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THE LABOR MARKET RETURNS TO A FOR-PROFIT COLLEGE EDUCATION

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The Labor Market Returns to a For-Profit College Education
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ABSTRACT

A lengthy literature estimating the returns to education has largely ignored the for-profit sector. In this paper, we offer some of the first causal estimates of the earnings gains to for-profit colleges. We rely on restricted-use data from the 1997 National Longitudinal Survey of Youth (NLSY97) to implement an individual fixed effects estimation strategy that allows us to control for time-invariant unobservable characteristics of students. We find that students who enroll in associate's degree programs in for-profit colleges experience earnings gains between 6 and 8 percent, although a 95 percent confidence interval suggests a range from -2.7 to 17.6 percent. These gains cannot be shown to be different from those of students in public community colleges. Students who complete associate's degrees in for-profit institutions earn around 22 percent, or 11 percent per year, and we find some evidence that this figure is higher than the returns experienced by public sector graduates. Our findings suggest that degree completion is an important determinant of for-profit quality and student success.

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I. Introduction

After several decades of strong growth and relatively little controversy in for-profit postsecondary education, a recent report by the Government Accountability Office has brought for-profit colleges into the spotlight. The report ignited a firestorm of media attention and debate by uncovering unscrupulous recruiting practices and fraud in federal financial aid programs at several large for-profit colleges (GAO 2010; Lewin 2010; Goodman 2010). In response, the Department of Education has implemented controversial new regulations for federal student aid eligibility, requiring institutions to show that graduates meet strict income-to-debt ratios and loan repayment rates to maintain eligibility (Federal Register 2010). Faced with these new restrictions, it is likely that some, and perhaps many, for-profit institutions will close their doors (Guryan and Thompson 2010).

Central to the debate over the new regulations is the question of the quality of a for-profit education. Proponents of the rules claim that for-profit colleges leave students with insurmountable debt and few skills, while opponents argue that these institutions provide valuable job training for underserved students. Both sides rely heavily on anecdotal evidence and descriptive comparisons of earnings of graduates in the private and public sector. Without a better understanding of the causal effects of a for-profit education on earnings, it is difficult, if not impossible, to assess the merits of the new regulations and the sector as a whole.

Our study is among the first to provide an assessment of college quality in the for-profit sector, by estimating the labor market returns, or earnings gains, to associate's degree programs in for-profit colleges. For-profit institutions are an integral part of the sub-baccalaureate market, conferring 18 percent of all associate degrees (Deming, Goldin, and Katz 2012). Previous research

has shown that these institutions compete for students with public community colleges (Cellini 2009), which confer about 76 percent of all associate's degrees (NCES 2010, Table 195).[1]

A long literature on the returns to education has focused on estimating the earnings gains generated by a year of high school or four-year college. Several studies have also assessed the returns to community colleges, but private sub-baccalaureate education has received much less attention in the literature.[2] Our study fills this gap in the literature, attempting to mitigate a crucial endogeneity problem that plagues studies of earnings gains: students in for-profit institutions may differ on both observable and unobservable dimensions from those in public institutions. If these differences are correlated with a student's choice of institution and her labor market success, cross-sectional OLS estimates of the impact of private two-year colleges on employment and earnings will be biased.

We implement an individual fixed effects approach to begin to address this problem. Unlike bachelor's degree candidates, student pursuing associate's degrees often work before, during, and after they attend college, allowing us to compare an individual student's earnings after attendance to her earnings before. In so doing, the individual fixed effects controls for all time-invariant student characteristics that may bias cross-sectional estimates of returns, although time-varying unobservables and selection issues may still remain.

Using the 1997 panel of the National Longitudinal Survey of Youth (NLSY97) restricted-access geocode data, we find that students enrolled in an associate's degree program at a for-profit college experience a 6 percent increase in earnings in our baseline specification. A 95 percent confidence interval generates a wide range of estimates for this group: as low as -1.4 percent and as high as 13.5 percent. In many, but not all specifications, we can rule out negative returns, but in no

[1] The 76 percent includes associate's degrees conferred by public four-year colleges and two-year community colleges. The remaining 6 percent of associate's degrees are conferred by non-profit institutions (NCES 2010, Table 195).
[2] We review the literature in detail in Section II.

specification can we rule out extremely low returns or reasonably high returns. Across a variety of robustness checks, we find no evidence that the returns to attendance are different in the public and private sector.

We also look specifically at students who complete degrees, although we acknowledge that completion is endogenous. For graduates of for-profit institutions, returns are about 22 percent, or 11 percent per year, a figure on par with those of students in other sectors and levels of education. In some specifications, these returns appear to be significantly higher than those of community college graduates. Moreover, for-profit graduates also appear to work more hours and be more likely to work full-time after graduation than public sector alumni.

In contrast, for-profit dropouts fare considerably worse than their counterparts in community colleges. While we can confidently rule out negative returns for public sector dropouts, we are unable to do the same for their for-profit counterparts whose absolute returns average - 2.6 percent and range from as low as -11 percent to 5.8 percent.

