The Long-Run Impact of Local College Access: How Colleges Shaped American Communities

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Abstract

We examine the long-term impact of local college access, leveraging variation in college openings from the second half of the twentieth century. We create a longitudinal dataset by linking the restricted Social Security Administration microdata to the 2000 Decennial Census, the 2005-2019 American Community Surveys (ACS), and the universe of 1970s IRS 1040 tax data, which allows us to directly observe respondents' birth county and assign college access based on respondent's age at the time of the college opening. We employ a difference-in-differences frameworks using our linked data to analyze the impact of college access on educational attainment, earnings and longevity, as well as mechanisms like migration and industry of employment. Overall, we find that college access increases educational attainment by 0.76%, earnings by 5%, and longevity by 0.09%. These effects are driven by two-year institutions. While four-year institution openings have a small positive effect on bachelor's degree attainment, they have limited impacts on subsequent labor market outcomes. Finally, the impact of college openings on educational outcomes is larger for minority groups, but this does not translate into larger subsequent labor market improvements.

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1 Introduction

The expansion of two-year and four-year colleges in the United States in the mid-20th century fundamentally reshaped the landscape of higher education. In the 1940s, only 5% of people over 25 years old had bachelor's degree, whereas it grew to 26% by 2000. This growth was largely driven by policy interventions aimed at democratizing educational opportunities (Goldin and Katz, 2008), especially for underserved populations such as lower-income households or households that are geographically isolated because they reside in areas without institutions of higher education.

This article uses individual-level administrative microdata to study how the expansion of higher education during the twentieth century influenced individuals' educational attainment, labor market outcomes, longevity, and geographic mobility. In particular, we leverage the timing and location of college openings to produce difference-in-differences (DID) estimates of the impact of local college access on long-run outcomes. We construct a longitudinally linked dataset to assign local college openings to an individual's place of birth and leverage the age-specific timing of an opening to study individuals for whom a college opening occurred in their birth county before they were a prime college-going age. Using administrative tax data and death records, we find that college access prior to prime first-time college-going ages increases educational attainment by 0.76%, earnings by 5%, and longevity by 0.09%. These effects are driven by access to two-year institutions. This finding is consistent with the view that two-year institutions often serve local communities and enroll individuals on the extensive margin of college attendance. While four-year institution openings have a small positive effect on local bachelor's degree attainment, they have limited impacts on subsequent labor market outcomes. We emphasize here and below that these impacts should be understood as *local* impacts of an institutional opening on an entire birth-county birth-cohort, rather than estimates of the individual returns to additional schooling.

We then test for impacts on industry choice and migration as mechanisms for the long-run labor market and health effects. Overall, local college openings reduce the probability of employment in the agricultural sector by 0.1 percentage points (-4.55%) and reduce the probability of migration to an urban county by 0.5 percentage points (-2.1%). Again, these industry choice and migration effects are again primarily driven by local two-year college access. Finally, we examine the potential for heterogeneous effects by rurality and by race. We find that the impact of local college access on educational outcomes is smaller in rural areas, and larger for Black people relative to White people, but these gains do not translate into subsequent labor market improvements.

Our work relates to a substantial body of literature on the relationship between improved college accessibility and individual outcomes. Seminal work by Card (1993) leverage geographic variation in college proximity to show substantial positive impact on educational attainment and subsequent earnings, especially for men from parents with low educational attainment. Community colleges have been shown to expand access to higher education by promoting educational access (Mountjoy, 2022) among socioeconomically underserved groups (Rouse, 1995, 1998), with comparable labor market returns to four-year institutions (Kane and Rouse, 1995), and to enhance students' educational aspirations (Leigh and Gill, 2004). Further, community college expansions have long-term improvements in socioeconomic status Connolly (2021) and health and longevity (Cowan and Tefft, 2025, Fletcher and Noghanibehambari, 2024). Even more broadly, research on the effects of access to education has long used local access to identify a wide range of causal effects of education (Bailey et al., 2021, Connolly, 2021, Currie and Moretti, 2003, Kim et al., 2025, Oreopoulos and Salvanes, 2011). In terms of geographic mobility, other studies have found that states that invest heavily in higher education did not necessarily retain their graduates (Bound et al., 2001), and higher educational attainment influences migration patterns (Malamud and Wozniak, 2012).

Our contributions are threefold. First, we provide *community-level*, birth-county-by-birth-cohort estimates that exploit the *timing* of a college opening rather than cross-sectional proximity to a college. A common critique of proximity-based instruments is that the causal identification margin is via those for whom proximity to a school is sufficient to change their decision about enrollment – rather than identifying broader effects of attendance throughout the local community – and that there may be heterogeneous returns to education among individuals with various *a priori* probabilities of enrollment (Card, 1993, 1999, 2001). Our design targets impacts in an individual's local birth cohort, aligning especially well with the place-based missions of two-year and rural institutions while also studying four-year openings. Related research uses historical college openings or branch openings to estimate local educational outcomes or local GDP (Russell et al., 2024, Lehnert et al., 2024). Second, we longitudinally link Census microdata to multiple administrative records and analyze various outcomes—educational attainment, administrative earnings, longevity, industry composition, and migration—within a unified framework, allowing us to simultaneously assess direct impacts and explore possible mechanisms including migration. Third, we extend previous studies on college expansion by analyzing openings of two-year and four-year institutions separately, and by estimating heterogeneity across rural contexts and racial groups.

The remainder of the paper proceeds as follows: Section 2 discusses historical context and policy background of the mid-century college expansion. Section 3 outlines the data and

research design. Section 4 discusses results of overall impacts of college openings, Section 5 discusses possible mechanisms, Section 6 discusses heterogeneous impacts across institution level, rurality, and race. Finally, Section 7 discusses policy implications of our findings.

2 Background

Recognizing the significance of applied higher education in supporting agricultural development and industrial growth, the Morrill Act of 1862 enabled the establishment of land-grant institutions in the U.S. by allocating funds raised from the sale of federally controlled lands.[1] Subsequently, the Morrill Act of 1890 specifically focused on the former Confederate states, mandating that they either to demonstrate that admissions policies are not racially discriminatory or to establish separate land-grant institutions serving African Americans. By 2022, the number of land-grant colleges and universities had grown to 112 institutions, including Historically Black Colleges and Universities (HBCUs) and Tribal Colleges and Universities (TCUs).[2]

While Morrill Acts established a foundational infrastructure for higher education, Servicemen's Readjustment Act of 1944 (GI Bill) significantly increased higher education participation by funding for World War II veterans. The Bill significantly increased the demand for postsecondary education, resulting in growth of two-year and four-year institutions (Bound and Turner, 2002, Stanley, 2003). Moreover, President Truman's Commission on Higher Education in 1947 aimed to promote expansion of community colleges to enhance access to higher education, particularly for individuals facing geographic or socioeconomic constraints.

Further federal support continued through the Higher Education Act (HEA) of 1965, which authorized substantial federal financial aid including Pell Grants. This lowered financial barriers and expanded higher education access to diverse populations (Kane and Rouse, 1999, Bound et al., 2010). Through various state-level community college and junior college acts throughout the 1950s to 1970s, state governments also fostered expansion of subsizied two-year college educations, effectively shifting enrollment from private, for-profit institutions toward public community colleges (Cellini, 2009). In the context of this extensive federal and state support, our analysis focuses on the opening period from 1943 to 1983, a critical period influenced the most from the establishment and expansion of higher education system across the U.S.

[1] Many of these lands had previously been acquired from Native American tribes through treaty, cession, or seizure (National Archives, 2022).

[2] Over a century later, in 1994, 29 TCUs were designated as Land-grant Institutions by the Equity in Educational Land-Grant Status Act.

3 Data and Research Design

3.1 Data Sources

We construct a longitudinally linked individual-level dataset by linking the long-form 2000 Decennial and 2005-2019 American Community Survey (ACS), and the universe of 1974 and 1979 Internal Revenue Service (IRS) tax data to the Social Security Administration's Numident file, using the U.S. Census Bureau's protected identification key (PIK) (Abramitzky et al., 2021, Bailey et al., 2020, Internal Revenue Service, 2016, US Census Bureau, 2011). The Numident file contains administrative records on date of birth and county of birth (US Census Bureau, 2022, Taylor et al., 2016). We use this information to define individuals' exposure to local postsecondary institution opening. Combining county of birth with the county of residence information from the 2000 long-form Decennial Census and the 2005-2019 ACS, we are also able to identify migration information from the county of birth to county of residence, as well as several later life education and economic outcomes.[3] The long-form Decennial Census and the ACS provide the same labor market outcomes of interest but they are both samples, so we link both to the Numident to maximize our sample size. The also link the and the universe of 1974 and 1979 Internal Revenue Service (IRS) tax data to gain a administratively recorded income measure earlier in individuals lifetime.

Institution-level college data are from Integrated Postsecondary Education Data System (IPEDS) and the Postsecondary Education Participation System (PEPS). IPEDS provides institutional-level characteristics—including opening and closing year, students' racial information, completion, enrollment, and financial structure—with coverage in 1980 and annually from 1984 onward. From the entire collection, we select several years based on the availability of key variables of interest: 1980, 1986, 2002, 2003, 2004, 2009, and 2013 surveys.[4] PEPS provides college closure information.

[3]We define two migration measures: (i) migration, indicating residence in a county different from one's birth county, and (ii) migration to an urban county, indicating residence in an urban county different from one's birth county. Urban counties are defined based on MSA delineations in 1940-1950, which is available on the IPUMS County Composition of Metropolitan Areas.

[4]We take 2004 (the 2003-04 IPEDS data) as the primary reference year for institution characteristics because it provides comprehensive and comparable data across key components, such as Graduation Rates (required since 1997-98), Student Financial Aid (required since 2000-01), and Finance (form revised for public institutions in 2002-03). Missing values from 2004 are supplemented using data from the 2002 and 2003 IPEDS; specifically, enrolled student age categories that are mandatory in odd-numbered years are taken from the 2003 IPEDS. Institution locations are sourced from the 2009 and 2013 collections, and institution opening years are from the 1980 and 1986 collections, which are the only collections reporting opening years. Since our sample cohorts are born between 1920 and 1965, post-1986 openings do not affect our analysis.

3.2 Sample Construction

Our primary analysis sample comprises individuals born between 1920 and 1965. This birth cohort range is selected to preserve sufficient variation in college exposure during prime first-time college-going ages (18-20) during the increased college institutions observed from 1940-1960. It also aligns with the availability of later-life outcomes in administrative data. In particular, the earliest 1920 cohort is younger than 60 at the time of the 1979 IRS tax data collection, ensuring wage and income data collection during the typical labor force participation age periods; and the latest birth cohort of 1965 reaches age 14—the youngest age for income reporting—in 1979.

We impose several sample restrictions. First, when measuring the first stage impacts on education, we keep individuals with non-missing information for the key outcomes including education, county of birth, employment, and income. Second, we restrict the treated counties to those experiencing a first college opening between 1943 and 1983. Given the 1920-1965 birth cohorts, this opening year window ensures within-county variation in exposure by age at opening (i.e., both exposed and unexposed birth cohorts are present in a county with a first college opening). Counties with openings between 1900 and 1942 are excluded because all sample birth cohorts (1920-1965) would be fully exposed, which precludes a within-county comparison. For control counties, we include (i) counties without any college opening over the sample period and (ii) counties with historical college openings prior to 1900. Third, we exclude for-profit institutions to focus on public and private not-for-profit institutions with comparable missions and funding structures.[5] Finally, we retain cohorts born ± 21 years away from being age 18 at the county's first opening. In other words, we focus on age cohorts of -3 through 41 at college opening.[6] This restriction ensures comparable cohorts around the opening event.

After applying the restrictions above, we are left with approximately 1,400 college openings between 1943 and 1983.[7] Our sample consists of over 24 million individuals born between 1920 and 1965, some of whom were born into the 359 counties having college openings between 1943 and 1983 while others were born into the 2,355 counties that either had no college opening or had an historical college opening prior to 1900.

[5] Alternative treatment and control group choices yield similar results.

[6] Negative value indicate cohorts not yet born when the opening occurred.

[7] By 1985, a little over 3,100 colleges opened.

3.3 Descriptive Evidence on College Access and Attendance

Figure 1 shows trends in college-access relative to trends in college-going in the United States throughout the twentieth century. In particular, the number of first-time college openings in a county[8] alongside the share of individuals attending any college by age 30, sourced from Autor et al. (2020). While both college-access and college-going exhibit a steady rise year after year, the pronounced rise in college-going for the post-war birth cohorts coincides with the dramatic expansion of two-year colleges in the same age-adjusted period. These aggregate patterns suggest that the increase of local college availability, particularly the growth of two-year institutions, played a key role in driving the observed increase in college attendance.

Table 1 provides further details on the characteristics of two- and four-year colleges opened between 1943 and 1983. Two-year institutions tend to enroll more undergraduates overall but with fewer full-time students, tend to serve a larger share of older and minority students, tend to charge lower tuition, and tend to have lower completion rates than four-year colleges. A greater share of two-year colleges provide day-care service and employment services as well. In terms of financial aid, two-year college students rely heavily on federal and state grants, and two-year institutions depend on state and local appropriations. By contrast, four-year colleges spend substantially more on instructional resources, and greater institutional grants are available.[9] These descriptive characteristics suggest that both types of institutions expanded access to higher education but may through different channels: two-year colleges primarily by lowering costs and accommodating the needs of a more diverse student body, and four-year colleges by investing more heavily in academic resources that may enhance students' educational experience and outcomes.

3.4 Measuring Access Using Exposure to College Openings

We assign college or university exposure to individuals based on their county of birth, which we directly observe from the Numident file. In counties with multiple college openings, we use the earliest opening, as the very first institution is likely to have the strongest and most immediate influence on the local community.[10] After a college or university opens in a county, we expect people to sort themselves in response to the opening. However, it is ex

[8]This measure is shown in terms of the calendar year measure in Autor et al. (2020) minus 21 years to provide a proxy for birth cohort-specific college access.

[9]Two- and four-year colleges opened in rural areas are broadly consistent with these patterns, with lower tuition and somewhat greater dependence on state and local appropriations per student (Appendix Table A.1).

[10]For instance, if a county had college openings in both 1950 and 1980, we retain only the year 1950 as the opening year. The overall results are not sensitive to this choice.

ante plausible that the timing of college or university openings is quasi-randomly related to whether individuals born into a given county were, for example, 20 or younger or 24 or older at the time when a college or university opened in their birth county. In other words, we are not aware of any evidence that household location and fertility choices are sensitive to future plans for the establishment of college or university.

Because we identify individuals who were *born into* counties having openings rather than individuals who actually *attended* college or university, the impacts we estimate in this study are intent-to-treat (ITT) estimates. These estimates reflect meaningful economic impacts of college or university proximity itself, even without directly measuring individual attendance.

We follow Bailey et al. (2021), which utilizes an age cutoff for determining Head Start program exposure, and assign age-specific opening exposure. While Head Start has a (reasonably) sharp age cutoff for program eligibility, colleges accept all ages as long as they meet certain requirements. While a sharp age cutoff does not exist for college, we assume that people whose age is older than 21 are less likely to start attend college and are effectively not exposed to a local opening in our intent-to-treat estimates developed below.[11] Our choice of the baseline age range as 21-23 is based on the age group of 18-20 considering their first-time college-attending, and we test the robustness of this choice in the Appendix (Figure B.1).[12] Thus, the interpretation of the event study figure x-axis will be reversed from the conventional event study figure: age ranges to the left of the event age are where we would expect to see treatment effects, while those to the right of the event age are where we would expect to see no treatment effect. Finally, we aggregate age at time of exposure into 3-year bins to reduce statistical noise.

