Human Capital Accumulation and the Expansion of Women's Economic Rights

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Abstract

Between 1850 and 1920, most U.S. states enacted laws expanding the rights of married women to own and control their separate property and to own their market earnings. The economic approach to property rights implies that as married women gain economic rights, the incentive to invest in girls' human capital will rise. This prediction is tested by examining the impact of these legal changes on girls' school attendance rates relative to boys'. State-level census data are used to examine the effects of these changes on school attendance among all school-aged children. Integrated Public Use Microdata Series data are used to examine their effect on school attendance among children ages 15–19, who are just beyond compulsory schooling ages. Consistent with hypothesized effects, the empirical analysis shows that expanding women's economic rights resulted in higher relative rates of school attendance by girls and had the largest effect on the 15–19 age group.

1. Introduction

The relationships among legal institutions, property rights, and economic activity are of growing interest to scholars. A substantial literature argues that secure property rights—and the legal institutions protecting those rights—strengthen incentives for investment and lead to higher economic growth.[1] One of the most dramatic and potentially important dimensions of legal and institutional change

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[1] Key studies include Glaeser et al. (2004), La Porta et al. (2002), Acemoglu, Johnson, and Robinson (2001), Knack and Keefer (1995), North (1990), Barro (1991), Scully (1988), de Soto (1989), Bohn and Deacon (1990), Besley (1995), and Libecap and Lueck (2011).

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is women's economic status as determined by the property rights they hold. Those include women's right to own and control property, to enter into legally binding contracts, to litigate, to own and operate businesses, and to own market earnings. We refer to these as economic rights to distinguish them from women's political rights such as the right to vote, hold office, and serve on a jury. Numerous scholars in law and history have commented on the substantial change in married women's economic status that occurred in many countries in the late nineteenth and early twentieth centuries as a result of changes in women's economic rights (for example, Chused 1983; Hamilton 1999; Siegel 1994a, 1994b).

Using the United States between 1850 and 1920 as a historical laboratory, we examine the effect of expansions in married women's economic rights on incentives to invest in the human capital of girls and young women. Human capital is important because it increases women's productivity in both the home and the labor market while enhancing their incentive to invent and innovate (Goldin 2006a; Khan 1996). General education is also critical for sound decision making in a democracy and for facilitating economic growth (Hanushek and Woessmann 2008). In particular, Goldin (2006b) emphasizes the importance of human capital acquisition in allowing women to move from mostly piecework and domestic or laundry labor into clerical positions in the early twentieth century.[2] She stresses that an important underpinning of this transition to higher quality jobs was the greatly increased supply of female high school graduates.[3] Goldin also notes the complementary and mostly exogenous factors that led to this increased supply of female high school graduates but does not consider the expansion of women's economic rights. Our analysis suggests that laws granting women economic rights were important in increasing the human capital of high-school-age females.

The United States in the late nineteenth and early twentieth centuries provides an excellent setting for examining the effect of economic rights reforms on women's human capital investments. First, there were large changes in women's legal status over this period. At the time of the American Revolution, women had very few rights compared with men. The doctrine of coverture, under which a married woman lived under her husband's legal cover, restricted women's choices in virtually all aspects of their lives. Indeed, a married woman—a *feme covert*—could not make contracts, buy or sell property, sue or be sued, own her market earnings, or draft wills.[4] Beginning in 1848, individual U.S. states passed laws that granted married women greatly expanded economic rights, including the right to own and control property and the right to control market earnings. Legal scholars have recognized that these two changes represent a major shift

[2] Goldin (2006b, pp. 3–5) characterizes this as a move from phase 1 to phase 2 of women's involvement in the labor force.

[3] Goldin (2006b, p. 5) states that "[b]oth the increased demand for clerical workers and the increased supply of high school graduates meant that, prior to marriage, young women entered nicer, cleaner, shorter-hour, and thus more 'respectable' jobs."

[4] Similar legal disabilities, although in modified form, existed in community property states.

in legal doctrine, and some have characterized the laws as constituting the "demise of coverture" (Hoff 1991, p. 87; Shammas 1994, p. 16).

A second benefit of the U.S. research setting is the relatively compressed time frame in which these changes took place. Between 1848 and 1920, all but eight U.S. states passed laws expanding married women's rights to both property and earnings.[5] The effective demise of coverture in the United States was thus realized in decades rather than in centuries, which reduces confounding influences that may occur over time. A third and final advantage of this research setting is that legislative change occurred at the state rather than the federal level, which provides 48 different legislative venues for our analysis.[6] Differences across states in the timing of legislation allow us to identify the effects of changes in women's property laws.

Although empirical study is limited, scholars in both law and economics have examined changes in women's economic rights.[7] Legal scholars have examined women's property legislation in detail, typically focusing on the meaning and interpretation of a particular state law (for example, Basch 1982; Lazarou 1986; Salmon 1982). Economists have focused on the fundamental forces driving changes in married women's property rights in a state (for example, Geddes and Lueck 2002; Doepke and Tertilt 2009; Fleck and Hanssen 2009; Fernandez 2012).

Disagreement about the likely impact of women's economic rights remains. Some historians and legal scholars emphasize that courts interpreted legislation conservatively and argue that coverture was more durable than statutory changes suggest (for example, Basch 1979; VanBurkleo 2001). Most empirical analysis has focused on the effect of granting women rights to own and control property—the married women's property acts—on women's property holding, and these findings are also mixed. For example, research on will making in rural Canada finds no improvement and a possible reduction in that activity around the time of legal changes (Cohen 1988). However, analysis of the effects of the British Married Women's Property Act of 1870 finds that it caused women to shift their wealth into forms of property that they could legally control during marriage (Combs 2004, 2005).[8] Khan (1996) studies the impact of U.S. legal changes on

[5] Those states are Alabama, Arizona, Florida, Louisiana, New Mexico, North Dakota, Oklahoma, and South Dakota. Notably, each of those states passed one (in six cases, the property act) of the two acts studied here prior to 1920.

[6] We omit Alaska and Hawaii because of lack of data for this period.

[7] Along with dramatic changes in women's legal status during the late nineteenth and early twentieth centuries, there were also important changes in American culture and women's role in that culture. These changes have been examined by both legal scholars and historians (for example, Chused 1983; McMahon 1912; Siegel 1994a, 1994b). We recognize that the divergence between economic rights and purely legal rights arises because enforcement costs limit the application of legal doctrine (Barzel 1977, 1997). We also recognize that norms sometimes come closer to defining economic rights because they implicitly recognize actual enforcement costs (Posner 1997), and many scholars (for example, Becker 1991; Cheung 1972; Ellickson 1991; Posner 1997) have noted the importance of culture and custom in defining rights. For this study, we focus on areas in which legal rules (for example, the doctrine of coverture) and norms are unlikely to differ persistently and significantly.

[8] Also see Shammas (1994), who finds that the married women's property acts affected women's ownership of property.

women's patent holding and finds an increase after passage of property rights statutes. Roberts (2007) examines the effects of expansions of women's economic rights on labor markets in the United States and finds little effect on female labor force participation during the period 1870–1900.

