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United States**

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ABSTRACT

Unpacking the Countercyclicality of Post-Secondary Enrollment in the United States*

Using data from the Current Population Survey's Education Supplement for 1977-2023, we explore two important, yet understudied facets of the pattern of countercyclical post-secondary education (PSE) enrollment in the U.S. First, we show that economic downturns are associated with higher enrollment probabilities at both 2- and 4-year colleges among young men, but only at 2-year institutions among young women. Second, we show that the overall increase in enrollment propensities during downturns is primarily driven by persistence (i.e., changes in enrollment among individuals with prior PSE participation), rather than matriculation (i.e., new enrollments). However, higher unemployment rates increase matriculation probabilities at 2-year colleges among 18-year-old men and women, and at 4-year colleges among individuals in their early 20s. Our findings improve our understanding of the dimensions along which aggregate economic fluctuations induce changes in human capital acquisition.

JEL Classification: I23, J24, E32

Keywords: college enrollment, business cycles, 2- and 4-year institutions, persistence

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1 Introduction

The decision to enroll in post-secondary education (PSE) depends not only on individuals’ abilities and preferences, but also on the broader economic conditions that prevail when the enrollment choice is made. Economic downturns might encourage enrollment, as the opportunity cost of forgone earnings falls, or discourage enrollment, as financially constrained individuals may be less able to afford PSE (Hoenack & Weiler, 1979; Dellas & Sakellaris, 2003; Anstreicher, 2025). On balance, the existing body of evidence points towards an overall expansion in PSE enrollments during economic downturns (Corman & Davidson, 1984; Grubb, 1988; Betts & McFarland, 1995; Dellas & Sakellaris, 2003; Sievertsen, 2016; Ulvestad & Skjelbred, 2023; Long, 2004; Hershbein, 2012; Hillman & Orians, 2013).

In this paper, we unpack the countercyclicality of PSE enrollments along two important yet understudied dimensions: (i) differences in enrollment behavior between 2-year colleges and 4-year universities, and (ii) differences in the role of changes in matriculation (new enrollments) and changes in persistence (enrollment among previous PSE participants). Our analysis leverages the large nationally-representative data available in the Education Supplement of the U.S. Current Population Survey (CPS). We focus on the association between PSE enrollment outcomes of young high school graduates (aged 18-24) and local economic conditions, as measured by state-level unemployment rates, over the period 1977–2023. We conduct all of our analyses separately for men and women, given evidence in the literature of the heterogeneous responses between these two groups (Card & Lemieux, 2001; Hershbein, 2012).

Understanding whether enrollment increases differentially at 2- and 4-year institutions is an essential part of fully characterizing the countercyclicality of PSE enrollment. On average, 2- and 4-year institutions differ along a wide range of consequential dimensions. Relative to 2-year institutions, 4-year colleges have higher completion rates, higher economic returns, and more institutional resources (U.S. Department of Education, National Center for Education Statistics, 2021; Andrews et al., 2024; Lovenheim & Smith, 2023; Mountjoy, 2022). Yet, much of the existing literature on countercyclical enrollment has focused either on only one type of institution (e.g., community colleges in Betts & McFarland, 1995) or has considered PSE

enrollment overall (e.g., Dellas & Sakellaris, 2003).¹

Our analysis systematically distinguishes between enrollment in 2- and 4-year colleges within the same framework. We find that higher unemployment increases PSE enrollment for both men and women, but with notable differences. For men, most of the increase is in 4-year colleges, while for women, enrollment rises in 2-year programs, but not in 4-year colleges, on average.

The other key dimension that we analyze is the distinction between matriculation and persistence.² Whether enrollment expansions that coincide with economic downturns are driven by new first-time enrollments or by continuing and returning students matters for at least two reasons. First, new enrollments might signify expanding access to PSE, while increased persistence would not.³ Second, matriculation and persistence may have different implications for PSE completion rates. Obtaining an educational credential is associated with higher economic returns, i.e., the “sheep-skin effect” (Belfield & Bailey, 2017; Kane & Rouse, 1995; Jaeger & Page, 1996), yet dropping out is common (Bound et al., 2010; Aina et al., 2022). Students who stay in PSE longer during economic downturns may be more likely to complete a PSE degree and benefit from higher returns. Uncovering the prevalence of this behavior can be informative about whether policies that strategically target funding to upper-year students (Matsuda, 2020) should be expanded during economic downturns. Despite the policy relevance of distinguishing matriculation from persistence, most of the existing literature only estimates how the stock of enrollees varies over the business cycle.⁴

We find that persistence accounts for most of the overall countercyclicality in enrollment. However, we also find increases in matriculation for specific groups:

¹One exception is Alessandrini (2018), who considers net substitution patterns between 2- and 4-year colleges during downturns in the Canadian context.

²We use “persistence” rather than “dropout” to frame our empirical work, because persistence is a more natural counterpart to matriculation (being enrolled for the first time or for a subsequent year). However, we think of the persistence decision as simply the reverse of the dropout decision.

³Mountjoy (2022) shows that 2-year colleges offer significant positive value added for entrants who would not have otherwise attended PSE, suggesting that there may be important returns for expanding access to PSE.

⁴In the Danish context, Sievertsen (2016) shows that higher local unemployment rates are positively associated with both PSE enrollment and completion. The annual CPS cross-sections that we investigate do not enable us to estimate how economic conditions at matriculation affect eventual degree completion.

Young high-school graduates (aged 18-19), are much more likely to start a 2-year college degree during bad economic times; for men, this is due to a net increase in PSE enrollment, while for women, growth in matriculation at 2-year colleges is offset by a decline in matriculation at 4-year institutions. In contrast, at slightly older ages (especially 23-24), higher unemployment is associated with substantial increases in 4-year college enrollment that is driven by both increased matriculation and persistence for men and women.

Our work complements and extends the existing body of research on how PSE enrollment responds to economic conditions. The earliest studies used cross-sectional state-level analyses to link unemployment and enrollment (Corman & Davidson, 1984; Grubb, 1988). Betts & McFarland (1995) were among the first to document the countercyclicality of enrollment in community colleges, while Dellas & Sakellaris (2003) confirmed that overall enrollment in PSE expands when unemployment rises.⁵ Countercyclicality has also been documented in Canada (Alessandrini, 2018), France (Arenas & Malgouyres, 2018), Denmark (Sievertsen, 2016), and for graduate enrollment in Norway (Ulvestad & Skjelbred, 2023). The Great Recession specifically has been associated with increased enrollment among displaced workers (Barr & Turner, 2015) and people of color (Long, 2014) in the U.S. By contrast, Anstreicher (2025) uses novel data linking individuals across multiple U.S. censuses to show that educational attainment fell among middle-class youth affected by the downturn. In Europe, the Great Recession was associated with higher PSE enrollment, but those gains were weakest among youth from low-income families, potentially contributing to greater inequality (Ayllón & Nollenberger, 2021).⁶

⁵A related literature analyzes the link between economic conditions and human capital accumulation using specific shocks for identification (rather than considering the general local unemployment rate). For example, Foote & Grosz (2020) leverage mass layoff events and find a marked increase in community college enrollment following such events. Charles et al. (2018) study the impact of the 2000s housing boom and bust cycle and find that the boom lowered college enrollment at 2-year colleges. Emery et al. (2012); Morissette et al. (2015) and Mosquera (2022) consider the local education effects of booms and busts induced by global changes in natural resource prices. Card & Lemieux (2001), Clark (2011) and Burga & Turner (2023) analyze the association between economic conditions and enrollment for younger (i.e., high-school age) students.

⁶Beyond impacting the *level* of human capital accumulation through PSE enrollment choices, adverse local economic conditions have also been shown to impact the *specific types* of human capital that individuals accumulate, due to their influence on students' field of study choices (Blom et al., 2021; Acton, 2021).

