 1940 census, a person is considered "employed" if she worked at least 1 hour for pay from March 24 to March 30 in 1940.

first three occupations were higher-paying occupations, while the last was not. Columns 5 to 8 of Table 2 show that an additional year of schooling increases the probability of being a stenographer/clerical worker/bookkeeper by 1.2 to 3.3 pp. while it decreases the probability of being a housekeeper by 1.9 pp. Although the improvement in women's occupational status might not fully account for the 16.9 percent increase in women's earnings because women earning positive wage earnings in 1940 were highly selected, it provides supportive evidence that women with more education were more likely to enter higher-paying occupations and receive larger returns to education in the labor market.[14]

Finally, I show that the results among non-southern-born women are similar to those shown in Table 3. The similarity between the two groups of results rules out that Southern-born White women were driving the results because the laws were adopted later during the South and the birth cohorts affected in the South were the youngest group in 1940. More details are illustrated in Table A3.

5.2 Heterogeneous Returns By Socioeconomic Background

Examining the heterogeneous returns by children's socioeconomic backgrounds shows that children from lower socioeconomic backgrounds benefited more from increasing years of education. As shown in Panels A and B of Table 4, an additional year of education increased the probability of gainful employment by 4 pp. for children whose father's occupational score was above the median level while it increased the probability of gainful employment by 8.2 pp. for children whose father's occupational score was below the median level. The differences become larger when we consider the differences in employment: 24.5% of children from higher socioeconomic backgrounds were gainfully employed in 1940, while only 16.3% of children from lower socioeconomic backgrounds were doing the same. This means children from a lower class experienced roughly a 50% increase in employment with an additional year of schooling. The results for other labor market outcomes (such as labor supply and occupational score) are similar, although some of the differences in IV estimates between the two groups are not statistically

[14]Note that the results from Table 3 are the average effect among native-born White women aged 28 to 55 in 1940, and the identification strategy cannot separate the effect of education on earnings over the life cycle. We might expect education not only benefit women immediately after graduation but also benefit women when they have the option to rejoin the labor force when they are older and after the children leave the households (Bailey 2006, Goldin, Kerr, et al. 2022). The effects over the life cycle are more difficult to examine due to the lack of panel data during this period.

significant.

Perhaps surprisingly, the large difference in the increase in gainful employment does not translate into a large difference in wage earnings between children from lower and higher socioeconomic backgrounds – column 5 of Table 4 suggests the increase in wage earnings is 20% versus 18% increase for these two groups respectively. This implies that although more women from lower socioeconomic backgrounds joined the labor force thanks to an increasing level of education, those earning positive wages experienced limited wage growth relative to women from higher socioeconomic backgrounds.

In addition, I show that the heterogeneous returns based on the farm status of the childhood households are similar to the results based on socioeconomic backgrounds. Children from farm households experienced a larger increase in gainful employment relative to children from non-farm households, but they did not experience a larger increase in wage earnings because of an increasing level of education.

Finally, Panels E and F of Table 4 show that children from rural areas benefited more from increasing levels of schooling. In particular, an additional year of education increased their probability of employment by 7.8 pp. (46%). It also increased their labor supply by 3.2 weeks worked per year and 2.6 hours worked per week (40%) and their occupational score by 2.0 (56%). In contrast, these labor market outcomes of children from urban areas were largely unaffected by increasing levels of schooling. The differences might be explained by the fact that more women in urban areas accomplished a high level of education and were more likely to be gainfully employed.

6 Returns to Education on Marriage Market Outcomes

The returns to education for women are not limited to their labor market outcomes since most married women did not work due to marriage bars and gender norms that prevented women from working outside the home (Goldin 1988; Goldin 1990; Goldin 2021). As a result, I additionally examine the returns to education for women regarding their marriage market outcomes, which include their decision to marry as well as the match quality (conditional on

marriage formation).[15]

6.1 Marriage Formation and Dissolution

Given the positive returns to education in the labor market, we might expect the effect of an additional year of education on the probability of marriage to be negative because some women would give up marriage to pursue a career. [16] The OLS estimate of years of education on the probability of never marrying in Column 1 in Table 5 is 1.36, confirming the positive correlation between the two variables. However, the IV estimate is -0.41, suggesting an additional year of education led to a 0.41 pp. decrease, instead of an increase, in the probability of never marrying. The IV estimate is also pretty small given that an average share of 12.45 percent of women aged 28 to 55 were never married in 1940. Importantly, the IV estimate is not statistically significant, and we cannot reject the hypothesis that education had no causal effect on marriage formation. Though initially surprising, the null result is consistent with the historical account that most women attended school to become efficient housekeepers and knowledgeable mothers after marriage, and most women eventually married despite their high educational status.

Conditional on marriage formation, there is positive evidence of assortative matching. Column 4 of Table 5 shows that an additional year of the wife's education is associated with 0.71 to 0.93 additional years of the husband's education. This is consistent with findings from past research on assortative mating during the historical United States (Goldin 2004; Bailey, Guldi, et al. 2014).

On the other hand, education might positively affect women's bargaining power within the household and allow women to exit marriage more easily. Column 2 of Table 5 supports this argument. Although only 2.5 percent of women in the 1940 sample got divorced or separated, the OLS and IV estimates suggest that an additional year of education increased the probability of divorce or separation by 0.06 and 1.43 pp., respectively. This is likely because women with more education could support themselves financially, and they were more likely to get a divorce or separation thanks to financial independence.

[15] Ideally, the returns to women's education on women's productivity in home production and quality of child-rearing should also be examined, but data on these outcomes are scarce.

[16] Lafortune et al. 2022 suggests that the most educated women were the least likely to marry among those born before 1960. In addition, Olivetti et al. 2022 shows similar evidence that women of the highest socioeconomic background are also least likely ever to get married.

In addition, I examine whether education delayed women's age at first marriage, given that education might make women stay in school longer. Column 3 of Table 5 shows that an additional year of education increased age at first marriage by 0.38 to 0.75 years, where the IV estimate is larger than the OLS estimate. This is consistent with the evidence from the post-WWII United States (Lennon 2022) and the mid-20th Century United Kingdom (Powdthavee and Adireksombat 2010). Note that the question regarding age at first marriage was only asked for sample-line women who were less than 5 percent of the female population. The results here should be interpreted cautiously, given the much weaker first-stage results due to the smaller sample size (see Table 1).

Finally, I show that the results among non-southern-born women are similar (see more details in Table A6). This addresses the concern that Southern-born White women could bias the results because the laws were adopted later in the South, and the birth cohorts affected in the South were the youngest group in 1940.

6.1.1 Heterogeneous Effects By Socioeconomic Background

The comparison of women from lower versus higher socioeconomic backgrounds reveals an interesting result: women from lower socioeconomic backgrounds were more likely to be never married in 1940 with more years of education (see Column 1 of Table 6). Although the negative coefficients do not imply that these women remained never married forever, they indicate that an additional year of education might allow women from lower socioeconomic backgrounds to search for a good marital match for longer. In addition, a higher level of education allowed women to work in the labor market, which also made remaining single for a longer time period possible for women from lower socioeconomic backgrounds.

6.2 Match Quality Among Married Couples

Women with more education might be able to find a better match in the marriage market. As a result, I examine the effect of education on match quality by examining these women's husbands' labor market outcomes. For example, if the wife's education negatively affects the husband's probability of unemployment, this indicates that more education allows the woman to find a better match in the marriage market.

Since women and men were affected by compulsory attendance during the same period, it is difficult to separate the effect of the wife's education on match quality from the effect of the husband's education. To alleviate this issue, I control for the husband's years of education in the specification. Without claiming causality, this allows me to examine whether the wife's education (independent of the husband's education to some extent) plays a role in match quality.[17]

The match quality is measured by the husband's labor market outcomes. The first outcome variable of interest is whether the husband was unemployed in 1940, which includes people who were employed on public emergency projects thanks to the New Deal.[18] Unemployment was common during this period due to the aftermath of the Great Depression, and the lack of unemployment indicates a better match quality. The OLS estimate in Column 1 of Table 7 shows that higher levels of education of the wife and the husband were both associated with a lower level of unemployment for the husband by 0.87 to 0.93 pp. The IV estimate, on the other hand, shows that an additional year of the wife's education reduced the probability of the husband being unemployed by 3.16 pp., which is a large effect given that only 13% of husbands in the sample were unemployed. The results suggest a high level of education attained by the wife might allow her to get a better match in the marriage market.