We examine the impact of changes in married women's economic rights on the human capital investments that parents make in their daughters. Our estimates emphasize the effects of the changes on school attendance among young women ages 15–19, who are just beyond compulsory schooling age limits. The remainder of the article is organized as follows. We first discuss the history of women's economic rights with emphasis on the latter half of the nineteenth and early twentieth centuries. We then rely on the economic literatures on property rights and family economics to argue that increased economic rights for married women will enhance incentives to invest in girls' human capital. We follow with an empirical analysis of the effects of changes in economic rights on human capital investments in girls and young women. We use state-level data obtained from census summaries and state-level data aggregated from the Integrated Public Use Microdata Series (IPUMS) census data sets from 1850 to 1920.[9] Consistent with hypothesized effects, empirical analysis shows that expanding women's economic rights resulted in higher relative rates of school attendance by girls and had the largest effect in the 15–19 age group.

2. The History and Economics of the Expansion of Women's Economic Rights

Married women's property acts (MWPAs) granted married women the right to own and control real and personal property. Married women's earnings acts granted married women the right to own their earnings from work outside the home. To appreciate the connection between legal regimes and human capital investment, we consider the history of women's economic rights in the United States and link those changes to economic models of human capital investment and schooling.

2.1. Some History of Women's Economic Rights

Under the English common-law system of coverture, which applied in the majority of U.S. states prior to the acts, the property that a wife owned prior to marriage (a so-called *feme sole*) came under the control of the husband during marriage.[10] Therefore, upon marriage, a woman relinquished control over her personal property—which included movable property such as livestock, furni-

[9] Census summaries include the decennial census compendia for various census years, and U.S. Bureau of the Census (1975). For additional information on the state-level data, see Geddes and Lueck (2002).

[10] As stated by Blackstone (1765–69, bk. 2, chap. 29), "[T]he very being and existence of the woman is suspended during coverture, or entirely merged and incorporated in that of the husband. And hence it follows, that whatever personal property belonged to the wife, before marriage, is by marriage absolutely vested in the husband."

ture, stocks, and money—to her husband. The husband was permitted to dispose of it at any time and could even will it away at death (Shammas, Salmon, and Dahlin 1987, p. 3). A series of state statutes weakened this legal doctrine in the United States over time.

The first type, known as debt statutes, granted a married woman a separate estate insulated from her husband's debts but did not grant her the right to manage and control that estate.[11] Debt statutes are not property acts under our definition. We define MWPAs as those that went further and granted the wife the ability to manage and control her separate estate. Such a granting is more consistent with the creation of a true property right from an economic perspective, which focuses on how the law allocates control over particular resources (Barzel 1997). An example of a statute, and indeed the first, that clearly granted married women control of their property is the New York Married Women's Property Act of 1848. There are several clauses that specifically address women's control rights and state that a married woman "shall continue her sole and separate property, as if she were a single female" (1848 N.Y. Laws, ch. 200, p. 307).

Earnings acts, which granted married women a property right to their market earnings, are easier to identify than property acts and typically went through less modification. New York state session laws are again instructive, as an 1860 act added earnings to the rights women held under the 1848 act cited above. Key clauses in this statute state that property acquired by a married woman "by her trade, business, labor or services" shall "be and remain her sole and separate property . . . and shall not be subject to the interference or control of her husband" (1860 N.Y. Laws, ch. 90, p. 157). This 1860 New York act has been identified by scholars as a major advance in women's economic status (VanBurkleo 2001, pp. 132–33). One prominent reformer at the time suggested that the act granted married women "equal rights with their husbands, save simply the right of voting."[12]

Legislative acts expanding married women's economic rights were not passed in a political vacuum. Women's groups lobbied for their passage in many states, and assorted arguments were marshaled both for and against passage. In some cases, male legislators who supported the expansions of rights were influenced by progressive attitudes and by women's rights activists. The sponsor of the 1848 New York Act discussed above, Judge Thomas Hertell, was persuaded by various women's rights orators and wanted a wife to be "respected as the equal of a good husband" (quoted in Rabkin 1980, p. 87). Women lobbied for a year in

[11] An example is from 1846 Ala. Acts 25, which states, "Sec. 6. *And be it further enacted*, That the property of the wife at the time of the marriage, or which she may receive by descent, bequest, or gift, shall not be subject to the debts or liabilities of the husband, contracted or incurred before the marriage; nor shall the husband be liable to pay the antenuptial contracts or liabilities of the wife, further than the property received by the wife; but such property received by the wife, shall be liable to her debts notwithstanding the termination of the coverture. Approved, 31st January, 1846."

[12] Andrew Colvin in a 1862 letter to Susan B. Anthony, quoted in Stanton et al. (1881, p. 749).

New York to secure the passage of the 1860 earnings act. Intense lobbying by women led to the passage of an MWPA in Ohio in 1861.[13] In the West, MWPAs were often passed with the intention of attracting women to the region and retaining them.[14] Scholars have also noted that reform was slower in the agrarian South and that legislatures there focused on granting women separate estates mainly to insulate them from profligate husbands (VanBurkleo 2001, p. 128; Chused 1983, p. 1361).

There was also opposition to enactment of these types of statutes, which usually relied on arguments that they would undermine traditional existing orders within the family. In Texas, for example, one delegate argued that property law reform was opposed to God's command that "the woman shall be subject to the man" (VanBurkleo 2001, p. 129). One commentator in 1871 noted the importance of these laws in weakening coverture, as well as the nature of arguments against them, stating that "[t]he law of the status of women is the last vestige of slavery. Upon their subjection it has been thought rests the basis of society; disturb that, and society crumbles into ruins. By the married women's property acts the first blow has been struck. . . . The huge idol will sooner or later be broken into pieces" (Note 1871, p. 73).

2.2. Incentive Effects of Expanding Women's Economic Rights

We argue that expansions of women's economic rights embodied in property and earnings acts strengthen incentives to invest in the human capital of girls and young women. This argument is based on insights from the economic literatures on human capital investment, on household decision making, and on property rights.

Economic approaches to human capital investment emphasize that the extent of these costly investments will depend on the magnitude of expected investment returns (Becker 1962). This principle leads to a number of predictions about the timing and extent of human capital investments by life stage and by gender. It predicts that human capital investments will be made early in life because of the longer lifespan remaining to realize investment returns and that changes in expected lifespan will lead to changes in investments (Becker 1962). It also predicts that investment in girls will be lower than that for boys if women's childbearing reduces their expected lifespan relative to men or if childbearing reduces expected returns on investments because of time constraints, health effects, or other effects of child rearing (Eschevarria and Merlo 1999). These two predictions are consistent with the observation that schooling occurs mainly while individuals are young and with evidence indicating that improvements in

[13] VanBurkleo (2001, p. 131) states that, "[i]n Ohio, incessant campaigning to persuade delegates to the constitutional convention to grant women 'all the political and legal rights . . . guaranteed to men' led to passage of a married women's property law in 1861."

[14] Regarding the California married women's property reform, August (1991, pp. 54–56) notes that one delegate explained that he had chosen the "best provision to get us wives." Also see Chused (1983).

expected female longevity lead to greater human capital investments in girls (Jayachandran and Lleras-Muney 2009).

Similarly, expansions of married women's economic rights are expected to increase the returns to human capital investments in girls, for several reasons. First, parents recognize that human capital is complementary to the exercise and protection of property rights. There is also a literature arguing that education improves the effective exercise and protection of property rights.[15] If parents believe that education will allow girls to more effectively exercise the rights they are granted through the acts, they will respond by increasing investments in girls' human capital.

