JUNIOR COLLEGES AND LOCAL DEVELOPMENT

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Abstract

The world's first "junior" colleges opened as early 1900s local industrialization fueled American growth. We use linked census data and staggered difference-in-difference designs around 300 college openings to show that two-year community college access increased male college-going and four-year attainment by 20%. Occupational upgrading followed, especially into skilled agriculture. County-level farm productivity and wages grew by 5–6%, more than the colleges' direct human capital effects could explain. Increased farmer employment in junior college towns facilitated sectoral reallocation towards skilled occupations nearby, developing the county's non-farm sector. Localized human capital spillovers, absent innovation or legislative mandates, spurred regional structural transformation.

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1 Introduction

Sectoral reallocation has long been a hallmark of American development (Easterlin, 1961; Kuznets, 1966). While the time and speed of regions' exit from agricultural employment in the nineteenth and twentieth century aligns with their economic development (Kim, 1995; Caselli and Coleman, 2001; Kim and Margo, 2004), most of the reallocation of agricultural labor which propelled income growth occurred *within*, not across, labor markets (Nagy, 2023; Eckert et al., 2023; Eckert and Peters, 2025). We examine the role of local human capital in facilitating local development and industrialization in rural America.

Our focus is a key American educational innovation of the early twentieth century: the junior college. Hundreds of two-year colleges opened across the United States in the 1910s and 1920s to fill the gap between mass schooling and bachelor's degrees, each of which was central to American leadership in both educational attainment and income growth (Goldin and Katz, 2009). In contrast with both historical and modern concern over the diversionary effects of two-year colleges (e.g. Brint and Karabel, 1989), we find that junior college openings created more educated workforces. Although the educational effects were quite geographically concentrated, we show that both college-town and nearby labor markets benefited from the ensuing increase in skilled labor supply, creating ripple effects across nearby locations and sectors which fueled decades of sustained productivity growth.

We combine archival junior college records with census data to investigate the local economic ramifications of junior college openings using two staggered difference-in-difference designs. We digitize a new database detailing 1900–1950 junior college characteristics and match each school to newly-compiled incorporated place data from 1900–1930 full-count censuses (Ruggles et al., 2021). We isolate the individual-level effects of junior college exposure by linking children's hometowns to the 1940 Census and comparing educational and labor market outcomes across cohorts that turned 18 before or after their local junior college opened, with the former being more likely to attend the college after graduating high school (Price et al., 2021; Abramitzky et al., 2022). We then expand our focus to town- and county-level sectoral employment and productivity data from the Censuses of Population, Agriculture, and Manufacturing (Haines, 2010; Haines et al., 2018; Janas, 2024; Ruggles et al., 2021) in the years before and after the same set of junior college openings.

We begin by documenting the institutional characteristics of the world's first community colleges.[1] Junior colleges were founded to provide transfer-ready liberal arts curricula, coursework for emerging middle-skill non-farm occupations, and tailored agricultural programs in low-cost local schools. They differed from existing four-year colleges by their less-developed locations and smaller enrollments; most students enrolled in public and coeducational institutions housed in existing high schools and managed by local school districts.

Despite their institutional novelty, new junior colleges immediately increased local college enrollment and degree attainment. Among the birth cohorts young enough to take advantage of new junior colleges in their hometowns, male (female) college enrollment increased by 3.1 (1.7) percentage points, or 23 (13) percent. Four-year attainment was unchanged for women but *rose* for men by 1.6 percentage points, suggesting that America's first two-year colleges democratized (rather than diverting) US higher education. Agricultural and business-specific training programs were especially effective at increasing enrollment; other school characteristics are unrelated to the observed enrollment effects.

Occupational upgrading in both farm and non-farm work accompanied these individual educational gains. Men's farm and non-farm laborer employment fell as their likelihood of working in more skilled positions like farmer and clerical work rose. Women's employment also rose in clerical and sales employment. This broad-based increase in employment skill level after junior colleges opened is consistent with the importance of business and agricultural training programs in junior colleges and the developing needs of the American workforce (Goldin and Katz, 1998).

We next show that this increase in skilled labor supply led to permanently higher local agricultural productivity. Difference-in-difference evidence shows that opening the first junior college in a county swiftly increased our measure of farm productivity, farm value per acre, by about 5.4 percent. We replicate our findings separately for 1910s or 1920s junior college openings, indicating that other time-varying local agricultural shocks cannot explain this effect. However, it is unlikely these gains stem solely from direct human capital upgrading in the farm sector: the county-level share of farmers with at least a full year of college education had grown by no more

[1] While local degree-issuing post-secondary institutions were usually referred to as "junior" colleges at the time, we also interchangeably refer to them as 'two-year' and 'community' colleges following the historical literature (Brint and Karabel, 1989).

than 1 percentage point even 1–2 decades following the college opening.

Instead, local farm labor reallocation improved farm sector performance. Like our farm productivity measure, farm labor expenditures per worker rose 6—10 percent in the years after the first junior college opened in a county. Overall farm employment in the county remained flat, but disaggregating the farm sector by occupation and location reveals that farmers became increasingly concentrated around junior college towns within the county. Remaining farmers therefore lived in locations with more-educated overall and agricultural labor, both of which could explain rising farm and farm labor productivity. Other aspects of agricultural production did not change after junior colleges opened, indicating that junior colleges' agricultural extensions and part-time programs likely played a significant role benefiting human capital and labor practices.

Junior college openings facilitated structural change nearby after their pivot towards high-productivity farming. We show that other towns in the same county flowed out of agriculture and into skilled non-farm occupations. Two measures of county-level manufacturing performance, value-added per worker and wages per worker, noisily rose after junior colleges opened, though data constraints limit pre-trend testing. Though local college enrollment rates increased, patenting intensity did not, indicating that the region's structural transformation was more likely spurred by improved local human capital.

Our research design combines distance-based identification of college supply (Card, 1993) with within-town time variation in junior college presence. Junior colleges were scattered across the country and opened in a narrow time frame, creating a tight window of educational access shocks that occurred in a single era of the ever-evolving American education market (e.g. Goldin and Katz, 1999b; Hoxby, 2009; Doxey Koetting et al., 2025; Bleemer and Quincy, 2025; Bleemer and Rothstein, 2025). Our key identification assumption is that towns where junior colleges opened would have had similar outcome trajectories as other towns in the same state absent the college. The main evidence favoring this assumption is that junior college towns do not have differential trends on our main outcomes in the years prior to college openings when compared to other towns. While the parallel trends assumption would be violated if junior college openings were spurred by contemporaneous educational demand shocks, we find no evidence that junior college openings affected high school graduation rates, differ in towns without four-year colleges, or were related to other time-varying development indicators. Junior colleges' reliance on local funding and pre-existing infrastructure implies that the direct economic spillovers emphasized in other studies of college expansion (e.g. Carneiro et al., 2023; Nimier-David, 2023) were second-order in this context, and placebo analysis shows very different productivity patterns in towns with already-established four-year colleges. Finally, we confirm our results using stacked difference-in-difference estimators (Cengiz et al., 2019), alternative census linking strategies, and controls for other time-varying educational policies. The evidence suggests that junior colleges, not other sources of educational enrichment or choices associated with our estimation strategy, drive our results.

This paper contributes to prior literature on the links between educational provision and development spanning macroeconomics, economic history, and labor economics. First, we contribute to the macroeconomic literature on human capital and sectoral change. The speed of agricultural employment decline explains income patterns globally and in United States history (Kim and Margo, 2004; Herrendorf et al., 2014; Gollin and Rogerson, 2025). Cross-country and cross-state studies show that periods of educational expansion lead to structural change and interpret within-period cohort variation as evidence that barriers to skill acquisition play a crucial role in development (Caselli and Coleman, 2001; Buera et al., 2022; Porzio et al., 2022). However, much of American sectoral reallocation occurred *within* regions as rural areas caught up to nearby urban ones, which indicates that the mechanisms linking industrialization and growth operate at finer levels of geography over time (Nagy, 2023; Eckert et al., 2023; Eckert and Peters, 2025). We use individual-level data and sharp geospatial and cohort exposure variation to establish how a local human capital shock creates productivity growth and sectoral change even relative to other places in the same state. Our paper illustrates that educational spillovers are localized and persistent, which suggests that spatial educational heterogeneity can contribute to long-run aggregate development.

Second, we join a long series of studies demonstrating the role of higher education in historical development. The United States' push for mass schooling fueled income growth and lowered inequality (Goldin and Katz, 2009), especially through specific innovations in the early 20th century such as compulsory schooling, child labor bans, and the high school movement (Goldin and Katz, 1999b; Acemoglu and Angrist, 2000; Lleras-Muney, 2002; Stephens Jr and Yang, 2014; Clay et al., 2021; Schmick and Shertzer, 2019; Doxey Koetting et al., 2025; Vidart, 2025). The establishment of universities, in contrast, is typically linked to innovation and institutional development both in the United States and Europe (Cantoni and Yuchtman, 2014; Cantoni et al., 2018; Liu, 2015; Kantor and Whalley, 2019; Andrews, 2023; Dittmar and Meisenzahl, 2024; Andrews and Smith, 2025). However, another strand of research emphasizes that the Industrial Revolution relied not just on inventors, but "upper tail human capital" built through practical industrial training (Squicciarini and Voigtländer, 2015; Cinnirella and Streb, 2017; Khan, 2018; Maloney and Valencia Caicedo, 2022; Mokyr et al., 2022; Kelly et al., 2023; Cinnirella et al., 2025; Hanlon, 2025). We bring these literatures together to illustrate how a novel, highly localized form of post-secondary education – the junior college – filled in the human capital distribution between basic education and the technological frontier during a crucial period in American development. We show that junior colleges improve local human capital and create persistent cross-sectoral productivity growth, a new mechanism in this literature.[2]

Finally, we bring a long-run local general equilibrium focus to research on the economic effects of community colleges. Past work has either leveraged student exposure to specific policy changes or students' distance to existing colleges to identify two-year colleges' average effects (Rouse, 1995; Gurantz, 2020; Acton, 2021; Mountjoy, 2022; Carruthers et al., 2023).[3] Our *openings*-based strategy identifies the local benefits to junior college access, including spillovers received by workers who never enroll at the college or who attend extension or evening classes. Studies of human capital spillovers from post-secondary education have documented modern benefits from historical college openings (Moretti, 2004a; Valero and Van Reenen, 2019; Howard et al., 2024; Howard and Weinstein, 2025; Yanagiura and Tateishi, 2024; Fan et al., 2025) and short-run local gains to new inflows of educated workers (Moretti, 2004b; Ciccone and Peri, 2006; Acemoglu et al., 2014; Cermeño, 2019; Coelli et al., 2024; Cox, 2024); we focus instead on human capital's regional development effects, which need not be even directionally similar to schools' direct effects on their students (e.g. Duflo, 2004).

[2]Our findings complement those of Connolly (2021), who examines the health effects of a subset of junior colleges using a similar research design.

[3]Kane and Rouse (1999) and Lovenheim and Smith (2023) review the recent literature on labor market returns to community college. Most researchers employ matching estimators or individual fixed effects to absorb selection bias in program enrollment (Jepsen et al., 2014; Stevens et al., 2019, e.g.); Grosz (2020) leverages nursing program lotteries to estimate large individual returns to that certificate, while Mountjoy (2022) leverages quasi-random variation in students' relative distance to two- and four-year colleges to identify positive earnings returns in 2000s Texas.

2 The Junior College Movement

As demand for post-secondary education increased at the turn of the 20th century, American colleges found a new form: the two-year "junior" college. Initially introduced in 1900 by the University of Chicago as a way to outsource lower-level courses, junior colleges gained traction as local schools training skilled workers. Capital-skill complementarity and the Managerial Revolution were rapidly creating a need for such workers (Chandler Jr, 1993; Goldin and Katz, 1998; Eells, 1931); occupations like accountants, insurance agents, draftsmen, and X-ray operators – non-production professions that required post-secondary education (Koos, 1924; Bennett, 1928) – were in particularly high demand. Junior colleges provided a mix of two-year technical degrees and preparatory liberal arts education for students who wished to transfer into four-year universities, targeting students interested in middle-to-high skilled work that necessitated greater learning than the era's profession-specific trade or normal schools (Eells, 1941; Frye, 1992). States in the Midwest and Plains led the way, with the Northeast and Mountain West lagging in adoption per capita before 1940 (Figure A-3).[4]

The need for technical training was particularly salient in rural communities, which still made up more than half of the US population in 1910 and were too small to sustain universities. Even outside urban areas, the high school movement was largely complete by 1910, with around three-quarters of youths 14-18 reporting attending school (Table 1) and over a million students graduating a year (Doxey Koetting et al., 2025). Four-year colleges were both geographically and topically removed from the "needs created by rising complexity and industrial growth" (Frye, 1992, p.30), and their curricula had become less focused on agricultural training (Seashore, 1940). Advances in agricultural techniques like new fertilizers and crop rotation methods had made farming potentially more productive, especially for educated farmers who were willing and able to implement these techniques (Bennett, 1928). However, accessing university training often drained promising rural youths into white-collar urban positions (e.g. Allison, 1928), "leav[ing] the country communities without competent leaders" and furthering the decline of American farming (Truesdell, 1926, p.10). Junior colleges supported small-town industry and agriculture by instead treating farming

[4]This varies slightly from the "educational belt" identified with the high school movement (Goldin and Katz, 1999a, p.368), as we see junior college expansion in Arkansas, Mississippi, Texas, and Oklahoma, for example, and not in Nevada, Wyoming, Oregon, or Wisconsin (Figure A-3).

as an applied science (Lange, 1917).

The junior college movement provoked controversy from its earliest years. Many educators worried that two-year institutions focused on preparatory and technical training would fail to instill the same quality of training available at four-year colleges. Critics predicted that local superintendents' lack of familiarity with higher education, lax accreditation – faculty were not always required to have relevant graduate training (Eells, 1931) – and small towns' limited tax base would doom most public junior colleges (Holliday, 1920; Palmer, 1927b). Others went beyond school quality concerns to question whether two-year college access would lure students away from four-year institutions, echoing later debates challenging the subsequent generation of two-year institutions, the community colleges of the 1960s and 1970s (Zook, 1929; Brint and Karabel, 1989).

2.1 Junior College Characteristics

Junior colleges opened in over 400 towns between 1910 and 1930, with their total enrollment rising in that period from less than 10,000 to nearly 100,000 students (almost 15 percent of all college students).[5] Two-year college enrollment rapidly surpassed that of more established higher education sectors: in 1914 there were just under twice as many students at Columbia University as at all junior colleges, but by 1938 the two-year sector enrolled more students than all Ivy Plus institutions added together. All but two states had at least one college (Figure 1a), but the towns where junior colleges were constructed tended to be relatively small (Table 1). Though the towns that opened junior colleges tend to have larger populations, higher educational investment (measured either using literacy rates or teachers per student), and lower commodity sector employment in 1910 than other non-college towns in the same state (which abstracts from state-level policies like child labor or compulsory schooling; Stephens Jr and Yang, 2014), these relationships were generally weaker than those predicting which towns have four-year institutions (see Table A-1).[6]

Junior colleges in different towns primarily differed from each other in organizational structure,

[5]These institutions often opened before legislation could be passed to regulate entry; even by 1932, only 13 states had laws governing junior college openings (Clement and Smith, 1932). After that, both federal and state governments became more involved in opening new junior colleges to help address youth unemployment, which makes later junior colleges substantively different (Frye, 1992).

[6]These relationships are little-changed when restricting to towns without four-year institutions. Table A-15 demonstrates junior college openings are also balanced on concurrent local development indicators like banking, market access, electricity expansion, and agricultural development stations.

cost, and in some curricular offerings. About 61 percent of 1931 junior college students attended public institutions, most of which were founded by entrepreneurial school district superintendents, while the remaining students attended Protestant or Catholic institutions or for-profit vocational enterprises. Both public and religious institutions generally operated out of existing high schools or nearby buildings (Whitney, 1928; Frye, 1992).[7] Like most contemporary four-year institutions (Goldin and Katz, 2011), 81 percent of two-year college enrollees attended co-educational institutions. The median college enrolled about 173 students in 1931 (Campbell, 1931).[8]

Junior colleges' integration with local school districts, abbreviated degree length, and lower cost – about half charged no tuition – led them to generally enroll lower-status students than four-year universities (Koos, 1924; Reynolds, 1927). Among 1930s college-goers, those from the bottom parental income tercile were about three times more likely to attend junior colleges than those from the top tercile (Bleemer and Quincy, 2025). Most junior college students reported that they would not have attended college if not for their hometown two-year institutions (Eells, 1931).

In addition to liberal arts courses designed to prepare students for transfer into four-year universities, most junior colleges offered technical coursework like crop production, machine shop, practical electricity, drafting, power machine operation, stenography, nursing, and printing (Burgess, 1922; Eells, 1941). One-third of students enrolled in these specialized terminal associates degrees, which were offered by 60 percent of junior colleges.[9] Pre-professional programs focused on depth in the chosen field, but students still often enrolled in a pared-down general education course of study (Daly, 1941). Only about two-fifths of junior college students either completed a two-year degree or transferred and ultimately earned a Bachelor's degree (Eells, 1941), and more than a third did not complete a full year of college credit. An additional set of students – about 15 percent of total enrollment – were self-designated 'special' students who took specific technical courses, such as agricultural extension work, without intending to complete a degree.[10]

[7] Some junior colleges also offered teacher training in states where teaching credentials did not require a Bachelor's degree.

[8] We provide enrollment, student-teacher ratios, tuition, and terminal degree program information disaggregated by town size in Figure A-2. Like most four-year institutions at the time, junior colleges were largely non-selective for high school graduates (Bleemer and Rothstein, 2025).

[9] Fewer than 15 percent of junior colleges reported working with local employers to determine course offerings (Eells, 1941).

[10] These extension courses were not restricted to college attendees, which created opportunities for less-educated local students to receive additional training (Griffenhagen and Associates, 1932; Weitzel, 1933).

3 Data

We geographically link information on where, when, and how junior colleges operated in the early 20th century to three datasets: an individual-level dataset (organized by childhood residential town and age) that records education and labor market outcomes and both town- and county-year panels containing information on occupational composition, productivity, and wages. We describe each of these data structures in turn.

3.1 Junior College Openings

We compile a comprehensive set of junior college openings from annual dictionaries produced by the American Association of Junior Colleges between 1931 and 1956, which record the founding year, town, and control of all two-year institutions along with characteristics like tuition and enrollment (see Appendix A for details).[11] We supplement these directories with contemporary government studies on junior college closures to ensure completeness (McDowell, 1919; Greenleaf, 1936). Figure 1 visualizes each town that had opened a junior college by 1928.[12] We supplement the resulting database with which terminal degree programs were available at each institution (as of a 1938 survey; Eells, 1941) and the presence of four-year institutions in the same towns (using the 1923-1947 College Blue Books; Bleemer and Quincy, 2025).

3.2 Linked Individual Census Records

We study the activities of early 20th century Americans following standard procedures to link individuals across the 1900-1940 full-count US Censuses (Ruggles et al., 2021, 2024). We link the birth year and childhood residential town of under-18 men and women in the 1900–1930 censuses to their adult educational, household, and labor market outcomes in 1940 using the Census Tree crosswalks (Price et al., 2021).[13] We assign geospatial coordinates to each person's childhood town

[11] These directories included any institution which self-identified as a junior college – including non-accredited, normal, and technical schools – so long as they offered two-year degrees equivalent to the associates degree.

[12] We define town as any incorporated place to be consistent with what we can observe in the census.

[13] These crosswalks incorporate earlier crosswalks (e.g. Abramitzky et al., 2022) but employ additional *ex post* information from Family Search to match individuals despite marital name changes (Buckles et al., 2025). While the resulting matches are somewhat positively selected (e.g. Bailey et al., 2020), Appendix B shows that all findings below are robust to alternative linking strategies. We do not consider links to the 1950 Census due to to data quality issues flagged by IPUMS.

of residence to measure their distance to the nearest junior college (see Appendix A.3 for details), and leverage harmonized occupation codes to construct eight standardized 1940 occupation categories.[14] We then construct an individual dataset in which each person is characterized by their childhood town and year of birth, resulting in annual variation within each town (with outcomes all measured in 1940) despite the decennial nature of the underlying census data.

3.3 Town- and County-Year Panels

We aggregate the decennial 1900-1940 US Censuses to the town level to measure total male employment and employment share by standardized occupation in each observed year. Unfortunately, labor market earnings are poorly measured in these censuses for several key occupations; even wages are only reported beginning with the 1940 Census, and self-employment and business income (which made up a large share of the era's labor earnings) are not observed prior to 1950.[15] Instead, our town-level analysis focuses on reallocation between occupations based on skill level, as in Katz and Margo (2014).

We move to the county level to measure local labor productivity directly by sector. We bring together data from two additional economic censuses conducted by the Census Bureau in the period: the 1880-1959 Census of Agriculture and the 1900-1939 Census of Manufactures.[16] The Census of Agriculture was conducted decennially between 1880 and 1920 and every 5 years thereafter; we measure counties' average agricultural productivity as the county's total farm value per acre. The Census of Manufactures was conducted in 1900, 1920, and every two years from 1927 to 1939; we measure counties' average manufacturing productivity by the county's total value-added per production worker (which is only observable starting in 1900) and mean labor wages per wage worker.

[14] The education field in the 1940 Census may misstate people's actual completed years of schooling (Goldin, 1998)), but our design differences out any location or birth cohort trends (e.g. ungraded schooling per Collins and Margo, 2006) which contribute to this source of measurement error.

[15] Self-employment and business income made up a large share of the era's labor earnings; even in 1950, only 44 percent of households reported their labor income was strictly wages and salaries (Census Bureau, 1952)

[16] These censuses were digitized by Haines (2010), Haines et al. (2018), and Janas (2024).

