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IZA DP No. 18285

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ABSTRACT

Labor Market Strength and Declining Community College Enrollment*

Declining U.S. college enrollments over the past 15 years have triggered questions about the health of the postsecondary sector. Using college-level data, we make four points. First, such declines are driven not by the 4-year sector but by 2-year community colleges, which have apparently shrunk by over 30% since the Great Recession's peak. Second, one-third of this apparent decline is an artifact of some community colleges being reclassified as offering 4-year degrees. Third, pre-Great Recession data shows a 1 percentage point increase in local unemployment rates increases first-time community college enrollment by 2%, suggesting many students are on the margin between community college and job opportunities. For-profit college enrollments are also countercyclical, while 4-year college enrollments are acyclical. Our estimates suggest strengthening labor markets explain 60% of the post-Great Recession decline in first-time community college enrollment. Fourth, students whose enrollment decisions are most sensitive to labor market conditions are unlikely to have completed degrees. Though declining enrollments are a challenge for community colleges, it is unclear whether they are problematic for students on the margin of enrollment.

JEL Classification: I23, J24

Keywords: community college, labor market conditions, unemployment rate

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1 Introduction

Declining college enrollments in the United States over the past 15 years have sparked widespread concern about the health of the postsecondary education sector and the value proposition of higher education. Survey evidence suggests that Americans have over the last decade increasingly expressed doubts about college, with large drops in the fraction expressing confidence in higher education (from 57% in 2015 to 36% in 2023) and believing that the college is worth its cost (from 53% in 2013 to 42% in 2023).[1] Recent popular discussions have connected such survey evidence to declining enrollments, concluding that concerns about the costs of four-year colleges are driving students away from higher education.[2] This narrative obscures, however, important heterogeneity across different types of postsecondary institutions, heterogeneity inconsistent with the story that changing costs of four-year college are driving much of the enrollment declines in the post-Great Recession era.

In this paper, we use nationwide, institution-level data to focus on four points that contribute to discussions about declining college enrollments over the past 15 years. First, we describe enrollment trends by college sector, paying careful attention to colleges that change sectors over time. Second, we carefully estimate the elasticity of college enrollment to local labor market conditions, doing so separately by college sector. Third, we use pre-Great Recession estimates of those elasticities to estimate the fraction of post-Great Recession enrollment declines that were predictable given changes in labor market conditions. Fourth, we pay attention not only to college enrollments but also to degree completions, which can differ substantially from enrollments in low completion rate sectors such as community colleges.

Our primary analyses use institution-level enrollment data from the Integrated Postsecondary Education Data System (IPEDS), which the federal Department of Education's National Center for Education Statistics (NCES) collects annually from each college that participates in federal financial aid programs. After carefully imputing enrollments in years where individual institutions fail to report, we aggregate the data at both the county and national levels. Our paper begins with two major descriptive findings.

First, the large declines in college enrollment sparking recent higher education discussions is driven not by the four-year sector but instead by the two-year community college sector and, to a lesser extent, by the for-profit sector. In both the public and private not-for-profit sectors, four-year college enrollment was higher in fall 2023 than in fall 2010. In contrast, official statistics suggest

[1] For survey evidence on confidence in higher education, see Gallup's reporting at https://news.gallup.com/poll/508352/americans-confidence-higher-education-down-sharply.aspx. For evidence on beliefs about college's value relative to cost, see the WSJ/NORC results at https://www.wsj.com/articles/americans-are-losing-faith-in-college-education-wsj-norc-poll-finds-3a836ce1.

[2] See, for example, Paul Tough's 2023 New York Times article "Americans Are Losing Faith in the Value of College. Whose Fault Is That?", at https://www.nytimes.com/2023/09/05/magazine/college-worth-price.html.

community college enrollments peaked in fall 2010 at 7.3 million students and by fall 2023 had fallen 37% from that peak. For-profit enrollment also peaked in fall 2010 at 1.8 million students and by fall 2023 had dropped over 50% from that peak.

Second, though community college enrollment declines explain much of recent overall enrollment decline, over one-third of the apparent decline in community college enrollments is an artifact of some community colleges being reclassified as four-year institutions. IPEDS assigns colleges to sectors defined by the highest degree offered by that college. Community colleges typically offer programs leading to associate's degrees and certificates. During the time period studied here, a number of community colleges began offering limited sets of programs leading to four-year degrees, leading IPEDS to reclassify them into the four-year sector even though the vast majority of their students were still pursuing more typical community college degrees. Official statistics thus make the decline in community college enrollments since the start of the Great Recession look steeper than the decline in the actual number of student pursuing associate's degrees. We quantify the magnitude of this distinction, stress the importance of correctly classifying colleges according the degrees being pursued by their students, and use for our measure of demand for associate's degrees a definition that assigns colleges to the two-year sector if they at any time were part of that sector.

In the causal part of the paper, we estimate the impact of local labor market conditions on enrollments in community colleges and other college sectors. To do so, we connect IPEDS data to annual measures of county-level unemployment rates from the Bureau of Labor Statistics. We then run two-way fixed effects regressions of logarithms of county-level enrollments by sector on such unemployment rates, as well as controls for county-specific college-age population measures. County fixed effects absorb features constant in a given county over time, while year fixed effects absorb any annual national shocks that affect counties similarly. The resulting estimated semi-elasticity of enrollment with respect to the unemployment plausibly isolates the impact of local labor market conditions from other confounding factors that vary by geography and time. We focus on first-time enrollments as best representing the initial decision of whether to pursue postsecondary education. This part of the paper has three major findings.

First, we find that a one percentage point increase in the local unemployment rate increases first-time community college enrollment by approximately 2 percent. For-profit colleges exhibit similar countercyclical enrollment patterns. In contrast, enrollment at four-year public and private colleges appears largely insensitive to local labor market conditions. These patterns suggest that many students view community college and employment as substitute options, enrolling in college when job opportunities are scarce and entering the workforce when labor markets are strong (Kane and Rouse, 1999).

Second, the majority of the post-Great Recession decline in first-time community college

enrollment was predictable given improving labor market conditions over this time. We perform a decomposition exercise where we compare actual annual declines in college enrollments relative to their peaks in the late 2000s with the declines predicted by our estimated semi-elasticities applied to actual national labor market conditions. Our estimates suggest that, in fall 2019, over 60% of the decline in first-time community college enrollments relative to 2009 was predictable given substantial improvements in the labor market over that time. Even given the pandemic's complications, nearly 50% of the fall 2023 decline relative to 2009 is attributable to a much stronger labor market than at the peak of the Great Recession. Strengthening labor markets also explain a substantial portion of the decline in for-profit college enrollments, albeit a smaller portion than for community colleges, likely because the 2010s saw the for-profit sector subject to substantially increased regulatory scrutiny that contributed to such declines.

Third, and perhaps surprisingly, declining enrollments do not translate into reduced degree completions. Multiple data sources suggest that the students whose enrollment decisions are sensitive to labor market conditions are unlikely to complete their degrees. Analysis of American Community Survey data shows that the fraction of 25-year-olds holding associate degrees has remained stable at 8-9 percent since 2010, despite the substantial enrollment declines. Institution-level data reveal that community college completion rates have actually increased during this period, rising from 21 percent for students who started in 2009 to 34 percent for students who started in 2020. These patterns are consistent with declining enrollments being concentrated among students with low completion probabilities.

Our findings have important implications for policy discussions about higher education. The common narrative of a broad crisis in college enrollment obscures the fact that traditional four-year institutions have not experienced meaningful declines. The community college enrollment patterns we document appear to reflect rational responses to improving economic opportunities rather than a fundamental loss of faith in higher education. While declining community college enrollments present challenges for institutional finances and capacity, they may not represent a clear welfare loss for the students on the margin between enrollment and employment, particularly given their low probability of degree completion.

This research contributes most closely to the literature on labor market conditions and college enrollments. A substantial body of work has established that community college enrollment is countercyclical, rising during economic downturns and falling during periods of labor market strength. Early work by Betts and McFarland (1995) found that a 1 percentage point increase in unemployment rates was associated with 3.5 percent increases in full-time community college enrollment. More recently, Hillman and Orians (2013) estimated that community college enrollment demand increases by 1.1-3.3 percent for each percentage point rise in unemployment. Clark (2011) provided complementary evidence from the UK, suggesting that youth labor market conditions

have large enrollment impacts. Charles, Hurst and Notowidigdo (2018) exploited variation in local housing booms during the 2000s to show that improved labor market opportunities lowered college enrollment, with effects concentrated at two-year colleges, accounting for approximately 25 percent of the recent slowdown in college attainment.

The Great Recession provides a particularly useful context for understanding enrollment responses to labor market conditions. Barr and Turner (2013, 2015) documented that weak labor market conditions during the Great Recession encouraged college enrollments, with much of the increase occurring outside selective institutions, and that unemployment insurance benefit durations played an important role in enrollment decisions. Schulze (2024) showed that the Great Recession produced large increases in adult community college enrollment but found substantial heterogeneity in returns, with limited or negative effects for those at the margin of enrollment. Related work has examined how economic shocks affect field-of-study choices, with Ersoy (2020) finding shifts from recession-sensitive to recession-resistant majors, Acton (2021) documenting how students shift between vocationally oriented programs following local employment declines, and Foote and Grosz (2020) showing that two-year college enrollment increases by three students for every one hundred workers laid off, with completions strongest in fields with larger earnings returns.

We also provide a longer historical context for recent work discussing the impact of the COVID-19 pandemic on college enrollments. Schanzenbach and Turner (2022) found that community college enrollment dropped 9.5 percent between 2019 and 2020, diverging from typical countercyclical patterns, with COVID disruptions generating supply-side impacts particularly for programs requiring hands-on learning. Bulman and Fairlie (2022) documented similar patterns in California, where the community college system lost nearly 300,000 students. Carruthers (2025) found that labor market tightness may have explained 11 percent of the overall fall in college enrollment between 2019 and 2022 and 26 percent of the fall in two-year college enrollment specifically. These studies suggest that while labor market conditions remain important, the pandemic introduced additional supply-side constraints that altered typical enrollment patterns.

Our paper builds on this literature in several key ways. First, we provide comprehensive documentation of recent enrollment trends across all major higher education sectors, carefully accounting for institutional re-classifications that have artificially inflated apparent community college enrollment declines. Second, we estimate sector-specific enrollment elasticities with respect to local labor market conditions, demonstrating that countercyclical patterns are concentrated in community colleges and for-profit institutions while four-year colleges show little sensitivity to unemployment rates. Third, we use pre-Great Recession estimates to predict post-Great Recession enrollment patterns, providing the first systematic accounting of what fraction of recent enrollment declines were predictable given improving labor market conditions. Our estimates suggest that

strengthening labor markets explain up to 60 percent of post-2009 declines in first-time community college enrollment. Fourth, unlike most prior work which focuses solely on enrollment, we examine degree completions and find that students whose enrollment decisions are sensitive to labor market conditions are unlikely to complete degrees. The stability in associate degree attainment despite large enrollment declines suggests that recent patterns may reflect rational economic decision-making rather than a crisis in higher education, with important implications for how we interpret declining community college enrollments.

2 Data

2.1 Enrollment, Retention, and Completion

We use institution-level enrollment data from IPEDS, which is based on annual surveys of higher education institutions conducted by NCES. We restrict our analysis to the years 1990 through 2023 and to institutions participating in Title IV federal funding programs, for whom survey completion is mandatory.

Our primary outcome of interest is the number of undergraduate students enrolled in college in the fall of each academic year. Though we begin by studying overall enrollment, most of our results focus on first-time enrollment, which counts only those undergraduates with no prior postsecondary experience at any institution. Whereas overall enrollment measures capture the stock of students at any moment in time, first-time enrollment measures capture something closer to a flow of students into college. Other outcomes of interest include retention rates and degree completions. Nationally aggregated measures based on our dataset match closely with those published by NCES. For example, our estimate of annual undergraduate enrollment at degree-granting postsecondary institutions is within 1.5% of the comparable NCES series for each year in our sample period.

Though IPEDS survey completion is mandatory for Title IV institutions, the institution-level data indicate a non-trivial number of reporting gaps. Of all the institutions that ever report positive first-time enrollment between 1990 and 2023, 13.7% are missing enrollment data for at least one year between non-consecutive years of positive enrollment. These gaps are often short: 11.7% of institutions have reporting gaps of three years or less. We impute enrollment for such short gaps by linearly interpolating enrollment between the last non-missing value before the gap and the first non-missing value after the gap. For longer gaps, we do not do this interpolation and instead leave enrollment as missing.

We conduct our analysis at the county level at which our measure of labor market strength is defined, as we explain in the next subsection. We identify the county of each college in IPEDS.

In some years, such as 1996-99 and 2009-23, IPEDS directly provides each college's county. In other years, when only a mailing address is provided, we use geocoding software to identify the corresponding county. For years where we have both address and county information, this procedure's achieves a 98% match rate. We restrict our analysis to institutions in the 50 states and DC, collapsing the IPEDS data to the county level by summing enrollments at all institutions within a given county and year.

2.2 Unemployment and Population

Our primary measure of labor market strength relevant to potential students in a given area is the local unemployment rate. Specifically, we use annual county unemployment rates from the Local Area Unemployment Statistics published by the Bureau of Labor Statistics. These are the finest level of geography at which unemployment rates are measured and are likely to be good proxies for the economic conditions facing potential community college students, the vast majority of whom enroll close to home.[3] One disadvantage of this measure is that it applies to the entire working population, with no gender- or race-specific unemployment rates available at the county level.

Our main outcomes are enrollment counts, rather than enrollment rates, requiring us to account for local changes in college-age populations over the period being studied. We do so with annual county-level population estimates from the National Institutes of Health Surveillance, Epidemiology, and End Results Program (SEER). Our main specifications control for the 15- to 34-year-old population, since this age range captures nearly 90% of community college students (U.S. Department of Education, National Center for Education Statistics, 2022).

