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Christopher Jepsen
University College Dublin and IZA

Kenneth Troske
University of Kentucky and IZA

Peter Mueser
University of Missouri and IZA

Kyung-Seong Jeon
University of Missouri

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Estimates of Earnings Returns by Field of Study for For-Profit Schools and Community Colleges

This paper estimates labor-market returns for students pursuing certificates or associate's degrees in eight broad fields of study at community colleges and for-profit institutions. The data contain 400,000 students beginning their studies between 2005 and 2012 in one state. We estimate two-step models to address recent econometric concerns with two-way fixed effects models. Our analyses show important differences in return by field, with similar patterns for for-profit schools and community colleges. Apart from those studying in health fields, returns are generally greater for those attending for-profit schools than those attending community colleges. Higher estimated overall returns for for-profit schools are not primarily due to differences in areas of study.

JEL Classification: J24, I26

Keywords: postsecondary education, labor-market returns, for-profit schools

Corresponding author:
Christopher Jepsen
School of Economics
University College Dublin
Belfield, Dublin 4
Ireland

E-mail: christopher.jepsen@ucd.ie

1. Introduction

Between 2000 and 2010 enrollment in for-profit colleges increased by 350 percent, compared with an increase of 27 percent in two-year public schools (Snyder, de Brey and Dillow, 2019). This growth in for-profit schools led to concerns about the quality of education provided by these institutions. Consequently, a number of papers compared the returns to attending for-profit schools with the returns to attending public community colleges (Deming, Goldin, and Katz, 2012; Lang and Weinstein, 2013; Cellini and Chaudhary, 2014; Liu and Belfield, 2013, 2014; Cellini and Turner, 2019; Darolia et al., 2015; Deming et al., 2016; Jepsen et al., 2023). However, as the series of papers by Altonji and co-authors (Altonji, Blom and Meghir, 2012; Altonji, Arcidiacono and Maurel, 2016) demonstrates, estimates of the returns to school will be a function of both students' abilities and preferences, which in turn affect students' choice of field of study. In addition, schools can affect students' choices through the academic and career advice they provide to students as well as through course offerings. Thus, to compare returns from attendance in for-profit schools and community colleges, researchers need to control for possible differences in the ability of the students, as well as for differences in fields offered by the two types of schools and differences in the returns to a chosen field.

Results in our previous paper (Jepsen, et al., 2023) show that there are substantial differences in the chosen field of study between for-profit schools and community colleges. Among men seeking an associate's degree, in community college 70 percent are in the academic/other field, whereas in for-profit schools fewer than 5 percent are in this field. Similarly, among women seeking a certificate, in for-profit schools 76 percent are in the health field, whereas in community college 44 percent are in this field. Thus, one potential source of differences in the estimated return to attendance to the two types of schools could be differences

in the preferences of students over course of study accompanied by differences in the returns by field across the two school types. In this paper we use student-level panel data from Missouri to further explore differences in choice of field. We also use the methodology developed in our previous paper to estimate returns separately by field.

Our main findings are that, although choice of field does vary substantially across for-profit schools and community colleges, these differences are not a result of observed differences in characteristics of students in the two schools. Instead, they seem related to unobserved differences, possibly differences in preferences. We also find that returns to attendance differ by field and by school type, but the patterns are consistent—in six of the seven fields where offerings overlap, the returns to attending a for-profit school are as high or higher than the returns to attending a community college. The one exception is the health field where the returns are higher in community colleges than in for-profit schools. However, previous research suggests that health fields are often oversubscribed in community colleges (Grosz, 2020), so many students in for-profit schools may not be able to access the higher returns in health fields in community colleges. These results show that the often-higher returns to attending a for-profit school relative to attending a community college are not a function of differences in field.

2. Literature

In her review of 12 papers on labor-market outcomes for for-profit schools, Cellini (2022) reports a consistent pattern where students in for-profit colleges nearly always have lower earnings than students in public schools. Included in her review is the seminal paper in this literature, the analysis by Cellini and Turner (2019) of students who receive federal aid and pursue certificates in for-profit schools. In contrast, more recent work by Jepsen et al. (2023) finds that students in for-profit schools have similar, and, often, greater earnings returns than

students in public schools in Missouri, for attendance in both certificate and associate's degree programs. They note that there are substantial differences in the types of students and the fields of study for the two types of schools, but their analyses based on a matching model to control for these differences do not alter their conclusions.[1]

Little previous work looks at field of study in for-profit schools. Although Cellini and Turner (2019) do not estimate returns for students in for-profit schools by field, they do report that students in community colleges seeking certificates have higher earnings than for-profit students in seven of the ten top fields of study, with differences being economically and statistically significant, particularly for several health fields. Previous work using survey data has too few observations for for-profit students to obtain meaningful estimates of return by field of study.

Several papers estimate labor-market returns to community college by field of study. In their pioneering study of displaced workers in Washington state, Jacobson, LaLonde, and Sullivan (2005a, 2005b) find that the returns to credits are much higher for technically-oriented subjects compared to other subjects.

For associate's degrees, Jepsen, Troske, and Coomes (2014) and Stevens, Kurlaender, and Grosz (2019) document the highest returns for health-related fields, with Jaggars and Xu (2016) also reporting high returns in health fields. Looking at a more detailed breakdown of fields, Liu, Belfield, and Trimble (2015) and Dadgar and Trimble (2015) show that nursing has the highest returns, along with substantial returns for allied health fields. Vocational and academic associate's degrees also have substantial earnings gains in multiple studies (Jepsen,

[1] Jepsen et al. (2023) also show that the primary reason for the difference in results reported by these studies is due differences in model specification. Jepsen et al. (2023) reproduce the Cellini and Turner (2019) result when they estimate a model pooling the data for for-profit and community college students, but they find higher returns for for-profit schools when they estimate separate models for for-profit and community college students.

Troske, and Coomes, 2014; Jaggars and Xu, 2016; Liu, Belfield, and Trimble 2015; Dadgar and Trimble, 2015).

Similarly, among diplomas and long-certificates, Jepsen, Troske, and Coomes (2014) and Stevens, Kurlaender, and Grosz (2019) find the highest earnings gains for health-related fields, and Liu, Belfield, and Trimble (2015), Dadgar and Trimble (2015), and Xu and Trimble (2016) find the highest gains for nursing. Among short-term certificates, labor-market gains are much more modest, and no clear pattern emerges across studies in return by field. For example, Jepsen, Troske, and Coomes (2014) find modest earnings gains for men receiving vocational certificates and women receiving health certificates. In Dadgar and Trimble (2015), women have modest gains in construction, and business and marketing; men have large gains in protective services.

We contribute to this literature in multiple ways. We provide the first analysis by field of study for students pursuing associate's degrees in for-profit institutions. Whereas Cellini and Turner (2019) estimate only the difference in earnings between students in for-profit schools and community colleges, we report gains in earnings separately for each school type. Our results provide a more meaningful answer to the question of how students in different fields fare, allowing us to compare the experiences in for-profit schools and community colleges. To what degree are student labor-market outcomes related to the fields they choose? Are there clear differences in the return within field by school sector? Because we estimate the effect of the treatment on the treated, we provide the best quantitative picture of the experience of the average student enrolling in a given field in a given type of school.

3. Data

We use administrative data on enrollment and earnings for students who entered for-profit post-secondary schools or public community colleges located in Missouri from January

2005 to December 2015. Missouri's Proprietary School Certification Program requires for-profit schools with a physical presence in the state to provide student-level data. These for-profit institutions include campuses of national institutions such as Strayer University as well as local institutions providing one or two subjects such as truck driving academies.[2] In total, our analysis includes 151 for-profit schools in the state. The Enhanced Missouri Student Achievement Study (EMSAS) contains student-level data for the state's 14 public community colleges.

Our unit of analysis is a spell of enrollment, where a spell is a period of participation in either a for-profit school or a community college. Given that students often take short breaks from enrollment, usually over the summer, our definition of a spell allows for periods of non-enrollment of less than a year within a spell.[3] The sample is limited to spells for students who specify that they are seeking certificates or associate's degrees. Nearly a third of spells in community colleges are omitted because the degree sought is "other", often for students who plan to transfer to a four-year school;[4] among for-profit schools, 13 percent of spells are omitted for student who were seeking other degrees, typically bachelor's or master's degrees. We exclude students who attend both for-profit schools and community colleges during the period of our study. Consistent with recent studies of community colleges, we exclude spells where students attend a public four-year educational institution in the state anytime between the beginning of a spell and two years following the end of the last period of enrollment. Finally, we omit approximately 16 percent of for-profit student spells and 2.2 percent of public college spells because they indicate at the time of enrollment that they are not permanent residents of Missouri

[2] Although the program criteria would appear to include nonprofit private schools, almost all are exempted in practice. For a discussion of the program's requirements, see http://dhe.mo.gov/psc/.
[3] Spells identify the semesters of attendance: winter/spring, summer, and fall. For details of spell construction and variable definitions, see Jepsen et al. (2023).
[4] Less than 10 percent of spells are omitted because students attend four-year schools.

or Kansas, the states for which we have administrative earnings data.[5]

Both the community college and for-profit data use the Classification of Instructional Programs (CIP) code to identify the field of study at the beginning of the spell. The data also contain the specific school attended and the degree sought. Among award recipients, we have the type of degree or certificate received and the field.