3.5 Econometric Approach

The benchmark model is the conventional two-way fixed effect (TWFE) difference-in-difference (DID) estimator. First, we implement the event study DID estimator by using the following equation:

$$Y_{icb} = \sum_{g, g \neq 21-23} \beta_g Open_c \times Age_g + \gamma_c + \gamma_b + \gamma_s b + \epsilon_{icb} \tag{1}$$

where Y_{icb} is a long-run outcome for an individual, i, born into county, c, in birth-year cohort, b. $Open_c$ is an indicator variable for an individual born in a county having a college

[11] Similar work on public two-year college openings by Connolly (2021) uses age cohorts between 32 and 34 as the baseline age to examine community colleges.

[12] The extent to which older birth cohorts are exposed to openings would bias our estimates towards zero, so we take our estimates developed below as conservative estimates of the effects of openings.

or university open between 1943 and 1983. Age_g is an indicator variable for an individual whose age is in age group g in the earliest college opening year.[13] We always include county fixed effects, γ_c, and birth cohort fixed effects, γ_b, to capture county or birth cohort specific differences that may be correlated with the outcomes. We also always include state-by-birth cohort linear trends, $\gamma_s b$, to capture differential changes in state-level educational policies and funding.

We also report a pooled DID estimates that matches equation 1:

$$Y_{icb} = \beta_{g<21} Open_c \times Age_{g<21} + \gamma_c + \gamma_b + \gamma_s b + \epsilon_{icb} \tag{2}$$

where $Age_{g<21}$ becomes an indicator variable for a person being younger than 21 at the time of a college opening and everything else is defined as in equation (1).

We implement both equation (1) and (2) for various subgroups to analyze heterogeneous effects. First, in addition to the analysis with the entire sample, we separately estimate the treatment effects by restricting the sample to rural counties.[14] Second, we examine institution-level-specific effects by separating counties based on whether their first college opening was a two-year or four-year institution. Specifically, when estimating the impact of two-year institutions, we exclude counties that had a four-year college opening, and vice versa. Finally, we further explore heterogeneity by subdividing the sample based on race to capture race-specific differences.

3.6 Robustness to other Estimators

Concerns regarding the conventional TWFE DID models with multiple treatment periods have been well documented (Callaway and Sant'Anna, 2021, Goodman-Bacon, 2021, de Chaisemartin and D'Haultfœuille, 2020). To verify our results are not driven by these potential issues, we test the robustness of our estimates to group time-average treatment effect estimates following Callaway and Sant'Anna (2021) in Appendix B. (These results are similar to our conventional TWFE DID estimates.) There may also be concerns related to parallel trends assumption in some estimates, so we also estimate the robustness of treatment effects when parallel trends assumption is violated following Rambachan and Roth (2023) in Appendix B. These alternative estimates yield consistent results consistent with our baseline specification, which we present and discuss in the next section.

[13] An age group for all individuals born into non-opening counties is defined as Age_{21-23}, the baseline age group.

[14] Rural counties are defined based on MSA non-metro delineations in 1940-1950, which is available on the IPUMS County Composition of Metropolitan Areas. Other rurality definitions yield similar results.

4 Main Results

4.1 Impacts on Educational Attainment

We begin by examining how local college openings affect individuals' educational attainment. Using the TWFE specification as the baseline (equation (1) and (2)), Figures 2 and 3 display dynamic effects on years of education and degree attainment, and Table 2 summarizes pooled DID estimates.

Figure 2 shows no statistically significant effects across non-college going age cohorts (ages 21+ at opening), while cohorts who were younger than 21 at the time of the opening achieved an additional .1 years of education. We decompose the effects by institution levels and degree attainment to show the source of the gains in educational attainment (Figure 3). Two-year openings increase overall educational attainment increases (Panel 3a), driven by increases in Associate's degree attainment with no impact on bachelor's degree attainment; four-year openings do not impact years of educational attainment (Panel 3d) and have at best a modest impact on associate degree attainment, an impact which is much less pronounced than the two-year openings. However, four-year college openings raise bachelor's degree attainment by approximately as much as two-year openings increase associate degree attainment (though the age-bin estimates are noisy). Because two-year institutions typically grant associate degrees and four-year institutions grant bachelor degrees, the relative size of these impacts is not surprising. Appendix Figure A.1 provides additional educational outcomes.

Table 2 summarizes the aggregate impacts. Pooling all openings (Panel A), a local opening increases years of education by approximately 0.1 years of education (0.76% of the control mean). This effect is driven by two-year college openings (Panel B), with increases in any college education by 2 percentage points (5.21%) and associate degree attainment by 1 percentage point (22%), but without increase in bachelor's degree. On the other hand, four-year college openings (Panel C) increase associate degree attainment by 0.3 percentage points (8.11%) and bachelor's degree attainment by 1 percentage point (9.47%), while leaving the years of education unchanged.

As a robustness check, we re-estimate impacts using the approach proposed by Callaway and Sant'Anna (2021). The results largely align for two-year openings and more attenuation for four-year openings, including statistically insignificant changes in some college education and bachelor's degree attainment.

In sum, two-year college openings drive the overall increases in educational attainment through increases in some college education or associate degrees, whereas four-year openings show suggestive gains at the bachelor's degree-level without significant increases in years of

education. Neither two-year nor four-year openings yield significant impacts on educational attainment beyond the bachelor's degree level. The two-year results are consistent with their institutional mission to serve individuals at the margin of college entry or completion. By contrast, the four-year results— namely, a modest change in total years along with possible gains at the associate and/or bachelor's degree—suggest potential heterogeneous effects through educational substitution. For example, four-year college openings may draw in marginal students—who otherwise might not have pursued college education—to enroll and complete associate or bachelor's degrees locally and may also redirect higher-ability students—who might have otherwise pursued more selective or advanced degree program elsewhere—toward earning terminal bachelor's degrees locally. These interpretations are consistent with the migration patterns documented below but should be viewed as suggestive. Given their greater impacts in the main analysis, we focus on the two-year openings in the following sections.

Finally, we note that our estimates are identified at the birth-county birth-cohort level and represent changes in educational attainment only for the local community and do not reflect, for example, students who migrate into the county to attend or work at a newly opened institution.

4.2 Impacts on Income and Longevity

Figure 4 plots event study estimates for administratively measured income and lifespan, disaggregated by two- and four-year openings. For two-year openings, a sustained increase in adjusted gross income (AGI) begins in cohorts slightly older than the baseline age cohort and persists into younger cohorts, reaching over $5,000 (roughly 5%) relative to the baseline cohort (Panel 4a).[15] Given that two-year colleges enroll older students on average relative to four-year colleges, this timing may suggest effects for older cohorts in the two-year setting. Panel 4b shows similar dynamics of positive impacts on lifespan. We discuss the connection between earnings and lifespan below in this section. Appendix Figure A.2 and A.3 provide additional event study estimates for pooled-institution types for labor market participation, lifespan, income, and migration outcomes.

Table 3 reports pooled DID estimates for labor market participation, income, and longevity.

[15]Though the estimates are flat for those 35 or older, individuals aged 22 to 34—who are assumed to have no direct exposure to the opening—exhibits upward trends that could indicate pretrends. We employs the robust inference in event-study design in Rambachan and Roth (2023), which estimates the bounds of treatment effects under the violation of the parallel trends assumption. Appendix Figure B.2 shows that our estimates are robust to this alternative specification. However, we also note that two-year institutions often enroll non-traditionally aged students so that the impacts on those aged 22 to 34 could be measuring genuine treatment effects rather than reflecting confounding pre-trends.

Pooling openings across both institution-types, discouraged labor market participation falls by 0.4 percentage points (-0.56%) and AGI rises by $5,350 (5.36%) in response to the opening.[16] We note, however, that the event–study results for discouraged participation display decreasing trends for older age cohorts, suggesting some sensitivity to pre–treatment dynamics. The impacts on unemployment, however, are small and imprecise in the aggregate (Table 3). Pooling openings across both institution-types, lifespan increases by 0.072 years (0.09%) (Table 3). These estimates are based on birth-county birth-cohort level college openings and likely include spillovers to individuals in the cohort who did not attend the newly opened college (Moretti, 2004). For this reason, we do not interpret these estimates as individual-level labor-market or lifespan returns to education, but instead as birth-county-cohort-level impacts. That said, these estimates are consistent with the view that two-year institutions serve local communities and impact individuals on the extensive margin of college attendance for whom the effects of college attendance may be relatively large.

Disaggregating by institution type we find that two-year openings account for the income and longevity gains, while four-year openings show suggestive evidence of shifts in extensive-margin labor outcomes.[17] For two-year colleges (Panel B of Table 3), discouraged status falls by 0.5 percentage point (-0.71%), AGI increases by $5,710 (5.72%), and lifespan increases by 0.078 years (0.10%), with negligible unemployment effects. Four-year college openings (Panel C), on the other hand, reduce unemployment by 0.2 percentage points (-20%), while AGI and lifespan effect are small and statistically insignificant.[18]

Finally, the magnitude of the AGI and longevity estimates are consistent with existing estimates of the relationship between earnings and lifespan. Our pooled openings estimates imply that a $5,350 increase in AGI corresponds to a 0.072 year gain in lifespan. The relative magnitude of these estimates implies a lifespan to income gradient similar to that in Chetty et al. (2016). Using Chetty et al. (2016) data for bottom quartile earners—the individuals likely to be on the margin of attending a local community college after its opening—a 1% earnings increase would be associated with a 0.016-0.019 year increase in life expectancy. Scaling these by the percentage impacts on earnings we estimated (5.36%) yields a predicted 0.085-0.101 years of additional lifespan increase, which is consistent to our estimated impact

[16]Replacing AGI with wage and salary income yields similar magnitude of $4,350 (4.9%). See Appendix Table A.2 for more details.

[17]We assign wages to be missing if the wage is zero and an individual is unemployed. Thus individuals with zero wages and unemployment status are excluded from our sample which implies that decreasing unemployment (as four-year institutions do) would not mechanically increase incomes, and the extensive labor market margin (employment status) does not automatically adjust the intensive labor market margin (earnings).

[18]The pooled event–study for discouraged nonparticipation for pooled college opening case show pre-trends (Appendix Figure A.2). We therefore interpret the discouraged estimates as suggestive and focus on the income and longevity impacts.

of 0.072 years on lifespan. We view this consistency as descriptive, and college access may affect longevity through other channels beyond earnings.

Employing the specifications proposed by Callaway and Sant'Anna (2021) (C-S DID), Appendix Figures B.3, B.4, and B.5 display event study estimates for lifespan (Panel B.3f), and Appendix Tables B.2 show pooled effects on labor market participation and lifespan. For pooled college openings, we find similar improvements in labor force participation and lifespan as under TWFE—a decline in discouraged nonparticipation of 0.5 percentage point (-0.70%) and an increase in lifespan of 0.042 years (0.05%). Results by institution level show directionally similar effects with statistically insignificant results.

5 Mechanisms: Migration and Industry Choice Effects

To investigate potential mechanisms, we estimate both equations (1) and (2) with migration outcomes and industry of employment as dependent variables. Table 4 reports the pooled DID estimates of migration outcomes and industry choice. We find no evidence that college openings affect overall migration patterns. However, local college access decreases the likelihood of migration to urban county by 0.5 percentage points (-2.10%), and two-year college openings drives the pattern with -0.7 percentage point change (-2.75%).[19] In contrast, four-year college openings increase the likelihood of migration to urban counties by approximately 2 percentage points (10%). Taken together with income results, these migration patterns suggest that the income gains associated with two-year colleges stem primarily from enhanced local employment opportunities, whereas four-year colleges encourage local out-migration to urban counties but without accompanying increases in earnings.

For industry choice outcomes, we estimate that local college openings reduce the probability of working in agriculture by 0.1 percentage points (-4.55%) and service industries by 0.3 percentage points (-0.43%), while raising the probability of employment in other sectors by 0.2 percentage points (1.65%). These effects are again primarily driven by the two-year college openings. By contrast, four-year openings increase the probability of working in agriculture by 0.3 percentage points (16%) and in service sector by 1 percentage point (1.41%), while decreasing the probability of working in other sectors by 1.2 percentage points (8.63%).

One possible explanation for these limited industry choice patterns is variation in occupational preferences and skill requirements for jobs that two-year and four-year college attendees pursue. Individuals attending two-year colleges might shift from sectors requiring less years of education, such as manual labor in agriculture or entry-level service jobs, to-

[19]"Migration to urban" is defined as migration from either rural or urban origin counties into urban destination counties.

ward occupations requiring vocational training or licenses and certificates, such as electrical or plumbing occupations. In contrast, four-year college attendees may transition toward managerial roles within agriculture (e.g., agribusiness management) and higher-skill service industries, such as information technology. Our estimates are consistent with these sorts of within-industry changes.

We also estimate the impacts on migration and industry choice by employing C-S DID (Appendix Table B.3). The results largely align with the TWFE results, with differences in statistical significance. For migration results, any opening reduces migration to urban counties by 1.3 percentage points (-5.35%), driven by two-year openings. By contrast, four-year openings raise both the overall migration and migration to urban counties by 2.4 percentage points and 1.2 percentage points, respectively. For industry outcomes, signs and magnitudes are similar to TWFE but with larger standard errors.

6 Potential for Heterogeneous Effects

6.1 Heterogeneous Effects by Rurality

Cohorts born into rural areas may experience different impacts from new college openings if new openings provide a bigger change in local access because baseline college education attainment lags urban areas (Van Maarseveen, 2021). To examine the potential heterogeneity in college opening impacts by rurality, we re-estimate the treatment effects by restricting the sample to rural counties.[20]

Table 5 shows that rural areas also experience gains in educational attainment.[21] While the overall years of education does not exhibit statistically significant increases for both two-year and four-year college openings, two-year openings raise the probability of some college education or above by 1.3 percentage points (3.4%), and associate degree attainment by 0.7 percentage points (17%), comparable to the all area estimates presented in Table 2. Four-year openings in rural counties increase the probability of some college education or above by 1.5 percentage points (4%), and bachelor's degree attainment or above by 1.4 percentage points (8.6%). Corresponding C-S DID estimates (Table B.4) also show similar patterns: two-year rural openings raise some college education or above and associate degree attainment, whereas four-year rural effects are positive but statistically not significant. Overall, these educational results suggest that college openings primarily enhance educational attainment

[20]Rural counties are defined based on MSA non-metro delineations in 1940-1950, which is available on the IPUMS County Composition of Metropolitan Areas.

[21]Figure 5 displays event study estimates of two-year openings' impact on educational outcomes and lifespan and shows no significant pre-trends.

among individuals who are at the margin of college enrollment or degree completion, with primary impacts from two-year colleges.

Turning to labor markets and longevity, Table 6 shows that rural two-year openings reduce discouraged non-participation by 0.4 percentage point (-0.57%) and raise lifespan by 0.03 years (0.04%). The unemployment rate rises by 0.1 percentage point, which can happen when increased numbers of individuals actively seeking employment. For rural four-year openings, the effects on labor market and longevity outcomes are small and statistically insignificant. The alternative C-S DID estimates report similar patterns for labor market participation but smaller and statistically not significant results for lifespan (Appendix Table B.5).