We subject our estimates to a variety of robustness checks and alternate sample constructions. Importantly, we test for trends in pre- and post-education earnings that might bias our estimates of both the absolute and differential returns to public and private sector education. Although we find that students in both sectors experience a decline in earnings of around 7 percent in the two years prior to enrollment, they also experience a commensurate decline in earnings immediately after attendance. These effects appear to counteract each other, yielding an estimate that is similar to, but slightly higher than our baseline estimate for the absolute return to for-profit attendance—around 7.5 percent. Our confidence interval remains large, however, with a range of -2.7 percent to 17.6 percent in this dynamic specification.

Our analysis reveals that for-profit students generally experience positive earnings gains and labor market outcomes similar to those of students in the public sector. Given the much higher cost

of a for-profit education relative to a public education, we expect that some students might find a community college a better investment, and further research is needed to assess whether the earnings gains from a for-profit education are enough to offset the high cost of attendance. Degree completion appears to be particularly important to student success in the for-profit sector and we suggest that, in the absence of earnings data, policymakers and prospective students should carefully study completion rates to assess the quality of a particular for-profit institution.

The rest of the paper proceeds as follows: Section II reviews the literature on the returns to education and provides background on private and public sub-baccalaureate education. Section III provides a conceptual framework and Section IV details our estimation strategy. Section V describes the data, Section VI presents results, and Section VII concludes.

II. Background

Over the past half-century, a large literature has developed to measure the returns to schooling. Reviews of the literature by Card (1999) and Ashenfelter, Harmon, and Oosterbeek (1999) report that one additional year of education results in earnings gains in the range of 6 to 9 percent. More recent and better-identified analyses reveal higher returns, averaging 10 to15 percent per year (Card 2001, Goldin and Katz 2008). The vast majority of the research in this area has focused on high school and four-year colleges: few studies identify the returns to various sectors and levels of schooling (Ashenfelter et al. 1999).

Only a handful of studies examine two-year colleges, and those that do focus almost exclusively on public community colleges. Reviewing the literature on community college returns, Kane and Rouse (1999) find that a year of community college attendance generates returns between 5 and 8 percent, just marginally below the average return to a four-year college attendance. Students who complete associate's degrees earn 15 to 27 percent more than observationally similar individuals with no postsecondary education.

Central to the literature on returns is a debate over the accuracy of various methods to identify the causal effect of education on earnings. Students who pursue additional education are likely to differ on both observable and unobservable dimensions from those who do not. If these differences are correlated with subsequent earnings, cross-sectional estimates of the returns to schooling will be biased. While a number of studies of high school and four-year college returns have attempted to address this endogeneity problem using instrumental variables and sibling comparisons, few studies in the community college literature have implemented similar identification strategies. Many studies estimate cross-sectional models comparing students attending community college to those who do not, generally controlling for ability with proxies, such as IQ scores (for example, Marcotte, Bailey, Borkoski, and Kienzl 2005, Kane and Rouse 1995, Leigh and Gill 1997, Grubb 1993 and 1995, Monk-Turner 1994, and Heineman and Sussna 1977).

Recent studies on the returns to community college education have implemented stronger identification strategies. Jacobson, LaLonde, and Sullivan (2005) and Jepsen, Troske, and Coomes (2011) use an individual- or person-specific fixed effects approach (as in this paper) comparing the wages of displaced workers before and after they attend a public community college, thereby controlling for time-invariant individual characteristics that may bias cross-sectional estimates. Among displaced workers in Washington State, Jacobson et al. (2005) find returns of 9 percent per year of education for men and 13 percent for women, with much higher returns to quantitative and technically-oriented vocational coursework than less-quantitative coursework in the humanities, social sciences, and basic skills. Among all community college students in Kentucky, Jepsen et al. (2011) find higher returns—about 40 percent for an associate's degree or diploma for women and 18 to 20 percent for men completing degrees.

We know of only three studies, Grubb (1993), Chung (2008), and Deming, Goldin, and Katz (2012) that attempt to assess the returns to for-profit postsecondary education.[3] All three draw on cross-sectional variation in earnings, comparing students who attend for-profit institutions with students who attend other types of postsecondary institutions. In a working paper, Chung (2008) instruments for college choice using tuition and concentration of community colleges. Deming, et al. (2012) use OLS and propensity score matching. Grubb and Chung find limited evidence of positive effects of for-profit training, particularly for women and certificate programs, but generally show no significant differences in returns to the for-profit sector relative to other sectors. Deming et al. reveal negative point estimates on the differential return to for-profits, but these results are not significant when conditioning on employment.

In this study, we provide new estimates of the impact of for-profit postsecondary education on earnings using an individual fixed effects approach, similar to Jacobson et al. (2005) and Jepsen et al. (2011), as well as earlier work by Angrist and Newey (1991).[4] By comparing before and after wages for the same individual, such approaches mitigate some of the most critical endogeneity problems that plague cross-sectional studies.

For-Profit Colleges and the Market for Associate's Degrees

Our paper focuses exclusively on students enrolled in associate's degree programs. These programs typically require two years of full-time coursework and result in the attainment of an Associate of Arts (AA) or Associate of Science (AS) degree.[5] Students may obtain their degree in any number of majors, including traditional liberal arts and science majors like history, psychology,

[3] Note that a related paper (Grubb, 1993b), using the same data and methods to estimate returns to community colleges was found to be severely flawed by Kane and Rouse (1995b).