In addition, I also show that an additional year of education attained by the wife increased the husband's wage earnings by 8.5 pp., despite that the wife's education did not improve the husband's occupational status or increase the husband's labor supply. This could be because a more educated wife increased the husband's productivity on the job, or it could be that a more educated woman was more likely to be matched with a more productive husband. On the other hand, there is little evidence that the wife's education affected the husband's non-wage earnings.

6.2.1 Heterogeneous Effects By Socioeconomic Background

The results on match quality by socioeconomic background are shown in Table 8. Based on Column 1, an additional year of the wife's education reduced the probability of the husband being unemployed in 1940 by 4.9 pp. among those from lower socioeconomic backgrounds.

[17] Causality is difficult to establish because marriage is an endogenous choice and the sample of married couples is selected. In addition, the husband's education is also endogenous.

[18] Public emergency work projects were developed to move workers from unemployment to relief work. As a result, being employed on public emergency projects indicates that the person had been unemployed in previous years.

This is much larger than the 0.4 pp. decrease for those from higher socioeconomic backgrounds. In addition, Column 6 suggests that an additional year of the wife's education also reduced their husband's probability of earning non-wage earnings above fifty dollars (an indication of self-employment) for those from lower socioeconomic backgrounds. The combined results indicate that women from lower socioeconomic backgrounds might have benefited more from education on match quality in the marriage market.

7 Conclusion

Although women and men had similar levels of educational attainment during the historical United States, the returns to education for women are not well documented. This paper fills the gap in the literature by estimating the effect of women's education on their labor market and marriage market outcomes using compulsory schooling laws as instrumental variables.

I show that additional years of education increased the probability of women's employment significantly, generating large returns to education for women in the labor market. On the other hand, there is little evidence that more education caused women not to be married, but it did increase women's probability of divorce. Conditional on marriage formation, I find that women's education had a positive effect on the husband's labor market outcomes. In both the labor market and marriage market, women from lower socioeconomic backgrounds benefited more from education.

Future research on the returns to education for women should focus on examining the mechanisms behind these results, which is difficult to accomplish given the data limitations. For example, do women with higher levels of educational attainment improve their husbands' productivity, which in turn leads to a positive effect on the husbands' labor market outcomes? Examining the mechanisms behind the large returns to education for women is important to understanding women's role in the labor market as well as the marriage market.

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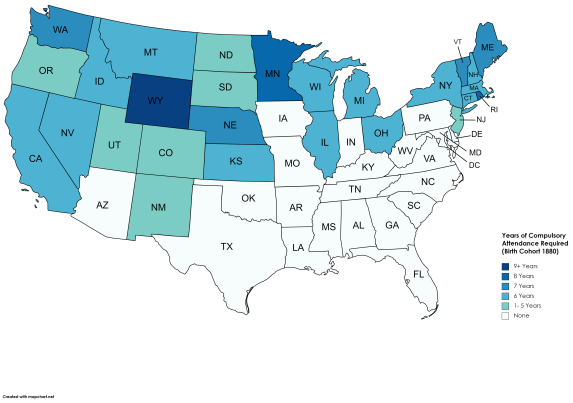
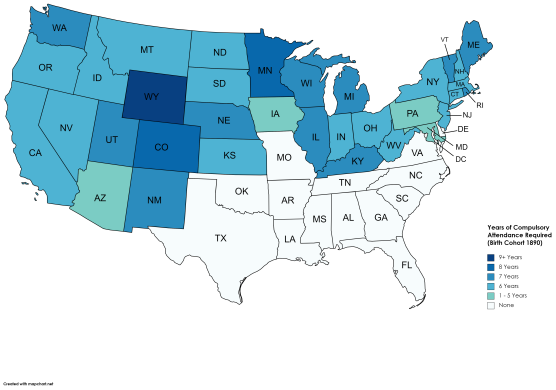
8 Figures