Using Social Security number, we matched the educational data with administrative data on quarterly earnings from the Missouri and Kansas Unemployment Insurance (UI) programs.[6] We have adjusted all earnings for inflation, with 2010 as the base year. Despite excluding some types of earnings such as self-employment and federal jobs, Kornfeld and Bloom (1999) and Wallace and Haveman (2007) document similar program effects of worker training programs and welfare programs, respectively, between wage record data and survey data.

The earnings data cover the first quarter of 1999 through the third quarter of 2014. Because our earnings analysis focuses on spells that began in 2005 through 2012, we have data for over five years prior to school attendance and at least seven quarters after initial enrollment in a for-profit school or community college. The analysis data set is a panel of student entries and time periods. We exclude quarters where the individual is under the age of 18 or over the age of 60 at any time during the quarter, as well as all observations from individuals with missing age or Social Security number.[7] We also exclude any quarter of earnings more than 24 quarters prior to program entry or more than 25 quarters after program entry.

[5] We keep students who do not specify a state of permanent residence (primarily community college students) because we find that the proportion of these students who have earnings reported in our UI wage record data is similar to that of students who report living in Missouri or Kansas.
[6] Although the St. Louis metropolitan area is on the border with Illinois, the proportion of Missouri residents who work in Illinois is small. Within the metropolitan area, only 16 percent of private sector jobs were in Illinois in 2012 (www.bls.gov/news.release/cewqtr.toc.htm), and these jobs were mostly held by Illinois residents.
[7] The number of observations omitted due to missing data or being outside the 18 to 60 age range is modest.

Although we study individuals attending for-profit schools and community colleges in Missouri, the industrial structure in Missouri is typical of U.S. states. Missouri earnings and wages are about 10 percent below the U.S. average. The proportion Hispanic is in line with most states even though it is below the U.S. average. Given the similarity between Missouri and many states across multiple dimensions, our results are plausible estimates for many parts of the country.

4. Descriptive Comparisons

Our analyses focus on students seeking certificates and associate's degrees. General information on the sample characteristics is provided in Table 1. We see substantial differences in demographic characteristics by type of degree sought and type of school. Perhaps the biggest difference is in race, where for-profit schools are disproportionately attended by Black students. Those seeking certificates are generally older, and those attending for-profit schools are older. We see that community college students are generally more likely to be from nonmetro areas.

Length of time in school differs as well. Certificates can require as little as a month of full-time study, and seldom take more than a year to complete, whereas an associate's degree is generally designed to require two years of full-time study (omitting summers). Our data show that the average spell for a student seeking a certificate is 3.2 semesters, whereas students seeking associate's degrees attend for 4.1 semesters on average.[8]

Field of study and gender also differ dramatically across this credential dimension. Table 2 provides the distribution of individual spells by field of study, type of credential, gender, and for-profit school versus community college. Before we turn to an examination of fields, it is worth noting that three-quarters of those seeking certificates are attending for-profit schools. In

[8] The counts are based on number of semesters spanned in a spell. Recall, spells include any nonenrollment periods of less than a year.

contrast, 87 percent of students seeking associate's degrees are attending community colleges. The numbers of associate's degrees for the two types of schools are strongly skewed by the large proportion of community college students listed as seeking degrees in academic or other fields. Looking at all credentials, 97 percent of students who list their chosen field as academic/other are community college students seeking associate's degrees. Further disaggregation of this field is not possible because over 95 percent of students pursuing academic associate's degrees are in the single category "liberal arts", with no subcategories.

Table 3 provides the distribution across fields in percentages. The academic/other field is presented as a percentage of the total number, whereas other field percentages omit academic/other. After the academic/other field, health is clearly the most important field overall, with nearly 38 percent of remaining cases specifying that field (rightmost column). Health is popular among women seeking certificates (in both for-profit schools and community colleges) and among women seeking associate's degrees in for-profit schools. Our second observation is that health is appreciably more important for women attending for-profit schools than for women attending community colleges. Women in community colleges are more likely to be in the "vocational" field than those in for-profit schools. These differences are apparent for both those seeking certificates and those seeking associate's degrees.

For men, the differences in the distribution of field of study do not generalize across credential type. Among men seeking certificates, transport and trades are more popular in for-profit schools, whereas engineering and vocational areas are more popular in community colleges. Among men seeking associate's degrees, computers, engineering, and health are larger in for-profit schools, whereas trades and vocational fields are more important in community colleges.

Table 4 shows that differences in the distribution of detailed subfields within broad fields are generally modest. The most popular subfields within each broader field are generally the same for the two types of schools within gender and credential type. One important difference is in the vocational classification. Among community college students, most students in vocational fields specify education as their field, whereas very few make this choice in for-profit schools.[9] Similarly, we also find that males seeking certificates in community colleges are much more likely to specify the security subfield than those in for-profit schools. Conversely, those in for-profit schools within the vocational classification are more likely to indicate services as their field of study than those in community colleges. This heterogeneity in subfield suggests that comparisons between school type for students within the vocational classification are less meaningful than for the other broad field classifications.

How important are differences in the kinds of individuals who select fields? Table 5 provides information on student characteristics by field. Racial differences are among the most pronounced across field, especially among those seeking certificates. The largest proportions Black are in health and trades, at about 34 percent. In contrast, fewer than 15 percent of the students in the academic/other category or in engineering are Black, and only about 18 percent in transport are Black. The average age varies from 28 years of age among those in the academic/other category, up to 37 in transport. The most dramatic outlier by field among certificate seekers is the proportion from major metropolitan areas in trades, for which only 18 percent are from major metropolitan areas, compared to proportions that range from 52 percent to 72 percent in the other fields.

[9] We suspect that some students who are hoping to ultimately obtain a state "teaching certificate" (only available to students with four-year degrees) may specify that they are seeking a certificate. We do not know how common this error is.

For students seeking associate's degrees, we observe smaller differences in characteristics by field, although the differences at least partly correspond with those for students seeking certificates. For example, as is the case for certificates, we note that Blacks are less likely to study in trades, with a share of only 8 percent, with the proportion in other fields ranging from 13 percent to 18 percent. We also looked to see if the patterns were similar by field within gender and school type. Although levels were often very different, basic patterns for men and women were similar.

There are substantial differences in the characteristics of students in for-profit schools and community colleges, which are presented in Table 6.[10] For each gender-credential group, we see that Blacks are substantially overrepresented in for-profit schools. For example, nearly 30 percent of men seeking certificates in for-profit schools are Black, compared to only 9 percent in community colleges; for women, the differential is 37 percent compared to 10 percent. As a result, the vast majority of Blacks seeking certificates are in for-profit schools. For men seeking certificates, we see that for-profit students are, on average, more than four years older than community college students. The difference is somewhat smaller for men seeking associate's degrees. In contrast, community colleges have an overrepresentation of students from small metropolitan areas for all groups.

Given the large difference in the distribution of fields between for-profit schools and community colleges, it is natural to ask to what degree the differences in characteristics are due to the field distribution. Table 6 provides a column indicating the difference in characteristics that can be traced to the differences within field; remaining differences are due to differences in

[10] The overall means for the characteristics are presented in Table 1.

the distribution of fields.[11] We find that, for almost all characteristics where differences are substantial, they are similar within field; hence, the field distribution does *not* explain most of the observed differences. For example, looking at the 4.2-year difference in age between for-profit and community college men seeking certificates, we see that the average difference within field is 3.6 years, implying that only about one-eighth of the age difference is due to differences in the distribution of field of study. The one exception is the gap in age between for-profits and community colleges for men seeking associate's degrees. We see that, of the nearly three-year difference in age, only about one year is within field, so that about two-thirds is explained by the field distribution. In this case, the lower average age for community college students is largely explained by the greater proportion of such students in the academic/other field. More than two-thirds of community college students are in this category, as compared with only 5 percent of for-profit students, and the average age in that field is at least two years younger than the average for the other categories combined.

In conclusion, we observe that the choice of field of study varies by gender, credential, and school type. Differences in field by gender are as expected, with women overrepresented in health and men in computers, engineering, trades, and transport. The most important difference in choice of field between students in for-profit schools and community colleges is that many more students in community colleges (especially among those seeking associate's degrees) choose the academic/other field of study—with almost all selecting liberal arts—whereas very few for-profit students choose this field. Although choice of field differs between students in for-

[11] The reported within-field difference is the mean difference across fields, weighted by the average proportion (for for-profits and community colleges) in a given field. In terms of the Oaxaca-Blinder decomposition, the reported measure is the first term on the right side of the following expression: $M_F - M_C = \sum_i \left(\frac{1}{2}\right)(P_{Fi} + P_{Ci})(M_{Fi} - M_{Ci}) + \sum_i \left(\frac{1}{2}\right)(M_{Fi} + M_{Ci})(P_{Fi} - P_{Ci})$, where M_S, M_{Si}, and P_{Si} are the overall mean for each school type, the means within school type and field, and the proportion in a field for a given school type, respectively, with $S = F, C$ indicating school type (for-profit or community college) and i indicating field.

profit schools and community colleges, these differences do not explain observed differences in characteristics (most importantly, differences in race and age) between these types of schools.