Our results also contribute to the large literature that analyzes the determinants of persistence in education (or its counterpart, dropping out). This literature has primarily focused on factors such as demographic characteristics, student preparedness, expectations and learning, college characteristics, grade inflation, and financial aid availability (Light & Strayer, 2000; Dynarski, 2003; Singell Jr, 2004; Arulampalam et al., 2005; Stratton et al., 2008; Bound et al., 2010; Stinebrickner & Stinebrickner, 2008, 2012, 2014; Denning et al., 2022; Arcidiacono et al., 2025). While some of these studies control for general economic conditions, this is not their main focus. Some exceptions include Light (1995), Kienzl et al. (2007), and Adamopoulou & Tanzi (2017). These papers, however, focus on specific sub-populations or time periods.

We contribute the most recent and comprehensive evidence to date on how PSE enrollment responds to economic downturns. By leveraging the richness and long time series of the nationally-representative CPS data, we are able to consider the experiences of a wide range of cohorts. We systematically distinguish between enrollment in 2- and 4-year colleges, and between matriculation and persistence, thus providing new details on the drivers of counter-cyclical enrollment that are relevant for designing policies that support both access to and persistence in post-secondary education.

2 Data and Empirical Strategy

2.1 Current Population Survey Education Supplement

Our analysis uses data from the U.S. Current Population Survey (CPS), as made available by IPUMS (Flood et al., 2024). The key advantages of the CPS are (i) its long time series, with data available since 1976, and (ii) its large sample sizes, which allow for representative analyses of the U.S. population and exploration of heterogeneity in the population. A disadvantage of the CPS is that it lacks any measure of scholastic ability and includes little information about respondents' socioeconomic backgrounds. Data sets with such information (e.g., panel data such as the NLSY) have smaller samples and fewer cohorts.

Our outcome variables (discussed in further detail below) are drawn from the

CPS’s Education Supplement, which is administered in October of each year.⁷ Information is available on the enrollment status of each household member at the time of the survey, as well as the type of institution (2-year or 4-year college) and the level of enrollment (first, second, third, or fourth year) for those who are enrolled.⁸ Respondents also provide retrospective information on their enrollment status in October of the previous year.

We use data for 1977-2023.⁹ We restrict the analysis to the civilian population, and we drop observations with allocated (imputed) values for any of our key education variables.¹⁰ We exclude individuals who have less than 12 years of education (or equivalent), as well as those who report being currently enrolled in grade 12 or below.

To focus on the subset of the population that is most likely to enroll in PSE, we restrict our analysis to young adults. Figure 1 shows the cumulative age distribution among enrollees in 2- and 4-year colleges aged 17-60, by sex. For all four groups, the share of enrollees aged 17 is less than 1.5%; we thus use 18 as our lower bound for age.¹¹ For our upper age bound, we choose age 24. Almost 80% of men enrolled in 4-year colleges and almost 70% of men enrolled in 2-year colleges are aged 18-24. For women, the corresponding figures are 75% and 57%. We explore the extent to which our results differ when we relax the age restriction in Appendix Table A.1.

Table 1 presents descriptive statistics for our sample of 18-24-year-olds with at least 12 years of education (or equivalent).¹² We first report the fraction enrolled in any type of post-secondary education. This includes those who are enrolled in a 2- or

⁷The Education Supplement is funded by the National Center for Educational Statistics (NCES).

⁸In the data, a small number of students report being in year 3 or year 4 at a 2-year college. For these students, we impute their level of enrollment as year 2.

⁹2023 is the most recent year for which data from the Education Supplement is available on IPUMS. 1976 is the earliest year available on IPUMS, but we exclude it due to limitations in the availability of state-level unemployment rates, as discussed in Section 2.2.

¹⁰These education variables are: educational attainment, current school enrollment status, current level of enrollment, current institution type (2-year or 4-year), previous year enrollment status, and previous year level of enrollment. We also exclude several observations that are classified as “not in universe” in the current enrollment status variable in 1978, as well as a small number of observations that indicate being enrolled in college but are classified as “not in universe” in the institution type variable. These “not in universe” cases do not seem to follow any systematic pattern and appear to be due to enumerator error.

¹¹Only a small number of 17-year-olds satisfy our ‘high school graduates’ restriction, so using 18 as our lower age bound does not imply a substantial additional restriction.

¹²All statistics are computed using the weighting variable provided by the CPS for the Education Supplement (*edsupwt* on IPUMS).

a 4-year college at any level (including graduate school), as well as those who report being enrolled in a “special school” (a category that existed before 1987 and includes schools focused on serving students with disabilities). The enrollment rates are 37.4% for men, and 39.5% for women.

The next row shows the fraction of individuals enrolled in *college* – our main outcome of interest. This includes those who are enrolled at a 2- or a 4-year institution, at a level below graduate school. College enrollment rates in our sample are 34.5% for men, and 36.2% for women. As shown in the subsequent rows, nearly three-quarters of these enrollees are in 4-year colleges.

We classify individuals in our sample into four mutually exclusive race/ethnicity groups: non-Hispanic White, non-Hispanic Black, Hispanic, and all others (including those who report more than one race). For simplicity, we refer to these groups as White, Black, Hispanic, and Other. Approximately 68% of the young adults in our sample are White, 13% are Hispanic, 13% are Black, and 6% report other racial affiliations. At the bottom of Table 1, we also report the average unemployment rate; we discuss this measure in detail in Section 2.2.

Figure 2 breaks down the overall 2- and 4-year college enrollment rates from Table 1 across our seven age levels, with stacked bars showing enrollment by year of study. As expected, college enrollment rates are highest at the typical college-going ages (18-21 for 4-year colleges, and 18-19 for 2-year colleges). The stacked bars reveal a clear age pattern in year-level composition: 18-year-olds are almost exclusively enrolled in first-year programs across both college types. At age 19, the share enrolled in the first year drops dramatically as students progress. By the early twenties, first-year enrollment becomes negligible, with most enrolled students in later years of study. This pattern is somewhat less extreme in 2-year colleges, where older students show a slightly higher share of first-year enrollment compared to the minimal share that we observe in 4-year colleges. Both the levels and the age gradient in 2-year college enrollment are very similar for men and women across year levels. By contrast, among 18-year-olds, women are almost 4 percentage points more likely than men to enroll in a 4-year college, driven entirely by higher first-year enrollment since virtually all 18-year-olds are first-year students. Among women, 4-year-college enrollment rates also fall more steeply after age 21. By age 23, the difference between men and women

is small and statistically insignificant.

2.2 Measuring Economic Conditions

To measure business cycle conditions, we use monthly state-level unemployment rates available from the Local Area Unemployment Statistics program at the Bureau of Labor Statistics (BLS).¹³ Because our enrollment outcomes are observed in October of each year, we compute a state-level annual unemployment rate corresponding to the prior school year. In other words, for each state s in each year t , we compute a lagged annual unemployment rate, UR_{st-1} , which is equal to the average monthly unemployment rate of that state between September of year $t - 1$ and August of year t .¹⁴ The earliest available monthly state unemployment rates from the BLS are for January 1976. Because our measure requires observations for year $t - 1$, the earliest year we can work with in our analysis is 1977.

Appendix Figure A.1 plots the evolution of these annual unemployment rates for all states over our sample period. We highlight the four most populous states—California, Texas, Florida, and New York. Our time period spans a wide range of business cycle conditions, including the ‘twin recessions’ of the 1980s, the early 1990s recession, the dot-com recession of 2001, the Great Recession, and the Covid pandemic.

While the overall national business cycle is clearly noticeable in Panel (a), there is also substantial heterogeneity across states. Panel (b) plots de-trended unemployment rates for each state, after we remove year and state fixed effects. The figure makes it clear that there is quite a bit of heterogeneity in business cycle conditions across states, even after we remove aggregate year-specific factors and state-specific time-invariant factors. As we discuss in the next section, our identification of the impacts of business cycle conditions on enrollment leverages this variation in de-trended unemployment rates.

We focus on the overall state-level unemployment rate because it is a broad sum-

¹³We use the non-seasonally adjusted series for the civilian non-institutional population, obtained from <https://www.bls.gov/lau/rdscnp16.htm>.