4 Individual Effects of Junior Colleges

4.1 Research Design

We study the effect of having a local junior college on residents' educational and labor market outcomes using a cross-cohort difference-in-difference design. Most students attended junior college in their hometown (Eells, 1940), and junior college enrollment was much more common in students' late teens and early 20s than at later ages (Koos, 1924).[17] Our key identifying assumption is that the potential outcomes of students from the same incorporated city evolve smoothly across cohorts, but differential outcomes experienced by people who are younger (especially around age 18) when their town's first junior college opens are likely attributable to their differential junior college access.[18] This assumption motivates the following parsimonious two-way fixed effect specification estimated over our linked individual dataset:

$$Y_{ic} = \sum_{t=8}^{38} \beta_t \mathbb{1}\{c + t = JC_{town_i}\} + \alpha_{town_i} + \delta_{state_i,c} + \epsilon_{ic} \tag{1}$$

where β_t estimates the differential outcomes of students i from birth cohort c who grew up in a town where the first junior college opens in JC_{town_i}, including any town within two miles of that junior college. We set $\beta_{28} = 0$ because individuals of that age were unlikely to take junior college courses. In addition, we absorb both town fixed effects (α_{town_i}) and separate cohort fixed effects for each state ($\delta_{state_i,c}$), absorbing differential state-level trends.[19] Though we estimate this model at the individual level, we reweight the observations so that each town-cohort combination has the same weight to compare across differently-sized towns. Standard errors are clustered by town, the unit of treatment assignment.

The earliest birth cohort in our baseline individual dataset is 1882, since that is the earliest

[17]Contemporary accounts typically noted that students entered junior college immediately after completing high school (Koos, 1924). This age may have been frequently higher than 18, however, because students in the 1920s were older than their age-for-grade would suggest. In Pasadena, California in 1928, for instance, more than a third of eleventh graders were between the ages of 17 and 25. Nationwide statistics from this period indicate that a fifth of 16 year olds were in grades 6 through 8, with another 20 percent in 9th grade (Eells, 1931).

[18]See Figure A-4 for parental status-based balance which supports this assumption as well as town-level labor market event studies in Figures A-15 and A-18.

[19]$\delta_{state_i,c}$ absorbs differences in compulsory schooling which vary by state + cohort, for instance (see Stephens Jr and Yang, 2014). We further interact these categories with farm residence to adjust for parental occupational differences which may have affected schooling trends in Figure A-6 and find similar results (e.g Goldin and Katz, 2008, p.283).

cohort for whom the 1900 Census records their childhood residential location; the latest is 1920, since later cohorts may not have entered college by 1940. We restrict our analysis to junior college openings ('events') between 1912 and 1928 so that the treated towns are balanced for cohorts that are 12 years older than age 18 (the modal junior college enrollment year) to 10 years younger than that age, though we also estimate and present unbalanced β_t coefficients for cohorts who were 31-38 when a local junior college opened. We omit the 10 towns where junior colleges opened before 1912 and the 291 towns where junior colleges opened between 1928 and 1955.[20] We also omit all towns with 1910 populations lower than the 10th percentile of treated town population and towns that do not have at least one linked person in every cohort, because these towns are mostly too small to provide plausible counterfactuals for the towns where junior college opened. The resulting sample includes 9,587,828 male and 5,915,611 female young people (between ages 22 and 58) who resided as children in one of 13,047 towns, 302 of which opened junior colleges in the sample period.

The small share of treated towns mitigates bias resulting from potential heterogeneity treatment effects across junior colleges or SUTVA violations from spillovers of the effects of junior college openings to neighboring towns, since little of the weight identifying β_t comes from comparisons between treated and either already-treated or neighboring towns (Goodman-Bacon, 2021). Nevertheless, we test the robustness of our estimation strategy using the stacked difference-in-difference estimator of Cengiz et al. (2019). Figure A-7 confirms the absence of any bias resulting from heterogeneous treatment effects or local SUTVA violations in our baseline estimation.

4.2 Educational Attainment

Figure 2 presents estimates from our baseline difference-in-difference model on youths' educational choices following a town's first junior college opening. Men and women in towns that opened junior colleges when they were over 26 exhibited the same educational patterns as those in towns without junior colleges, but younger residents were more likely to attend college, by about 3.1 percentage points among men and about 1.7 percentage points among women. These effects are relatively stronger for men who turned 18 a few years after the college opens, likely because

[20] As noted by IPUMS, the current 1950 full count data release under-represents college take-up (our main measure of compliance) by 15%, so we cannot add later cohorts.

the college was larger and more established by the time they graduated high school. Most of these students did not ultimately complete a four-year college degree (Figure 2c), but Figure 2b shows that impacted young men's likelihood of completing a four-year degree rose by at least 1.6 percentage points (with no measurable effect for women). On net, junior colleges led more students to four-year degrees than they did divert students from those degrees despite both contemporaneous and current worries to the contrary (Brint and Karabel, 1989; Holliday, 1920).[21]

These enrollment effects represent a plausibly large democratization of higher education in the early 20th century. Applying our difference-in-difference coefficient to the median treated cohort and multiplying by two yields an estimated junior college enrollment that is 26% of the average 1931 junior college (Campbell, 1931).[22] Contemporary research found that late and prolonged enrollment and out-of-town enrollees were not uncommon.[23] There are four other potential enrollment sources: people who enroll for more than two years, people who enroll later than age 20, people who enroll from out of town, and people diverted from attending other institutions. The first two channels align with the evidence of college take-up among those just over age 18 in Figure 2a as well as qualitative evidence on the popularity of non-degree coursework (Weitzel, 1933). However, the enrollment effects from nearby towns are small (Table A-3 and Figure A-16), limiting their potential contribution. Diversion also seems unlikely, as we find no evidence of declines in four-year college attainment (Figure 2b), even among those with four-year colleges in the same town (Figure A-7) or higher pre-opening college attendance rates (Table A-5). We conclude that it is likely that junior college openings induced college enrollment in line with the size of these local institutions without drawing students out of four-year institutions or negatively impacting other potential college attendees.

We provide a range of robustness checks to ensure that junior college openings, not other ed-

[21] There is no effect of junior college openings on high school graduation in Figure A-11. These institutions did not reflect other local educational trends, perhaps because over a million students in 15,000 cities were already graduating high school annually by 1910 (Doxey Koetting et al., 2025). Extending our event window in Figure A-7 to cover 50 birth cohorts indicates these effects remained stable over longer time horizons, though we do not have balanced samples for all towns in this entire horizon.

[22] We get this number by adding our male and female difference-in-difference estimates from Table A-2 and multiplying it by the average town-year cohort in our estimation sample: 800 people $\times$ 0.025 = 20. These are two-year schools, so we double our estimate, and divide by the average sample degree-seeking enrollment of 173.

[23] In one study, Sears (1932) finds that one-sixth of male junior college enrollees were over 20 when they began junior college, one-tenth of enrollees were in their fifth or later semester of college, and that 61% were from the same county as the school, with an additional one-fifth coming from adjacent counties.

ucational shocks or our empirical strategy, drive our results. It is unlikely that the town labor markets are otherwise becoming more skill-dependent, as we find no evidence that father's occupational standing relates to junior college openings (Figure A-4). Another concern would be that towns opening junior colleges had higher educational demand than towns that never open junior colleges. We address this concern by dropping towns with four-year institutions in Figure A-7 and find similar results.[24] Our results are also unchanged if we exclude nearby towns most at risk of local SUTVA violations (Table A-4) , implement the Cengiz et al. (2019) robust difference-in-difference estimators (Figure A-7), alternative cohort fixed effects (Figure A-6), different census linking strategies (Figure BB-1), or alter our junior college distance cut-offs or population thresholds (Table A-3 and Figure A-9).

Tables A-5 and A-6 investigate heterogeneity in the educational effects of junior colleges. Colleges that offered terminal two-year degrees in agriculture (e.g. animal husbandry and farm machine repair) and business (e.g. bookkeeping and sales training) spurred above-average enrollment increases, with the former leading an additional 1.2 percentage points of young men to earn Bachelor's degrees (from a 7.2 percent baseline). Junior colleges' average enrollment effects were similar in towns that had above- and below-median levels of baseline high school attainment, further emphasizing the independent gains from the high school movement and junior college openings. Consistent with the qualitative evidence above, youths sought specific forms of technical training both on and off the farm, but other dimensions of heterogeneity (like tuition or student-teacher ratios) did not appear as important.

4.3 Occupational Upgrading

Advocates for junior college expansion promoted its benefits for those seeking any kind of middle-to-high skilled work, differentiating the new institutions from the more specialized training provided at technical and normal schools. We estimate the effects of junior college attendance on later-life occupational choice by estimating Equation 1 on a series of mutually exclusive indicators

[24] Similarly, while the secondary schools built a generation earlier as part of the 'high school movement' had a comparable effect on school attendance at ages 16-18 (Doxey Koetting et al., 2025), the educational mechanisms are distinct: junior college openings did not affect high school attainment (Figure A-11), and their college enrollment effects do not differ by 1900 high school enrollment (Table A-5). We also do not find effects on contemporaneous school attendance for students at the typical age of entering high school (14-15) but we do for youths in their late teens (18-19), in line with the ex-post college enrollment estimates in our baseline specification (Figure A-5).

for 1940 occupation type.[25]

Figure 3 shows that junior college openings substantially improved male non-farm occupational outcomes by moving workers from unskilled to semi-skilled work, whereas occupational trends largely evolved in parallel prior to junior college openings. Relative to older cohorts, men in their late teens and early 20s when junior college opened became about 1.4 percentage points (10 percent) more likely to work in clerical and sales roles, potentially offset by a small but statistically-detectable decline in the probability of working as a non-farm laborer.[26] The only other measurable change in non-farm employment following junior college openings is a decline in manager, official, and proprietor occupations, driven almost entirely by the latter occupation (Table A-7).[27] Moreover, these youths' out-migration probabilities fell, creating a boon for local labor markets (see Table A-14 and Figure A-10).

We also find evidence that junior colleges induced upward movement on the occupational ladder in the agricultural sector. Junior colleges increased farmer employment by about the same amount (1.9 percentage points) as farm laborer employment fell (1.6 percentage points). Interestingly, junior college openings appear to have led even men in their mid-20s to become more likely to be farmers, implying a potential role for the agricultural extension function of junior colleges (despite their not reporting having attained any additional completed years of college education). Indeed, one would expect these occupational patterns based on the observed change in youths' educational attainment with one exception: the rise in farmer employment.[28] Junior college openings did not lead to any net change in the farm sector share of male employment but the sector became more skilled, echoing the importance of professional skill development in junior college curricula and in the vocational training results in the college enrollment analysis above.

Though only 21 percent of in-sample women were in the labor market, Table A-12 demon-

[25] We follow the non-farm grouping in Katz and Margo (2014): white collar includes professional, managerial, clerical, and sales work; skilled blue collar refers to craft workers; and unskilled workers include operatives, service workers, and non-farm laborers. For ease of interpretation, we multiply reported β_t's by 100. See Table A-7 for difference-in-difference estimates.

[26] Junior college openings increased male employment in knowledge- or technology-intensive work to a small but statistically-precise extent across the non-farm sector (Table A-9).

[27] The 0.95 percentage point decline is among men who report being self-employed and "Managers, officials, and proprietors (not elsewhere classified)." See Table A-10.

[28] In particular, we predict the probability of each occupational group using the national average for each education-birth cohort pair in 1940 via Equation 1. The difference-in-difference coefficients are precise and explain over a quarter of the other occupational results, but the farming results are close to 0.

strates that junior college availability also shifted young women toward clerical and sales roles, though to a lesser extent than for their male counterparts. Junior college openings are not associated with meaningful changes in women's' labor market participation (Table A-11, but following junior college openings, young women have higher marriage rates, lower fertility ($p = 0.10$), and delayed first childbirth (Table A-13).[29] Junior college expansion thus contributed to the early 20th century movement of women into semi-skilled employment (Goldin, 1994; Feigenbaum and Gross, 2024; Vidart, 2024; Rashid, 2025) alongside the more pervasive high school movement (Goldin, 1998; Doxey Koetting et al., 2025).

While the 1940 Census elicited wage income, it does not record labor earnings for small business proprietors or farmers. Because junior colleges moved many young workers out of the former occupations and into the latter and increased reporting self-employment income (see Figure A-12), we are thus unable to measure the individual labor market return to the newly-produced human capital. We return to the consequences of junior college openings for labor productivity in the next section.

5 Local Development Effects of Junior Colleges

The net effects of junior college expansion on the local economy depend on the feedback between the expansion in college attendance and the local labor market. Junior colleges might benefit local residents by enhancing the human capital of young college enrollees and 'special' extension students, by facilitating the transmission of innovative production technologies to local managers and skilled workers (and other spillovers from local educational gains), and potentially by locally agglomerating innovative firms.[30] However, there has been nearly a century of debate over whether the net economic value of two-year college education is even positive, in part because it is unclear whether junior college training provides marketable skills worth their opportunity cost (Palmer, 1927a; Zook, 1929; Belfield and Bailey, 2011; Lovenheim and Smith, 2023) and in part because even postgraduate wage gains could result from a combination of a novel signaling technology and

[29] See Figure A-13 for event studies of female labor market outcomes which again support our research design. Many of our fertility and marriage outcomes were only asked of a random 1% sample of women, limiting our power to estimate separate event coefficients within each town.

[30] Because junior colleges often operated out of high schools with relatively small faculties, there is likely little scope for direct economic ramifications of either junior college construction or consumption.

a changed pattern of labor market sorting instead of meaningful aggregate wage or productivity gains (Spence, 1973; Aryal et al., 2022). Having documented young peoples' educational takeup and their shift from low-skill labor toward middle-skill and farming occupations following junior college openings, we now turn toward estimating those junior colleges' net local economic effects.

5.1 Research Design

We study the local economic effects of opening a junior college using a staggered difference-in-difference design across towns and counties where junior colleges are opened. Town and county employment characteristics are aggregated from the decennial US Census microdata and county characteristics are measured every 2–10 years in the Censuses of Agriculture and Manufacturing. Data on non-labor outcomes are measured at the county level due to data constraints, so they will reflect broader geographical spillovers from junior colleges subject to any attenuation due to counties' relatively large size.[31]

Our key identifying assumption is that the potential outcomes of towns and counties that open their first junior college evolve similarly to those of other towns in the same state, motivating another two-way fixed effect specification estimated across town- or county-years:

$$Y_{pd} = \Sigma_{t \in T} \gamma_t \mathbb{1}\{d - t = JC_p\} + \zeta_p + \eta_{state_p,d} + \epsilon_{pd} \tag{2}$$

where γ_t estimates the differential outcomes of place p – either a county or a town – that opened a junior college t years before (indicated by JC_p), relative to the period immediately before the junior college's opening. For example, when using decennial census data, we set JC_p to be 1920 for any place where the first junior college was opened between 1910 and 1919, and γ_1 represents the differential outcome of places where junior colleges had opened between 11 to 20 years earlier.[32] As above, we absorb place (ζ_p) and state-year ($\eta_{state_p,d}$) fixed effects. We again restrict the sample to places with populations over the 10th percentile among treated locations prior to the first

[31] The county-level approach yields 334 events between 1910 and 1928 among 3,105 counties; the mean (median) treated town contained a quarter (sixth) of its county population. As a result, we find similar but attenuated individual-level effects of junior colleges on all treated county residents' educational outcomes (Figure A-16).

[32] Towns are treated if a junior college opened in any town within two miles of their center. County treatment is based on the first treated town anywhere in the county.

included opening date and omit places with junior colleges opening before 1910 or after 1928.[33] When using decennial census data, we further restrict to places observed at least four times between 1900 and 1940 to ensure that the sample is balanced on treatment timing. As above, we provide evidence favoring the parallel trends assumption by presenting near-zero $\hat{\gamma}_t$ estimates for $t < 0$ and further show county-level balance on a host of simultaneous shocks to development in Table A-15.

5.2 Agricultural Productivity

We first focus on the local effects of junior colleges on the agricultural sector, which employed 12 percent of male workers in junior college towns in 1920. We measure local agricultural productivity by average local farm value per acre in the county-level Census of Agriculture (CoA).[34] The irregular timing of the CoA – decennially 1890–1920 and then approximately every 5 years until 1959 – challenges estimation of the staggered γ_t terms in Equation 2. We focus on two sets of treated counties: those where the first junior college was built in 1910-1919 (before the 1920 CoA) or in 1920–1928 (before the 1925 or 1930 CoA). We estimate Equation 2 separately for each set, omitting other counties that ever open junior colleges, and plot the two sets of resulting $\hat{\gamma}_t$ coefficients in Figure 4.[35]

The figure shows that the towns that open junior colleges have parallel agricultural productivity trends with other counties in the decades leading up to the college's opening, but per-acre farm value jumps upwards in subsequent years. The pattern and magnitude looks remarkably similar for the counties that open junior colleges in the 1910s and 1920s despite the differences in agricultural demand and technology in the first half of the twentieth century. There was a persistent 5.4 percent increase in agricultural productivity that phase in around 5–15 years after the college opening

[33]While this place-level design could facilitate estimation of the effects of later junior college openings, we continue to restrict to pre-1929 openings because the locations of later junior college openings were influenced by centralized federal and state concerns about youth unemployment during the 1930s (Frye, 1992), threatening our parallel trends assumption.

[34]This variable captures the reported value of farm land, building, and equipment per acre of farm land (including unimproved land) via Haines et al. (2018) and reflects both farm performance and profitability, which we summarize as productivity (e.g. Hornbeck and Naidu, 2014; Boone and Wilse-Samson, 2023; Edwards and Thurman, 2025).

[35]For example, the presented '1 to 10' coefficient is the 1920 $\hat{\gamma}_t$ for the 1910–1919 JC counties and the 1930 $\hat{\gamma}_t$ for the 1920–1928 counties. For the latter set, only those which opened junior colleges between 1920 and 1924 are used to identify the 1925 JC counties.

($t = 2.6$).[36]

The farm sector became more productive in tandem with rising local educational attainment. We demonstrate this by applying Equation 2 to our town- and county-level panel, where the outcome variable is the share of prime-aged (ages 25–55) men in each town and year that we can link forward to the 1940 census who then report at least 13 years of education.[37] Figure 5a presents the results for towns receiving a junior college ("treated"), other towns in the same county as a junior college opening ("nearby"), and in the county overall alongside 95% confidence intervals. Male workers were no more likely to have college educations before junior colleges opened in a given county, but 11 to 20 years later the county workforce was about 1 percentage point more likely to have attended college, driven by a 3 percentage point rise in junior college towns.[38]

However, the county's higher agricultural productivity is unlikely to be largely explained by the direct effect of new local human capital. Figure 5b shows that while local farmers' educational attainment rose proportionately with the overall labor force, the county-level rise in farmer college enrollment was less than 1 percentage point. Even if many additional farmers attended junior college courses but did not achieve the full year of course credits required to report 13 years of education to the Census – because they completed extension programs or limited formal coursework – it is implausible that so few newly college-educated farmers could have directly caused a 5.4 percent rise in farm value per acre alone.[39]

What explains this agricultural productivity growth if not a direct human capital channel? Figure 6 investigates alternative labor-market-based mechanisms. Panel (a) shows that average farm labor expenditures per farm worker – measuring the numerator in the Census of Agriculture and the denominator in the Census (e.g. Abramitzky et al., 2023)– swiftly and persistently rose in counties where junior colleges opened in both the 1910s and the 1920s. Farm work thus became better com-

[36]The similarity of the decade-specific and pooled coefficients suggests that the standard errors of the 1910s $\hat{\gamma}_t$ are larger because there are fewer events (101 vs 205) in the estimation sample.

[37]We construct this measure for each census wave by linking all prime-aged men in that census forward to 1940 to retrieve their educational attainment.

[38]The United States rolled out two-year college far earlier than many other countries, but our estimated workforce college-going effect is notably similar to Nimier-David (2023)'s estimated magnitude for France's 1990s rollout of two-year colleges, and from a similar 15 percent college-going baseline).

[39]We find a 1.0 percentage point increase in farmers' college enrollment rates one decade after the first junior college in a county. Each newly educated farmer would then need to be over 500% more productive to explain the overall 5.4% farm productivity increase. Multiplying the average farm wage gains after junior college openings (Figure 6a) by two years of schooling implies a 21% increase, leaving most of the productivity gains unexplained.

pensated alongside increasing agricultural productivity. However, we find no evidence of regional sectoral change: the county-level farm sector employment share did not respond to junior college openings (Figure 6b).

Disaggregating employment by junior college proximity instead reveals that junior college openings result in a redistribution of agricultural employment by space and skill *within* treated counties. The former channel is evident in the contrast between farm sector employment shares between junior college and nearby locations in Figure 6b. The latter can be seen when we separate farm employment into farmer and farm laborer occupation in Figures 6c and 6d. Unlike nearby towns, who exited both types of farm occupations for non-farm work (Figure A-18), junior college towns became more specialized in farmer employment relative to both less-skilled farm laborers and non-agricultural occupations.

These results suggest two potential explanations for the agricultural productivity gains in Figure 4. First, farm sector skill in junior college locations' farm sectors increased as farmers became more prevalent than farm laborers. These farmers' rising collegiate training increased local human capital, either formally as in Figure 5b or through part-time courses or agricultural extensions.[40] Farm workers who did not attend junior college could obtain skills from their neighbors (e.g. Foster and Rosenzweig, 1995; Parman, 2012), raising farm labor productivity and therefore wages. Second, in the presence of geospatial information frictions (e.g. Kantor and Whalley, 2019), farmers in junior college locations would become relatively more productive than farmers in other towns.[41] Nearby farmers could therefore reduce cultivation of less-productive land or leave the sector entirely without causing net declines in county-wide farm output.[42] Junior college openings had no short-run effect on either total farm acreage or crop acreage allocation (Figures A-17b, A-17e, and A-17f), indicating that farm productivity more likely rose through local educational spillovers and

[40]This effect is concentrated among treated locations' farmers, especially younger ones (Figure A-15), which may reflect within-cohort occupational spillovers. Farm laborers' college enrollment share did not increase in either junior college towns or neighboring locations (Figure A-14), but we do not observe individuals' take-up of agricultural extension or part-time classes, so we cannot rule out direct human capital gains driving their wage gains.