We also expect stronger economic rights to increase girls' schooling because of resultant shifts in property rights within the household. Expansions of women's economic rights have been characterized as changing the household decision-making regime from patriarchy to intrahousehold bargaining (Doepke and Tertilt 2009; Fernandez 2012). Human capital investments allow women to obtain greater benefits within the household if human capital increases bargaining power. The desire to allow daughters to reap the benefits of expanded economic rights via household bargaining also leads families to increase investments in girls' human capital.[16]

Human capital investments may also increase marriage market opportunities (Benham 1974; Peters and Siow 2002), and the benefits of (positive) assortative mating are likely to be higher under a household bargaining regime (a regime of expanded women's rights). Nonmarket benefits of education include higher productivity within the household, with implications for family health and child quality (Haveman and Wolfe 1984). Household returns to women's education will be higher when they have greater input into decisions. Expectations that girls will have greater decision-making power within marriage strengthen incentives for positive sorting in the marriage market, thereby increasing returns to investments in daughters' human capital.

Geddes and Lueck (2002) characterize the decline of coverture as a shift from a regime in which men control women and own their output to a self-ownership regime in which women own themselves and their output and contract freely with others. Their reasoning implies that expanding rights will lead to increased human capital investment for girls if rights are associated with increased contracting opportunities outside the household. Others have noted that women's participation in the labor force was low throughout this period and was particularly low among married women (for example, Roberts 2007). Still, labor force participation among women—especially young women—increased in the late

[15] See, for example, Pierce (2005), who finds a negative relation between education levels and the termination of parental rights, and Vidmar and Schuller (1987), who find a relationship between education levels and the pursuit of legal rights.

[16] Eschevarria and Merlo (1999) demonstrate in an overlapping-generations model of household bargaining that families choose higher investments in girls' education when household decisions are made through intrahousehold bargaining than when decisions are made under patriarchy.

nineteenth century, and the timing of this increase coincides broadly with the coming of age of girls who were affected by changes in women's economic rights in their youth.

These literatures point to a variety of avenues by which the expansion of women's property rights will increase human capital investment in girls and young women. These predictions imply specifically that investment in girls will increase relative to that in boys. Moreover, we expect that these effects will be long lasting because they are permanent changes in women's rights for the period we examine. The rate of school attendance is a direct measure of human capital investment. We thus predict that expanding women's economic rights will lead to increased school attendance by girls relative to boys.

Anecdotal evidence from this period is consistent with women's enhanced economic rights affecting children's schooling. Doepke and Tertilt (2009, p. 1582) describe a July 1868 debate in the House of Commons regarding a marital property bill in England. The debate included consideration of the impact of marital property law reform in the United States, and the testimony of a New York merchant was taken: "[a]sked whether he had 'seen any alteration in the condition of married women . . . since the alteration of the law,' the witness replied, 'I have noticed the women are being more educated, and are more desirous to educate their children. They send their children almost universally to school.'" We next examine that proposition empirically.

3. Sample and Data

We test the prediction that greater economic rights increased human capital investments in girls by examining whether passage of earnings and property acts is associated with an increase in girls' school attendance relative to boys'. We examine the period 1850–1920, combining data on state passage of the laws with state-level data from the U.S. decennial census summary reports and from individual-level data from IPUMS-USA (Ruggles et al. 2010). The census data are aggregated to the state level. Thus, our data set is organized at the state-by-year level in 10-year intervals.

Because of changes in territory boundary definitions over this time period, our sample includes only those states and territories in each census year that had achieved (roughly) their permanent boundaries by that year.[17] We include all states with permanent boundaries in our sample, not just those that adopted Anglo-American common law. As noted previously, it was the common-law doctrine of coverture that vested all household property rights in the husband

[17] For example, in the 1850 census the data reported for Oregon (territory) correspond to the current states of Oregon, Washington, and Idaho combined. By 1860, Oregon's present-day boundaries had been defined, but the census data reported for Washington (territory) correspond to the current states of Washington and Idaho combined. Washington and Idaho obtained their permanent borders by 1870. Thus, in our sample we include Oregon from 1860 forward and Washington and Idaho from 1870 forward.

prior to passage of the married women's rights acts. The eight U.S. states that evolved from territories under the control of France or Spain acquired a civil-law tradition.[18] Part of that tradition was the doctrine of community property, which treats property acquired during the marriage as jointly owned by both spouses. Husband and wife held marital property in equal and undivided interests in the eight community property states of that era. However, community property law did not actually give women equal rights since husbands usually held exclusive-control rights over joint property and wealth. Statutory changes through property and earnings acts were needed to extend equal rights, in the economic sense, to married women. Thus, we include the community property states in our sample but explore the impacts of this difference in legal regimes in the empirical estimates.

3.1. Data on Legal Changes

Data on state laws granting married women greater economic rights come from both primary and secondary sources. We use the earliest year a state passed an act granting married women management and control over their separate earnings or estates.[19] This approach provides a specific characterization of property rights that emphasizes women's control. Obtaining reliable dates of passage for property acts and earnings acts for all states was challenging because of numerous legislative permutations in some states.

We conducted extensive legal research to obtain the most accurate enactment dates possible. We used a three-step process. The first was to examine current published lists of act dates. There are two major published lists: Khan (1996) and Hoff (1991). Khan's primary focus is on the dates at which married women could hold patents in their own name, while Hoff reports the date of all acts that may have affected married women's property and earnings. Neither scholar focuses on women's ownership and control rights per se. In order to confirm the accuracy of the dates listed by those authors and to provide documentation for them, we obtained the relevant state legislative session laws for the years listed.

For further confirmation and to search for missing dates, we consulted legal treatises in the area. There are three major relevant legal treatises: Bishop (1875), Kelly (1882), and Wells (1879).[20] Those treatises were also helpful in obtaining additional documentation. We include discussion from legal treatises where helpful. Our final step was to further examine state session laws, going back in time to determine whether acts earlier than those obtained through the above two

[18] The eight community property states in our data set are Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Texas, and Washington. Wisconsin is today a community property state but did not adopt this doctrine until the 1970s.

[19] We emphasize the earliest date because some states, such as New York, passed follow-up married women's property acts to more precisely define the rights of married women. See, for example, Basch (1982, pp. 200–235).

[20] Several other treatises were used but were not as central.

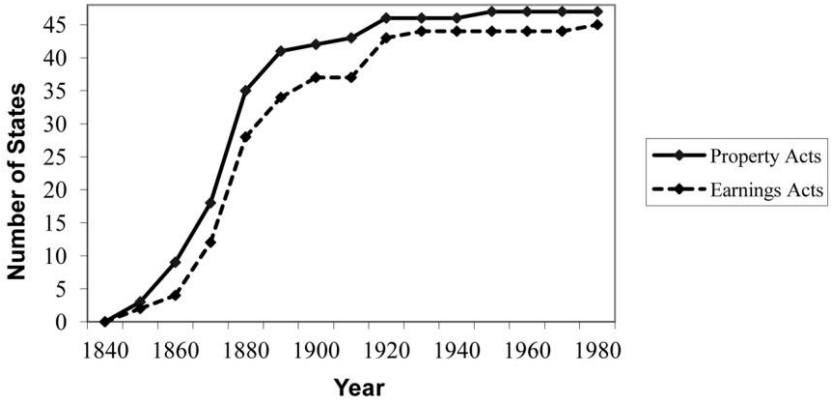

Figure 1. Cumulative adoption of married women's property acts and earnings acts

steps were passed. The final dates we derive are similar but not identical to those from Hoff (1991), Khan (1996), and Geddes and Lueck (2002).[21]

Figure 1 charts the number of states adopting each act type over time, illustrating the time frame and the rate of adoption. In general, the property acts were adopted earlier than the earnings acts. The figure also demonstrates the relatively short time frame over which changes in women's economic rights occurred in the United States.