Table 7 reports results of migration and industry choice in rural counties. Two-year openings raise the likelihood overall migration by 0.8 percentage points (1.15%) but do not significantly facilitate migration toward urban counties, while C-S DID suggests a reduction in migration to urban counties (Appendix Table B.6). Four-year openings, on the other hands, show larger and positive effects of 1-2 percentage point (4-8%) on migration to urban counties. For industry choice, two-year openings have small and not statistically significant effects, whereas four-year openings increase the probability of engaging in agricultural industry by 0.5 percentage points (24%) and reduce employment in "other" industries by 1.1 percentage points (-8%) in TWFE; the corresponding C-S DID estimates are similar in sign but not statistically significant.

We interpret the migration and industry choice results as evidence that rural two-year colleges primarily expand local employment opportunities without promoting migration to urban areas or altering industry choice, whereas rural four-year colleges are more likely to reorganize employment location and industry choice—toward urban labor markets and into agriculture roles, possibly requiring higher skills. We emphasize, however, that industry estimates are not statistically different from zero under C-S DID, and thus these mechanisms should be interpreted with caution.

6.2 Heterogeneous Effects by Race

To assess the potential heterogeneity by race, we re-estimate our main specifications on subsamples of individuals identifying themselves as White or Black.[22] Table 8 report that two-year openings raise educational attainment for both groups, with somewhat larger gains for Black individuals. Years of education increase by 0.1 (0.73%) for White and 0.15 (1.28%) years for Black. Probabilities of having some college educations or higher increase by 2 per-

[22]The impacts of any college openings are presented in Appendix Table A.3 through A.5, and four-year openings in Appendix Table A.7 through A.9.

centage points (5%) for White and 2.1 percentage points (7%) for Black. Degree attainment also differs: for White, associate degrees by 0.9 percentage point (21.43%) while bachelor's is small negative by 0.3 percentage point (-3.06%); for Black, associate and bachelor's degree both rise by 0.7 (19.44%) and 0.4 (7%) percentage points, respectively, with bachelor's degree or higher by 0.8 percentage point (7.34%). Overall, two-year college access improves educational attainment for both racial groups, with slightly larger gains in degree attainment for Black individuals.

On the other hand, we observed notable differences in labor market outcomes, lifespan, and migration patterns across racial groups (Table 9). White individuals experience slight increase in unemployment but also shows decrease in probability of discouraged, implying improved labor market engagement. Lifespan also increases by 0.08 years (0.10%) for White. Black individuals, on the other hand, do not experience statistically significant improvements in labor market participation and lifespan. Migration outcomes also differ by race: in both races, the probability of migrating to urban counties decreased for both groups, with a larger decline for Black individuals. Meanwhile, White and Black individuals show similar patterns for industry choice (Appendix Table A.6): less likely to work in agricultural industry. These estimates provide evidence of heterogeneous returns to education across races, possibly reflecting variations in local opportunities, social networks or barriers (Bertrand and Mullainathan, 2004, Lang and Manove, 2011, Ananat et al., 2018), rather than differences in industry sector reallocation.

7 Conclusion

This paper provides new evidence on the long-term, local impacts of the expansion of two-year and four-year colleges across the mid-twentieth century. Using linked federal administrative microdata and variation in the timing of college openings, we show that local access to higher education raised educational attainment and income, and modestly enhanced longevity. These effects were driven by the establishment of two-year institutions, which broadened access to post-secondary education for a broader population compared to four-year institutions. These findings are consistent with the view that two-year institutions often serve local communities and that an individual on the extensive margin of college attendance is more sensitive to loosening access constraints caused by a local two-year institution opening. By contrast four-year institutions often serve a broader geographic group of students and enroll students who likely would have gone to college regardless of local college access.

In addition to schooling and earnings, our findings highlight potential mechanisms through which local colleges altered individuals' economic outcomes. Local access to colleges shifted

employment away from agriculture and reduced out-migration to urban counties, suggesting that higher education access contributes to changes in local employment opportunities. Heterogeneity analyses further show that remote areas also enjoyed benefits from two-year openings. Black individuals experienced somewhat greater educational gains than White individuals, but these gains did not translate into larger labor market returns.

While this article uses some of the most complete datasets and longitudinal linkages available, our analysis is nonetheless limited by Census data availability. As linkages of 1950-1990 Decennial Census to other Census products in the Federal Statistical Research Data Center are not available at the time of writing, our estimates do not include cohorts who have passed away prior to 2000. Given the well-known negative relationship between mortality and education, our estimates may be biased and understate the true long-run effects. Additionally, while the Numident and IRS data used in this article are administrative, our measures of educational attainment (2000-2019) are self-reported and thus subject to more measurement error. Nonetheless, these microdata represent some of the most comprehensive extant microdata available to examine these topics.

In sum, the results underscore the critical role of college openings—especially two-year institutions—in broadening access to education, improving individuals' labor market outcomes, and enhancing well-being. At the same time, recent concerns about college closures and mergers raise important questions about whether the loss of local educational access today may reverse some of these historical gains. An open question for future work is the potential costs of contraction in higher education for individuals and communities. In addition, future research could use similar data to examine the potential for heterogeneous effects by historical type of institutions, such as Historically Black Colleges and Universities or Tribal Colleges and Universities (Edwards et al., 2025, Kim et al., 2025).

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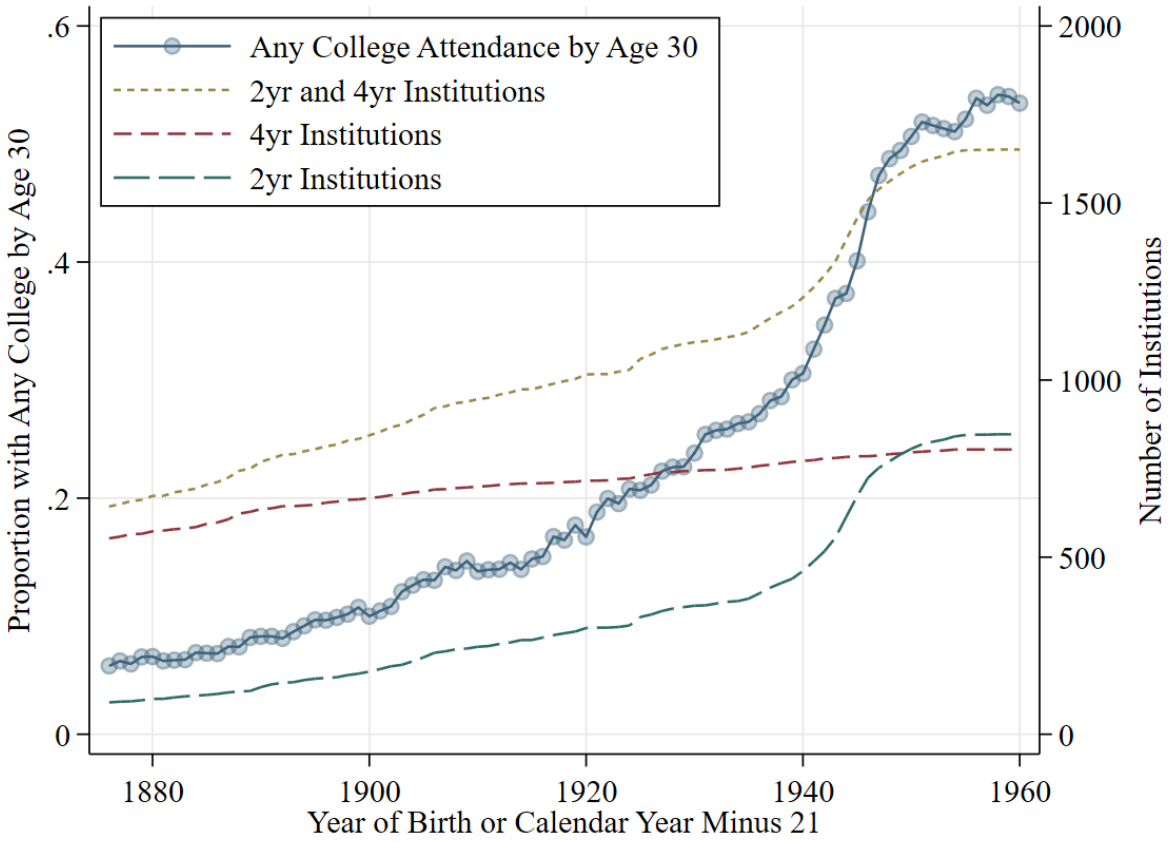
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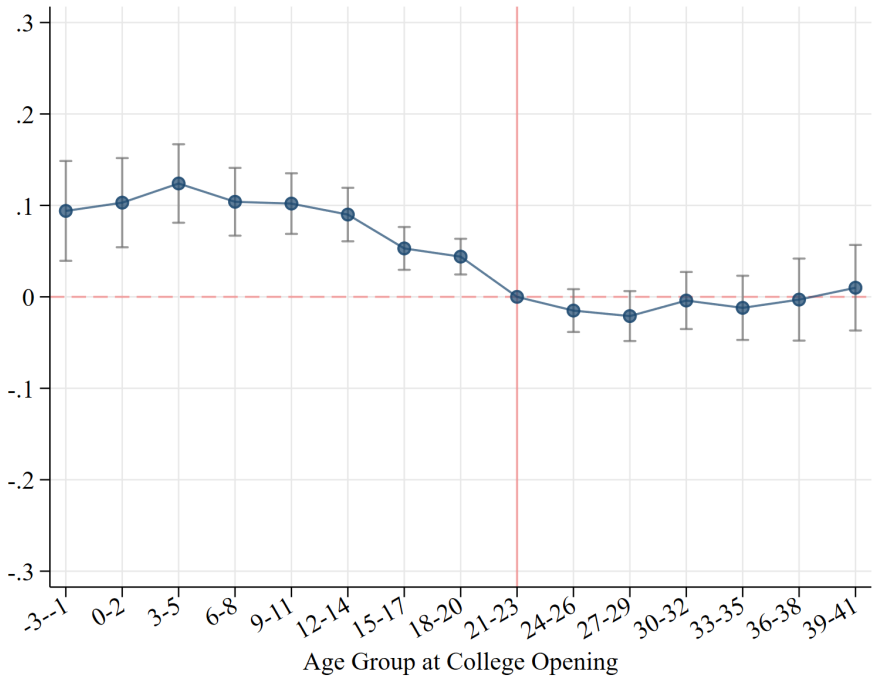
Figures

Figure 1: Trends in US College Attendance and Institutional Expansion, 1876-1960 Birth Cohorts



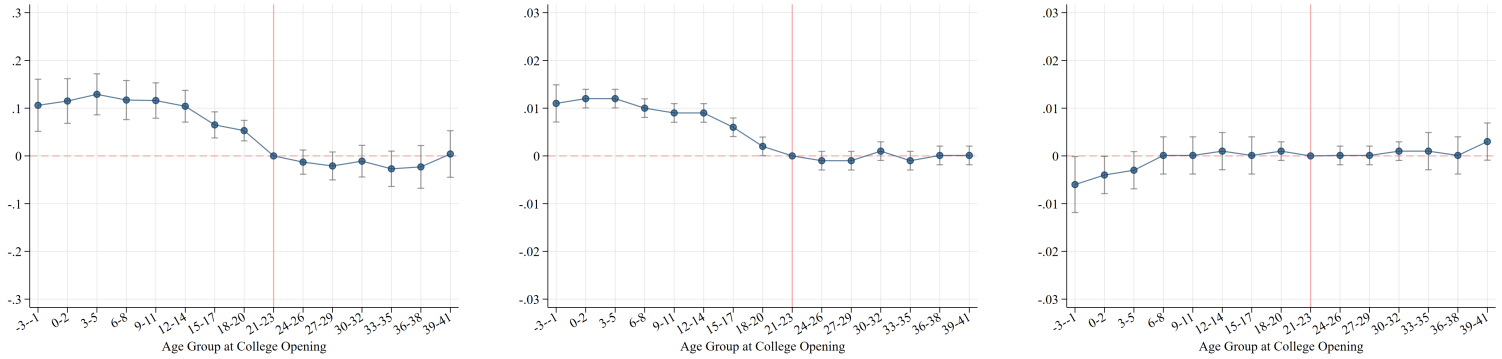
Note: This figure displays the national trends in the share of U.S. born individuals attending any college (1+ years) by age 30 (left axis) and the number of two-year and four-year institutions (right axis). "Any college" includes those with some college education, two-year degrees, four-year degrees, and graduate degrees. Institution counts are aligned with birth cohorts by subtracting 21 years from the calendar year to approximate typical college attending age. *Sources*: College attendance from Autor et al. (2020); institutional counts from IPEDS.

Figure 2: Impact of College Access on Educational Outcomes, Two-year and Four-year Pooled

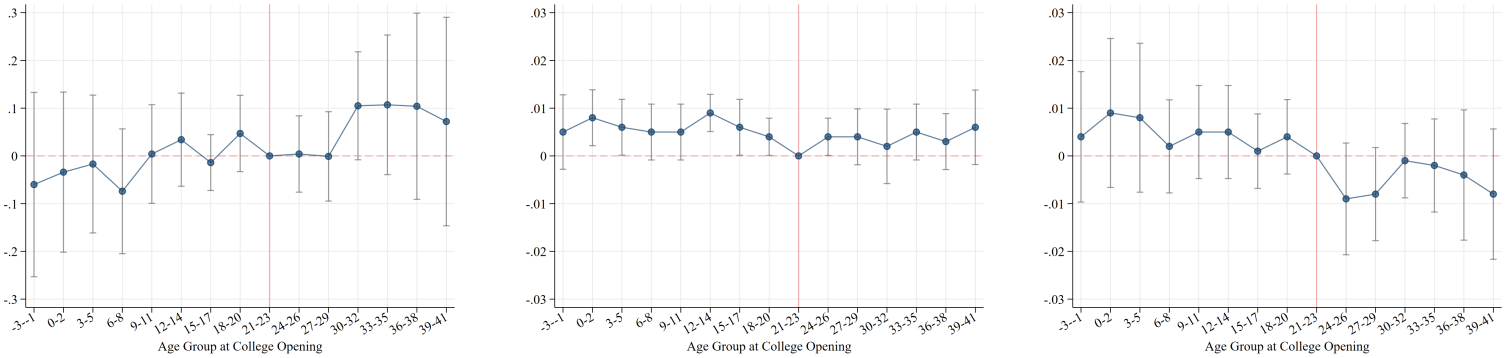


Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

Figure 3: Impact of College Access on Educational Outcomes, Two-year vs Four-year openings



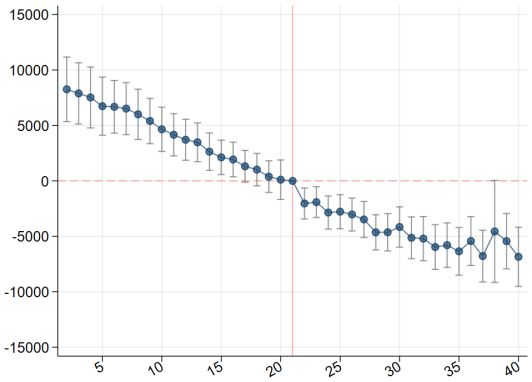
(a) Years of Education (Two-year) (b) Associate Degree (Two-year) (c) Bachelor Degree (Two-year)



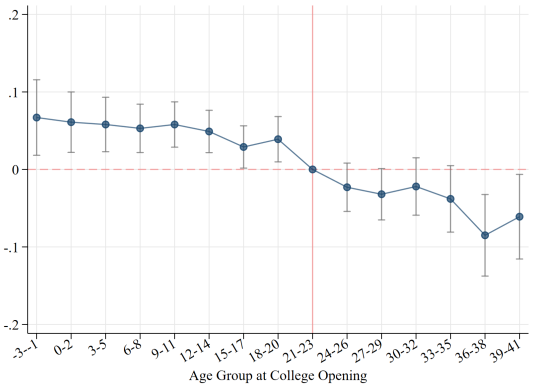
(d) Years of Education (Four-year) (e) Associate's Degree (Four-year) (f) Bachelor's Degree (Four-year)