3 Motivating Descriptive Patterns

3.1 Total Enrollment

Before estimating the relationship between local labor market conditions and college enrollment, we describe the college enrollment patterns that motivate this investigation. We do so in this section using official IPEDS definitions of sectors, to begin with the set of facts most often cited in public discussions of these issues. The broad fact driving much of this policy discussion is that total U.S. undergraduate enrollment has declined substantially since 2010. Figure 1 shows this, with a vertical gray line marking the start of the Great Recession in fall 2008. In fall 2010, 18.2 million students were enrolled in college, a total that declined steadily until an even more rapid decline at

[3] See Figure 5-5 from the 2023 Economic Report of the President, at https://bidenwhitehouse.archives.gov/wp-content/uploads/2023/03/ERP-2023.pdf.

the onset of the COVID-19 pandemic. After a slight uptick in fall 2023, total enrollment was 15.9 million students, 12.6% below its 2010 peak.

Discussions of this enrollment decline often overlook that the post-2010 drop is concentrated outside traditional four-year colleges. For example, a lengthy 2023 New York Times article claiming that Americans have lost faith in the value of four-year colleges and tying this to declining overall college enrollments never mentions that four-year college enrollments have been stable or growing.[4] Again using IPEDS data, the top panel of Figure 2 shows that, in both the public and private not-for-profit sectors, four-year college enrollment was somewhat higher in fall 2023 than in fall 2010. Four-year college enrollment in those sectors rose from 2010 to 2019 more than the small decline experienced in the post-pandemic era starting in 2020.

Instead, the drop in overall enrollment is largely driven by community colleges and, to a lesser extent, for-profit colleges. Community college enrollment peaked in 2010 at 7.3 million students. It then declined fairly steadily in the 2010s, had another sharp drop in fall 2020 during the start of the pandemic, and has since shown little sign of recovery. As a result, fall 2023 community college enrollment was 4.6 million students, 37.2% below its 2010 peak. For-profit college enrollment also peaked in 2010, at 1.8 million students, before declining in the 2010s and plateauing after that. As a result, for-profit colleges enrolled 0.8 million students in fall 2023, a 54.5% drop from its 2010 peak.

3.2 First-Time Enrollment

Declining enrollment in the community college sector is largely accounted for by smaller entering cohorts of first-time degree-seeking undergraduates. As the bottom panel of Figure 2 shows, first-time community college enrollment rose immediately at the start of the Great Recession in fall 2008, then peaked in fall 2009 at 1.3 million students. It then declined steadily to 0.9 million students in 2019, before dropping further at the start of the pandemic and only recovering slightly since then. First-time enrollment at for-profit colleges peaked in 2010, declined steadily in the decade following, and has since plateaued well below that 2010 peak. First-time enrollments at four-year public and private not-for-profit colleges have increased fairly steadily, with the exception of the pandemic's onset.

In contrast, retention rates, measured as the share of first-time undergraduates who return the following fall, have held relatively steady across each sector over the last 15 years.[5] This suggests that understanding declines in enrollment requires understanding why students choose not to attend college in the first place, rather than studying changes in continuing enrollment conditional on

[4] See https://www.nytimes.com/2023/09/05/magazine/college-worth-price.html.

[5] See Figure A.2.

having already enrolled. We therefore focus the remaining analyses on explaining declines in first-time community college enrollments.

3.3 Business Cycles

The decline in first-time enrollment since 2010 at community colleges and for-profit colleges coincided with a historic labor market recovery from the height of the Great Recession until the onset of the COVID-19 pandemic in March 2020. To explore whether changing labor market conditions during prior periods also relate to college enrollment patterns, Figure 3 overlays six decades of first-time enrollment data with gray bars indicating years when the national unemployment rate was increasing. This facilitates visual comparison of macroeconomic business cycles with Americans' college choices.

Since the mid-1970s, rising unemployment has nearly always corresponded with spikes in first-time community college enrollment. Of the last six such recessionary periods, all but the most recent pandemic-related rise in unemployment show local maxima in community college enrollments. Put differently, labor markets that strengthen after a recession ends are almost always associated with falling community college enrollment rates. Conversely, unemployment rates seem less clearly related to enrollments in public four-year colleges over this time period, or to enrollment in private four-year and for-profit colleges during the last three decades. We turn now to measuring the causal component of this impact at the local level.

4 Methodology

Our aim is to quantify the extent to which the relationship between labor market conditions and college enrollment, particularly for community colleges, is causal. The association between these variables at the national level could be driven by other factors changing over time that are correlated both with macroeconomic conditions and college choices. Exploring this relationship at a more local level arguably allows us to control for sources of such omitted variable bias at the national level.

To measure the historical cyclicality of undergraduate enrollment, we follow previous literature and estimate the semi-elasticity of first-time enrollments with respect to the local unemployment rate. Our main estimating equation is:

$$\ln(Y_{ct}) = \beta_1 U_{ct} + \beta_2 \ln(P_{ct}) + \beta_3 Imputed_{ct} + \eta_c + \delta_t + \varepsilon_{ct} \tag{1}$$

Here, Y_{ct} denotes first-time degree-seeking undergraduate enrollment in county c in the fall of year t, U_{ct} denotes the unemployment rate in county c in year t, P_{ct} denotes the 15- to 34-year-old

population in county c in year t, and $Imputed_{ct}$ is the share of undergraduate enrollment imputed in county c and year t as described in our data section above.

County fixed effects η_c control for any county-specific factors that are constant over time, so that our coefficients are within-county estimates generated by comparing a given county to itself over time. Time fixed effects δ_t control for any year-specific shocks that affect the nation as a whole. Our outcome measures aggregate enrollments rather than enrollment rates, so we control for population measures to account for differential growth rates in the potential pool of college enrollees. Our primary coefficient of interest, β_1, thus measures the within-county relationship between the unemployment rate and college enrollment, controlling for national annual shocks and changes in the local college-age population. We run versions of our estimating equations both unweighted and weighted by county-level college-age population. Heteroskedasticity robust standard errors are clustered by county.

We estimate equation 1 separately for a variety of college outcomes and populations. Our main outcomes are first-time enrollment in the four largest sectors of higher education: public four-year colleges, public two-year colleges, private not-for-profit four-year colleges, and for-profit colleges. We later study college completions in each sector as well. We begin by studying the entire population of college students and then estimate enrollment elasticities separately by gender and race. Specifically, for subgroup g, we estimate:

$$\ln(Y_{ctg}) = \beta_1 U_{ct} + \beta_2 \ln(P_{ctg}) + \beta_3 Imputed_{ctg} + \eta_c + \delta_t + \varepsilon_{ctg} \tag{2}$$

In this specification, enrollment, population, and imputation measures are now subgroup-specific, while we continue to use the aggregate unemployment rate given the lack of subgroup-specific county-level unemployment measures.

5 Defining College Sectors

To correctly estimate how demand for different college degrees changes with local labor market conditions, we need to measure as best we can which degrees students are pursuing. We would ideally measure demand for different college degrees using the type of degree program a student initially enrolled in. IPEDS does not, however, report such information. We therefore focus on the type of institution students enroll in. The enrollment patterns discussed above rely on IPEDS' assignment of colleges to sectors, which in turn is based on control of the institution (public, private not-for-profit, for-profit) and the highest level of degree program offered (four-year, two-year, or less than two-year).

Institutions can, however, change sectors over time, complicating interpretation of enrollment

trends by sector. Empirically, the most common sector change involves public two-year institutions becoming public four-year institutions by starting to offer at least one four-year degree. Of the higher education institutions with undergraduate enrollment in 2010, 5.5% changed their IPEDS-reported sector at least once by 2023. Switches from public two-year to public four-year accounted for 85% of undergraduate enrollment subject to those switches.

These sector changes generally do not reflect meaningful changes in the primary type of enrollment or composition of degrees awarded by an institution. The distribution of Associate degrees as a share of all undergraduate degrees by institution is bimodal.[6] Institutional switches from the two-year to four-year sector generally entail minor changes in that share.[7] In short, community colleges that are re-classified as four-year colleges nonetheless continue to almost exclusively enroll those seeking two-year degrees. To more accurately count college enrollments by the degree type most students at the college are likely pursuing, we define a time-invariant classification that permanently assigns an institution to the public two-year sector if it ever was a public two-year institution.

Correct assignment of colleges to sectors is numerically important and has become more so over time. A substantial part of the publicized decline in enrollment at public two-year colleges turns out to be driven by institutions changing sectors, as seen in panel A of Figure 4. According to the IPEDS sectoral definition, fall enrollment at public two-year colleges fell by 37.2% or 2.7 million students between 2010 and 2023, from 7.3 to 4.6 million students. Re-classifying sectors as we do shows that two-year college enrollment actually fell during that time by only 21.4% or 1.7 million students, from 8.1 to 6.4 million students. The 1 million student difference between these two measures, representing 36% of the official decline, is due to primarily administrative sector switches that arguably do not reflect meaningful changes in demand for the degrees typically offered by community colleges. Panel B similarly shows that that a substantial portion of the rise in apparent four-year college enrollment is driven by community colleges being reclassified as four-year institutions. Our time invariant sector definition suggestion that demand for public four-year degrees has largely plateaued since 2010, rather than risen substantially as IPEDS suggests.[8]

6 Elasticity Results

Consistent with the national time series evidence, community college enrollment appears quite countercyclical with respect to local labor market conditions. Figure 5 shows estimated semi-

[6] See Figure A.3 for the distribution of Associate degrees by institution in 2023.

[7] See Figure A.4 for evidence that, even 10 years after such a switch, bachelor degrees make up just over over 10% of all completions at affected institutions.

[8] For more detail on total and first-time enrollments across all four major college sectors according to the time-invariant definition, see Figure A.5, which can be compared to Figure 2.

elasticities from equation 1 estimated on pre-Great Recession data (1990-2007). For each college sector, we show two sets of estimates, the leftmost one weighting all counties equally and the rightmost one weighting counties by their college-age population. First-time enrollment in community colleges increases by 2.1 percent in reaction to a 1 percentage point rise in the local unemployment rate. The magnitude of that result is nearly identical regardless of whether counties are weighted by population, though the confidence interval is larger for the population-weighted estimate. The for-profit sector also exhibits such countercyclicality, with a 1 percentage point increase in the unemployment rate increasing first-time enrollment by 4.0 percent (in the unweighted version) or by 1.1 percent (in the population-weighted version). Results for both community colleges and for-profit colleges are consistent with a substantial number of students being on the margin between employment and enrollment in those sectors. When employment opportunities decrease, enrollments in those sectors rises substantially.[9]

In contrast, first-time enrollment in the public and private 4-year sectors appears if anything slightly procyclical. A one percentage point increase in the unemployment rate reduces first-time enrollments in four-year public colleges by 0.6 percent (1.9 percent in the population-weighted version) and in four-year private colleges by 1.0 percent (1.4 percent in the population-weighted version). None of these estimates is, however, statistically distinguishable from zero. Nonetheless, the negative sign of these estimates is consistent with the marginal student considering four-year college being discouraged from enrolling during difficult economic times. Such procyclicality in the four-year sector could be driven by recessions exacerbating credit constraints either by lowering parental incomes or by lowering state appropriations to public institutions, both of which increase the immediate price of four-year colleges. Community colleges, conversely, are substantially less expensive to attend and federal financial aid often covers the bulk of such costs for many students. Additionally, many four-year colleges draw students from outside of their counties, so that county-level labor market conditions may not be as relevant to potential students as for community colleges.

We see little clear evidence of heterogeneity by student gender or race in these semi-elasticities. Figure 6 shows our subgroup estimates for community colleges. The point estimates for men and women are nearly identical. Black community college enrollments appear somewhat more sensitive to macroeconomic conditions than White enrollments, though the extent of that difference is sensitive to weighting and in no case are the Black-White differences statistically significant. Estimates for Hispanic students are nearly identical to those of White students in the unweighted case, or close to zero but very imprecise in the population-weighted case.[10]

[9]The magnitude of this countercyclicality looks similar if measure by all enrollment rather than just first-time enrollment. See Figure A.1 for details.

[10]Point estimates for the for-profit sector exhibit slightly more heterogeneity by gender and race, though no groups have statistically distinguishable semi-elasticities from any other. See Figure A.6 for details.

The estimated semi-elasticity of first-time enrollment with respect to the unemployment rate is fairly robust to the time period studied. Table 1 shows these semi-elasticities estimated for the pre-Great Recession period (panel A), the pre- and post-Great Recession period excluding pandemic years (panel B), and a longer time period starting in 1960, the first year when IPEDS measured public two- and four-year enrollments (panel C). The first rows of panels A and B show that our 2.1% estimated semi-elasticity of first-time community college enrollment rises to 2.8% if the entire pre- and post-Great Recession period (prior to the pandemic) is included in the estimation. We use the smaller estimate in later decomposition exercises predicting post-Great Recession enrollment trends in order to separate the estimation and prediction samples, but note that the true sensitivity of community college enrollment to local labor market conditions may be even larger in recent decades. The estimated sensitivity of for-profit college enrollment is remarkably similar across the different time periods, as seen in the last column and first rows of panels A and B.

Aggregating our main specification to the commuting zone rather than county leaves our main results largely intact. The second row of panels A and B aggregates our county-level data to the commuting zone level, weighting by population, on the theory that such geographies might better reflect people's labor market and college enrollment opportunities. For the 1990-2019 time period in panel B, aggregating at the commuting zone level yields a community college semi-elasticity of 2.7%, compared to the 2.8% from the county-level estimates. For the pre-Great Recession period in panel A, the commuting zone estimate is somewhat smaller 1.3%. For-profit college elasticities are nearly unchanged by aggregating to commuting zone rather than county. Across both of these geographies and time periods, public and private four-year semi-elasticities are generally small and statistically insignificant.

