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Pandemic-era shifts in postsecondary enrollment☆

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ABSTRACT

In this paper, we describe how the pandemic affected undergraduate enrollment in colleges and universities, with a focus on how these effects vary across programs in different fields of study. We use newly developed administrative data on program enrollment reported by institutions to the National Student Loan Data System (NSLDS) for all students who receive federal support, either grants or loans, to attend college over the past decade. We build upon prior work to examine enrollment (vs. degrees granted) for a national census of aided students and extend analyses into the post-pandemic period. We find that in 2021, when most programs were still being offered remotely, the typical undergraduate program had 8–10% lower enrollment of federal aid recipients than its pre-pandemic trend would have suggested. This aggregate pattern, however, masks considerable variability across sectors and fields. Community college enrollment was hit particularly hard, with the pandemic accelerating existing patterns of enrollment loss in several large fields (Liberal Arts, Security and Protective Services). Large declines in industrial trades ended up being transitory, as short-run supply constraints were removed and enrollment recovered. Both supply- and demand-factors are important to understanding these patterns.

1. Introduction

The COVID-19 pandemic led to historic disruptions in all dimensions of life in the United States. Postsecondary education was no exception. Students and their families faced unprecedented spikes in economic uncertainty. Colleges and universities, meanwhile, closed campuses and transitioned to online or hybrid modes of delivery. Even after reopening, institutions contended with new challenges related to class size, spacing between students, and other public health constraints. These disruptions and responses to the pandemic likely affected students' decisions of whether to enroll, as well as their choice of major and type of credential.

Existing literature provides insight into how shocks similar to the pandemic, including economic downturns, school closures, and periods of heightened uncertainty, affect postsecondary enrollment and field-of-study decisions (Schanzenbach & Turner, 2022). College enrollment is generally countercyclical (Barr & Turner, 2015; Foote & Grosz, 2020; Grosz & Monarrez, 2026). Evidence from prior recessions shows that downturns can shift students toward fields associated with stable employment and public funding, such as healthcare, education, and public administration, while discouraging enrollment in more cyclical or capital-intensive sectors like business and engineering (Altonji et al., 2016; Blom et al., 2021; Long et al., 2015). Research also demonstrates that economic conditions and other types of disruptions, such as natural disasters, mass layoffs, and teacher strikes, also affect enrollment and alter major choice, especially among students from less advantaged backgrounds (Acton, 2021; Gust, 2024; Langen & Laine, 2025; Schanzenbach et al., 2026). In the K12 education setting, the pandemic had both short- and long-run impacts on enrollment decisions, as families shifted to private and homeschooling options from public schools differentially based on income and other factors (Bacher-Hicks et al., 2024; Frances & Goodman, 2025; Musaddiq et al., 2022).

Overall, postsecondary enrollment declined after the pandemic started (Irwin et al., 2023; National Student Clearinghouse Research Center, 2020), but it is important to examine which sectors and

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institutions were hit the hardest, as these patterns have direct implications for the supply of a trained labor force. Moreover, understanding how enrollment shifted across fields of study is critical because these choices affect the economic returns to higher education (Altonji et al., 2012; Kirkeboen et al., 2016). If pandemic-era enrollment declines were concentrated in majors with historically higher earnings premia and disproportionately affected lower-income students, this may exacerbate inequality in long-term labor market outcomes. Conversely, if shifts favored fields aligned with projected growth in healthcare and technology, the pandemic could accelerate structural realignments in the supply of college-educated workers.

In this paper we assess how the pandemic affected undergraduate enrollment in colleges and universities, with a focus on how these effects varied across programs in different fields of study. We use newly developed administrative data on program enrollment reported by institutions to the National Student Loan Data System (NSLDS) for all students who receive federal support, either grants or loans, to attend college between award years 2015–2016 and 2023–2024.

Throughout the pandemic, researchers and policymakers released reports about trends at individual programs, institutions, states, or groups of states (Bulman & Fairlie, 2022; Korotchenko & Dobbs, 2023; Perez et al., 2022). The new data provided in this paper extend to federal aid recipients in programs across the entire country and across all postsecondary sectors. Our data also provide a more up-to-date – including after the pandemic ended – and granular view of enrollment trends compared to information typically publicly available from the federal government. For example, researchers often use data from the Integrated Postsecondary Education Data System (IPEDS) on credentials awarded, but these data do not allow for disaggregated reporting on program enrollment by detailed field of study and credential level; therefore, our newly developed data provide a more complete picture of national trends relative to analyses of enrollment for specific programs, institutions, or states.

We present data on differences in enrollment trends across sector, field of study, and program. We estimate the extent to which each program's enrollment of aid recipients during and after the pandemic deviated from its trend prior to the pandemic. Using these results, we consider several explanations for the patterns of enrollment changes observed in the data, including "supply-side" factors involving the difficulty of offering some programs online, and "demand-side" drivers related to students' shifting preferences for different types of careers in the wake of the pandemic.

We find that in the 2021 award year (July 2020—June 2021), when many programs still remained remote and online after the onset of the pandemic, the typical undergraduate program had 8–10% lower enrollment of federal aid recipients than its pre-pandemic trend would have suggested.[1] The aggregate patterns, however, mask considerable variability across sectors and fields. At four-year colleges, enrollments stayed relatively stable after an initial drop in 2020. For-profit colleges weathered the pandemic relatively well, expanding and maintaining enrollment since 2020.

Community college enrollment was hit particularly hard in the first full year of the pandemic, and overall enrollment of federal aid recipients had still not recovered by 2024. For programs in some fields – such as in Liberal Arts, Security and Protective Services, and even in parts of Health – enrollment had already been in decline in the years before the pandemic emerged. In many of these cases, the pandemic accelerated existing patterns of enrollment loss.[2] For other programs and fields, such as in the industrial trades, large declines experienced at the onset of the pandemic ended up being transitory as short-run supply constraints were removed and enrollment recovered.

Differences in postsecondary enrollment trends during the pandemic can be understood through both supply- and demand-side forces. On the supply side, we find that programs linked to occupations emphasizing skills like repairing, equipment maintenance, and operation control saw sharp enrollment declines in 2021, as previously documented by Schanzenbach and Turner (2022). We build on these findings by showing that these programs began to rebound as colleges resumed in-person classes, suggesting that temporary instructional constraints largely drove their short-term losses. On the demand side, programs associated with telework-eligible occupations experienced sustained enrollment declines through 2023. This persistence points to more lasting changes in student preferences or labor market expectations as remote work became more common. In contrast, most other programs, which comprise the bulk of community college enrollment, saw continued declines that extended preexisting downward trends rather than reversing them.

2. Data

Our data come from the US Department of Education's National Student Loan Data System (NSLDS). The data include enrollment information for all students who received Title IV funding, including in subsequent terms during which they did not receive such funding. We measure enrollment at each institution classified by its 4-digit Classification of Instructional Program (CIP) codes and credential level (which we call "programs"). Our panel is thus unique at the institution-program-year level. Specifically, our data are based on units defined by the unique combination of the first six digits of its institution's Office of Postsecondary Education Identification ("OPEID") number, the program's CIP code measured at the 4-digit level, and the program's credential level. Credential levels include undergraduate certificate, associate degree, bachelor's degree, post-baccalaureate certificate, master's degree, doctoral degree, first professional degree, or post-graduate certificate. We restrict our analysis to enrollment in undergraduate certificate, associate degree, and bachelor's degree programs. We also examine aggregations at a 2-digit CIP code level (which we call "fields of study"). Institutions report this information for all enrolled Title IV students to the Department of Education for the purposes of administering the Title IV programs. We use these records to calculate the number of students receiving Title IV, HEA funds in each program annually. Students may be enrolled in multiple programs during an academic year, either because they attend multiple institutions or are enrolled in multiple programs at the same institutions. Institutions are categorized by the predominant degree granted, as reported in the College Scorecard.

Our panel spans award years 2015–2016 to 2023–2024 and includes enrollment information for about 200,000 unique programs and 1.4 million program-year observations.[3] The institutional coverage of our data is identical to IPEDS, though NSLDS data are available in real time within the department and only covers Title IV students, while IPEDS enrollment measures include all students. The primary strength of our data is the ability to measure enrollment at a program level, which is not comprehensively available in IPEDS. IPEDS collects information on enrollment in only a handful of broad fields.[4] Given this incomplete coverage of fields, researchers have typically examined degree *completions* by field, which may miss short-term changes both because of the long lag between enrollment and completion and because many students

[1] Throughout, we refer to the award year by the year in which it ends. For example, the 2021 award year is the year that begins in July of 2020 and runs through the end of June, 2021.

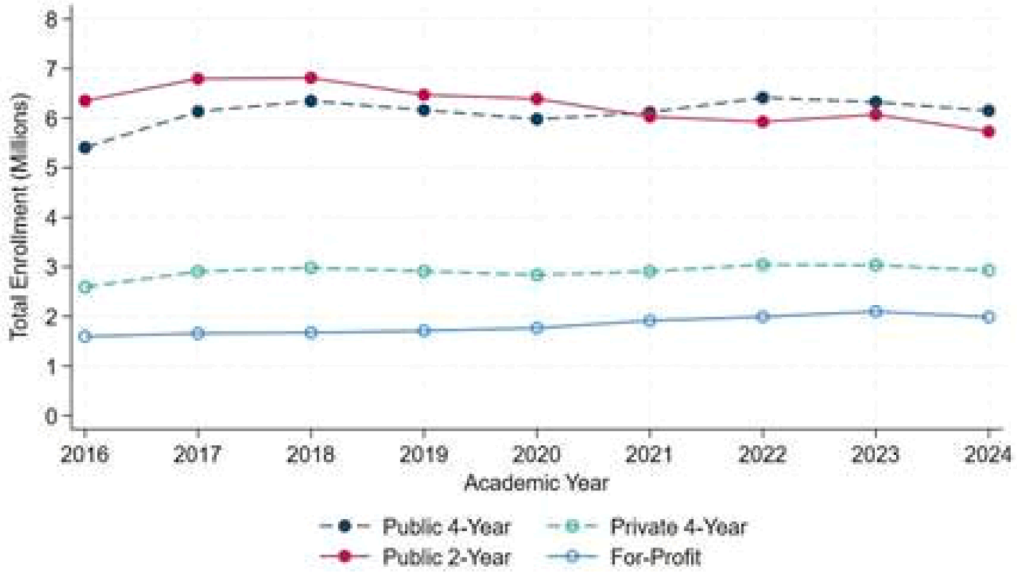
[2] Both fall and full-time-equivalent enrollment at community colleges and for-profit institutions declined substantially since their peaks in the early 2010s through the start of our analysis period (U.S. Department of Education, 2022).

[3] Our dataset is publicly available at peer-center.org.