[4] This approach has also been used in the broader labor economics literature. For example, Ashenfelter (1978) and Ashenfelter and Card (1985) use individual fixed effects to assess the impact of job training programs on earnings. Angrist and Newey (1991) and Freeman (1984) examine the impact of union status on earnings. See Angrist and Kreuger (1999) for an overview of the fixed effects strategy in labor economics.

[5] We cannot differentiate between these degrees in our data.

or computer science, as well as more vocational fields such as medical assisting, paralegal studies, or homeland security.

As noted above, students enrolled in public institutions account for the vast majority (76 percent) of the 787,000 associate's degrees awarded each year in the United States. These institutions are typically community colleges, which offer associate's degrees as their highest degree. However, some four-year colleges (offering bachelor's degrees or higher) may also offer associate's degree programs. These institutions award 27 percent of all associate's degrees in the public sector (NCES 2010).

For-profit institutions that award associate's degrees are also classified as two-year or four-year institutions by the U.S. Department of Education. Interestingly, of roughly 144,000 students obtaining associate's degrees from for-profits, 40 percent of students receive them from institutions that also offer bachelor's degrees (NCES 2010). We include students pursuing associate's degrees in both sets of institutions in our analysis.

It should also be noted that private, non-profit institutions also offer associate's degrees, but comprise only 6 percent of the total number of degrees conferred. Of the non-profits, four-year institutions dominate, awarding 86 percent of non-profit associate's degrees (NCES 2010). We drop students pursuing associate's degrees in non-profit institutions from our analysis and focus exclusively on public and for-profit students.[6]

Research on for-profit colleges is scarce, primarily due to a lack of data. Most studies of these colleges rely on a non-random sample of schools and students based on the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS) and most are purely descriptive in nature (Apling 1993; Bailey, Badway, and Gumport 2001; Deming, Goldin, and Katz

[6] Results are similar when we leave in the 13 students pursuing associate's degrees in non-profit institutions.

2012; Rosenbaum, Deil-Amen, and Person 2006; Turner 2006).[7] Administrative licensing data has added to our knowledge of these institutions in recent years and allowed for causal studies of institutional behavior (Cellini 2009, 2010) and a more accurate count of institutions (Cellini and Goldin 2012), but in spite of these advances surprisingly little is known about for-profit colleges and their students.

What we have learned from these studies and data sources is that there are approximately 7,500 for-profit institutions in the Unites States, at any level (two-year, four-year, or less-than-two-year) (Cellini and Goldin 2012), about 3,000 of which are eligible for federal student aid programs (NCES 2010). Average enrollment is just 350 students (Cellini 2009), a figure that pales in comparison to community colleges that average 6,600 students each nationwide (NCES 2010).

Despite these differences, research on California colleges shows that community colleges and for-profits offer extremely similar associate's degrees and certificate programs in a wide range of vocational and academic fields. Moreover, these colleges compete for students: when funding for community colleges increases, for-profit colleges exit the market (Cellini 2009). Both sectors also offer part-time programs to meet the needs of working students (Rosenbaum, Person, Del-Amien 2005), but some notable differences in student characteristics and program offerings remain.

Deming, Goldin, and Katz (2012) report that, relative to community colleges, for-profit institutions (including aid-eligible two-year and four-year institutions) enroll a higher proportion of women (65 vs. 57 percent), blacks (22 vs. 14 percent), GED recipients (17 vs. 10 percent), and single parents (29 vs. 12 percent). Income differences are also substantial: the average income of a for-profit student is roughly $15,000-20,000 less than a community college student. Yet, despite these differences, for-profit students appear much more similar to community college students than

[7] The IPEDS severely undercounts the number of private two-year colleges in the U.S. For many years the survey relied on snowball sampling and did not require their participation. In recent years, greater efforts have been made to track down institutions receiving federal financial aid, but many colleges remain unaccounted for in the data (see Cellini and Goldin 2012).

to students in four-year public and non-profit institutions. We return to investigate demographic and socioeconomic differences between associate's degree students in the public and for-profit sectors for our sample of students in the NLSY in Section IV.

Program offerings in for-profit and community colleges generally show substantial overlap, as noted above, but some differences remain. Turner (2006) reports that for-profit colleges award a disproportionate share of associate degrees and less-than-two-year certificates in pre-professional and vocational fields in which skills are easy to verify and physical plant requirements are modest. Community colleges award a much larger share of associate's degrees in the liberal arts than for-profit colleges, in part due to their role as transfer institutions (Cellini 2009, Turner 2006). In most states, community colleges have articulation agreements with public four-year colleges, allowing students to pursue the first two years of their bachelor's degree at a community college before transferring to a university. Nonetheless, only a small portion of community college students appears to take advantage of the opportunity: in California, only 15 percent of students transfer within seven years (Sengupta and Jepsen 2006).

The most important difference between private and public two-year colleges is undoubtedly their price: required tuition and fees for public community colleges average just $2,300 for in-state students, while for-profit two-year colleges charge more than six times as much, averaging $15,000 in 2009-10 (NCES 2010).[8] For-profit students undoubtedly receive substantial federal, state, and private financial aid awards to bring costs down, but, as in the four-year college market, the public-private price differential remains substantial (Cellini 2010).