For community college enrollments, estimates generated using national time series data yields semi-elasticities not far from our central estimates. We create these by simply regressing national enrollment on the contemporaneous national unemployment rate, in the third rows of panels A and B and in panel C. In the pre-Great Recession period, the national estimate of 2.8% is about a third larger than the county-level estimate of 2.1%. In the 1990-2019 period, the national estimate of 3.9% is also about a third larger than the county-level estimate of 2.8%. Over the entire post-1960 period, the national estimate of 1.8% is only slightly smaller than the county-level estimates from other time periods. At least for community colleges, national estimates are somewhat larger than those using smaller geographies in the same time period, suggesting that a part of the national correlation over time is driven by something other than local labor market conditions. Nonetheless, for community colleges, national semi-elasticities in the pre-Great Recession period and the longer 1960-2019 period are close to and statistically indistinguishable from our core 2.1% estimate from

county-level analysis.[11]

First-time community college enrollment reacts fairly quickly to shocks to local labor market conditions. The estimates discussed above all relate enrollment to contemporaneous labor market conditions, comparing fall enrollment in a given year to the unemployment rate over that same year. Table 2 shows the longer-term dynamics of a shock to local unemployment, using our main two-way fixed effects specification but changing the timing of treatment relative to measured outcomes. A one-percentage point increase in local unemployment this year predicts a 0.73 percentage point increase in the following year's unemployment, a 0.48 increase two years later, and so on, only decaying to zero after six years. Nonetheless, as the second column shows, the enrollment effects of an unemployment shock decay much faster. The contemporaneous semi-elasticity of 2.1 percent decays to 1.6 percent after one year, then 0.5 percent after two years, at which point they are statistically indistinguishable from zero. The effects of unemployment on first-time community college enrollment thus seem to load heavily on the initial year or two of the shock.

7 Decomposing the national decline

7.1 Methodology

We then turn to using the estimates from the above section to understand national trends in community college enrollment. Specifically, we use the elasticities estimated by our county-level analysis in the previous section to attribute enrollment changes at the national level to changes in the national unemployment rate vs. changes in population. We use our county-level estimates to best capture the causal impact of unemployment rates on enrollment patterns. Using the estimates from equation 1 based on the 1990-2007 sample, we define two counterfactual first-time enrollment projections compared to the enrollment peak in 2009.

First, we isolate the projected effect of the labor market recovery in each year $t \in \{2010, 2019\}$ as

$$\ln \hat{Y}_t^{UR} - \ln Y_{2009} = \hat{\beta}_1 (U_t - U_{2009}) \tag{3}$$

Second, we isolate the projected effect of population growth as

$$\ln \hat{Y}_t^{Pop} - \ln Y_{2009} = \hat{\beta}_2 (\ln(P_t) - \ln(P_{2009})) \tag{4}$$

The first calculation above is equivalent to asking how each post-Great Recession year's enrollment numbers would have evolved given the actual evolution of the national unemployment rate multiplied

[11] In contrast, four-year public enrollments appear much more procyclical in national data than when accounting for commuting zone or county fixed effects.

by our estimated semi-elasticities from the pre-Great Recession period (holding fixed college-age population). We can then compare actual changes in enrollments to those predicted by our model to compute what fraction of the observed declines in enrollment can be attributed to changing labor market conditions as the Great Recession receded. The second calculation asks how each post-Great Recession year's enrollment numbers would have evolved given the actual evolution of the college-age population (holding fixed unemployment rates).

We define these projections for both the public two-year sector and the for-profit sector. For the community college sector we choose 2009 as the reference year because that represents the peak of first-time enrollments. For the profit-sector, we define the base year in equations 3 and 4 as 2010 instead, which is when first-time enrollment in the for-profit sector peaked. We use semi-elasticities estimated from our unweighted models and discuss the robustness of these results to using estimates from our model weighted by county-level college-age population.

7.2 Results

Our estimates suggest that improving labor market conditions in the decade after the Great Recession explain the majority of the decline in first-time community college enrollment over that time. Figure 7 shows actual and predicted changes in such enrollment relative to 2009. The dashed bars show actual enrollment changes, the red bars show changes predicted by the strengthening labor market, and the blue bars show changes predicted by a growing college-age population.

In fall 2019, the last year prior to the pandemic, over 60% of the decline in first-time community college enrollments relative to fall 2009 was predictable given substantial improvements in the labor market over that time. Though the pandemic complicates the picture by adding another disruption to college enrollments, in fall 2023 we still estimate that nearly 50% of the post-2009 decline in first-time community college enrollments is attributable to a much stronger labor market than at the peak of the Great Recession. Using our population-weighted semi-elasticities barely changes these conclusions, as the two point estimates of the semi-elasticities are nearly identical.[12] Holding constant labor market conditions, growth in college-age population suggests first-time community college enrollments should have grown very slightly since 2009.

Strengthening labor markets also explain a substantial portion of the decline in for-profit college enrollments, albeit a smaller portion than for community colleges. Figure 8 shows the decomposition exercise for for-profit colleges. In fall 2019, the last year prior to the pandemic, 36% of the decline in first-time for-profit college enrollments relative to fall 2010 were predictable given labor market improvements. That estimate is nearly identical in fall 2023, when 37% of the post-2009 decline is attributable to strengthening labor markets. Using the lower population-weighted

[12] See Figure A.7 for decomposition estimates for first-time community college enrollment, using semi-elasticities generated with county-level college-age population weights.

semi-elasticities cuts these predicted contributions roughly in half.[13] That a larger fraction of the for-profit enrollment decline is unexplained by labor market conditions is unsurprising. The for-profit sector was subject to substantially increased regulatory scrutiny during the Obama administration in the 2010s, efforts that almost certainly contributed to declines beyond those driven by changing labor market conditions.

8 Enrollment vs. Completion

Whether declining community college enrollments are harmful to students on the margin of enrollment depends in part on whether such students would complete their college degrees after enrolling. Students choosing between college enrollment and labor market opportunities may be only marginally committed to their studies and thus less likely to complete their degrees. Whether declining community college enrollments translate into declining community college degree completion rates depends on how the marginal student's completion rate compares to the average student's. We explore this question using multiple data sets.

The fraction of Americans holding associate degrees does not appear to have changed since 2010, even as community college enrollments declined precipitously. Figure 9 uses data from the American Community Survey to generate annual measures of educational attainment among 25 year olds. The share of Americans with a college degree of any sort has been rising steadily but that rise has been driven entirely by increased completion of BAs. From 2010 through 2023, the fraction of Americans whose highest degree is an AA has stayed remarkably stable around 8-9 percent. Such individual-level survey data shows no sign that decreased community college enrollments have translated to decreased degree completions, at least as measured by terminal degrees.

Institution-level data also show no sign of a slowdown in community college degree completion. Figure 10 shows IPEDS data from 2009-23 on community college enrollment and completion numbers and completion rates.[14] While first-time enrollments have fallen substantially, the number of Associate's degree completions reported by colleges rose between 2009 and 2019 (before dropping during the first few years of the pandemic). The combination of these two trends means that community colleges' self-reported completion rates have climbed substantially, from 21% for students who started in 2009 to nearly 34% for students who started in 2020.

Our county-level analysis also suggests relatively little connection between local labor market conditions and degree completion. In Table 3 we show results from estimating Equation 1 using

[13] See Figure A.8 for decomposition estimates for first-time for-profit college enrollment, using semi-elasticities generated with county-level college-age population weights.

[14] Those series are taken directly from NCES and therefore use the official IPEDS classification rather than our preferred definition we use in other parts of the analysis.

Associate's Degree completions as an outcome but measuring the unemployment rate two, three, and four years prior, when those completers would likely have started their degree. We do this for both the 1990-2007 and 1990-2019 samples, as well as with and without county population weights. Although there is always a clear relationship between local labor market conditions and first-time community college enrollments, the relationship of local labor market conditions to completions is always substantially smaller than to enrollments and is statistically insignificant across the majority of time frames and weighting schemes.

These three sources of evidence suggest that few of those whose community college enrollment is sensitive to local labor market conditions will ultimately complete their college degrees. The marginal enrollee here appears highly likely not to persist in college, consistent with their labor market sensitivity. Those on the margin between working and studying may be academically weaker than the average student or may be more likely to return to the labor market during their studies if such an opportunity arises. Declining community college enrollments thus appear concentrated among a subset of students unlikely to complete their degrees.

9 Conclusion

We demonstrate that widely discussed declines in U.S. college enrollment reflect patterns concentrated in community colleges rather than a broad crisis in higher education. We show that: four-year institutions have maintained stable enrollments; over one-third of apparent community college declines stem from administrative reclassification; community college enrollments are strongly countercyclical; strengthening labor markets explain 60 percent of the community college enrollment decline from 2009-19 (and nearly 50 percent of the decline through 2023); and students on the margin between community college enrollment and employment appear unlikely to complete a degree.

These findings have important implications for policy discussions and research. For policymakers concerned about declining community college enrollments, our results suggest that much of the decline reflects potentially rational economic decision-making rather than institutional failure. While enrollment declines create fiscal challenges for community colleges, they may indicate that these institutions successfully serve students whose educational goals are sensitive to economic opportunities. For researchers studying higher education trends, our work highlights the importance of examining sectoral heterogeneity and accounting for institutional reclassifications when interpreting enrollment data. The common practice of analyzing aggregate enrollment trends obscures meaningful differences across institutional types and student populations. For the broader debate about higher education value, our findings suggest discussions should distinguish between different types of institutions. The enrollment patterns we document do not support narratives about widespread

disillusionment with college education, but rather point to heterogeneous responses to economic conditions across different segments of the higher education market.

Several limitations suggest directions for future research. Our county-level unemployment measures may not perfectly capture labor market opportunities for specific demographic subgroups. Additionally, our focus on enrollment and completion does not address wages, career trajectories, or skill development outcomes that could provide a more complete picture of welfare implications. The COVID-19 pandemic has added new complexity to enrollment trends, with particularly sharp community college declines during 2020-2021. While our analysis suggests much of the pre-pandemic decline can be explained by labor market strength, understanding how the pandemic affects longer-term patterns remains important for future research.

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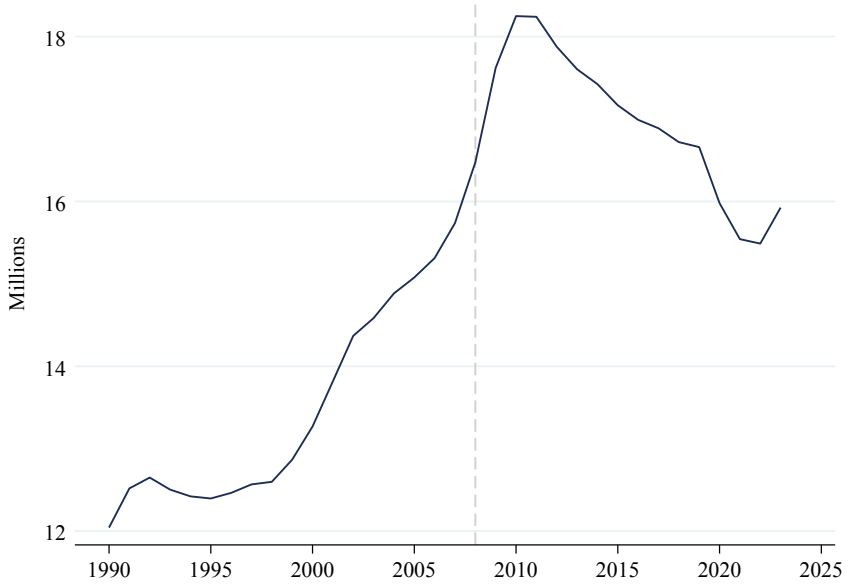
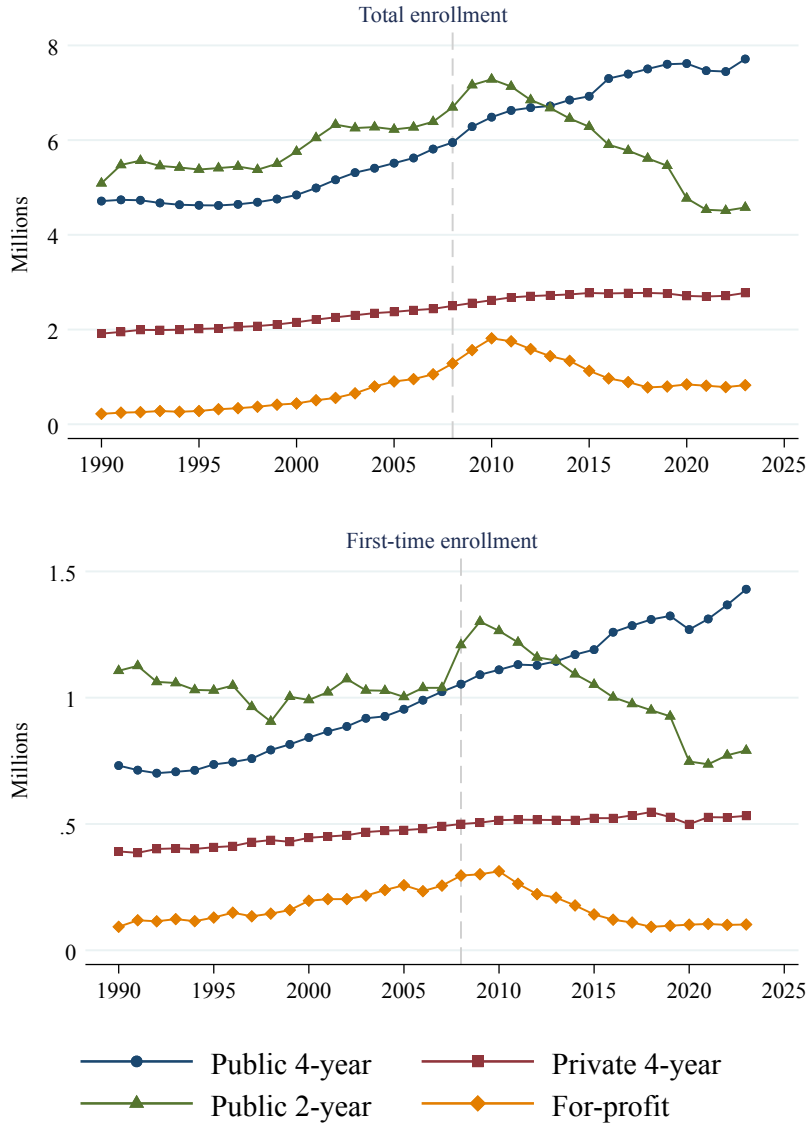
U.S. Department of Education, National Center for Education Statistics. 2022. "Table 303.50. Total fall enrollment in degree-granting postsecondary institutions, by level of enrollment, control and level of institution, attendance status, and age of student: 2021." *https://nces.ed.gov/programs/digest/d22/tables/dt22_303.50.asp*, Data from the Integrated Postsecondary Education Data System (IPEDS), Spring 2021, Fall Enrollment component. Prepared November 2022. Accessed: 27 February 2025.