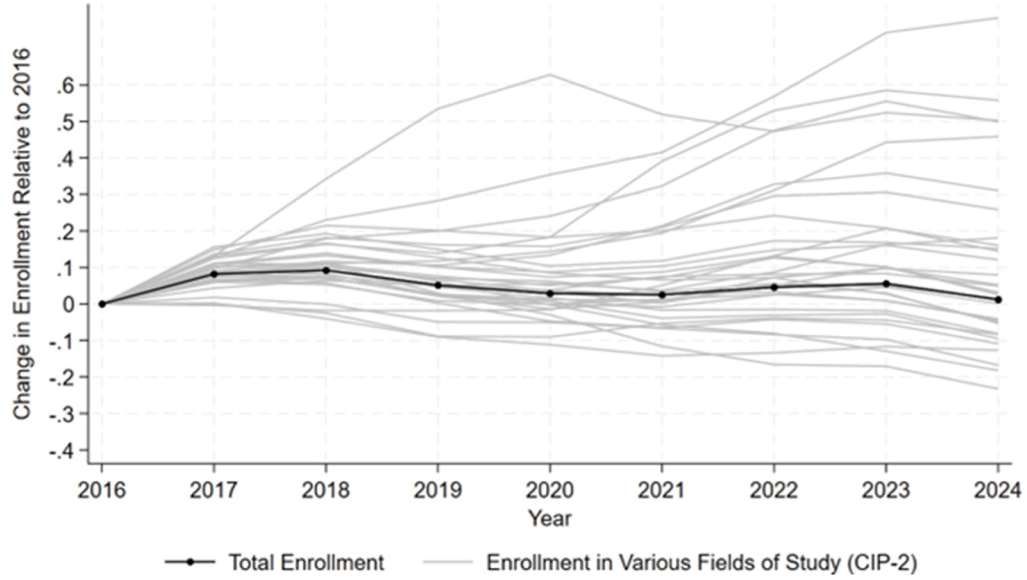
[4] Institutions report enrollment for both undergraduate and graduate students in Education, Engineering, Biological Sciences, Mathematics, Physical Sciences, Business, Law, Dentistry, and Medicine to IPEDS.

do not graduate. Prior work has also relied on information for a small number of states, which provide a limited view given heterogeneity across contexts.

Our data only include federal student aid recipients. We believe that understanding aided students is an important measure because these students are the direct beneficiaries of federal financial support, and the contexts and recipients of federal financial aid have been at the forefront of prominent public debates. In 2019, the most recent year available in the NCES data, 55% of undergraduates received some kind of Title IV federal aid. The enrollment behavior of non-recipients in response to the pandemic could be different. As we show later, however, aggregate trends in enrollment in our data are comparable to those in other publicly available sources that do not filter on aid receipt. It is possible aid receipt itself could be responsive to the pandemic, too. For example, if the pandemic shocked parental incomes and wealth, then this could change aid receipt (Gurantz & Wielga, 2021). Although we cannot see trends in federal aid by sector specifically, we show in Appendix Fig. A1 that overall financial aid receipt rates did not change substantially throughout the pandemic. Although there are some fluctuations, especially in community colleges, these are likely not large enough to dramatically affect our findings. Similarly, in Appendix Fig. A2 we use the National Postsecondary Student Aid Survey waves of 2016 and 2020 to compare the fraction of students receiving federal aid by field of study, with small differences. While not studying aid receipt explicitly, Gurantz and Wielga (2021) show that FAFSA applications dropped in the year of the pandemic but quickly rebounded. Therefore, we acknowledge that the pandemic could have affected both need for aid and FAFSA applications, perhaps in a counteracting ways, and we are not aware of research that provides clear guidance on the magnitude and direction on the divergence between enrollment trends among aided and



a) Predominant Degree and Control of Institution



b) Enrollment Relative to Award Year 2016, by 2-Digit CIP

Fig. 1. Undergraduate Enrollment of Federal Aid Recipients in Award Years 2016–2024. Notes: Figure plots the percent change since 2016 in total undergraduate enrollment of Title IV recipients at 2-year public, 4-year public, 4-year private, and for-profit institutions, by 2-digit CIP code. Enrollment is measured at the program level and then aggregated to the year and 2-digit CIP code, where program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

non-aided students.

3. Broad trends in enrollment through the pandemic

We begin by documenting trends in enrollment of Title IV aid recipients of Title IV aid recipients across different sectors of the U.S. postsecondary education landscape. Panel a) of Fig. 1 shows the number of enrolled students since 2016, by the control and predominant degree of the institution. Public institutions accounted for the majority of enrollment, with two-year public institutions enrolling about 5.8 million federal aid recipients and four-year public institutions enrolling about 5.5 million in 2016. Over this period, enrollment at public four-year institutions declined slightly, but enrollment at community colleges fell substantially. As a result, by 2023 the gap in enrollment of federally-aided students between public 2- and 4-year schools had grown to about 600,000 students. Enrollment of federal aid recipients of federal aid recipients at private four-year institutions stayed steady at about 3 million students per year, and for-profit colleges' enrollment levels grew slightly following the onset of the pandemic. Not shown are private two-year institutions, which only enrolled approximately one percent of undergraduate federal borrowers annually. Appendix Fig. A3 shows these trends as cumulative percent changes in enrollment relative to award year 2016.

Steady increases between 2016 and 2020 in the for-profit sector were followed by a sharp jump in enrollment in the first full pandemic year (2021), and steady increases through 2024. Undergraduate enrollment at four-year public and private colleges followed similar trajectories before the pandemic: rising slightly from 2016 to 2018, and then declining to 2020. In the wake of the pandemic, enrollment at four-year public and private institutions remained relatively stable.

At community colleges, enrollment of federal aid recipients started declining sooner than at four-year colleges and continued its pre-pandemic decline through the pandemic, albeit at a faster rate: enrollment was about 4% lower in 2019 compared to 2016 levels; but by 2024, enrollment was about 21% lower than 2016 levels.

These enrollment trends are somewhat different than enrollment trends in publicly available sources, especially from the National Student Clearinghouse (NSC), which have generally shown continued enrollment declines through the pandemic followed by bumps in the most recent year. This paper does not contradict these findings, but instead investigates how enrollment across different areas of study changed through the pandemic. Appendix Fig. A4 shows comparable trends in enrollment of students receiving Title IV aid from 2010 to 2021 using IPEDS, with a vertical line showing the years of data that overlap with what is in our main sample. The two datasets do align for public colleges, though the relative flat enrollment trends for community colleges between 2016–2018 followed several years of consistent drops in enrollment. Appendix Fig. A5 shows trends in overall Spring enrollment from National Student Clearinghouse Reports. These go to 2023, but are not separated out by whether they receive financial aid. These trends are also comparable, though the levels are different. Here, there are relatively fewer community college students than in our data. Appendix Fig. A6 includes data from the NCES Digest of Education Statistics, which again is similar in trend to our data, but not in levels.

The overall changes in enrollment since 2016 mask substantial variation across fields of study within sector. In panel b) of Fig. 1, the solid line with circle markers shows the overall trend in enrollment across all sectors. The lighter lines without markers show trends in enrollment for 32 broad fields of study defined by 2-digit CIP codes, such as Healthcare, Social Sciences, and Business and Management. Appendix Fig. A7 splits this figure out into the four sectors we consider throughout this report: community colleges, 4-year publics, 4-year privates, and for-profits.

Enrollment in more than half of these fields of study declined prior to the pandemic from 2016 to 2019. At community colleges, fields of study with pre-pandemic declining enrollment were particularly large, comprising about 85% of enrollment in 2016. In addition, panel b) of Fig. 1 demonstrates that enrollment in many programs breaks from the prior trend starting in the 2021 award year (the first full year of the pandemic), notably in both positive and negative directions.

The large variation in enrollment changes across programs illustrated in the figure leads to the main research question of why different programs saw such different responses around the pandemic. Given the substantial differences in trends across programs even prior to the pandemic, the analysis that follows focuses on enrollment deviations from those trends.

4. De-trended enrollment

4.1. Method for accounting for trends

As shown earlier, about half of all fields of study had declining enrollment even before the pandemic began, and most students at community colleges were enrolled in fields with pre-pandemic declines. Therefore, enrollment declines after the pandemic's onset are not necessarily evidence of its impact. Similarly, level enrollment through the pandemic, such as that observed in the four-year college sector, is also not evidence that the pandemic had no effect. To account for this, we estimate changes in enrollment relative to the trends that existed prior to 2020.

To assess whether the degree of differential enrollment change across programs during the pandemic was unusual, we examine the dispersion of year-over-year enrollment changes across programs over time. For each award year we calculate the interquartile range (IQR) of the percentage change in enrollment across programs. Appendix Fig. A8 shows these IQRs over time. The dispersion of enrollment changes increases substantially during the pandemic years relative to the pre-pandemic period, indicating that enrollment changes across programs were more divergent during the pandemic than in preceding years. This pattern is similar when we examine programs separately by institution type.

We first estimate the linear time trends in log enrollment of federal aid recipients in the four pre-pandemic years for each 4-digit CIP code and credential level using program-year data, separately by sector. Then for each year 2020 through 2024, we calculate the difference between the actual log enrollment in each year for that program and the log enrollment predicted by the pre-pandemic trend. We refer to this difference as the *detrended enrollment*.[5] We then use these data to identify and explain which programs saw increases and decreases in enrollment, beyond what would have happened had they continued to follow their pre-pandemic trend. Note that since our models are estimated using log enrollment, we are estimating pre-trends assuming proportional growth rather than a growth rate linear in levels.

4.2. Overall patterns in de-trended enrollment

Fig. 2 shows the distribution of detrended enrollment in each of the five years following the onset of the pandemic across all programs. There is one panel for each sector. The middle line in each panel shows the detrended enrollment for the median program, and the outer lines show the 25th and 75th percentile across all programs in each year.

In 2020, a partial pandemic year, enrollment in the median community college program was just slightly below its trend in the previous four years. The following award year, 2021, was fully affected by the pandemic, and there is an obvious shift down in enrollment for the median program in most sectors: the typical field experienced 7 percent lower enrollment than its pre-pandemic trend would have predicted. Changes in enrollment were not, however, uniform across programs:

[5] The detrended enrollment is calculated using programs defined at the institution, 4-digit CIP, and credential level, where there were at least 10 programs with positive enrollment.