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

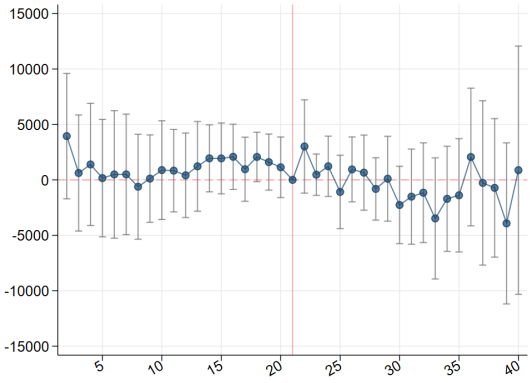
Figure 4: Impact of College Access on Income and Longevity, Two-year vs Four-year openings



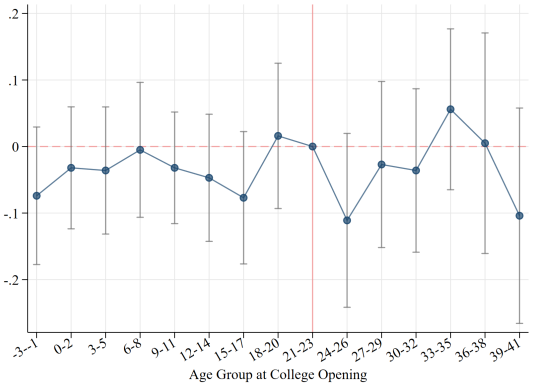
(a) Adjusted Gross Income (Two-year)



(b) Lifespan (Two-year)



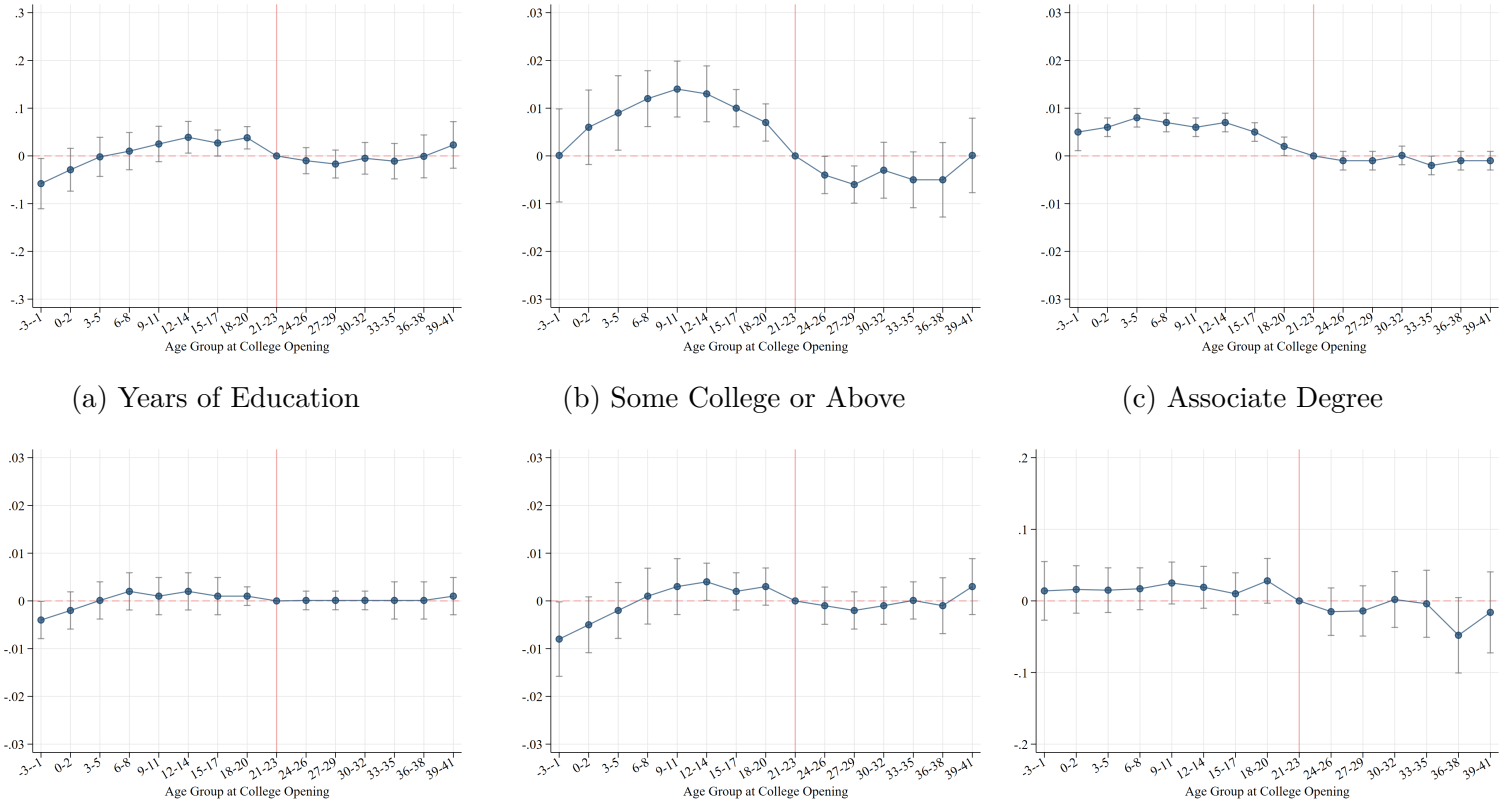
(c) Adjusted Gross Income (Four-year)



(d) Lifespan (Four-year)

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to (i) the 2000 long-form Decennial Census and the American Community Survey (2005–2019) microdata for labor market participation and lifespan outcomes, and (ii) the universe of Internal Revenue Service (IRS) tax microdata for tax years 1974 and 1979 for income. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Figure 5: Impact of 2 Year College Access on Educational and Health Attainment, Rural Areas



(a) Years of Education (b) Some College or Above (c) Associate Degree

(d) Bachelor's Degree (e) Bachelor's Degree or Above (f) Longevity

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as a rural two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Tables

Table 1: Institutional Characteristics - Two-year and Four-year

	Two-year			Four-year		
	Mean	S.D.	Count	Mean	S.D.	Count
Student Profiles						
Fall Enrollment, UG	6,611	6,235	647	4,735	6,765	323
Full-Time Only	2,540	2,200	647	3,260	4,444	321
White, UG (ratio)	0.67	0.22	647	0.65	0.23	323
Black, UG (ratio)	0.13	0.15	647	0.11	0.13	323
Age $>$ 24, UG (ratio)	0.42	0.10	647	0.33	0.22	322
150% of Normal Time Completers, UG (ratio)	0.24	0.14	647	0.45	0.19	296
Avg Tuition, UG (In State, $)	3,370	2,583	647	13,552	9,981	320
Student Services, and Financial Aid						
Academic/Career Counseling (ratio)	1.00	0.07	649	0.97	0.16	351
Day Care (ratio)	0.60	0.49	649	0.29	0.46	351
Employment Services (ratio)	0.94	0.24	649	0.84	0.37	351
Avg Federal Grants Received by UG ($)	3,678	785	646	4,113	1,124	297
Avg State/Local Grants Received by UG ($)	1,582	1,006	646	3,490	2,332	295
Avg Institutional Grants Received by UG ($)	1,412	1,040	646	5,627	4,605	296
Expenditure and Revenue						
Avg Instructional Expenditure Per Student ($)	8,691	7,050	616	53,144	313,447	307
Avg Federal Appropriations Per Student ($)	76	495	616	722	9,203	307
Avg State/Local Appropriations Per Student ($)	10,426	5,629	616	19,782	115,370	307

Note: The table presents descriptive statistics comparing two-year and four-year institutions in terms of students, tuition, institutional services, and financial aid. Data are primarily drawn from the 2004 IPEDS, and missing values are supplemented with data from the 2002 and 2003 IPEDS. "Completers within 150% of Normal Time" means completers within 6 years for a bachelor's degree and 3 years for an associate's degree. "Employment Services" means activities intended to assist students by providing part-time employment in obtaining part-time employment to partially aid students' educational costs.

Table 2: Impact of College Access on Educational Attainment

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. Any College Opening					
$OPEN_c \times AGE_{<21}$	0.094***	0.019***	0.008***	<0.001	<0.001
	(0.017)	(0.002)	(0.001)	(0.001)	(0.002)
As PCT of Mean	0.76%	4.99%	20.00%	0.54%	0.31%
(Mean) Age 21+	12.39	0.381	0.04	0.093	0.163
Observations	28,440,000	28,440,000	28,440,000	28,440,000	28,440,000
Panel B. Two-year College Opening					
$OPEN_c \times AGE_{<21}$	0.109***	0.020***	0.009***	-0.001	<0.001
	(0.018)	(0.003)	(0.001)	(0.001)	(0.002)
As PCT of Mean	0.88%	5.21%	21.95%	-1.09%	0.31%
(Mean) Age 21+	12.4	0.384	0.041	0.092	0.163
Observations	27,640,000	27,640,000	27,640,000	27,640,000	27,640,000
Panel C. Four-year College Opening					
$OPEN_c \times AGE_{<21}$	-0.050	0.015*	0.003**	0.009**	0.010
	(0.054)	(0.008)	(0.002)	(0.004)	(0.006)
As PCT of Mean	-0.40%	3.97%	8.11%	9.47%	6.06%
(Mean) Age 21+	12.43	0.378	0.037	0.095	0.165
Observations	14,320,000	14,320,000	14,320,000	14,320,000	14,320,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table 3: Impact of College Access on Labor Market and Health Outcomes

	(1) Unemployed	(2) Discouraged	(3) Adjusted Gross Income	(4) Lifespan
Panel A. Any College Opening				
$OPEN \times AGE_{<21}$	<0.001	-0.004***	5,350***	0.072***
	(<0.001)	(0.001)	(600)	(0.013)
As PCT of Mean	4.55%	-0.56%	5.36%	0.09%
(Mean) Age 21+	0.011	0.710	99,870	81.29
Observations	28,440,000	28,440,000	60,760,000	28,440,000
Panel B. Two-year College Opening				
$OPEN_c \times AGE_{<21}$	<0.001	-0.005***	5,709***	0.078***
	(<0.001)	(0.001)	(628)	(0.014)
As PCT of Mean	4.55%	-0.71%	5.72%	0.10%
(Mean) Age 21+	0.011	0.701	99,740	80.97
Observations	27,640,000	27,640,000	61,000,000	27,640,000
Panel C. Four-year College Opening				
$OPEN_c \times AGE_{<21}$	-0.002**	-0.010*	1,042	-0.003
	(0.001)	(0.005)	(1,169)	(0.038)
As PCT of Mean	-20.00%	-1.40%	1.06%	0.00%
(Mean) Age 21+	0.010	0.714	97,890	81.70
Observations	14,320,000	14,320,000	61,230,000	14,320,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to (i) the 2000 long-form Decennial Census and the American Community Survey (2005–2019) microdata for labor market participation and lifespan outcomes, and (ii) the universe of Internal Revenue Service (IRS) tax microdata for tax years 1974 and 1979 for income. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table 4: Impact of College Access on Migration and Industry Choice

	(1) Migration	(2) Migration (to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. Any College Opening						
$OPEN_c \times AGE_{<21}$	0.005	-0.005**	-0.001**	0.002	-0.003*	0.002*
	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
As PCT of Mean	0.73%	-2.06%	-4.55%	1.29%	-0.43%	1.65%
(Mean) Age 21+	0.689	0.243	0.022	0.155	0.702	0.121
Observations	28,440,000	28,440,000	16,110,000	16,110,000	16,110,000	16,110,000
Panel B. Two-year College Opening						
$OPEN_c \times AGE_{<21}$	0.005	-0.007***	-0.002***	0.003*	-0.003**	0.002**
	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
As PCT of Mean	0.72%	-2.75%	-8.70%	1.89%	-0.43%	1.67%
(Mean) Age 21+	0.692	0.255	0.023	0.159	0.698	0.120
Observations	27,640,000	27,640,000	15,680,000	15,680,000	15,680,000	15,680,000
Panel C. Four-year College Opening						
$OPEN_c \times AGE_{<21}$	0.015	0.019**	0.003**	<0.001	0.010*	-0.012***
	(0.013)	(0.009)	(0.001)	(0.004)	(0.005)	(0.003)
As PCT of Mean	2.18%	9.69%	15.79%	0.38%	1.41%	-8.63%
(Mean) Age 21+	0.687	0.196	0.019	0.132	0.710	0.139
Observations	14,320,000	14,320,000	7,736,000	7,736,000	7,736,000	7,736,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table 5: Impact of College Access on Educational Outcomes, Rural

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. Two-year College Opening					
$OPEN_c \times AGE_{<21}$	0.025	0.013***	0.007***	0.001	0.002
	(0.017)	(0.002)	(0.001)	(0.001)	(0.002)
As PCT of Mean	0.20%	3.38%	17.07%	1.08%	1.23%
(Mean) Age 21+	12.39	0.385	0.041	0.093	0.163
Observations	12,820,000	12,820,000	12,820,000	12,820,000	12,820,000
Panel B. Four-year College Opening					
$OPEN_c \times AGE_{<21}$	-0.024	0.015*	0.002	0.009**	0.014**
	(0.054)	(0.008)	(0.001)	(0.003)	(0.007)
As PCT of Mean	-0.19%	4.03%	5.26%	9.47%	8.64%
(Mean) Age 21+	12.41	0.372	0.038	0.095	0.162
Observations	9,040,000	9,040,000	9,040,000	9,040,000	9,040,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata and restricted to individuals born in rural counties. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Table 6: Impact of College Access on Labor Market and Health Outcomes, Rural

	(1) Unemployed	(2) Discouraged	(3) Lifespan
Panel A. Two-year College Opening			
$OPEN_c \times AGE_{<21}$	0.001**	-0.004***	0.030**
	(<0.001)	(0.001)	(0.013)
As PCT of Mean	9.09%	-0.57%	0.04%
(Mean) Age 21+	0.011	0.700	80.92
Observations	12,820,000	12,820,000	12,820,000
Panel B. Four-year College Opening			
$OPEN_c \times AGE_{<21}$	-0.001	-0.004	0.009
	(0.001)	(0.004)	(0.035)
As PCT of Mean	-10.00%	-0.56%	0.01%
(Mean) Age 21+	0.010	0.716	81.85
Observations	9,040,000	9,040,000	9,040,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata and restricted to individuals born in rural counties. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Table 7: Impact of College Access on Migration and Industry Choice, Rural

	(1) Migration	(2) Migration (Rural to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. Two-year College Opening						
$OPEN_c \times AGE_{<21}$	0.008**	0.001	<0.001	-0.001	<0.001	0.001
	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
As PCT of Mean	1.15%	0.36%	2.08%	-0.63%	0.07%	0.83%
(Mean) Age 21+	0.694	0.275	0.024	0.160	0.696	0.121
Observations	12,820,000	12,820,000	6,825,000	6,825,000	6,825,000	6,825,000
Panel B. Four-year College Opening						
$OPEN_c \times AGE_{<21}$	-0.003	0.010	0.005***	<0.001	0.007	-0.011***
	(0.010)	(0.007)	(0.002)	(0.003)	(0.005)	(0.004)
As PCT of Mean	-0.43%	4.18%	23.81%	0.36%	0.99%	-8.03%
(Mean) Age 21+	0.690	0.239	0.021	0.137	0.705	0.137
Observations	9,040,000	9,040,000	4,672,000	4,672,000	4,672,000	4,672,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata and restricted to individuals born in rural counties. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Table 8: Impact of Two-Year College Access on Educational Attainment, by Race