The large price differential lends itself to two important predictions. First, assuming a perfectly competitive market, all else equal, we would predict higher earnings gains for for-profit students, relative to community college students. Of course, it is not at all clear that the market is perfectly

[8] The average for for-profits include only federal aid eligible institutions. For-profits that are not aid eligible charge about 75 percent less (Cellini and Goldin 2012).

competitive: imperfect information may be particularly problematic if for-profit students are heavily recruited and may not be aware of local community college offerings (Cellini 2009). Alternatively, students may be misled or not fully informed about the expected costs and benefits of their education. This claim was supported in a recent report by the Government Accountability Office (GAO 2010) and reflected in the new regulations designed to protect students from predatory for-profit institutions (Federal Register 2010).

Second, we might expect differential selection into for-profit and community colleges, with higher income students, or those with higher expected future earnings growth, differentially selecting into for-profits, thereby biasing estimates of returns. Again, however, this prediction is not as clear as it may seem. Recent research suggests that for-profits recruit low-income students to capture federal aid (Cellini 2010), and the work by Deming, et al. (2012) reveals that for-profit students have substantially lower incomes than public postsecondary students. Nonetheless, differential selection by sector is likely to be a problem, particularly for identification of differential returns to the public and for-profit sectors. We explore the issue of selection in detail below.

III. Empirical Methods

Ideally, we would like to randomly assign individuals to for-profit colleges to identify the causal effect of a for-profit college education. In this set up, a comparison of post-education earnings of individuals across the treatment and control groups would provide accurate estimates of the absolute return to a for-profit education. Since randomization is not an option in our context, we follow the job-training literature and use individual, or person-specific, fixed effects to control for unobservable characteristics that may influence the choice of sector and subsequent wages. We first describe our approach and then discuss identification problems that may still persist.

In the fixed effects approach, we aim to identify the causal effect of a for-profit college education by estimating log weekly earnings and other employment outcomes, y_{it}, for individual *i*

in year *t* as a function of college attendance, for-profit college attendance, and individual characteristics as follows:

$$y_{it} = \beta_0 + \beta_1(FP_i * Post_{it}) + \beta_2(Post_{it}) + \gamma X_{it} + d_t + d_i + \varepsilon_{it} \quad (1)$$

The variable $Post_{it}$ identifies the timing of each student's attendance. It equals 1 in the year after we observe the individual enrolled in an associate's degree program, and remains 1 in subsequent years.[9] Students who complete associate's degrees receive 1 in the years after completion. We interact this variable with FP_i, an indicator for whether the individual reported attending a for-profit college. The result is that the variable of interest $FP_i * Post_{it}$ equals 1 for for-profit college students in each year after attendance and 0 otherwise.

Measures of the returns to attendance are perhaps the most relevant for policy, as they represent the average earnings gains for those who enroll in for-profits, regardless of whether they complete their degree.[10] We focus primarily on these estimates throughout. However, measures of the returns to degree completion are common in the literature and useful for comparison, although we acknowledge that graduates are a selected sample and completion rates may differ across sectors, a point we return to below.

To separately identify the effects of degree completion, we interact for-profit and any college attendance with degree completion. Specifically, we create two new variables, $FP_i * Post_{it} * Degree_i$ and $Post_{it} * Degree_i$, where $Degree_i$ equals one for students who complete associate's degrees, as in equation (2):

$$y_{it} = \beta_0 + \beta_1(FP_i * Post_{it}) + \beta_2(Post_{it}) \quad (2)$$
$$+\beta_3(FP_i * Post_{it} * Degree_i) + \beta_4(Post_{it} * Degree_i) + \beta_5 X_{it} + d_t + d_i + \varepsilon_{it}$$

[9] For example, if a student reports pursuing an associate's degree only in one year, *Post* equals zero in the year he attends and becomes one in the following year.

[10] Returns per credit-hour would also be useful, but credit-hour data is self-reported in the NLSY97 and difficult to match precisely with the program of study.

In both equations (1) and (2), we include fixed effects, d_i, for each student in the sample. The fixed effects model is identified off of changes in each student's earnings before and after college attendance. β_1 in equations (1) and (2) reflects the comparison of the before-after earnings gains for for-profit students to the before-after gains for public college students—the differential return. In equation (2), $\beta_1 + \beta_3$ reflects the differential return to for-profit graduates relative to community college graduates. In equation (1), $\beta_1 + \beta_2$ captures the absolute return to for-profit college attendance—our primary interest in this study. In equation (2), the absolute return to degree completion in a for-profit college is represented by $\beta_1 + \beta_2 + \beta_3 + \beta_4$.

X_{it}, is a vector of time varying individual characteristics, including age fixed effects and an indicator equal to one in the years that the individual is enrolled in college to control for differential earnings during enrollment. Our model also includes a vector of calendar year fixed effects, d_t, to control for inflation and other time-varying effects that are common across individuals.

The individual fixed effects control for time-invariant unobservable characteristics, such as innate ability, that are correlated both with earnings and the choice of sector. In the case of public and for-profit associate's degree students, ability is only one of the omitted variables we might be concerned about. A student's motivation, location, social network, information about educational options, or knowledge of the local labor market may cause additional biases. To the extent that these do not change over time, our fixed effects will provide adequate controls for these potentially confounding omitted variables.