5. Methods

In estimating labor-market returns, we use a student fixed effects model to compare the post-schooling earnings of an individual with the pre-schooling earnings of the same individual. The average age at school entry is between 24.8 and 32.7 for the groups presented in Table 1, with most students age 20 or older. Thus, the pre-schooling earnings of students are a plausible counterfactual for earnings in the absence of enrolling in education. Person fixed-effects models are common in papers using administrative data to study labor-market returns to certificates and associate's degrees (Cellini and Turner, 2019; Cellini and Chaudhary, 2014; Jepsen, Troske and Coomes, 2014, Belfield and Bailey, 2017).

Several recent papers document limitations and biases in "standard" fixed-effects models. In response, we estimate the two-step model used in Borusyak, Jaravel, and Spiess (2021).[12] We fit the model separately by gender, type of school (for-profit versus community college), program (certificate versus associate's degree), and field, yielding 60 sets of estimates (associate's degrees in transit are not offered). Although the fixed-effects model adjusts for time-invariant individual differences, researchers also include controls for calendar quarter and age to predict the earnings that an individual would have obtained in the period following enrollment if he or she had not enrolled.[13]

The model is estimated in multiple steps. First, we estimate parameters using log earnings for all time periods from 5 to 24 quarters prior to enrollment. We include all individuals who

[12] The only difference between our model and the one they specify is that our first stage estimates are based on a slightly different sample than our final stage estimates, whereas Borusyak, Jaravel, and Spiess (2021) assume the two samples are the same.

[13] All time-invariant personal characteristics as well as field of study are captured in person fixed effects.

began participation over the period 2005 through 2015. The fixed-effects model fits the following multivariate regression:

(1) $$LNEARN_{it} = \delta \cdot AGE_{it} + \eta_i + \tau_t + \varepsilon_{it}.$$

The unit of analysis is earnings in quarter-year *t* for individual *i*. *LNEARN* is the natural logarithm of total reported UI earnings across all jobs for the quarter. Quarters with no reported UI earnings are excluded. *AGE* is the individual's age in years, represented by a third-order polynomial. The model also contains person fixed effects (η) and calendar quarter-year fixed effects (τ). The last element (ε) is the error term.

Using the estimates from equation (1), we construct counterfactual earnings for quarters beginning four quarters prior to the enrollment. For an individual *i*, we specify:[14]

(2) $$\widehat{LNEARN}_{it} = \hat{\delta} \cdot AGE_{it} + \hat{\eta}_i + \hat{\tau}_t.$$

In the final step, we fit the following equation for the cohorts entering between 2005 and 2012:

(3) $$LNEARN_{it} - \widehat{LNEARN}_{it} = \alpha \cdot ENROLL_{it} + \beta \cdot ENTRY_{it} + \varepsilon_{it}.$$

ENROLL is a variable equal to one-half for the first quarter and last quarter of school enrollment and a value of one for each quarter in between.[15] We assign a value of one-half for the entry and exit quarter because the school entry and exit dates likely do not align perfectly with the calendar quarter.

The input of interest is the vector *ENTRY*, a set of dichotomous variables for each quarter of entry from four quarters prior to the date of entry through quarter 25 after entry. The variables

[14] Because we estimate the model in (1) on earnings five or more quarters prior to program entry, and the latest entry date available is at the end of 2015, the most recent earnings available are for quarter 3 in 2014. Our approach avoids the potential bias in estimating time and age effects that can occur in single-equation, fixed-effects models as described in de Chaisemartin and D'Haultfoeuille (2020), Borusyak, Jaravel, and Spiess (2021), and elsewhere.

[15] For approximately 18 percent of for-profit students, the exit date is missing. For these students, we assign an exit date that is 365 days after the entry date. We considered alternative models that omitted those with missing exit dates and fitted models with alternative parameterizations for enrollment but found that none of our substantive conclusions was altered.

for the four quarters before enrollment are included to capture any anticipation effects or pre-entry dips in enrollment (as noted in Ashenfelter, 1978). The set of quarters more than four quarters before enrollment serve as the reference period. Thus, the coefficient for each quarter represents the difference in earnings for the specified quarter relative to quarters more than one year before school entry, controlling for age, calendar quarter effects, and person fixed effects.

Because we exclude observations more than 24 quarters before program entry and more than 25 quarters after program entry, we have up to 50 quarters of earnings observations per person. We look at spells of attendance rather than degree completion to avoid endogeneity concerns associated with non-random completion (Cellini and Chaudhary, 2014; Cellini and Turner, 2019).

One advantage of modeling attendance as a series of quarterly variables is that this approach does not specify any parametric relationship between earnings and the time since enrollment. We do not pool the data by gender, school type, or program type because in our previous paper we find that the restrictions imposed by pooling the data produce substantially different results, implying that our more flexible specification is appropriate. We initially estimated (1) separately for each of the 60 subgroups, but we found that, for the smaller subfields, estimates were often implausibly large or less than zero. We discovered that if we fit (1) for each of the eight subgroups defined by gender, credential, school type, pooling together different fields of study, but continued to fit (2) and (3) for the 60 subgroups, we observed that smaller fields displayed far fewer estimates outside plausible ranges, whereas estimates for larger groups were essentially unchanged. We therefore present these results.

Because the sample includes only individuals who attended for-profit schools or community colleges, identification of the post-attendance parameters relies on a parallel trends

assumption, namely that the patterns of schooling returns are similar for individually initially enrolling at different ages and in different periods. Under these "parallel trends" assumptions, Borusyak, Jaravel, and Spiess (2021) show that this multi-step estimator is efficient, even when all observations are eventually treated.[16]

We have estimated standard errors using a bootstrap approach, sampling (with replacement) from the population of individuals and performing the full estimation procedure for each replication. Our standard error for a coefficient is the standard deviation of the coefficient estimate across 1000 replications. Given the large number of parameters we estimate, we have suppressed standard errors and confidence interval in our presentation. The appendix provides tables that present underlying estimates and standard errors.

6. Return by Field of Study

We have calculated returns by gender, degree type, and type of school, generating eight returns for each of up to eight areas of study, a total of 60 estimates. Rather than presenting all 60 estimates separately, Figure 1 provides a return profile for each field of study, combining estimates for the eight groups, where the return presented for each field is the average of the eight estimates, weighted by the number of student spells in each.[17] For all areas, there is a decline in earnings prior to the quarter of enrollment, reaching a minimum in the first or second quarter following enrollment. The decline is smallest for those in the academic/other field, where the decline is only about 8 percent in the second quarter after entry. In contrast, those in transport experience a decline in earnings of over 45 percent in the quarter after entering training. Students

[16] In our earlier paper (Jepsen et al., 2023), we show that the test for parallel trends in Borusyak, Jaravel, and Spiess (2021) fails in about half the specifications. However, the results from a random effects model are nearly identical, and the coefficient for a differential time trend for the period prior to enrollment — identifying the violation of the parallel trends assumption — is trivial in magnitude.

[17] Mean estimates used in Figure 1 are presented in Appendix Table A1, along with bootstrap standard errors.

in trades and health have somewhat longer and deeper declines in earnings through the third and fourth quarters after entry, with declines approaching 0.3 log points for several quarters.

For all fields, earnings increments increase after the dip but remain below their expected levels for up to five quarters after entry. Although fields generally show increases in relative earnings through quarter 25 (the last quarter in our data), increases tend to slow in later years. Return estimates in the fifth and sixth years after entry (quarters 17-24) imply that earnings increments associated with the eight field categories vary from about 0.14 log points to 0.27 log points. Although there is substantial overlap, returns for health and computers are generally higher than the others; business and trades are lower.

Next, we calculate separate return profiles for for-profit schools and community colleges. Figure 2 presents the mean return across subgroups for quarters 17-20 (the fifth year) after initial enrollment by field, weighted by the number spells of participation.[18] We have ordered the fields by approximate size of return. Below the return, we present the number of students in a given field for for-profits and community colleges. Looking at the for-profit schools, the lowest return is in trades, which produces an increase in earnings of 0.16 log points, although the return for the vocational fields is similar (0.18 log points). The highest return for for-profit schools is in the academic/other category (an increment of 0.26 log points), but only 2,000 students are in that category, very small compared to the over 200,000 students pursuing these fields in community colleges. Computers and engineering have similar returns in for-profit schools, with log increments of 0.25 and 0.23, respectively.

The variation in returns across field in community colleges is somewhat greater, with business displaying the lowest return (0.09 log points) and health the highest (0.28 log points).