FIGURE 1: Undergraduate fall enrollment



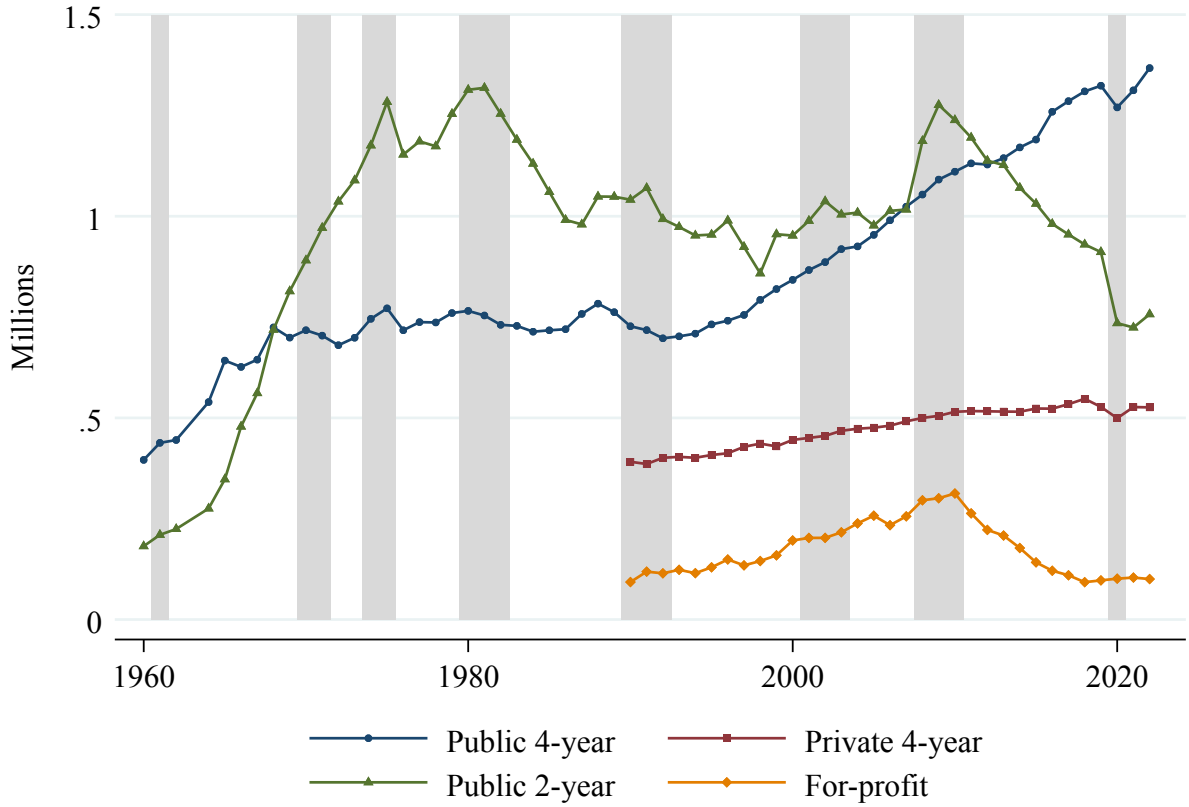
Notes: This figure shows total undergraduate fall enrollment in the United States from 1990 to 2023. The series aggregates institution-level enrollment data from the annual IPEDS Complete Data Files. The sample is restricted to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs.

FIGURE 2: Degree-seeking undergraduate enrollment, by sector



Notes: This figure shows undergraduate enrollment by sector of institution from 1990 to 2023. The series aggregate institution-level enrollment data from the annual IPEDS Complete Data Files. The sample is restricted to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs. Institutional sector in the IPEDS classification is assigned based on level of enrollment (4-year, 2-year, less than 2-year) and control of the institution (public, private not-for-profit, private for-profit) in each reporting year. We pool enrollment at private for-profit institutions across all levels. The top panel shows total fall enrollment by sector. The bottom panel shows first-time degree/certificate-seeking fall enrollment by sector.

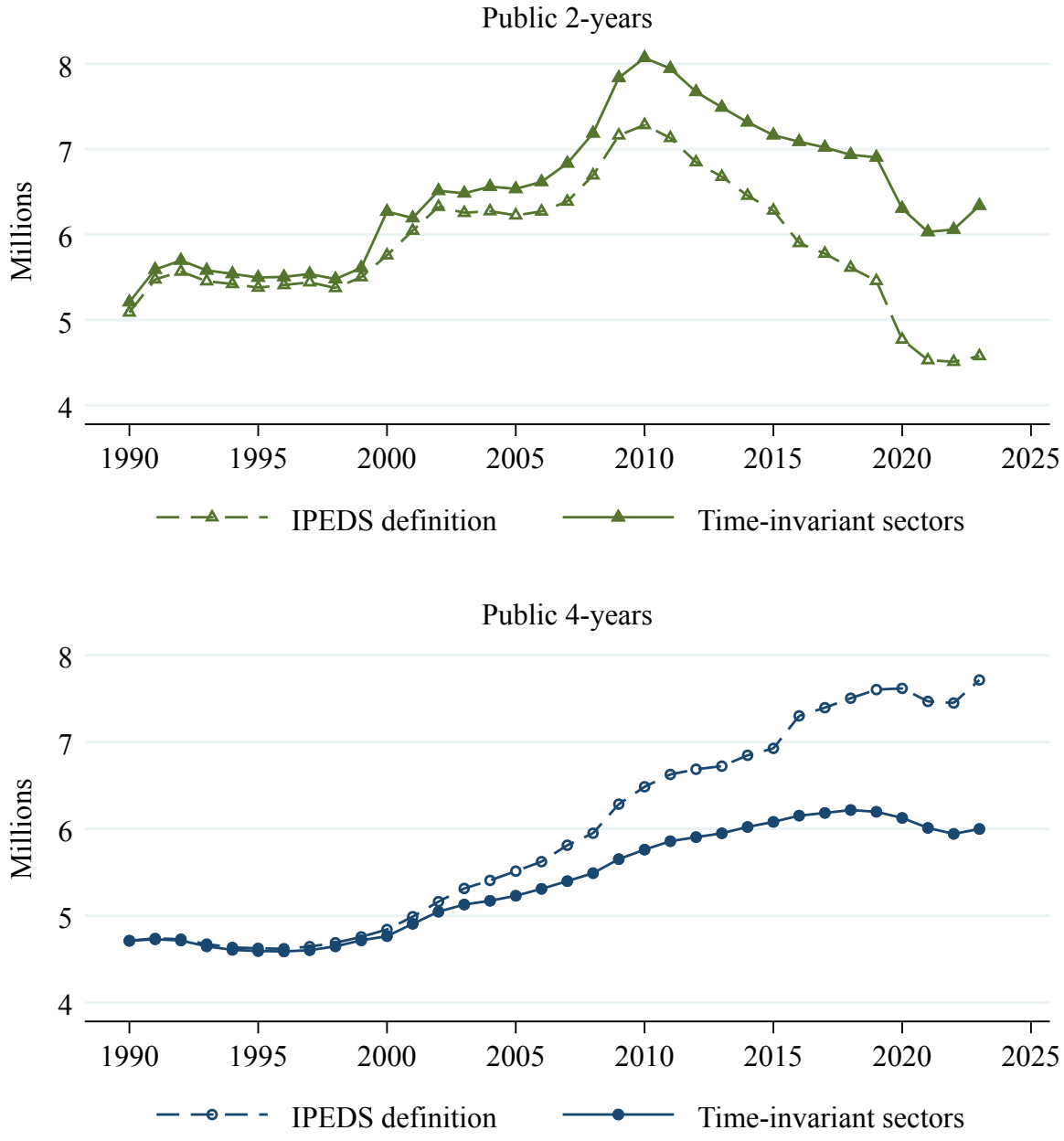
FIGURE 3: First-time undergraduate enrollment by sector



Shaded areas indicate periods when the national unemployment rate is increasing.

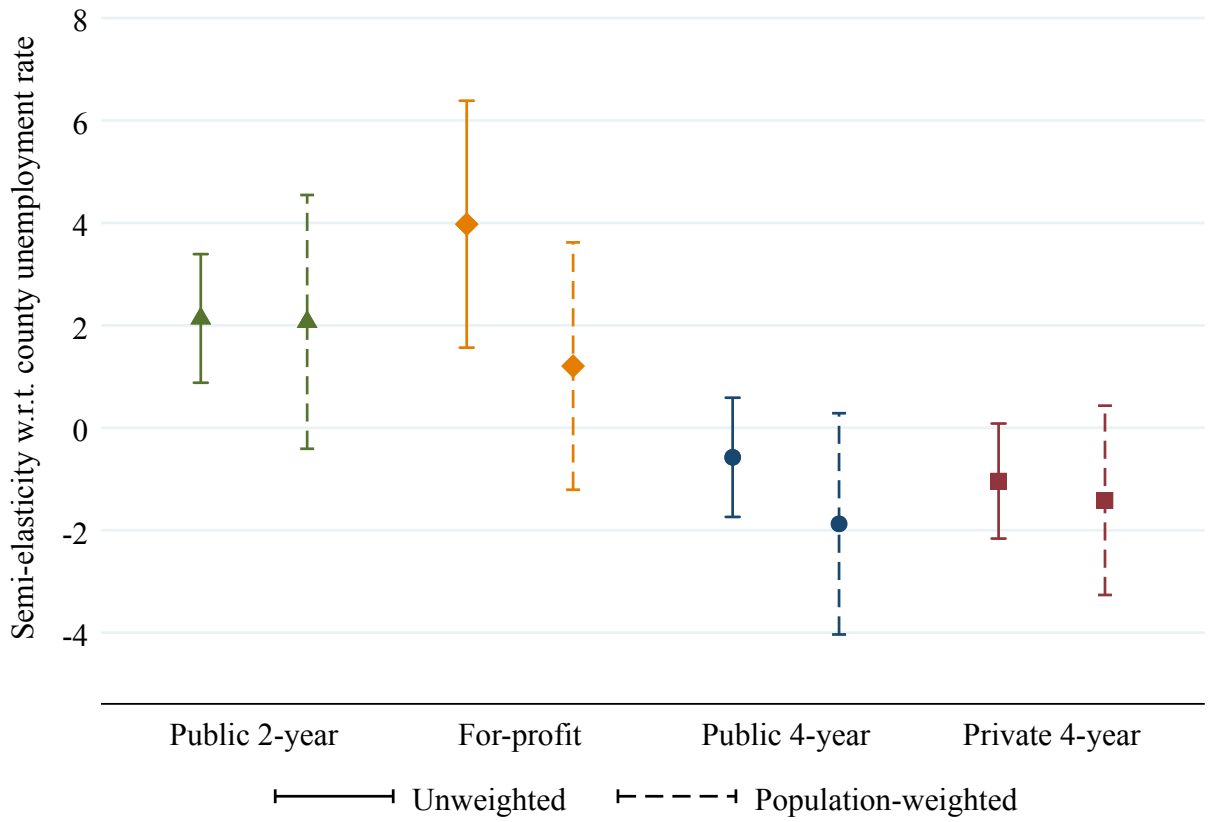
Notes: This figure shows first-time degree/certificate-seeking undergraduate fall enrollment by sector of institution and periods of increasing national unemployment from 1960 to 2023. Historical enrollment at public 4-year and 2-year institutions is taken from the Digest of Education Statistics (Table 305.10), which provides enrollment for those sectors going back to 1960. The Digest does not identify historical enrollment over this period at private for-profit vs. private not-for-profit institutions. Our enrollment series for those institutions are based on annual IPEDS Complete Data Files and correspond to the series in the bottom panel of Figure 2. All enrollment numbers refer to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs. Our unemployment measure is the annual national unemployment rate based on the Current Population Survey and retrieved from FRED at the Federal Reserve Bank of St. Louis. Shaded areas indicate periods when the national unemployment rate per this definition is increasing compared to the prior year.

FIGURE 4: Undergraduate enrollment by sector definition



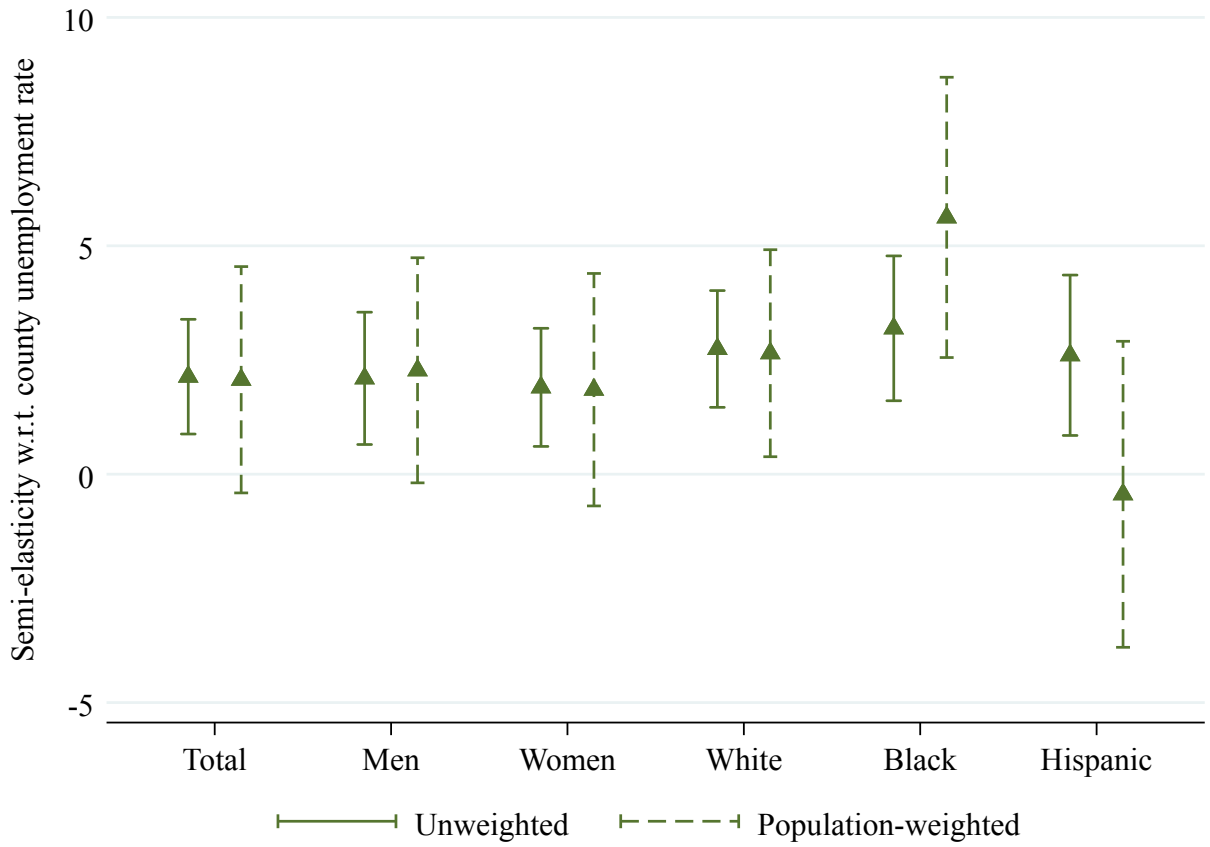
Notes: This figure shows undergraduate fall enrollment from 1990 to 2023 at public two- and four-year institutions, respectively, using two different sector definitions. The series aggregate institution-level enrollment data from the annual IPEDS Complete Data Files. The sample is restricted to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs. The dashed series in each panel refers to enrollment according to the official IPEDS sector classification in each reporting year and corresponds to the series in the top panel of Figure 2. The solid series in each panel refers to our preferred time-invariant sector classification that invariantly classifies any institution that is ever a public two-year over this time period as always a public two-year institution.