The key identifying assumption of the fixed effects approach is that conditional on observables, nothing else that affects earnings changes contemporaneously with college attendance. However, this assumption can breakdown and bias estimates of the absolute returns to a for-profit education in three ways.

First, our sample consists of younger workers that may exhibit changing labor force attachment over the age-range we observe, which would bias the estimates on the absolute returns to for-profit colleges. To address such concerns, we allow for more flexible controls by interacting the age fixed effects with individual covariates such as race, sex, and region in some specifications. In additional robustness checks, we use the presence of valid earnings data in the pre-period as a selection criterion, similar to the training literature. We also limit the sample to students age 18 and over, and drop the years in school.

Second, we worry about biases associated with the dynamic selection of individuals into college. In particular, estimates of the absolute returns may be biased upwards if individuals experience a decline in earnings in the years immediately preceding enrollment. This issue, sometimes referred to as "Ashenfelter's dip," is well-known in the job training literature, as individuals with negative earnings shocks are more likely to enroll in training than individuals in untreated control groups.[11] The same type of selection may occur if individuals who are laid off or otherwise experience a decline in earnings are more likely to enroll in associate's degree programs than others. This type of dip would cause our estimate of absolute returns to a two-year degree to overstate the true gain. We explicitly test for an "Ashenfelter's dip" by including indicator variables for two years before attendance.

We also test the temporal pattern of earnings after attendance. The training literature suggests that individuals may experience a temporary dip in earnings after completing education or training, causing static estimates to be biased downward. Such a post-education dip is commonly observed among displaced workers who seek retraining because the immediate post-training or post-college period is often one of transition before these workers reach a new higher level of earnings. We follow Jacobson, LaLonde and Sullivan (2005), by including an interaction of $FP_i * Post_{it}$ with the

[11] See Ashenfelter (1978), Ashenfelter and Card (1985), and Heckman and Hotz (1989) for more discussion.

reciprocal of the number of years since an individual left college to capture the dynamic pattern of earnings post-college.

Third, our estimates apply to a selected sample of individuals who ever enroll in an associate's degree program and for whom we can observe earnings before and after education. These restrictions may cause our estimates of absolute returns to be biased upwards because the decision to pursue an associate's degree may be endogenous to earnings. To test for such selection issues, we extend our analysis to students who have a high school diploma but no college education (with a falsified age-appropriate $Post_{it}$ variable) and to students who complete a bachelor's degree.

Our focus is on the absolute returns to for-profit attendance because such returns are of primary importance to policy makers who must regulate these institutions. However, we also present estimates of the differential returns to a for-profit college relative to a public community college. The fixed effects approach can fail to identify the differential returns if any time-varying individual characteristics influence both the choice of sector and subsequent earnings.

If both the returns to education and selection into for-profit colleges are heterogeneous by demographic, family, or other individual characteristics (Card 1999, 2001), then our estimates of the differential returns are biased in the fixed effects framework. We discuss observable differences between for-profit and community college attendees in more detail in the data section. These differential estimates may also be biased if individuals experience differential earnings dips before attending an associate's degree program. We explicitly test for a differential "Ashenfelter's dip" in the results section.

IV. Data

To implement our analysis, we draw on the restricted-access 1997 panel of the National Longitudinal Survey of Youth, a major nationally representative longitudinal survey that tracks a cohort of students through secondary school, college, and beyond. The NLSY97 is based on a

representative panel of 8,984 youths who were 12 to 17 years old when they were first surveyed in 1997. The youths are interviewed each year and we use data available through 2009. We thus have a group of individuals ranging from age 24 to 29 by 2009. The panel contains in-depth questions on educational attainment, earnings, and other related topics. Our main analytical sample is restricted to students who ever report "working towards an associate's degree." In many specifications, we add controls for degree completion, as described in equation (2) above.[12]

We focus on associate's degree students for several reasons. First, we need to observe earnings before and after attendance, and most associate's degree students work before attending. In our sample, we observe earnings for 76 percent of for-profit students and 75 percent of community college students in the pre-education period. In the post period, we observe earnings for 80 percent of for-profit students and 78 percent of community college students. Since a high percentage of bachelor's degree students do not work before attendance and we observe few post-education years for these students, our main sample drops students who receive bachelor's degrees and those who have completed four or more years of postsecondary education without completing a degree. We add these students back into our sample as a robustness check below.

Another reason for focusing on associate's degree students is that associate's degree students in the public and for-profit sectors are likely to be more similar to each other than to students enrolled in other types of programs, mitigating selection bias to some degree. Finally, for-profits offer a disproportionate share of associate's degrees (Turner 2006), so focusing on these students allows us a large enough sample size to identify returns within and across sectors.