¹⁴For example, when working with the October 1980 data, we consider the average monthly unemployment rate from September 1979 to August 1980 in each state.

mary measure reflecting variation in opportunity costs, parental resources affected by wealth shocks or job losses, and state and local government resource constraints due to variation in tax revenues. Nonetheless, since we estimate the impact of economic conditions on enrollment separately by sex, it also seems natural to measure local economic conditions using sex-specific unemployment rates. As a robustness check, we replicate our main results using sex-specific state-level unemployment rates also obtained from the BLS.

2.3 Empirical Strategy

We estimate regression equations of the following type:

$$y_{it(s)} = \beta_0 + \beta_1 UR_{s,t-1} + \beta_2 X_{it} + \alpha_s + \gamma_t + \epsilon_{it(s)}. \quad (1)$$

$y_{it(s)}$ represents the enrollment status of individual i at time t , and s represents their state of residence. We consider several enrollment outcomes $y_{it(s)}$. We first focus on a simple binary variable for being enrolled in PSE or not. We then distinguish between the type of institution (2-year or 4-year), and the level of enrollment (first year, or second year and above) to capture new entry versus continuation.

$UR_{s,t-1}$ is the lagged state unemployment rate, our measure of the local economic conditions that may influence enrollment, constructed as described in Section 2.2. X_{it} represents a vector of demographic characteristics for individual i at time t , specifically their race/ethnicity and age.¹⁵ α_s and γ_t represent state and year fixed effects, respectively, and $\epsilon_{it(s)}$ is an error term assumed to satisfy standard properties.

Our coefficient of interest is β_1 . This captures the association between local economic conditions and individuals' enrollment probabilities. The inclusion of year fixed effects flexibly accounts for national-level changes over time in enrollment propensities and for nationwide changes in economic conditions across years. The state fixed effects account for time-invariant differences across states. Identification of β_1 is obtained from differential changes in state-level economic conditions over time (see Panel (b) of Appendix Figure A.1).

¹⁵We use indicator variables for each of the race/ethnicity groups described in Section 2.1, and indicator variables for each year of age (between 18-24) at the time of the survey.

To allow for fully heterogeneous patterns across men and women, we estimate all of our models separately for these two groups. All regressions are weighted using the corresponding variable provided by the CPS for the Education Supplement, and standard errors are clustered at the cohort $\times$ state level.

In addition to the baseline regression model described above, we also consider specifications in which we interact $UR_{s,t-1}$ with our age indicators, to explore heterogeneity in the impact of economic conditions on enrollment outcomes at different age levels.

3 Economic Conditions and College Enrollment

This section presents our main results. First, we show that overall college enrollment is countercyclical, and we discuss how this general trend varies significantly across sexes and institution types. We next show that this countercyclicality is primarily driven by persistence rather than new entry to PSE programs. Finally, we explore the heterogeneity in the impact of economic conditions on enrollment across different age groups.

3.1 PSE Enrollment is Countercyclical at both 2-year and 4-year Colleges

Table 2 displays results from estimating the regression in equation (1), restricting the sample to men in Columns (1)-(4), and women in Columns (5)-(8). The dependent variable in Columns (1) and (5) is an indicator variable for being enrolled in any type of post-secondary education. These columns show positive coefficients on the unemployment rate for both sexes, implying that high unemployment rates encourage enrollment. The estimated coefficient is much larger for men, and is strongly statistically significant. This indicates that enrollment is strongly countercyclical for men, while the evidence for the countercyclicality of female enrollment is much weaker, with the coefficient not statistically significant at conventional levels.

In Columns (2) and (6), we instead use an indicator variable for being enrolled in *college* – our main outcome of interest. We consider an individual to be enrolled

in college if they report being enrolled in years 1 or 2 of a college degree at a 2-year institution or in years 1 to 4 at a 4-year institution. Relative to the outcome in Columns (1) and (5), this indicator variable is no longer equal to one for individuals who report being enrolled in graduate school, or for those who report being enrolled in a “special school” (a category that exists before 1987 and includes schools focused on serving students with disabilities).

The conclusion remains the same: there is strong evidence for the countercyclicality of college enrollment for men. For women, the coefficient is also positive, but much smaller than for men and not statistically significant. A one percentage point increase in the state-level unemployment rate is associated with about a 0.51 percentage point increase in the likelihood of young men being enrolled in college. This compares with the 35 percent college enrollment rate for men in our sample. The very different findings for men and women are remarkable, given that opportunity costs of time in college fall for both groups when the unemployment rate rises, but are consistent with existing evidence in the literature (e.g. Card & Lemieux, 2001; Hershbein, 2012). Estimates reported below will explore more details about the differences in responses by sex.

The remaining columns disaggregate the effects from Columns (2) and (6) across the two institution types, by re-estimating the regression in equation (1), but replacing the dependent variable with an indicator for enrollment in a 2-year college in Columns (3) and (7), and an indicator for enrollment in a 4-year college in Columns (4) and (8). Since the ‘College’ variable is equal to the sum of the ‘2-year’ and the ‘4-year’ variables, the coefficients in Columns (3) and (4) add up to the coefficient in Column (2) for men, and similarly across the corresponding columns for women. Thus, the relative magnitudes of the coefficients allow us to decompose the overall enrollment effect across the two institution types for each sex.

The results show that higher unemployment rates are associated with higher enrollment probabilities for men at both 2-year and 4-year colleges, with the magnitude of the effect being more than twice as large for 4-year colleges. For 2-year colleges, a 1-percentage-point increase in the unemployment rate is associated with a 0.15 percentage-point increase in the probability of enrollment, while for 4-year colleges, each percentage-point increase in the local unemployment rate increases the enroll-

ment probability by 0.36 percentage points. While the impact on enrollment into 4-year colleges is highly statistically significant, the evidence of the impact on enrollment into 2-year colleges is much weaker. For women, the unemployment rate has no statistically significant overall effect on enrollment, but does have a positive and significant impact on 2-year college enrollment, with a 1-percentage-point increase in unemployment raising the enrollment probability by 0.17 percentage points. The effect on 4-year college enrollment is slightly negative (-0.03), though not statistically significant. The results for women suggest that the small overall enrollment effect may hide a partial shift from 4-year to 2-year colleges in response to economic downturns.

The coefficients on other control variables are as expected: for both men and women, enrollment decreases with age. Overall PSE enrollment is lower for individuals from traditionally under-represented groups (Black and Hispanic young adults). This is entirely due to their lower propensities to enroll in 4-year colleges. The probability of 2-year college enrollment for Black and Hispanic men does not differ relative to White men, while Black and Hispanic women are significantly more likely to enroll in 2-year colleges compared to White women.

To verify the robustness of our findings by considering a broader age range, in Appendix Table A.1 we reproduce the results from Table 2, but include individuals aged between 18 and 45 in our analysis sample.¹⁶ The evidence on the countercyclicality of PSE enrollment is overall qualitatively similar, but much weaker in magnitude and statistical significance, suggesting that PSE enrollment is responsive to business cycle conditions mostly at younger ages. This justifies our focus on 18-24 year olds.

Furthermore, because there is evidence that men and women are differentially affected by business cycles (Hoynes et al., 2012; Albanesi & Şahin, 2018), the differences in PSE enrollment responses we observe for men and women could vary with the population group used to measure unemployment. To investigate that possibility, we estimate the relationship between sex-specific unemployment rates and PSE enrollment in Appendix Table A.2. For comparison, the top panel repeats the estimates using the overall unemployment rate reported in Table 2. Since the BLS publishes sex-specific state-level unemployment rates by calendar year rather than month, we are constrained to estimate the relationship between enrollment in October of year t

¹⁶The sample in Appendix Table A.1 excludes the years 1977 and 1978 due to the limited availability of the enrollment variable for individuals above age 34 in those years.

and the sex-specific unemployment rate in calendar year $t - 1$ (rather than the prior academic year). To show that this difference has only small effects on the estimates, in Panel B of Table A.2, we report estimates from equation (1) using the overall state-level unemployment rate in the prior calendar year. Finally, Panel C of Table A.2 shows estimates of the effect of the male unemployment rate on enrollment of young men in our sample – columns (1) through (4) – and the effect of the female unemployment rate on enrollment of young women in our sample – columns (5) through (8).