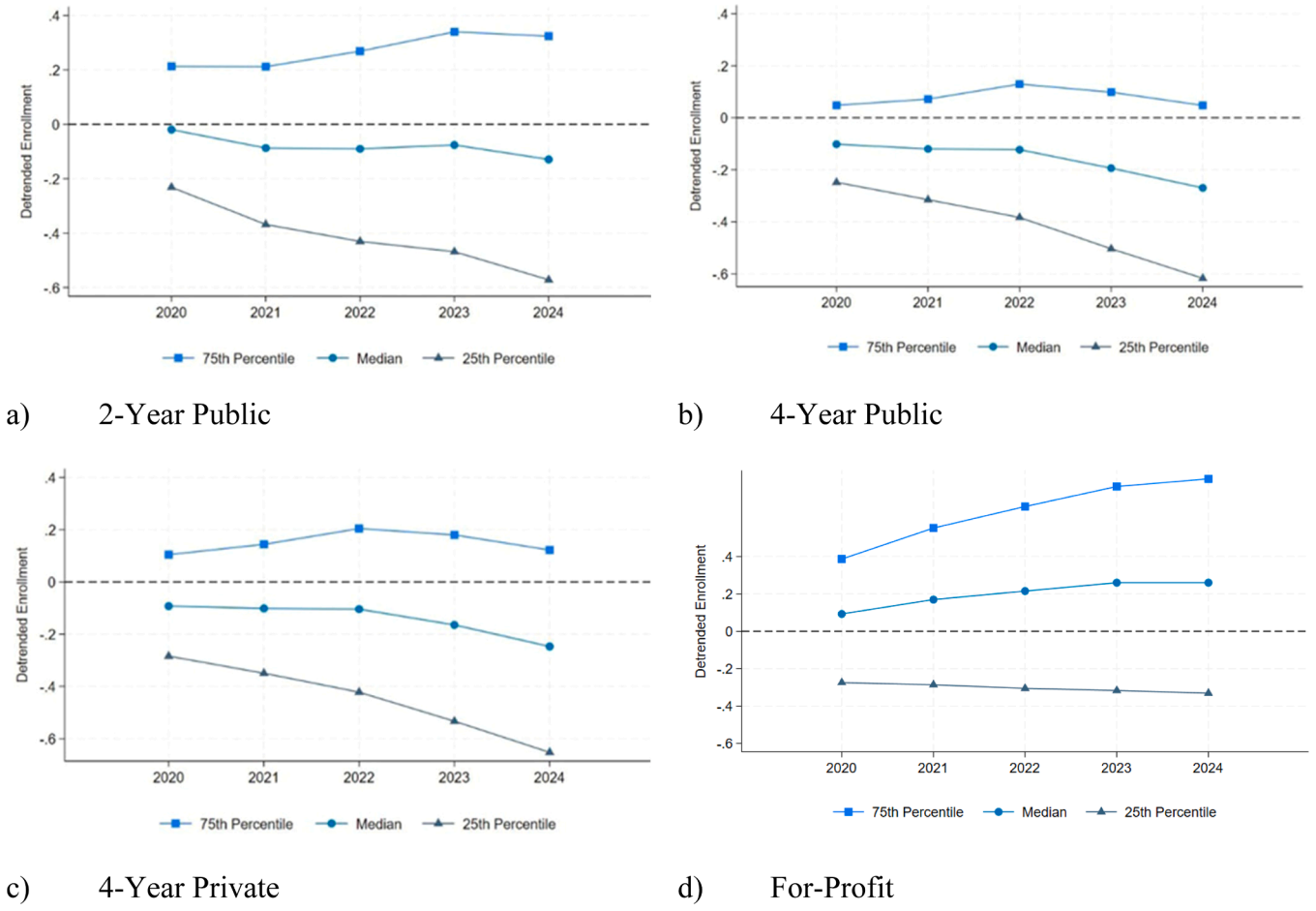


Fig. 2. Detrended Undergraduate Enrollment in 2020–2024. Notes: Figure plots the 25th, 50th, and 75th percentile of the from-trend deviation in total program enrollment of Title IV recipients in each pandemic and post-pandemic year. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

about 38% percent of community college programs had positive detrended enrollment in 2020–21. In fact, the wide variation in detrended enrollment across programs, as can be seen by the gap between the 25th and 75th percentiles, is an important feature for all the sectors. The overall patterns thus mask quite substantial variation in off-trend enrollment between programs.

For the next three years, 2022 −2024, the median community college program's enrollment continued to be below its pre-pandemic trend, but there was more variation in enrollment outcomes across programs. This spreading out is shown by the widening gaps between the 25th and 75th percentile lines.

Panels b) and c) show the analogous results for public and private four-year colleges. Both sectors exhibit similar detrended enrollment patterns. Unlike for community colleges, there is no drop in 2021, the first fully affected pandemic year. In fact, the three years 2020–2022 remain fairly flat, meaning that, while enrollment was somewhat lower for the typical program than pre-pandemic trends would have predicted, the declines did not accelerate as they did for community colleges. As with community colleges, though, the variation across programs widened over time. In 2023 and 2024, however, enrollment did drop relative to pre-pandemic trends.

Finally, panel d) shows that for-profits saw a different pattern of detrended enrollment than the public and private colleges. Enrollment actually grew relative to pre-pandemic trends for-profits. This is consistent with recent work showing that for-profit colleges are more responsive to the business cycle than not-for-profit institutions (Gilpin et al., 2015; Goodman & Winkelmann, 2025; Grosz & Monarrez, 2026). In general, prior research has found that for-profit program flexibility and student composition, among other reasons, might drive some of these differences (Armona et al., 2018).

4.3. *Detrended enrollment patterns across fields of study*

Just as the pandemic affected people and communities differently, it also had differential effects on postsecondary programs. Panel a) of Fig. 3 shows the median community college program's detrended enrollment for the 10 largest community college fields of study.[6] Each point represents the percent difference in enrollment relative to the pre-pandemic linear trend. Points that fall on (below) the zero line represent enrollment that is equal to (lower than) what would be predicted given trends that existed prior to the pandemic. There is considerable variation in how these areas of study fared during the pandemic. In some, like Education and Family & Consumer Sciences, enrollment stayed on trend in the pandemic or even increased. In others, the trend accelerated. This is particularly pronounced in the Liberal Arts, for which the enrollment decline accelerated in 2020 (a partial pandemic year) but continued as the pandemic hit full swing. For Health and Security & Protective Services, enrollment began to decline relative to trend at the beginning of the pandemic and continued to decline even further as the pandemic

[6] The Appendix includes tables with the median detrended enrollment in 2020-2024 for each 2-digit CIP code and for each sector.

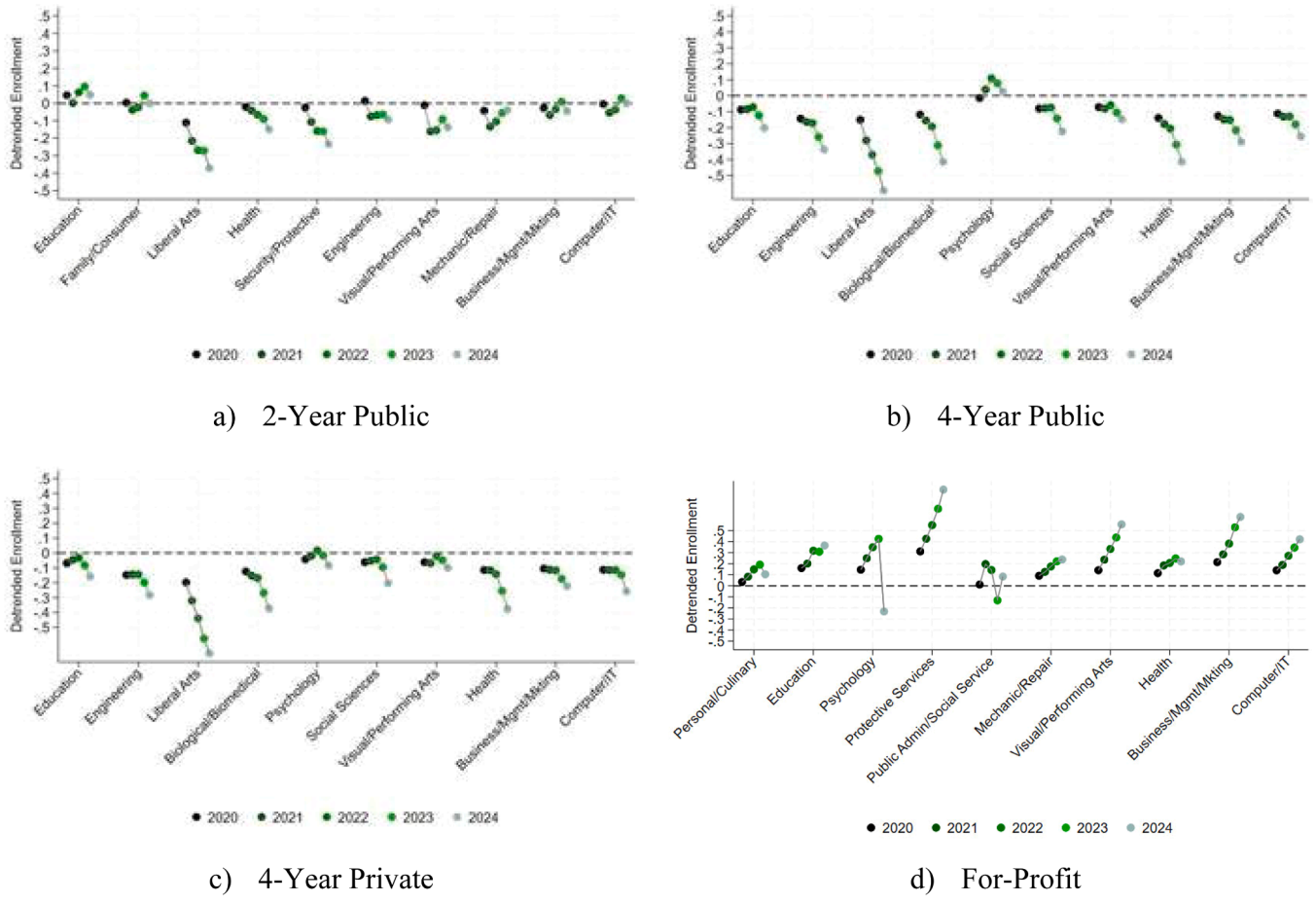


Fig. 3. Detrended Undergraduate Enrollment, by 2-Digit CIP Code, 2019–2024. Notes: Figure plots the 50th percentile of the from-trend deviation in total program enrollment of Title IV recipients in each pandemic and post-pandemic year, separately for selected 2-digit CIP codes. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

receded.

Some areas of study had a trend break that seemed to linger for the next few years. This was true in Engineering as well as in Visual and Performing Arts. In other areas, a temporary disruption from the pandemic was followed by a slow reversion back to trend. For example, enrollment in Mechanic and Repair programs declined off trend in 2021 but was almost back to trend by 2024. This is most likely due to these types of programs not being able to be offered virtually, a theme that we return to in the next section. Business, Management and Marketing, as well as Computer and IT, saw smaller declines but also slowly reverted.