[41]These shifts in comparative advantage could occur through human capital or, as suggested by Figure A-17c, rising capital adoption as suggested by Nelson and Phelps (1966). Tractor adoption data begin too late for us to examine the time-varying effects, but junior college locations consistently had more tractors per farm than other locations between 1925 and 1940 (Table A-17).

[42]Table A-16 demonstrates that individual farms tended to be smaller after junior colleges opened, which is also consistent with reduced usage of less-productive land.

neighboring towns' agricultural labor reallocation.[43]

5.3 Non-Farm Productivity

The local non-farm sector also evolved following junior college openings. A lack of long-run manufacturing and service sector data mean that the evidence on productivity gains is less conclusive.[44] Our preferred measure of productivity is value-added per production worker, but this is observable in only the 1920 and biennial 1927-1939 Censuses of Manufacturing (CoM). An alternative measure – manufacturing wages per production worker – is available in those censuses as well as the 1900 CoM. As a result, we are only able to investigate the manufacturing effects of 1920s junior college openings (since there is no reasonable pre-period estimate for 1910s openings) and we have only a single data point of evidence (1900 per-worker wages) on the possible presence of non-parallel pre-trends between places with and without junior colleges. However, Figure 7 shows that both productivity measures noisily rise by about 2.7 percent in the years following junior college openings ($t = 1.6 - 1.7$), with a delayed phase-in of higher wages per production worker and no evidence of differential trends between the 1900 and 1920 CoM. We view these results as evidence that junior college openings may have improved wages and productivity in both the farm and non-farm sectors.

Increasing human capital and labor up-skilling coincided with development in the non-farm sector. Figure 7c plots the share of prime-aged men employed in the non-farm sector who report having a college education. More than a decade after the first junior college in a county, college enrollment shares were 0.9 percentage points higher in the county overall, in line with the equivalent individual-level analysis (Figure A-16). County-wide gains in college enrollment were similar in both timing and magnitude to flows of workers into clerical and other white-collar employment (Figure 7d).[45] As junior college locations grew the college educated workforce, towns

[43] This human capital-based mechanism may explain why junior colleges create more persistent productivity gains than the agricultural experiment stations documented in Kantor and Whalley (2019). Knowledge is non-rival and diffuse across locations in a state over time, but if skill acquisition and farming employment reallocation gains are highly localized (as Figure A-16 suggests), then junior college counties may remain more productive than other locations in the state for a longer period.

[44] The first service sector census did not occur until 1929 for wholesale and retail trade, and expanded later to other industries.

[45] We cannot observe the potential presence of capital upgrading due to inconsistently defined manufacturing capital data over this period. Figure A-21 presents other occupational changes.

nearby moved into white collar work to offset declines in their farm employment. Junior colleges thus improved human capital, created within-county farm employment reallocation, and released other workers into skilled non-farm jobs which then may have improved local non-farm sector performance.

These skill-based effects did not occur alongside rising innovative activity. A number of prior studies of the effects of local higher education have pointed toward targeted innovation as a potential mechanism (Aghion et al., 2009; Liu, 2015; Kantor and Whalley, 2019; Hausman, 2022; Andrews, 2021, 2023; Dittmar and Meisenzahl, 2024). We investigate the effect of junior colleges on local innovation by estimating Equation 2 on the number of new patents annually in a county per 100,000 residents (Petralia et al., 2016) for junior colleges founded between 1910 and 1928. The evidence, presented in Figure 8, leaves no reason to believe that junior colleges spurred innovation in the region. The gains in productivity we document align much more closely in timing and magnitude with changes in human capital and sectoral reallocation. Junior colleges more likely created human capital which pushed local economies closer to the technological frontier, producing "imitators" rather than innovators and university-led growth (Krueger and Lindahl, 2001; Vandenbussche et al., 2006; Aghion et al., 2009).

5.4 Robustness

The primary identification concern in estimating the local economic effects of junior college openings is that parallel trends could be violated if junior college openings are spurred by or simultaneous with other municipal activities that also affect local labor markets and productivity. There are some dimensions along which junior college towns and counties are evolving differently than non-college places; for example, junior college places are growing faster than other places both before and after the junior college opens (Figure A-21). It is unlikely there is a systematic population threshold at which communities build junior colleges and otherwise become more productive, as population growth *decelerated* county-wide after junior college openings and we find similar treatment effects by decade despite differences in treated locations' size (Table 1). The absence of substantial heterogeneity in the observed treatment effects by opening decade also rules out other shocks to American agriculture (eg. the Dust Bowl or World War II) as first-order mediators of the junior college effect.

The fact that productivity effects phase in 5–15 years prior to junior college openings in both the 1910s and 1920s also rules out that the observed effects are driven by more-educated (and otherwise more-successful) towns otherwise accruing agricultural productivity gains following the mass-production of the tractor. We further investigate this hypothesis by conducting a placebo analysis comparing the evolution of agricultural productivity between towns with and without four-year colleges (omitting towns with junior colleges; Figure A-19). Specification choices also do not appear to drive our conclusions; for example, our results are robust to relaxing the population threshold used to define the sample (Figure A-20).

6 Discussion

This study leverages the first wave of American two-year colleges and both individual- and region-level data to illuminate the dynamics underpinning local structural change and development. Junior college openings in the beginning of the 20th century resulted in new college enrollment among eligible young men (and some women), which swiftly translated into higher agricultural productivity in the surrounding region. The increased education of local farmers – through regular degree programs, evening classes, and agricultural extension – played an important role in this productivity growth, but we document two other mechanisms by which junior colleges promote regional development. First, the expansion of junior college locations' farm employment and wages suggest that non-college-educated farm workers received spillover benefits from local educational expansion. Second, rising agricultural productivity around junior college towns appears to have freed up agricultural labor in neighboring towns, leading to rising white-collar employment and a potential net increase in regional manufacturing productivity. The resulting persistent human-capital-based gains in agricultural productivity sustained more production with fewer workers for decades and created the conditions for structural transformation elsewhere. Indeed, we find that the non-farm sector expanded nearby and may have also become more productive. There is no evidence that innovation increased after junior college openings; instead, these results are consistent with human-capital-led structural transformation (e.g. Porzio et al., 2022) through new within-cohort and within-region mechanisms.

These human capital spillovers occurred in less-developed American labor markets than those existing when the modern community colleges opened in the 1960s, let alone the labor markets of the present day. The early 20th century United States featured less college enrollment, lower returns to education (Autor et al., 2020), and a far larger agricultural sector (employing 21 percent of men in 1930); current American community colleges are less likely to foster agricultural productivity growth and structural change than their early predecessors. Our findings, however, echo the enrollment effects arising from other countries' more recent higher education expansions (Nimier-David, 2023) and the externalities from research university access emphasized in the present-day United States (e.g. Moretti, 2004a). The historical American experience suggests that two-year college openings have localized and persistent effects beyond those visible in short-run or aggregate data or those that specifically accrue to students. These long-lived local general equilibrium effects suggest that there are potential gains to scaling up tertiary educational investment in other contexts. Further work could explore the individual- and local- level gains to two-year college expansions in other contexts to address the viability of this globally popular policy proposal (e.g. Chase-Mayoral, 2017).

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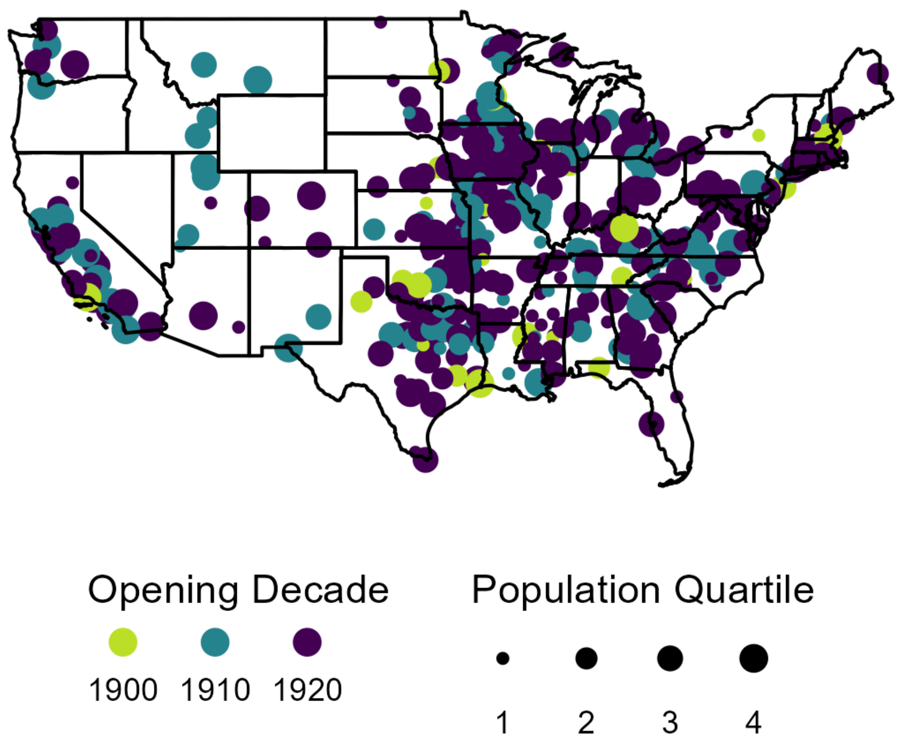
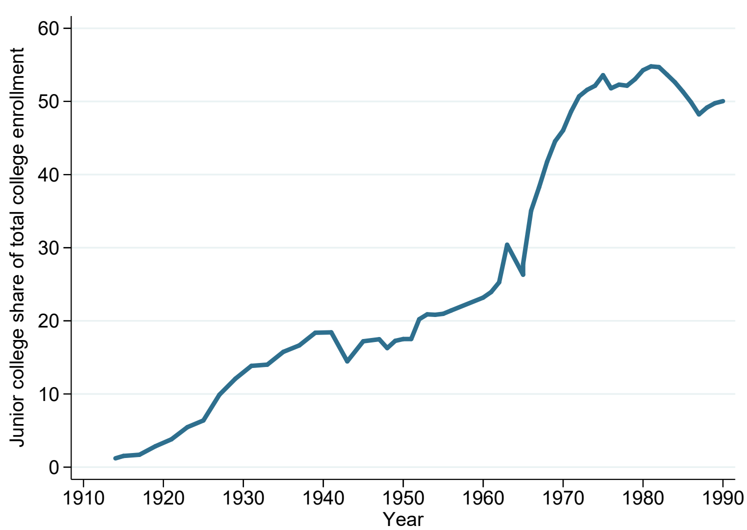
Figure 1: The distribution of US junior college openings

(a) Map of junior college openings

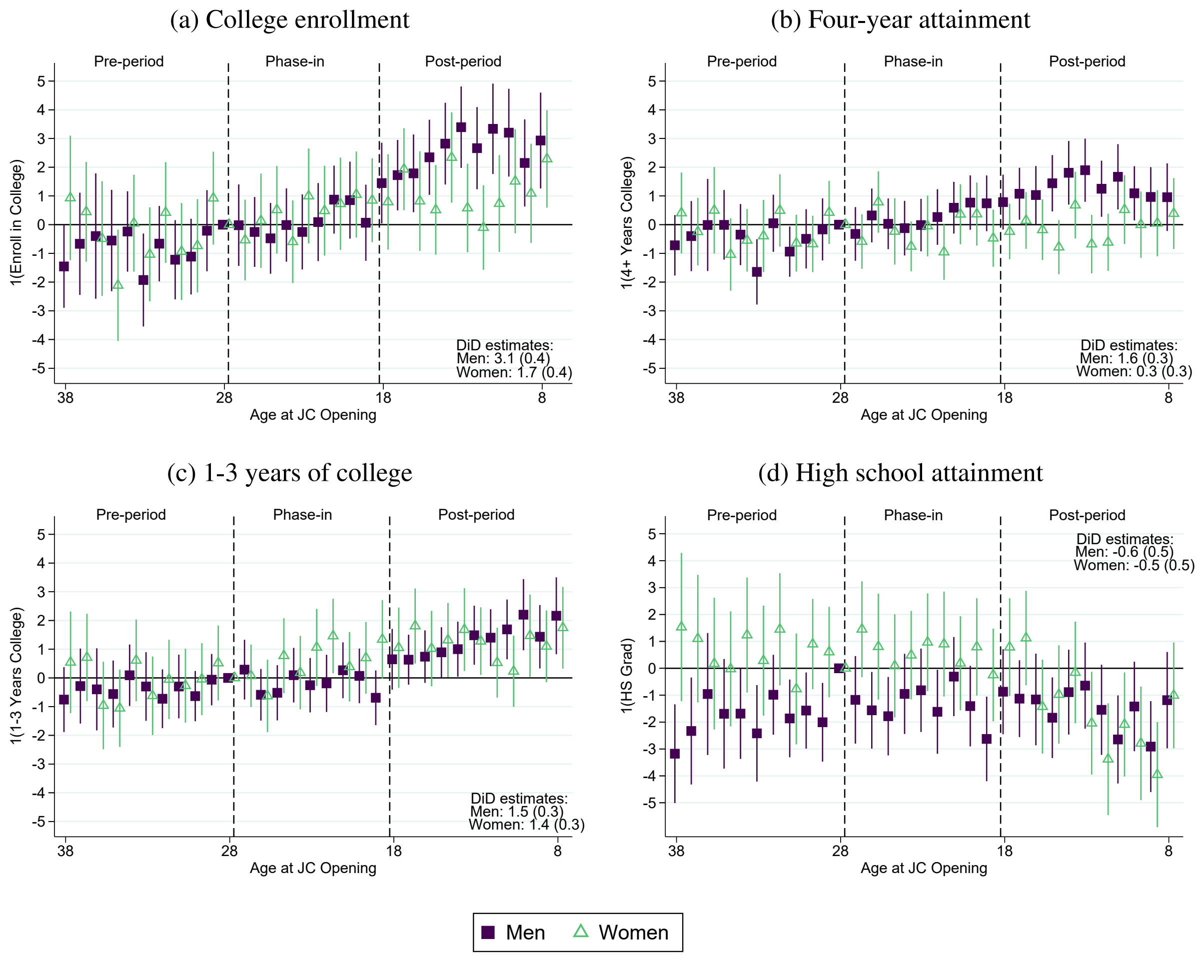


(b) Share of undergraduate enrollment



Note: The map in (a) shows the location and timing of every junior college opened in the US between 1910 and 1928, overlaid on a map of all incorporated cities in the US in 1920. Town marker size is determined by 1920 town population quartile. The time series in (b) plots the share of college enrollment at two-year institutions regardless of opening year. Source: (a): Junior College Journal Directories, McDowell (1919), Greenleaf (1936), and the US Census (Ruggles et al., 2021). (b): McDowell (1919), Blose and Foster (1949), and Snyder (1993).

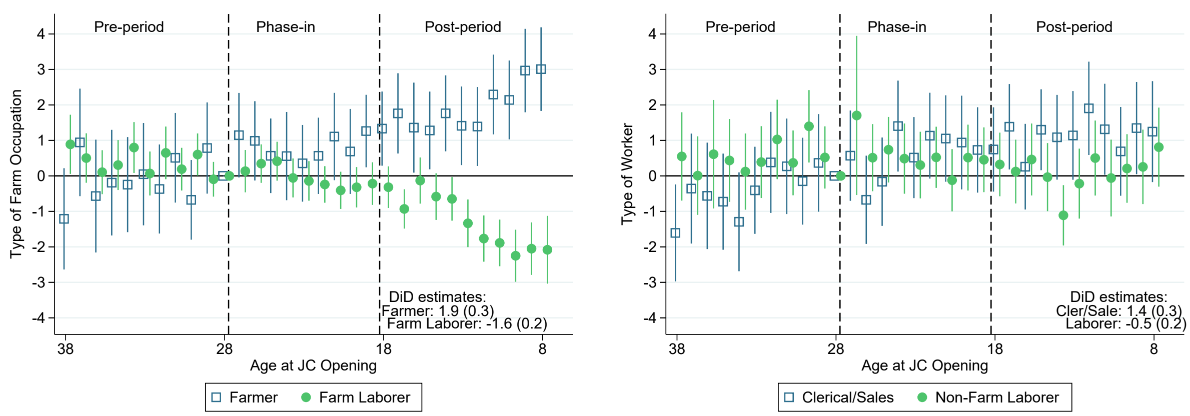
Figure 2: Effect of junior college on college education



Note: Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for reporting (a) at least 13 years of education, (b) at least 16 years of education, (c) 13–15 year of education, or (d) at least 12 years of education, estimating separate β for male and female students in a pooled sample. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. separately by gender. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

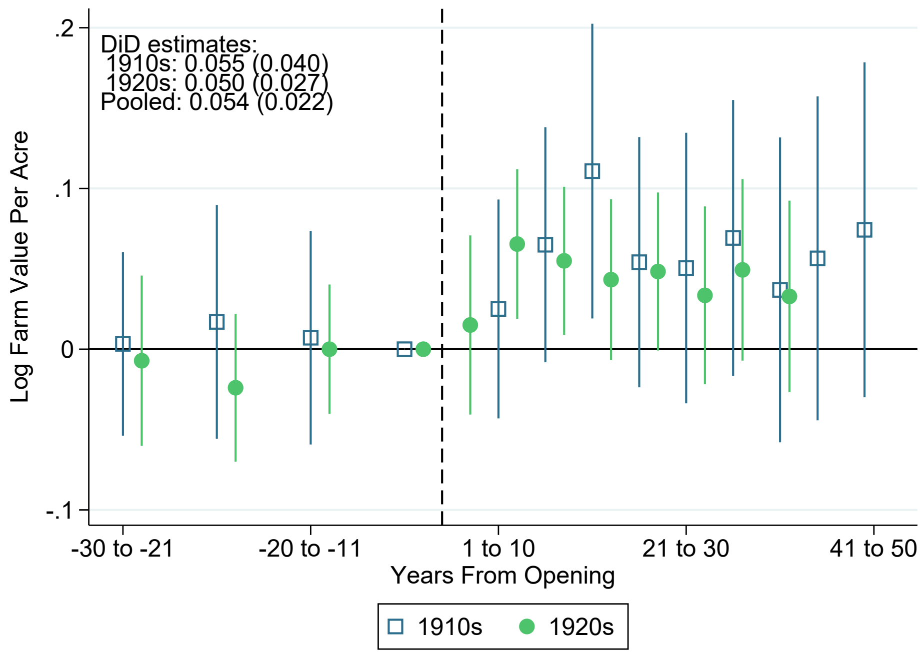
Figure 3: Effect of junior college openings on individual male occupations

(a) Farm sector (b) Non-farm sector



Note: Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 male occupation group (based on $OCC1950$) and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. separately by gender. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and labor market outcomes in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure 4: Effect of junior college openings on local farm value per acre

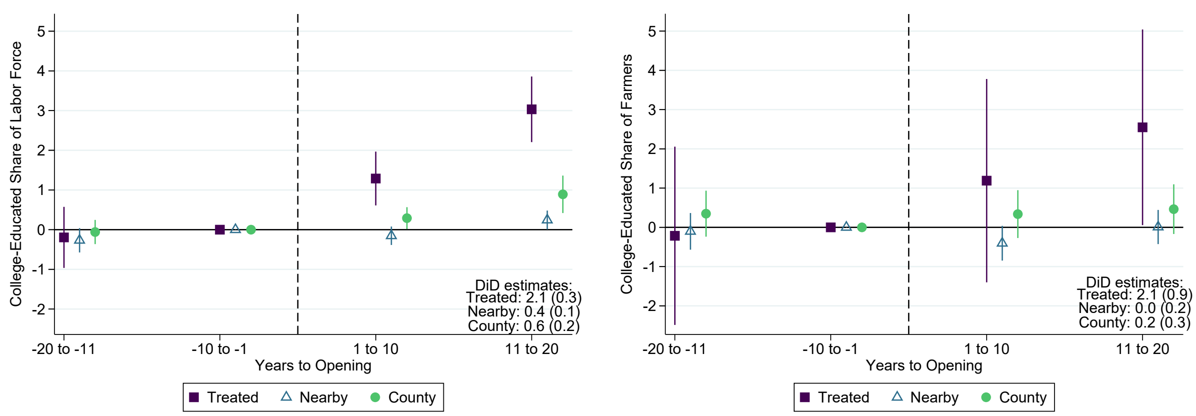


Note: Staggered difference-in difference estimates from Equation 2, where the outcome is county-level log farm value per farmland acre and treated counties have had a junior college anywhere in the county. Two-period difference-in-difference estimates include an indicator for the first 5 years after a junior college opened and the equilibrium treatment effect for later treated periods. We omit the other decade of junior colleges when estimating opening decade-specific estimates. Each estimation sample omits counties with under the 10th percentile in treated county populations in 1910 (13,462 for pooled and 14,422 for 1910s openings) and 1920 (13,705 for 1920s openings). Events are defined as the 334 counties that opened their first junior college between 1910 and 1928. Standard errors are clustered by county and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), and Haines et al. (2018).