Figure 2 shows the geographic patterns of the passage of laws with a series of maps indicating the census date by which each state changed its laws. These maps reveal that northeastern and some western states tended to be early adopters of the laws, while southern states tended to adopt later. These patterns are perhaps unsurprising in light of uneven economic development and population growth across states during this period.

3.2. Data from Census Summaries

Data on aggregate schooling rates by state and data on other state characteristics that serve as controls were obtained from U.S. decennial census compendia. School attendance is reported separately for school-age boys and school-age girls

[21] There are 11 states for which more exhaustive research resulted in a change in the date of passage of both types of acts used in Geddes and Lueck (2002). Only eight of those changes affect estimates using decennial census years. Detailed reasons for those changes are available from the authors.

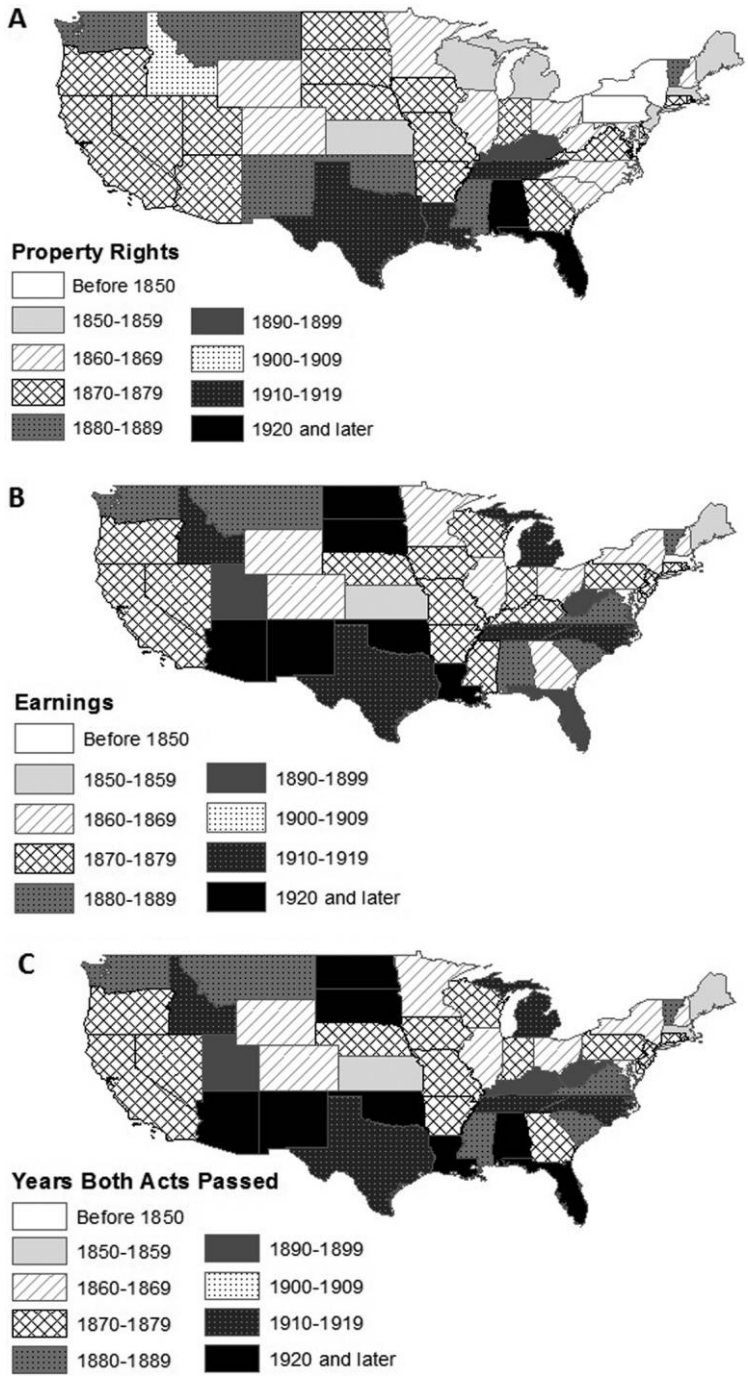

Figure 2. Passage of women's economic rights acts in the United States. *A*, Passage of the married women's property acts; *B*, passage of the earnings acts; *C*, passage of both acts.

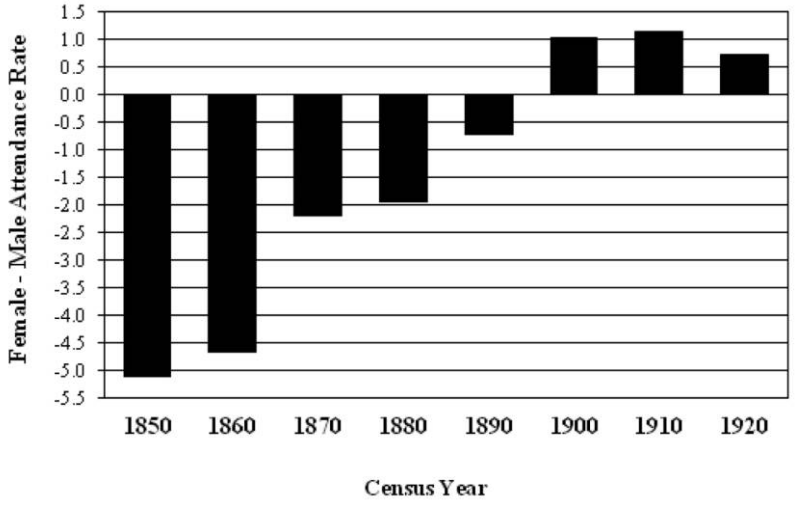

Figure 3. Girls' relative school attendance by census year for all U.S. states

in these published census data and is defined as the number of children ages 5–19 who attended school during the year.[22]

Figure 3 displays the relative school attendance rates for girls in each census year, using the published census data. In early sample years, girls' school attendance rates are lower than boys', but this difference decreases over time. For census years 1900 and beyond, girls' school attendance rates slightly exceed that of boys'.

3.3. Data from the Integrated Public Use Microdata Series

To examine changes in school attendance among specific age groups, we aggregate data from historical census files of the IPUMS. The IPUMS includes individual-level data on high-precision samples of the American population drawn from every surviving census from 1850 to 2000. We use the IPUMS to construct state-level data on school attendance for children in different age

[22] The data encompass the entire population, except for the slave population in 1850 and 1860, which is excluded. The school-age population is defined in the census as individuals ages 5–18 for 1850–1870, ages 5–17 in 1880, and ages 5–19 in years 1890 and beyond. These definitional differences may lead to differences in published school attendance rates in different census years. However, these should not impact our analysis since they are defined symmetrically in a census year for boys and girls. The data are based on the census question of whether an individual in the household attended almost any type of school for at least 1 day during the previous year (see Goldin 2006a, p. 391). Although we would prefer a more detailed measure of attendance, this is the only series that encompasses the period of act passage. Moreover, this measure is appealing because it includes many types of schooling (not just formal), including night and commercial schools, for example (see Goldin 2006a, p. 392). Our predictions are not limited to formal schooling.

ranges. The IPUMS samples for the census years 1850–80 and 1900–1920 are used, since the 1890 census data files were lost to fire.