On balance, Table A.2 suggests that both men and women respond similarly to their sex-specific unemployment rate as they do to the overall rate. Moreover, the conclusion that business cycles affect PSE enrollment among men more strongly than among women is robust to this change in how unemployment is measured. The coefficient estimates are mostly smaller in magnitude in the specifications using sex-specific unemployment rates. This is consistent with measurement-error attenuation bias, since sex-specific unemployment rates are likely harder to measure precisely. Nonetheless, the broad pattern of effects is very similar. One exception is the coefficients in Column (8) that relate unemployment to enrollment in 4-year colleges among women. These coefficients switch signs but are all statistically indistinguishable from zero and are much smaller than the effects on 4-year college enrollment among men.

3.2 Countercyclical Enrollment Occurs More through Persistence than Matriculation

Next, we explore the extent to which changes in enrollment over the business cycle are due to matriculation (new enrollments) or persistence (individuals with previous PSE participation). We do this in three ways. First, we focus on the level of enrollment in a college program: Students enrolled in the first year of a college program represent new enrollments, while students enrolled in the second or subsequent year of a college program represent persistence (due to continuation or re-enrollment). As a second approach, we distinguish between individuals whose highest level of completed education is exactly high school, and individuals who report that they have completed at least one year of college. Finally, we distinguish between currently enrolled respondents who were not enrolled in college in the prior October (i.e., new enrollments)

and those who were (i.e., those who persisted in a program).

Panels A and B of Table 3 consider the first of these three measures. Columns (1) and (4) reproduce the estimates of the overall impact of economic conditions on enrollment in either 2-year (Panel A) or 4-year (Panel B) colleges, for men and women respectively, as documented in Table 2. The remaining columns decompose this effect between those enrolled in the first year of their college program, and those enrolled in the second or subsequent years.¹⁷

Starting with 2-year colleges, for both men and women, the total effect of unemployment on enrollment is driven primarily by students who are enrolled in their second year. The relationship between the unemployment rate and the probability of enrolling in the first year of a 2-year college program is positive, but much smaller in magnitude and not statistically significant. A 1-percentage-point increase in unemployment is associated with a statistically significant increase in the probability of enrollment in the second year of about 0.12 percentage points for men and about 0.14 for women.

The estimates for 4-year colleges in Panel B show a very similar pattern for men. For this group, there is a strong and statistically significant increase in the probability of being enrolled in the second or subsequent year at a 4-year college when unemployment is high. Specifically, a 1-percentage-point rise in unemployment is associated with an increase in the probability of upper-year enrollment of 0.3 percentage points, which represents around 83% of the total effect in Column (1). This significant impact suggests that, for men, economic downturns strongly influence persistence in 4-year college programs, much more than downturns influence new enrollment. For women, in contrast, there is no statistically significant effect of unemployment on 4-year college enrollment, irrespective of the level of attendance.

Panels C and D present results based on our alternative approach, which distinguishes enrolled individuals according to their highest level of completed education. This yields very similar results to those above, further bolstering the argument that the countercyclicality of enrollment is primarily driven by persistence rather than matriculation.

¹⁷Note that, as above, the coefficients in Columns (2) and (3) add up to the coefficient in Column (1), and the coefficients in Columns (5) and (6) add up to the coefficient in Column (4), allowing us to perform a simple decomposition of the overall effect.

Finally, Panels E and F leverage the CPS variables that indicate (i) whether individuals were enrolled in school in October of the previous year, and (ii) their *level* of enrollment in October of the previous year. This allows us to determine whether an individual was already enrolled in college in the prior year. The variable indicating the level of enrollment in the previous year is only available from 1988 onwards, so this part of the analysis uses data for 1988-2023 only.

Columns (1) and (4) reproduce the overall effect of economic conditions on enrollment in 2- and 4-year colleges, now using only the 1988-2023 sample for which we have information on the level of enrollment in the prior year. Qualitatively, results for this subset of years are very similar to what we find for the full sample. Quantitatively, the point estimates for the impacts of economic conditions on the probability of 2-year college enrollment are larger for both men and women. The impact of economic conditions on the probability of 4-year college enrollment is also larger in this sub-sample for men, and remains statistically indistinguishable from zero for women.

The remaining columns decompose this effect across those who were enrolled in college in October of the previous year, and those who were not. In Columns (2) and (5), the dependent variable is equal to 1 for individuals who are currently enrolled in college and who were *not* college enrollees one year earlier, i.e., new enrollees (at least relative to the prior year). In Columns (3) and (6), the dependent variable is equal to 1 for individuals who are enrolled in college and who were also enrolled in college one year earlier (i.e., continuing students). As in the previous tables, the coefficients add up to the total effect.

In line with the results from Panels A to D, we see that the increased likelihood of enrolling in 2-year colleges for women, and in 4-year colleges for men, is primarily driven by persistence, rather than new enrollments. Regarding the increase in the probability of 2-year college enrollment for men, both persistence and new enrollments have similar point estimates.

Overall, the results in Table 3 indicate that persistence plays a quantitatively more important role than matriculation in accounting for the overall countercyclical patterns of PSE enrollment.

3.3 Business Cycle Enrollment Patterns Vary by Age

Our results so far reflect average behavior among CPS respondents aged 18 to 24 and may mask considerable heterogeneity across age levels. In Table 4 we allow the relationship between local economic conditions and college enrollment to vary by age, by expanding our baseline model to include an interaction between the state-level unemployment rate and an indicator variable for the respondent’s age. For each age level in our sample (18 to 24), we report the marginal effect of the unemployment rate on enrollment.¹⁸

The estimates in the first set of columns of Table 4 show that men’s enrollment in 2-year colleges increases alongside unemployment rate increases for those aged 18 to 22, although these effects are only statistically significant for 18- and 21-year-olds. The pattern for effects on 4-year college enrollment among men differs: the effects grow in magnitude almost monotonically with age, and peak at the older ages. This implies that the sensitivity of 4-year college enrollment to the business cycle is greater for 23- and 24-year-olds than for 18-year-olds.

Turning to women in the second set of columns of Table 4, we see that a higher unemployment rate increases enrollment in 2-year colleges but decreases enrollment in 4-year colleges among the youngest women. This may be because young women recently out of high school substitute away from 4-year college enrollment towards 2-year college programs during economic downturns, or because some young women who would have not enrolled in PSE during good times enroll in 2-year colleges during bad times, while some young women who would have enrolled in 4-year colleges during good times do not enroll in PSE during bad times. For women at the higher ages, the effect is strong and positive for 4-year college enrollment, similar to men.

Finally, Tables 5 and 6 explore the age dynamics of matriculation versus persistence in college programs. Table 5 estimates age-specific effects of the unemployment rate on 2-year college enrollment. The columns labeled ‘Total’ replicate the corresponding effects for 2-year college enrollment from Table 4. The subsequent columns distinguish between enrollment in the first year of the program and enrollment in the second year. Among 18-year-old men, a higher unemployment rate is associated

¹⁸Recall that average age-specific enrollment rates by institution type and level of enrollment are reported in Figure 2.

with much greater enrollment in the first year of a 2-year college program. Local economic conditions do not appear to induce older students to start a 2-year college degree. Rather, a higher unemployment rate is associated with a greater likelihood of (continued) enrollment in the second year of a study program for men aged 19 to 21. The age pattern of women’s enrollment in 2-year colleges is quite similar, with both 18 and 19-year-old women being increasingly likely to start a 2-year college degree when unemployment is high, and with higher persistence probabilities among those aged 19 and above.