[18] Appendix Tables A2-A6 provide the estimates underlying Figures 2-6, along with bootstrap standard errors.

Figure 2 clearly illustrates the importance of field for community college students, in that low return fields have substantial numbers of students in them. In fact, if we omit transport (with a trivial number of community college students), no field except for computers and health provides a return of over 0.16 log points.[19] For-profit returns vary substantially, but all except for trades have returns over 0.17 log points.

In comparisons between for-profit schools and community colleges, we observe that returns are higher in the for-profit sector in six of the eight categories. In health, the return for community college students is 0.281 log points versus 0.222 log points for for-profit students, a difference that is borderline significant at conventional levels (see Appendix Table A2). For the other areas, omitting academic/other, which has a very small number of for-profit students, and transport, which has a trivial number of community college students, the increment in favor of for-profit students varies from 0.034 log points for trades, to 0.081 log points for engineering. All but one of these differences is statistically significant.

A natural question is the extent to which observed differences in the graph above reflect differences between men and women or differences between those seeking certificates versus associate's degrees. Figures 3 through 6 contain the average return in quarters 17 to 20 – the fifth year – after enrolling, distinguishing by gender and degree sought. Fields with fewer than 300 students are denoted by points that are "hollow" rather than filled, such as the 57 women pursuing transport certificates in community colleges.

In the community college literature, the returns are highest in health, especially for associate's degree recipients (see Jepsen, Troske, and Coomes, 2014; Stevens, Kurlaender, and Grosz, 2019; and others). This finding is confirmed in our data for each subgroup, as we find that

[19] There are only 612 students in community college in transport while there are 10,355 students in for-profit students in the transport field.

the highest returns for both men and women seeking associate's degrees in community colleges are in health (see Figures 5 and 6). Health also provides the highest returns for men seeking associate's degrees in for-profit schools. For women seeking associate's degrees in for-profit schools, the two fields with returns higher than those in health—trades and engineering—have fewer than 400 students combined, compared with over 13,000 in health.

When looking at certificates, our results mimic the findings noted elsewhere in the literature of substantial variation in return by field of study. Among men in community colleges, those in business, vocational subjects, and health have the largest returns (Figure 3). Returns by field for men in for-profit schools tend to vary somewhat less, aside from a high return for the few students pursuing academic certificates. For women, ignoring fields of study with fewer than 300 students, the for-profit return is greater by 0.03 to 0.17, with the exception of health, where the community college return is greater by 0.06 (see Figure 4).

Looking across all the figures, of 25 comparisons where the number of cases is sufficient, in 16 comparisons for-profit returns are higher, in four community college returns are higher, and in five they are virtually the same. The bottom line is that the higher returns of for-profit schools observed in Figure 2 are not a result of providing a different mix of students by gender or type of credential, although those differences are substantial.

7. Discussion and Conclusion

These analyses highlight the importance of field of study in understanding the decisions facing students seeking post-secondary training below a bachelor's degree. For those seeking certificates, about three-quarters attend for-profit schools, and there are differences by field. Looking at men, we see that transport (truck driving) and trades are much more common in for-profit schools, and engineering and vocational fields more common for community colleges.

Notably, health is the dominant field for women in both for-profit schools and community colleges, but the focus on health certificates is greater in for-profit schools, with more than three-quarters of women who seek certificates in for-profit schools choosing health.

Looking at students seeking associate's degrees, we see that over 85 percent of students attend community colleges. The most important difference in field choice between for-profit schools and community colleges is that over two-thirds of students (both men and women) in community colleges choose the academic field—almost all of them studying liberal arts—in contrast to only five percent of students in for-profit schools. Even omitting this field, about two-thirds of students seeking associate's degrees enroll in community colleges.

Although differences across fields are clearly important, they explain little of the observed differences in return between for-profit schools and community colleges. Students in community college who pursue the academic option do not appear to suffer in the labor market relative to students in most other fields. In most fields, returns are lower in community colleges than in for-profit schools. Our estimates suggest that in five of the six general fields with substantial numbers of students in both school types, returns are as high or higher for students attending for-profit schools.

The exception is that returns in health fields for community college students are both higher than those in other fields and higher than the returns of students in for-profit health programs. This finding squares with the observation that health programs in public schools are commonly oversubscribed, and admission is often rationed (Grosz, 2020). As a result, the high returns we find for health fields in community colleges are likely not available to all students. In contrast, although returns are lower in for-profit schools, health credentials appear to be widely

available, especially at the certificate level. These data provide support for the claim that for-profit schools offer students opportunities that they may not be able to access at public schools.

Given that our estimates attempt to identify returns of those who participate in a particular field within a particular school type, the returns provide a direct answer to the question of whether students are benefiting from their training choices. For essentially all subgroups we are studying, our answer is "yes." Although returns are clearly higher in some fields than others, it is not obvious that students would always be able to switch to the field of study with the greatest returns. In addition to rationing, idiosyncratic preferences and abilities are important determinants of choice. On the other hand, our results suggest that, for those students who are able to choose between alternative fields, differences in pecuniary returns are likely to be significant and may well be decisive.

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Table 1: Descriptive Statistics by Gender and Program Type

	For-Profit				Community College			
	Men		Women		Men		Women	
	Certificate	Associate's	Certificate	Associate's	Certificate	Associate's	Certificate	Associate's
Variable	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
Demographics and Schooling Information								
White	0.642	0.601	0.544	0.626	0.764	0.697	0.768	0.673
Black	0.279	0.263	0.374	0.281	0.090	0.141	0.100	0.179
Other/missing race	0.079	0.136	0.082	0.093	0.146	0.163	0.132	0.148
Age at time of entry	32.7	27.6	29.5	28.1	28.5	24.8	28.9	26.8
	(10.7)	(8.3)	(10.0)	(8.8)	(10.5)	(8.4)	(10.5)	(9.6)
Less than high school	0.063	0.013	0.067	0.021	0.002	0.003	0.003	0.004
High school	0.718	0.775	0.766	0.806	0.727	0.799	0.802	0.812
GED	0.199	0.205	0.154	0.164	0.043	0.050	0.051	0.056
Missing education	0.020	0.008	0.014	0.010	0.229	0.148	0.145	0.128
Major urban	0.496	0.802	0.667	0.735	0.522	0.626	0.406	0.651
Small metro	0.141	0.127	0.163	0.161	0.282	0.187	0.309	0.147
Nonmetro	0.357	0.071	0.170	0.104	0.196	0.187	0.285	0.202
Missing metro	0.006	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Schooling Information								
Semesters Spanned	2.67	4.19	3.15	4.07	3.14	3.87	4.36	4.35
Completed certificate	0.630	0.012	0.525	0.024	0.196	0.011	0.097	0.010
Completed associate's	0.007	0.416	0.013	0.470	0.041	0.099	0.089	0.123
No certificate or degree	0.363	0.572	0.462	0.506	0.764	0.891	0.814	0.867
Number of entries	32,117	12,979	39,830	21,115	9,789	113,259	14,371	153,533

Note: The standard deviation for age is in parentheses.

Table 2: Distribution of Enrollment by Field, Gender, Credential, and For-Profit School/Community College

	Certificates				Associate's Degrees				
	Males		Females		Males		Females		
Field	For-Profit	Community College	For-Profit	Community College	For-Profit	Community College	For-Profit	Community College	Total
Academic/Other	266	1,059	357	3,044	631	77,937	1,080	120,089	204,463
Business	1,266	632	2,754	1,232	1,285	4,326	2,506	8,796	22,797
Computers	1,402	615	587	307	3,675	5,654	985	1,959	15,184
Engineering	1,872	1,578	274	160	3,128	7,397	359	956	15,724
Health	4,950	1,555	30,404	6,289	2,340	2,715	13,413	10,670	72,336
Trades	9,968	1,480	482	76	430	6,459	33	410	19,338
Transport	9,432	612	923	57	0	6	0	0	11,030
Vocational	2,961	2,258	4,049	3,206	1,490	8,765	2,739	10,653	36,121
Total	32,117	9,789	39,830	14,371	12,979	113,259	21,115	153,533	396,993

Table 3: Distribution of Enrollment for Field, by Gender, Type of Degree Sought, and For-Profit School/Community College: Percent

	Certificates				Associate's Degrees				
	Males		Females		Males		Females		
Field	For-Profit	Community College	For-Profit	Community College	For-Profit	Community College	For-Profit	Community College	Overall
Academic/Other	*0.8*	*10.8*	*0.9*	*21.2*	*4.9*	*68.8*	*5.1*	*78.2*	*51.5*
Omitting Academic/Other									
Business	4.0	7.2	7.0	10.9	10.4	12.2	12.5	26.3	11.8
Computers	4.4	7.0	1.5	2.7	29.8	16.0	4.9	5.9	7.9
Engineering	5.9	18.1	0.7	1.4	25.3	20.9	1.8	2.9	8.2
Health	15.5	17.8	77.0	55.5	19.0	7.7	66.9	31.9	37.6
Trades	31.3	17.0	1.2	0.7	3.5	18.3	0.2	1.2	10.0
Transport	29.6	7.0	2.3	0.5	0.0	0.0	0.0	0.0	5.7
Vocational	9.3	25.9	10.3	28.3	12.1	24.8	13.7	31.9	18.8
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 4: Distribution of Enrollment by Two-Digit CIP Code, by Gender, Type of Degree Sought, and For-Profit School/Community College