FIGURE 5: Cyclicality of first-time undergraduate enrollment, by sector and weighting



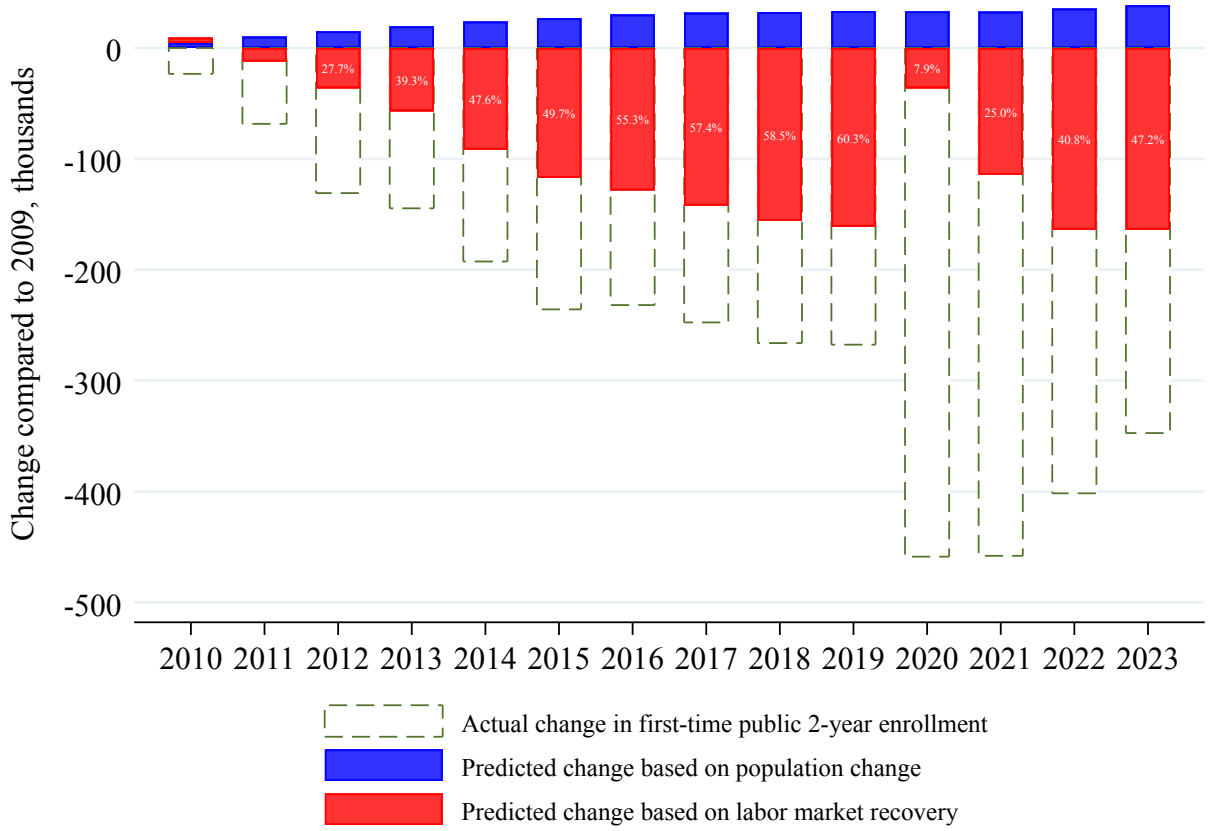
Notes: This figure shows our estimates of the semi-elasticity of county-level undergraduate enrollment with respect to the local unemployment rate, separately by sector of institution. See equation 1 for the estimating equation. Enrollment data refer to first-time degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Annual county-level unemployment rates are retrieved from the BLS Local Area Unemployment Statistics. Annual county-level population counts are retrieved from the NIH Surveillance, Epidemiology, and End Results Program (SEER). We restrict to the population of 15-34-year-olds. We limit our sample window to 1990 through 2007. We present estimates both unweighted and weighted by the annual county group population. The figure includes 95% confidence intervals for each point estimate. Standard errors are robust and clustered at the county-level.

FIGURE 6: Cyclicality of first-time undergraduate enrollment at public two-years by demographic, 1990-2007



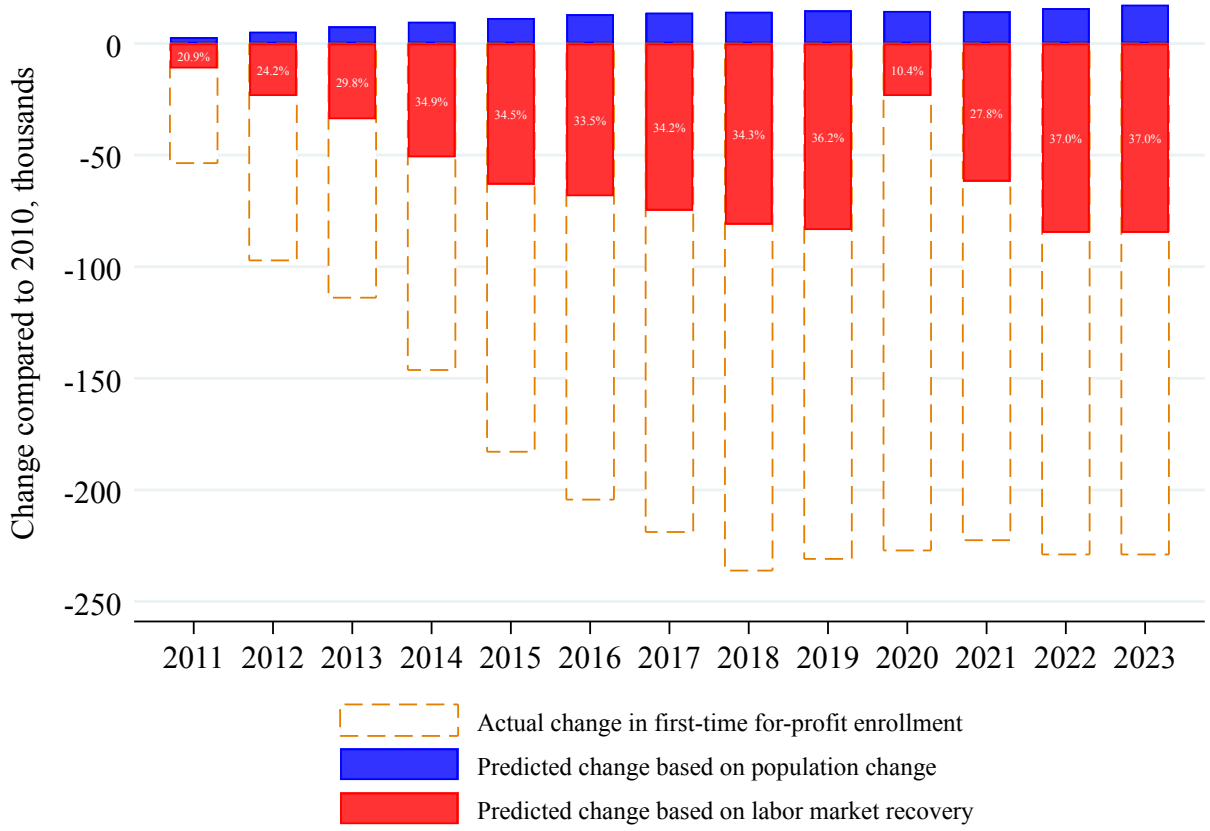
Notes: This figure shows our estimates of the semi-elasticity of county-level undergraduate enrollment with respect to the local unemployment rate at public two-year colleges for different demographic groups. See equation 2 for the estimating equation. Group-specific enrollment data refer to first-time degree/certificate-seeking enrollment for that demographic group and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Annual county-level unemployment rates are retrieved from the BLS Local Area Unemployment Statistics and are not group-specific. Annual county-level population counts are retrieved from the NIH Surveillance, Epidemiology, and End Results Program (SEER). We restrict to the population of 15-34-year-olds of that sex or race group. We limit our sample window to 1990 through 2007. We present estimates both unweighted and weighted by the annual group-specific county population. The figure includes 95% confidence intervals for each point estimate. Standard errors are robust and clustered at the county-level.

FIGURE 7: Decomposing the Decline in First-time Community College Enrollment



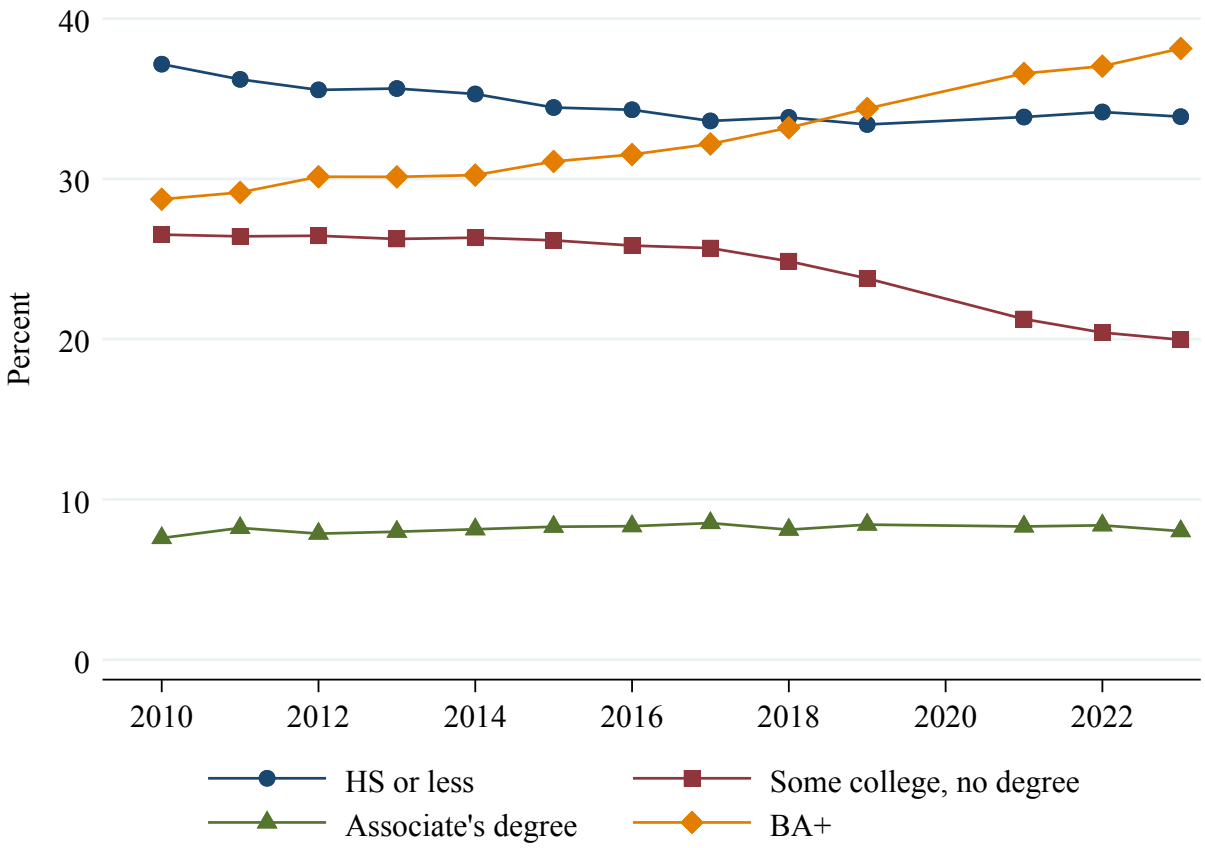
Notes: This figure decomposes the post-2009 decline in enrollment at public two-year colleges into the trends consistent with the trajectories of the unemployment rate and population over that time period, based on the historical county-level relationship between enrollment and those variables. The historical relationship is given by the point estimates from equation 1 estimated on pre-Great Recession data from 1990 to 2007. The subsequent changes in the unemployment rate and population imply predicted changes in enrollment that we estimate separately using equations 3 and 4 and plot here in the red and blue bars, respectively. Enrollment data refer to first-time degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Calculations are based on the annual national unemployment rate retrieved from FRED at the Federal Reserve Bank of St. Louis, as well as the annual national population of 15-34-year-olds, which we aggregate from SEER county-level data.