Table 6 presents a similar decomposition for 4-year college students, breaking down the effect of unemployment across first-year and upper-year enrollment. For men, the table shows that the overall insignificant effect on total enrollment among 18- and 19-year-olds is due to large and opposing shifts between first-year enrollment and persistence (upper-year enrollment). Moreover, the previously-observed overall insignificant effect of unemployment on first-year enrollment in 4-year colleges for men (Table 3, Panel B) results from a substantial drop in enrollment probability among younger students, which is only partially offset by a significant increase among older students. Meanwhile, the positive effect on persistence (upper-year enrollment) is driven by both the youngest and the oldest students.

For women, we observe a similar pattern in first-year enrollment. Among 18- and 19-year-old women, first year enrollment is strongly pro-cyclical. The unemployment effect, again, increases with age, becoming positive and statistically significant for those 20 and up. The unemployment effects on continued (upper-year) enrollment in 4-year colleges exhibit a u-shaped pattern. For 18- and 22- to 24-year-olds the effects are positive, while the effects are negative for 19- to 21-year-olds.

To summarize, although we find that persistence plays a quantitatively more important role than matriculation in accounting for the overall countercyclicality of PSE enrollment, there is important heterogeneity by age. Higher unemployment rates are associated with large and statistically significant increases in matriculation (first-year enrollment) probabilities at 2-year colleges among 18-year-old men and 18- and 19-year-old women. Downturns also significantly increase the probability that slightly-older (20- to 24-year-old) men and women will begin study at a 4-year institution (relative to a very low base; see Figure 2). The effects on persistence (upper-year

enrollment) are fairly widespread across sex, age, and institution type, with the main exception being 19- to 21-year-old women at 4-year colleges.

4 Conclusion

Our paper uses the large representative data in the Current Population Survey’s Education Supplement to uncover new features about the relationship between fluctuations in state-level unemployment rates and the probability of college enrollment among young adults in the U.S. We confirm that overall enrollment in PSE is counter-cyclical in samples that include more recent data than that used in previous literature. In line with existing evidence, we find that enrollment is more responsive to economic fluctuations among young men than among young women.

The key contributions of our analysis are to distinguish between (i) enrollment in 2- and 4-year colleges, and (ii) matriculation (new enrollments) and persistence (enrollment among those with previous PSE participation), emphasizing heterogeneities across young men and women of different ages. These are important dimensions of this topic on which there has been limited systematic evidence in the existing literature.

We find that, during bad economic times, enrollment in both 2- and 4-year colleges increases for men, while enrollment increases only in 2-year colleges for women. Overall, our results indicate that persistence is a more important mechanism of PSE countercyclicality than matriculation. However, when we delve deeper into the responses of individuals of different ages, we find that new entry into PSE is counter-cyclical for particular groups: For both men and women, economic downturns are associated with higher rates of matriculation into 2-year colleges among the most recent high-school graduates (18-year-olds) and into 4-year colleges at slightly older ages (20-24).

Young women recently out of high school (aged 18-19) are significantly less likely to start a 4-year degree during bad times, but are significantly more likely to start a 2-year degree. On average, enrollment in 2- and 4-year colleges imply very different costs and post-schooling careers. If women are substituting away from 4-year college because economic fluctuations impose financial constraints, then policies that aim to

reduce barriers to PSE might be more effective if they incorporate insurance against such fluctuations.

While our results shed new light on how matriculation and continuation probabilities at different types of institutions change over the business cycle by sex and age, our data do not allow us to study heterogeneity across other important dimensions, such as socioeconomic background or prior academic achievement. Some evidence exists in this regard (e.g. Alessandrini, 2018; Arenas & Malgouyres, 2018; Anstreicher, 2025), but there is scope for more research on how individuals from different backgrounds react to the business cycle in terms of their PSE enrollment decisions. Such evidence would have important implications for policies aimed at enhancing upward mobility. More research with richer data is also needed in order to understand the mechanisms behind the observed differences in PSE enrollment responses for men and women. For example, the impact of the business cycle on home production and fertility could stand behind the weaker response of women’s PSE enrollment to local economic conditions (Hershbein, 2012; Coskun & Dalgic, 2024).

With cross-sectional data, such as the CPS, it is difficult to investigate the ‘downstream’ outcomes of individuals experiencing varying economic conditions at these young ages. Our findings of increased persistence during downturns might imply higher rates of PSE completion among the affected cohorts, but they might also reflect longer durations for the same level of completion. Future research with individual panel data could estimate how economic conditions at the time of matriculation affect degree completion. Economic conditions during PSE might also impact individuals’ future labor market outcomes. Evidence from cross-sectional data in which the timing of college enrollment can be imputed indicates that college graduates who start their degrees in bad times have higher subsequent earnings than those who start their degrees in good times (Bičáková et al., 2021, 2023). A comprehensive analysis of the link between economic conditions and individual outcomes, using longitudinal data from the time of college entry until the time when individuals are in the labor market, would be a promising area for future research.

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Table 1: Descriptive Statistics

	Men	Women	Total
<i>Fraction Enrolled:</i>			
Any Level	0.374 (0.484)	0.395 (0.489)	0.385 (0.487)
College (2- or 4-Year)	0.345 (0.475)	0.362 (0.480)	0.354 (0.478)
2-year College	0.095 (0.293)	0.101 (0.301)	0.098 (0.297)
4-year College	0.250 (0.433)	0.261 (0.439)	0.256 (0.436)
<i>Race:</i>			
White	0.689 (0.463)	0.678 (0.467)	0.683 (0.465)
Hispanic	0.134 (0.340)	0.129 (0.335)	0.131 (0.337)
Black	0.119 (0.324)	0.136 (0.342)	0.127 (0.333)
Other	0.059 (0.235)	0.057 (0.233)	0.058 (0.234)
Unemp. Rate			0.062 (0.021)
Obs.	221,876	240,574	462,450

Note: Our analysis sample is drawn from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year.

Table 2: Impact of Economic Conditions on Enrollment Probabilities

	Men				Women			
	(1) Any PSE	(2) College	(3) 2-Year	(4) 4-Year	(5) Any PSE	(6) College	(7) 2-Year	(8) 4-Year
Unemp. Rate	0.607*** (0.127)	0.510*** (0.124)	0.147 (0.076)	0.363** (0.117)	0.178 (0.126)	0.137 (0.122)	0.169* (0.078)	-0.032 (0.110)
Age Fixed Effects—Reference group, 18 year olds								
19	-0.057*** (0.005)	-0.057*** (0.005)	-0.026*** (0.004)	-0.031*** (0.005)	-0.057*** (0.005)	-0.056*** (0.005)	-0.029*** (0.004)	-0.027*** (0.005)
20	-0.116*** (0.005)	-0.116*** (0.005)	-0.083*** (0.004)	-0.032*** (0.005)	-0.126*** (0.005)	-0.126*** (0.005)	-0.088*** (0.004)	-0.039*** (0.005)
21	-0.163*** (0.005)	-0.175*** (0.005)	-0.123*** (0.004)	-0.052*** (0.005)	-0.190*** (0.005)	-0.203*** (0.005)	-0.131*** (0.004)	-0.072*** (0.005)
22	-0.273*** (0.005)	-0.315*** (0.005)	-0.145*** (0.004)	-0.169*** (0.005)	-0.331*** (0.005)	-0.380*** (0.005)	-0.151*** (0.004)	-0.229*** (0.005)
23	-0.369*** (0.005)	-0.420*** (0.005)	-0.160*** (0.004)	-0.260*** (0.005)	-0.414*** (0.005)	-0.474*** (0.005)	-0.164*** (0.004)	-0.310*** (0.005)
24	-0.416*** (0.005)	-0.467*** (0.005)	-0.168*** (0.004)	-0.299*** (0.005)	-0.462*** (0.004)	-0.517*** (0.004)	-0.171*** (0.004)	-0.346*** (0.005)
Race—Reference group, White								
Hispanic	-0.118*** (0.005)	-0.105*** (0.004)	0.002 (0.003)	-0.107*** (0.004)	-0.092*** (0.004)	-0.075*** (0.004)	0.013*** (0.003)	-0.088*** (0.004)
Black	-0.083*** (0.004)	-0.070*** (0.004)	-0.004 (0.003)	-0.066*** (0.004)	-0.068*** (0.004)	-0.056*** (0.004)	0.005* (0.002)	-0.061*** (0.004)
Other	0.132*** (0.006)	0.098*** (0.006)	0.003 (0.004)	0.095*** (0.006)	0.080*** (0.006)	0.053*** (0.006)	-0.009* (0.004)	0.062*** (0.006)
State FE	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.110	0.139	0.061	0.087	0.137	0.176	0.059	0.115
Obs.	221,876	221,876	221,876	221,876	240,574	240,574	240,574	240,574