			Certificates				Associate's Degrees			
			For-Profits	Community College	For-Profits	Community College	For-Profits	Community College	For-Profits	Community College
Field	CIP		Men	Men	Women	Women	Men	Men	Women	Women
			Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Academic or Other	26	Biological Sciences	0.0	0.1	0.0	0.2	0.0	0.3	0.0	0.3
	19	Family Sciences	0.0	0.2	0.1	3.7	0.0	0.2	0.0	3.6
	16	Foreign Languages	0.0	0.2	0.0	0.6	0.0	0.0	0.0	0.1
	24	Liberal Arts	0.0	7.3	0.1	13.4	1.1	66.3	3.8	72.4
	50	Performing Arts	0.3	1.8	0.4	1.6	3.8	1.1	1.3	0.9
		Other academic fields	0.4	1.3	0.3	1.6	0.0	1.0	0.0	1.0
		Missing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Business	52	Business	3.4	6.4	6.7	8.6	9.9	3.7	11.9	5.7
	09	Journalism	0.5	0.0	0.2	0.0	0.0	0.1	0.0	0.1
Computers	10	Communications	0.1	0.7	0.1	0.4	1.0	0.7	0.1	0.4
	11	Computer Sciences	4.3	5.5	1.4	1.7	27.3	4.3	4.6	0.9
Engineering	14	Engineering	0.0	0.4	0.0	0.0	0.3	2.1	0.0	0.2
	15	Engineering Tech	5.8	15.7	0.7	1.1	23.8	4.4	1.7	0.4
Health	34	Health-Related Skills	0.2	0.0	0.1	0.0	0.2	0.0	0.1	0.0
	51	Health Professions	15.2	15.9	76.2	43.8	17.8	2.4	63.5	6.9
Trades	46	Construction Trades	5.0	2.3	0.2	0.2	0.8	0.7	0.0	0.0
	47	Mechanic	20.4	8.1	0.9	0.2	2.3	4.0	0.1	0.2
	48	Precision Production	5.6	4.7	0.1	0.1	0.3	1.0	0.0	0.1
Transport	49	Transportation	29.4	6.3	2.3	0.4	0.0	0.0	0.0	0.0

Table 4 (Continued): Distribution of Enrollment by Two-Digit CIP Code, by Gender, Type of Degree Sought, and For-Profit School/Community College

			Certificates				Associate's Degrees			
			For-Profits	Community College	For-Profits	Community College	For-Profits	Community College	For-Profits	Community College
Field	CIP		Men	Men	Women	Women	Men	Men	Women	Women
			Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Vocational	01	Agriculture	0.8	1.1	0.5	0.8	0.0	0.8	0.0	0.3
	04	Architecture	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
	13	Education	0.8	9.0	1.1	15.9	0.0	1.2	0.0	2.8
	22	Legal Studies	0.1	0.5	0.4	2.0	1.4	0.1	4.7	0.7
	36	Leisure Studies	0.4	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	03	Natural Resources	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	31	Parks and Recreation	0.4	0.0	0.1	0.0	1.4	0.0	0.3	0.0
	12	Services	6.8	1.1	7.9	1.5	2.5	1.1	2.2	0.8
	44	Public Administration	0.0	0.3	0.0	0.4	0.0	0.2	0.0	0.8
	41	Science Tech	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.1
	43	Security	0.0	10.9	0.0	1.5	6.2	4.0	5.8	1.4

NOTES: The ‘other academic fields’ category includes CIP codes: 5 (Ethnic and Gender Studies), 23 (English), 27 (Mathematics), 30 (Interdisciplinary Studies), 32 (Basic Skills), 37 (Personal Awareness), 38 (Philosophy), 39 (Theology), 40 (Physical Sciences), 42 (Psychology), 45 (Social Studies), 53 (High School Diplomas and Certificates), and 54 (History).

Table 5: Characteristics of Students by Field and Credential

	Students Seeking Certificates							
	Academic/ Other	Business	Computers	Engineering	Health	Trades	Transport	Vocational
White	0.700	0.613	0.662	0.753	0.571	0.599	0.729	0.734
Black	0.146	0.288	0.244	0.106	0.335	0.338	0.178	0.177
Other/missing race	0.154	0.100	0.095	0.142	0.094	0.063	0.093	0.089
Age at time of entry	27.992	33.038	33.543	33.892	28.774	29.536	37.065	28.347
Less than high school	0.021	0.060	0.013	0.011	0.056	0.013	0.140	0.009
High school	0.792	0.758	0.751	0.740	0.773	0.704	0.622	0.821
GED	0.056	0.109	0.144	0.118	0.132	0.245	0.173	0.105
Missing education	0.132	0.074	0.091	0.131	0.039	0.037	0.066	0.065
Major urban	0.580	0.719	0.527	0.608	0.638	0.181	0.523	0.567
Small metro	0.170	0.127	0.096	0.232	0.225	0.071	0.360	0.074
Nonmetro	0.250	0.154	0.377	0.160	0.137	0.748	0.098	0.359
Missing metro	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000
Number of entries	4,726	5,884	2,911	3,884	43,198	12,006	11,024	12,474
	Students Seeking Associate's Degrees							
	Academic/ Other	Business	Computers	Engineering	Health	Trades	Transport	Vocational
White	0.653	0.704	0.725	0.716	0.733	0.820	1.000	0.682
Black	0.184	0.178	0.133	0.144	0.165	0.081	0.000	0.182
Other/missing race	0.163	0.118	0.142	0.141	0.102	0.099	0.000	0.136
Age at time of entry	25.452	29.006	27.729	26.741	28.282	25.009	22.341	26.967
Less than high school	0.003	0.010	0.009	0.002	0.010	0.002	0.000	0.007
High school	0.804	0.778	0.797	0.805	0.829	0.806	0.833	0.812
GED	0.052	0.106	0.111	0.095	0.109	0.085	0.167	0.083
Missing education	0.141	0.107	0.083	0.098	0.052	0.108	0.000	0.098
Major urban	0.692	0.462	0.579	0.729	0.590	0.332	0.000	0.644
Small metro	0.117	0.262	0.273	0.184	0.263	0.434	1.000	0.199
Nonmetro	0.191	0.276	0.148	0.087	0.147	0.233	0.000	0.157
Missing metro	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of entries	199,737	16,913	12,273	11,840	29,138	7,332	6	23,647

Table 6: Differences in Characteristics of Students in For-Profit Schools and Community Colleges with Decomposition by Field of Study

	Students Seeking Certificates				Students Seeking Associate's Degrees			
	Men		Women		Men		Women	
Variable	Mean Difference For-Profit-Community College	Mean Difference within Field	Mean Difference For-Profit-Community College	Mean Difference within Field	Mean Difference For-Profit-Community College	Mean Difference within Field	Mean Difference For-Profit-Community College	Mean Difference within Field
White	-0.122	-0.142	-0.224	-0.207	-0.096	-0.139	-0.047	-0.100
Black	0.189	0.190	0.274	0.254	0.122	0.147	0.102	0.133
Other/missing race	-0.067	-0.048	-0.050	-0.048	-0.027	-0.008	-0.055	-0.033
Age at time of entry	4.200	3.642	0.600	0.345	2.800	1.064	1.300	0.344
Less than high school	0.061	0.053	0.064	0.065	0.010	0.007	0.017	0.011
High school	-0.009	0.040	-0.036	-0.017	-0.024	-0.009	-0.006	0.002
GED	0.156	0.142	0.103	0.091	0.155	0.135	0.108	0.091
Missing education	-0.209	-0.235	-0.131	-0.139	-0.140	-0.133	-0.118	-0.104
Major urban	-0.026	0.112	0.261	0.304	0.176	0.243	0.084	0.226
Small metro	-0.141	-0.268	-0.146	-0.234	-0.060	-0.156	0.014	-0.137
Nonmetro	0.161	0.153	-0.115	-0.070	-0.116	-0.087	-0.098	-0.089
Missing metro	0.006	0.003	0.001	0.000	0.000	0.000	0.000	0.000