Panels b) and c) of Fig. 3 shows corollary graphs to panel a), but now for public and private four-year enrollment for the 10 largest fields of study. Since enrollment in the four-year sector grew from 2016 to 2019 for most programs, the below trend enrollment in 2020 was a notable departure. However, as with community college detrended enrollment, there were a variety of patterns across fields. Some fields, like the Liberal Arts, Biology, and Health, seemed to face enrollment declines that grew in magnitude each year. Others were relatively flat, including Engineering, the Social Sciences, and the Arts. Psychology, one of the largest undergraduate majors, had positive detrended enrollment in the three pandemic years at public institutions. The patterns were largely similar for the other fields between the public and private sectors. In general, most fields saw declines in detrended enrollment in the final year, 2024.

Panel d) of Fig. 3 shows the same analysis for-profit institutions. Here the patterns are markedly different than for the community colleges and four-year public and private institutions. More of the fields actually saw higher than expected enrollment during the pandemic, even as a few did not. The largest increases were in protective services and business. Interestingly, there were also increases in visual and performing arts.

Appendix Tables A1, A2, A3 and A4 show the results across 2-digit CIP codes. Two patterns stand out. The familiar distinction between STEM and humanities fields does a poor job of organizing the results, since both categories contain fields at the top and the bottom of the distribution. At community colleges, a more useful distinction is between transfer-oriented academic fields and terminal occupational programs.

Within both STEM and the humanities, it is the transfer-oriented academic fields that decline most: Physical Sciences, Biological and Biomedical Sciences, Mathematics and Statistics, Foreign Languages, History, and Liberal Arts all show large and persistent negative detrended enrollment through 2024, while applied and occupational fields such as Computer and Information Sciences, Engineering Technologies, Business, and Health Professions hold considerably closer to trend. This pattern is consistent with a shift in community college enrollment away from the transfer function and toward more directly vocational training, complementing the labor market evidence discussed above.

The lack of a consistent pattern across all STEM or humanities programs leads us to examine particular fields of interest. One of these is Education programs. Enrollment in these programs declined across nearly all institution types following the pandemic, consistent with pandemic-era declines in the teaching occupation (Bleiberg & Kraft, 2023; Camp et al., 2025). At both 2-year and 4-year public institutions, Education shows persistent negative detrended enrollment, with a similar pattern at 4-year private institutions. As with other fields,

Education enrollment in the for-profit sector appears to recover in later years, possibly reflecting demand for alternative certification pathways as traditional teacher pipelines contracted. We note that Education enrollment is an imperfect proxy for teacher supply, but the consistency of the decline across institution types suggests that pandemic-era contractions in the teaching occupation are reflected in enrollment patterns.

Health is another field where pandemic-related occupational disruptions were substantial, with widespread reports of burnout and workforce exit among healthcare workers during and after the pandemic (Morgantini et al., 2020). To examine whether the aggregate Health results in our main analysis mask meaningful differences across specific fields, Appendix Fig. A9 disaggregates the 2-digit Health CIP category into its underlying 4-digit fields and plots the distribution of detrended enrollment by institution type and year. The median detrended enrollment is negative and grows increasingly so over time for public and private 4-year institutions, indicating that the aggregate Health decline is broadly shared across specific fields rather than driven by outliers. For-profit institutions are again the notable exception, with median detrended enrollment remaining near or above zero throughout the period. Across all institution types, however, the distribution widens considerably after 2020. This suggests that the pandemic generated meaningful heterogeneity in enrollment shifts even within the Health category.

4.4. Potential explanations for the patterns of enrollment across fields of study

The COVID-19 pandemic forced education online in the short-term. Over a longer time horizon, the pandemic may change the way that some organizations—schools as well as workplaces— think about remote work and classes. One way to interpret the differences across fields in the effects of the pandemic is that they may be tied to the careers that their students seek. In other words, the ways that the pandemic will alter the labor market may be first reflected in trends in postsecondary enrollment. For this analysis we focus on community college and for-profit enrollment since their career technical programs have a more direct link to specific occupations and employment.

We categorized programs following conventions in prior literature to understand different theories of how the pandemic may have changed enrollment patterns.

We start with supply-side factors. Schanzenbach and Turner (2022) document that enrollment drops during the pandemic were particularly acute in programs that required in-person training. They focused on programs that train students for so-called Assembly, Repair, and Maintenance ("ARM") occupations, whose training is particularly hands-on and thus were less likely to be amenable to virtual or remote learning. Using the O*NET data, they define these programs as related to occupations that scored a 3 or higher in importance on the Repairing, Equipment Maintenance, Equipment Selection, and Operation and Control skills. To replicate their analysis, we matched these groups of occupations to each 4-digit CIP code using crosswalks created by the NCES. There can be multiple CIP codes that match each occupation. Therefore, we defined a CIP code as ARM if at least half of its underlying matched occupations are coded as ARM.

Using data from a subset of states, Schanzenbach and Turner (2022) find that the colleges that were most concentrated in training in ARM fields saw the largest declines in overall enrollment during the first full year of COVID, 2021. We extend their analysis, looking at enrollment in ARM programs across all two-year public colleges in the country, and for additional years.

The first results in Fig. 4 below show a similar finding: ARM fields saw declines in enrollment of approximately 14 percent relative to their prior trend in the first full year of the pandemic, echoing the findings of Schanzenbach and Turner (2022). Our data allow us to look out further and examine enrollment trends beyond the first year of the pandemic, however. In the next academic year, 2022, we observe that as students returned to in-person classes, detrended enrollment in ARM programs started to rebound. By the last year of data these fields had almost entirely reverted to trend. Thus, while the immediate effects of the pandemic on ARM training were stark, they do not seem to have been permanent. This suggests that temporary supply-side constraints on the delivery of hands-on instruction is an important explanation for the short-run enrollment patterns in the initial years of the pandemic, but that these constraints were transitory.

The second set of results in Fig. 4 focus on a demand-side explanation. We ask how changes in enrollment relates to occupations that most lend themselves to telework. One persistent consequence of the pandemic has been that the telework policies that were put in place as temporary measures have stuck around even as the acute health threat of COVID has dissipated (Parker et al., 2022).

Not all occupations easily transition to telework, and we follow Dingel and Neiman (2020) to identify the most telework-eligible programs. Using O*NET data, the telework-eligible occupations are those that did not score highly on a variety of skills and contexts, such as occupations that are primarily outdoors; include exposure to disease or injury; spend time walking or running; include operation of machinery or vehicle; and include other physical tasks. In an analogous way as for ARM occupations, we define a CIP code as telework-eligible if at least

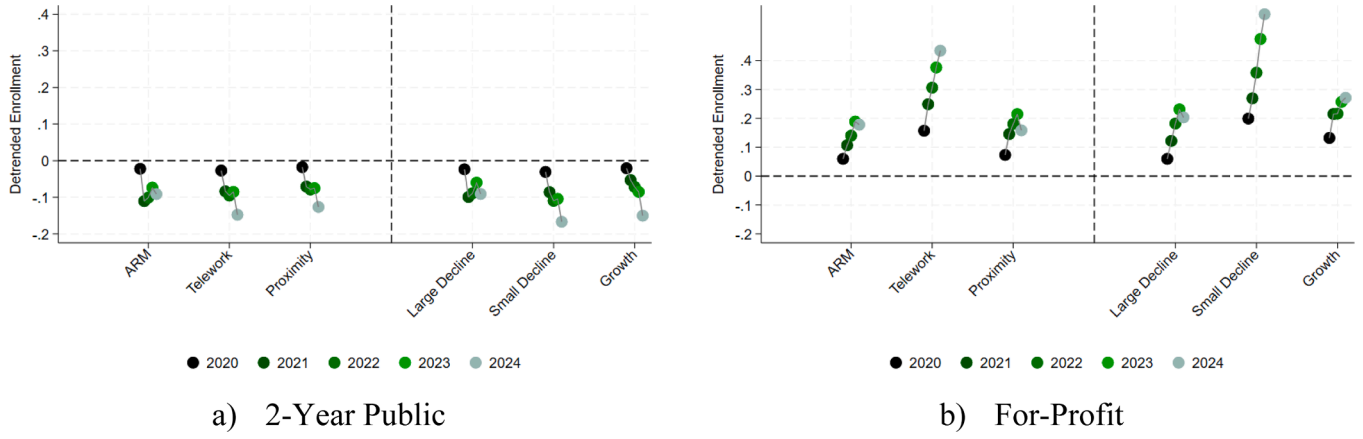


Fig. 4. 2019–2024 Detrended Undergraduate Enrollment, by Training and Labor Market Exposure. Notes: Figure plots the 50th percentile of the from-trend deviation in total program enrollment of Title IV recipients in each pandemic and post-pandemic year, separately for selected 2-digit CIP codes. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. CIP codes are classified using NCES occupation crosswalks and O*NET-based measures for ARM training, telework eligibility, and physical proximity, and Del Rio-Chanona et al. (2020) predicted employment shocks. Students can be counted in multiple programs in the same academic year. Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

half of its underlying matched occupations are coded as telework-eligible.

These telework-eligible occupations do not involve activities outdoors, with in-person interactions, or with large amounts of physical activity. These fields saw detrended enrollment declines that persisted throughout the pandemic and recovery, with only a very small reversion in 2023.

A related but distinct dimension of pandemic exposure is physical proximity. We follow Mongey et al. (2021) to construct a measure that captures the extent to which workers in an occupation must interact physically with others in the course of their work.[7] Proximity is not simply the inverse of teleworkability. For example, construction and agricultural work require in-person presence but not necessarily close contact with other people. The proximity measure captures aspects of pandemic exposure, and in particular the risk of disease transmission. Again, we use NCES crosswalks to match occupations to 4-digit CIP codes, defining a program as high-proximity if at least half of its underlying matched occupations score above the median on the Mongey et al. proximity index (Mongey et al., 2021).

The third set of results in Fig. 4 indicate that high-proximity community college programs saw enrollment declines broadly similar in magnitude to ARM programs in the initial years of the pandemic, and notably larger than the declines observed for telework-eligible programs. However, unlike ARM programs, which largely reverted to trend by 2024, high-proximity programs show more persistent negative detrended enrollment. This suggests that the labor-market risks associated with close-contact occupations may have had a more lasting effect on students' program choices than the temporary instructional constraints that drove the ARM results. This pattern is broadly consistent across both 2-year public and for-profit institutions.

Our final categorization follows Del Rio-Chanona et al. (2020), who predict each occupation's employment shock in the early months of the pandemic. This measure captures the labor-market disruption associated with a program's underlying occupations, complementing the supply-side (ARM) and exposure-based (teleworkability, proximity) measures described above. Using their measured shock, we compute the mean shock across matched occupations for each program. We then categorize programs as having a large decline (41% of CIP codes), a low decline (44%), or positive growth (15%).