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. White					
$OPEN_c \times AGE_{<21}$	0.092***	0.019***	0.009***	-0.003*	-0.003
	(0.018)	(0.003)	(0.001)	(0.001)	(0.002)
As PCT of Mean	0.73%	4.79%	21.43%	-3.06%	-1.75%
(Mean) Age 21+	12.55	0.397	0.042	0.098	0.171
Observations	24,670,000	24,670,000	24,670,000	24,670,000	24,670,000
Panel B. Black					
$OPEN_c \times AGE_{<21}$	0.147***	0.021***	0.007***	0.004**	0.008***
	(0.044)	(0.004)	(0.001)	(0.002)	(0.002)
As PCT of Mean	1.28%	7.29%	19.44%	7.02%	7.34%
(Mean) Age 21+	11.45	0.288	0.036	0.057	0.109
Observations	2,435,000	2,435,000	2,435,000	2,435,000	2,435,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Table 9: Impact of Two-Year College on Labor Market, Health, and Migration Outcomes, by Race

	(1) Unemployed	(2) Discouraged	(3) Lifespan	(4) Migration	(5) Migration (to Urban)
Panel A. White					
$OPEN_c \times AGE_{<21}$	0.001***	-0.004**	0.081***	<0.001	-0.004*
	(<0.001)	(0.001)	(0.016)	(0.004)	(0.002)
As PCT of Mean	10.00%	-0.57%	0.10%	0.07%	-1.83%
(Mean) Age 21+	0.010	0.697	81.12	0.687	0.219
Observations	24,670,000	24,670,000	24,670,000	24,670,000	24,670,000
Panel B. Black					
$OPEN_c \times AGE_{<21}$	<0.001	-0.003	-0.016	0.005	-0.024***
	(0.001)	(0.002)	(0.024)	(0.006)	(0.007)
As PCT of Mean	3.33%	-0.41%	-0.02%	0.69%	-4.82%
(Mean) Age 21+	0.015	0.727	80.05	0.722	0.498
Observations	2,435,000	2,435,000	2,435,000	2,435,000	2,435,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) micro-data. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

A Appendix: Additional Descriptive Statistics and Results

This appendix includes figures and tables which provide statistics and college opening estimates by county rurality status and individual race. Overall, we find that rural area openings have smaller educational attainment impacts than urban area openings and that openings impact educational attainment measures for Black residents more strongly than for White even though these gains do not translate into larger subsequent labor market impacts.

A.1 Additional Descriptive Statistics for Rural Institutions

Table A.1: Institutional Characteristics - Two-year and Four-year, Rural

	2-year			4-year		
	Mean	S.D.	Count	Mean	S.D.	Count
Student Profiles						
Fall Enrollment, UG	4,216	3,983	370	3,650	4,972	108
Full-Time Only	1,724	1,369	370	2,483	3,141	108
White, UG (ratio)	0.75	0.17	370	0.73	0.19	108
Black, UG (ratio)	0.12	0.14	370	0.08	0.09	108
Age > 24, UG (ratio)	0.42	0.10	370	0.31	0.21	108
150% of Normal Time Completers, UG (ratio)	0.25	0.12	370	0.42	0.17	103
Avg Tuition, UG (In State, $)	2,950	1,800	370	12,435	9,935	108
Student Services, and Financial Aid						
Academic/Career Counseling (ratio)	0.99	0.07	371	0.99	0.09	112
Day Care (ratio)	0.51	0.50	371	0.29	0.46	112
Employment Services (ratio)	0.93	0.25	371	0.85	0.36	112
Avg Federal Grants Received by UG ($)	3,614	744	370	3,917	950	102
Avg State/Local Grants Received by UG ($)	1,560	783	370	3,149	1,891	102
Avg Institutional Grants Received by UG ($)	1,409	874	370	5,275	4,160	102
Expenditure and Revenue						
Avg Instructional Expenditure Per Student ($)	8,532	3,230	364	25,672	129,443	108
Avg Federal Appropriations Per Student ($)	40	376	364	1,305	13,567	108
Avg State/Local Appropriations Per Student ($)	10,950	5,785	364	5,392	7,755	108

Note: The table presents descriptive statistics comparing two-year and four-year institutions in rural counties in terms of students, tuition, institutional services, and financial aid. Data are primarily drawn from the 2004 IPEDS, and missing values are supplemented with data from the 2002 and 2003 IPEDS. "Completers within 150% of Normal Time" means completers within 6 years for a bachelor's degree and 3 years for an associate's degree. "Employment Services" means activities intended to assist students by providing part-time employment in obtaining part-time employment to partially aid students' educational costs.

A.2 Additional Results for Wage and Salaries

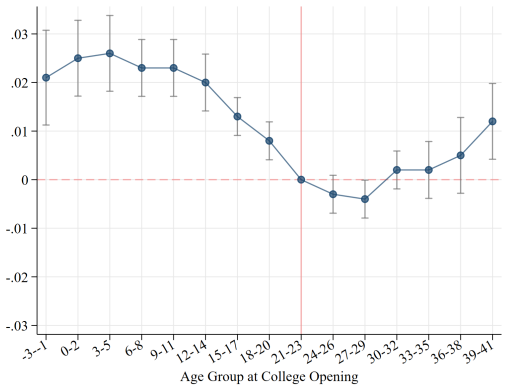
Table A.2: Impacts of College Access on Wage and Salary

	(1) All Openings	(2) Two-year	(3) Four-year
$OPEN_c \times AGE_{<21}$	4,354***	4,612***	906.3
	(500.1)	(522.6)	(1,161)
(Mean) Age 21+	88,900	88,900	87,000
Observations	60,760,000	61,000,000	61,230,000

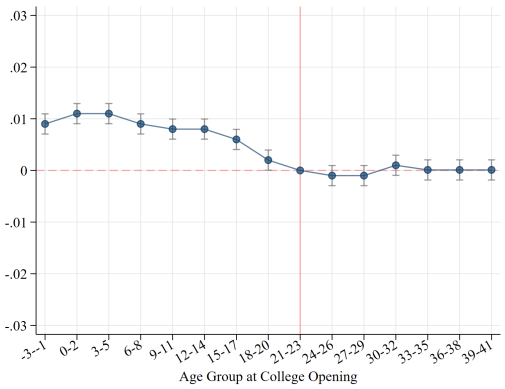
Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Each column presents estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the universe of Internal Revenue Service (IRS) tax microdata for tax years 1974 and 1979.

A.3 Additional Results for Any Institution Openings

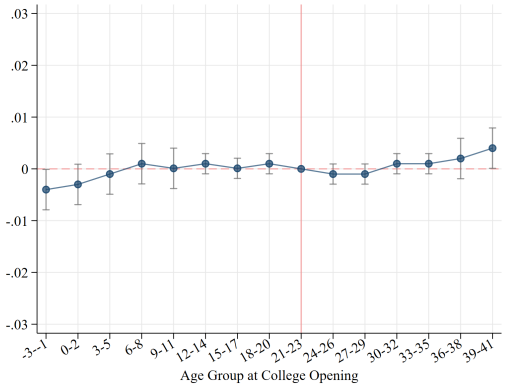
Figure A.1: Impacts of College Access on Educational Attainment



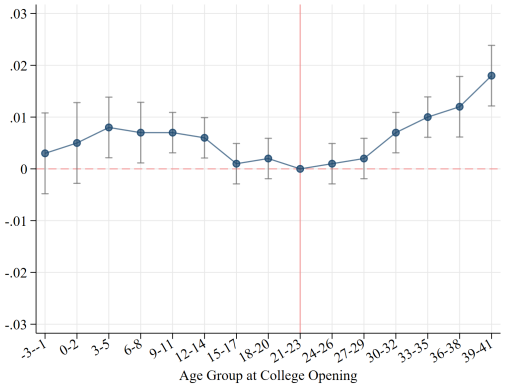
(a) Some College or Above



(b) Associate Degree



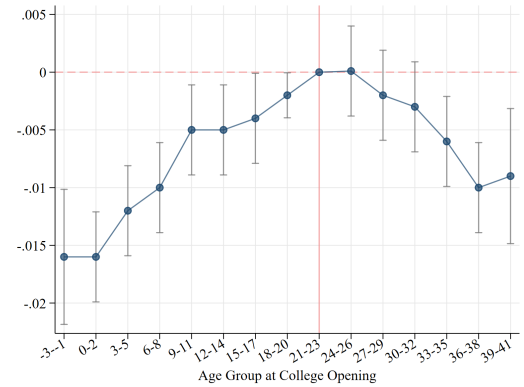
(c) Bachelor's Degree



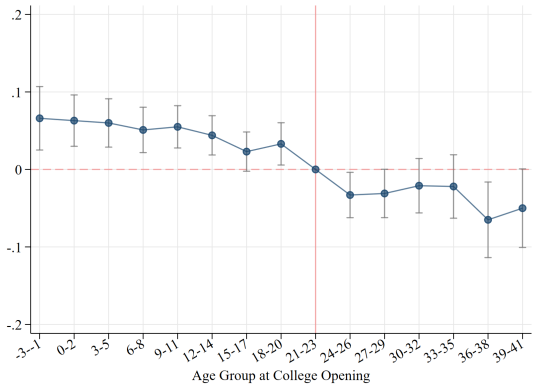
(d) Bachelor's Degree or Above

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

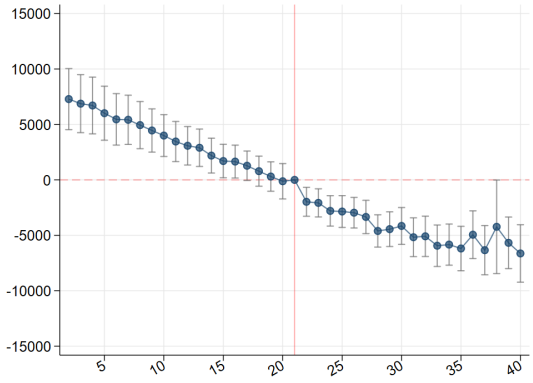
Figure A.2: Impacts of College Access on Labor Market and Health Outcomes



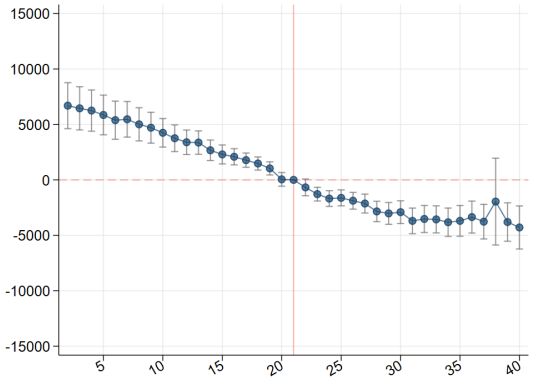
(a) Discouraged



(b) Lifespan



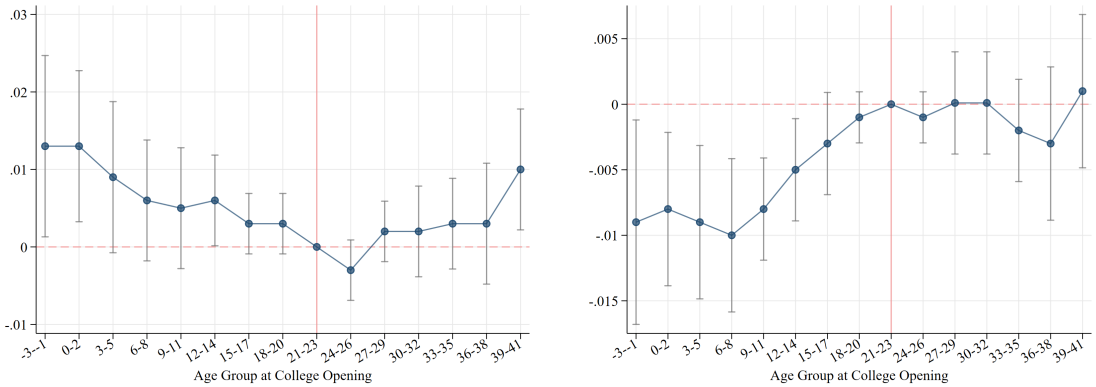
(c) Adjusted Gross Income



(d) Wage and Salary

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to (i) the 2000 long-form Decennial Census and the American Community Survey (2005–2019) microdata for labor market participation and lifespan outcomes, and (ii) the universe of Internal Revenue Service (IRS) tax microdata for tax years 1974 and 1979 for income. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4. The event-study figure for unemployment is omitted due to disclosure restrictions: after rounding to three decimal places (below the Census Bureau's four-digit limit), all coefficients and standard errors equal 0.000 or 0.001, making the figure uninformative.

Figure A.3: Impacts of College Access on Migration Outcomes



(a) Migration

(b) Migration to Urban

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

A.3.1 Effects by Race

Table A.3: Impacts of College Access on Educational Outcomes by Race

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. White					
$OPEN_c \times AGE_{<21}$	0.081***	0.017***	0.008***	-0.002	-0.003
	(0.017)	(0.003)	(0.001)	(0.001)	(0.002)
As PCT of Mean	0.65%	4.30%	19.51%	-2.04%	-1.75%
(Mean) Age 21+	12.54	0.395	0.041	0.098	0.171
Observations	25,370,000	25,370,000	25,370,000	25,370,000	25,370,000
Panel B. Black					
$OPEN_c \times AGE_{<21}$	0.112***	0.017***	0.006***	0.003*	0.006**
	(0.040)	(0.004)	(0.001)	(0.002)	(0.002)
As PCT of Mean	0.98%	5.90%	17.14%	5.26%	5.50%
(Mean) Age 21+	11.43	0.288	0.035	0.057	0.109
Observations	2,508,000	2,508,000	2,508,000	2,508,000	2,508,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) micro-data. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

Table A.4: Impacts of College Access on Labor Market and Health Outcomes by Race

	(1) Unemployed	(2) Discouraged	(3) Lifespan
Panel A. White			
$OPEN_c \times AGE_{<21}$	0.001**	-0.003**	0.072***
	(<0.001)	(0.001)	(0.014)
As PCT of Mean	10.00%	-0.42%	0.09%
(Mean) Age 21+	0.010	0.707	81.46
Observations	25,370,000	25,370,000	25,370,000
Panel B. Black			
$OPEN_c \times AGE_{<21}$	<0.001	-0.003	-0.004
	(0.001)	(0.002)	(0.023)
As PCT of Mean	3.33%	-0.41%	<0.01%
(Mean) Age 21+	0.015	0.733	80.30
Observations	2,508,000	2,508,000	2,508,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

Table A.5: Impacts of College Access on Migration and Industry Outcomes by Race

	(1) Migration	(2) Migration (Rural to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. White						
$OPEN_c \times AGE_{<21}$	0.001	-0.003	-0.001**	0.002	-0.002	0.002
	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
As PCT of Mean	0.15%	-1.44%	-4.17%	1.29%	-0.29%	1.64%
(Mean) Age 21+	0.684	0.209	0.024	0.155	0.699	0.122
Observations	25,370,000	25,370,000	14,420,000	14,420,000	14,420,000	14,420,000
Panel B. Black						
$OPEN_c \times AGE_{<21}$	0.003	-0.017**	-0.001*	-0.001	-0.001	0.003
	(0.005)	(0.007)	(0.001)	(0.004)	(0.004)	(0.003)
As PCT of Mean	0.42%	-3.57%	-7.69%	-0.64%	-0.14%	2.70%
(Mean) Age 21+	0.717	0.476	0.013	0.157	0.719	0.111
Observations	2,508,000	2,508,000	1,363,000	1,363,000	1,363,000	1,363,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