Figure 1: States with Different Lengths of Compulsory Attendance

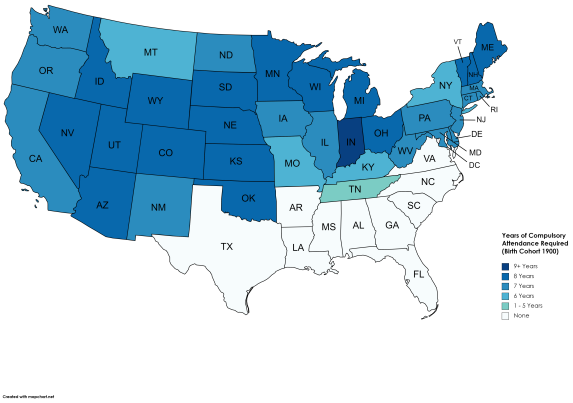
(a) Birth Cohort 1880



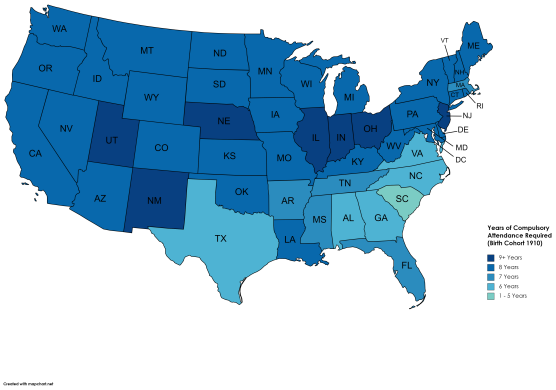
(b) Birth Cohort 1890



(c) Birth Cohort 1900

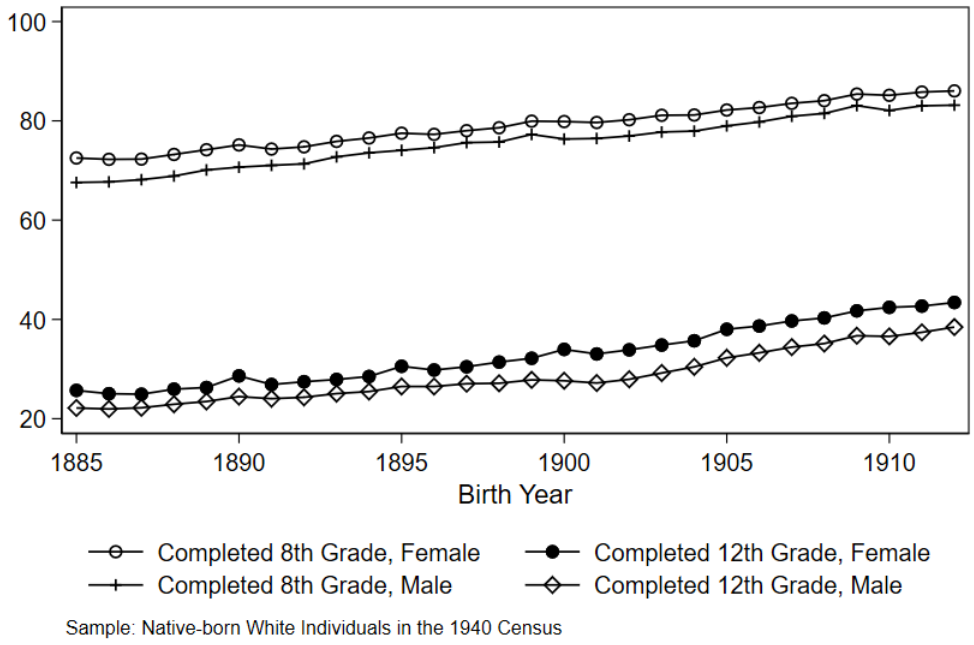


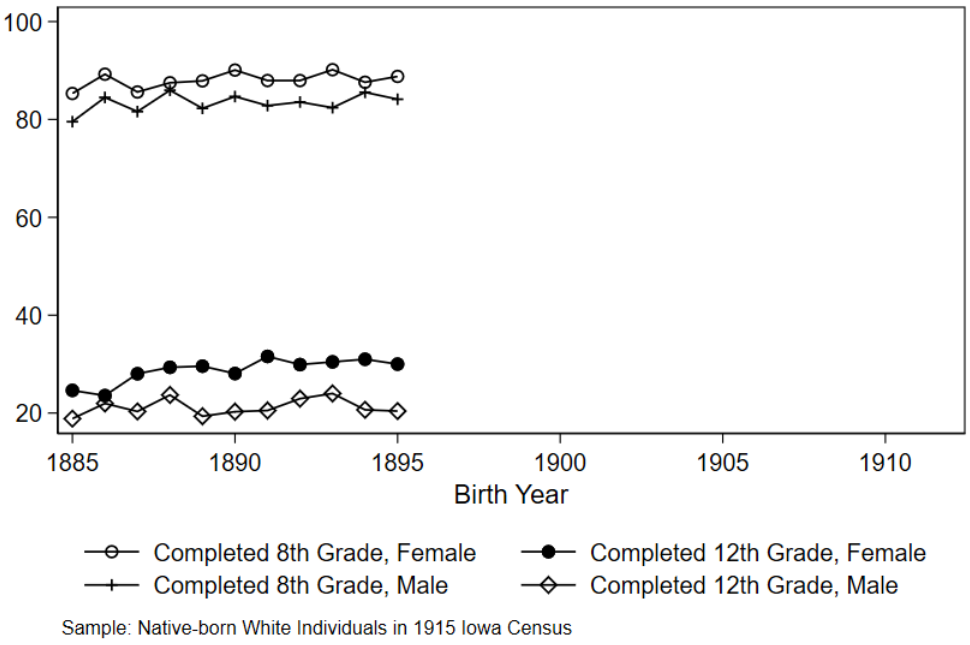
(d) Birth Cohort 1910



The figure illustrates the lengths of compulsory attendance for birth cohorts 1880, 1890, 1900, and 1910 in different states. Lengths of compulsory attendance are categorized into (1) None; (2) 1-5 years; (3) 6 years; (4) 7 years; (5) 8 years; (6) 9 years and above.

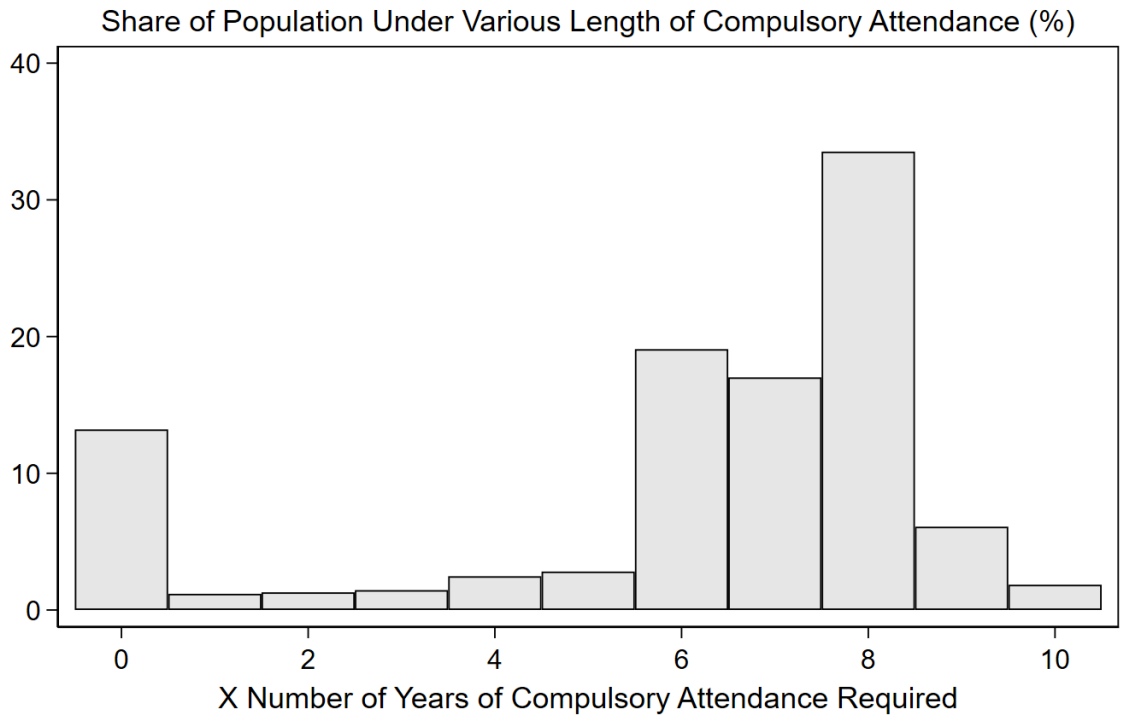
Figure 2: Share of Population that Completed 8th and 12th Grade by Gender (%)





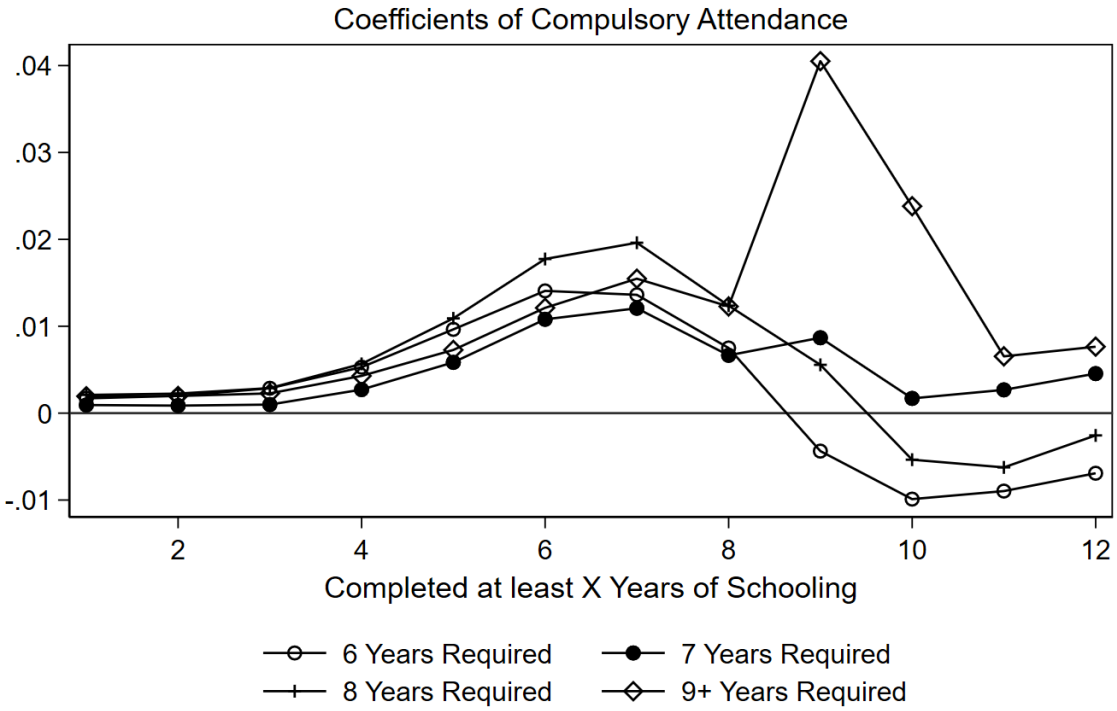
The figure at the top shows the share of the population completed 8th and 12th grade as reported in the 1940 Decennial Census. The sample is restricted to white and native-born women who were born between 1885 and 1912. The figure at the bottom shows the share of the population completed 8th and 12th grade as reported in the 1915 Iowa State Census. The sample is restricted to white and native-born women who were at least 20 years old when the 1915 Iowa State Census was taken.