The final three sets of results in Fig. 4 are consistent with the labordemand interpretation. Programs associated with high-decline occupations saw the largest enrollment drops relative to trend, while programs associated with positive employment growth saw enrollment hold up considerably better and in some cases above trend, particularly in later years. Low-decline programs fell between these two groups. Unlike the ARM result, the high-decline pattern does not rebound by 2024, suggesting that labor-demand conditions, rather than temporary constraints, may generate more persistent shifts in enrollment.

Finally, we note that some of the occupations most severely affected by the pandemic, such as in restaurants, retail, and other service industries, do not map cleanly to postsecondary training programs. These fields are thus absent from most of our analysis. This limits our ability to capture the full scope of pandemic-related labor market disruption, but is an inherent feature of studying enrollment in postsecondary programs.

5. Conclusion

The sizable disruption to postsecondary education caused by the pandemic was experienced differently across different postsecondary programs. The most significant enrollment losses were in the community college sector, where the pandemic accelerated the pace of decline that predated the pandemic. Community colleges play an important role in higher education since they are generally accessible to a broad swath of students, can offer programs that are directly aligned with some vocational fields, and can serve as a pathway to a bachelor's degree. Therefore, dips in enrollment in high demand fields may lead to skilled workforce shortages in the future. Many of the fields that experienced substantial enrollment losses beyond trend during the first full year of COVID, such as those associated with Assembly, Repair, and Maintenance professions, have rebounded as instruction has returned to in-person. Still others, such as those associated with remote work, have seen only a modest reversion to the pre-pandemic trend. Liberal Arts and General Studies, a very large category that includes many transfer-prep programs, has seen accelerating enrollment decline even after the pandemic.

At public and non-profit four-year colleges, enrollment declined relative to trend in 2020, which mostly predated the pandemic; there was little additional enrollment decline in the first full year of the pandemic, though enrollment has not returned to trend. For-profit institutions largely maintained or even expanded enrollment during the pandemic.

This work has focused on broad patterns by sector and field, though there is substantial variation in enrollment patterns across individual programs within these groups. The new availability of up-to-date and finely grained information on program-level enrollment should facilitate deeper research into the forces driving student choice, program expansion, and contraction. For instance, geographic differences in communities' response to COVID, changes in the goals or preparation of secondary students, or shifts in labor market demand may all alter the types of postsecondary programs students enroll in. Future work could also examine whether these enrollment shifts differed across student socioeconomics and demographic groups, which our program-level data do not allow us to observe directly. Moreover, as we get further from the pandemic and students have had more opportunity to enter and progress through the workforce, future work could also examine whether and how transitory and persistent enrollment trends manifest themselves in skilled workforce shortages.

It will also be important to see whether the enrollment reductions seen during COVID reduce credential attainment at the certificate, Associate's, and Bachelor's level. The lack of bounce-back of the 2-year sector may signal a need for more investment in affordability and student support at these institutions. This real-time information provided by NSLDS can be used to track whether these investments are paying off.

[7] This categorization is similar to the one by Koren and Peto (2020).

Appendix

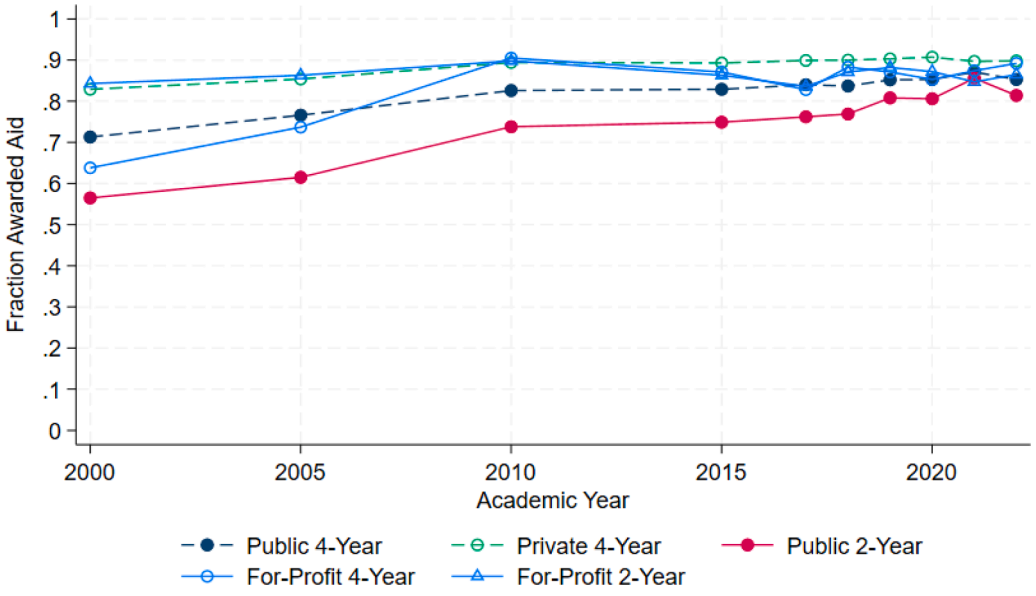


Fig. A1. Fraction of Students Receiving Aid, Using NCES Digest Data. Notes: Figure plots the fraction of all students receiving aid, by the control and sector of the institution as reported in Digest of Education Statistics. Source: Digest of Education Statistics 2025, Table 331.80.

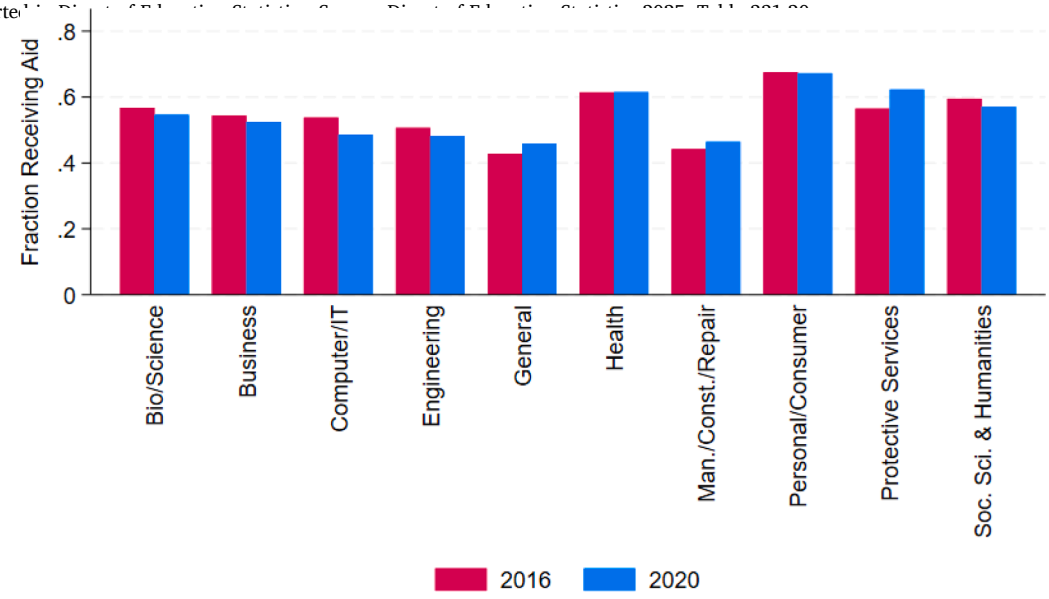


Fig. A2. Fraction of Students Receiving Federal Aid, by Field of Study, 2016 and 2020. Notes: Figure plots the fraction of all students receiving aid, by field of study. Source: National Postsecondary Student Aid Study (NPSAS) 2016 and 2020.

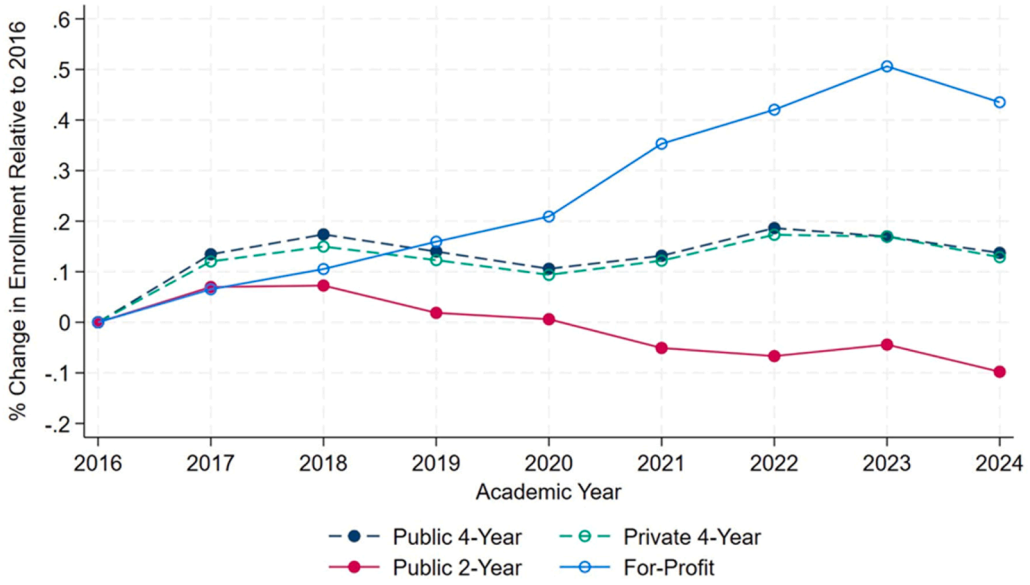


Fig. A3. Undergraduate Enrollment Change Relative to Academic Year 2016, by Predominant Degree and Control of Institution. Notes: Figure plots the percent change in total undergraduate enrollment of Title IV recipients by the control and predominant degree of the institution since 2016. Enrollment is measured at the program level and then aggregated, where program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple p [illegible] LDS).