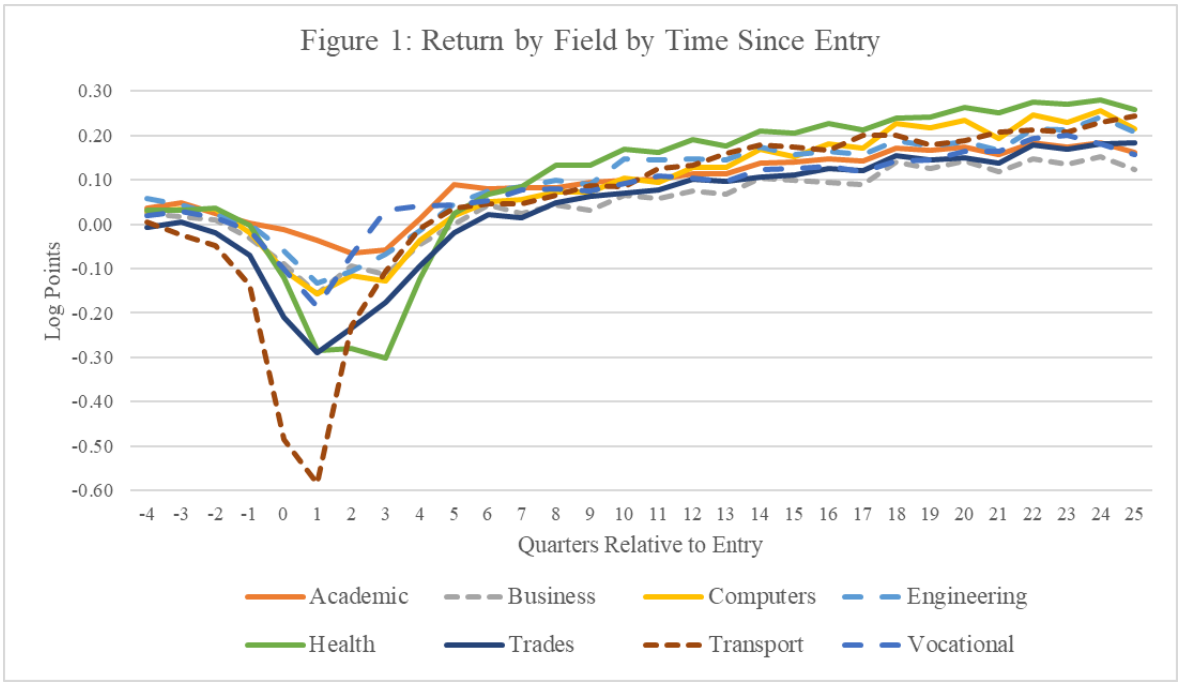


Figure 1: Return by Field by Time Since Entry
Log Points
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-0.60
-4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Quarters Relative to Entry
Academic
Business
Computers
Engineering
Health
Trades
Transport
Vocational

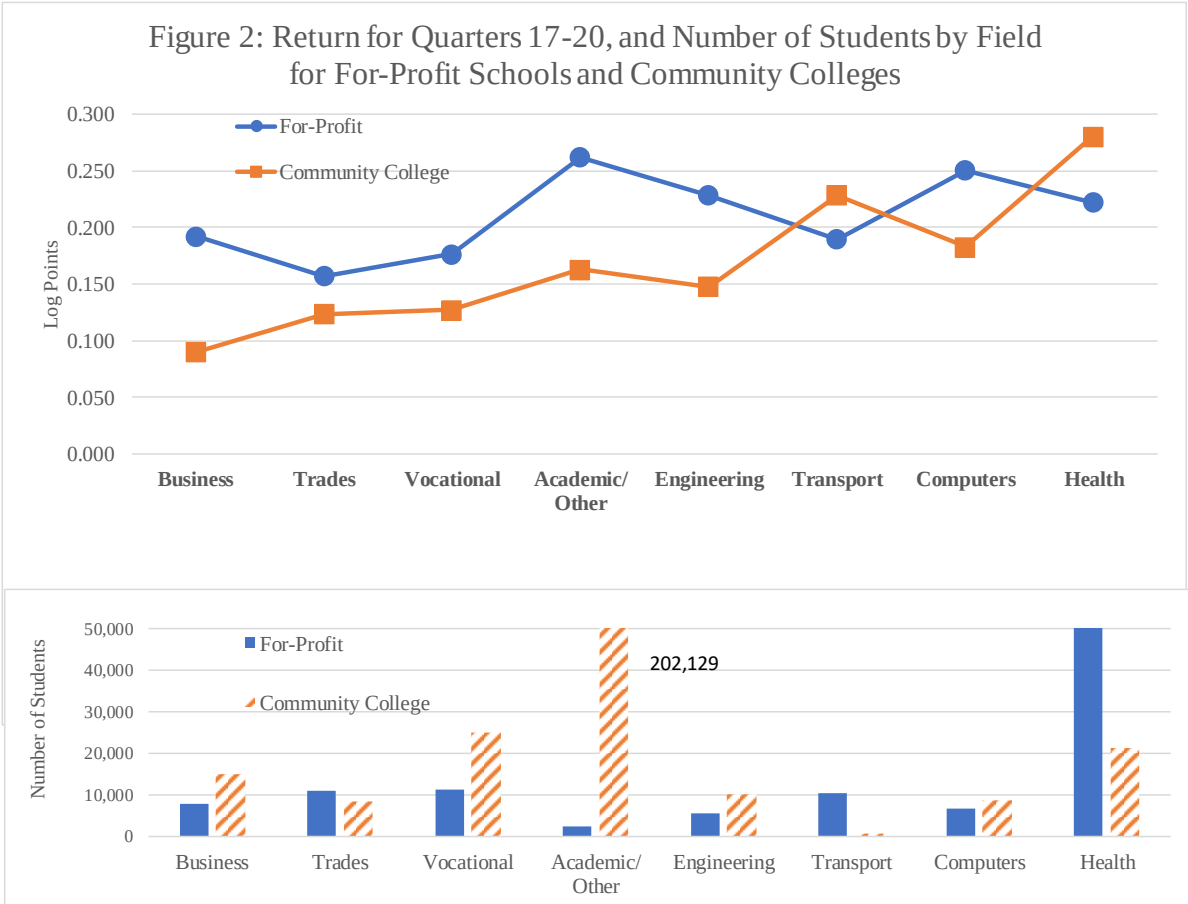
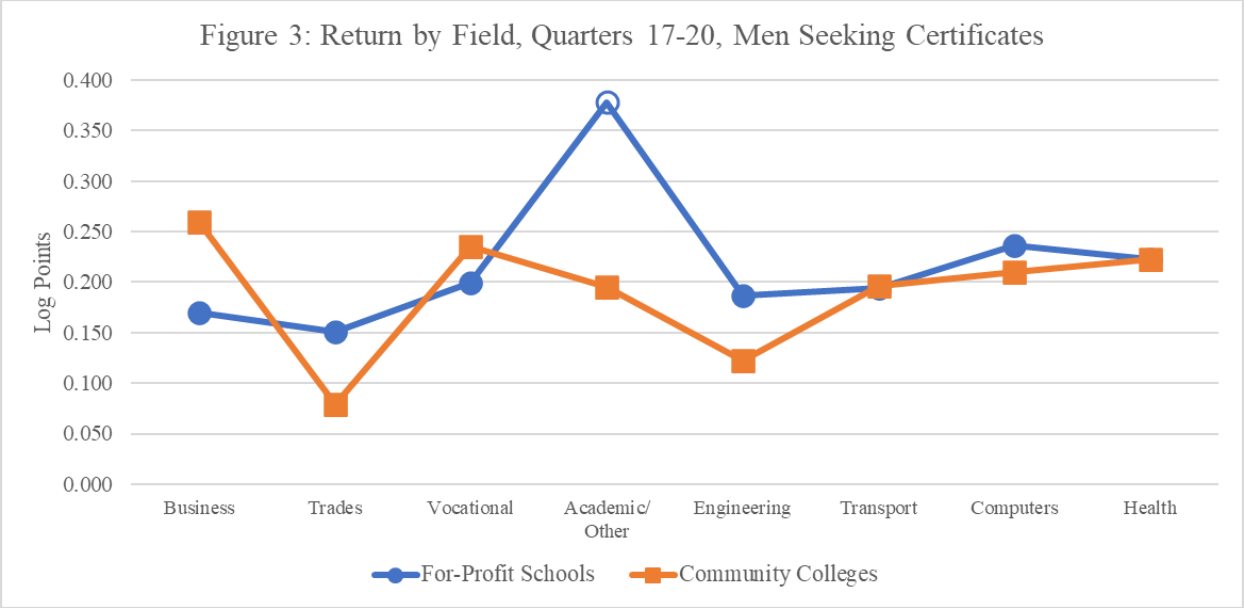
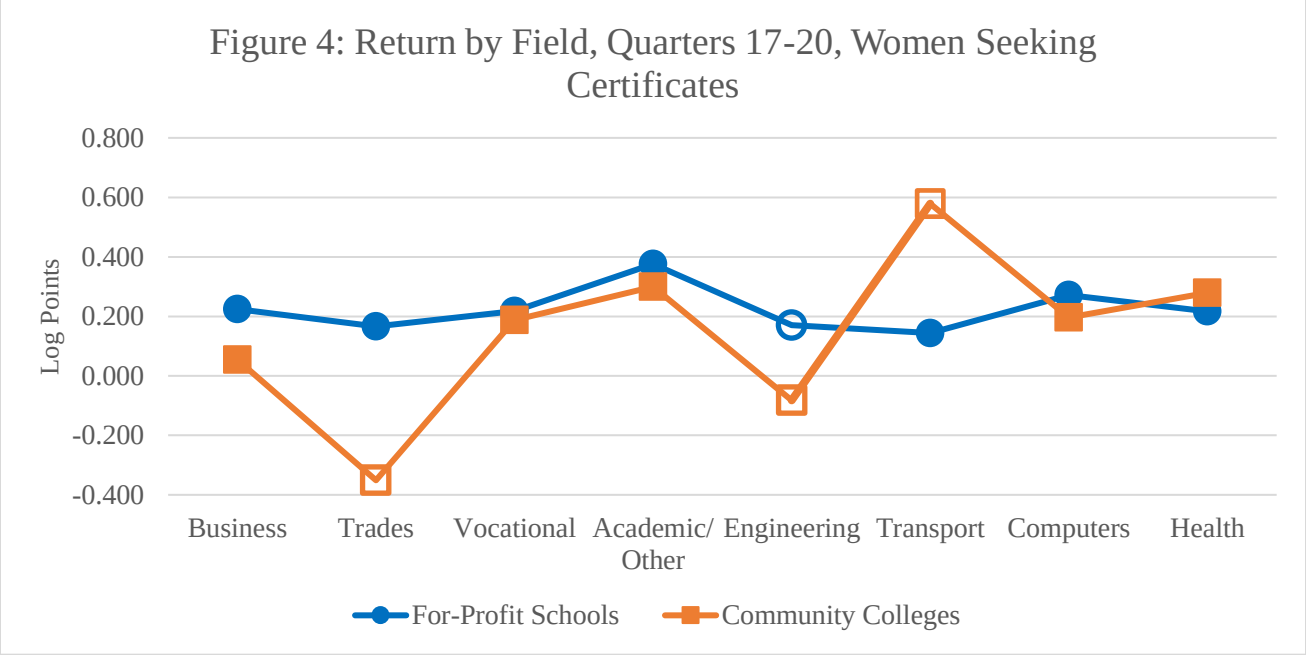
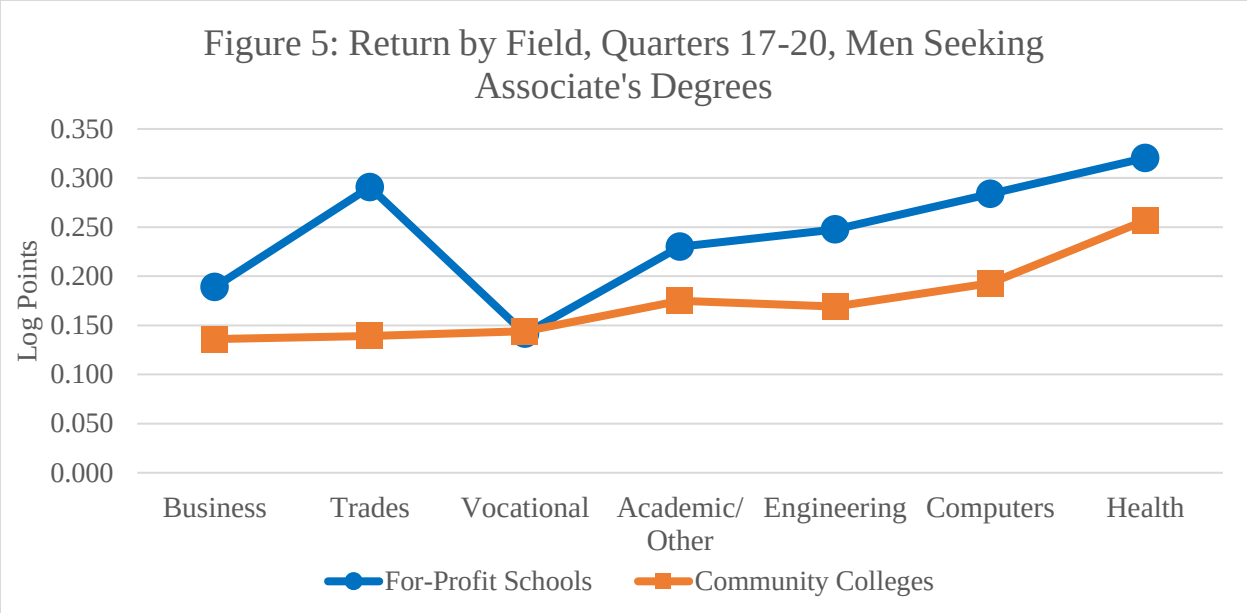