A.4 Additional Results for Two-year Openings

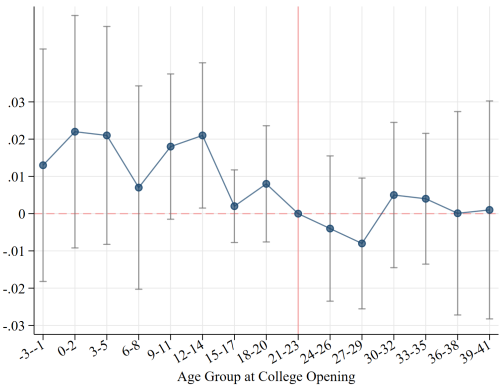
Table A.6: Impacts of Two-Year College Access on Migration and Industry Choice by Race

	(1) Migration	(2) Migration (Rural to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. White						
$OPEN_c \times AGE_{<21}$	<0.001	-0.004*	-0.002***	0.002	-0.003*	0.002*
	(0.004)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)
As PCT of Mean	0.07%	-1.83%	-8.33%	1.26%	-0.43%	1.65%
(Mean) Age 21+	0.687	0.219	0.024	0.159	0.696	0.121
Observations	24,670,000	24,670,000	14,040,000	14,040,000	14,040,000	14,040,000
Panel B. Black						
$OPEN_c \times AGE_{<21}$	0.005	-0.024***	-0.002*	0.001	-0.003	0.003
	(0.006)	(0.007)	(0.001)	(0.004)	(0.004)	(0.003)
As PCT of Mean	0.69%	-4.82%	-15.38%	0.61%	-0.42%	2.73%
(Mean) Age 21+	0.722	0.498	0.013	0.163	0.713	0.110
Observations	2,435,000	2,435,000	1,325,000	1,325,000	1,325,000	1,325,000

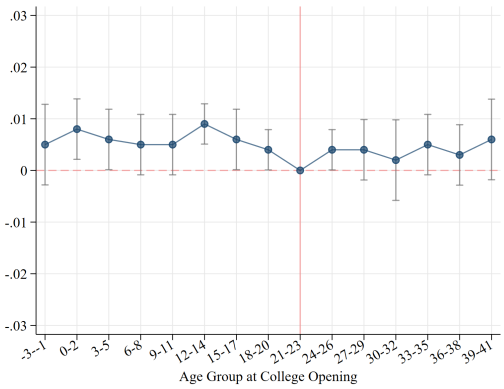
Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment county status is defined as any two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

A.5 Additional Results for Four-year Openings

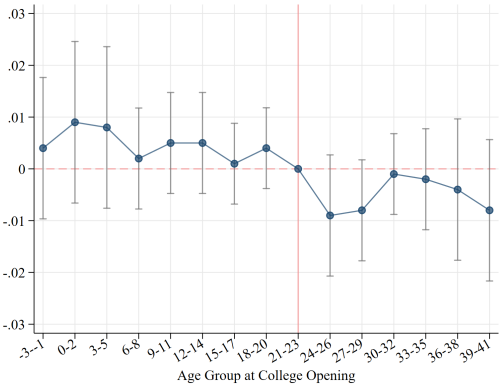
Figure A.4: Impacts of Four-Year College Access on Educational Outcomes



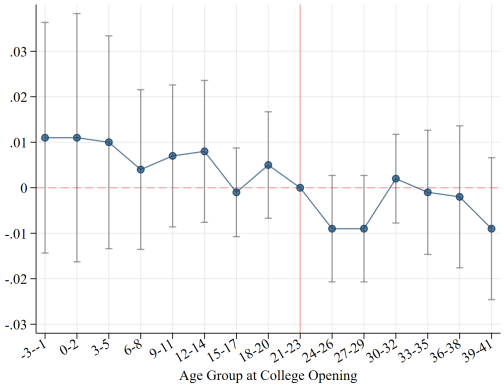
(a) Some College or Above



(b) Associate Degree



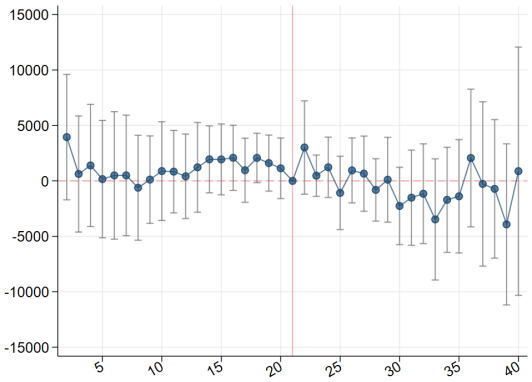
(c) Bachelor's Degree



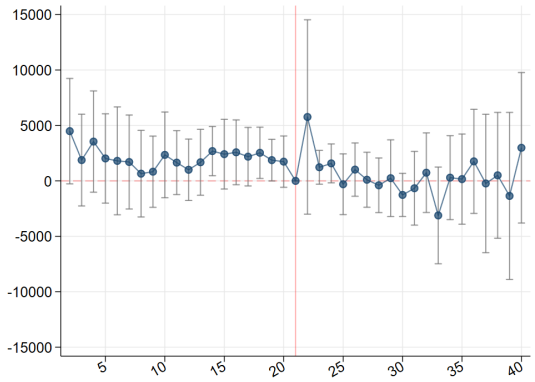
(d) Bachelor's Degree or Above

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

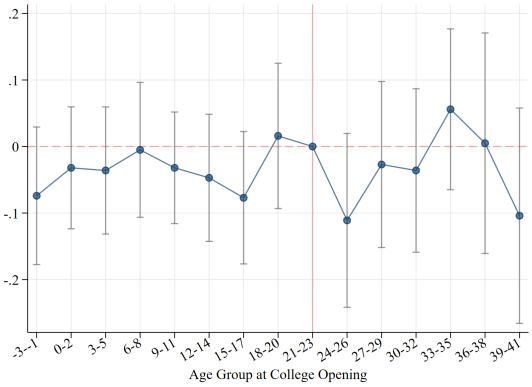
Figure A.5: Impacts of Four-Year College Access on Income and Health Outcomes



(a) Adjusted Gross Income



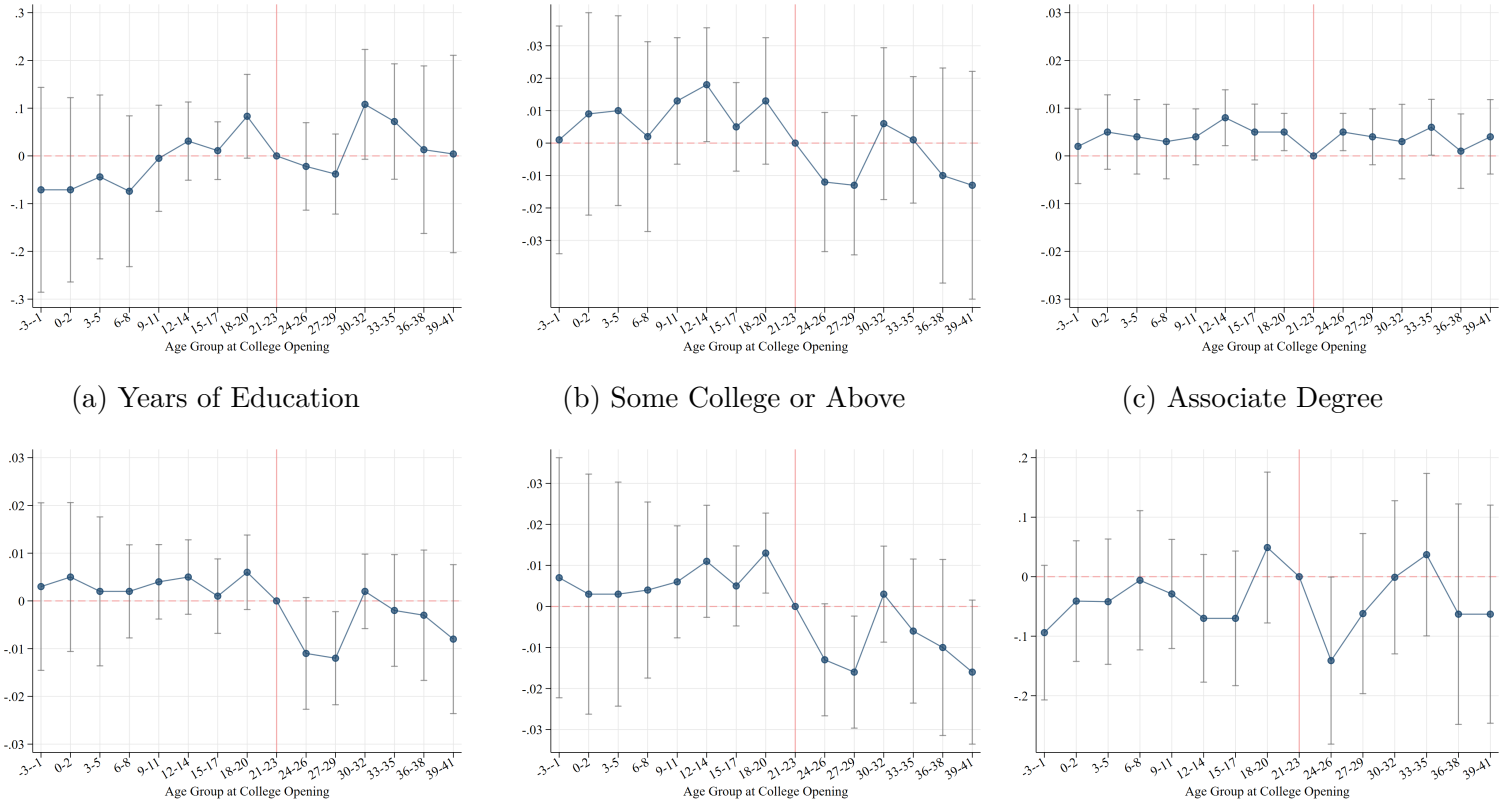
(b) Wage and Salary



(c) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to (i) the 2000 long-form Decennial Census and the American Community Survey (2005–2019) microdata for labor market participation and lifespan outcomes, and (ii) the universe of Internal Revenue Service (IRS) tax microdata for tax years 1974 and 1979 for income. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Figure A.6: Impacts of Rural Four-Year College Access on Educational and Health Outcomes



(a) Years of Education (b) Some College or Above (c) Associate Degree

(d) Bachelor's Degree (e) Bachelor's Degree or Above (f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on the fixed effect event study specification in Equation 1. Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as a rural four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

A.5.1 Effects by Race

Table A.7: Impacts of Four-Year College Access on Educational Outcomes by Race

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. White					
$OPEN_c \times AGE_{<21}$	-0.027	0.014	0.003*	0.009**	0.009
	(0.062)	(0.010)	(0.002)	(0.005)	(0.008)
As PCT of Mean	-0.22%	3.63%	8.11%	9.00%	5.26%
(Mean) Age 21+	12.55	0.386	0.037	0.100	0.171
Observations	12,670,000	12,670,000	12,670,000	12,670,000	12,670,000
Panel B. Black					
$OPEN_c \times AGE_{<21}$	-0.230***	0.002	0.004	-0.003	-0.006
	(0.060)	(0.009)	(0.003)	(0.004)	(0.005)
As PCT of Mean	-1.99%	0.64%	10.26%	-4.92%	-5.08%
(Mean) Age 21+	11.54	0.314	0.039	0.061	0.118
Observations	1,358,000	1,358,000	1,358,000	1,358,000	1,358,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Table A.8: Impacts of Four-Year College Access on Labor Market and Health Outcomes by Race

	(1) Unemployed	(2) Discouraged	(3) Lifespan
Panel A. White			
$OPEN_c \times AGE_{<21}$	-0.001	-0.007	-0.034
	(0.001)	(0.005)	(0.040)
As PCT of Mean	-11.11%	-0.98%	-0.04%
(Mean) Age 21+	0.009	0.711	81.94
Observations	12,670,000	12,670,000	12,670,000
Panel B. Black			
$OPEN_c \times AGE_{<21}$	-0.004**	-0.007	0.136
	(0.001)	(0.008)	(0.109)
As PCT of Mean	-28.57%	-0.96%	0.17%
(Mean) Age 21+	0.014	0.731	79.85
Observations	1,358,000	1,358,000	1,358,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Table A.9: Impacts of Four-Year College Access on Industry Choice by Race

	(1) Agricultural	(2) Manufacturing	(3) Service	(4) Other
Panel A. White				
$OPEN_c \times AGE_{<21}$	0.003**	0.001	0.009	-0.013***
	(0.001)	(0.004)	(0.006)	(0.004)
As PCT of Mean	15.00%	0.74%	1.28%	-9.29%
(Mean) Age 21+	0.020	0.135	0.705	0.140
Observations	6,860,000	6,860,000	6,860,000	6,860,000
Panel B. Black				
$OPEN_c \times AGE_{<21}$	-0.001	-0.007	0.020	-0.012
	(0.002)	(0.013)	(0.016)	(0.013)
As PCT of Mean	-10.00%	-6.25%	2.68%	-9.02%
(Mean) Age 21+	0.010	0.112	0.746	0.133
Observations	708,000	708,000	708,000	708,000

Note: Table presents estimates developed from the DID specification in Equation (2), which includes county fixed effects, birth cohort fixed effects, and state-by-birth cohort linear trends. Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

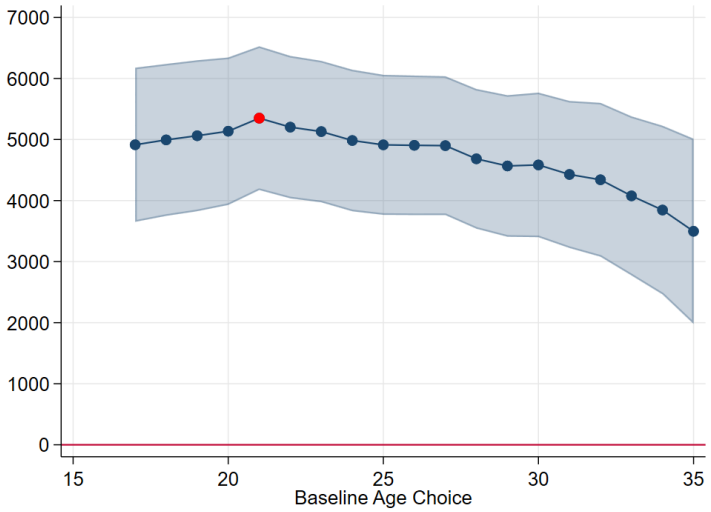
B Appendix: Robustness

This appendix reports results of alternative specifications for robustness check. We first display estimates for aggregate gross income with varying baseline ages, and then report honest DID (Rambachan and Roth, 2023) results for outcomes displaying potential parall trends assumption violations. Lastly, we report C-S DID (Callaway and Sant'Anna, 2021) for various outcomes. The results remain similar to the main results.

B.1 Robustness to Alternative Baseline Age Choices

Figure B.1 summarizes the DID estimates for AGI based on varying baseline ages. The estimates remain fairly constant across different baseline age of 17 through 30, suggesting that our results are not driven our main baseline age group of 21-23 (red dot represents baseline age of 21), and our estimates are consistent across different baseline age choice.