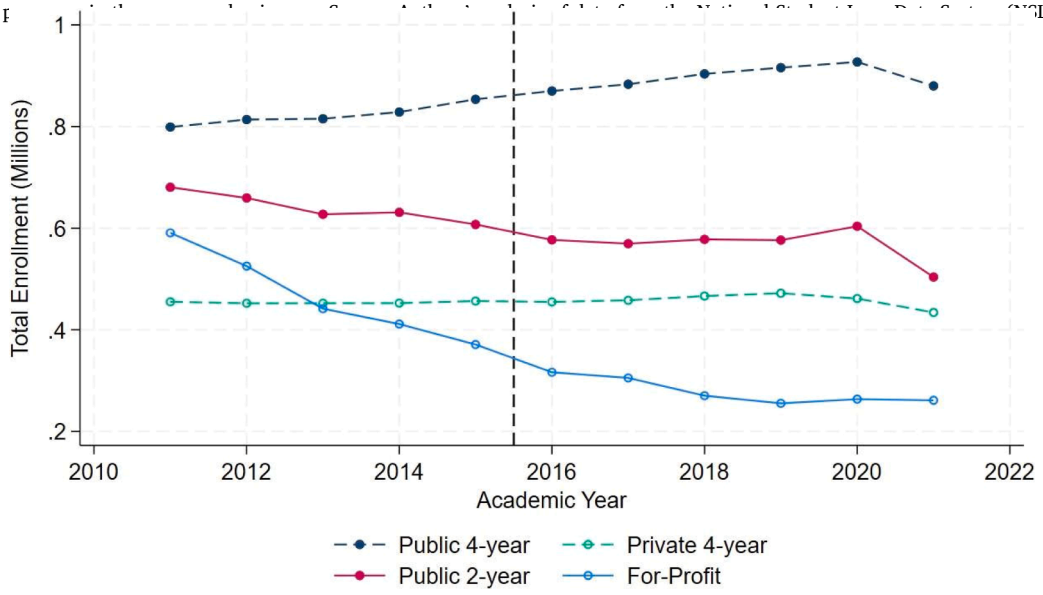


Fig. A4. Enrollment for Undergraduate Recipients of Title IV Aid, by Predominant Degree and Control of Institution, Using IPEDS Data. Notes: Figure plots the total enrollment of first-time full-time undergraduate Title IV recipients by the control and predominant degree of the institution as reported in IPEDS. Enrollment is measured at the institution level and then aggregated across institutions. Students can be counted in multiple institutions in the same academic year if they attend more than one institution. Source: Authors' analysis of data from IPEDS.

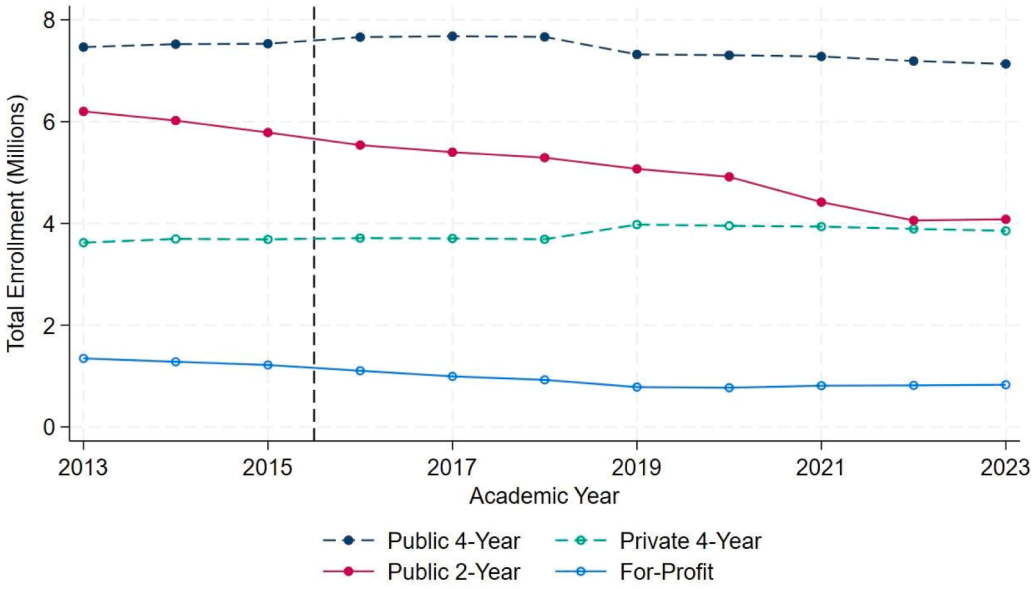


Fig. A5. Undergraduate Enrollment by Sector, Using NSC Data. Notes: Figure plots the total enrollment of all students by the control and sector of the institution as reported to the National Student Clearinghouse. The data cover 97 percent of Title IV degree-granting institutions. Enrollment is reported at the sector and control level. Source: NSC Sp

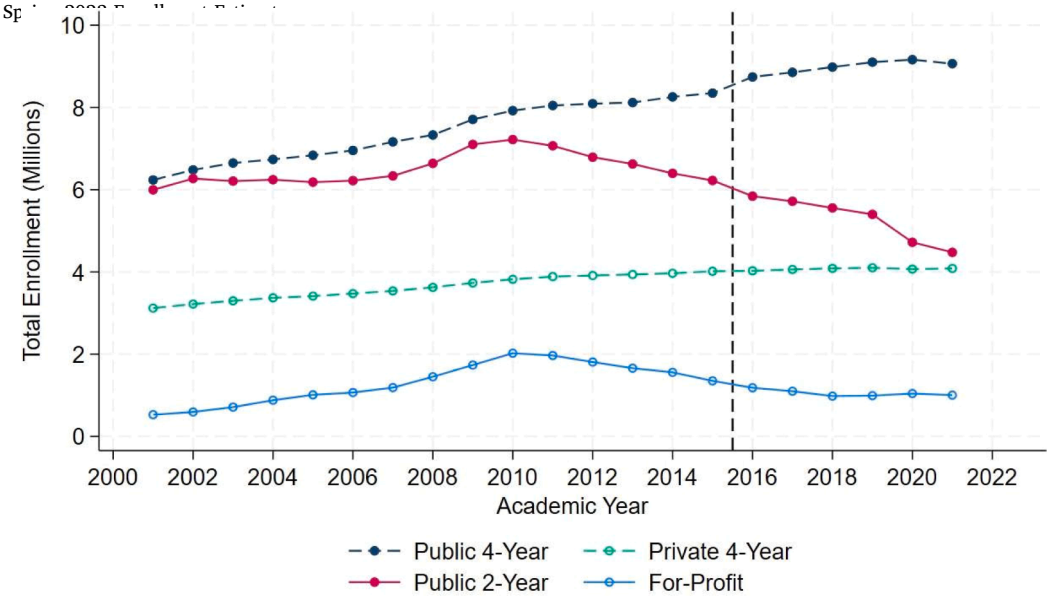


Fig. A6. Enrollment for Recipients of Title IV Aid, by Predominant Degree and Control of Institution, Using NCES Digest Data. Notes: Figure plots the total enrollment of all students by the control and sector of the institution as reported in Digest of Education Statistics, which draws from IPEDS. Enrollment is measured as unduplicated headcounts of students enrolled in a twelve month period in the academic year. Source: Digest of Education Statistics 2022, Table 303.25.

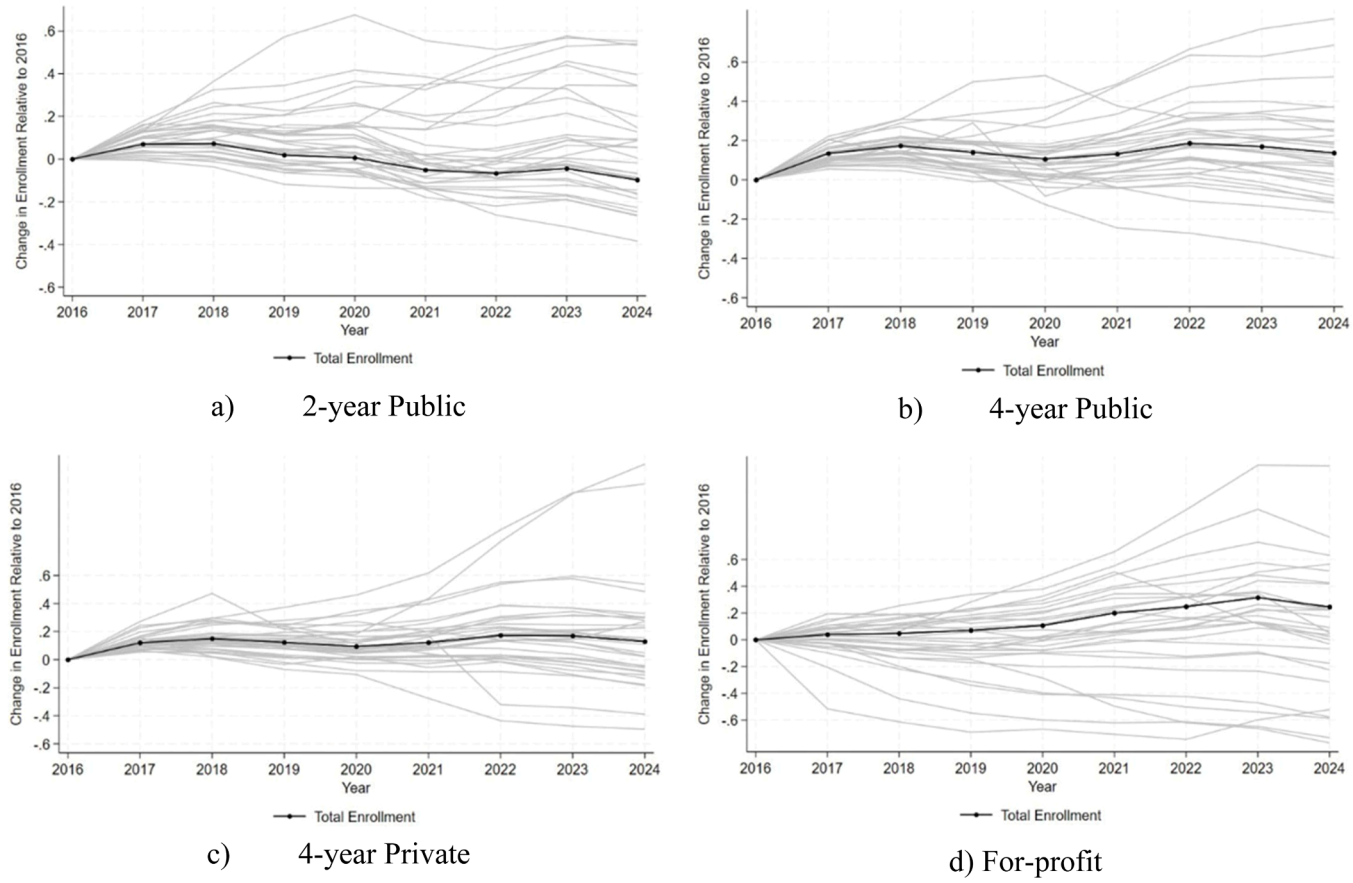
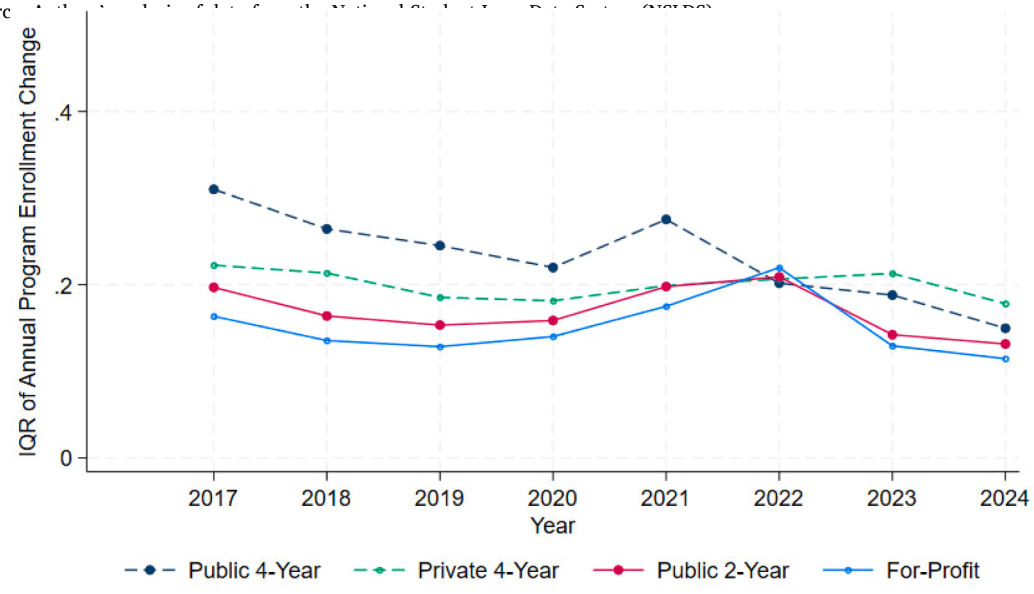
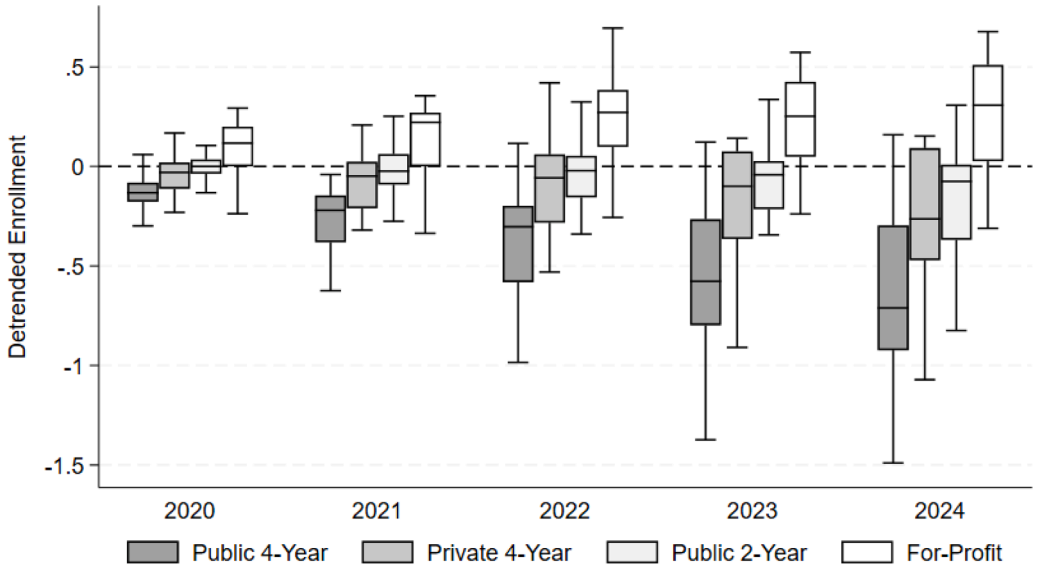