Figure 5: Effect of junior college openings on local human capital

(a) College-educated share of prime-age men

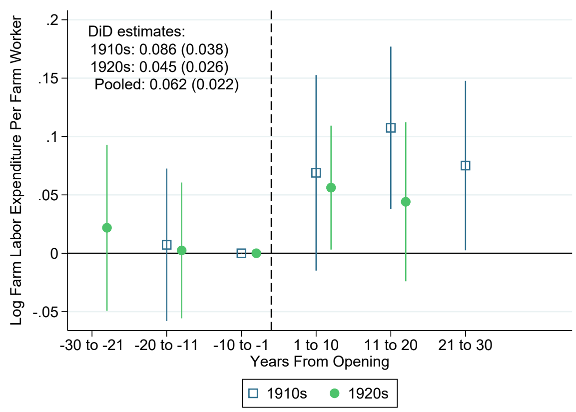
(b) College-educated share of male farmers



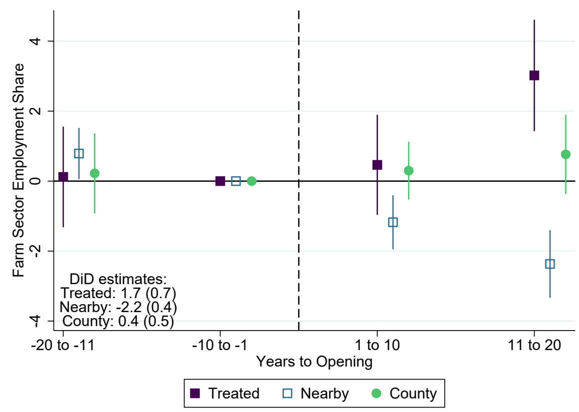
Note: Staggered difference-in difference estimates from Equation 2, where the outcome is the share of men aged 25–55 in the labor force in that town (or county) and census successfully linked to 1940 who later report in 1940 having at least 13 years of education. Panel (b) restricts to men with farmer occupations in each census. Treated towns open a junior college within two miles whereas "nearby' towns are any other town in the same county. Counties are treated by the first junior college opened. We estimate "treated" and "nearby" effects simultaneously and county-level effects separately after aggregating to that geographic level. Two-period difference-in-difference estimates the treatment effect for treated periods after junior colleges opened.. Each estimation sample omits geographic units with under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns or 323 counties that opened their first junior college between 1912 and 1928. Standard errors are clustered at the sample's level of aggregation and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Abramitzky et al. (2022), and the US Census (Ruggles et al., 2021).

Figure 6: Effect of junior college openings on local farming labor markets

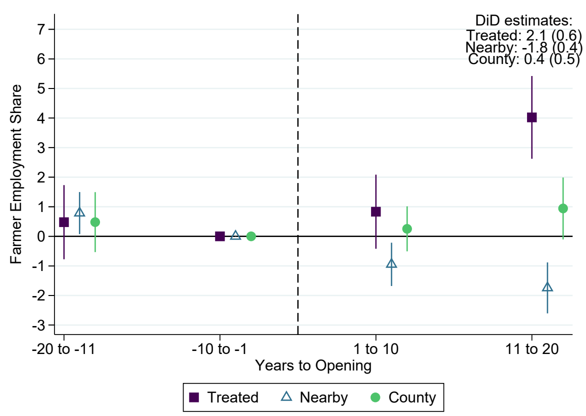
(a) Log farm wages per worker



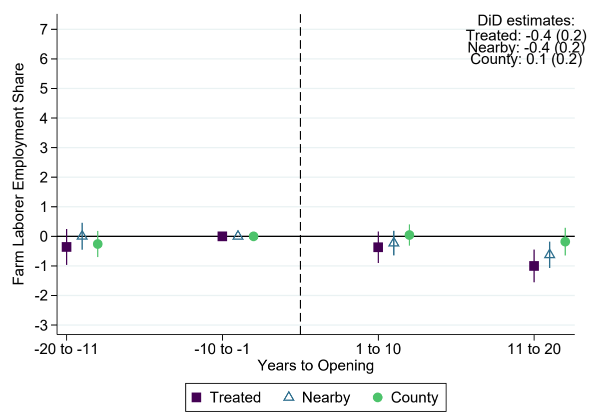
(b) Farm sector share of employment



(c) Farmer share of employment

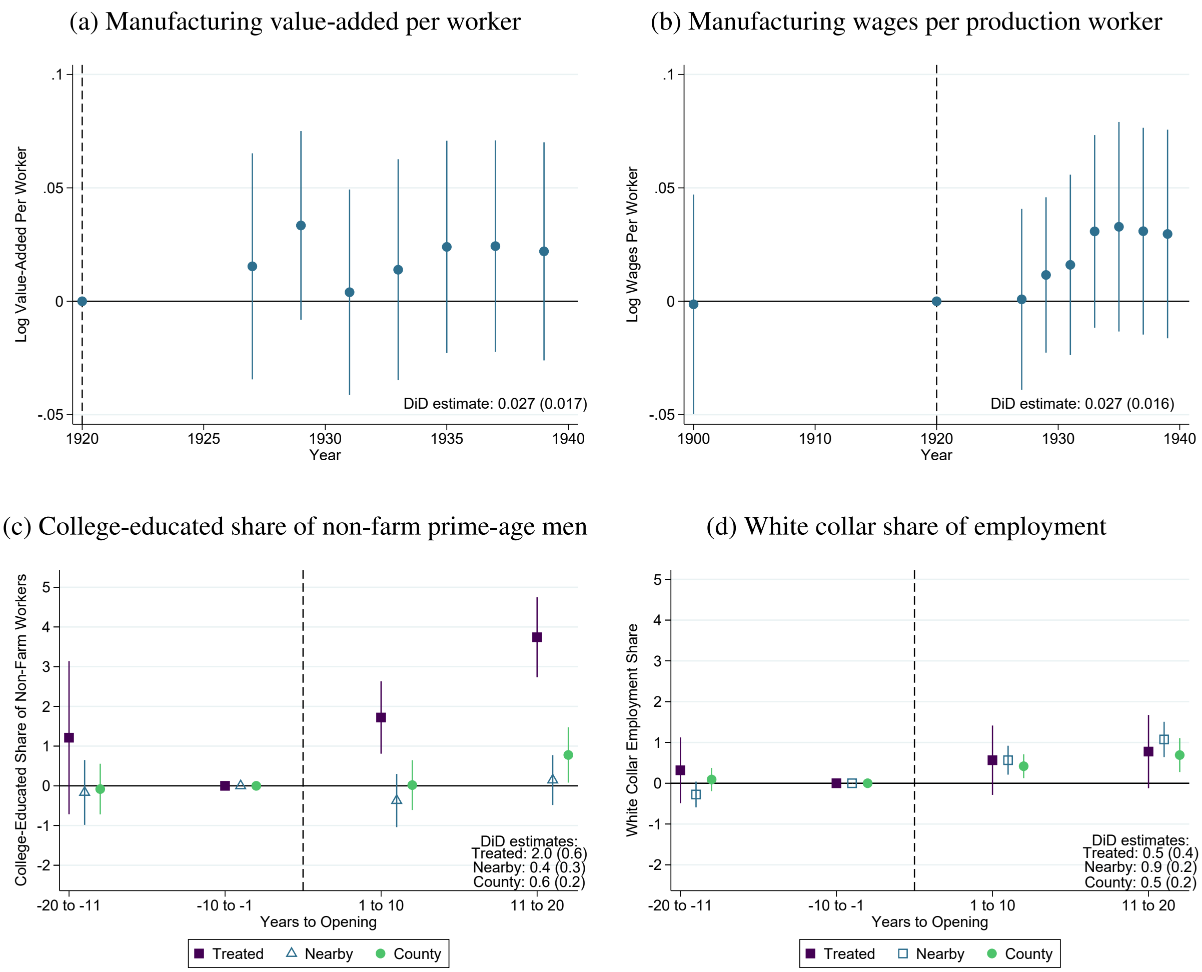


(d) Farm laborer share of employment



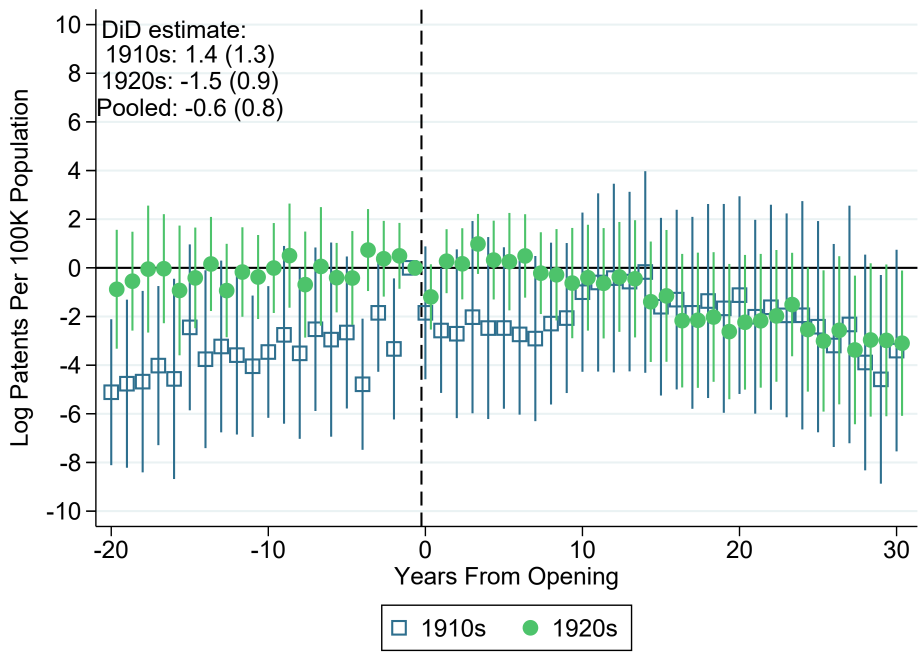
Note: Staggered difference-in difference estimates use Equation 2 with outcomes defined as follows. Panel (a): county-level log farm labor expenditures per male farm worker constructed using total farm labor expenditures excluding housework from the Census of Agriculture and total male prime-aged men reporting farmer or farm laborer occupations in the Census of Population. Panels (b)–(c) report the share of men aged 25–55 in the labor force in a town reporting any farming occupation (b), farmer occupations (c), or farm laborer occupations (c) via $OCC1950$. See Figure 4 for Panel (a) sample definitions. See Figure 5 for Panels (b), (c), and (d) sample definitions. Standard errors are clustered by county, except in the "treated" and "nearby'" town-level estimates in in (b), (c), and (d) and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Haines et al. (2018), and the US Census (Ruggles et al., 2021).

Figure 7: Effect of junior college openings on local non-farm outcomes



Note: Staggered difference-in difference estimates use Equation 2 with outcomes defined as follows. Panel (a): log manufacturing value-added per manufacturing production worker. Panel (b): county-level log manufacturing wages per manufacturing production worker . Panel (c): the share of men aged 25–55 in non-farm occupations (via OCC1950) in that town and census successfully linked to 1940 who later report in 1940 having at least 13 years of education, Panel (d): share of men aged 25–55 in a town in each Census of Population reporting a professional, manager, clerical, or sales occupation, following Katz and Margo (2014). Panels (a) and (b) use only 1920s openings and non-treated counties, omitting earlier-treated counties and those under the 10th percentile of 1920 population (13,705). See Figure 5 for Panel (c) and (d) sample definitions. See Figure 5 for Panel (d) sample definitions. Standard errors are clustered by county except for the “treated” and “nearby" town-level coefficients in (c) and (d), which cluster at the town level. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936),Haines (2010), Janas (2024), Petralia et al. (2016), Abramitzky et al. (2022), and the US Census (Ruggles et al., 2021).

Figure 8: Effect of junior college openings on county patenting



Note: Staggered difference-in difference estimates use Equation 2 with log county resident inventor patents per 100,000 population as the outcome. Population is linearly interpolated between decennial censuses. See Figure 4 for sample definitions. Standard errors are clustered by county. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), and Petralia et al. (2016).

Table 1: Town and junior college characteristics

	All	1(JC)	Open 1910s	Open 1920s	Vocational	Transfer	Public	Private
A: 1920 towns								
Overall:								
Population	2,128	4,3148	71,599	30,070	41,194	45,456	42,332	43,759
Pop $\leq$ 10,000	96.7	60.2	52.6	63.7	58.7	62.0	56.1	63.3
10,000 $<$ Pop $\leq$ 100,000	1.7	31.5	36.8	29.0	34.2	28.3	41.3	24.2
Male occupation shares:								
Other White Collar	7.8	19.2	19.8	18.9	18.8	19.7	18.3	19.9
Farmer	49.6	12.1	11.0	12.7	12.1	12.2	10.6	13.3
Clerical/Sales	3.7	11.7	11.9	11.5	11.5	11.8	11.5	11.8
Unskilled	30.7	38.0	38.5	37.7	38.6	37.2	39.3	37.0
Skilled Blue Collar	8.2	19.0	18.7	19.2	19.0	19.0	20.3	18.1
% Ages 14–18 in School	74.9	73.7	74.0	73.6	74.9	72.2	75.9	72.0
Observations	48,143	362	114	248	196	166	155	207
B: Junior colleges								
% Public		43	32	48	55	28	100	0
% No Tuition		34.2	33.3	34.6	38.7	27.2	54.9	15.0
Avg. Student-Teacher Ratio		14.1	14.7	13.8	15.4	11.4	16.7	11.6
Avg. Enrollment		175.8	263.5	143.7	219.5	104.5	227.1	128.4
% with Engineering		15.2	13.2	16.1	28.1	0 27.7	5.8	
% with Agriculture		14.9	14.0	15.3	27.6	0	27.7	5.3
% with Business		43.6	36.8	46.8	80.6	0	57.4	33.3
Observations		362	114	248	196	166	155	207

Note: Occupation shares are relative to all gainfully employed men in that town in 1920. Age 14–18 school attendance shares via $SCHOOL$ variable in 1910. Enrollment refers to total degree-seeking student enrollment, as of 1931. Terminal degree programs are as of 1938 from Eells (1941). Tuition is the earliest available, via Campbell (1931) or Greenleaf (1936), and covers nine months of schooling. Control defined by the first institution opened in a town. See Appendix A.4 for complete details Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Eells (1941), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Appendix A: Data Appendix

A.1 Junior Colleges

Measuring junior college openings requires we use contemporaneous, not retrospective lists of junior colleges. Existing datasets, such as IPEDS or HEGIS, start well after the first junior college opening boom, meaning they fail to record two-year colleges which close or change type in the interim. Since many institutions have closed or converted to four-year schools at some point in the past century, we leverage a series of directories published by the American Association of Junior Colleges beginning in 1931. We digitized Campbell (1931), Campbell (1936), Eells and Winslow (1941), Long and Sanders (1941), and Bogue and Ritter (1956). As described in Campbell (1936), for instance, these lists were included all schools that do at least some junior college-type coursework, not just those organized exclusively as two-year post-secondary institutions. Institutions could opt out of being listed if they did not feel inclusion was appropriate. In addition, these institutions did not have to be accredited to be listed, and some schools only appear after several years of being open, making the long time span of directories crucial for identifying where institutions operated before World War II.

We manually check each case where the name, town (within a state), control, open date, or coed status of an institution varies across directory years using a range of sources, e.g. university websites directories of closed colleges, and two independently constructed Department of Education publications (McDowell, 1919; Greenleaf, 1936). Within each directory, we first correct for these misspellings or other data errors, and then take the earliest institution for each town. Then we pool all four *Junior College Journal* directories with those only listed in the earlier Department of Education publications. We then keep the earliest junior college in each town.[46]

In addition, we capture schools' terminal degree program using a survey of all accredited junior colleges in 1938 by the American Association of Junior Colleges.[47] We therefore consider any school without vocational programs to be non-vocationally oriented. There are seven types of specialized terminal curricula: fine arts, engineering, technical training, public service, health services, agricultural, and business, and a seventh option for those intending to leave college after two years with a more general degree. We hand match these degree offerings to the 1941 Junior College Directory and then to the list of junior college openings. Figure A-3 shows cross-state variation in the availability of terminal degree programs at junior colleges.

A.2 Four-Year Colleges

We also record the location of every four-year college open in this time period using the 1923, 1928, 1933, 1939, and 1947 editions of the *College Blue Book*. These directories list the name

[46] We drop observations which claim a pre-1900 junior college in some, but not all, records. As noted in Campbell (1931), it is unlikely these inconsistently recorded institutions were junior colleges before the beginning of the junior college movement.

[47] The survey asked all accredited institutions about the types of terminal degree programs offered. The association conducted extensive follow-ups from 1938 to 1941 with any non-responding accredited institution (Eells, 1941). If necessary, they obtained the institution's most recent course catalog and filled out the survey on the school's behalf. We view the resulting list of program offerings as complete for accredited schools existing in the late 1930s into the early 1940s. However, surveys note the existence of these types of programs by 1920 (Koos, 1924). The vocational share of coursework was stable across case studies conducted between 1921 and 1938 (Eells, 1941).

and location of every college operating in the United States in that year. We transform this 24-year window of repeated cross-sections into a list of towns which ever receive a college before 1940, our key measure of four-year college exposure, factoring in college changes in names and locations. Specifically, we hand-link each college to the locational database described in Appendix A.3, and then define treatment based on the earliest founding year within each town. So long as a town ever receives a college before 1940, we consider that town to have a four-year college in our dataset.

A.3 Mapping College Openings

We measure youths' exposure to early junior college openings using their place of residence in the restricted use version of their childhood census. We assign latitude and longitude for these towns by combining two NHGIS data products for each census: contemporary county boundaries and the Census Bureau's list of geocoded incorporated places (Manson et al., 2024).[48].

We take these state-county-town triplets to each census wave using their state, county and place of residence ($STDCITY$) in the restricted use versions of these variables. There is no population minimum associated with this town variable, $STDCITY$ unlike the public-use version. Next, we manually correct for misspellings and errors in county boundaries. When there is no geocode assigned to a $STDCITY$-county-state triplet, we use GeoHack to assign latitudes and longitude. Then, for those households without an associated town string, we use the place assigned to them by the Census Place Project, which algorithmically assigns a location name and latitude/longitude (Berkes et al., 2023). Finally, we use our latitudes and longitudes to differentiate between places which span multiple counties within a state and place names which repeat within a state. This yields a list of geo-referenced distinct places within each census wave.[49]

In order to stack census waves in our analysis, we must also harmonize the locations enumerated in each. That is, we must address changes in town names and annexations occurring between census waves which would otherwise induce false place name match failures over time. We build crosswalks between each census wave and the 1920 list of locations by 1) exact spatial matching using latitude and longitude and 2) finding the nearest 1920 location to each unmatched location.

We do a similar procedure to assign latitudes and longitudes for our list of colleges, again privileging 1920 NHGIS and supplemental GeoHack locations over the Census Place Project 1920 data. With these georeferenced junior colleges in hand, we spatially merge college locations to 1920 census-based unique location identifiers used across each census wave. We define junior college access based on whether town centroids are within two miles of a junior college town centroid to adjust for any potential noise in the spatial merge and any nearby commuters.

[48]This list assigns spatial coordinates to each incorporated place contemporarily listed by the Census Bureau for each census

[49]We prefer this iterative procedure to the pre-built Census Place Project Version 2.0 crosswalks because the latter assigns the same latitude and longitude to every place name within a state in all censuses if there is an incorporated city with that name, despite the presence of repeat names. For instance, San Jose Township in Los Angeles County, California is assigned the latitude and longitude of San Jose City in Santa Clara County, California. To avoid this sort of guesswork, we leverage the information collected within each census to distinguish these communities where possible.

A.4 Aggregate Junior College Enrollment

Figure 1 displays US two-year college enrollment over its first half-century. This variable differs from the series in Carter et al. (2006), for instance, by calculating the two year college share of first-time full-time college enrollment. Where possible, we use *120 Years of American Education: A Statistical Portrait* Table 24 (see this link. We grow this first-time enrollee series backward using several earlier publications, adjusting for level differences with wedges calculated when series overlap. Before 1931, we digitize two-year college enrollment from the 1944/46 Digest of Educational Statistics Table 3 and McDowell (1919) on junior colleges (for 1914-15 and 1915-16), available through here and here, respectively.