Figure B.1: Income Estimates with Various Baseline Ages



B.2 Robustness to Alternative DID Estimators

Our AGI result in Figure A.2c displays pre-treatment trends among older birth cohorts. To assess the sensitivity of our estimates to potential violations of the parallel-trends assumption, we apply the Honest DiD framework of Rambachan and Roth (2023). This approach estimates confidence intervals under bounded deviations from parallel trends (Figure B.2). The result shows that, when we allow for violations as large as the largest pre-treatment deviation, the estimated post-treatment effects on AGI remain positive and statistically significant. This suggests that our main result on AGI is robust to minor deviations from parallel trends.

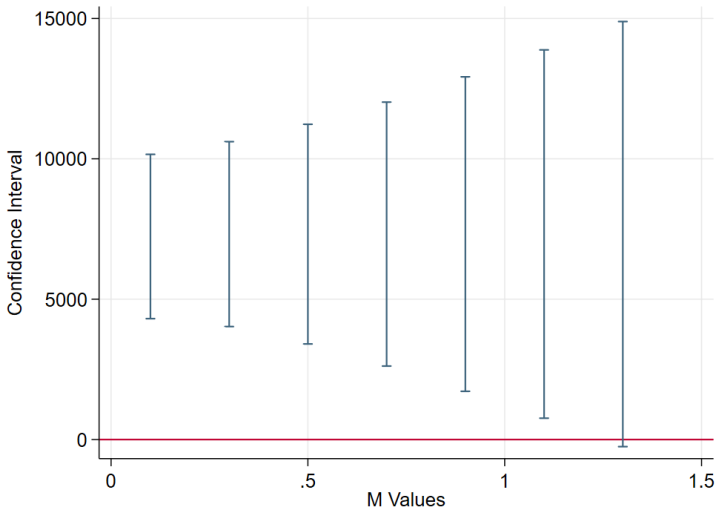
In Appendix B.2.2, we further assess robustness using the staggered adoption estimator of Callaway and Sant'Anna (2021). This approach produces qualitatively similar patterns across outcomes, though the statistical significance declines for some variables. Educational outcomes remain largely consistent with the main results, especially for any-college and two-year openings. Labor market participation outcomes also maintain their direction and magnitude, though the effect on lifespan lose statistical significance. For four-year openings, the estimates remain positive but not statistically significant. Migration outcomes exhibit patterns similar to those in the main specification, whereas industry choice estimates are small and statistically not significant.

Heterogeneity analysis on rural areas show that the rural two-year college openings continue to provide improvements in educational attainment and labor-force participation, while effects on longevity and migration are smaller and statistically not significant. Four-year openings results broadly align in direction with the main specification but are not statistically significant. Racial group analysis remain fairly consistent with the main results.

Overall, these complementary analyses reinforce the main conclusion that local college opening improved educational attainment and labor market participation, while highlighting that these effects are more pronounced in two-year college expansion.

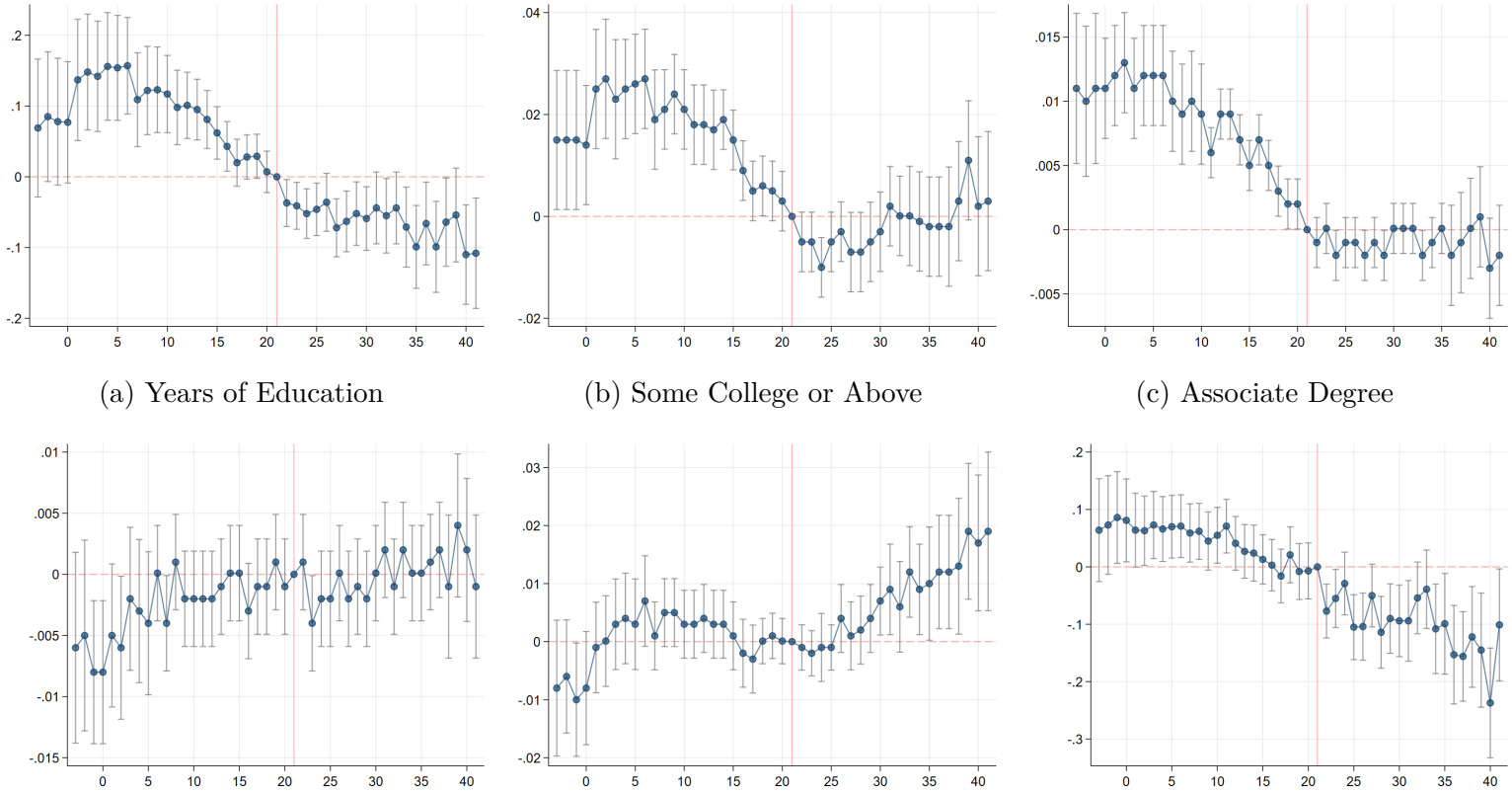
B.2.1 Robustness to Rambachan and Roth (2023)

Figure B.2: Honest DID - Adjusted Gross Income



B.2.2 Robustness to Callaway and Sant'Anna (2021)

Figure B.3: Impacts of College Access on Educational and Health Outcomes (CS DID)

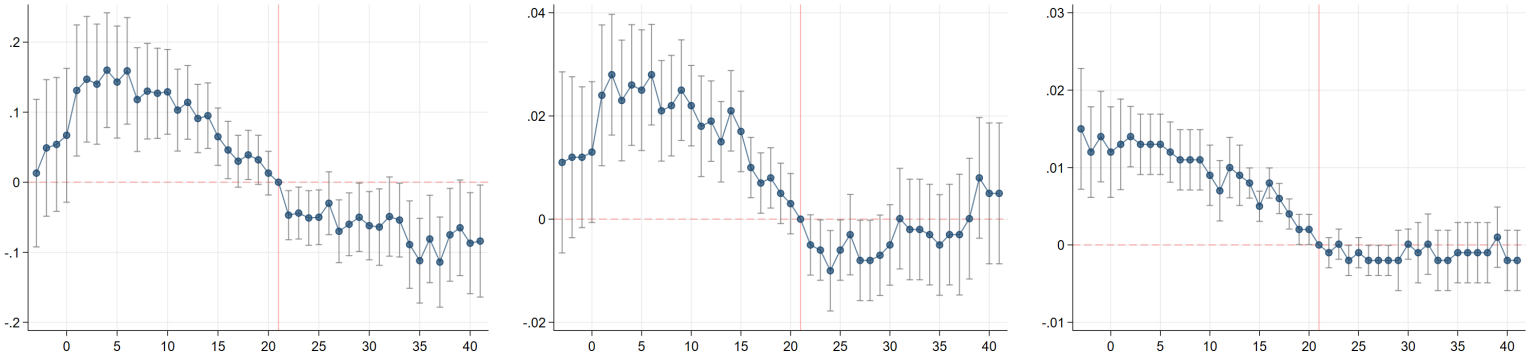


(a) Years of Education (b) Some College or Above (c) Associate Degree

(d) Bachelor's Degree (e) Bachelor's Degree or Above (f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on Callaway and Sant'Anna (2021). Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as any two- or four-year institution opening during the observation period, as described in Section 3.4.

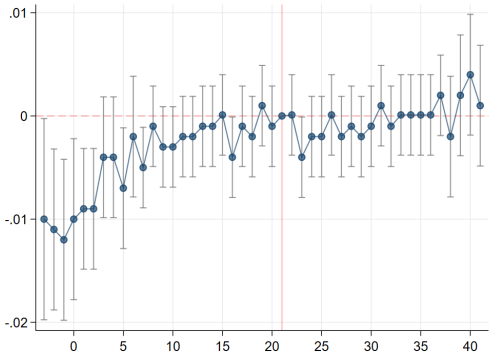
Figure B.4: Impacts of Two-Year College Access on Educational and Health Outcomes (CS DID)



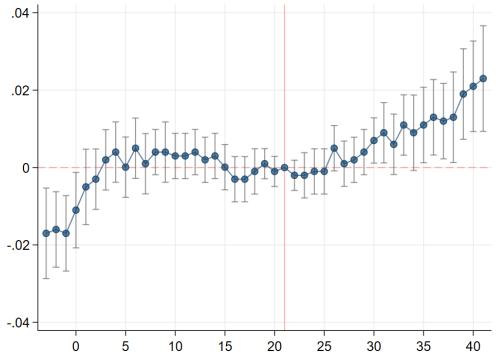
(a) Years of Education

(b) Some College or Above

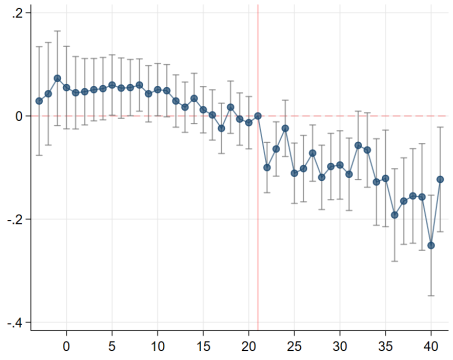
(c) Associate Degree



(d) Bachelor's Degree



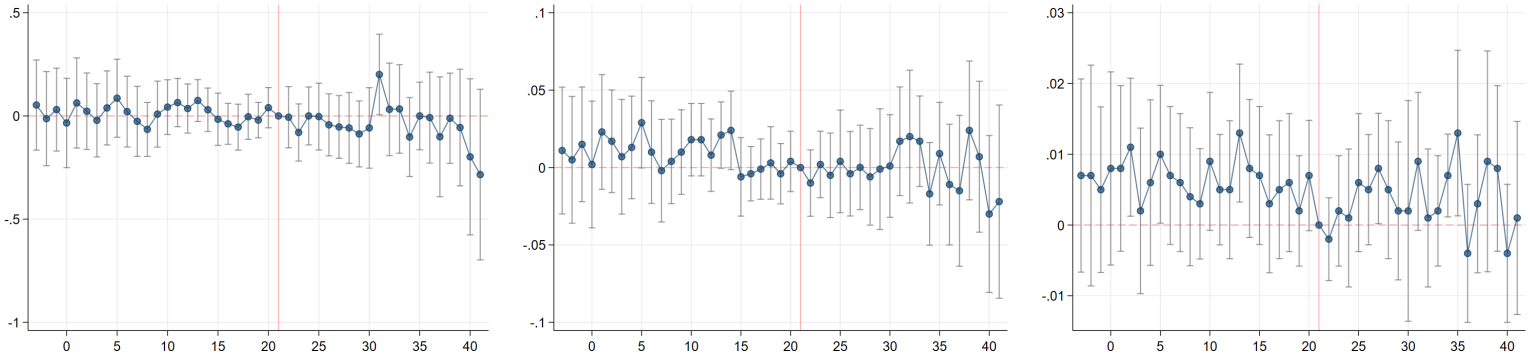
(e) Bachelor's Degree or Above



(f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on Callaway and Sant'Anna (2021). Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

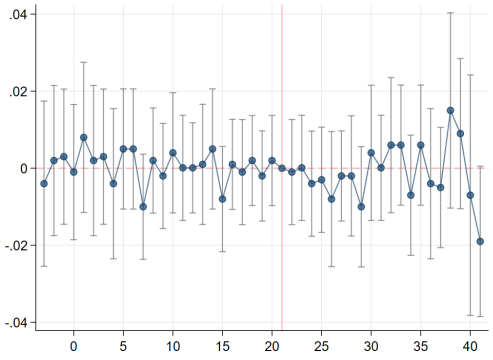
Figure B.5: Impacts of Four-Year College Access on Educational and Health Outcomes (CS DID)



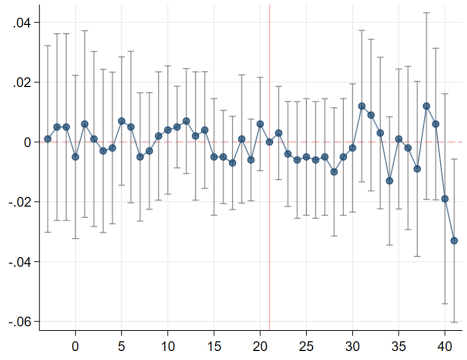
(a) Years of Education

(b) Some College or Above

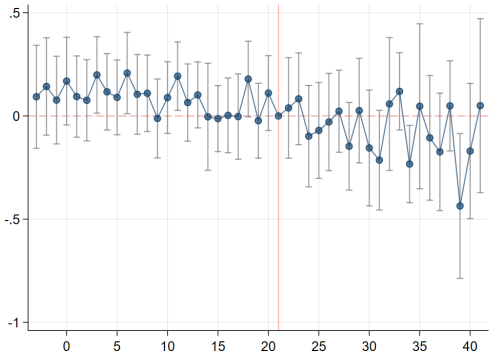
(c) Associate Degree



(d) Bachelor's Degree



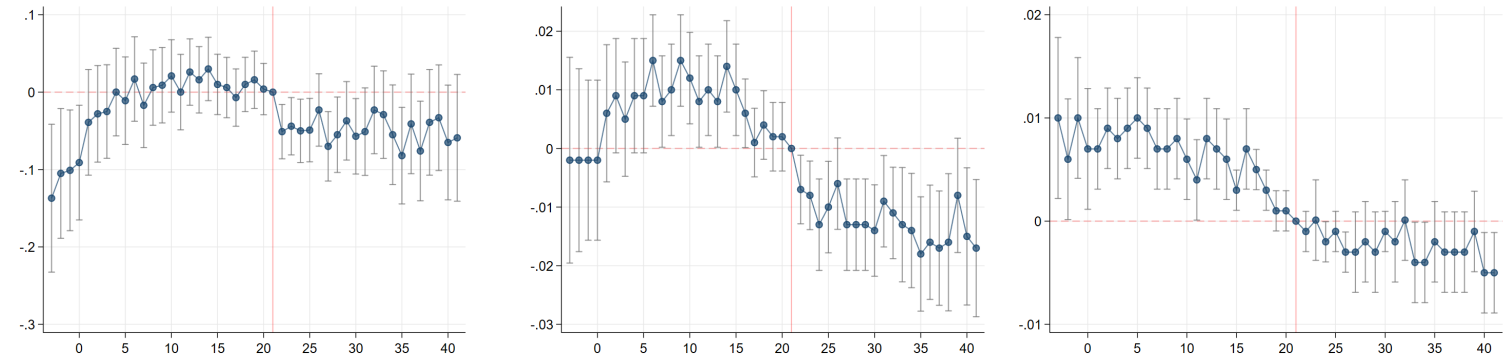
(e) Bachelor's Degree or Above



(f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on Callaway and Sant'Anna (2021). Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as any four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