Note: The dependent variable is an indicator variable for being enrolled in: any type of post-secondary education (including graduate programs) in Columns (1) and (5); college (excluding graduate programs) in Columns (2) and (6); 2-year college in Columns (3) and (7); 4-year college in Columns (4) and (8). The analysis is based on data from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 3: Persistence vs Matriculation

	Men			Women		
	(1) Total	(2) Year 1	(3) Year 2+	(4) Total	(5) Year 1	(6) Year 2+
Panel A: 2-Year College						
Unemp. Rate	0.147 (0.076)	0.029 (0.050)	0.118* (0.057)	0.169* (0.078)	0.033 (0.050)	0.136* (0.057)
R^2	0.061	0.072	0.028	0.059	0.072	0.030
Panel B: 4-Year College						
Unemp. Rate	0.363** (0.117)	0.067 (0.051)	0.296** (0.103)	-0.032 (0.110)	-0.040 (0.048)	0.008 (0.097)
R^2	0.087	0.189	0.084	0.115	0.220	0.107
	Total	No PSE	Prev PSE	Total	No PSE	Prev PSE
	Total	No PSE	Prev PSE	Total	No PSE	Prev PSE
Panel C: 2-Year College						
Unemp. Rate	0.147 (0.076)	-0.021 (0.046)	0.168** (0.059)	0.169* (0.078)	-0.062 (0.047)	0.231*** (0.066)
R^2	0.061	0.054	0.034	0.059	0.055	0.035
Panel D: 4-Year College						
Unemp. Rate	0.363** (0.117)	0.050 (0.049)	0.313** (0.108)	-0.032 (0.110)	-0.001 (0.048)	-0.031 (0.101)
R^2	0.087	0.125	0.072	0.115	0.141	0.096
	Total	Not LY	Enr LY	Total	Not LY	Enr LY
	Total	Not LY	Enr LY	Total	Not LY	Enr LY
Panel E: 2-Year College						
Unemp. Rate	0.289* (0.119)	0.139 (0.074)	0.150 (0.082)	0.301* (0.128)	0.096 (0.068)	0.205 (0.105)
R^2	0.061	0.071	0.032	0.059	0.070	0.035
Panel F: 4-Year College						
Unemp. Rate	0.761*** (0.173)	0.176 (0.091)	0.585*** (0.151)	0.181 (0.176)	0.024 (0.080)	0.158 (0.152)
R^2	0.088	0.165	0.085	0.115	0.201	0.112

Note: The dependent variable is an indicator variable for being enrolled in college. Panels A and B distinguish between individuals enrolled in their first year ('Year 1') and individuals enrolled in second year or above ('Year 2+'). Panels C and D distinguish between enrolled individuals whose highest level of education is high school ('No PSE'), and those who have at least some college education ('Prev PSE'). Panels E and F distinguish between enrolled individuals who were not college enrollees one year earlier ('Not LY') and those who were ('Enr LY'). The sample size is 221,876 for men and 240,574 for women in Panels A-D, and 147,556 for men and 155,702 for women in Panels E-F. All specifications include state, year and age fixed effects, as well as controls for race/ethnicity. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4: Heterogeneous Effects across Ages

	Men			Women		
	College	2-Year	4-Year	College	2-Year	4-Year
Marginal Effect of Unemp. Rate for Each Age Level						
18	0.861*** (0.207)	0.614** (0.191)	0.247 (0.220)	0.184 (0.194)	0.518** (0.165)	-0.335 (0.201)
19	0.360 (0.192)	0.241 (0.158)	0.119 (0.191)	0.009 (0.191)	0.546*** (0.151)	-0.537** (0.183)
20	0.380* (0.193)	0.226 (0.134)	0.153 (0.178)	-0.398* (0.192)	0.217 (0.129)	-0.616*** (0.186)
21	0.643*** (0.195)	0.330** (0.109)	0.313 (0.184)	-0.238 (0.200)	0.057 (0.120)	-0.295 (0.192)
22	0.411* (0.174)	0.040 (0.101)	0.371* (0.173)	0.190 (0.169)	-0.009 (0.097)	0.199 (0.156)
23	0.613*** (0.177)	-0.092 (0.105)	0.704*** (0.173)	0.602*** (0.151)	0.027 (0.095)	0.575*** (0.144)
24	0.387* (0.152)	-0.192 (0.104)	0.580*** (0.149)	0.553*** (0.157)	-0.062 (0.099)	0.615*** (0.140)
R^2	0.139	0.061	0.087	0.176	0.059	0.116
Obs.	221,876	221,876	221,876	240,574	240,574	240,574

Note: The dependent variable is the probability of being enrolled in college. The analysis is based on data from the October CPS Education Supplement for the years 1977-2023. All specifications include state, year and age fixed effects, as well as controls for race/ethnicity. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5: Heterogeneous Effects across Ages: Enrollment in 2-year College

	Men			Women		
	Total	1stYr	2ndYr	Total	1stYr	2ndYr
Marginal Effect of Unemp. Rate for Each Age Level						
18	0.614** (0.191)	0.687*** (0.180)	-0.073 (0.078)	0.518** (0.165)	0.538** (0.175)	-0.019 (0.075)
19	0.241 (0.158)	-0.054 (0.121)	0.295** (0.104)	0.546*** (0.151)	0.195* (0.099)	0.351** (0.113)
20	0.226 (0.134)	-0.068 (0.083)	0.294** (0.109)	0.217 (0.129)	-0.034 (0.077)	0.251* (0.108)
21	0.330** (0.109)	0.058 (0.072)	0.272** (0.098)	0.057 (0.120)	-0.045 (0.067)	0.103 (0.104)
22	0.040 (0.101)	-0.006 (0.067)	0.046 (0.075)	-0.009 (0.097)	-0.133* (0.067)	0.124 (0.071)
23	-0.092 (0.105)	-0.084 (0.069)	-0.007 (0.075)	0.027 (0.095)	-0.089 (0.060)	0.116 (0.068)
24	-0.192 (0.104)	-0.158* (0.070)	-0.034 (0.068)	-0.062 (0.099)	-0.079 (0.062)	0.017 (0.070)
R^2	0.061	0.072	0.028	0.059	0.072	0.030
Obs.	221,876	221,876	221,876	240,574	240,574	240,574