Appendix B: Census Linking Balance

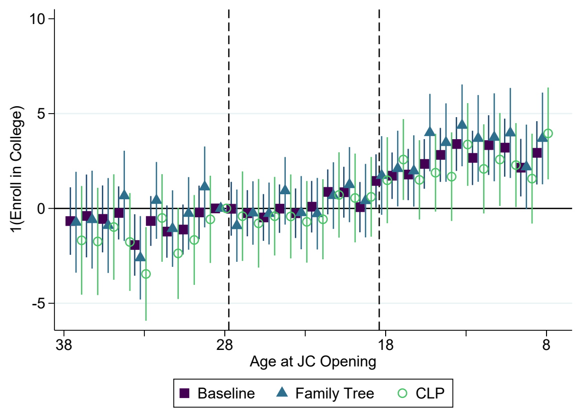
Table BB-1: Census linking balance table

	(1) Male	(2) Age	(3) Black	(4) Urban	(5) W/S Income	(6) 1(Own)	(7) Occscore
A. Baseline							
1(Matched)	15.09	1.38	-4.77	-2.83	308.96	0.16	3.67
	(0.0)	(0.0)	(0.0)	(0.0)	(1.2)	(0.0)	(0.0)
Constant	47.51	37.75	9.94	60.52	1021.43	41.75	13.87
	(0.0)	(0.0)	(0.0)	(0.0)	(0.2)	(0.0)	(0.0)
B: Weighted							
1(Matched)	-1.495	-0.0285	0.252	0.272	96.61	-2.703	0.162
	(0.0207)	(0.00478)	(0.0183)	(0.0203)	(0.511)	(0.0205)	(0.00538)
Constant	47.51	37.75	9.942	60.52	1021.4	41.75	13.87
	(0.00669)	(0.00141)	(0.00401)	(0.00655)	(0.166)	(0.00661)	(0.00185)
Mean	50.1	38.0	9.1	60.0	1079.5	41.8	14.5
N	66,949,833	66,949,833	66,949,833	66,949,833	66,949,833	66,949,833	66,949,833

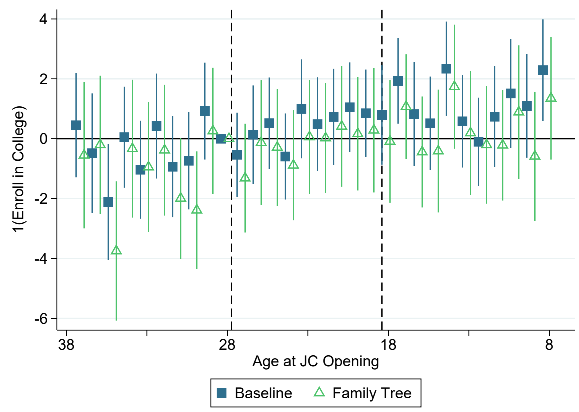
Note: Our linked sample is positively selected from the 1940 population overall but differences fall when we re-weight the sample to be more representative. Each cell in this table displays the result of a regression of a 1940 outcome on an indicator which is 1 if a person is in our linked sample. Binary outcomes are multiplied by 100 for ease of interpretation. The estimation sample here includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 censuses, the 1902-1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses. Panel B re-weights the sample to make the linked sample representative based on race, region, occupation group, reporting being ever married, sex, living in a different state than state of birth, 10-year age bins, and urban status in 1940, following Ward (2023). Source: Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Figure BB-1: Effects of junior college openings on college enrollment using alternative census linking strategies

(a) Men



(b) Women



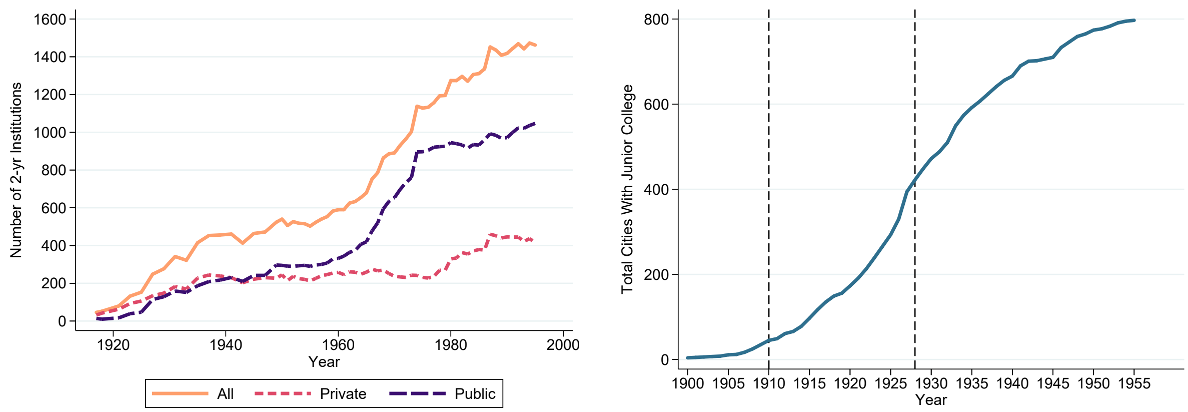
Note: Changing the linkage method does not alter our baseline college enrollment estimates for men or women.: Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for reporting (a) at least 13 years of education, (b) 13–15 year of education, or (c) at least 16 years of education, estimating separate β for male and female students in a pooled sample. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. separately by gender. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Census linking methods defined using Census Tree-provided indicators. Women do not appear in the Census Linking Project. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Other Appendix Figures and Tables

Figure A-1: Number of junior colleges in the US

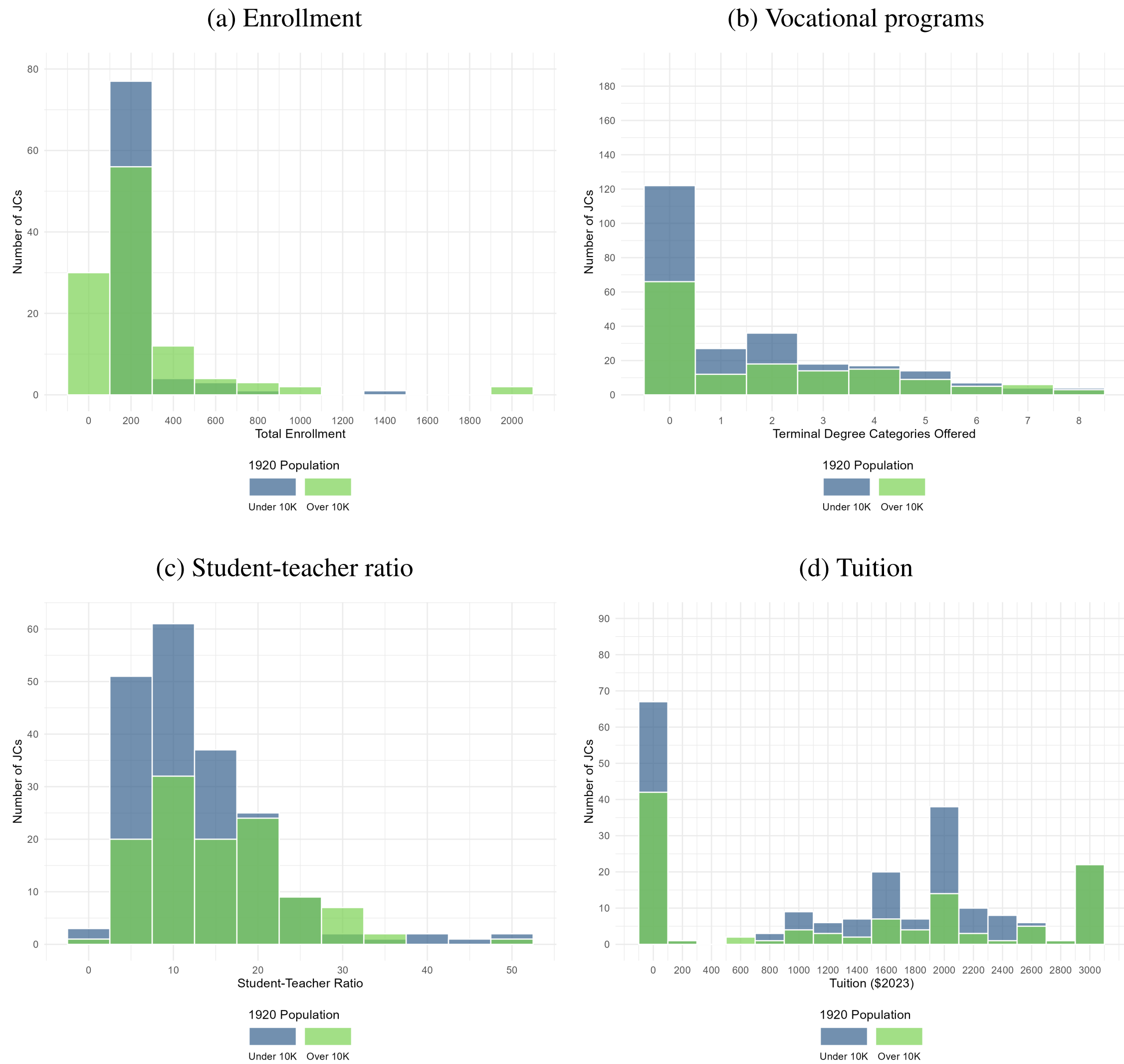
(a) Total colleges by control

(b) Towns with a junior college



Note: This figure demonstrates the rapid pace of two-year college expansion by control and location over time. We plot the number of two-year colleges in the United States by control and year in (a), and the number of incorporated cities with at least one junior college by year in (b). Dotted lines in (b) indicate the period of junior college openings leveraged in our baseline event study analysis. Source: Historical Statistics of the United States, Junior College Journal Directories, McDowell (1919), and Greenleaf (1936).

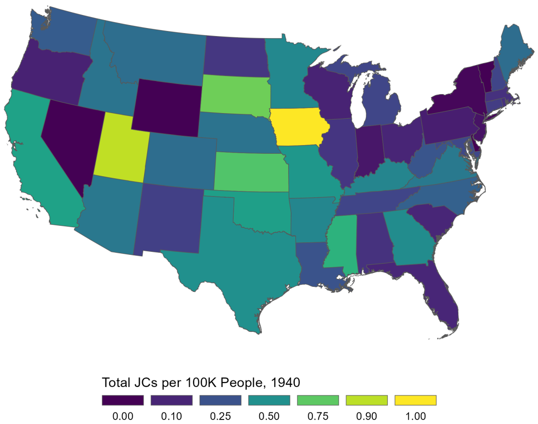
Figure A-2: Institutional characteristics by 1920 town population



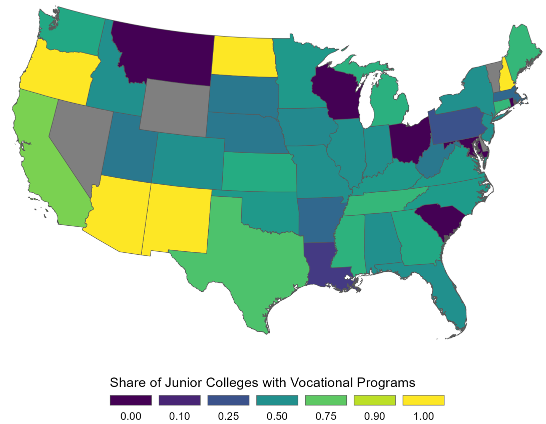
Note: School quality measures overlap based on town size. All characteristics are of the first junior college opened in a town, measured in 1931 except terminal degree programs (1938) and student-teacher ratios (1936). Tuition winsorized at $3,000 (44 schools), enrollment winsorized at 2,000 (2 schools), and student-teacher ratios winsorized at 50 students per teacher (2 schools). Source: Campbell (1931), Campbell (1936), Greenleaf (1936), Eells (1941) and the US Census (Ruggles et al., 2021).

Figure A-3: 1940 Regional variation in the availability of US junior colleges

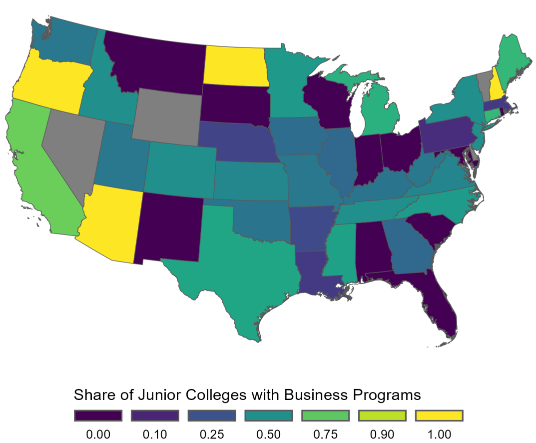
(a) JCs per capita



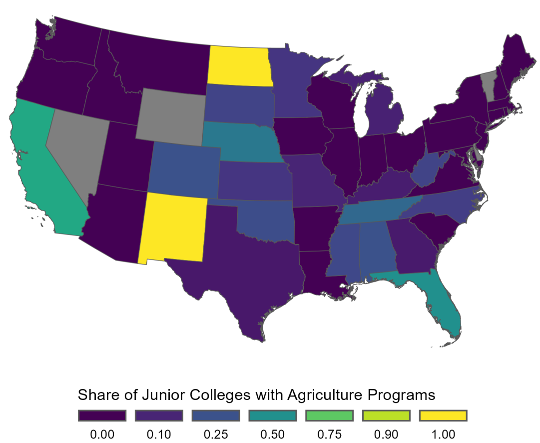
(b) Share JCs with any vocational degrees



(c) Share JCs with business degrees

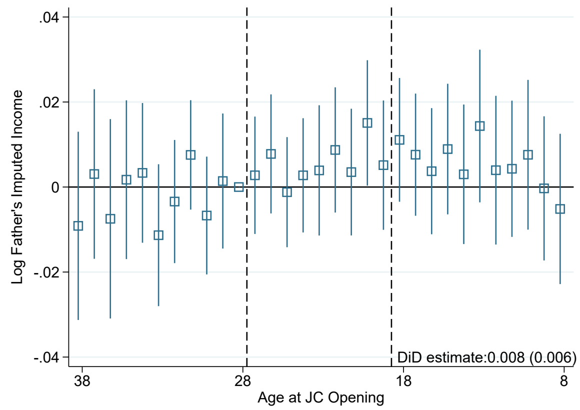


(d) Share JCs with agriculture degrees



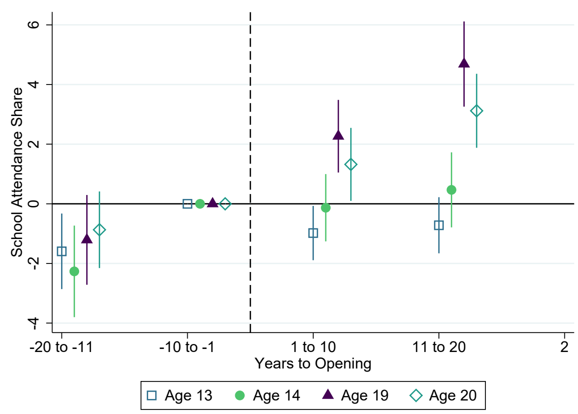
Note: Junior colleges were widespread in the South, Plains and West, especially when considering vocational degree programs. Choropleths showing the per-capita density of junior colleges by US state in 1940 (a) and the share of junior colleges in each state that offered terminal, agriculture, and business degrees in 1940. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Eells (1941), and state populations via FRED.

Figure A-4: Effects of junior college openings on father's imputed income



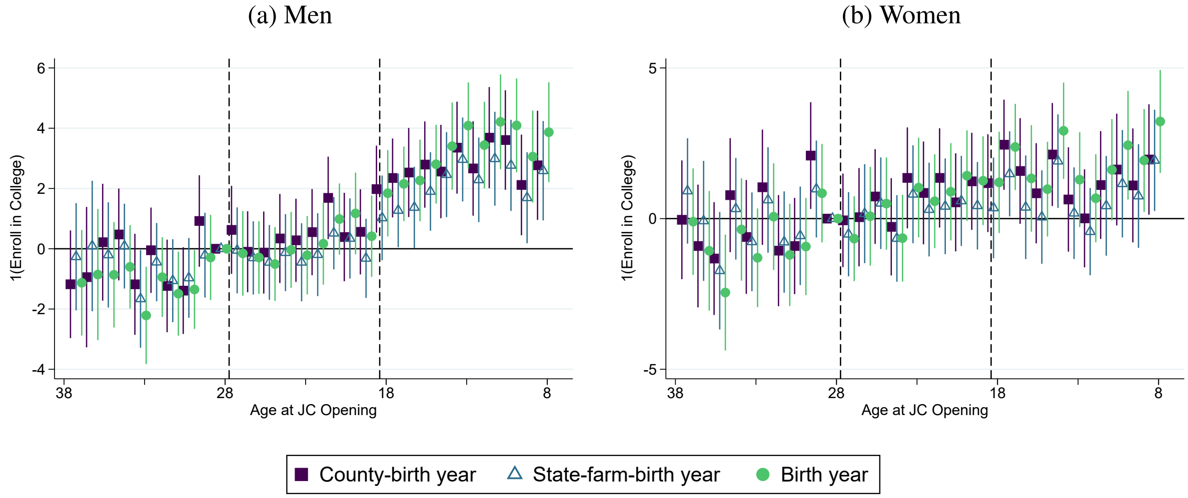
Note: Father's imputed incomes do not change across junior college openings. Staggered difference-in-difference estimates from Equation 1 where the outcome is log imputed parental income. All imputed incomes derived from a LASSO predicted 1950 total income return to male workers' work given their occupation, industry, geography, farm status, self-employment status, and race. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town and parental status in the earlier census. The sample includes all male household heads living in towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-5: Effect of junior college openings on school attendance by age



Note: School attendance does not increase among those entering high school after junior college but it does among young adults who likely were old enough to have completed high school. Staggered difference-in difference estimates from Equation 2, where the outcome variable is the share of people at a specific age in a town in a given census reporting that they are currently attending school ($SCHOOL$). The estimation sample omits towns with populations under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), and the US Census (Ruggles et al., 2021).

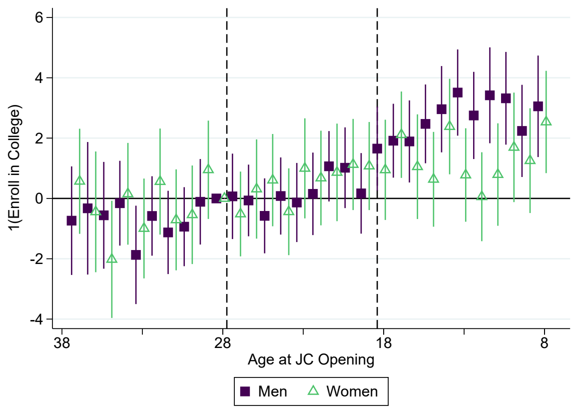
Figure A-6: Effects of junior college openings on college enrollment using alternative cohort fixed effects



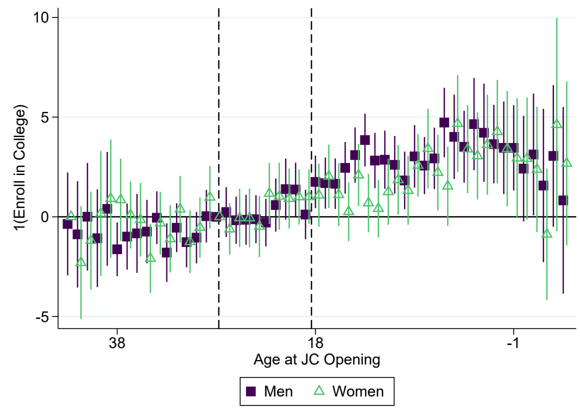
Note: Changing our cohort fixed effects does not alter our baseline estimates of the effect of junior college openings on whether men report college enrollment. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 male completion of at least 13 years of schooling. We switch here to alternative cohort fixed effects using either birth year or childhood state of residence-farm residence-birth year triplet fixed effects instead of our baseline childhood state of residence-birth year dyad fixed effects. . The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and labor market outcomes in the later Census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-7: Alternative specifications of effects of junior college openings on individual college enrollment

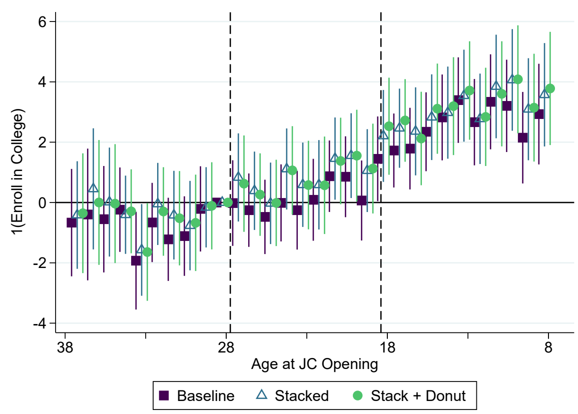
(a) Omitting towns with four-year colleges



(b) Longer unbalanced event window

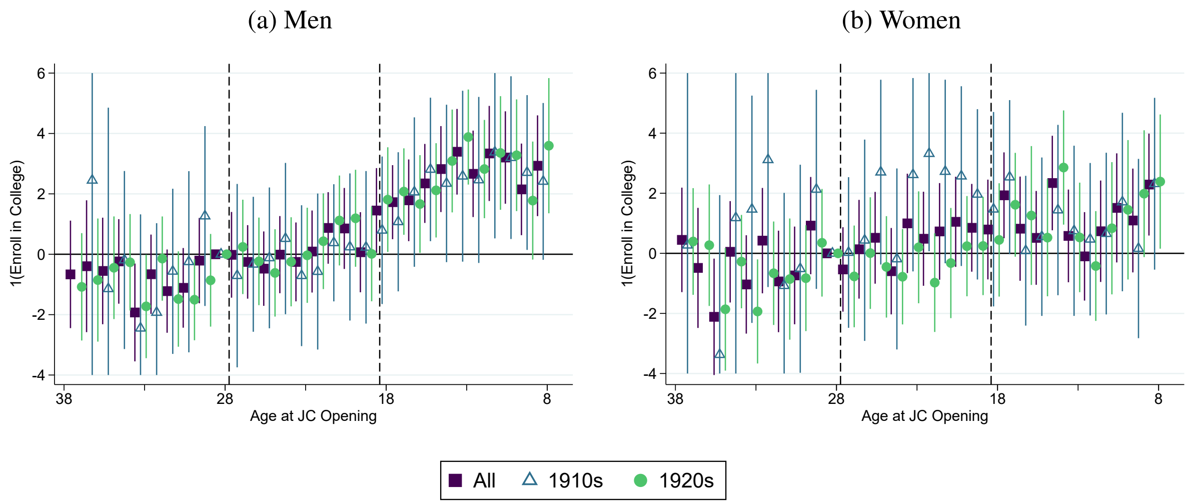


(c) Stacked difference-in-difference estimator



Note: This figure shows our baseline results are robust to omitting towns with four-year colleges, which are the most likely to experience diversion. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 completion of at least 13 years of schooling for men only. Panel (a) drops all towns with at least one college in the 1922 College Blue Book. Panel (b) extends our event estimation to be 25 years before or after the junior college opens, which is not balanced outside of the ages 8 to 28 time period. Panel (c) uses our baseline sample (stacks) or drops towns between 2 and 5 miles from a junior college (donut) using the Cengiz et al. (2019) stacked estimator. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and labor market outcomes in the later Census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), 1922 College Blue Book, Price et al. (2021), and the US Census (Ruggles et al., 2021).