The school attendance rates for different age groups are of interest because states also began to enact compulsory school attendance laws during this era, and these laws required school attendance for both girls and boys in certain age ranges (Landes and Solomon 1972; Richardson 1980). We expect that laws expanding women's economic rights will have the largest effect on girls no longer falling under compulsory schooling requirements, since such girls face the decision to continue with education, to marry, and/or to enter the workforce. Apart from any legal constraints created by schooling laws, school attendance laws may also have served as rules of thumb that provided girls with guidance on how much schooling to obtain and thus affected their choices.[23] The median and modal ending age for compulsory schooling laws was 14.[24] We therefore expect that women just beyond the age of compulsory schooling—ages 15–19—will display the largest school attendance response to the legal changes.

Table 1 reports the national averages for female school attendance, male school attendance, and differences in male and female school attendance for four constructed age categories by census year. In the early years of our sample period, the 15–19 age group displays the largest differences in female and male school attendance, with females' attendance nearly 12 percentage points below males' in 1850. This age group also exhibits the largest increase in females' schooling relative to males'. By 1900, the 15–19-year-old females' school attendance rate is greater than that of males'.

3.4. Relating Schooling Changes to Rights Changes

Figure 3 and Table 1 display a general upward time trend in girls' school attendance relative to boys', both overall and for girls beyond the age of compulsory schooling whose attendance should be most affected by the laws we consider. But these data do not relate girls' relative school attendance rates to the passage of the laws in a state. To explore whether such a relationship exists, Figure 4 presents a comparison of the average change in the difference between female and male school attendance rates in the 2 decades just before law passage and the 2 decades immediately after law passage in a state. The figure shows the percentage of school-age females attending schools minus the percentage of school-age males attending school for each state in each census year. Because we have schooling data at 10-year intervals only, we compare the 2 decades prior to enactment (from 10 to 19 years before and from 20 to 29 years before) to the 2 decades immediately following enactment (from 10 to 19 years after and from 20 to 29 years after).

[23] Rules of thumb are likely to be particularly important for decisions that are made only occasionally in life, such as exiting or entering the workforce. The importance of rules of thumb in retirement decisions has been noted by Burtless (2004).

[24] In 1890, for example, 15 of 26 states had laws with an ending age of 14 (Landes and Solmon 1972).

Table 1

Percentage of School-Age Children in School by Sex, Age, and Year

Year	Ages 5–9			Ages 10–14			Ages 15–19			Ages 20–24		
	Female	Male	Difference	Female	Male	Difference	Female	Male	Difference	Female	Male	Difference
1850	23.92	24.32	−.40	55.30	54.67	.63	24.04	35.70	−11.67	2.05	5.11	−3.06
1860	23.77	21.97	1.80	58.73	61.10	−2.37	27.22	35.64	−8.42	1.75	4.93	−3.18
1870	18.26	18.02	.24	57.62	59.47	−1.85	22.16	29.05	−6.89	1.19	2.91	−1.72
1880	22.45	22.48	−.03	70.48	67.06	3.42	26.52	28.64	−2.12	1.49	4.09	−2.60
1900	22.74	23.17	−.43	79.88	77.92	1.95	34.56	31.36	3.20	1.90	3.00	−1.10
1910	30.23	30.37	−.14	89.18	88.46	.72	42.85	39.21	3.64	3.67	4.47	−.80
1920	34.71	34.24	.47	92.50	92.60	−.10	43.34	39.80	3.54	3.88	4.31	−.43

Source. Authors' calculations from Integrated Public Use Microdata Series (IPUMS) historical census files (Ruggles et al. 2010).
Note. No IPUMS data are available for 1890 because the original census files were lost to fire.

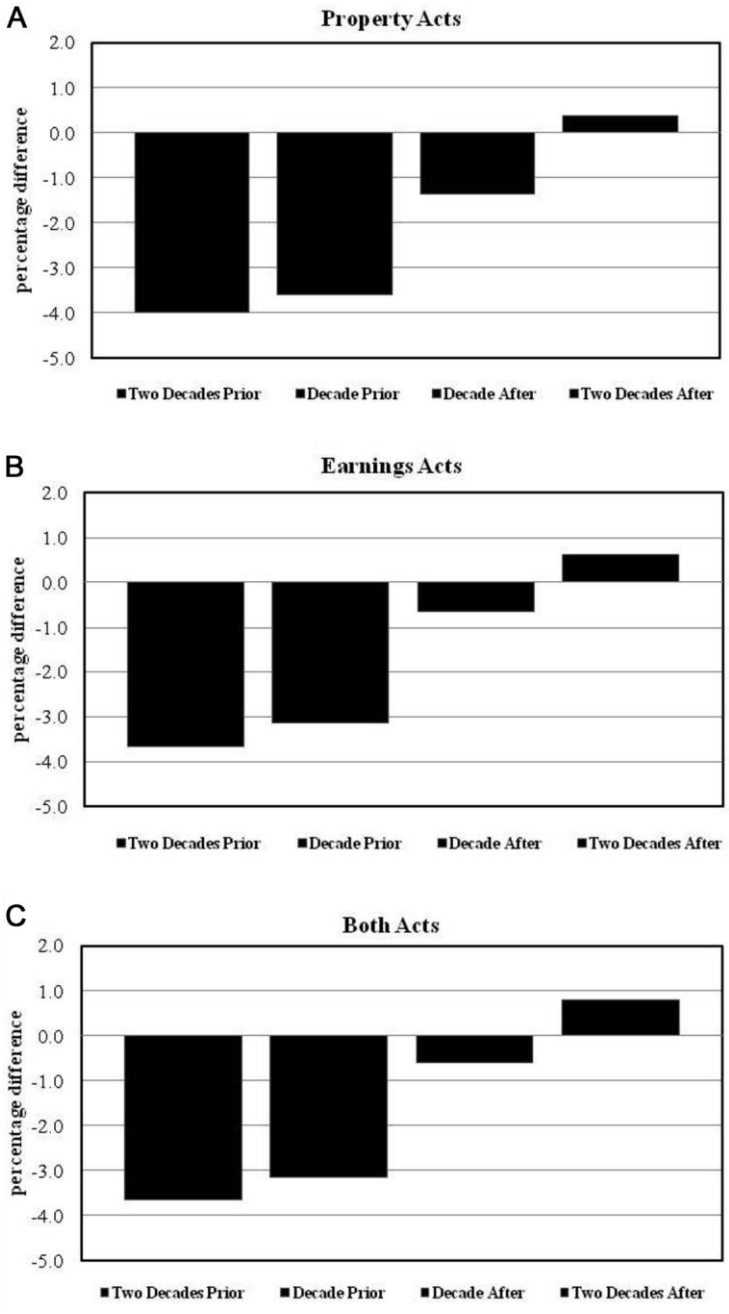

Figure 4. Female minus male school attendance rates prior to and after the acts

Figure 4*A* displays the mean schooling differences before and after the date of passage of an MWPA, Figure 4*B* displays the mean differences before and after passage of an earnings act, and Figure 4*C* displays these differences before and after the date by which a state had passed both acts. The data show that female school attendance rates become closer to male school attendance rates after passage of the acts, although the effects are larger for earnings acts than for property acts. These patterns are consistent with our hypothesis.