The two key variables in our analysis are indicators for the post-education time period and whether an individual attended a for-profit college. To construct a consistent measure of post-education, we code $Post_{it}$ as 1 only when we are certain that individuals are out of school. In the

[12] All results and robustness checks were run both with and without the controls for completion. Full results for completers are available on request.

case of graduates, this includes all years following the receipt of an associate's degree. For "attendees," who do not complete a degree in the time period we observe, we assume they attend college for one year in our baseline specifications. $Post_{it}$ therefore switches to 1 the year after they first report attending a two-year institution and remains 1 for all subsequent years.[13]

Our use of the restricted-access NLSY97 data allows us to match students with school codes in the Department of Education's Integrated Postsecondary Data System (IPEDS). The IPEDS collects institution-level information on colleges eligible for federal student aid.[14] From this, we classify all students attending either a two-year or four-year for-profit institution in the year they report attendance as "for-profit."[15] As noted above, our variable of interest, $(FP_i * Post_{it})$, is equal to 1 beginning the year after the individual receives an associate's degree from a for-profit college, or one year after attendance for those who do not complete, and remains 1 for all subsequent years.

Following the returns literature (e.g., Angrist and Krueger 1991), our main dependent variable is the log of weekly earnings—the product of the individual's hourly wage and average hours worked per week. In the NLSY97, individuals report their wages and hours for up to ten jobs, but the number of people reporting wages for more than five jobs is less than one percent. Hence, we focus on average weekly earnings across the first five jobs.[16]

We further limit our analysis to students who are 16 years or older to avoid capturing wages in informal early jobs (e.g., babysitting, paper route). In some specifications we further limit the sample to individuals 18 or over. We also drop 12 observations with weekly earnings above

[13] We experimented with alternate definitions of post such as counting the year of graduation for completers and assuming two years of attendance for attendees who do not complete. The results were essentially unchanged.
[14] 14 associate's degree students had invalid IPEDS school codes and 235 were missing school codes altogether. The latter group may include students enrolled in for-profit institutions that are not eligible for federal student aid: we omit them from our sample. Robustness checks using self-reported "private" and "public" sector attendance for these students yielded similar results (available on request).
[15] As noted above, students may pursue associate's degrees in either four-year or two-year institutions. When we cannot observe institutional sector in the year students report pursuing an associate's degree, we rely on the prior year. We find no differential effect on earnings from attending a four-year for-profit institution versus a two-year for-profit institution.
[16] The results are robust to alternate definitions of weekly earnings based on the first job alone and all reported jobs.

$100,000 because they are clear outliers.[17] Observations reporting zero earnings are treated as missing and dropped from the analysis: our estimates therefore reflect returns conditional on employment.[18] We observe earnings for an average of 5.2 years before attendance and 5.5 years after attendance. Since we observe post-education earnings for a short time period for very young workers, our findings may underestimate the returns to both public and for-profit colleges if earnings are more responsive to degree completion in the long run.

In addition to weekly earnings, we examine several other labor market outcomes. We first decompose weekly earnings and estimate the effects on log hourly wages and log hours worked per week across the first five jobs. We also estimate the effects of for-profit and public two-year college education on full-time employment and any employment, this time including observations with missing earnings data. Our measure of full-time employment equals one if an individual reports working 35 or more hours per week, and our indicator for any employment equals one if an individual reports non-zero weekly earnings per week.

In addition to the individual fixed effects models, for comparison, we also present a cross-sectional OLS regression where we control for observable individual characteristics. We construct dummy variables for an individual's gender, race, foreign-born status and whether a language other than English is the primary language spoken at home. We also include controls for math and reading comprehension test scores, and household income. Table 1 reports the summary statistics for the main variables used in our analysis. We present the means by sector and by pre- and post-education for the time varying variables.

We follow 2,159 individuals who report working toward an associate's degree of which 226, or 10.5 percent, attended a for-profit institution. In the pre-education period, for-profit students are 3.5

[17] Our results are robust to both keeping these observations and dropping the individuals reporting these observations.
[18] We also estimated models where we substituted $1 for individuals with missing weekly earnings. In other robustness checks, we dropped all observations for an individual who ever had zero earnings, and limited the sample to students with any pre-period earnings. In all three cases, results were similar (available on request).

percent more likely to be employed full-time and work 1.5 hours longer per week. However, we observe no significant differences in employment outcomes in the post-education period across the two sectors. Post-education, individuals attending for-profit colleges earn higher weekly earnings ($509 compared to $482), but the difference is statistically insignificant. On observable time-invariant demographic characteristics in the lower panel, for-profit college attendees are more likely to be female and non-white, as found in previous research (Deming, et al. 2012). They have lower income and are less likely to be foreign born, but they are slightly more likely to have a native language other than English and have marginally higher math test scores. We note that although many of these observable differences are significant, few differences are large.

Of these 2,159 individuals, 30 percent have completed an associate's degree and completion rates vary by sector: 51 percent of for-profit students complete their associate's degree compared to 27 percent of community college students.[19] Hence, for-profit colleges account for a higher proportion of degree completers in our sample, at 18 percent. These differential completion rates may bias estimates of returns to completion in either direction: it could be that students selecting for-profits are more motivated or higher-ability than public school counterparts, yielding higher returns to for-profits. Alternatively, if the distribution of returns is the same in both sectors, then for-profits may be graduating students lower in the ability distribution, yielding lower absolute returns for these students.