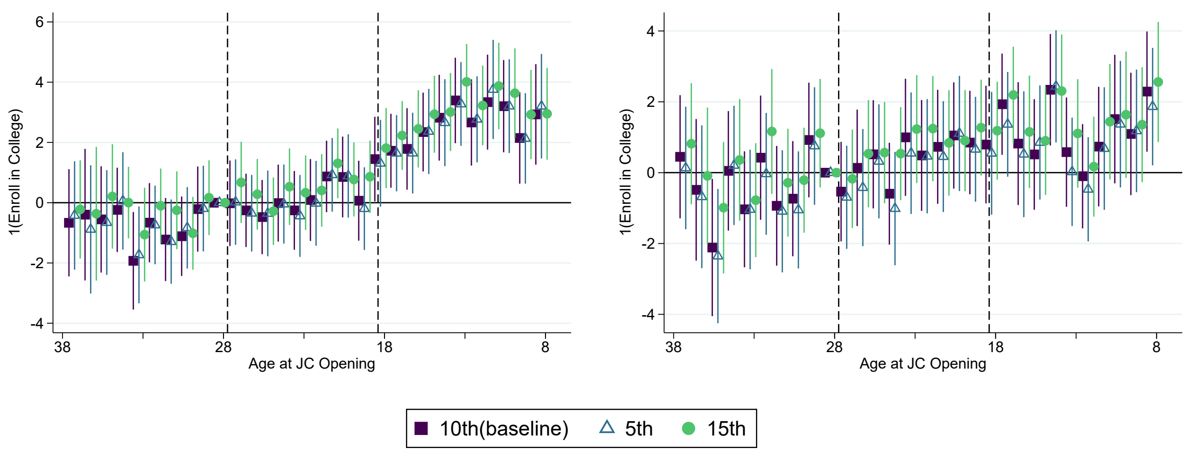
Figure A-8: College enrollment effects of junior college openings with treatment timing heterogeneity



Note: We separately estimate treatment effects by junior college openings and find that female enrollment effects are higher variance in the earlier decade, perhaps due to fewer events, fewer observations, or noisier effects. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 completion of at least 13 years of schooling are presented using all 1912–28 openings (baseline), and then separately by decade. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals (truncated at the y-axis minima and maxima). Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

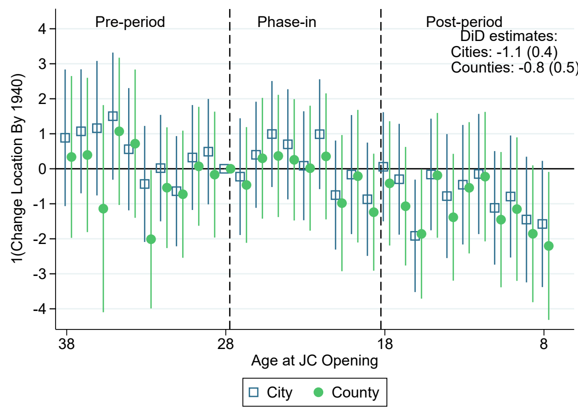
Figure A-9: College enrollment effects of junior college openings with different population size thresholds

(a) Men (b) Women



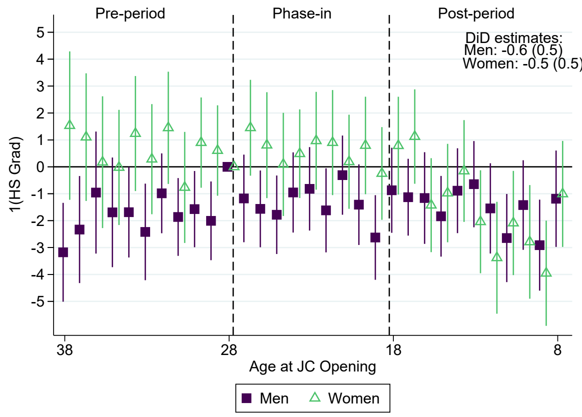
Note: Changing our 1910 population percentile threshold from the 10th percentile of treated towns to other thresholds does not alter our baseline college enrollment effects . Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 completion of at least 13 years of schooling are presented varying the minimum 1910 population required for inclusion: the 10th percentile of treated towns (baseline), the 5th, and the 15th. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1 linked observation in each birth cohort and meeting the given population threshold, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-10: Migration effects of junior college openings



Note: Junior college exposure increased the probability men remained near their childhood location in 1940. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 location, either whether it is the same as each individual's childhood census location. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-11: High school graduation effects of junior college openings

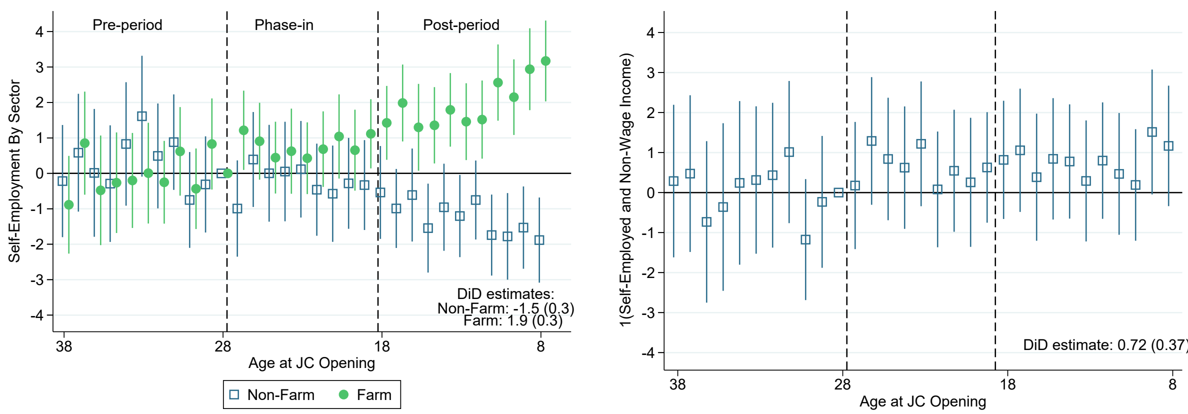


Note: Junior college exposure did not increase high school graduation rates. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for whether an individual completed at least 12 years of education by the 1940 census. Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-12: Effects of junior college openings on male self-employment

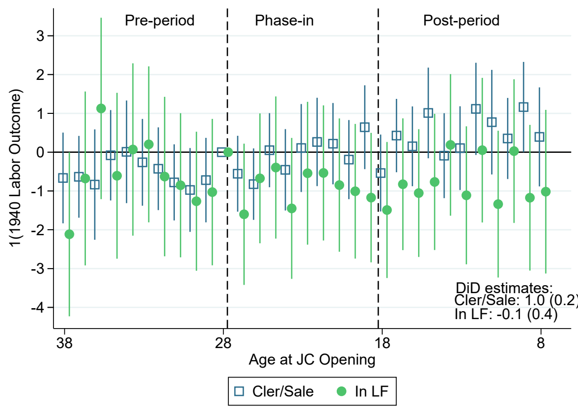
(a) 1(Self-employed) by sector

(b) 1(Self-employed and report non-wage income)



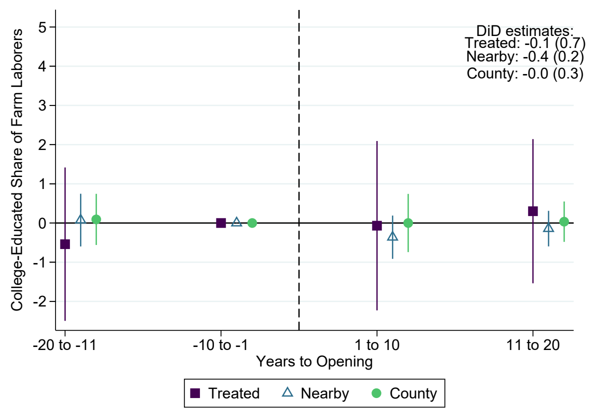
Note: Junior college openings changed the composition of self-employment and increased the reporting of non-wage earnings by the self-employed, limiting our ability to capture individual returns to education. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 male self employment (defined using $CLASSWKR$) either interacted with an indicator for reporting being a farmer versus not (from $OCC1950$) (a) or an indicator for reporting at least $50 of non-wage and salary income in 1940 ($INCNONWG$). Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and labor market outcomes in the later Census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-13: Female labor market effects of junior college openings



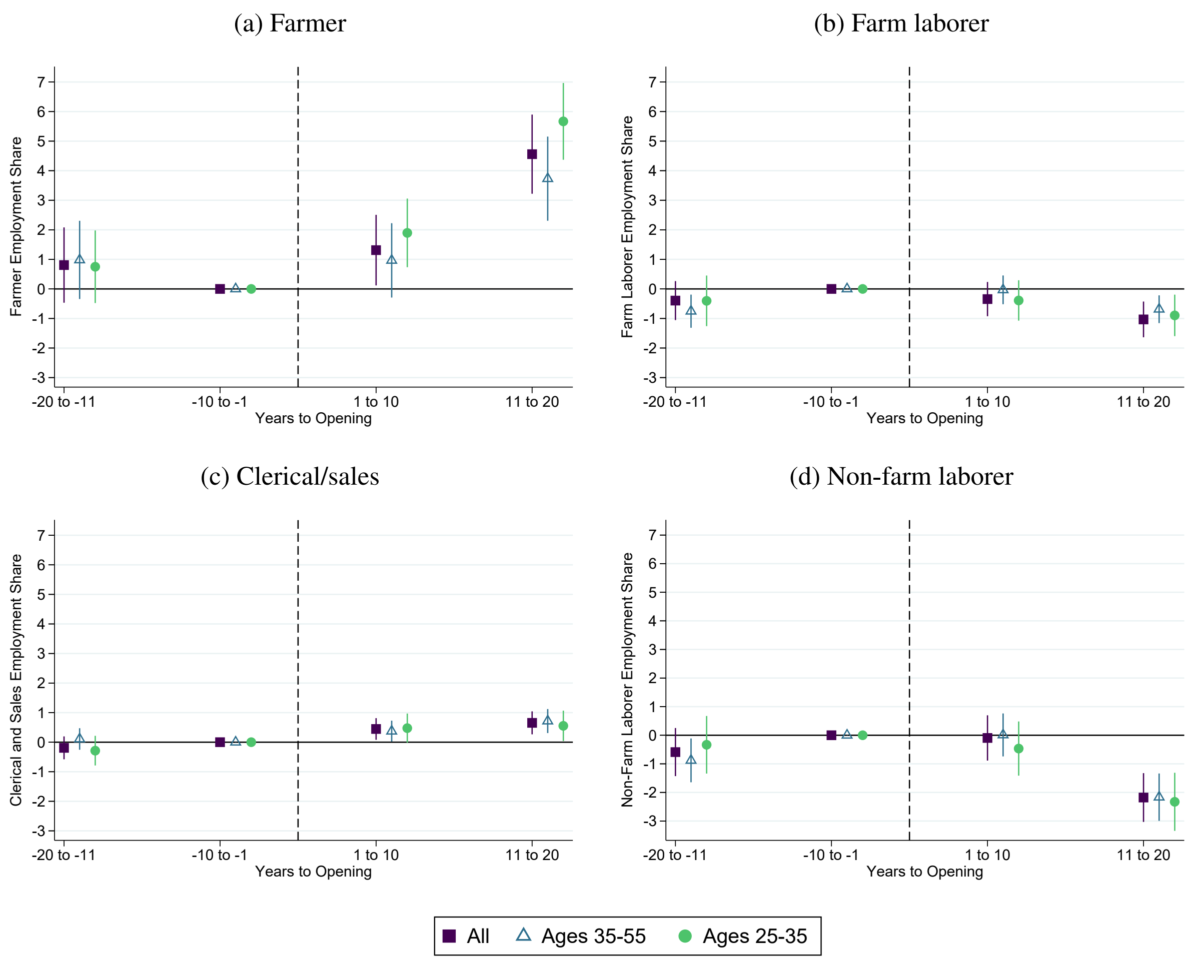
Note:: Junior college exposure increased female employment in clerical/sales work but did not induce widespread changes in female labor force participation. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for 1940 labor marker participation ($LABFORCE$) or occupation ($OCC1950$). Two-period difference-in-difference estimates include an indicator for the phase in between ages 19 and 30 and treatment effect for those 18 or younger when a junior college opens in a town. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and labor market outcomes in the later Census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021).

Figure A-14: Effect of junior college openings on farm laborer human capital



Note: There are no detectable effects on farm laborers' college enrollment anywhere in counties receiving junior colleges. Staggered difference-in difference estimates from Equation 2, where the outcome is the share of men aged 25–55 reporting farm laborer occupations in that town (or county) and census successfully linked to 1940 who later report in 1940 having at least 13 years of education. Treated towns open a junior college within two miles whereas "nearby' towns are any other town in the same county. Counties are treated by the first junior college opened. We estimate "treated" and "nearby" effects simultaneously and county-level effects separately after aggregating to that geographic level. Two-period difference-in-difference estimates the treatment effect for treated periods after junior colleges opened. Each estimation sample omits geographic units with under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns (334 counties) that opened their first junior college between 1912(1910) and 1928. Standard errors are clustered by town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010) Abramitzky et al. (2022), and the US Census (Ruggles et al., 2021).

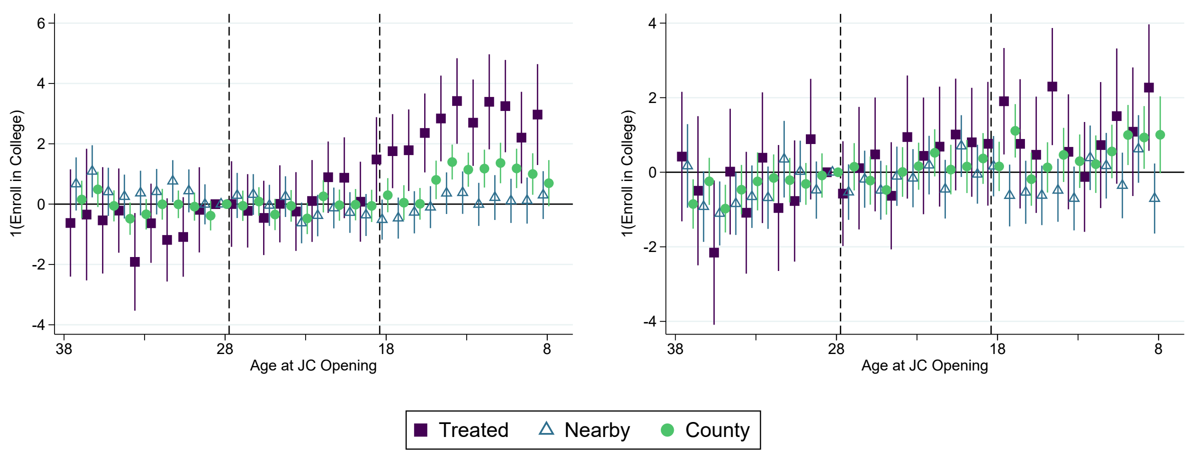
Figure A-15: Effect of junior college openings on town employment shares by age group



Note: Town-level employment effects are larger and occur earlier among younger men. Staggered difference-in difference estimates use Equation 2 where the outcome for each panel is the share of men aged 25–55 in the labor force in each town reporting each occupation group (‘all") or separately by age group. The sample omits towns with under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Haines et al. (2018), and the US Census (Ruggles et al., 2021).

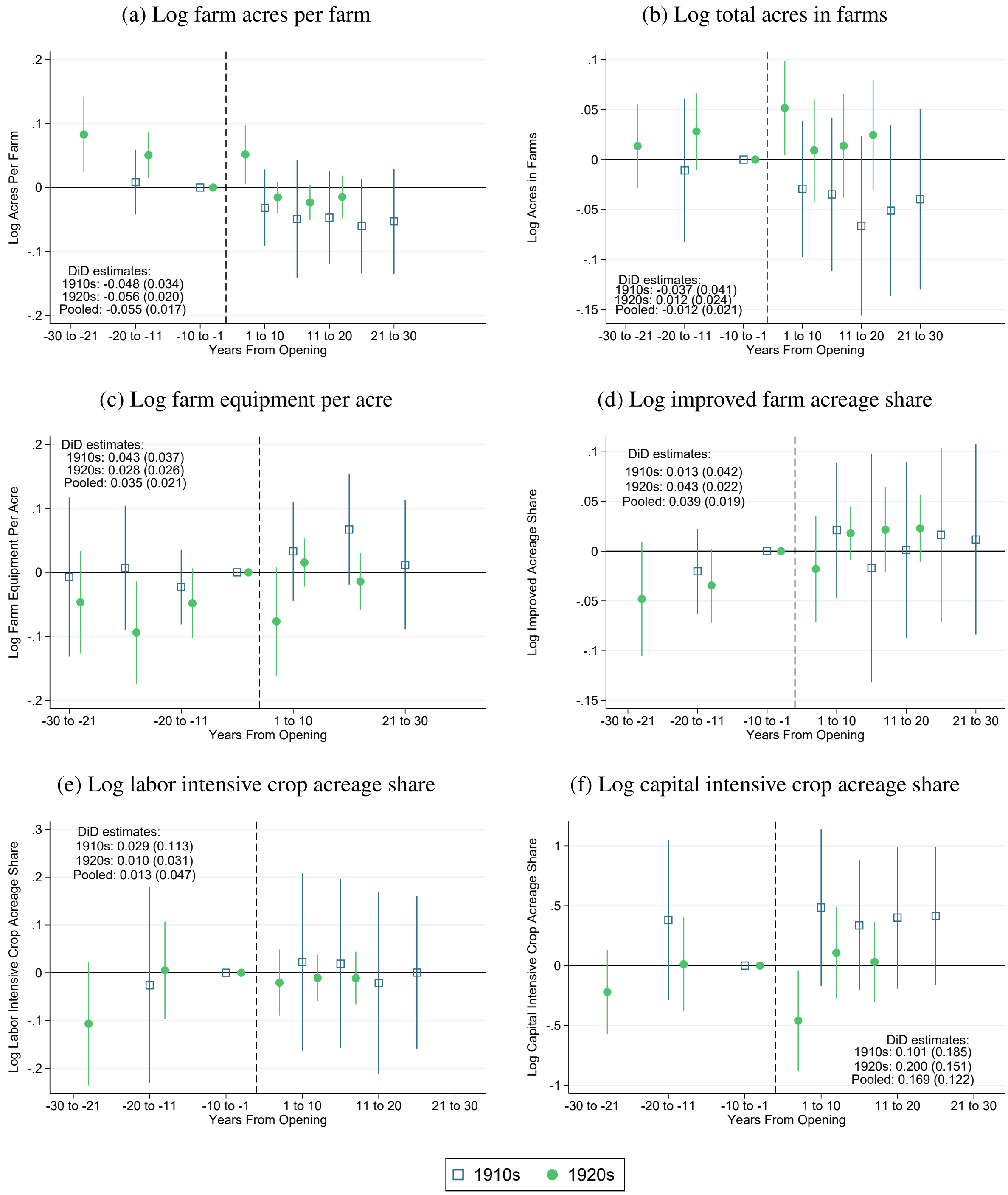
Figure A-16: Effect of local junior college openings on college enrollment

(a) Men (b) Women



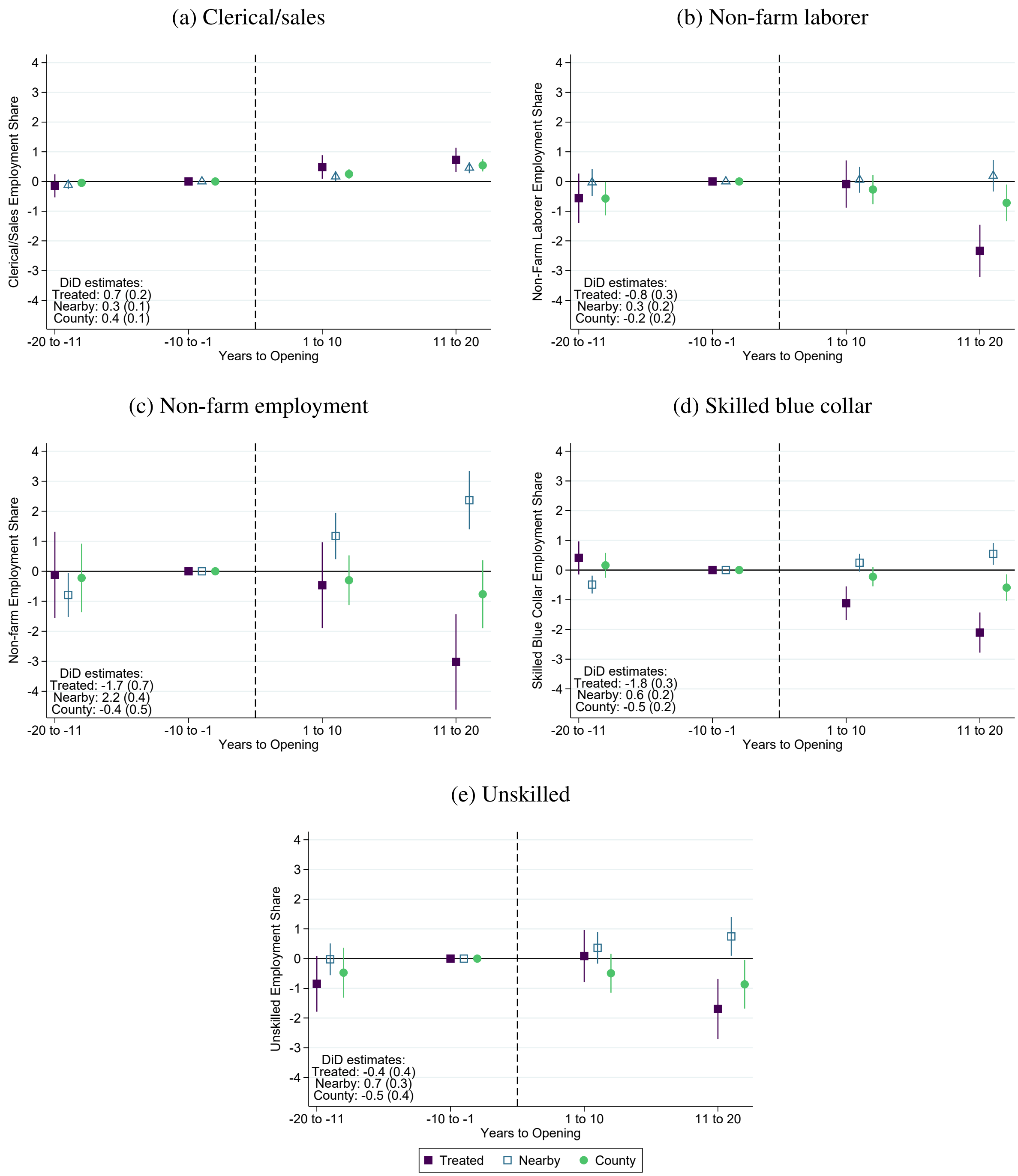
Note: College enrollment effects are slightly attenuated (though consistent with the baseline) when using county-level variation but college enrollment effects for youths living elsewhere in the county are near zero. Staggered difference-in-difference estimates from Equation 1 where the outcome is an indicator for reporting at least 13 years of education. Treated towns open a junior college within two miles whereas "nearby' towns are any other town in the same county. Counties are treated by the first junior college opened. We estimate "treated" and "nearby" effects simultaneously and county-level effects separately after aggregating to that geographic level. Each estimation sample omits geographic units with under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns (334 counties) that opened their first junior college between 1912(1910) and 1928. Standard errors are clustered by the level of geographic aggregation and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), and the US Census (Ruggles et al., 2021).