4. Empirical Methods

We now provide more formal tests of the hypothesis that passage of earnings and property acts is associated with an increase in girls' schooling. To control for unobservable factors that may impact the overall demand for or supply of schooling, we measure girls' school attendance relative to boys', as in our previous comparisons. The primary dependent variable in our models is the difference in girls' and boys' schooling rates (the percentage of school-age females attending school minus the percentage of school-age males attending school) in each state and census year.[25]

4.1. The Empirical Model

We estimate the effect of these legal changes on investments in girls' human capital using regression analysis that controls for other determinants of human capital investment. Our empirical model includes state fixed effects to account for the fact that different states are likely to have permanently different rates of girls' school attendance relative to boys'. Because of the importance of changes over time in girls' relative school attendance rates during this era, the models also include census-year fixed effects. All models are estimated with standard errors that are robust to arbitrary forms of heteroskedasticity and to arbitrary correlation patterns within states in a census year.

A simple empirical model to test our predictions about how a state's property rights regime affects the difference in girls' and boys' school attendance can be written as follows:

$$\text{Female} - \text{Male Schooling Rate}_{st} = \boldsymbol{X}_{st}\boldsymbol{\beta} + \theta\text{Law Indicator}_{st} + \nu_s + u_t + \varepsilon_{st}, \quad (1)$$

where $s = 1, \ldots, n$ indexes the state, and $t = 1850, 1860, \ldots, 1920$ indexes the census year (excluding 1890). The dependent variable is girls' relative school attendance. The term $\boldsymbol{X}_{st}$ is a row vector of exogenous variables (our basic controls, discussed below), $\boldsymbol{\beta}$ is a column vector of unknown coefficients, Law Indicator$_{st}$ is a dummy variable equal to one if the relevant act granting economic

[25] We also estimated models using the ratio of female-to-male school attendance rates in addition to female minus male school attendance rates. The results are robust to this alternative specification of the dependent variable. The use of the raw difference rather than the ratio simplifies the interpretation of the coefficient estimates.

rights to married women was in force in state s in year t, and θ is an unknown coefficient. The variables v_s and u_t are state and census year fixed effects, respectively, and ε_{st} is a random error term.

A concern with equation (1) is that analysis in Geddes and Lueck (2002) and Doepke and Tertilt (2009) suggests that passage of acts expanding women's economic rights may be jointly determined with girls' school attendance, because increases in the relative returns to women's human capital investments are one catalyst to changing the rights regime. Traditional instrumental variables (IV) estimation is one possible approach to control for this potential endogeneity, but variables that are correlated with the passage of the acts and are also uncorrelated with girls' school attendance rates are difficult to identify.[26]

Our proposed solution to endogeneity prioritizes the expected differential effects on age groups. We estimate a difference-in-differences model of the effect of the law in the 15–19 age cohort compared with its effect in younger age cohorts in a state. We use two alternative younger age cohorts as comparison groups: those ages 10–14 and those ages 5–10. Because our dependent variable is the rate of girls' school attendance relative to boys', this is a triple-difference estimate. This gives us the following estimating equation:

$$\begin{aligned}&[\text{Female} - \text{Male Schooling Rate}_{st(15\text{–}19)}\\&- \text{Female} - \text{Male Schooling Rate}_{st(\text{under } 15)}]\\&= \mathbf{X}_{st}(\beta_{15\text{–}19} - \beta_{\text{under } 15}) + (\theta_{15\text{–}19} - \theta_{\text{under } 15})\text{Law Indicator}_{st}\\&+ [\varepsilon_{st(15\text{–}19)} - \varepsilon_{st(\text{under } 15)}].\end{aligned} \tag{2}$$

The identifying assumption is that legal changes will not impact girls' relative schooling rates in younger age groups because convention or compulsory schooling laws required girls and boys in those age groups to attend school. Although passage of acts giving women additional economic rights may be a function of the level of girls' school attendance, it is likely to be a function of attendance overall and not just attendance by 15–19-year-olds. Effects of the acts are tested via the hypothesis that $\theta_{15\text{–}19} - \theta_{\text{under } 15}$ is significantly greater than zero.

Note that in equation (2) the state and census-year fixed effects drop out because of differencing. This is the appropriate form of the estimating equation

[26] We undertook instrumental variables estimates using as an excluded instrument the percentage of a state's neighboring states that had a married women's property act in force, to take advantage of the geographical patterns of the passage of laws displayed in Figure 2. We calculated the number of contiguous jurisdictions and the percentage of jurisdictions with a property act on the basis of state and territory boundaries as they appeared in each census year. The use of this instrument is consistent both with political theory suggesting that adoption of new policies will be influenced at least in part by developments in other states (Walker 1969) and with empirical evidence showing that neighboring states' policies are important in explaining states' policy adoption (Huff, Lutz, and Srivastava 1988; Besley and Case 1995; Chamberlain and Harder-Maikel 2005; Renzulli and Roscigno 2005). However, this proved to be a somewhat weak instrument, and the resulting estimates of the impact of the laws were unexpectedly large.

if state and year fixed effects are invariant across different age groups. If there are state and census-year fixed effects that vary across age groups, the model will take the form of equation (2) but with state and census-year fixed effects remaining in the form of $[v_{s(15–19)} - v_{s(\text{under } 15)}] + [u_{t(15–19)} - u_{t(\text{under } 15)}]$. For comparison purposes, we also present estimates using this alternative assumption.

Because the passage of property and earnings acts in a state is highly correlated, we do not include indicator variables for the presence of each act in the same regression. Rather, we estimate separate models that include only an indicator for the presence of a property act, an earnings act, or both act types. We test the hypothesis that $(\theta_{15–19} - \theta_{\text{under } 15}) > 0$ for each act type separately.

4.2. *Control Variables*

Our control variables include an indicator for community property states[27] and an indicator for whether the state had a compulsory schooling law in a given year, the average real wealth per capita, the percentage of the population that is black, the percentage of the population living in urban areas, the percentage of the population that is foreign-born, the ratio of females to males in the population, the average fertility rate, and the number of teachers per capita. The dates of passage of compulsory schooling laws are from Landes and Solomon (1972) and Richardson (1980). We are grateful to Robert Tamura for providing fertility data. All other control variables are from the historical decennial census compendia.

The models include a community property law indicator because it is likely that a community property regime reduced the degree to which husbands could expropriate wives' property relative to the common-law doctrine of coverture.[28] This difference in marital property regimes may affect incentives to invest in girls' human capital. Information on the presence of a compulsory schooling law is included because such a law may equalize boys' and girls' school attendance rates.[29] Higher real per capita wealth is included since higher levels of wealth may enhance incentives to invest in human capital (consistent with Fernandez

[27] This measure drops out of the estimates that include state and census-year fixed effects, since the regimes vary only by state.

[28] That community property was more favorable to wives can be seen in inheritance laws, where wives would automatically inherit half of the marital property rather than the third that was customary under common law (Fernandez 2012; Geddes and Zak 2002). Consistent with the notion that the social costs of the community property approach were lower, married women's property acts and earnings acts tended to be enacted later in community property states than in common-law states. The first acts were passed in 1850 in common-law states, but in community property states the first acts were not passed until 1880. By 1920, 97 percent of common-law states had passed an earnings act, but only 56 percent of community property states had done so.

[29] Lleras-Muney (2002) finds that during the period 1915–39, compulsory schooling laws increased educational attainment by an average of 5 percent and decreased educational inequality because they had greater effects on school attendance among those with lower levels of education. See, however, Landes and Solomon (1972), Tyack (1976), and the literature discussion in Lleras-Muney (2002), which shows that the effects of compulsory schooling laws on school attendance rates are mixed in the time period that we study.