Figure 3: Share of Population Under Various Lengths of Compulsory Attendance (%)



The figure shows the share of the population that was under various lengths of compulsory attendance laws in 1940. The sample is restricted to white and native-born women who were born between 1885 and 1912.

Figure 4: The Effect of Compulsory Attendance Laws on Years of Schooling Completed



The figure plots the coefficients of dummy variables that indicate different lengths of compulsory attendance laws from separate regressions. Each regression has a different outcome variable that indicates whether one completed at least X years of schooling, where X ranges from 1 to 12. Detailed results from the regressions are shown in Table A1. The sample is restricted to white and native-born women who were born between 1885 and 1912 (N=18836237).

9 Tables

Table 1: First Stage - The Effect of Compulsory Attendance on Years of Schooling Completed

	(1) All Women	(2) Married Women	(3) Working Women	(4) Sample-line Women	(5) No South
Required Years of Schooling					
6 Years	0.018	0.010	0.111***	0.030	0.009
	(0.013)	(0.013)	(0.018)	(0.020)	(0.015)
7 Years	0.069***	0.060***	0.193***	0.081***	0.060***
	(0.015)	(0.016)	(0.022)	(0.023)	(0.017)
8 Years	0.078***	0.067***	0.206***	0.096***	0.063***
	(0.017)	(0.018)	(0.023)	(0.025)	(0.018)
9 Years +	0.153***	0.154***	0.184***	0.168***	0.138***
	(0.023)	(0.024)	(0.028)	(0.032)	(0.023)
N	18836237	14902197	4151245	936920	14784416
F Stats	15.983	15.541	24.121	8.392	15.283

The outcome variable is years of education completed reported in the 1940 census. The independent variables are dummy variables indicating years of required compulsory attendance. The regression includes birth state fixed effects and birth year by region fixed effects. The sample from Column 1 is White, native-born women who were born between 1885 and 1912. Columns 2, 3, 4, and 5 further restrict the sample to currently married women in 1940, working women who earned positive wages in 1940, sample-line women in the 1940 census, and women born outside of the South. First-Stage F Stats are reported.

Table 2: First Stage By Socioeconomic Background - The Effect of Compulsory Attendance on Years of Schooling Completed

	(1) All	(2) > Median OccScore	(3) <= Median OccScore	(4) Skilled Occ.	(5) Other Occ.
Required Years of Schooling					
6 Years	0.030*	0.035*	-0.003	-0.005	0.009
	(0.014)	(0.016)	(0.016)	(0.015)	(0.016)
7 Years	0.079***	0.108***	0.014	0.092***	0.011
	(0.016)	(0.019)	(0.019)	(0.018)	(0.019)
8 Years	0.099***	0.121***	0.032	0.097***	0.028
	(0.017)	(0.020)	(0.021)	(0.020)	(0.021)
9 Years +	0.220***	0.229***	0.236***	0.220***	0.169***
	(0.023)	(0.027)	(0.031)	(0.027)	(0.030)
N	6159887	2946448	3213439	2142574	3444008
F Stats	24.535	20.447	23.198	23.956	11.599

	(6) Non-Farm	(7) Farm	(8) Rural	(9) Urban
6 Years	0.040*	-0.019	0.030*	-0.032
	(0.016)	(0.018)	(0.015)	(0.019)
7 Years	0.105***	0.004	0.045*	0.071**
	(0.019)	(0.021)	(0.018)	(0.023)
8 Years	0.127***	0.010	0.069***	0.076**
	(0.020)	(0.024)	(0.021)	(0.024)
9 Years +	0.243***	0.221***	0.248***	0.156***
	(0.026)	(0.033)	(0.030)	(0.031)
N	3274783	2885104	4311929	1847958
F Stats	23.750	25.712	21.047	14.205

The outcome variable is years of education completed reported in the 1940 census. The independent variables are dummy variables indicating years of required compulsory attendance. The regression includes birth state fixed effects and birth year by region fixed effects. The sample from Column 1 is the linked sample of White native-born women who were born between 1885 and 1912. Columns 2 and 3 select the sample of women based on their father's occupational scores (above and below median), Columns 4 and 5 select the sample of women based on the category of their father's occupations (skilled and others), and Columns 6 to 9 select the sample of women based on farm and urban status of their fathers.

Table 3: The Returns to Education on Labor Market Outcomes

	(1) Gainful Occupation		(2) Weeks Worked		(3) Hours Worked		(4) ln Wage	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	2.190***	7.129***	0.907***	3.399***	0.752***	2.289***	0.112***	0.169***
	(0.019)	(1.862)	(0.009)	(0.829)	(0.006)	(0.614)	(0.001)	(0.023)
$\overline{Y}$	25.871	25.871	11.114	11.114	9.219	9.219	6.391	6.391
	(5) Steno-graphers		(6) Clerical Workers		(7) Book-keepers		(8) House-keepers	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	0.515***	3.342***	0.238***	1.777***	0.213***	1.214***	-0.282***	-1.899***
	(0.011)	(0.724)	(0.003)	(0.438)	(0.002)	(0.225)	(0.003)	(0.391)
$\overline{Y}$	2.482	2.482	1.748	1.748	1.284	1.284	2.012	2.012

The outcome variables are whether one had a gainful occupation in 1940 (*100), weeks worked in 1939, weekly hours worked in 1940, the natural log of wages reported in 1940, and whether the woman was a stenographer, a clerical worker, a bookkeeper, or a housekeeper (*100). The independent variable is the number of years of education completed. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample is White, native-born women who were born between 1885 and 1912 (N=18836237). Column 4 further restricts the sample to working women who earned positive wages (N=4151245).

Table 4: The Returns to Education on Labor Market Outcomes By Socioeconomic Background

	(1) Gainful Occ.	(2) Weeks Worked	(3) Hours Worked	(4) OccScore	(5) ln(Wage)	(6) Steno-grapher	(7) House-keeper
				Panel A: Father's OCCSCORE > Median			
Educ	3.991*	2.131*	1.611*	1.174**	0.179***	2.766***	-0.589**
	(1.771)	(0.832)	(0.653)	(0.425)	(0.045)	(0.725)	(0.212)
$\overline{Y}$	24.460	10.350	8.363	5.676	6.512	3.252	0.903
				Panel B: Father's OCCSCORE <= Median			
Educ	8.167***	3.293***	2.477***	2.107***	0.201***	2.041***	-0.558**
	(1.432)	(0.589)	(0.463)	(0.351)	(0.052)	(0.451)	(0.209)
$\overline{Y}$	16.338	7.792	6.228	3.490	6.138	0.992	1.145
				Panel C: Children from Farm Households			
Educ	7.635***	2.921***	2.094***	1.909***	0.184**	1.133***	-0.511*
	(1.238)	(0.507)	(0.412)	(0.305)	(0.063)	(0.236)	(0.225)
$\overline{Y}$	15.178	7.477	5.972	3.171	6.037	0.649	1.146
				Panel D: Children from Non-farm Households			
Educ	4.400**	2.124**	1.832**	1.312**	0.219***	2.797***	-0.520**
	(1.695)	(0.781)	(0.619)	(0.407)	(0.042)	(0.696)	(0.200)
$\overline{Y}$	24.065	10.202	8.236	5.573	6.502	3.153	0.931
				Panel E: Children from Rural Areas			
Educ	7.830***	3.232***	2.601***	2.017***	0.217***	1.592***	-0.584**
	(1.312)	(0.545)	(0.439)	(0.319)	(0.042)	(0.390)	(0.217)
$\overline{Y}$	17.027	7.911	6.362	3.666	6.130	0.959	1.183
				Panel F: Children from Urban Areas			
Educ	1.677	1.104	0.527	0.605	0.165**	3.948***	-0.333
	(1.671)	(0.773)	(0.623)	(0.405)	(0.056)	(0.881)	(0.228)
$\overline{Y}$	26.200	11.019	8.878	6.155	6.601	4.013	0.778