Figure A-17: Effect of junior college openings on other agricultural outcomes



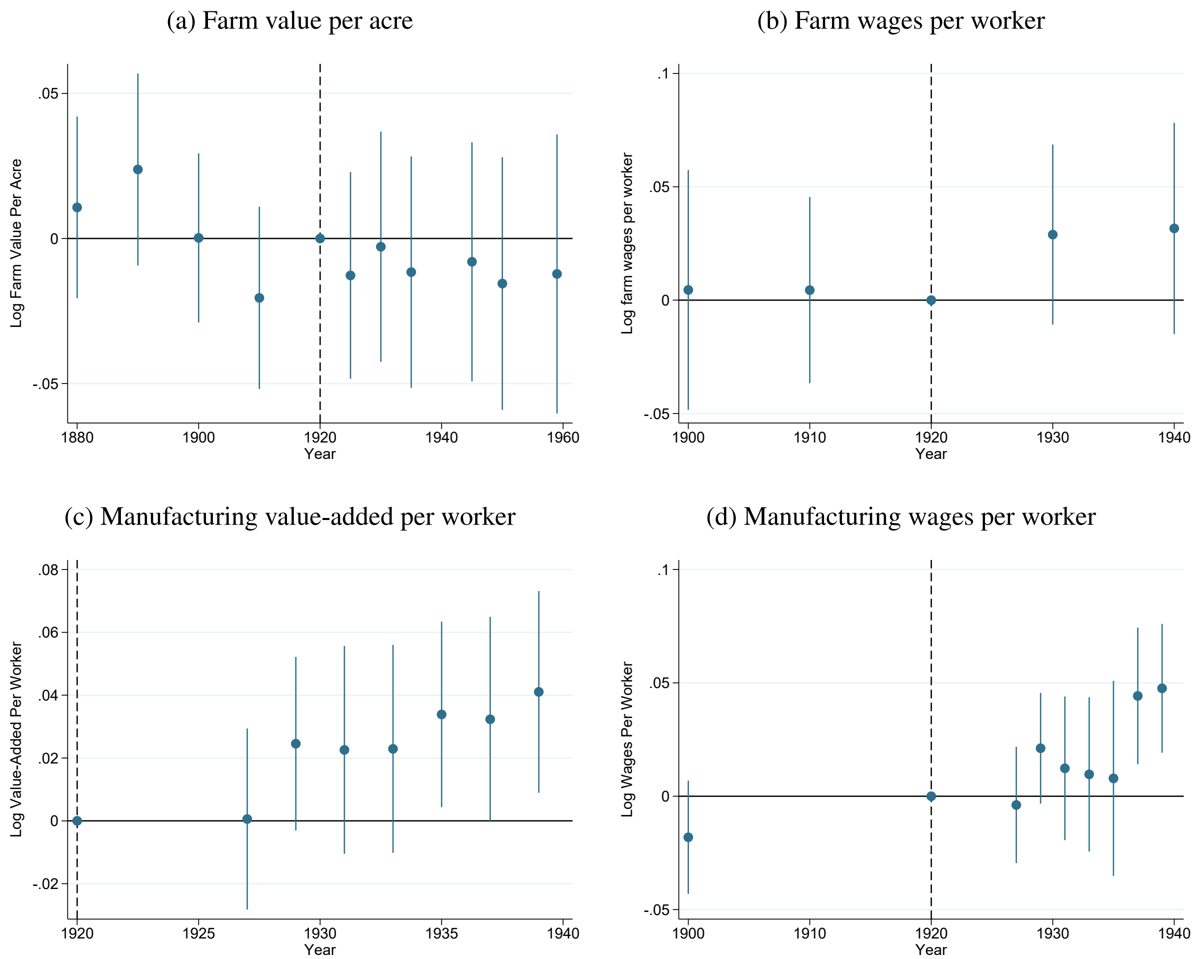
Note: Other aspects of farm production did not change at the same time as junior college openings. Staggered difference-in difference estimates from Equation 2, where the outcomes are as follows. Panel (a) total acres in farms/total farms. Panel (b): Total acres in farms. Panel (c) log farm equipment (or implements and machinery)/total acres in farms. Panel (d): Total improved acres (or cropland after 1920)/total acres in farms. Panel (e): Hay and corn acreage/total acres in farms. Panel (f) wheat acreage/ total acres in farms. The last two follow definitions in Abramitzky et al. (2023). Two-period difference-in-difference estimates include an indicator for the first 5 years after a junior college opened and the equilibrium treatment effect for later treated periods. We omit the other decade of junior colleges when estimating opening decade-specific estimates. Each estimation sample omits counties with under the 10th percentile in treated county populations in 1910 (13,462 for pooled and 14,422 for 1910s openings) and 1920 (13,705 for 1920s openings). Events are defined as the 334 counties that opened their first junior college between 1910 and 1928. Standard errors are clustered by county and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), and Haines et al. (2018).

Figure A-18: Effect of junior college openings on non-farm employment shares



Note: Junior college and nearby places' middle-skilled employment shares both increased after junior college openings, with the latter also experiencing a rise in other non-farm employment. Staggered difference-in difference estimates use Equation 2 where the outcome for each panel is the share of men aged 25–55 in the labor force in each town reporting each occupation category (via $OCC1950$) where (c) includes all farmer and non-farmer occupations, and Panels (d), and (e) reflect the two other mutually exclusive non-farm categories besides white collar(Katz and Margo, 2014). Panel (a) is a subset of (d) and Panel (b) is a subset of white collar. Treated towns open a junior college within two miles whereas "nearby' towns are any other town in the same county. Counties are treated by the first junior college opened. We estimate "treated" and "nearby" effects simultaneously and county-level effects separately after aggregating to that geographic level. Each estimation sample omits geographic units with under the 10th percentile in treated populations in 1910 or appearing in fewer than 4 census waves. Events are defined as the 302 towns (334 counties) that opened their first junior college between 1912(1910) and 1928. Standard errors are clustered by level of geographic aggregation and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Haines et al. (2018), and the US Census (Ruggles et al., 2021).

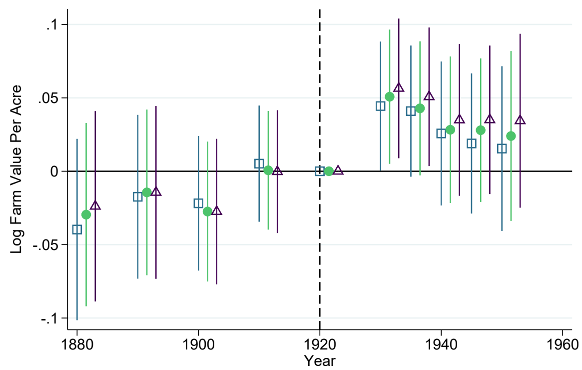
Figure A-19: Effect of existing four-year colleges on local productivity and wages



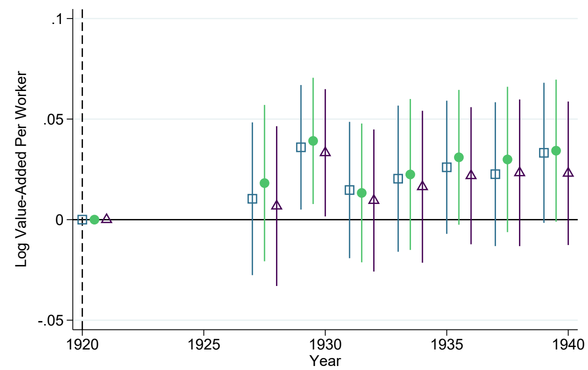
Note: We do not replicate our baseline junior college opening-based productivity and wage effects when using existing four-year college locations as our definition of treatment. Staggered difference-in difference county-level estimates from Equation 2, where the treatment is having a four-year college anywhere in the county instead of a junior college, omitting 1920 as the placebo treatment year. Panel (a) log farm value per farmland acre. Panel (b): log farm labor expendiures (exclusing housework) per male farm sector worker (which requires decennial population data). Panel (c): log manufacturing value-added per manufacturing production worker. Panel (d): county-level log manufacturing wages per manufacturing production worker. The estimation sample matches our baseline, omitting counties with under the 10th percentile in treated county populations in 1920 (13,705 for 1920s openings), as well as counties with 1910s or 1920s junior college openings. Standard errors are clustered by county and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Haines et al. (2018), Janas (2024), College Blue Books and the US Census (Ruggles et al., 2021).

Figure A-20: Alternative population threshold choices and local productivity and wages

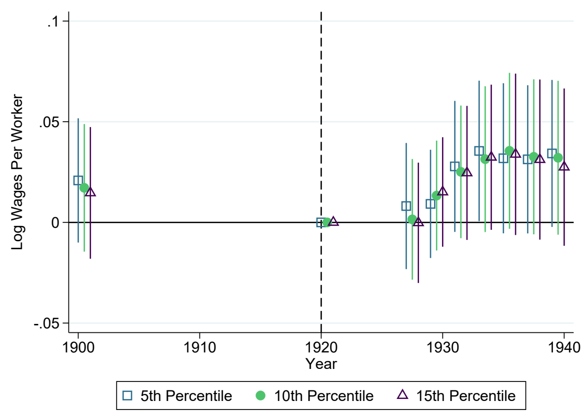
(a) Farm value per acre



(b) Manufacturing value-added per worker



(c) Manufacturing wages per worker

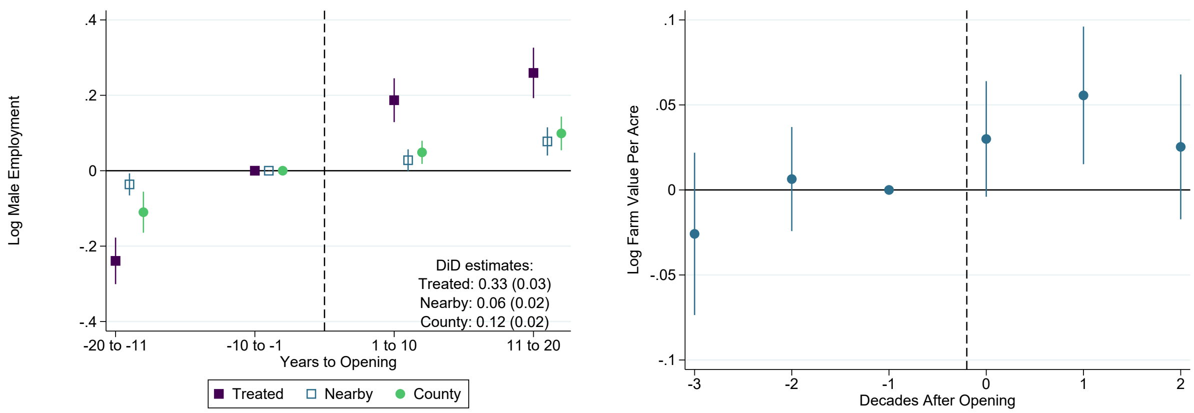


Note: Changing our treated location population percentile-based cut-off for sample inclusion does not alter our results. Staggered difference-in difference county-level estimates from Equation 2, where we change our minimum population threshold to be other percentiles of the 1920s junior college openings' 1920 population distribution. Panel (a) log farm value per farmland acre. Panel (b): log manufacturing value-added per manufacturing production worker. Panel (c): county-level log manufacturing wages per manufacturing production worker. The estimation sample matches our baseline 1920s openings-only strategy, which drops earlier-treated counties Standard errors are clustered by county and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), Haines et al. (2018), and Janas (2024).

Figure A-21: Effect of junior college openings on population

(a) Total town male employment

(b) Total county population



Note: Area populations did not differentially grow after junior college openings. Staggered difference-in difference estimates use Equation 2 where the outcome is either the total number of men reporting gainful employment in each year and geographic unit in (a), or in (b) the total county population. Treated towns open a junior college within two miles whereas "nearby' towns are any other town in the same county. Counties are treated by the first junior college opened. We estimate "treated" and "nearby" effects simultaneously and county-level effects separately after aggregating to that geographic level in Panel (a) . Each estimation sample omits geographic units with under the 10th percentile in treated populations in 1910 or appearing in fewer than four census waves. Events are defined as the 302 towns (334 counties) that opened their first junior college between 1912(1910) and 1928. Standard errors are clustered by level of geographic aggregation and we plot 95 percent confidence intervals. Source: Junior College Journal Directories, McDowell (1919), Greenleaf (1936), Haines (2010), and the US Census (Ruggles et al., 2021).

Table A-1: Predicting college openings with 1910 town covariates

	2yr or 4yr	4 yr	2 yr	2 yr without 4 yr	2 yr if have college
Log population	5.37 (0.30)	3.09 (0.18)	2.30 (0.32)	2.28 (0.32)	-1.98 (1.64)
White share	-2.01 (1.26)	-0.55 (0.71)	-1.47 (0.82)	-1.47 (0.82)	-3.30 (15.23)
Foreign-born share	0.25 (2.31)	0.17 (1.14)	0.29 (1.75)	0.08 (1.77)	45.67 (34.21)
Out-of-state migrant share	3.09 (1.78)	0.27 (0.96)	2.83 (1.19)	2.82 (1.22)	46.09 (19.94)
Homeownership rate	-1.00 (0.84)	-1.67 (0.71)	0.69 (0.51)	0.67 (0.51)	-13.51 (19.94)
Farm resident share	1.52 (0.79)	1.44 (0.63)	0.10 (0.66)	0.07 (0.65)	13.62 (21.22)
Log commodity workers p.c.	-13.66 (1.91)	-7.32 (1.26)	-6.46 (1.70)	-6.34 (1.71)	-4.98 (51.55)
Log manufacturing workers p.c.	-2.22 (3.69)	-0.05 (2.13)	-2.37 (2.53)	-2.16 (2.57)	3.70 (56.31)
Log prof./mgr. workers p.c.	62.51 (14.27)	46.59 (9.17)	17.00 (9.42)	15.92 (8.83)	48.64 (166.93)
Log craft/oper. workers p.c.	-6.60 (4.00)	-5.35 (1.95)	-1.43 (3.32)	-1.25 (3.31)	17.96 (74.85)
Literacy rate	8.96 (2.01)	4.90 (1.26)	4.11 (1.36)	4.06 (1.36)	21.48 (38.84)
Log teachers per school attendee	1.80 (0.21)	1.09 (0.14)	0.70 (0.16)	0.71 (0.16)	-11.38 (4.20)
School attendance share ages 5-10	-3.09 (2.06)	-0.73 (1.46)	-2.32 (1.50)	-2.36 (1.51)	42.00 (66.40)
School attendance share ages 10-14	6.46 (2.72)	2.77 (1.86)	3.72 (1.91)	3.69 (1.91)	-98.36 (84.40)
School attendance share ages 14-18	-1.17 (1.28)	0.04 (1.24)	-1.24 (0.51)	-1.21 (0.51)	-22.47 (19.65)
Constant	-36.26 (3.19)	-21.11 (1.82)	-15.38 (2.56)	-15.15 (2.48)	53.27 (41.68)
Mean	2.8	1.6	1.2	1.2	43.8
N	36,334	36,334	36,334	36,334	1,033

Note: Predicting college openings suggests junior colleges opened in smaller and less developed towns than four-year colleges. These regressions predict college openings between 1910 and 1940 using 1910 census characteristics among all potential census locations. Indicators multiplied by 100 for ease of interpretation. Four-year college locations via College Blue Books. Standard errors clustered at state level. State fixed effects not shown. White refers to all those enumerated as white in 1910. Out-of-state migrants are those born outside their 1910 state of residence. Homeownership refers to those who either own their home free and clear or who have a mortgage. Occupational characteristics defined by the first digit of $OCC1950$ while industry characteristics use $IND1950$ (e.g. commodity uses the agriculture and mining industry codes). Literacy rate is calculated as the share of people over 10 who could read and write. Teachers per student attendee divides the number of people enumerated with teacher as their occupation by the number of people who report being in school The $SCHOOL$ variable also used for school attendance shares. The final column restricts only to towns with a college. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Eells (1941), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-2: Summary of baseline junior college difference-in-difference effects

	(1) 1(Any College)	(2) 1(1-3 Years College)	(3) 1(4+ Years College)	(4) 1(12+ Years Education)
Age $\leq$ 18 $\times$ JC $\times$ Man	3.09	1.49	1.64	-0.56
	(1.21)	(0.25)	(0.28)	(1.27)
Age $\leq$ 18 $\times$ JC $\times$ Woman	1.71	1.44	0.28	-1.28
	(1.23)	(0.32)	(0.25)	(0.53)
Mean	13.6	7.0	6.6	30.8
N	15,257,183	15,257,183	15,257,183	15,257,183

Note: Junior college openings increased male and female college enrollment without affecting high school graduation rates. Each column in this table displays the difference-in-difference version of Equation 1 regressing an indicator for completing a grade level multiplied by 100 in 1940, where treated cohorts are those 18 or under when a junior college opened in their childhood hometown. We interact our interaction term for treatment with an indicator for gender and add the latter indicator as a control and include separate gender-specific effects for the phase in between ages 19 and 30. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town and we plot 95 percent confidence intervals. Source: Junior College Journal Directories McDowell (1919), Greenleaf (1936), Price et al. (2021), and the US Census (Ruggles et al., 2021). Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Eells (1941), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-3: College enrollment effects by distance to opening and gender

	Men	Women
Age $\leq$ 18 $\times$ JC in 0-2 miles	3.81	0.63
	(1.20)	(1.27)
Age $\leq$ 18 $\times$ JC in 2- 5 miles	1.19	0.08
	(0.33)	(1.24)
Age $\leq$ 18 $\times$ JC in 5-10 miles	0.03	-0.09
	(0.01)	(0.23)
Age $\leq$ 18 $\times$ JC in 10-15 miles	-0.05	0.03
	(0.16)	(0.20)
Age $\leq$ 18 $\times$ JC in 15-20 miles	-0.27	-0.25
	(0.15)	(0.20)
Age $\leq$ 18 $\times$ JC in 20-50 miles	-0.10	-0.01
	(0.07)	(0.10)
Mean	13.5	13.2
N	9,941,474	5,915,611

Note: We find no evidence that more distant junior college openings impacted college enrollment, suggesting effects were highly localized. Each column in this table displays the result of an OLS regression of 1940 college enrollment separately by gender. The regression is the difference-in-difference version of Equation 1 where the outcome is an indicator for reporting at least 13 years of education in 1940. These regressions add in indicators for treatment for youths in towns with the given distance from a college opening separately for men and women. All indicators multiplied by 100 for ease of interpretation. Treatment determined by the first junior college to open within 2 miles of each place's centroid. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-4: Junior college effects on higher educational attainment, excluding nearby locations

	(1) 1(Any College)	(2) 1(1-3 Years College)	(3) 1(4+ Years College)	(4) 1(12+ Years Education)
A: 5 Mile Donut				
Age $\leq$ 18 $\times$ JC $\times$ Man	3.03	1.54	1.53	-0.77
	(1.23)	(0.27)	(0.29)	(0.50)
Age $\leq$ 18 $\times$ JC $\times$ Woman	1.59	1.47	0.13	-0.64
	(1.24)	(0.34)	(0.26)	(0.54)
Mean	13.6	7.1	6.6	30.8
N	14,583,329	14,583,329	14,583,329	14,583,329
B: 20 Mile Donut				
Age $\leq$ 18 $\times$ JC $\times$ Man	3.03	1.63	1.47	-0.73
	(1.23)	(0.27)	(0.29)	(0.51)
Age $\leq$ 18 $\times$ JC $\times$ Woman	1.52	1.49	0.09	-0.60
	(1.24)	(0.34)	(0.27)	(0.55)
N	10,891,307	10,891,307	10,891,307	10,891,307
C: 50 Mile Donut				
Age $\leq$ 18 $\times$ JC $\times$ Man	3.33	1.79	0.03	-0.17
	(1.27)	(0.29)	(0.02)	(0.58)
Age $\leq$ 18 $\times$ JC $\times$ Woman	1.73	1.31	-1.24	-0.36
	(1.28)	(0.35)	(0.21)	(0.63)
N	5,224,101	5,224,101	5,224,101	5,224,101

Note: The baseline educational results are unchanged if we exclude the individuals most likely to experience locational proximity-based spillovers. Each column in this table displays the result of an OLS regression of an indicator for completing a grade level multiplied by 100 or total years of education in 1940 separately by gender, omitting individuals who live within a specified distance from a junior college (specified by panel) but never receive one in their location. The regression is the difference-in-difference version of Equation 1 where treated cohorts are those 18 or under when a junior college opened in their childhood hometown. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Eells (1941), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-5: College enrollment effects by junior college characteristics