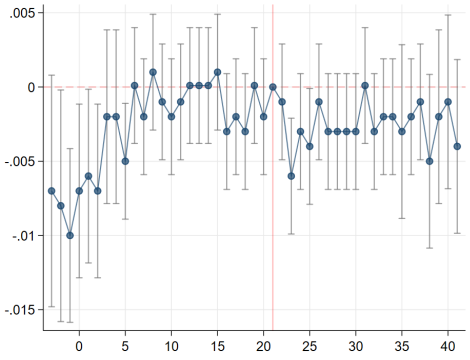
Figure B.6: Impacts of Rural Two-Year College Access on Educational and Health Outcomes (CS DID)



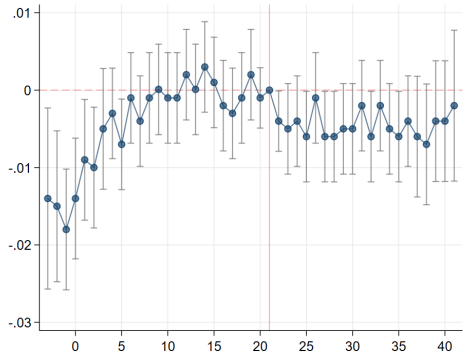
(a) Years of Education

(b) Some College or Above

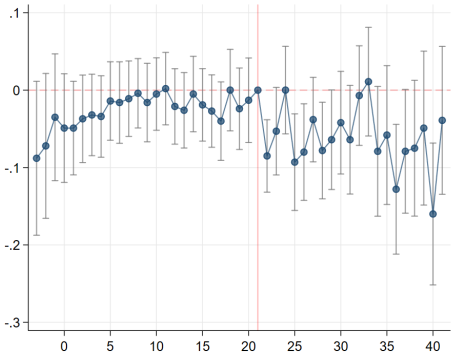
(c) Associate Degree



(d) Bachelor's Degree



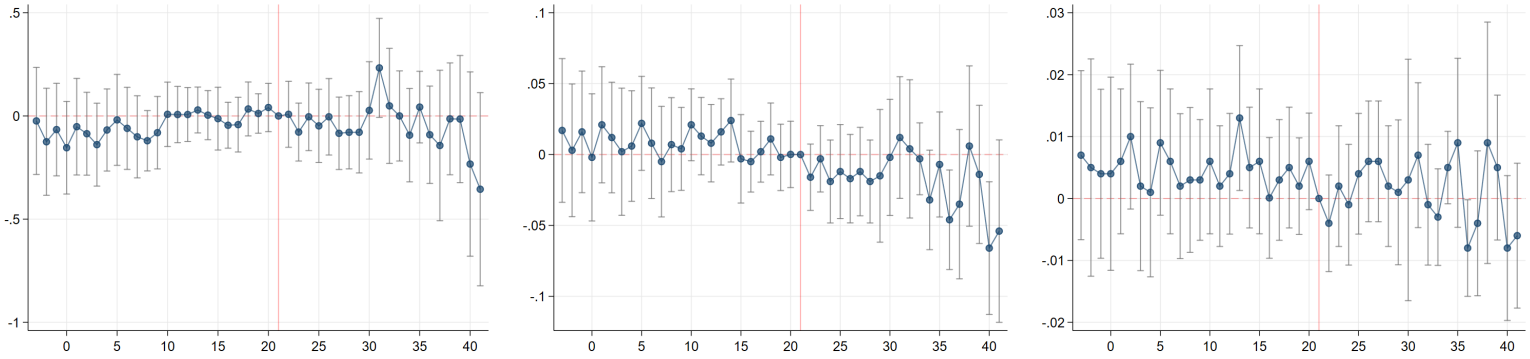
(e) Bachelor's Degree or Above



(f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on Callaway and Sant'Anna (2021). Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as a rural two-year institution opening during our observation period, following the definitions outlined in Section 3.4.

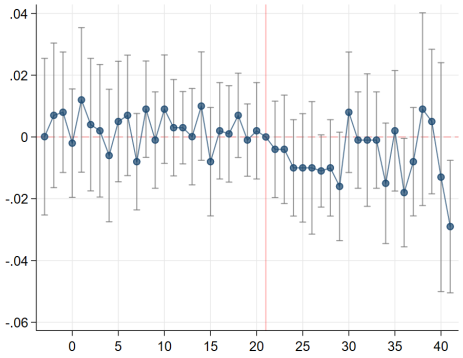
Figure B.7: Impacts of Rural Four-Year College Access on Educational Outcomes (CS DID)



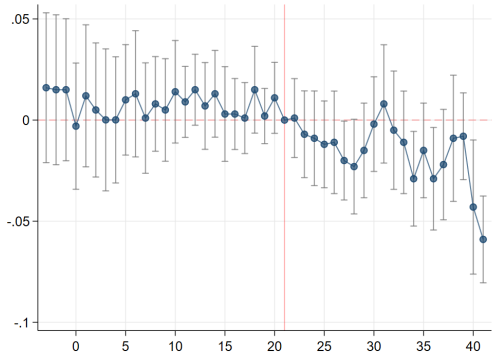
(a) Years of Education

(b) Some College or Above

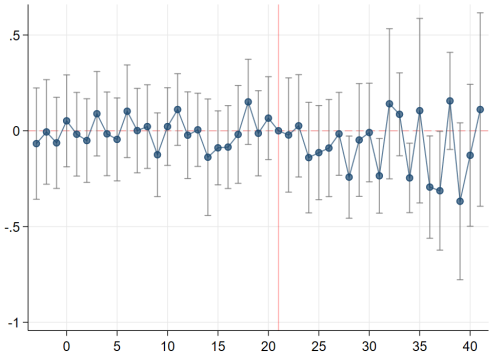
(c) Associate Degree



(d) Bachelor's Degree



(e) Bachelor's Degree or Above



(f) Lifespan

Note: Figure displays estimates with 95% confidence intervals based on Callaway and Sant'Anna (2021). Respondent age at time of local opening is given on the x-axis. These age specific estimates are interpreted relative to the age at which the decision of the first-time higher education attendance is common, i.e., the younger cohorts on the left of each subfigure are treated, while the older cohorts on the right of the figure are assumed not attending college and thus not exposed to the treatment. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined as a rural four-year institution opening during our observation period, following the definitions outlined in Section 3.4.

Table B.1: Impacts of College Access on Educational Outcomes (CS DID)

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. Any College Opening					
Treatment Effects	0.092***	0.017***	0.008***	-0.002	0.001
	(0.025)	(0.003)	(0.001)	(0.002)	(0.003)
As PCT of Mean	0.74%	4.46%	20.00%	-2.15%	0.61%
(Mean) Age 21+	12.39	0.381	0.040	0.093	0.163
Observations	28,440,000	28,440,000	28,440,000	28,440,000	28,440,000
Panel B. Two-year College Opening					
Treatment Effects	0.094***	0.017***	0.009***	-0.004*	<0.001
	(0.027)	(0.004)	(0.001)	(0.002)	(0.003)
As PCT of Mean	0.76%	4.43%	21.95%	-4.35%	0.31%
(Mean) Age 21+	12.40	0.384	0.041	0.092	0.163
Observations	27,640,000	27,640,000	27,640,000	27,640,000	27,640,000
Panel C. Four-year College Opening					
Treatment Effects	0.013	0.009	0.006*	0.001	0.001
	(0.060)	(0.012)	(0.004)	(0.006)	(0.009)
As PCT of Mean	0.10%	2.38%	16.22%	1.05%	0.61%
(Mean) Age 21+	12.43	0.378	0.037	0.095	0.165
Observations	14,320,000	14,320,000	14,320,000	14,320,000	14,320,000

Note: Table presents estimates based on DID specification following Callaway and Sant'Anna (2021). Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table B.2: Impacts of College Access on Labor Market Outcomes (CS DID)

	(1) Unemployed	(2) Discouraged	(3) Lifespan
Panel A. Any College Opening			
Treatment Effects	0.001	-0.005**	0.042*
	(0.001)	(0.002)	(0.023)
As PCT of Mean	9.09%	-0.70%	0.05%
(Mean) Age 21+	0.011	0.710	81.29
Observations	28,440,000	28,440,000	28,440,000
Panel B. Two-year College Opening			
Treatment Effects	0.001	-0.007***	0.033
	(0.001)	(0.003)	(0.024)
As PCT of Mean	9.09%	-1.00%	0.04%
(Mean) Age 21+	0.011	0.701	80.97
Observations	27,640,000	27,640,000	27,640,000
Panel C. Four-year College Opening			
Treatment Effects	-0.001	-0.001	0.087
	(0.002)	(0.008)	(0.086)
As PCT of Mean	-10.00%	-0.14%	0.11%
(Mean) Age 21+	0.010	0.714	81.70
Observations	14,320,000	14,320,000	14,320,000

Note: Table presents estimates based on DID specification following Callaway and Sant'Anna (2021). Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table B.3: Impacts of College Access on Migration and Industry Choice (CS DID)

	(1) Migration	(2) Migration (Rural to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. Any College Opening						
Treatment Effects	0.002	-0.013***	-0.001	0.003	-0.002	<0.001
	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.002)
As PCT of Mean	0.29%	-5.35%	-4.55%	1.94%	-0.28%	0.41%
(Mean) Age 21+	0.689	0.243	0.022	0.155	0.702	0.121
Observations	28,440,000	28,440,000	16,110,000	16,110,000	16,110,000	16,110,000
Panel B. Two-year College Opening						
Treatment Effects	-0.002	-0.016***	-0.002*	0.006**	-0.004	0.001
	(0.003)	(0.003)	(0.001)	(0.003)	(0.003)	(0.003)
As PCT of Mean	-0.29%	-6.27%	-8.70%	3.77%	-0.57%	0.83%
(Mean) Age 21+	0.692	0.255	0.023	0.159	0.698	0.120
Observations	27,640,000	27,640,000	15,680,000	15,680,000	15,680,000	15,680,000
Panel C. Four-year College Opening						
Treatment Effects	0.024*	0.012*	0.003	-0.002	-0.006	0.005
	(0.012)	(0.007)	(0.006)	(0.012)	(0.017)	(0.012)
As PCT of Mean	3.49%	6.12%	15.79%	-1.52%	-0.85%	3.60%
(Mean) Age 21+	0.687	0.196	0.019	0.132	0.710	0.139
Observations	14,320,000	14,320,000	7,736,000	7,736,000	7,736,000	7,736,000

Note: Table presents estimates based on DID specification following Callaway and Sant'Anna (2021). Panels present estimates for any college opening, two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment status is defined at the county level as follows: (i) any two- or four-year institution opening during the observation period (Panel A), (ii) first opening during the observation period is a two-year institution (Panel B), and (iii) first opening during the observation period is a four-year institution (Panel C), as described in Section 3.4.

Table B.4: Impacts of Rural College Access on Educational Outcomes (CS DID)

	(1) Years of Education	(2) Some College Education +	(3) Associate Degree	(4) Bachelor's Degree	(5) Bachelor's Degree +
Panel A. Two-year College Opening					
Treatment Effects	-0.006	0.007**	0.006***	-0.002	-0.003
	(0.020)	(0.003)	(0.001)	(0.002)	(0.002)
As PCT of Mean	-0.05%	1.82%	14.63%	-2.15%	-1.84%
(Mean) Age 21+	12.39	0.385	0.041	0.093	0.163
Observations	12,820,000	12,820,000	12,820,000	12,820,000	12,820,000
Panel B. Four-year College Opening					
Treatment Effects	-0.041	0.008	0.005	0.003	0.008
	(0.069)	(0.013)	(0.004)	(0.007)	(0.010)
As PCT of Mean	-0.33%	2.15%	13.16%	3.16%	4.94%
(Mean) Age 21+	12.41	0.372	0.038	0.095	0.162
Observations	9,040,000	9,040,000	9,040,000	9,040,000	9,040,000

Note: Table presents estimates developed analogous to the DID specification in Equation (2), but following Callaway and Sant'Anna (2021). Panels present estimates for two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Table B.5: Impacts of Rural College Access on Labor Market Outcomes (CS DID)

	(1) Unemployed	(2) Discouraged	(3) Lifespan
Panel A. Two-year College Opening			
Treatment Effects	0.001**	-0.006**	-0.022
	(0.001)	(0.003)	(0.022)
As PCT of Mean	9.09%	-0.86%	-0.03%
(Mean) Age 21+	0.011	0.700	80.92
Observations	12,820,000	12,820,000	12,820,000
Panel B. Four-year College Opening			
Treatment Effects	<0.001	-0.002	-0.005
	(0.002)	(0.010)	(0.104)
As PCT of Mean	5.00%	-0.28%	-0.01%
(Mean) Age 21+	0.010	0.716	81.85
Observations	9,040,000	9,040,000	9,040,000

Note: Table presents estimates developed analogous to the DID specification in Equation (2), but following Callaway and Sant'Anna (2021). Panels present estimates for two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.

Table B.6: Impacts of Rural College Access on Migration and Industry Choice (CS DID)

	(1) Migration	(2) Migration (Rural to Urban)	(3) Agricultural	(4) Manufacturing	(5) Service	(6) Other
Panel A. Two-year College Opening						
Treatment Effects	0.001	-0.005*	-0.002	0.002	-0.001	0.001
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)
As PCT of Mean	0.14%	-1.82%	-8.33%	1.25%	-0.14%	0.83%
(Mean) Age 21+	0.694	0.275	0.024	0.160	0.696	0.121
Observations	12,820,000	12,820,000	6,825,000	6,825,000	6,825,000	6,825,000
Panel B. Four-year College Opening						
Treatment Effects	0.018	0.019**	0.009	0.009	-0.015	-0.003
	(0.014)	(0.009)	(0.007)	(0.009)	(0.019)	(0.014)
As PCT of Mean	2.61%	7.95%	42.86%	6.57%	-2.13%	-2.19%
(Mean) Age 21+	0.690	0.239	0.021	0.137	0.705	0.137
Observations	9,040,000	9,040,000	4,672,000	4,672,000	4,672,000	4,672,000

Note: Table presents estimates developed analogous to the DID specification in Equation (2), but following Callaway and Sant'Anna (2021). Panels present estimates for two-year college opening, and four-year college opening, respectively. Standard errors in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Observation counts, means, coefficients, and standard errors are rounded to protect respondent confidentiality. Samples are constructed from the SSA Numident file linked to the 2000 long-form Decennial Census and the American Community Survey (2005-2019) microdata. For details on additional sample restrictions, see Section 3.2. Note that sample size for industry estimates is smaller than other variables due to missing industry information from self-employment, long-term unemployment, and other factors. Treatment county status is defined by the type of the first college opening during the observation period: two-year or four-year, following the definitions in Section 3.4.