The outcome variables are whether one had a gainful occupation in 1940 (*100), weeks worked in 1939, weekly hours worked in 1940, the natural log of wages reported in 1940, and whether the woman was a stenographer, a clerical worker, a bookkeeper, or a housekeeper (*100). The independent variable is the number of years of education completed. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample in Panel A and B consists of women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=2946448 and N=3213439). The sample in Panel C and D consists of women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=2885104 and N=3274783). The sample in Panel E and F consists of women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=4311929 and N=1847958). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

Table 5: The Returns to Education on Marriage Market Outcomes

	(1) Never Married		(2) Divorced/ Separated		(3) Age at First Marriage		(4) H's Educ	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	1.361***	-0.410	0.063***	1.430***	0.382***	0.746**	0.708***	0.925***
	(0.017)	(0.851)	(0.003)	(0.317)	(0.003)	(0.272)	(0.001)	(0.059)
$\overline{Y}$	12.455	12.455	2.492	2.492	21.616	21.616	9.085	9.085

The outcome variables are whether one had never been married (*100), whether one had been divorced or separated (*100), age at first marriage, and the husband's years of education. The independent variable is the number of years of education completed. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample is White, native-born women who were born between 1885 and 1912 (N=18836237). Column 3 further restricts the sample to sample-line women (N=710094) since information for age at first marriage is only available for this group. Column 4 further restricts the sample to White, native-born women who were married and with their husband present in the household in 1940 (N=12583226).

Table 6: The Returns to Education on Marriage Outcomes By Socioeconomic Background

	(1) Never Married	(2) Divorced/ Separated	(3) Age at First Marriage	(4) Husband's Education
Panel A: Father's OCCSCORE > Median				
Educ	-0.722	0.531	0.975**	0.761***
	(1.557)	(0.294)	(0.338)	(0.060)
$\overline{Y}$	12.971	1.748	21.570	9.790
Panel B: Father's OCCSCORE <= Median				
Educ	2.986**	0.566**	0.741*	0.836***
	(0.922)	(0.202)	(0.326)	(0.053)
$\overline{Y}$	7.529	1.147	21.056	8.393
Panel C: Children from Farm Households				
Educ	2.870***	0.221	0.514	0.781***
	(0.777)	(0.172)	(0.342)	(0.049)
$\overline{Y}$	6.807	1.029	21.020	8.176
Panel D: Children from Non-farm Households				
Educ	-0.443	0.697*	0.912**	0.776***
	(1.465)	(0.271)	(0.331)	(0.055)
$\overline{Y}$	12.679	1.734	21.550	9.740
Panel E: Children from Rural Areas				
Educ	2.013**	0.527**	0.615	0.814***
	(0.731)	(0.180)	(0.316)	(0.047)
$\overline{Y}$	7.353	1.203	21.035	8.475
Panel F: Children from Urban Areas				
Educ	-0.556	0.494	1.118**	0.673***
	(1.676)	(0.328)	(0.386)	(0.079)
$\overline{Y}$	14.919	1.870	21.949	10.197

The outcome variables are whether one had never been married (*100), whether one had been divorced or separated (*100), age at first marriage, and the husband's years of education. The independent variable is the number of years of education completed. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample in Panel A and B consists of women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=2946448 and N=3213439). The sample in Panel C and D consists of women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=2885104 and N=3274783). The sample in Panel E and F consists of women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=4311929 and N=1847958). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

Table 7: The Returns to Education on Match Quality - Married Women Only

	(1) H's Unemployed		(2) H's OccScore		(3) H's Weeks Worked	
	OLS	IV	OLS	IV	OLS	IV
Educ	-0.935***	-3.163**	0.396***	0.412	0.381***	0.419
	(0.010)	(1.188)	(0.004)	(0.489)	(0.005)	(0.560)
H's Educ	-0.874***	0.367	1.132***	1.124***	0.478***	0.456
	(0.009)	(0.662)	(0.005)	(0.272)	(0.005)	(0.313)
$\overline{Y}$	12.959	12.959	25.700	25.700	43.096	43.096
	(4) H's Hours Worked		(5) H's ln(Wage)		(6) H's Nonwage Earnings > \$50	
	OLS	IV	OLS	IV	OLS	IV
Educ	0.577***	0.481	0.052***	0.085*	0.891***	2.633
	(0.006)	(0.761)	(0.001)	(0.040)	(0.018)	(1.938)
H's Educ	0.367***	0.421	0.077***	0.059**	-0.102***	-1.072
	(0.007)	(0.426)	(0.000)	(0.022)	(0.026)	(1.081)
$\overline{Y}$	38.001	38.001	7.029	7.029	37.171	37.171

The outcome variables are whether the husband was unemployed or employed on public emergency work projects in 1940 (*100), the husband's occupational score, the husband's weeks worked in 1939, the husband's hours worked per week, the husband's natural log of wage earnings, and whether the husband earned more than \$50 in nonwage earnings in 1940. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The independent variables are the number of years of education completed by the wife (instrumented in the IV regressions) and the number of years completed by the husband. The sample is White, native-born women who were married and with her husband present in the household in 1940 (N=12583226). Columns 5 further restricts the sample to households where the husband was earning positive wages in 1940 (N=8653408). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

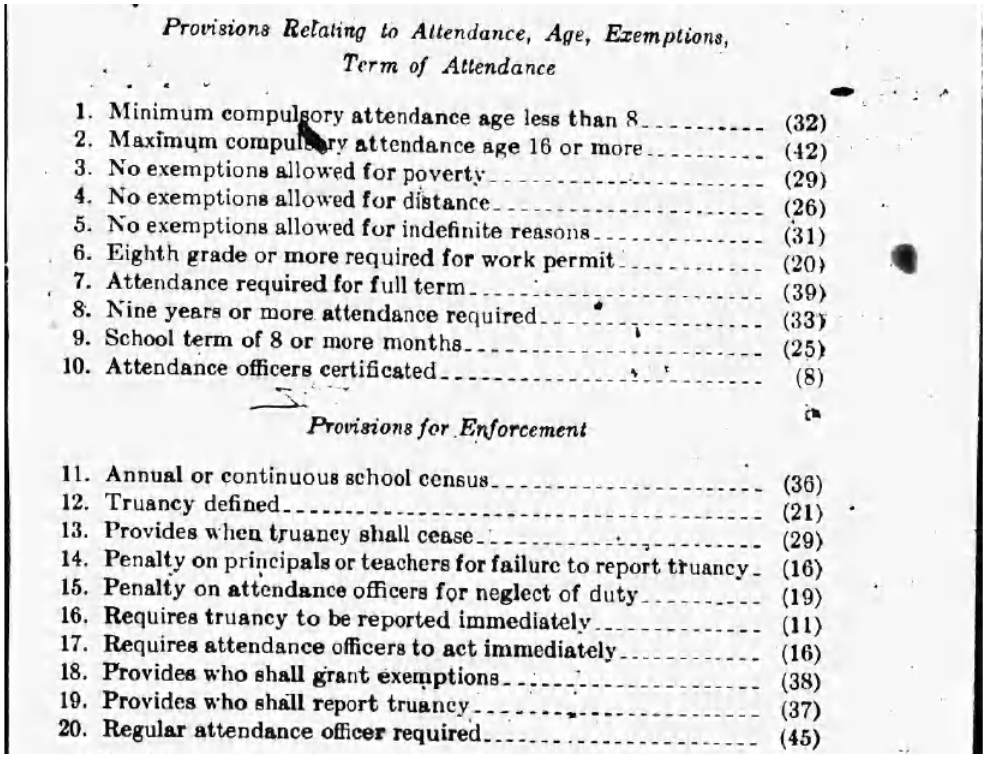
Table 8: The Returns to Education on Match Quality By Socioeconomic Background