FIGURE 8: Decomposing the Decline in First-time For-Profit College Enrollment



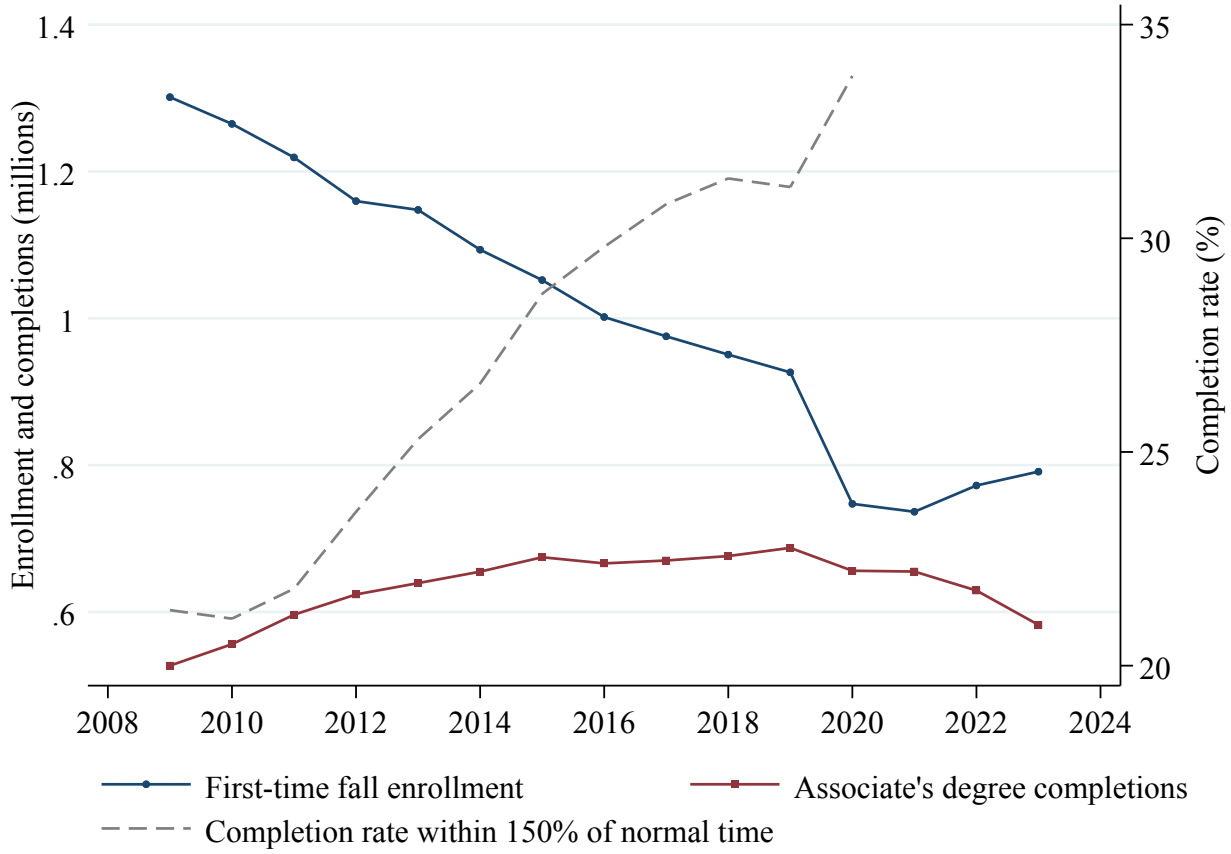
Notes: This figure decomposes the post-2010 decline in enrollment at for-profit colleges into the trends consistent with the trajectories of the unemployment rate and population over that time period, based on the historical county-level relationship between enrollment and those variables. The historical relationship is given by the point estimates from equation 1 estimated on pre-Great Recession data from 1990 to 2007. The subsequent changes in the unemployment rate and population imply predicted changes in enrollment that we estimate separately using equations 3 and 4 and plot here in the red and blue bars, respectively. Enrollment data refer to first-time degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Calculations are based on the annual national unemployment rate retrieved from FRED at the Federal Reserve Bank of St. Louis, as well as the annual national population of 15-34-year-olds, which we aggregate from SEER county-level data.

FIGURE 9: Educational attainment of 25-year-olds



Notes: This figure shows the distribution of highest educational attainment for 25-year-olds in the United States by calendar year. The shares are calculated using data from the American Community Survey, which we access through IPUMS. "HS or less" refers to individuals who did not finish high school or finished high school or an equivalent credential (e.g. GED). "BA+" refers to individuals whose highest educational attainment is a bachelor's or postgraduate degree.

FIGURE 10: Increasing completion rates in the public two-year sector



Notes: This figure shows first-time fall degree/certificate-seeking enrollment, associate degree completions, and the three-year completion rate at public two-year colleges from 2009 to 2023. Enrollment and completions are plotted on the left axis, and the completion rate is plotted on the right axis. Enrollment and completions are based on annual IPEDS Complete Data Files. This figure uses the official IPEDS sector classification to be consistent with the completion rate data, which we retrieve from the NCES Trend Generator.

TABLE 1: Elasticity of first-time enrollment with respect to unemployment rate

	Sector			
Aggregation	**Public 2-year**	**Public 4-year**	**Private 4-year**	**For-profit**
Panel A: 1990–2007				
County	0.0214	-0.0058	-0.0104	0.0400
	(0.0064)	(0.0059)	(0.0057)	(0.0123)
Commuting zone	0.0125	-0.0025	-0.0096	0.0430
	(0.0087)	(0.0076)	(0.0089)	(0.0181)
National	0.0277	-0.0516	-0.0352	-0.1550
	(0.0110)	(0.0116)	(0.0105)	(0.0749)
Panel B: 1990–2019				
County	0.0282	0.0010	-0.0078	0.0403
	(0.0052)	(0.0051)	(0.0051)	(0.0124)
Commuting zone	0.0266	0.0030	0.0057	0.0415
	(0.0072)	(0.0061)	(0.0085)	(0.0161)
National	0.0390	-0.0113	-0.0031	0.0803
	(0.0045)	(0.0071)	(0.0054)	(0.0404)
Panel C: 1960–2019				
National	0.0176	-0.0410		
	(0.0153)	(0.0112)		

Notes: This table shows our estimates of the semi-elasticity of undergraduate enrollment with respect to the unemployment rate for different time periods and levels of geographic aggregation, separately by sector of institution. See equation 1 for the general estimating equation. The estimating equation at the national level does not include year fixed effects. Enrollment refers to first-time degree/certificate-seeking enrollment. Panels A and B are based on annual IPEDS Complete Data Files, while Panel C is based on the Digest of Education Statistics (Table 305.10). Sector assignment in Panels A and B uses our preferred sector definition described in Section 5, while sector assignment in Panel C uses the standard IPEDS definition. Unemployment rates are retrieved from the BLS Local Area Unemployment Statistics, and population counts are retrieved from the NIH Surveillance, Epidemiology, and End Results Program (SEER). Standard errors are robust and clustered at the relevant geographic level.

TABLE 2: Effects of a Shock to the Current Unemployment Rate u_t on Future Enrollment

	1990–2007		1990–2019	
Lead ℓ	Unemployment	Enrollment	Unemployment	Enrollment
0	1.0000	0.0214	1.0000	0.0282
	(0.0000)	(0.0064)	(0.0000)	(0.0052)
1	0.7271	0.0163	0.7734	0.0228
	(0.0107)	(0.0065)	(0.0057)	(0.0052)
2	0.4807	0.0054	0.5388	0.0168
	(0.0178)	(0.0065)	(0.0092)	(0.0052)
3	0.3209	0.0028	0.3587	0.0124
	(0.0216)	(0.0060)	(0.0112)	(0.0050)
4	0.1933	0.0006	0.2012	0.0083
	(0.0217)	(0.0056)	(0.0122)	(0.0049)
5	0.0830	−0.0020	0.0726	0.0055
	(0.0201)	(0.0058)	(0.0131)	(0.0048)
6	−0.0117	−0.0024	−0.0206	0.0029
	(0.0187)	(0.0058)	(0.0143)	(0.0046)

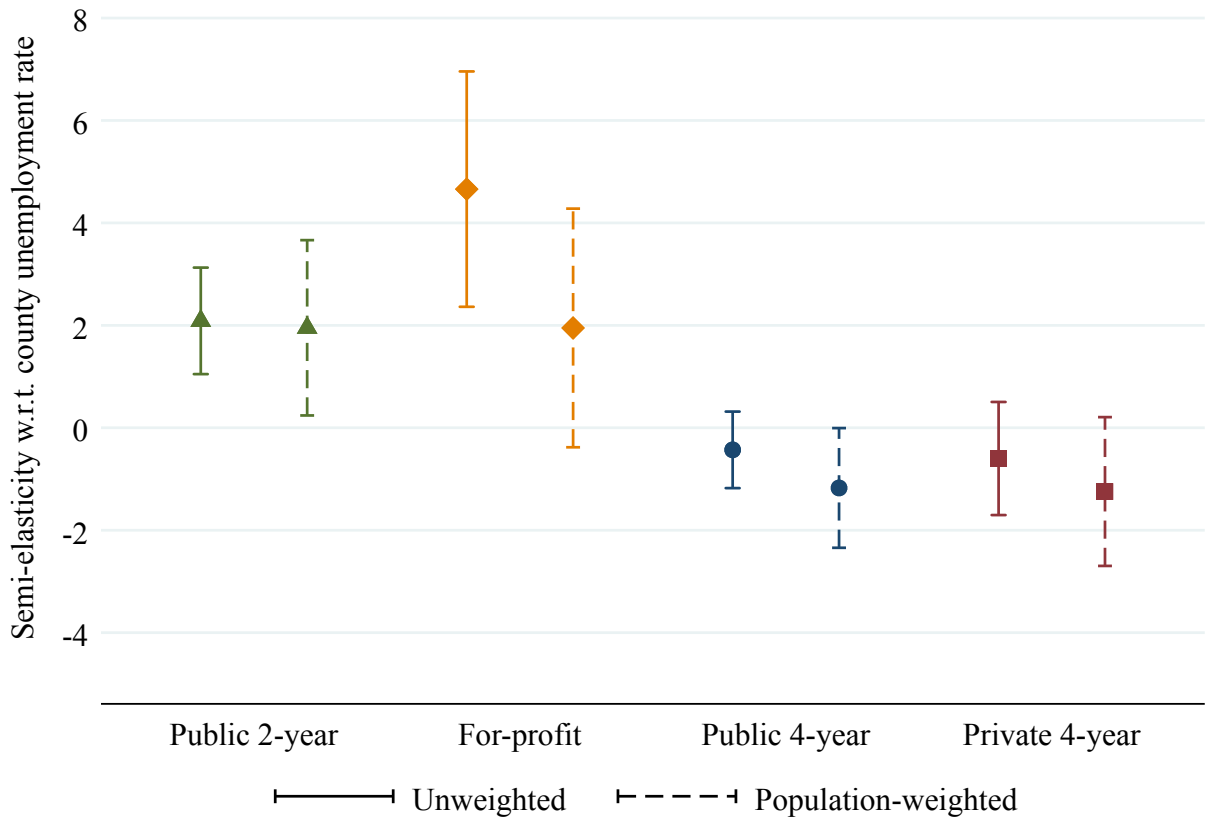
Notes: This table shows the decay over time of the semi-elasticity of undergraduate enrollment at public two-year colleges with respect to the current unemployment rate. The enrollment columns 2 and 4 show elasticities based on versions of equation 1 with varying leads ℓ of first-time enrollment as the dependent variable. The unemployment columns 1 and 3 show the analogous coefficients for regressions where future unemployment is the dependent variable. Columns 1 and 2 are based on the 1990-2007 sample window; columns 3 and 4 are based on the 1990-2019 sample window. Standard errors are robust and clustered at the county level.

TABLE 3: Elasticity of associate degree completions with respect to lagged unemployment rate

	1990–2007		1990–2019	
Lag	**Enrollment**	**Completions**	**Enrollment**	**Completions**
Panel A: Unweighted				
Current	0.0214		0.0282	
	(0.0064)		(0.0052)	
2-year lag		0.0101		0.0176
		(0.0052)		(0.0052)
3-year lag		0.00777		0.0167
		(0.00532)		(0.0053)
4-year lag		0.0028		0.0129
		(0.0052)		(0.0054)
Panel B: Population-weighted				
Current	0.0207		0.0178	
	(0.0126)		(0.0095)	
2-year lag		-0.0002		-0.0078
		(0.0118)		(0.0115)
3-year lag		-0.0006		-0.0065
		(0.0116)		(0.0111)
4-year lag		-0.0003		-0.0047
		(0.0116)		(0.0111)