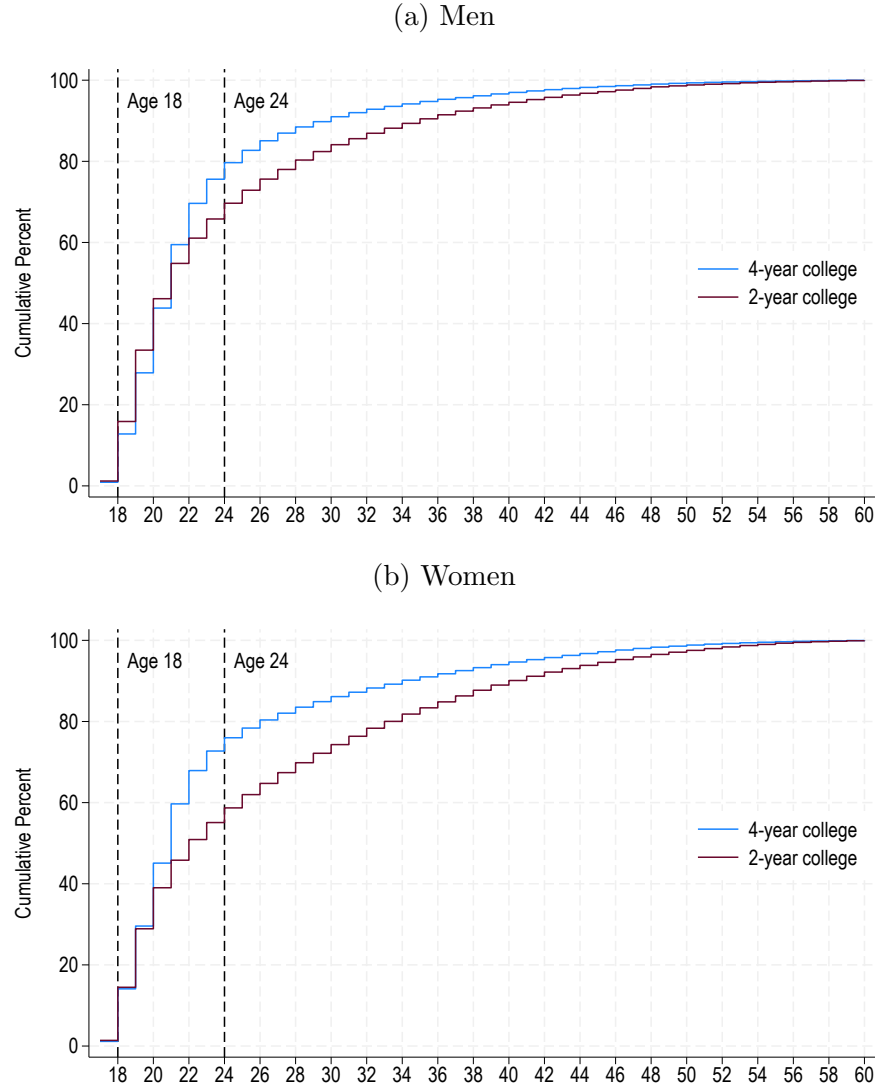
Note: The dependent variable is the probability of being enrolled in 2-year college (overall and at different levels). All specifications include state, year and age fixed effects, as well as controls for race/ethnicity. The analysis is based on data from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6: Heterogeneous Effects across Ages: Enrollment in 4-year College

	Men			Women		
	Total	1stYr.	2+ yrs	Total	1stYr.	2+ yrs
Marginal Effect of Unemp. Rate for Each Age Level						
18	0.247 (0.220)	-0.325 (0.202)	0.572*** (0.121)	-0.335 (0.201)	-0.992*** (0.192)	0.658*** (0.132)
19	0.119 (0.191)	-0.478*** (0.108)	0.596*** (0.176)	-0.537** (0.183)	-0.411*** (0.103)	-0.126 (0.180)
20	0.153 (0.178)	0.150* (0.071)	0.003 (0.169)	-0.616*** (0.186)	0.135* (0.061)	-0.750*** (0.181)
21	0.313 (0.184)	0.269*** (0.064)	0.044 (0.183)	-0.295 (0.192)	0.136* (0.058)	-0.431* (0.190)
22	0.371* (0.173)	0.185** (0.057)	0.187 (0.161)	0.199 (0.156)	0.182** (0.055)	0.017 (0.149)
23	0.704*** (0.173)	0.252*** (0.054)	0.452** (0.156)	0.575*** (0.144)	0.210*** (0.056)	0.365** (0.132)
24	0.580*** (0.149)	0.275*** (0.054)	0.305* (0.130)	0.615*** (0.140)	0.231*** (0.053)	0.385** (0.124)
R^2	0.087	0.189	0.084	0.116	0.221	0.108
Obs.	221,876	221,876	221,876	240,574	240,574	240,574

Note: The dependent variable is the probability of being enrolled in 4-year college (overall and at different levels). All specifications include state, year and age fixed effects, as well as controls for race/ethnicity. The analysis is based on data from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

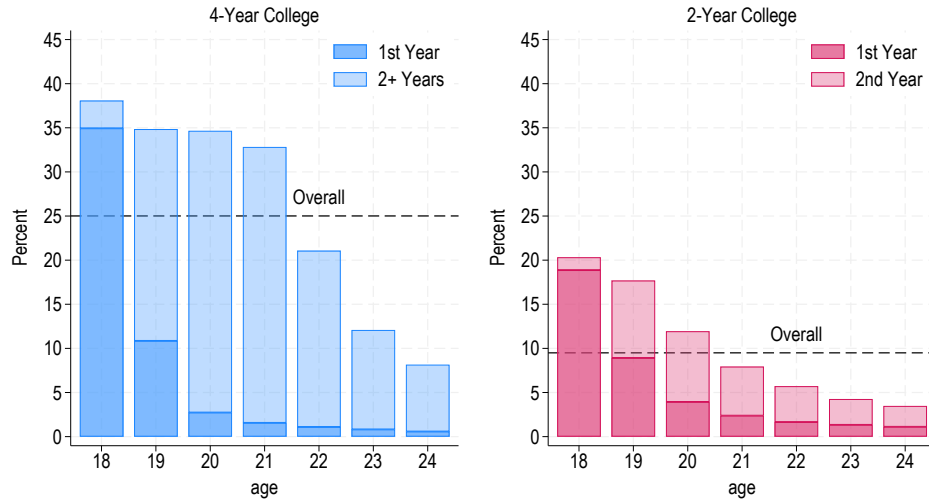
Figure 1: Cumulative Age Distribution Conditional on Enrollment in a 2-Year or 4-Year College



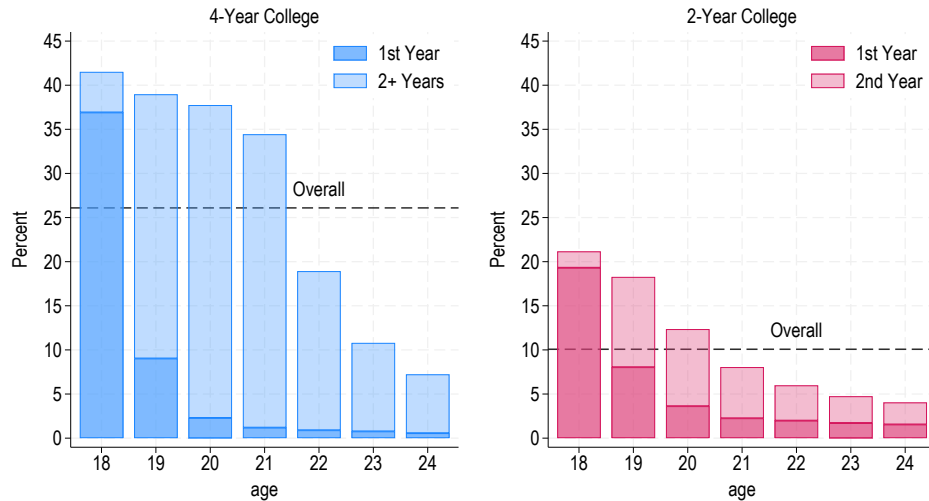
Note: The figures report the cumulative age distribution conditional on being enrolled in a 2-year college and conditional on being enrolled in a 4-year college, for men in the top panel and women in the bottom panel. The heights of the blue and red lines represents the percentage of 4-year and 2-year college enrollees, respectively, who are at or younger than the age indicated on the horizontal axis. We exclude a small number of enrollees who report being younger than 17 or older than 60. All lines are based on data from the October CPS Education Supplement for the years 1979-2023. We exclude 1977 because enrollment status is only available for individuals up to age 34 in that year. We exclude 1978 because enrollment status is missing for many individuals above age 34 in that year.

Figure 2: 4-Year and 2-year College Enrollment Rates, Overall and by Age

(a) Men



(b) Women



Note: The bars report age-specific enrollment rates. Stacking splits students by year in program: first year and second year for 2-year colleges; first year and 2+ years for 4-year colleges. Our analysis sample is drawn from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See the text for further details on sample restrictions.