	(1) H's Unem -ployed	(2) H's OccScore	(3) H's Weeks Worked	(4) H's Hours Worked	(5) H's ln(Wage)	(6) H's Nonwage $>$ \$50
			Panel A: Father's OCCSCORE $>$ Median			
Educ	-0.417	0.094	0.261	0.321	0.061	3.645
	(1.227)	(0.447)	(0.616)	(0.765)	(0.037)	(1.862)
$\overline{Y}$	11.658	28.448	43.982	38.141	7.213	32.414
			Panel B: Father's OCCSCORE $<=$ Median			
Educ	-4.925***	0.865	2.055***	2.641**	0.077*	-7.352**
	(1.126)	(0.452)	(0.533)	(0.856)	(0.037)	(2.247)
$\overline{Y}$	12.841	22.686	43.040	39.009	6.782	47.544
			Panel C: Children from Farm Households			
Educ	-3.700***	1.428***	1.789***	1.320	0.082*	-8.997***
	(1.067)	(0.418)	(0.462)	(0.855)	(0.036)	(2.196)
$\overline{Y}$	12.685	21.779	42.962	39.234	6.691	49.809
			Panel D: Children from Non-farm Households			
Educ	-1.317	0.365	0.619	0.909	0.080*	2.669
	(1.172)	(0.444)	(0.573)	(0.704)	(0.035)	(1.771)
$\overline{Y}$	11.890	28.250	43.910	38.121	7.200	33.001
			Panel E: Children from Rural Areas			
Educ	-2.403*	1.274**	1.697***	1.607*	0.099**	-7.222**
	(0.992)	(0.458)	(0.493)	(0.791)	(0.035)	(2.257)
$\overline{Y}$	13.267	23.253	42.814	38.539	6.807	44.994
			Panel F: Children from Urban Areas			
Educ	-0.757	0.041	0.019	0.398	0.048	2.607
	(1.293)	(0.446)	(0.626)	(0.795)	(0.034)	(2.052)
$\overline{Y}$	10.589	29.801	44.668	38.497	7.329	30.409

The outcome variables are whether the husband was unemployed or employed on public emergency work projects in 1940 (*100), the husband's occupational score/weeks worked in 1939/hours worked per week/natural log of wage earnings, and whether the husband earned more than \$50 in nonwage earnings in 1940. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The independent variables are the number of years of education completed by the wife (instrumented in the IV regressions) and the number of years completed by the husband (not reported). The sample in Panel A and B consists of married women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=2183674 and N=2653752). The sample in Panel C and D consists of married women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=2401011 and N=2436415). The sample in Panel E and F consists of married women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=3538241 and N=1299185). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

10 Appendix

Figure A1: Provisions Regarding Compulsory Attendance Laws



Provisions Relating to Attendance, Age, Exemptions, Term of Attendance

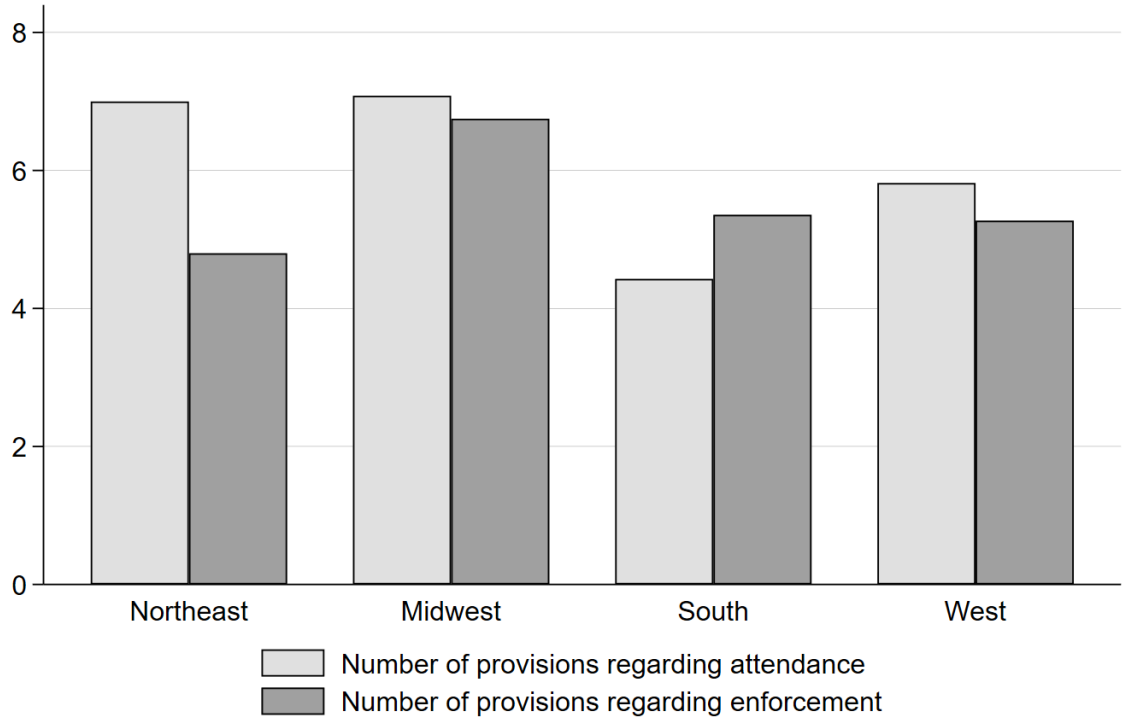
1.	Minimum compulsory attendance age less than 8	(32)
2.	Maximum compulsory attendance age 16 or more	(42)
3.	No exemptions allowed for poverty	(29)
4.	No exemptions allowed for distance	(26)
5.	No exemptions allowed for indefinite reasons	(31)
6.	Eighth grade or more required for work permit	(20)
7.	Attendance required for full term	(39)
8.	Nine years or more attendance required	(33)
9.	School term of 8 or more months	(25)
10.	Attendance officers certificated	(8)

Provisions for Enforcement

11.	Annual or continuous school census	(36)
12.	Truancy defined	(21)
13.	Provides when truancy shall cease	(29)
14.	Penalty on principals or teachers for failure to report truancy	(16)
15.	Penalty on attendance officers for neglect of duty	(19)
16.	Requires truancy to be reported immediately	(11)
17.	Requires attendance officers to act immediately	(16)
18.	Provides who shall grant exemptions	(38)
19.	Provides who shall report truancy	(37)
20.	Regular attendance officer required	(45)

The figure shows different provisions regarding compulsory attendance laws in Deffenbaugh and Keesecker 1935.

Figure A2: Number of Provisions Regarding Compulsory Attendance Laws in Different Regions



The figure shows the number of provisions regarding compulsory attendance laws in different regions with data collected by Deffenbaugh and Keesecker 1935.

Table A1: The Effect of Compulsory Attendance on Years of Schooling Completed

	(1)	(2)	(3)	(4)	(5)	(6)
Years of Schooling Completed==	*One*	*Two*	*Three*	*Four*	*Five*	*Six*
6 Years	0.0017***	0.0020***	0.0029***	0.0053***	0.0096***	0.0141***
	(0.0004)	(0.0005)	(0.0007)	(0.0010)	(0.0015)	(0.0019)
7 Years	0.0009	0.0009	0.0010	0.0027*	0.0058***	0.0108***
	(0.0006)	(0.0007)	(0.0009)	(0.0012)	(0.0017)	(0.0022)
8 Years	0.0021**	0.0023**	0.0029**	0.0057***	0.0109***	0.0177***
	(0.0007)	(0.0008)	(0.0010)	(0.0013)	(0.0018)	(0.0023)
9 Years +	0.0019*	0.0020	0.0023	0.0043*	0.0073**	0.0121***
	(0.0009)	(0.0011)	(0.0014)	(0.0017)	(0.0022)	(0.0027)
	(7)	(8)	(9)	(10)	(11)	(12)
Years of Schooling Completed==	*Seven*	*Eight*	*Nine*	*Ten*	*Eleven*	*Twelve*
6 Years	0.0136***	0.0075***	-0.0044	-0.0099***	-0.0090***	-0.0069**
	(0.0021)	(0.0021)	(0.0026)	(0.0023)	(0.0023)	(0.0023)
7 Years	0.0121***	0.0067**	0.0087**	0.0017	0.0027	0.0046
	(0.0025)	(0.0025)	(0.0030)	(0.0028)	(0.0030)	(0.0029)
8 Years	0.0196***	0.0124***	0.0056	-0.0054	-0.0062*	-0.0026
	(0.0027)	(0.0029)	(0.0035)	(0.0029)	(0.0029)	(0.0029)
9 Years +	0.0155***	0.0123***	0.0405***	0.0238***	0.0065	0.0076
	(0.0032)	(0.0034)	(0.0050)	(0.0043)	(0.0042)	(0.0040)

The table shows results from 12 separate regressions, and each regression has a different outcome variable that indicates whether one completed at least X years of schooling, where X ranges from 1 to 12. The independent variables are dummy variables that indicate different lengths of compulsory attendance laws. The regression includes birth state fixed effects and birth year by region fixed effects. The sample includes white and native-born women who were born between 1885 and 1912 (N=18836237).