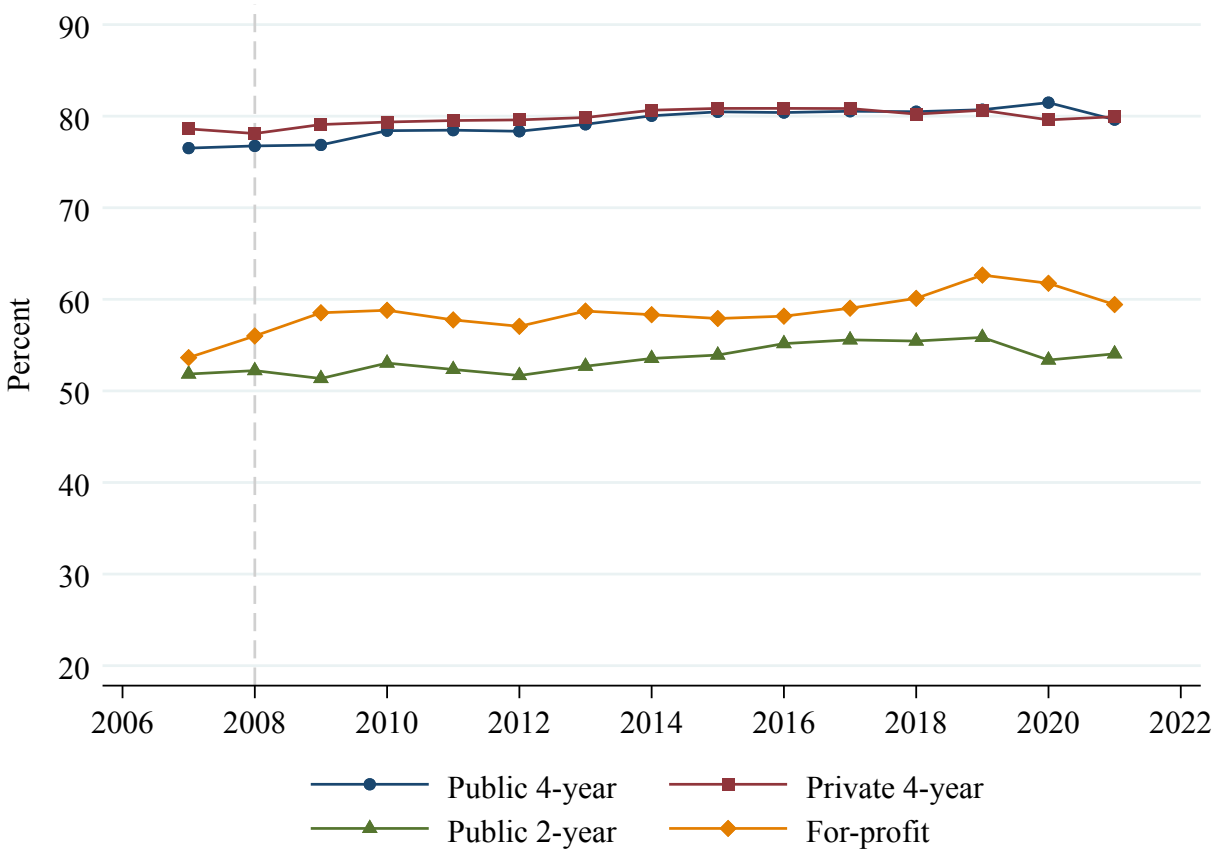
Notes: This table shows the semi-elasticity of undergraduate enrollment and associate degree completions at public two-year colleges with respect to current and lagged unemployment rates, respectively. The enrollment columns show elasticities of first-time degree/certificate-seeking enrollment with respect to the current unemployment rate, which are estimated using equation 1. The completion columns show elasticities of associate degree completions with respect to the two-/three-/or four-year lagged unemployment rate. These elasticities are estimated using analogous versions of equation 1 with associate degree completions as the dependent variable and the lagged unemployment rate as the main regressor of interest. Columns 1 and 2 are based on the 1990-2007 sample window; columns 3 and 4 are based on the 1990-2019 sample window. Panel A reports unweighted estimates, while Panel B reports estimates from regressions using (lagged) county population weights. Standard errors are robust and clustered at the county level.

FIGURE A.1: Cyclicality of total undergraduate enrollment, by sector and weighting



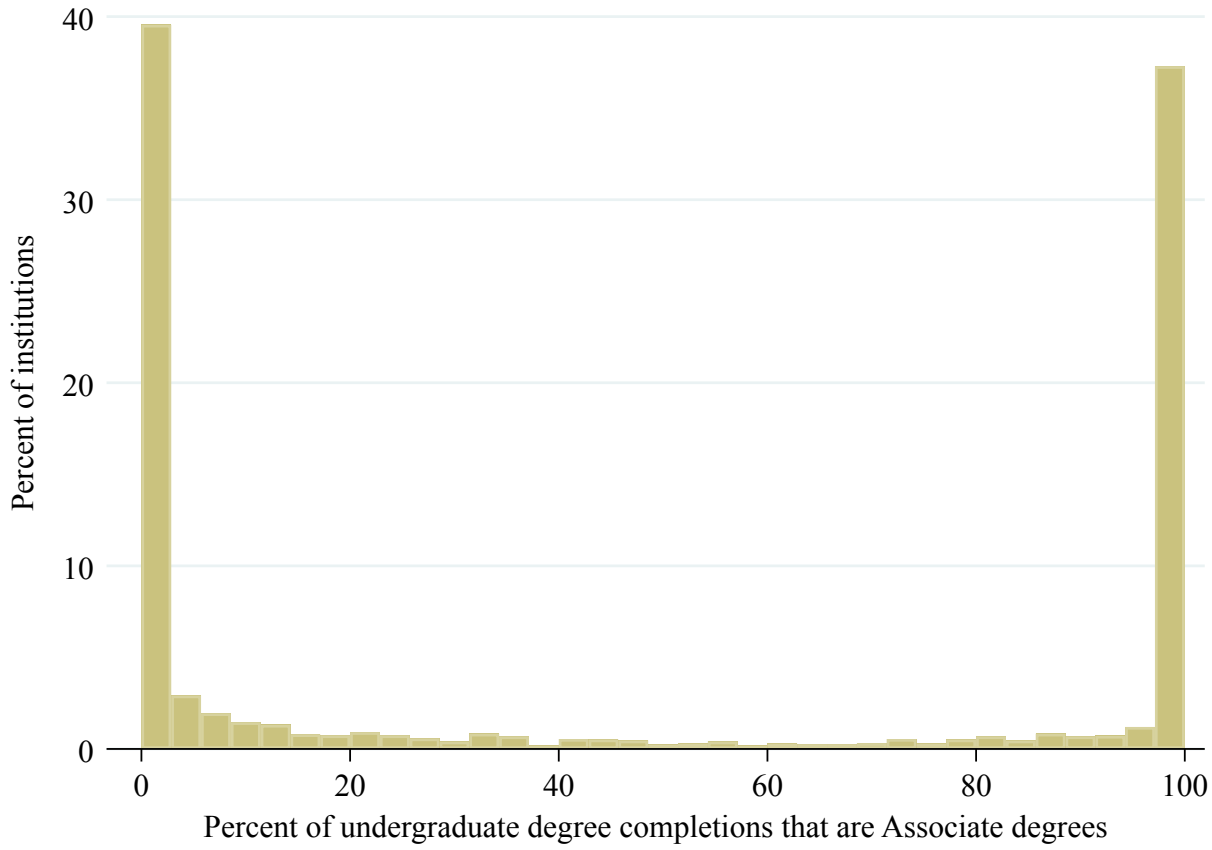
Notes: This figure shows our estimates of the semi-elasticity of county-level undergraduate enrollment with respect to the local unemployment rate, separately by sector of institution. See equation 1 for the estimating equation. Enrollment data refer to total degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Annual county-level unemployment rates are retrieved from the BLS Local Area Unemployment Statistics. Annual county-level population counts are retrieved from the NIH Surveillance, Epidemiology, and End Results Program (SEER). We restrict to the population of 15-34-year-olds. We limit our sample window to 1990 through 2007. We present estimates both unweighted and weighted by the annual county group population. The figure includes 95% confidence intervals for each point estimate. Standard errors are robust and clustered at the county-level.

FIGURE A.2: Retention rates of first-time undergraduate students



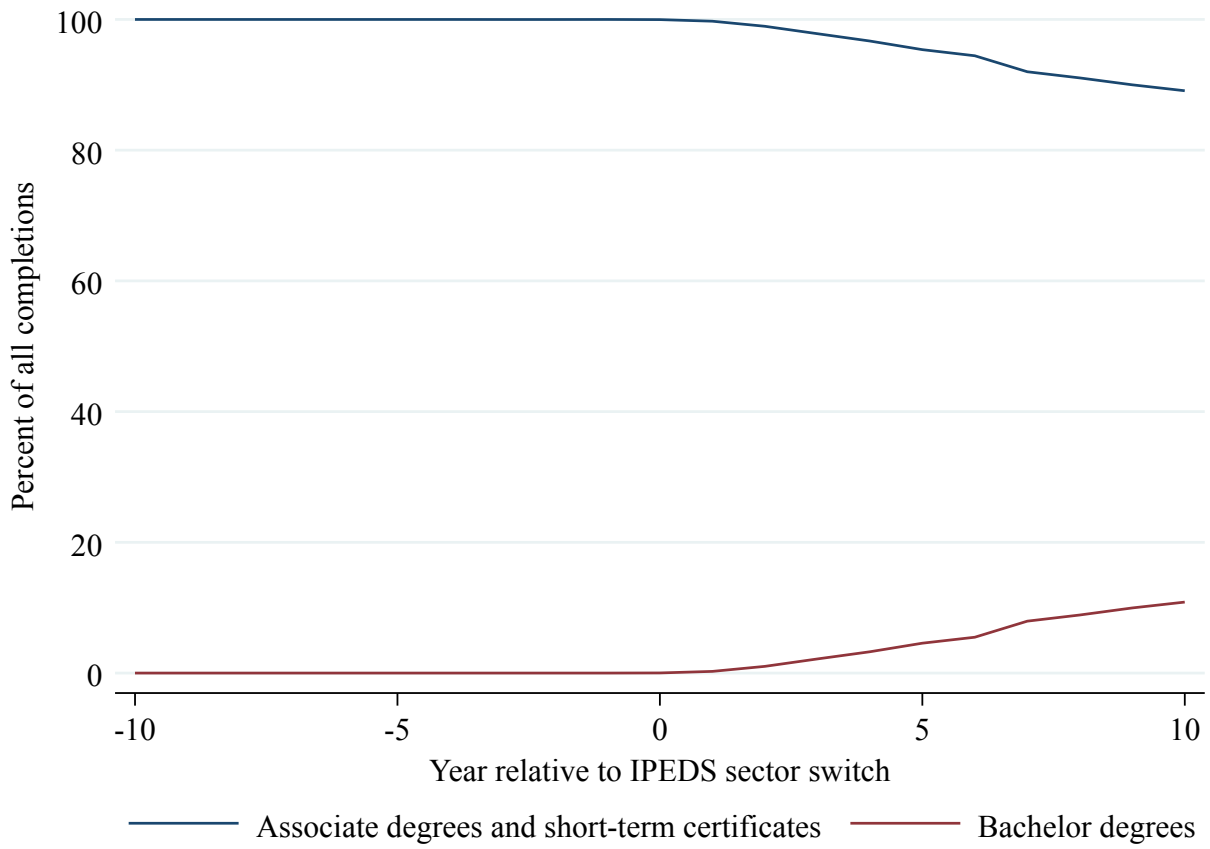
Notes: This figure shows retention rates of first-time degree-seeking undergraduates by sector of institution from 2007 to 2021 for students who enrolled in the prior year. Retention rates are retrieved from the NCES Digest of Education Statistics Table 326.30. Institutional sector in the IPEDS classification is assigned based on level of enrollment (4-year, 2-year, less than 2-year) and control of the institution (public, private not-for-profit, private for-profit) in each reporting year.

FIGURE A.3: Distribution of Associate degree completions, 2023



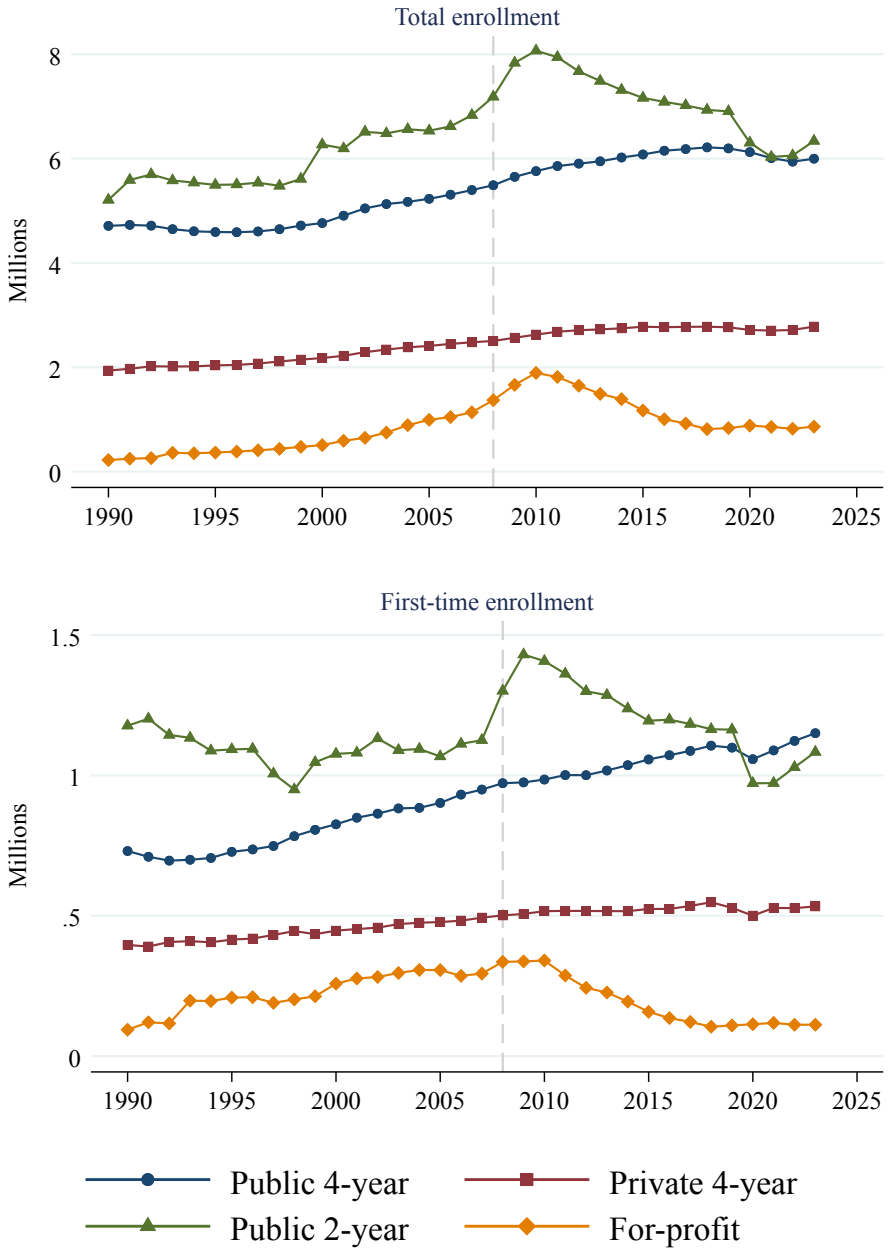
Notes: This figure shows the distribution across postsecondary institutions of the share of undergraduate degrees awarded in 2023 that were associate degrees. The underlying institution-level completions data are retrieved from the 2023 IPEDS Complete Data Files and refer to completions between July 1, 2022 and June 30, 2023. The sample is restricted to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs. For each institution, we compute the number of associate degrees awarded over the number of associate and bachelor degrees awarded.