Appendix Tables and Figures

Table A.1: Impact of Economic Conditions on Enrollment Probabilities - 18 to 45 Age Range

	Men				Women			
	(1) Any PSE	(2) College	(3) 2-Year	(4) 4-Year	(5) Any PSE	(6) College	(7) 2-Year	(8) 4-Year
Unemp. Rate	0.129** (0.042)	0.109** (0.037)	0.018 (0.024)	0.092** (0.034)	-0.005 (0.048)	-0.006 (0.040)	-0.007 (0.029)	0.001 (0.033)
Race—Reference group, White								
Hispanic	-0.035*** (0.002)	-0.025*** (0.001)	0.003*** (0.001)	-0.029*** (0.001)	-0.029*** (0.002)	-0.017*** (0.001)	0.006*** (0.001)	-0.022*** (0.001)
Black	-0.018*** (0.001)	-0.011*** (0.001)	0.002* (0.001)	-0.013*** (0.001)	-0.004** (0.001)	0.000 (0.001)	0.008*** (0.001)	-0.008*** (0.001)
Other	0.051*** (0.002)	0.024*** (0.002)	0.000 (0.001)	0.024*** (0.002)	0.022*** (0.002)	0.008*** (0.002)	-0.004*** (0.001)	0.012*** (0.001)
Age FE	✓	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.225	0.269	0.076	0.195	0.220	0.268	0.063	0.207
Obs.	931,696	931,696	931,696	931,696	1,011,992	1,011,992	1,011,992	1,011,992

Note: The dependent variable is an indicator variable for being enrolled in: any type of post-secondary education (including graduate programs) in Columns (1) and (5); college (excluding graduate programs) in Columns (2) and (6); 2-year college in Columns (3) and (7); 4-year college in Columns (4) and (8). The analysis is based on data from the October CPS Education Supplement for the years 1979-2023. We exclude 1977 because enrollment status is only available for individuals up to age 34 in that year. We exclude 1978 because enrollment status is missing for many individuals above age 34 in that year. The sample includes individuals aged 18 to 45 who have at least 12 years of education. See text for further sample restriction details. The unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

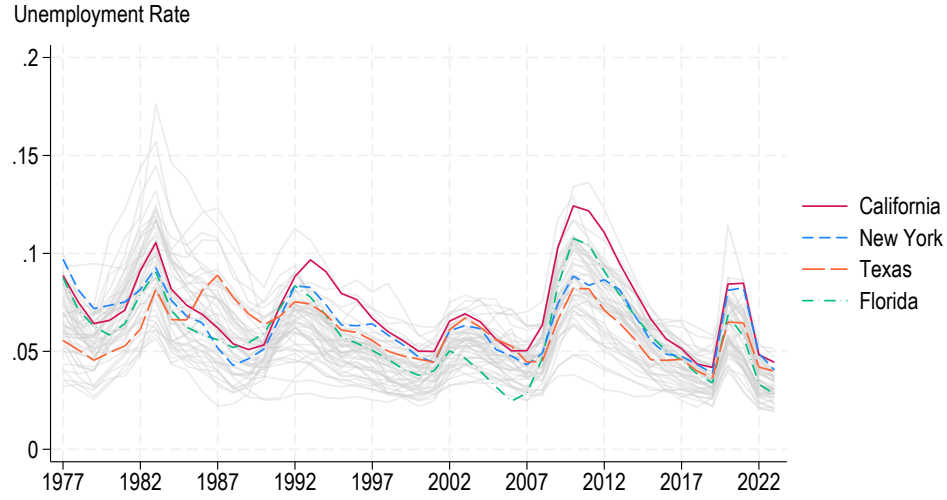
Table A.2: Impact of Sex-Specific Economic Conditions on Enrollment Probabilities

	Men				Women			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Any PSE	College	2-Year	4-Year	Any PSE	College	2-Year	4-Year
Panel A: Benchmark (School Year Unemployment Rate)								
Unemp Rate	0.607*** (0.127)	0.510*** (0.124)	0.147 (0.076)	0.363** (0.117)	0.178 (0.126)	0.137 (0.122)	0.169* (0.078)	-0.032 (0.110)
R^2	0.110	0.139	0.061	0.087	0.137	0.176	0.059	0.115
Panel B: Calendar Year Unemployment Rate								
Unemp Rate	0.540*** (0.125)	0.499*** (0.123)	0.118 (0.076)	0.381*** (0.115)	0.186 (0.122)	0.196 (0.118)	0.140 (0.080)	0.057 (0.107)
R^2	0.110	0.139	0.061	0.087	0.137	0.176	0.059	0.115
Panel C: Sex-Specific Calendar Year Unemployment Rate								
Unemp Rate	0.412*** (0.111)	0.368*** (0.110)	0.114 (0.067)	0.254* (0.103)	0.174 (0.125)	0.176 (0.121)	0.064 (0.078)	0.112 (0.113)
R^2	0.110	0.139	0.061	0.087	0.137	0.176	0.059	0.115

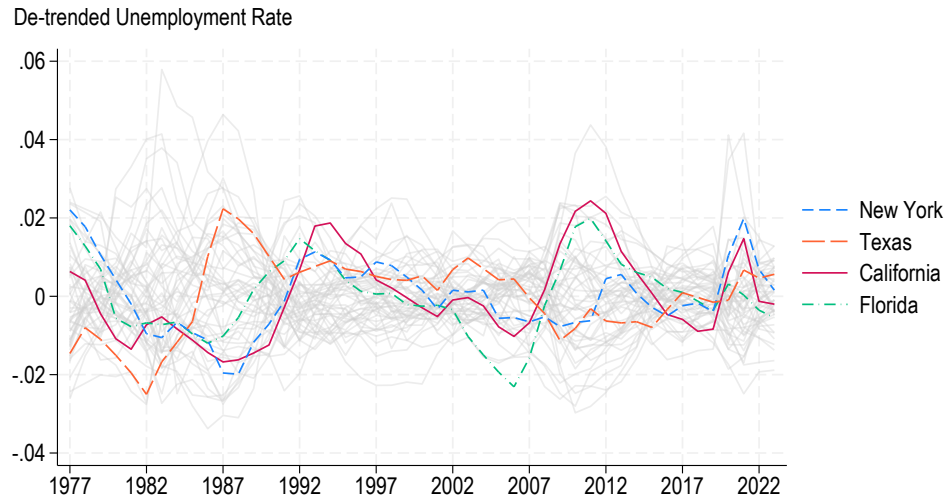
Note: The dependent variable is an indicator variable for being enrolled in: any type of post-secondary education (including graduate programs) in Columns (1) and (5); college (excluding graduate programs) in Columns (2) and (6); 2-year college in Columns (3) and (7); 4-year college in Columns (4) and (8). The analysis is based on data from the October CPS Education Supplement for the years 1977-2023. The sample includes individuals aged 18 to 24 who have at least 12 years of education. See text for further sample restriction details. The sample size is 221,876 for men and 240,574 for women. In the top panel, the unemployment rate is the average of the monthly state-level unemployment rates for the period September-August immediately preceding the survey year. In the second panel, the unemployment rate is the average of the monthly state-level unemployment rates for the period January-December in the year prior to the survey year. In the third panel, the unemployment rate is the annual state-level unemployment rates for the period January-December in the year prior the survey year among men in Columns (1) through (4) and among women in Columns (5) through (8). Standard errors clustered at the year $\times$ state level in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure A.1: Annual Unemployment Rates 1977-2023, by State

(a) Unemployment Rates



(b) De-trended Unemployment Rates



Note: Panel (a) reports state-level annual unemployment rates constructed as the average monthly unemployment rate for each state from the BLS Local Area Unemployment Statistics in the previous school year (between September of the previous year and August of the current year). Panel (b) reports residualized unemployment rates, after removing state and year fixed effects.