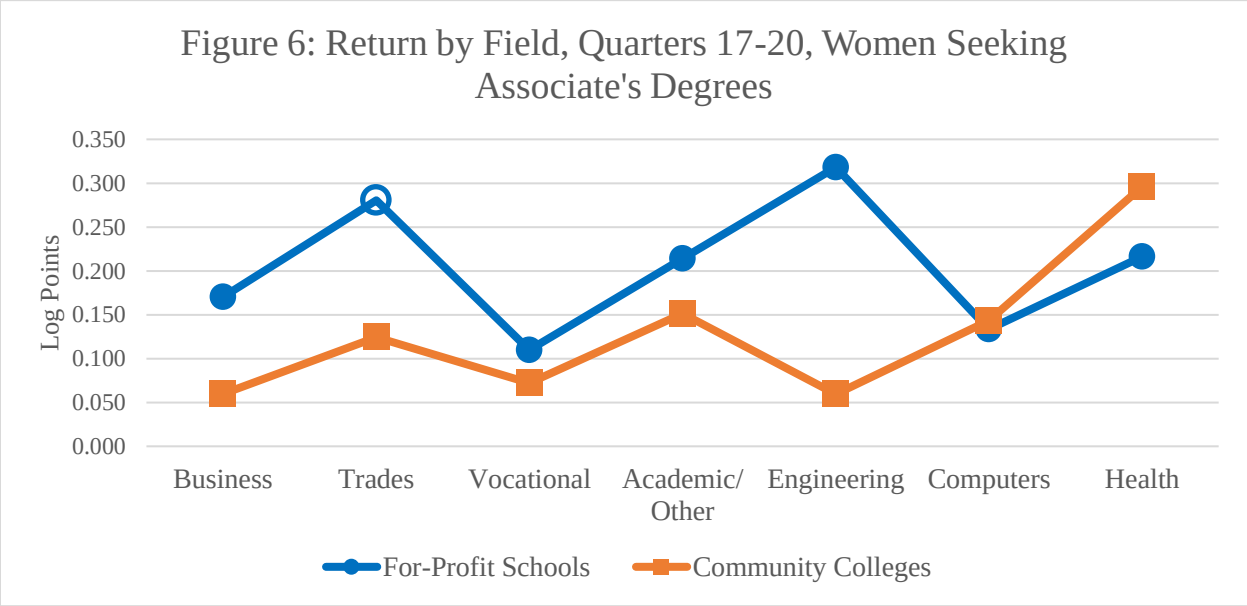
Figure 2: Return for Quarters 17-20, and Number of Students by Field for For-Profit Schools and Community Colleges
Log Points
0.300
0.250
0.200
0.150
0.100
0.050
0.000
For-Profit
Community College
Business
Trades
Vocational
Academic/ Other
Engineering
Transport
Computers
Health
Number of Students
50,000
40,000
30,000
20,000
10,000
0
For-Profit
Community College
202,129
Business
Trades
Vocational
Academic/ Other
Engineering
Transport
Computers
Health





Note: "Hollow" marks indicate fields of study with fewer than 300 students.





Note: “Hollow” marks indicate fields of study with fewer than 300 students.