[2012]). The percentage of the population that is urban is included since it reflects the extent of the labor market. Families may decide to obtain more schooling for girls in areas where labor market opportunities are greater.

We include a control variable for the percentage of the population that is black. Several studies suggest that black parents attached a higher value to education, while others suggest that black mothers worked in the paid labor force to allow their children to attend school (Lieberson 1980; Pleck 1978). Commentators also argue that a relative scarcity of employment opportunities increased black school attendance (Goldin 1981; Perlmann 1988). Research suggests that ethnicity is important for a daughter's occupational and educational attainment (Mellott and Sassler 2007; Sassler 2006). We therefore include the percentage of the population that is foreign-born as a proxy for ethnicity.[30]

We include the ratio of females to males in the state's population as a control variable because gender ratios may affect political rights held by women and therefore influence girls' relative schooling. In addition, gender ratios may serve as a proxy for the effects of shocks such as the Civil War, which likely affected the relative availability of young men to engage in agricultural work rather than in schooling. These different conjectures suggest different effects of the gender ratio on girls' relative school attendance, so we do not have a strong prediction about the sign of this variable.

We also include a measure of women's fertility—the average number of children born to women in a state in each census year. Women's fertility is an important control since it is directly associated with decisions to invest in human capital (Becker, Murphy, and Tamura 1990) and may be associated with unobservable economic or social changes that are correlated with expansions of economic rights and investments in girls' human capital (Fernandez 2012). We include the number of teachers per capita in a state and year to account for differences in the supply of education. This may affect overall school attendance rates or may impact girls' relative school attendance if girls' education is viewed as secondary to boys'. Summary statistics for all variables are reported in Table 2.

5. Estimation Results

Estimates of equation (2) showing the acts' effect on girls' relative schooling difference for the 15–19 age cohort versus younger age cohorts are reported in Tables 3 and 4. Table 3 shows the estimates using ages 10–14 as the control group. In this specification, the dependent variable is the difference between the female school attendance rate and the male school attendance rate for the 15–19 age cohort versus this same difference for the 10–14 age cohort. Table 4 reports estimates of this same model using the 5–9 age cohort as the control group. Standard errors are clustered by census year.

The estimates in Table 3 show that all three measures of women's economic

[30] Data on the ethnicity of particular immigrant groups are spotty over this period.

Table 2

Summary Statistics for Regression Variables

Variable Name	Description	*N*	Mean	SD
Female − Male Schooling Rate	Difference in state's female and male school attendance rates for school-age population	345	−1.146	3.034
Age 15–19 Female − Male Schooling Rate	Difference in state's female and male school attendance rates for population ages 15–19	289	−1.827	8.900
Age 10–14 Female − Male Schooling Rate	Difference in state's female and male school attendance rates for population ages 10–14	289	.890	5.133
Age 5–9 Female − Male Schooling Rate	Difference in state's female and male school attendance rates for population ages 5–9	289	.067	3.602
Age 15–19 − Age 10–14 Female − Male Schooling Rate	State's female minus male school attendance rates for age 15–19 minus that for age 10–14	289	−2.717	9.612
Age 15–19 − Age 5–9 Female − Male Schooling Rate	State's female minus male school attendance rates for age 15–19 minus that for age 5–9	289	−1.894	9.763
Law Indicator: Property Act	State has married women's property act	345	.681	.466
Law Indicator: Earnings Act	State has married women's earnings act	345	.568	.496
Law Indicator: Both Acts	State has both property and earnings acts	345	.539	.499
Compulsory Schooling Law	State has a compulsory schooling law	345	.490	.501
Per Capita Wealth	State wealth per capita (constant $1,000s)	345	13.894	9.611
Percent Black	Percentage of state population that is black	345	12.514	17.882
Percent Urban	Percentage of state population living in urban areas	345	27.887	20.806
Percent Foreign-born	Percentage of state population that is foreign-born	345	13.919	11.0538
Ratio Females to Males	Ratio of the state's female population to the state's male population	345	90.847	15.297
Women's Fertility	Average number of children born per adult female	345	4.701	1.186
Teachers per Capita	Number of teachers divided by state population	345	6.316	5.908

Source. Overall school attendance, wealth, sex ratios, population, and teachers per capita are obtained from various tables in U.S. Bureau of the Census (1850, 1866, 1872, 1881, 1895, 1901, 1913, 1921). School attendance rates for individuals ages 5–9, 10–14, 15–19, and 20–24 are constructed by the authors from historical Integrated Public Use Microdata Series data (Ruggles et al. 2010). Earnings and property acts data are constructed by the authors. Compulsory schooling laws data are from Landes and Solmon (1972). Women's fertility data are from Robert Tamura.

Table 3

Effects of Women's Economic Rights Acts on Differences in Relative School Attendance, Ages 15–19 versus Ages 10–14

	Without Fixed Effects						With State and Year Fixed Effects					
Variable	Property Act		Earnings Act		Both Acts		Property Act		Earnings Act		Both Acts	
Law Indicator	5.264**	(3.982)	2.976*	(2.367)	2.634**	(3.093)	1.774	(1.474)	1.821**	(3.193)	2.035**	(3.158)
Compulsory Schooling Law	1.832	(1.029)	3.157*	(2.109)	3.096*	(1.996)	−.457	(−.304)	−.584	(−.394)	−.780	(−.524)
Per Capita Wealth	.074*	(2.033)	.101*	(2.510)	.100*	(2.385)	.068	(.857)	.068	(.860)	.071	(.887)
Percent Black	.095*	(2.009)	.076+	(1.658)	.084+	(1.868)	.083	(.357)	.080	(.331)	.059	(.256)
Percent Urban	−.041+	(−1.708)	−.063+	(−1.688)	−.058+	(−1.754)	−.231**	(−4.476)	−.244**	(−5.174)	−.245**	(−5.236)
Percent Foreign-born	−.030	(−.617)	.010	(.146)	.007	(.117)	−.055	(−.440)	−.032	(−.269)	−.031	(−.253)
Ratio Females to Males	−.092	(−.924)	−.048	(−.479)	−.054	(−.546)	.174	(.925)	.188	(1.020)	.194	(1.051)
Women's Fertility	−3.243**	(−5.465)	−3.116**	(−5.594)	−3.211**	(−5.340)	−2.753**	(−4.313)	−2.838**	(−5.124)	−2.761**	(−5.627)
Teachers per Capita	.204**	(2.863)	.200**	(3.111)	.199**	(3.235)	.272**	(6.351)	.269**	(6.308)	.269**	(6.268)
Community Property	3.968*	(2.365)	4.096**	(2.680)	3.872*	(2.536)						
R^2	.422		.394		.391		.392		.392		.393	

Note. The dependent variable is the difference in girls' and boys' school attendance rates for 15–19-year-olds minus this same difference in attendance rates for 10–14-year-olds. State averages are from aggregate census data and include years 1850–80 and 1900–1920; 1890 census data are not available because they were lost in a fire. *T*-statistics are in parentheses and are based on standard errors robust to heteroskedasticity and arbitrary correlation over states in a census year. $N = 289$.

+ Indicates significant difference from zero at the 10% confidence level using a two-sided test.

* Indicates significant difference from zero at the 5% confidence level using a two-sided test.