Table A2: First Stage Results with An Alternative Set of Instruments

	(1) All Women	(2) Married Women	(3) Working Women	(4) Sample-line Women	(5) No South
Required Years of Schooling					
1 - 5 Years	0.028	0.020	0.038	0.038	0.019
	(0.018)	(0.018)	(0.024)	(0.027)	(0.031)
6 Years	0.043*	0.028	0.144***	0.063*	0.024
	(0.021)	(0.022)	(0.029)	(0.031)	(0.030)
7 Years	0.094***	0.079**	0.227***	0.115***	0.076*
	(0.023)	(0.024)	(0.032)	(0.033)	(0.032)
8 Years	0.104***	0.086**	0.241***	0.130***	0.079*
	(0.026)	(0.026)	(0.034)	(0.036)	(0.034)
9 Years +	0.180***	0.173***	0.220***	0.204***	0.155***
	(0.030)	(0.031)	(0.038)	(0.042)	(0.038)
N	18836237	14902197	4151245	936920	14784416
F Stats	12.858	12.435	19.443	6.993	12.160

The outcome variable is years of education completed reported in the 1940 census. The independent variables are dummy variables indicating years of required compulsory attendance. The regression includes birth state fixed effects and birth year by region fixed effects. The sample from Column 1 is White, non-South, native-born women who were born between 1885 and 1912. Column 2, 3, 4 and 5 further restricts the sample to currently married women in 1940, working women who earned positive wages in 1940, sample-line women in the 1940 census, and women born outside of the South. First-Stage F Stats of all independent variables (but not fixed effects) are reported.

Table A3: 1940 Characteristics of Women in the Linked Census Tree Sample and Complete-Count Sample

	(1) Tree	(2) All Women
Age	39.9	39.8
	(7.7)	(7.9)
Ever Married	89.3	87.5
	(31.0)	(33.0)
Farm	22.5	19.7
	(41.7)	(39.8)
Urban	54.8	58.8
	(49.8)	(49.2)
Northeast	32.2	29.6
	(46.7)	(45.7)
Midwest	39.8	41.9
	(49.0)	(49.3)
South	21.9	21.6
	(41.3)	(41.2)
Educ	9.6	9.5
	(3.1)	(3.2)
Gainfully Employed	21.1	25.9
	(40.8)	(43.8)
Self Employed	2.5	3.0
	(15.7)	(17.0)
OCCSCORE	4.8	5.7
	(9.9)	(10.5)
ln(Wage)	6.4	6.4
	(1.0)	(1.0)
Nonwage Earnings $>$ \$50	11.0	12.8
	(31.3)	(33.4)
N	6270951	19244286

The outcome variables are age in 1940, whether one had been married in 1940 (*100), farm/urban status in 1940 (*100), whether one lived in the Northeast/Midwest/South region in 1940 (*100), years of education, whether one was gainfully employed/self-employed in 1940 (*100), one's OCCScore in 1940, natural log of wage earnings in 1940, and whether one had non-wage earnings higher than \$50 in 1940 (*100). The sample from Column 1 is the linked Census Tree sample of White and native-born women born between 1885 and 1912. The sample from Column 2 is the complete-count sample of White and native-born women born between 1885 and 1912.

Table A4: The Effect of Years of Schooling on Labor Market Outcomes (No South)

	(1) Gainful Occupation		(2) Weeks Worked		(3) Hours Worked		(4) ln Wage	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	2.333***	11.644***	0.984***	5.135***	0.772***	3.612***	0.113***	0.171***
	(0.020)	(2.282)	(0.009)	(1.011)	(0.007)	(0.743)	(0.001)	(0.026)
$\overline{Y}$	26.484	26.484	11.307	11.307	9.360	9.360	6.439	6.439
	(5) Steno-graphers		(6) Clerical Workers		(7) Book-keepers		(8) House-keepers	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	0.557***	4.462***	0.245***	2.317***	0.219***	1.633***	-0.290***	-2.048***
	(0.014)	(0.880)	(0.004)	(0.525)	(0.003)	(0.270)	(0.002)	(0.437)
$\overline{Y}$	2.714	2.714	1.927	1.927	1.383	1.383	2.113	2.113

The outcome variables are whether one had a gainful occupation in 1940 (*100), weeks worked in 1939, weekly hours worked in 1940, the natural log of wages reported in 1940, and whether the woman was a stenographer, a clerical worker, a bookkeeper, or a housekeeper (*100). The independent variable is the number of years of education completed. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample is White, non-South, native-born women who were born between 1885 and 1912 (N=14784416). Column 4 further restricts the sample to working women who earned positive wages (N=3371943).

Table A5: The Returns to Education on Labor Market Outcomes By Socioeconomic Background (No South)

	(1) Gainful Occ.	(2) Weeks Worked	(3) Hours Worked	(4) OccScore	(5) ln(Wage)	(6) Steno-grapher	(7) House-keeper
Panel A: Father's OCCSCORE > Median							
Educ	5.485**	2.673**	1.961**	1.532**	0.166***	3.189***	-0.647**
	(1.981)	(0.933)	(0.727)	(0.475)	(0.044)	(0.832)	(0.237)
$\overline{Y}$	24.534	10.355	8.312	5.685	6.534	3.338	0.968
Panel B: Father's OCCSCORE <= Median							
Educ	8.506***	3.380***	2.598***	2.161***	0.267***	2.229***	-0.532**
	(1.383)	(0.565)	(0.446)	(0.338)	(0.058)	(0.440)	(0.205)
$\overline{Y}$	16.661	7.932	6.353	3.589	6.195	1.166	1.371
Panel C: Children from Farm Households							
Educ	7.495***	2.753***	2.056***	1.828***	0.287***	1.235***	-0.422*
	(1.124)	(0.457)	(0.376)	(0.276)	(0.077)	(0.220)	(0.214)
$\overline{Y}$	15.131	7.503	6.025	3.173	6.072	0.738	1.425
Panel D: Children from Non-farm Households							
Educ	5.483**	2.514**	2.094**	1.573***	0.202***	3.109***	-0.582**
	(1.843)	(0.852)	(0.672)	(0.443)	(0.040)	(0.776)	(0.217)
$\overline{Y}$	24.176	10.229	8.204	5.593	6.526	3.241	0.995
Panel E: Children from Rural Areas							
Educ	8.736***	3.532***	2.818***	2.204***	0.275***	1.840***	-0.645**
	(1.343)	(0.555)	(0.445)	(0.326)	(0.050)	(0.405)	(0.223)
$\overline{Y}$	17.111	7.928	6.379	3.693	6.164	1.058	1.415
Panel F: Children from Urban Areas							
Educ	2.086	1.227	0.524	0.704	0.158**	4.042***	-0.306
	(1.849)	(0.855)	(0.681)	(0.446)	(0.054)	(0.995)	(0.256)
$\overline{Y}$	26.143	10.984	8.794	6.128	6.612	4.001	0.822

The outcome variables are whether one had a gainful occupation in 1940 (*100), weeks worked in 1939, weekly hours worked in 1940, the natural log of wages reported in 1940, and whether the woman was a stenographer, a clerical worker, a bookkeeper, or a housekeeper (*100). The independent variable is the number of years of education completed. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample in Panel A and B consists of non-southern women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=2475170 and N=2224390). The sample in Panel C and D consists of non-southern women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=1942926 and N=2756634). The sample in Panel E and F consists of non-southern women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=3057821 and N=1641739). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

Table A6: The Returns to Education on Marriage Market Outcomes (No South)

	(1) Never Married		(2) Divorced/ Separated		(3) Age at First Marriage		(4) H's Educ	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Educ	1.544***	0.333	0.045***	1.590***	0.400***	0.817**	0.687***	0.963***
	(0.014)	(0.927)	(0.003)	(0.361)	(0.003)	(0.293)	(0.001)	(0.062)
$\overline{Y}$	13.356	13.356	2.556	2.556	21.912	21.912	9.401	9.401

The outcome variables are whether one had never been married (*100), whether one had been divorced or separated (*100), age at first marriage, and the husband's years of education. The independent variable is the number of years of education completed. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample is White, native-born women who were born between 1885 and 1912 (N=14784416). Column 3 further restricts the sample to sample-line women (N=552530) since information for age at first marriage is only available for this group.