Appendix

Table A1: Mean Coefficient Estimates and Standard Errors by Field, Weighted by Subsample Size

Coefficient	Business		Trades		Vocational		Academic		Engineering		Transport		Computer		Health	
Quarter	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE	Coef.	SE
-4	0.025	0.005	-0.008	0.015	0.019	0.009	0.036	0.003	0.059	0.008	0.004	0.008	0.029	0.007	0.032	0.004
-3	0.016	0.006	0.005	0.007	0.028	0.005	0.047	0.002	0.045	0.011	-0.025	0.011	0.033	0.014	0.032	0.003
-2	0.010	0.006	-0.020	0.009	0.015	0.007	0.023	0.003	0.021	0.012	-0.047	0.012	0.033	0.010	0.036	0.004
-1	-0.032	0.008	-0.071	0.011	-0.014	0.007	0.002	0.003	-0.001	0.010	-0.137	0.010	-0.018	0.013	-0.003	0.005
0	-0.031	0.013	-0.138	0.026	-0.014	0.013	0.057	0.003	0.004	0.017	-0.333	0.027	-0.031	0.016	0.048	0.006
1	-0.039	0.015	-0.144	0.030	-0.010	0.009	0.103	0.005	-0.004	0.022	-0.583	0.038	-0.009	0.027	0.052	0.007
2	0.024	0.013	-0.089	0.036	0.017	0.011	0.074	0.004	0.021	0.015	-0.228	0.017	0.031	0.025	0.057	0.006
3	0.004	0.011	-0.029	0.026	0.031	0.008	0.082	0.003	0.060	0.018	-0.106	0.013	0.019	0.029	0.036	0.007
4	0.013	0.012	-0.020	0.019	0.041	0.007	0.082	0.003	0.051	0.014	-0.009	0.015	0.037	0.017	0.045	0.009
5	0.001	0.010	-0.020	0.018	0.044	0.008	0.089	0.003	0.046	0.015	0.035	0.015	0.020	0.017	0.025	0.006
6	0.043	0.012	0.022	0.013	0.054	0.009	0.079	0.003	0.075	0.014	0.046	0.015	0.051	0.018	0.067	0.013
7	0.023	0.013	0.014	0.018	0.078	0.008	0.082	0.004	0.083	0.014	0.046	0.014	0.056	0.013	0.084	0.010
8	0.044	0.012	0.049	0.019	0.079	0.010	0.081	0.004	0.100	0.015	0.066	0.013	0.073	0.015	0.133	0.012
9	0.033	0.009	0.062	0.014	0.075	0.006	0.093	0.005	0.089	0.012	0.087	0.015	0.073	0.011	0.133	0.009
10	0.065	0.009	0.071	0.017	0.091	0.008	0.100	0.004	0.148	0.015	0.086	0.013	0.103	0.014	0.168	0.010
11	0.057	0.015	0.077	0.015	0.109	0.009	0.103	0.005	0.145	0.014	0.126	0.017	0.095	0.012	0.163	0.008
12	0.075	0.010	0.102	0.017	0.105	0.008	0.114	0.006	0.148	0.019	0.134	0.017	0.127	0.012	0.190	0.013
13	0.068	0.009	0.097	0.011	0.098	0.008	0.115	0.007	0.145	0.015	0.160	0.014	0.127	0.009	0.176	0.013
14	0.104	0.015	0.107	0.015	0.122	0.008	0.138	0.006	0.174	0.017	0.179	0.017	0.169	0.011	0.209	0.013
15	0.098	0.015	0.112	0.017	0.126	0.012	0.140	0.004	0.157	0.013	0.174	0.016	0.153	0.015	0.205	0.011

Continued

Table A1 Continued

16	0.095	0.015	0.126	0.022	0.130	0.011	0.148	0.006	0.163	0.019	0.167	0.014	0.182	0.016	0.226	0.009
17	0.090	0.015	0.120	0.013	0.118	0.012	0.143	0.005	0.156	0.015	0.201	0.015	0.172	0.017	0.213	0.015
18	0.139	0.018	0.154	0.014	0.143	0.016	0.171	0.004	0.187	0.022	0.201	0.022	0.227	0.014	0.239	0.015
19	0.126	0.013	0.145	0.012	0.146	0.019	0.167	0.006	0.177	0.016	0.178	0.019	0.216	0.021	0.241	0.016
20	0.144	0.014	0.151	0.015	0.164	0.015	0.175	0.005	0.185	0.017	0.189	0.024	0.234	0.019	0.263	0.013
21	0.118	0.013	0.137	0.017	0.165	0.018	0.156	0.005	0.167	0.016	0.208	0.024	0.193	0.019	0.252	0.016
22	0.148	0.025	0.178	0.015	0.192	0.016	0.185	0.006	0.215	0.020	0.213	0.023	0.247	0.015	0.275	0.013
23	0.135	0.024	0.170	0.013	0.201	0.015	0.173	0.006	0.212	0.019	0.207	0.027	0.230	0.016	0.271	0.015
24	0.151	0.021	0.181	0.015	0.180	0.011	0.184	0.006	0.242	0.024	0.229	0.018	0.257	0.015	0.280	0.016
25	0.124	0.024	0.184	0.020	0.157	0.011	0.162	0.006	0.207	0.018	0.244	0.027	0.215	0.026	0.258	0.018
Enrollment	-0.118	0.015	-0.146	0.028	-0.176	0.010	-0.139	0.005	-0.128	0.018	-0.307	0.062	-0.148	0.027	-0.336	0.007

Note: As reported in Figure 1, mean of coefficients across gender-credential-school type, based on Equation (3), weighted by sample size. Standard errors are for means based on bootstrap with 1000 replications.

Table A2: Mean Coefficient Estimates for Quarters 17-20 and Standard Errors, by Field and School Type, Weighted by Subsample Size

	For-Profit Schools		Community Colleges			
	Coef.	SE	Coef.	SE	Difference	SE
Business	0.192	0.030	0.090	0.010	0.103	0.029
Trades	0.157	0.016	0.123	0.018	0.034	0.026
Vocational	0.177	0.016	0.127	0.016	0.049	0.015
Academic	0.262	0.033	0.163	0.005	0.099	0.032
Engineering	0.228	0.025	0.148	0.015	0.081	0.023
Transport	0.190	0.016	0.229	0.095	-0.039	0.096
Computer	0.250	0.025	0.183	0.014	0.067	0.024
Health	0.222	0.022	0.281	0.012	-0.058	0.030

Note: As reported in Figure 2, means of coefficients across gender-credential categories by school type based on Equation (3), weighted by sample size. Standard errors are for means based on bootstrap with 1000 replications.

Table A3: Mean Coefficient Estimates for Quarters 17-20 and Standard Errors, by Field and School Type, Men Seeking Certificates

	For-Profit Schools		Community Colleges			
	Coef.	SE	Coef.	SE	Difference	SE
Business	0.169	0.039	0.260	0.057	-0.090	0.075
Trades	0.151	0.017	0.079	0.037	0.072	0.040
Vocational	0.199	0.022	0.235	0.059	-0.036	0.066
Academic	0.378	0.081	0.196	0.055	0.182	0.100
Engineering	0.187	0.024	0.122	0.043	0.065	0.049
Transport	0.194	0.017	0.196	0.095	-0.002	0.095
Computer	0.236	0.024	0.210	0.089	0.026	0.092
Health	0.223	0.017	0.223	0.039	0.000	0.040

Note: As reported in Figure 3, coefficients are estimated by school type based on Equation (3). Standard errors are for means based on bootstrap with 1000 replications.

Table A4: Mean Coefficient Estimates for Quarters 17-20 and Standard Errors, by Field and School Type, Women Seeking Certificates

	For-Profit Schools		Community Colleges			
	Coef.	SE	Coef.	SE	Difference	SE
Business	0.225	0.049	0.054	0.042	0.171	0.048
Trades	0.166	0.061	-0.351	0.186	0.517	0.193
Vocational	0.218	0.030	0.188	0.045	0.030	0.045
Academic	0.376	0.095	0.299	0.034	0.077	0.092
Engineering	0.170	0.070	-0.082	0.084	0.253	0.091
Transport	0.144	0.051	0.579	0.209	-0.435	0.230
Computer	0.272	0.054	0.197	0.120	0.075	0.113
Health	0.217	0.038	0.279	0.024	-0.062	0.044

Note: As reported in Figure 4, coefficients are estimated by school type based on Equation (3). Standard errors are for means based on bootstrap with 1000 replications.

Table A5: Mean Coefficient Estimates for Quarters 17-20 and Standard Errors, by Field and School Type, Men Seeking Associate's Degrees

	For-Profit Schools		Community Colleges			
	Coef.	SE	Coef.	SE	Difference	SE
Business	0.189	0.080	0.136	0.020	0.053	0.087
Trades	0.291	0.058	0.139	0.019	0.152	0.066
Vocational	0.141	0.037	0.144	0.021	-0.003	0.042
Academic	0.230	0.065	0.175	0.013	0.055	0.065
Engineering	0.248	0.045	0.169	0.019	0.078	0.041
Computer	0.284	0.034	0.193	0.021	0.091	0.035
Health	0.320	0.054	0.257	0.027	0.064	0.069

Note: As reported in Figure 5, coefficients are estimated by school type based on Equation (3). Standard errors are for means based on bootstrap with 1000 replications.

Table A6: Mean Coefficient Estimates for Quarters 17-20 and Standard Errors, by Field and School Type, Women Seeking Associate's Degrees

	For-Profit Schools		Community Colleges			
	Coef.	SE	Coef.	SE	Difference	SE
Business	0.170	0.032	0.060	0.013	0.110	0.038
Trades	0.281	0.338	0.124	0.077	0.156	0.310
Vocational	0.110	0.034	0.072	0.013	0.038	0.039
Academic	0.214	0.045	0.151	0.007	0.063	0.048
Engineering	0.318	0.106	0.059	0.059	0.259	0.105
Computer	0.134	0.055	0.143	0.036	-0.010	0.066
Health	0.216	0.025	0.296	0.021	-0.080	0.026

Note: As reported in Figure 6, coefficients are estimated by school type based on Equation (3). Standard errors are for means based on bootstrap with 1000 replications.