** Indicates significant difference from zero at the 1% confidence level using a two-sided test.

Table 4

Effects of Women's Economic Rights Acts on Differences in Relative School Attendance, Ages 15–19 versus Ages 5–9

	Without Fixed Effects			With State and Year Fixed Effects		
Variable	Property Act	Earnings Act	Both Acts	Property Act	Earnings Act	Both Acts
Law Indicator	5.849** (3.984)	4.752** (2.863)	4.352** (3.799)	2.784^{+} (1.950)	2.750* (2.248)	2.998* (2.180)
Compulsory Schooling Law	1.989 (1.045)	3.154^{+} (1.950)	3.017^{+} (1.750)	.692 (.450)	.501 (.334)	.218 (.140)
Per Capita Wealth	.188* (2.558)	.219** (3.900)	.217** (3.807)	.187 (1.506)	.185 (1.476)	.190 (1.506)
Percent Black	.124^{+} (1.941)	.097 (1.624)	.110^{+} (1.830)	.316^{+} (1.718)	.311 (1.514)	.281 (1.434)
Percent Urban	−.020 (−.512)	−.059 (−1.305)	−.052 (−1.160)	−.217 (−1.511)	−.238^{+} (−1.677)	−.238^{+} (−1.693)
Percent Foreign-born	−.059 (−.847)	−.004 (−.049)	−.006 (−.089)	−.183 (−1.304)	−.148 (−1.170)	−.146 (−1.136)
Ratio Females to Males	−.102 (−1.097)	−.040 (−.454)	−.048 (−.544)	.083 (.527)	.105 (.680)	.113 (.734)
Women's Fertility	−1.862 (−1.324)	−1.563 (−1.204)	−1.703 (−1.309)	−.769 (−.378)	−.913 (−.432)	−.807 (−.383)
Teachers per Capita	.210** (6.123)	.207** (6.086)	.206** (6.288)	.220** (4.621)	.216** (4.555)	.216** (4.511)
Community Property	2.517 (1.519)	3.165* (2.164)	2.851* (1.981)			
R^2	.380	.363	.358	.300	.295	.296

Note. The dependent variable is the difference in girls' and boys' school attendance rates for 15–19-year-olds minus this same difference in attendance rates for 5–9-year-olds. State averages are from aggregate census data and include years 1850–80 and 1900–1920; 1890 census data are not available because they were lost in a fire. *T*-statistics are in parentheses and are based on standard errors robust to heteroskedasticity and arbitrary correlation over states in a census year. $N = 289$.

$^{+}$ Indicates significant difference from zero at the 10% confidence level using a two-sided test.

* Indicates significant difference from zero at the 5% confidence level using a two-sided test.

** Indicates significant difference from zero at the 1% confidence level using a two-sided test.

rights have the predicted positive effect on girls' minus boys' school attendance in the 15–19 age cohort relative to the 10–14 age cohort. In the models without fixed effects, the estimated coefficients for each act are statistically significant at the 5 percent confidence level or better; the earnings act coefficient is significant at only the 5 percent level, but the property act coefficient and the coefficient for both acts are significant at the 1 percent confidence level. In the models with state and census-year fixed effects, the impact of the earnings act and of both acts are statistically significant at the 1 percent confidence level, while the property act loses statistical significance. The magnitude of the coefficient estimates when fixed effects are included suggests that expansions of economic rights are associated with a 1.8–2.0 percent increase in school attendance by girls ages 15–19 relative to boys of the same age and relative to girls ages 10–14. Given that the total change in the schooling difference between 1850 and 1920 was just over 15 percentage points for this age group, the estimates suggest that the acts' effects were also economically important.

The estimates in Table 4 are broadly similar to those reported in Table 3, but the effects of the acts are larger and more significant. In the estimates without fixed effects, the estimated coefficients for the act variables are statistically significant at the 1 percent confidence level. When state and census-year fixed effects are included, coefficient estimates for the earnings act and for both acts remain statistically significant at the 5 percent confidence level, while that for the property act falls to 10 percent. The magnitude of coefficient estimates suggests that economic rights expansions are associated with a 2.8–3.0 percent increase in relative school attendance by girls ages 15–19 over that of girls ages 5–9. The larger effect on schooling relative to this younger age group is perhaps unsurprising if the acts increased incentives to invest in human capital by obtaining more years of schooling.

Several control variables are also statistically significant in Tables 3 and 4. In models including fixed effects, significant variables include the number of teachers per capita, women's fertility rates, and the percentage of the population living in urban areas. A larger number of teachers per capita is associated with higher rates of relative school attendance among 15–19-year-old girls relative to younger cohorts. Higher fertility rates and more urban populations are associated with lower rates of relative school attendance for 15–19-year-old girls, although this difference is statistically significant only in the estimates using the 10–14 age cohort. This is consistent with the idea that teacher availability, women's fertility, and urbanization affect the length of time that girls remain in school (relative to boys).

Of particular interest in models without fixed effects, the indicator for states with community property law regimes is positive and statistically significant at the 5 percent confidence level or better in all but one of the estimated models. Community property regimes increase school attendance among 15–19-year-old girls (relative to boys) by 3.9–4.1 percent over that of 10–14-year-old girls. Effects are smaller when comparing 15–19-year-olds with those under age 10, which

suggests a 2.9–3.2 percent increase in relative school attendance among older girls as a result of community property. This smaller difference may result if living in a community property state increases girl's school attendance during ages 10–14 as well as beyond age 14. Overall, the positive and significant effect of a community property regime on girls' relative school attendance is consistent with our general thesis that marital property rights regimes affect incentives to invest in girls' schooling.[31]

6. Summary and Conclusions

This article examines the effects of expanding women's economic rights on investment in female human capital. We focus on the nineteenth-century United States where individual states adopted laws that weakened the common-law doctrine of coverture and gave married women the right to own property and to make contracts. Using decennial state-level panel data from 1850–1920, we estimate the effect of the acts granting those rights on one measure of female human capital investment: school attendance. Our analysis indicates that enhancement of women's economic rights increased school-age girls' attendance relative to that of school-age boys'.[32] In particular, we compare girls' school attendance at different ages and find that additional economic rights for women generate larger increases in girls' relative school attendance in the 15–19 age group than in younger age groups. This supports our hypothesis and suggests a causal effect of rights changes on school attendance, since we expect the acts to have their largest effects on this older age group.

Our study adds to the literatures on the effects of property rights and on the effects of institutional change more broadly. Our estimates provide additional empirical evidence for the argument that legal institutions protecting property rights strengthen investment incentives. This article also helps address the gap in our understanding of the empirical effects of granting women economic rights and, by extension, the effects of extending economic rights to other groups.

The dramatic changes in the rights of women over the course of American history suggest the importance of property rights institutions. Human ownership regimes are important because they affect incentives to acquire and develop human capital. Because human capital investment is costly to monitor, and because it is also costly to monitor the highly skilled labor associated with this investment, it is difficult to generate the incentives for efficient investment and use of human capital without granting individuals basic rights of self-ownership. Our findings suggest that changes in women's economic rights are likely to be

[31] We also estimated models in which the community property indicator was interacted with the married women's rights act indicator. This interaction did not affect the main results and was never statistically significant. This suggests that the change in incentives to invest in schooling did not differ across states with different marital rights regimes.

[32] Our findings do not support Doepke and Tertilt's (2009) prediction that an increase in women's rights will have no effect on the gender education gap.

an important factor in the investment of women's human capital outside the household.

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