Table A7: The Returns to Education on Marriage Outcomes By Socioeconomic Background (No South)

	(1) Never Married	(2) Divorced/ Separated	(3) Age at First Marriage	(4) Husband's Education
	Panel A: Father's OCCSCORE > Median			
Educ	-0.861	0.616	0.990**	0.789***
	(1.713)	(0.324)	(0.356)	(0.063)
$\overline{Y}$	13.521	1.727	21.716	9.885
	Panel B: Father's OCCSCORE <= Median			
Educ	3.138***	0.522**	0.318	0.817***
	(0.885)	(0.197)	(0.358)	(0.052)
$\overline{Y}$	8.014	1.234	21.373	8.821
	Panel C: Children from Farm Households			
Educ	2.677***	0.108	0.227	0.748***
	(0.698)	(0.163)	(0.402)	(0.046)
$\overline{Y}$	7.034	1.104	21.351	8.580
	Panel D: Children from Non-farm Households			
Educ	-0.528	0.807**	0.965**	0.810***
	(1.581)	(0.293)	(0.346)	(0.058)
$\overline{Y}$	13.239	1.717	21.696	9.857
	Panel E: Children from Rural Areas			
Educ	2.065**	0.513**	0.321	0.814***
	(0.732)	(0.182)	(0.368)	(0.048)
$\overline{Y}$	7.654	1.276	21.305	8.837
	Panel F: Children from Urban Areas			
Educ	-1.195	0.635	1.123**	0.683***
	(1.859)	(0.363)	(0.421)	(0.082)
$\overline{Y}$	15.284	1.815	22.039	10.195

The outcome variables are whether one had never been married (*100), whether one had been divorced or separated (*100), age at first marriage, and the husband's years of education. The independent variable is the number of years of education completed. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The sample in Panel A and B consists of non-southern women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=2475170 and N=2224390). The sample in Panel C and D consists of non-southern women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=1942926 and N=2756634). The sample in Panel E and F consists of non-southern women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=3057821 and N=1641739). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

Table A8: The Returns to Education on Match Quality - Married Women Only (No South)

	(1) H's Unemployed		(2) H's OccScore		(3) H's Weeks Worked	
	OLS	IV	OLS	IV	OLS	IV
Educ	-0.995***	-3.676**	0.360***	0.683	0.380***	1.083
	(0.012)	(1.240)	(0.004)	(0.522)	(0.006)	(0.574)
H's Educ	-0.976***	0.431	1.177***	1.007***	0.511***	0.142
	(0.008)	(0.651)	(0.006)	(0.273)	(0.006)	(0.302)
$\overline{Y}$	12.974	12.974	26.436	26.436	43.196	43.196
	(4) H's Hours Worked		(5) H's ln(Wage)		(6) H's Nonwage Earnings > \$50	
	OLS	IV	OLS	IV	OLS	IV
Educ	0.573***	0.752	0.046***	0.087*	1.067***	-1.529
	(0.008)	(0.774)	(0.000)	(0.040)	(0.021)	(1.967)
H's Educ	0.370***	0.277	0.075***	0.053*	0.063*	1.426
	(0.010)	(0.409)	(0.000)	(0.021)	(0.031)	(1.030)
$\overline{Y}$	37.942	37.942	7.103	7.103	35.253	35.253

The outcome variables are whether the husband was unemployed or employed on public emergency work projects in 1940 (*100), the husband's occupational score, the husband's weeks worked in 1939, the husband's hours worked per week, the husband's natural log of wage earnings, and whether the husband earned more than \$50 in nonwage earnings in 1940. Both OLS and IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The independent variables are the number of years of education completed by the wife (instrumented in the IV regressions) and the number of years completed by the husband. The sample is White, native-born women who were married and with her husband present in the household in 1940 (N=9643189). Columns 5 further restricts the sample to households where the husband was earning positive wages in 1940 (N=6873292). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.

Table A9: The Returns to Education on Match Quality By Socioeconomic Background (No South)

	(1) H's Unem -ployed	(2) H's OccScore	(3) H's Weeks Worked	(4) H's Hours Worked	(5) H's ln(Wage)	(6) H's Nonwage $>$ \$50
			Panel A: Father's OCCSCORE $>$ Median			
Educ	-0.750	0.095	0.508	0.479	0.071	2.635
	(1.298)	(0.477)	(0.656)	(0.801)	(0.039)	(1.925)
$\overline{Y}$	11.785	28.620	43.930	37.848	7.236	31.430
			Panel B: Father's OCCSCORE $<=$ Median			
Educ	-5.287***	0.598	2.228***	3.058***	0.069*	-7.948***
	(1.062)	(0.412)	(0.502)	(0.810)	(0.035)	(2.109)
$\overline{Y}$	12.999	23.443	43.181	39.390	6.886	45.962
			Panel C: Children from Farm Households			
Educ	-3.940***	1.032**	1.818***	1.681*	0.069*	-8.748***
	(0.960)	(0.362)	(0.423)	(0.793)	(0.033)	(1.937)
$\overline{Y}$	12.889	22.338	43.080	39.802	6.788	48.638
			Panel D: Children from Non-farm Households			
Educ	-1.807	0.430	0.910	1.099	0.092*	1.946
	(1.243)	(0.477)	(0.616)	(0.740)	(0.038)	(1.837)
$\overline{Y}$	11.977	28.459	43.882	37.861	7.227	32.059
			Panel E: Children from Rural Areas			
Educ	-2.890**	1.065*	1.994***	2.057**	0.100**	-8.332***
	(0.973)	(0.435)	(0.491)	(0.796)	(0.035)	(2.227)
$\overline{Y}$	13.584	23.874	42.835	38.678	6.887	43.337
			Panel F: Children from Urban Areas			
Educ	-0.327	-0.000	0.101	0.516	0.052	2.046
	(1.374)	(0.480)	(0.679)	(0.851)	(0.036)	(2.203)
$\overline{Y}$	10.758	29.739	44.546	38.164	7.333	29.863

The outcome variables are whether the husband was unemployed or employed on public emergency work projects in 1940 (*100), the husband's occupational score/weeks worked in 1939/hours worked per week/natural log of wage earnings, and whether the husband earned more than \$50 in nonwage earnings in 1940. Only IV estimates are reported. The regression includes birth state fixed effects and birth year by region fixed effects. The independent variables are the number of years of education completed by the wife (instrumented in the IV regressions) and the number of years completed by the husband (not reported). The sample in Panel A and B consists of non-southern married women aged 28 to 55 in 1940 whose fathers had OCCSCORE above and below the median level (N=1818473 and N=1822169). The sample in Panel C and D consists of non-southern married women aged 28 to 55 in 1940 who were from farm and non-farm households when they were children (N=1607083 and N=2033559). The sample in Panel E and F consists of non-southern married women aged 28 to 55 in 1940 who were from rural and urban areas when they were children (N=2492246 and N=1148396). The table also shows the mean of the outcome variables $\overline{Y}$ in each category.