As noted above, dynamic selection into college is also a concern. To visually examine the time pattern of earnings, Figure 1 graphs log weekly earnings by sector against years since college entry. We do not observe a large decline in earnings in the years immediately prior to entry for either group, and earnings for both groups appear to experience similar increases after attendance. There may be a slight dip for for-profit students in the year prior to enrollment, but this effect does not

[19] Deming, et al. (2012) also find higher associate's degree completion in the for-profit sector, but this pattern does not appear to hold for bachelor's degree completion.

appear to be large. Notably, the two groups also show similar variance in earnings in every year except the last (for which we have very few observations). We formally test for differential trends in pre-education earnings in the next section. Finally, Figure 2 graphs the age profile of earnings of the individuals in our sample. The age of entry is marginally different across the two sectors–20.6 for the public sector and 21.9 for the for-profit sector. For-profit college students have slightly higher post-education earnings by age, but the differences appear small.

V. Results

A. Main Results

Table 2A presents our first set of findings on log weekly earnings for students pursuing associate's degrees in for-profit and public colleges. Specification (1) is a standard OLS model exploiting variation across individuals, including detailed controls, as described above. Specification (2) is our baseline fixed effects estimate, controlling for years in school as well as age and year fixed effects, as described in equation (1). Specification (3) adds interactions of age with race, gender, and region to the baseline fixed effects model allowing for more flexible controls. Specification (4) limits the sample to years when individuals were 18 or over, to avoid picking up earnings while in high school. Specification (5) drops the years students were in school. And, specifications (6) and (7) separate the sample by students attending for-profit and public institutions, respectively.

We turn first to the second row of Table 2A, which shows the return to attendance in either sector. The OLS specification in column (1) indicates that pursuing an associate's degree at any type of institution generates earnings gains of about 9 percent. While we recognize these coefficients are likely biased, our estimate is comparable to other cross-sectional estimates in the literature on returns to two-year colleges (e.g., Kane and Rouse 1995, 1999). We consider specifications (2)-(5) more reliable, as they add the individual fixed effects. In these specifications,

the effect of attending either type of institution drops to around 6 or 7 percent in most specifications (with one exception: when we limit the sample to students age 18 and over, the coefficient drops to about 3 percent and is no longer significant).

The first row of Table 2A presents estimates of β_1 from equation (1), representing the differential return to for-profits. Although slightly positive (but not significant) in the OLS specification, the point estimates drop to around zero and are never significant in specifications (2)-(5). Summing $\beta_1$and β_2 yields the absolute return to for-profit college attendance. With small negative point estimates on β_1, returns to for-profits appear to remain around 6 percent in most specifications. The 95 percent confidence interval for the differential effect ranges from -8.2 percent to 7.0 percent. Adding this to the point estimate on the return to attendance in either sector yields a range of - 1.4 percent to 13.8 percent for the absolute return to for-profits. Again, in the specification dropping students age 16 and 17, we see slightly different results, but summing the two coefficients yields a return of around 5 percent (although no coefficients are significant in this specification).

Specifications (6) and (7) limit the sample to for-profit and public students, respectively, and are therefore identified off of a single, rather than double, difference. Here, we find fairly large returns to for-profits of 11 percent, although a 95 percent confidence interval suggests returns could be as high as 21 percent or as low as 1 percent. Returns to public college attendance are around 6 percent (with a 95 percent confidence interval of 2.2 to 10.5 percent). A Chow test suggests that these coefficients do not differ significantly from each other (F-statistic is 0.02).

Table 2B is similar to 2A, but adds controls for students who complete their associate's degrees in the time period we observe, following equation (2). Summing the coefficients on $Post_{it}$ and $Post_{it} * Degree_i$, we find that completing an associate's degree in the public sector yields earnings gains around 20 percent in the fixed effects models (specifications (2)-(5)) with confidence intervals

ranging from 13.7 percent to 27.3 percent (specification 2). Completing a degree in a for-profit institution, in the first row (the coefficient on $FP_i * Post_{it} * Degree_i$), again reveals no significant difference with the public sector, but sizable positive point estimates, between 8 and 16 percent.

Summing all four coefficients to identify the absolute return to for-profit degree completion, yields returns of about 22 percent (or 11 percent per year) in our baseline fixed effects specification in column (2), but again, this cannot be shown to be different from degree completion in a public institution. The confidence intervals on the absolute returns to for-profit colleges are similar to those for public colleges, ranging from 12.8 percent to 32 percent.

However, as in Table 2A, our specifications that limit the sample to for-profit students reveal much higher returns. In specification (6), for-profit completers generate returns of 34 percent, compared to just 19 percent in the public sector. In this case, the Chow test is marginally significant at just over the 10 percent significance level with an F-statistic of 2.67.

Table 2B also suggests a striking difference between students who complete degrees and those who do not. The differential effect for dropouts, represented by the coefficient on $FP_i * Post_{it}$ reveals large negative point estimates from 5 to 15 percent. Adding the coefficients on $Post_{it}$ and $FP_i * Post_{it}$ for these students yields small negative, but insignificant, absolute returns of 2.6 percent (specification 2) for dropouts with a confidence interval ranging from a low of - 11 percent to positive 5.7 percent. In comparison, attending a public community college without completion generates no such negative returns: community college attendees experience earnings gains of 5.3 percent ($Post_{it}$) with a confidence interval ranging from 1.3 to 9.4 percent. We can confidently rule out any negative returns for this group.