Fig. A7. Changes in Enrollment Relative to Academic Year 2016, by 2-Digit CIP Code. Notes: Figure plots the percent change since 2016 in total enrollment of Title IV recipients at 2-year public, 4-year public, and 4-year private institutions, by 2-digit CIP code. Enrollment is measured at the program level and then aggregated, where program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Sourc



a) Predominant Degree and Control of Institution

Fig. A8. Interquartile Range of Year-to-Year Enrollment Changes. Notes: Figure plots the interquartile range of program-level percent changes in enrollment since 2017 in total undergraduate enrollment of Title IV recipients at 2-year public, 4-year public, 4-year private, and for-profit institutions. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Source: Authors'analysis of data from the National Student Loan Data System (NSLDS).



a) Predominant Degree and Control of Institution

Fig. A9. Distribution of Detrended Enrollment within Health. Notes: Figure plots the median and interquartile range of program-level percent changes in enrollment since 2017 in undergraduate enrollment of Title IV recipients at 2-year public, 4-year public, 4-year private, and for-profit institutions, within the 2-Digit CIP code of Healthcare (51). Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Students can be counted in multiple programs in the same academic year. Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

Appendix Table A1
Estimated detrended enrollment, community colleges.

	CIP	2020	2021	2022	2023	2024
1	Agriculture, Agriculture Operations, And Related Sciences	−0.02	−0.01	0.02	0.02	−0.00
3	Natural Resources And Conservation	−0.00	−0.02	−0.00	−0.00	−0.00
4	Architecture And Related Services	−0.00	−0.06	−0.01	0.01	−0.06
5	Area, Ethnic, Cultural, Gender, And Group Studies	−0.09	−0.12	−0.11	−0.15	−0.18
9	Communication, Journalism, And Related Programs	−0.05	−0.19	−0.27	−0.25	−0.33
10	Communications Technologies/Technicians And Support Services	−0.03	−0.15	−0.17	−0.15	−0.20
11	Computer And Information Sciences And Support Services	−0.02	−0.07	−0.05	−0.01	−0.02
12	Personal And Culinary Services	−0.02	−0.08	−0.04	0.03	0.02
13	Education	0.02	−0.02	0.02	0.05	−0.02
14	Engineering	−0.04	−0.15	−0.15	−0.10	−0.16
15	Engineering/Engineering-Related Technologies/Technicians	0.00	−0.07	−0.07	−0.06	−0.09
16	Foreign Languages, Literatures, And Linguistics	−0.07	−0.18	−0.26	−0.29	−0.42
19	Family And Consumer Sciences/Human Sciences	0.01	−0.05	−0.03	0.04	−0.00
22	Legal Professions And Studies	0.06	0.13	0.18	0.18	0.17
23	English Language And Literature/Letters	−0.04	−0.15	−0.19	−0.22	−0.28
24	Liberal Arts And Sciences, General Studies And Humanities	−0.09	−0.19	−0.24	−0.24	−0.33
25	Library Science	−0.03	−0.08	−0.05	−0.06	−0.07
26	Biological And Biomedical Sciences	−0.08	−0.16	−0.23	−0.28	−0.46
27	Mathematics And Statistics	−0.03	−0.17	−0.22	−0.25	−0.42
29	Military Technologies And Applied Sciences	−0.11	−0.29	−0.34	−0.47	−0.66
31	Parks, Recreation, Leisure, Fitness, And Kinesiology	−0.04	−0.12	−0.15	−0.13	−0.21
32	Basic Skills And Developmental/Remedial Education	0.02	0.03	0.04	0.05	0.06
34	Health-Related Knowledge And Skills	0.22	0.33	0.38	0.49	0.60
36	Leisure And Recreational Activities	0.22	0.26	0.25	0.31	0.33
37	Personal Awareness And Self-Improvement	0.04	0.03	−0.09	−0.02	−0.24
38	Philosophy And Religious Studies	−0.04	−0.16	−0.16	−0.16	−0.12
39	Theology And Religious Vocations	0.37	−0.04	0.66	0.81	0.95
40	Physical Sciences	−0.07	−0.18	−0.32	−0.35	−0.50
41	Science Technologies/Technicians	0.02	−0.05	−0.02	−0.01	−0.01
42	Psychology	0.06	0.01	−0.00	0.01	−0.11
43	Homeland Security, Law Enforcement, Firefighting And Related Protective Services	−0.04	−0.11	−0.17	−0.16	−0.22
44	Public Administration And Social Service Professions	0.00	−0.07	−0.05	−0.04	−0.08
45	Social Sciences	−0.06	−0.13	−0.19	−0.22	−0.30
46	Construction Trades	−0.01	−0.10	−0.07	−0.06	−0.10
47	Mechanic And Repair Technologies/Technicians	−0.03	−0.11	−0.09	−0.05	−0.03
48	Precision Production	−0.03	−0.15	−0.12	−0.09	−0.12
49	Transportation And Materials Moving	0.03	0.09	0.11	0.15	0.14

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Appendix Table A1 (*continued*)

	CIP	2020	2021	2022	2023	2024
50	Visual And Performing Arts	−0.02	−0.14	−0.14	−0.12	−0.14
51	Health Professions And Related Programs	−0.02	−0.04	−0.06	−0.08	−0.14
52	Business, Management, Marketing, And Related Support Services	−0.03	−0.07	−0.05	−0.03	−0.06
54	History	−0.08	−0.17	−0.22	−0.32	−0.43

Notes: Table reports the median from-trend deviation in total program enrollment of Title IV recipients at 2-year public institutions, by 2-digit CIP code, for each year 2020–2024. Detrended enrollment is calculated as the difference between actual log enrollment and the log enrollment predicted by each program's pre-pandemic (2016–2019) linear trend. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Only CIP codes with at least 10 programs with positive enrollment are included. Students can be counted in multiple programs in the same academic year.
Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

Appendix Table A2
Estimated detrended enrollment, public 4-Year.