	Student-Teacher Ratio	Tuition	Total Enrollment	Vocational Programs	1900 HS graduation rate	1900 college enrollment rate
A: 1(Any college)						
Age $\leq$ 18 $\times$	2.22	3.20	2.66	2.61	2.73	3.03
JC under median	(0.53)	(0.58)	(1.23)	(0.51)	(1.20)	(1.00)
Age $\leq$ 18 $\times$	3.01	2.29	2.42	2.52	3.14	2.87
JC over median	(1.29)	(1.28)	(0.80)	(1.26)	(0.75)	(1.24)
Mean	13.5	13.5	13.5	13.6	13.6	13.6
Test of equality	0.20	0.17	0.76	0.88	0.57	0.88
N	14,864,818	14,766,080	14,742,779	15,257,183	12,349,048	12,420,065
B: 1(1-3 years)						
Age $\leq$ 18 $\times$	1.08	2.00	1.70	1.30	1.89	1.32
JC under median	(0.38)	(1.20)	(0.29)	(0.32)	(0.30)	(0.67)
Age $\leq$ 18 $\times$	1.95	1.47	1.53	1.61	1.09	1.66
JC over median	(0.34)	(0.34)	(0.57)	(0.31)	(1.25)	(0.29)
Mean	7.0	7.0	7.0	7.0	6.9	6.9
Test of equality	0.05	0.26	0.77	1.22	0.08	0.62
N	14,864,818	14,766,080	14,742,779	15,257,183	12,349,048	12,420,065
C: 1(4+ years)						
Age $\leq$ 18 $\times$	1.18	1.22	1.00	1.32	0.86	1.73
JC under median	(0.36)	(1.20)	(0.27)	(0.35)	(0.22)	(0.75)
Age $\leq$ 18 $\times$	1.08	0.85	0.91	0.95	2.07	1.23
JC over median	(0.27)	(0.27)	(1.22)	(0.27)	(0.55)	(0.28)
Mean	6.5	6.6	6.5	6.6	6.8	6.7
Test of equality	0.80	0.38	0.85	0.33	0.02	0.51
N	14,634,243	14,534,954	14,511,663	15,024,450	12,171,768	12,241,561

Note: Splitting junior college openings across a larger range of school quality measures indicates that college enrollment gains were largest in schools with low attendance costs. Each cell in this table displays the result of an OLS regression of an indicator for college enrollment (Panel A), some college (Panel B), and college attainment (Panel C) by 1940 pooled across gender (adding fixed effects to the baseline regression) , splitting the junior college effect by its characteristics. Indicators multiplied by 100 for ease of interpretation. See Figure A-2 for details on these data. Tuition is split based on whether the school charged any tuition to in-district students. "1900 college enrollment" refers to the share of youths reporting and 13+ years of education in 1940 for each 1900 location among those turning 18 between 1901 and 1905 whom we successfully link to the 1940 census. The regression is the difference-in-difference version of Equation 1 where the outcome is a 1940 educational attainment indicator and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Observations omitted if the junior college did not report that characteristic or, in the last two columns, we do not observe the place in the 1900 census. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-6: College enrollment and attainment by terminal degree program offerings

	1(Any college)		1(1-3 years)		1(4+ years)	
	Male	Female	Male	Female	Male	Female
Age $\leq$ 18 $\times$ JC $\times$ Engin.	0.10	1.29	0.58	2.21	-1.22	-0.96
	(0.85)	(1.15)	(0.59)	(0.93)	(0.66)	(0.62)
Age $\leq$ 18 $\times$ JC $\times$ Tech.	-0.89	0.04	-0.84	0.61	-0.11	-1.29
	(1.23)	(1.44)	(0.69)	(1.38)	(1.09)	(0.78)
Age $\leq$ 18 $\times$ JC $\times$ Misc.	2.49	1.12	0.96	1.28	1.56	0.59
	(0.89)	(1.19)	(0.58)	(0.93)	(0.59)	(0.58)
Age $\leq$ 18 $\times$ JC $\times$ Arts	-2.14	-3.25	-0.84	-2.20	-1.32	-1.09
	(0.89)	(1.17)	(0.61)	(0.95)	(0.61)	(0.62)
Age $\leq$ 18 $\times$ JC $\times$ Agric.	1.74	0.26	0.73	1.26	1.02	-0.22
	(0.79)	(1.24)	(0.63)	(1.09)	(0.61)	(0.62)
Age $\leq$ 18 $\times$ JC $\times$ Busin.	2.35	0.69	1.11	0.32	1.28	1.23
	(0.83)	(1.14)	(0.51)	(0.93)	(0.56)	(0.56)
Age $\leq$ 18 $\times$ JC $\times$ Health	0.06	0.69	-0.04	0.24	0.09	1.24
	(1.03)	(1.36)	(0.60)	(0.91)	(0.65)	(0.71)
Age $\leq$ 18 $\times$ JC $\times$ Govern.	0.13	0.39	0.55	0.50	-1.24	-0.09
	(0.67)	(0.88)	(1.22)	(0.73)	(1.25)	(1.29)
Mean	13.6	13.4	6.3	8.2	7.4	5.1
N	9,196,894	5,434,477	9,196,894	5,434,477	9,068,539	5,333,277

Note: Terminal degree offerings in business and agriculture increased male college enrollment and four-year degree attainment. Each column in this table displays the result of an OLS regression of an indicator for whether a person reported at least 13 years of education in 1940 multiplied by 100 on type of terminal degree program separately by gender. The regression is the difference-in-difference version of Equation 1 where treated cohorts are those 18 or under when a junior college opened in their childhood hometown. Here we split the treatment effect up by type of terminal degree program offered by each junior college (which is not mutually exclusive). The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and educational attainment in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. We omit schools which did not respond to the survey on terminal degree programs. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Eells (1941), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-7: Junior college effects on male occupational outcomes

	(1) Professional	(2) Farmer	(3) Clerical	(4) Sale	(5) Craft	(6) Operative	(7) Service	(8) Farm Lab	(9) Laborer
Age $\leq 18 \times$ JC	0.69	1.86	0.91	1.29	-1.24	0.08	0.26	-1.56	-0.50
	(0.24)	(0.34)	(0.20)	(0.18)	(0.28)	(0.30)	(0.15)	(0.17)	(0.24)
Mean	7.2	11.0	7.2	6.4	17.4	17.7	4.9	3.3	9.9
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828

Note: We find evidence that junior college openings increased male clerical work and reduced laborer occupational shares. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, restricting only to men. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 male occupation (defined by the first digit of $OCC1950$) and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-8: Junior college effects on male occupational outcomes by sector

	(1) White Collar	(2) Skilled Blue Collar	(3) Unskilled	(4) Clerical/Sales	(5) Laborer
A: Manufacturing					
Age $\leq$ 18 $\times$ JC	0.60	-0.18	0.09	1.24	-0.09
	(0.16)	(0.16)	(0.24)	(0.10)	(0.13)
Mean	5.0	6.2	11.8	2.8	3.1
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828
B: Other Non-Farm					
Age $\leq$ 18 $\times$ JC	0.87	-0.26	-0.24	0.96	-1.21
	(0.32)	(0.24)	(0.32)	(0.24)	(0.18)
Mean	21.9	11.2	20.7	10.9	6.8
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828

Note: Male occupational upgrading was broad-based by industry outside the farm sector. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, restricting only to men. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 male occupation group (based on $OCC1950$), interacted these categories with an indicator for whether the worker reports working in a manufacturing industry (defined using the first digit of $IND1950$), and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. The first three columns are mutually exclusive: white collar includes professional, managerial, clerical, and sales work, skilled blue collar represents craftsmen, and unskilled workers include operative, service, and non-farm laborers. Panels B and C further . The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier census and industry and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-9: Junior college effects on innovative occupational outcomes by sector

	(1)	(2)	(3)	(4)	(5)	(6)
		New Occupations			Knowledge Intensive Jobs	
	Overall	Manufacturing	Other	Overall	Manufacturing	Other
A: All Men						
Age $\leq$ 18 $\times$ JC	-0.12	0.03	-0.15	0.18	0.18	0.00
	(0.12)	(0.06)	(0.11)	(0.10)	(0.06)	(0.07)
Mean	3.4	0.8	2.7	1.2	0.5	0.7
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828
B: All Women						
Age $\leq$ 18 $\times$ JC	0.02	0.01	0.01	-0.03	-0.03	0.00
	(0.08)	(0.01)	(0.08)	(0.03)	(0.03)	(0.01)
Mean	1.0	0.0	1.0	0.1	0.0	0.0
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355
C: Married Women						
Age $\leq$ 18 $\times$ JC	-0.01	0.01	-0.02	-0.02	-0.03	0.02
	(0.05)	(0.01)	(0.05)	(0.03)	(0.03)	(0.01)
Mean	0.3	0.0	0.3	0.0	0.0	0.0
N	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257
D: Un-married Women						
Age $\leq$ 18 $\times$ JC	-0.08	0.03	-0.10	-0.11	-0.05	-0.06
	(1.21)	(0.05)	(1.20)	(0.07)	(0.06)	(0.04)
Mean	4.9	0.1	4.8	0.2	0.1	0.1
N	837,098	837,098	837,098	837,098	837,098	837,098

Note: Men tended to increase employment in technology-complementary jobs after junior colleges opened, though these increases represented a small share of the overall change in employment. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, separately by sex,and in Panels C and D, marital status. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 occupation group (based on $OCC1950$) and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. We define “new occupations" as those existing in the 1940, but not 1880, census, following Fiszbein (2022). We also use the Fiszbein (2022) definition of “knowledge intensive" jobs: those coded in $OCC1950$ as scientists and engineers We also interact these occupation categories with an indicator for whether the worker reports working in a manufacturing industry (defined using the first digit of $IND1950$). The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and marital status and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-10: Junior college effects on managerial, official, and proprietor employment

	(1) Any occ. in group	(2) Specific occ. in group	(3) Not classified in group	(4) Not classified and employee	(5) Proprietor	(6) Any occ. but proprietor
A: Men						
Age $\leq$ 18 $\times$ JC	-1.57	-0.32	-1.24	-0.29	-0.95	-0.62
	(0.24)	(0.10)	(0.23)	(0.16)	(0.17)	(0.19)
Mean	10.9	1.7	9.2	4.4	4.8	6.1
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828
B: Women						
Age $\leq$ 18 $\times$ JC	-0.18	-0.07	-0.11	-0.02	-0.09	-0.08
	(0.10)	(0.06)	(0.09)	(0.05)	(0.07)	(0.08)
Mean	1.2	0.2	0.9	0.3	0.6	0.6
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355

Note: Male exit from the managerial, official, and proprietor category is largely explained by a decline in proprietor occupations. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, separately restricting only to men or women. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 occupations in the managerial, official, and proprietor category. Column 1 includes all $OCC1950$ codes in this group, which we split by whether the person is in a specific occupation or in the residual “not elsewhere classified" category ($OCC1950 = 290$). Columns 4 and 5 further split this latter group by whether the person reports being self employed (our measure of being a proprietor, as it corresponds to individuals’ raw occupation responses in the data). Column 6 estimates the probability of being a manager or official (which does not count the proprietor group in Column 5). The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-11: Junior college effects on female labor market outcomes

	(1) In LF	(2) Professional	(3) Farmer	(4) Clerical	(5) Sale	(6) Craft	(7) Operative	(8) Service	(9) Farm Lab	(10) Laborer
A: All Women										
Age $\leq$ 18 $\times$ JC	-0.15	-1.28	0.17	0.87	0.09	-0.14	0.11	-0.19	0.02	-0.30
	(0.39)	(0.20)	(0.07)	(0.19)	(0.11)	(0.05)	(0.18)	(0.18)	(0.06)	(0.14)
Mean	20.7	4.0	0.5	4.5	1.6	0.3	4.4	4.5	1.2	2.9
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355
B: Married										
Age $\leq$ 18 $\times$ JC	0.92	-0.09	0.03	0.80	0.21	-0.08	0.27	0.23	0.01	-0.31
	(0.33)	(0.13)	(0.05)	(0.14)	(0.10)	(0.04)	(0.18)	(0.16)	(0.06)	(0.15)
Mean	12.6	1.6	0.2	2.6	1.3	0.3	3.7	2.2	1.2	3.2
N	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257
C: Unmarried										
Age $\leq$ 18 $\times$ JC	-4.56	-2.20	0.99	2.00	-0.32	-0.34	-0.36	-3.36	0.03	-0.13
	(1.00)	(0.84)	(0.31)	(0.77)	(1.22)	(0.17)	(0.51)	(0.75)	(0.09)	(0.26)
Mean	68.0	17.9	1.7	15.8	3.3	0.7	8.5	17.6	0.5	1.3
N	837,098	837,098	837,098	837,098	837,098	837,098	837,098	837,098	837,098	837,098

Note: We find evidence that junior college openings increased female clerical and sales work. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, restricting only to women. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 female labor market standing and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. Marital status and labor market outcomes both observed in 1940. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and marital status and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-12: Junior college effects on female occupational outcomes by sector

	(1) White Collar	(2) Skilled Blue Collar	(3) Unskilled	(4) Clerical/Sales	(5) Laborer
A: Overall					
Age $\leq$ 18 $\times$ JC	1.21	-0.14	-0.37	0.97	-0.30
	(0.30)	(0.05)	(0.27)	(0.22)	(0.14)
Mean	10.7	0.3	11.8	6.1	2.9
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355
B: Manufacturing					
Age $\leq$ 18 $\times$ JC	0.15	-0.04	0.04	0.18	-0.02
	(0.07)	(0.03)	(0.15)	(0.06)	(0.04)
Mean	1.0	0.2	3.6	0.9	0.1
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355
C: Other Non-Farm					
Age $\leq$ 18 $\times$ JC	0.26	-0.10	-1.22	0.78	-0.28
	(0.29)	(0.04)	(0.24)	(0.21)	(0.13)
Mean	9.7	0.2	8.2	5.2	2.8
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355

Note: Female occupational upgrading was more muted than male patterns but were otherwise similar, as women entered white clerical and sales employment in the non-farm sector. Each column in this table displays the result of an OLS regression of 1940 labor market indicator variable, multiplied by 100, restricting only to men. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 female occupation group (based on $OCC1950$) and treated cohorts are those 18 or under when a junior college opened in their childhood hometown. The first three columns are mutually exclusive: white collar includes professional, managerial, clerical, and sales work, skilled blue collar represents craftsmen, and unskilled workers include operative, service, and non-farm laborers. Panels B and C further interact these categories with an indicator for whether the worker reports working in a manufacturing industry (defined using the first digit of $IND1950$). The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 censuses, 1892–1901 birth cohorts in the linked 1910–1940 census, the 1902–1911 birth cohorts in the linked 1920–1940 censuses, and the 1912–1920 birth cohorts in the linked 1930–1940 censuses, measuring home town in the earlier census and industry and occupation in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-13: Junior college effects on female marriage and fertility outcomes

	(1) 1(Ever married)	(2) Age at first marriage	(3) 1(Currently married)	(4) 1(Has children)	(5) Age at first birth	(6) Number of children
Age $\leq$ 18 $\times$ JC	0.37	-0.12	1.09	-0.73	0.52	0.15
	(0.27)	(0.16)	(0.35)	(1.24)	(0.07)	(0.09)
Mean	91.6	21.2	85.2	72.7	24.5	2.8
N	5,669,355	225,375	5,669,355	5,669,355	4,101,737	227,538

Note: Junior college openings delayed women's first child and reduced the probabilty of having children. Each column in this table displays the result of estimating the difference-in-difference version of Equation 1 on 1940 marital or fertility outcomes, multiplied by 100 except in Columns 2 and 5, restricting only to women. Columns 1 and 3 are an indicator for reporting ever having married and still being married for all women (via $MARST$). Column 2 is restricted to ever-married sample line women, hence the drop in sample size. Column 4 uses an indicator for having a child present in one's household ($NCHILD$) for all women. Column 5 restricts to women with any children and uses the difference between mother age and the age of the eldest child ($ELDCH$). Column 6 uses the number of children ever born to a woman ($CHBORN$), which was only asked of sample-line ever-married women. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and marital and fertility information in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-14: Junior college effects on location choice in 1940

	(1) Δ towns	(2) Δ counties	(3) Δ states	(4) 1(2-year in 1940)	(5) 1(4-year in 1940)
A: Men					
Age $\leq$ 18 × JC	-1.11	-0.81	-0.56	6.74	-0.14
	(1.25)	(1.28)	(0.39)	(1.23)	(0.19)
Mean	68.5	52.9	26.7	16.9	9.9
N	9,587,828	9,587,828	9,587,828	9,587,828	9,587,828
B: Women					
Age $\leq$ 18 × JC	-0.01	0.27	0.52	1.86	-0.18
	(1.27)	(0.54)	(1.24)	(0.52)	(0.22)
Mean	68.0	49.2	22.2	16.6	10.2
N	5,669,355	5,669,355	5,669,355	5,669,355	5,669,355
C: Married Women					
Age $\leq$ 18 × JC	-0.32	0.13	0.19	3.37	-0.32
	(0.51)	(0.57)	(0.50)	(0.54)	(0.22)
Mean	67.8	48.3	21.8	15.8	9.8
N	4,832,257	4,832,257	4,832,257	4,832,257	4,832,257
D: Unmarried Women					
Age $\leq$ 18 × JC	-1.20	-0.84	1.62	-6.31	0.27
	(0.99)	(1.07)	(0.91)	(1.06)	(0.66)
Mean	69.1	54.2	24.9	21.3	12.1
N	837,098	837,098	837,098	837,098	837,098

Note: Junior college exposure increased the probability men and women lived near a junior college in 1940. Each column in this table displays the result of an OLS regression of 1940 location choice, multiplied by 100 restricted by sex in Panels A and B, and also by 1940 marital status in Panels C and D. We present staggered difference-in-difference estimates from the difference-in-difference version of Equation 1 where the outcome is an indicator for 1940 location, either whether it is the same as each individual's childhood census location in Columns 1–3, or whether their town in 1940 has each type of college. The sample includes the 1882–1891 birth cohorts in the linked 1900–1940 birth cohorts, 1892–1901 birth cohorts in the linked 1910–1940 Census, the 1902-1911 birth cohorts in the 1920–1940 Census, and the 1912–1920 birth cohorts in the 1930–1940 Census, measuring home town in the earlier Census and later location and marital information in the 1940 census. The sample includes all towns with at least 1,277 people in 1910 (10th percentile of the treated towns) and 1 linked observation in each birth cohort, excluding towns that opened their first junior college before 1912 or after 1928. Events are defined as the 302 towns that opened their first junior college between 1912 and 1928. Standard errors, in parentheses, are clustered by childhood town. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-15: County balance on other development indicators

	(1) 1(Electricity Access)	(2) $\%\Delta$ Electricity	(3) Log Market Access	(4) $\%\Delta Market$ Access	(5) 1(Banked)	(6) $\%\Delta Banks$	(7) 1(Agr. Station)
1(Opens JC)	-2.06	5.55	-0.05	0.04	0.13	-3.42	0.01
	(3.25)	(9.80)	(0.03)	(0.14)	(0.09)	(2.13)	(0.62)
Mean	70.1	61.2	17.9	15.1	99.9	-16.7	1.2
N	1,918	1,918	1,849	1,849	1,901	1,899	1,918

Note: Junior college openings are balanced on other concurrent development indicators . Each column here represents the regression of a different county-level outcome on an indicator for receiving a junior college between 1910 and 1928 alongside state-clustered standard errors. We construct decadal changes for the 1910s in Columns 2 and 4, and for the 1920s in Column 6. Sample sizes depends on availability of outcome variables. Sources: Junior college openings: Junior College Directories, McDowell (1919), and Greenleaf (1936). Electrification changes: Vidart (2024). Market access: Hornbeck and Rotemberg (2024). Banks: Federal Deposit Insurance Corporation (1992). Agricultural experiment stations: Kantor and Whalley (2019).

Table A-16: Farmland changes after the first junior college in a county

	(1) Log(Farms)	(2) Log(Acres/Farm)	(3) < 100 Acres	(4) Log # Farms 100–500 Acres	(5) > 500 Acres
Get JC x POST	0.042	-0.054	0.063	-0.005	-0.007
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Mean	7.8	4.7	7.2	6.6	3.2
N	11,647	11,647	11,647	11,647	11,647

Note: Junior college openings led to more, small farms. Each column here represents the regression of a different county-level farming sector outcome on an indicator for receiving a junior college during the 1920s using Equation 2 with outcomes defined as follows. Column 1: log total farms. Column 2: log total farm acreage/ total farms. Column 3: Total farms under 100 acres/ total farms. Column 4: Total farms between 100 and 500 acres/total acres. Column 5: Total farms over 500 acres/ total farms. The sample omits counties with under the 10th percentile in treated county populations in 1910 (13,462). Events are defined as the 334 counties that opened their first junior college between 1910 and 1928. Standard errors, in parentheses, are clustered by county. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).

Table A-17: Tractor adoption and county-level junior college access

	(1) Log(Tractors)	(2) Log(Tractors per farm)
Gets JC $\times$ 1925	0.268	0.128
	(0.07)	(0.06)
Gets JC $\times$ 1930	0.214	0.111
	(0.07)	(0.06)
Gets JC $\times$ 1940	0.211	0.047
	(0.07)	(0.05)
Mean	5.2	-2.6
N	5,825	5,803

Note: Junior college openings correlate with earlier tractor adoption. We predict county-level tractor adoption based on junior college openings and year of census, absorbing state-year dyad fixed effects. The Census of Agriculture did not ask this question before 1925, so we do not have a pre-period for most college openings. Instead, we correlate tractor adoption over time with receiving a junior college between 1902 and 1928. Standard errors, in parentheses, are clustered by county. Source: Junior College Directories, McDowell (1919), Greenleaf (1936), Price et al. (2021), and US full count censuses (Ruggles et al., 2021).