FIGURE A.4: Degree composition around switch from two-year to four-year institution



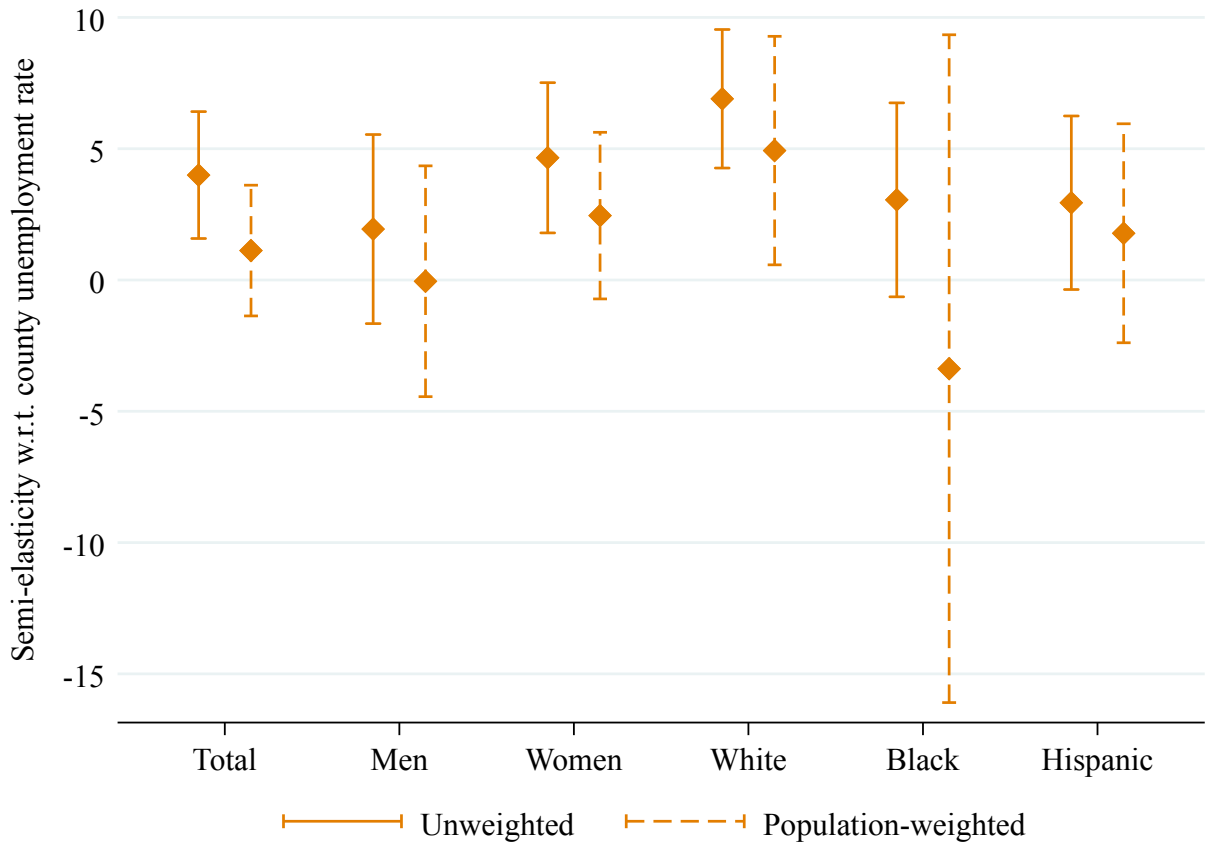
Notes: This figure shows the degree composition for postsecondary institutions that switch their official IPEDS classification from public two-year institution to public four-year institution in the years before and after the reclassification. The sample is limited to degree-granting institutions that switch sectors a single time between 1990 and 2022. The underlying institution-level completions data are retrieved from annual IPEDS Complete Data Files. For each institution, we compute the share of all completions in a year that are associate degrees and short-term certificates or bachelor degrees. The means across institutions are weighted by undergraduate fall enrollment.

FIGURE A.5: Undergraduate enrollment by time-invariant sectoral definition



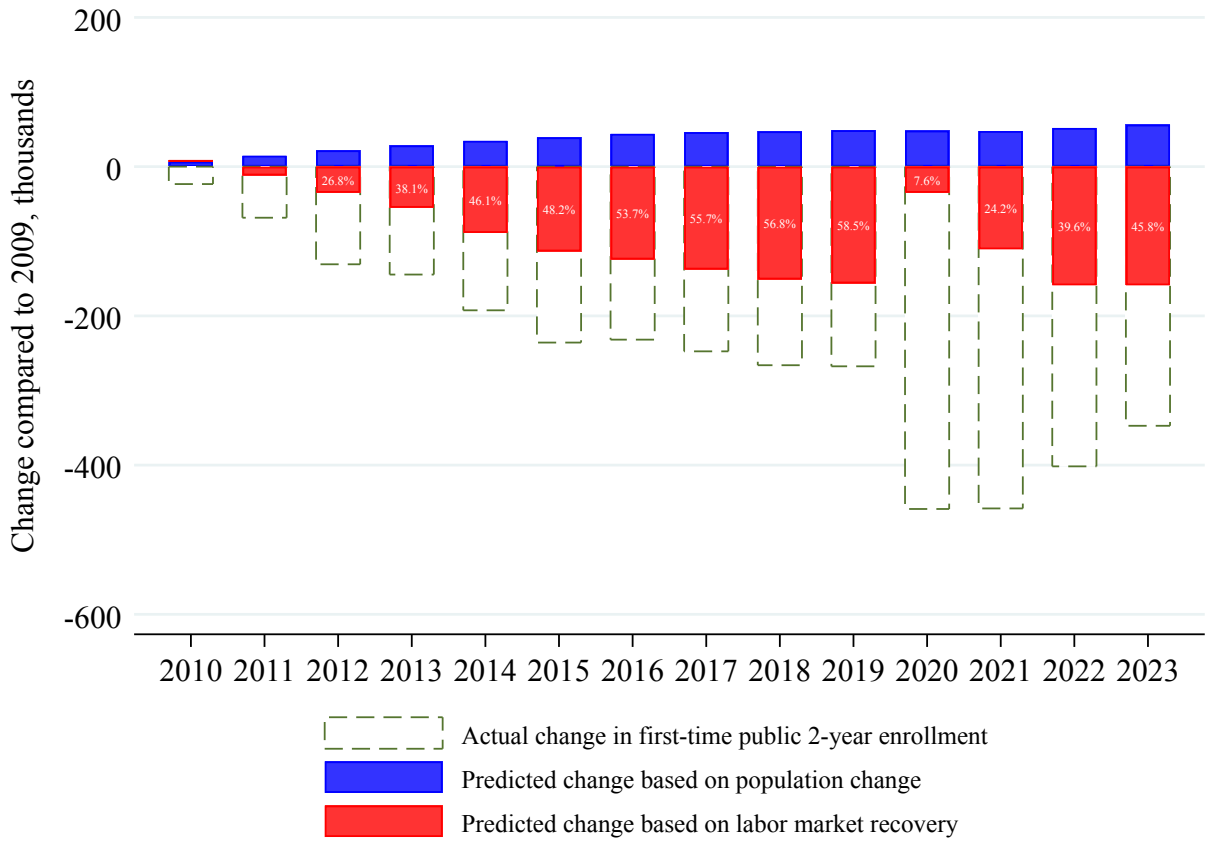
Notes: This figure shows undergraduate enrollment by sector of institution from 1990 to 2023. The series aggregate institution-level enrollment data from the annual IPEDS Complete Data Files. The sample is restricted to degree-granting institutions, which are institutions that grant associate or higher degrees and participate in Title IV federal financial aid programs. The figure is analogous to Figure 2 except that institutional sector here refers to our preferred time-invariant sector classification that invariantly classifies any institution that is ever a public two-year over this time period as always a public two-year institution. The top panel shows total fall enrollment by sector. The bottom panel shows first-time degree/certificate-seeking fall enrollment by sector.

FIGURE A.6: Cyclicality of first-time undergraduate enrollment at for-profits by demographic, 1990-2007



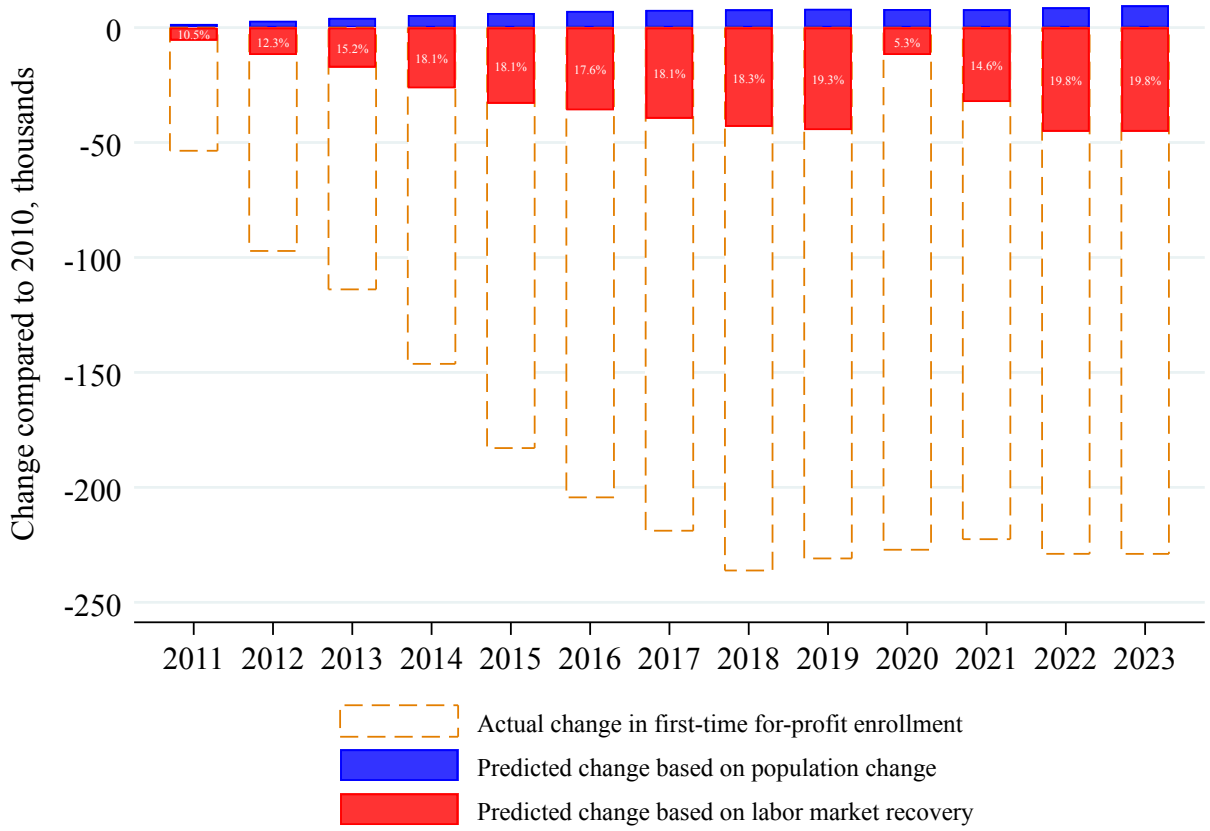
Notes: This figure shows our estimates of the semi-elasticity of county-level undergraduate enrollment with respect to the local unemployment rate at for-profit colleges for different demographic groups. See equation 2 for the estimating equation. Group-specific enrollment data refer to first-time degree/certificate-seeking enrollment for that demographic group and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Annual county-level unemployment rates are retrieved from the BLS Local Area Unemployment Statistics and are not group-specific. Annual county-level population counts are retrieved from the NIH Surveillance, Epidemiology, and End Results Program (SEER). We restrict to the population of 15-34-year-olds of that sex or race group. We limit our sample window to 1990 through 2007. We present estimates both unweighted and weighted by the annual group-specific county population. The figure includes 95% confidence intervals for each point estimate. Standard errors are robust and clustered at the county-level.

FIGURE A.7: Decomposing the decline in first-time degree-seeking enrollment at public 2-years (weighted,2009-2023)



Notes: This figure decomposes the post-2009 decline in enrollment at public two-year colleges into the trends consistent with the trajectories of the unemployment rate and population over that time period, based on the historical county-level relationship between enrollment and those variables. The historical relationship is given by the point estimates from equation 1 estimated on pre-Great Recession data from 1990 to 2007. Compared to Figure 7, this figure uses the population-weighted rather than unweighted elasticity as the measure of the historical relationship. The subsequent changes in the unemployment rate and population imply predicted changes in enrollment that we estimate separately using equations 3 and 4 and plot here in the red and blue bars, respectively. Enrollment data refer to first-time degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Calculations are based on the annual national unemployment rate retrieved from FRED at the Federal Reserve Bank of St. Louis, as well as the annual national population of 15-34-year-olds, which we aggregate from SEER county-level data.

FIGURE A.8: Decomposing the decline in first-time degree-seeking enrollment at for-profits (weighted,2009-2023)



Notes: This figure decomposes the post-2010 decline in enrollment at for-profit colleges into the trends consistent with the trajectories of the unemployment rate and population over that time period, based on the historical county-level relationship between enrollment and those variables. The historical relationship is given by the point estimates from equation 1 estimated on pre-Great Recession data from 1990 to 2007. Compared to Figure 8, this figure uses the population-weighted rather than unweighted elasticity as the measure of the historical relationship. The subsequent changes in the unemployment rate and population imply predicted changes in enrollment that we estimate separately using equations 3 and 4 and plot here in the red and blue bars, respectively. Enrollment data refer to first-time degree/certificate-seeking enrollment and are based on annual IPEDS Complete Data Files. Sector assignment uses our preferred sector definition described in Section 5. Calculations are based on the annual national unemployment rate retrieved from FRED at the Federal Reserve Bank of St. Louis, as well as the annual national population of 15-34-year-olds, which we aggregate from SEER county-level data.