		2020	2021	2022	2023	2024
1	Agriculture, Agriculture Operations, And Related Sciences	−0.10	−0.08	−0.01	−0.06	−0.12
3	Natural Resources And Conservation	−0.13	−0.14	−0.13	−0.21	−0.30
4	Architecture And Related Services	−0.04	−0.04	0.00	−0.06	−0.09
5	Area, Ethnic, Cultural, Gender, And Group Studies	−0.09	−0.14	−0.11	−0.16	−0.27
9	Communication, Journalism, And Related Programs	−0.08	−0.08	−0.09	−0.15	−0.20
10	Communications Technologies/Technicians And Support Services	0.04	0.10	0.07	0.13	0.12
11	Computer And Information Sciences And Support Services	−0.11	−0.13	−0.15	−0.20	−0.25
12	Personal And Culinary Services	−0.05	0.06	0.07	0.02	0.11
13	Education	−0.07	−0.07	−0.05	−0.10	−0.17
14	Engineering	−0.14	−0.15	−0.15	−0.24	−0.31
15	Engineering/Engineering-Related Technologies/Technicians	−0.02	−0.05	−0.08	−0.15	−0.20
16	Foreign Languages, Literatures, And Linguistics	−0.03	−0.08	−0.09	−0.12	−0.22
19	Family And Consumer Sciences/Human Sciences	−0.11	−0.12	−0.13	−0.22	−0.32
22	Legal Professions And Studies	−0.14	−0.16	−0.10	−0.21	−0.35
23	English Language And Literature/Letters	−0.07	−0.09	−0.07	−0.11	−0.17
24	Liberal Arts And Sciences, General Studies And Humanities	−0.15	−0.27	−0.36	−0.46	−0.58
25	Library Science	0.15	0.47	0.53	0.84	0.86
26	Biological And Biomedical Sciences	−0.13	−0.15	−0.20	−0.32	−0.41
27	Mathematics And Statistics	−0.12	−0.16	−0.20	−0.32	−0.43
28	Military Science, Leadership And Operational Art	0.00	0.00	0.00	0.00	−1.10
29	Military Technologies And Applied Sciences	0.46	0.32	−0.17	−0.44	−0.62
31	Parks, Recreation, Leisure, Fitness, And Kinesiology	−0.12	−0.15	−0.14	−0.20	−0.26
32	Basic Skills And Developmental/Remedial Education	0.08	0.08	0.11	0.14	0.15
34	Health-Related Knowledge And Skills	0.07	0.22	−0.02	−0.01	−0.03
36	Leisure And Recreational Activities	0.20	0.13	0.35	0.39	0.51
37	Personal Awareness And Self-Improvement	0.05	−0.07	0.50	0.81	−0.53
38	Philosophy And Religious Studies	−0.07	−0.09	−0.09	−0.15	−0.23
39	Theology And Religious Vocations	0.00	0.00	0.00	0.00	0.00
40	Physical Sciences	−0.12	−0.16	−0.18	−0.24	−0.32
41	Science Technologies/Technicians	−0.07	−0.05	−0.43	−0.25	−0.15
42	Psychology	−0.01	0.06	0.13	0.10	0.07
43	Homeland Security, Law Enforcement, Firefighting And Related Protective Services	−0.06	−0.05	−0.06	−0.15	−0.25
44	Public Administration And Social Service Professions	−0.08	−0.10	−0.11	−0.22	−0.29
45	Social Sciences	−0.07	−0.08	−0.07	−0.14	−0.22
46	Construction Trades	−0.00	−0.09	−0.23	−0.00	−0.00
47	Mechanic And Repair Technologies/Technicians	0.01	−0.07	−0.08	−0.13	−0.08
48	Precision Production	0.05	0.11	0.16	0.12	0.17
49	Transportation And Materials Moving	−0.06	−0.07	−0.06	−0.14	−0.18
50	Visual And Performing Arts	−0.07	−0.08	−0.06	−0.09	−0.14
51	Health Professions And Related Programs	−0.14	−0.18	−0.23	−0.32	−0.42
52	Business, Management, Marketing, And Related Support Services	−0.13	−0.15	−0.15	−0.21	−0.29
54	History	−0.06	−0.06	−0.04	−0.09	−0.17

Notes: Table reports the median from-trend deviation in total program enrollment of Title IV recipients at 4-year public institutions, by 2-digit CIP code, for each year 2020–2024. Detrended enrollment is calculated as the difference between actual log enrollment and the log enrollment predicted by each program's pre-pandemic (2016–2019) linear trend. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Only CIP codes with at least 10 programs with positive enrollment are included. Students can be counted in multiple programs in the same academic year.
Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

Appendix Table A3
Estimated detrended enrollment, private 4-year.

		2020	2021	2022	2023	2024
1	Agriculture, Agriculture Operations, And Related Sciences	−0.09	−0.10	−0.13	−0.22	−0.31
3	Natural Resources And Conservation	−0.07	−0.06	−0.04	−0.06	−0.19
4	Architecture And Related Services	−0.03	−0.11	−0.22	−0.27	−0.33
5	Area, Ethnic, Cultural, Gender, And Group Studies	−0.04	−0.03	−0.04	−0.04	−0.12
9	Communication, Journalism, And Related Programs	−0.06	−0.06	−0.07	−0.11	−0.14

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Appendix Table A3 (*continued*)

		2020	2021	2022	2023	2024
10	Communications Technologies/Technicians And Support Services	−0.04	−0.01	0.05	0.02	−0.05
11	Computer And Information Sciences And Support Services	−0.11	−0.13	−0.14	−0.17	−0.30
12	Personal And Culinary Services	0.05	0.00	0.03	0.01	0.06
13	Education	−0.05	−0.05	−0.03	−0.08	−0.12
14	Engineering	−0.12	−0.11	−0.10	−0.18	−0.24
15	Engineering/Engineering-Related Technologies/Technicians	0.01	0.06	0.14	0.13	0.06
16	Foreign Languages, Literatures, And Linguistics	0.02	0.03	0.03	0.00	0.00
19	Family And Consumer Sciences/Human Sciences	−0.03	0.02	0.02	−0.12	−0.12
22	Legal Professions And Studies	−0.04	−0.05	−0.08	−0.06	−0.14
23	English Language And Literature/Letters	−0.07	−0.08	−0.07	−0.10	−0.16
24	Liberal Arts And Sciences, General Studies And Humanities	−0.17	−0.27	−0.40	−0.51	−0.60
25	Library Science	0.07	0.11	0.16	0.25	0.29
26	Biological And Biomedical Sciences	−0.11	−0.14	−0.15	−0.25	−0.35
27	Mathematics And Statistics	−0.07	−0.06	−0.09	−0.14	−0.22
29	Military Technologies And Applied Sciences	−0.29	−0.58	−0.33	−0.60	−0.64
31	Parks, Recreation, Leisure, Fitness, And Kinesiology	−0.10	−0.10	−0.10	−0.13	−0.21
32	Basic Skills And Developmental/Remedial Education	0.06	−0.68	−0.64	−0.60	−0.56
34	Health-Related Knowledge And Skills	0.06	−0.65	−0.99	−1.68	−1.62
35	Interpersonal And Social Skills	−0.38	−0.77	−1.15	−1.72	−2.10
36	Leisure And Recreational Activities	0.04	0.06	0.11	0.14	0.18
38	Philosophy And Religious Studies	−0.08	−0.12	−0.15	−0.18	−0.22
39	Theology And Religious Vocations	−0.01	−0.07	−0.09	−0.17	−0.18
40	Physical Sciences	−0.05	−0.07	−0.08	−0.17	−0.25
41	Science Technologies/Technicians	−0.00	0.06	−0.01	−0.23	−0.30
42	Psychology	−0.03	−0.01	0.03	−0.00	−0.06
43	Homeland Security, Law Enforcement, Firefighting And Related Protective Services	−0.06	−0.08	−0.11	−0.19	−0.31
44	Public Administration And Social Service Professions	−0.09	−0.12	−0.16	−0.24	−0.33
45	Social Sciences	−0.05	−0.05	−0.04	−0.11	−0.20
46	Construction Trades	−0.81	−0.08	−0.13	−0.19	−0.24
47	Mechanic And Repair Technologies/Technicians	0.19	0.12	0.43	0.17	−0.20
48	Precision Production	−0.09	−0.12	0.00	0.08	−0.07
49	Transportation And Materials Moving	0.14	0.21	0.31	0.38	0.49
50	Visual And Performing Arts	−0.04	−0.04	−0.03	−0.05	−0.09
51	Health Professions And Related Programs	−0.09	−0.10	−0.13	−0.21	−0.31
52	Business, Management, Marketing, And Related Support Services	−0.08	−0.10	−0.09	−0.14	−0.18
54	History	−0.04	−0.06	−0.08	−0.10	−0.21

Notes: Table reports the median from-trend deviation in total program enrollment of Title IV recipients at 4-year private institutions, by 2-digit CIP code, for each year 2020–2024. Detrended enrollment is calculated as the difference between actual log enrollment and the log enrollment predicted by each program's pre-pandemic (2016–2019) linear trend. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Only CIP codes with at least 10 programs with positive enrollment are included. Students can be counted in multiple programs in the same academic year.
Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

Appendix Table A4
Estimated detrended enrollment, for-profit.

		2020	2021	2022	2023	2024
1	Agriculture, Agriculture Operations, And Related Sciences	0.29	0.80	0.67	0.14	−0.52
3	Natural Resources And Conservation	0.22	0.30	0.49	0.67	0.75
9	Communication, Journalism, And Related Programs	0.10	0.12	0.19	0.11	0.14
10	Communications Technologies/Technicians And Support Services	0.33	0.38	0.46	0.52	0.48
11	Computer And Information Sciences And Support Services	0.14	0.19	0.27	0.35	0.42
12	Personal And Culinary Services	0.04	0.08	0.15	0.19	0.10
13	Education	0.16	0.20	0.32	0.31	0.37
14	Engineering	0.01	−0.01	0.00	0.02	0.00
15	Engineering/Engineering-Related Technologies/Technicians	0.19	0.30	0.37	0.53	0.56
19	Family And Consumer Sciences/Human Sciences	0.01	0.02	0.18	0.07	0.04
22	Legal Professions And Studies	0.22	0.32	0.45	0.56	0.79
23	English Language And Literature/Letters	0.04	−0.04	0.09	0.14	0.15
24	Liberal Arts And Sciences, General Studies And Humanities	0.21	0.19	0.04	0.35	0.33
26	Biological And Biomedical Sciences	0.11	0.35	0.44	0.62	0.72
31	Parks, Recreation, Leisure, Fitness, And Kinesiology	0.27	0.47	0.60	0.77	0.89
32	Basic Skills And Developmental/Remedial Education	0.32	0.44	0.57	0.69	0.59
34	Health-Related Knowledge And Skills	−0.08	0.08	0.24	0.39	0.55
36	Leisure And Recreational Activities	−0.26	−0.06	0.14	0.14	−1.61
42	Psychology	0.15	0.25	0.35	0.42	−0.23
43	Homeland Security, Law Enforcement, Firefighting And Related Protective Services	0.31	0.43	0.55	0.70	0.87
44	Public Administration And Social Service Professions	0.01	0.20	0.14	−0.13	0.08
45	Social Sciences	−0.02	−0.05	0.02	−0.06	−0.25
46	Construction Trades	−0.04	−0.06	−0.10	0.01	−0.05
47	Mechanic And Repair Technologies/Technicians	0.09	0.13	0.18	0.22	0.24
48	Precision Production	0.01	0.04	0.04	0.06	−0.01
49	Transportation And Materials Moving	−0.33	−0.33	−0.49	−0.55	−0.78
50	Visual And Performing Arts	0.14	0.24	0.33	0.44	0.56

(*continued on next page*)

Appendix Table A4 (*continued*)

		2020	2021	2022	2023	2024
51	Health Professions And Related Programs	0.11	0.18	0.21	0.25	0.22
52	Business, Management, Marketing, And Related Support Services	0.21	0.28	0.38	0.53	0.62
54	History	0.19	0.34	0.44	0.69	0.70

Notes: Table reports the median from-trend deviation in total program enrollment of Title IV recipients at for-profit institutions, by 2-digit CIP code, for each year 2020–2024. Detrended enrollment is calculated as the difference between actual log enrollment and the log enrollment predicted by each program's pre-pandemic (2016–2019) linear trend. Program is defined by the combination of 6-digit OPEID code, 4-digit CIP code, and credential level. Only CIP codes with at least 10 programs with positive enrollment are included. Students can be counted in multiple programs in the same academic year.
Source: Authors' analysis of data from the National Student Loan Data System (NSLDS).

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