In Table 3A, we explore the impact of for-profit enrollment on other employment outcomes such as hourly wage, hours worked per week, full-time, and any employment, using our preferred

baseline individual fixed effects regression with indicators for the years in school plus age and year fixed effects. For comparison, we show the results on weekly earnings in column (1).

The results in columns (2) and (3) suggest that the positive effects of associate's degree enrollment on earnings in either sector arise primarily through higher hours worked per week (5 percent higher), rather than higher hourly wages (1.5 percent and insignificant) for students in both sectors. We are again unable to detect a statistically significant differential effect on either wages or hours worked for for-profit students. Specifications (4) and (5) are linear probability models for full-time and any employment, and again, there are no differential effects of for-profit attendance on these outcomes. Point estimates on $FP_i * Post_{it}$ are very close to zero in both specifications, suggesting that both public and private sector students are about 6 percent more likely be employed or employed full-time.

In Table 3B where we control for completion, we find some differential effects for for-profit degree completers relative to community college completers. For-profit students appear to work 10 percentage points more hours and are 11 percentage points more likely to work full time than their public sector counterparts. Summing all four coefficients to assess the absolute effects for for-profit completers, we find that for-profit graduates work 11.6 percent more hours, and are 15.4 percent more likely to work full-time than they were before completing their associate's degree.

B. Testing for Earnings Dips Pre- and Post-Education

Although the individual fixed effects control for time invariant individual characteristics, the dynamic decision to attend any type of college can bias estimates of the absolute returns to education in either sector. As described above, one type of bias arises if an individual's earnings decline in the years immediately prior to college entry. If the pre-earnings trend is different for public and for-profit sector students, then this will also bias the estimates of the differential return to for-profit colleges. Although we find little evidence of such a dip in Figure 1, we test for the dip

empirically in Table 4. These specifications replace $Post_{it}$ with an indicator for the two years before enrollment, denoted $Pre\text{-}Ed_{it}$.[20] Again, we add an interaction with for-profit college $FP_i * Pre\text{-}Ed_{it}$. We also include our standard individual, age, and year fixed effects, along with controls for years in school.

The results suggest that attendees in both sectors experience a dip in earnings of about 7 percent in the two years before enrolling. They also work fewer hours and are less likely to be employed full-time. However, we find no evidence of differential pre-education earnings or employment trends for for-profit students, suggesting that estimates of differential returns are less likely to be biased by pre-education trends than absolute returns. Subtracting 7 percent from our estimates of the absolute returns to for-profits from our baseline specification in Table 2A, specification (2), would suggest negative returns of one percent.[21]

Before concluding that absolute returns are negative, however, it is important to acknowledge that a dip in earnings can also occur immediately following a student's departure from school, biasing estimates in the opposite direction of Ashenfelter's dip, as students transition to new careers. To capture these dynamics, we interact the $Post_{it}$ variable with the reciprocal of the number of years since leaving school (labeled $1/k$) similar to Jacobson, LaLonde and Sullivan (2005). This reciprocal term equals 1 in the year immediately after college allowing for a transition period and converges to zero over time. The $Post_{it}$ variable now can be interpreted as the long run effect of attending an associate's degree program, while the sum of $Post_{it}$ and $Post_{it} * 1/k$ is the immediate short run effect. Similar to Table 4, we also include an indicator for the two years before enrollment $Pre\text{-}Ed_{it}$ and the interaction, $FP_i * Pre\text{-}Ed_{it}$.

[20] We assume that completers first enroll two years prior to completion.
[21] We ran this test (and all others) controlling for completion, as well. Results are generally very similar and are available on request.

Table 5 presents the results, which reveal a small transitional dip in weekly earnings immediately after college. There does not appear to be any significant differential effect for for-profit students. The absolute returns to for-profits in the short run range from -7.7 percent to 13 percent, but in the long run they increase to 7.5 percent with a confidence interval ranging from -2.7 to 17.6 percent. These long run estimates are remarkably similar to our static estimates from Table 3A, which range from -1.4 to 13.8 percent.

Most of the action in the short run dynamics comes from hours worked per week rather than changes in the hourly wage, as shown in columns (2) and (3). The for-profit students are more likely to work longer hours per week immediately after college. But, in the long run they work 6.6 percentage points fewer hours than their public sector counterparts, yielding no significant difference in absolute hours worked for the for-profit students after college in the long run. We find no significant differences between the two sectors for full-time or any employment.

We observe individuals for a very short time period after they attend college, therefore because of the short-run transitional post-education dip, our static estimates may be underestimating the long run returns to attending an associate's degree program at a for-profit college (or community college for that matter). Yet, the overestimation due to Ashenfelter's dip in the years prior to attendance appears to cancel out these effects, keeping our estimates of the absolute returns to for-profit attendance around 7 or 8 percent.

C. High School and College Samples

Our main sample drops individuals with no postsecondary education. Since our estimate of the absolute returns to a for-profit education is identified for a sub-group (associate's degree enrollees) that might have higher returns than the average individual, this may produce higher estimates than the average treatment effect for the population as a whole. To assess the degree of selection bias, we therefore add individuals with only a high school diploma back into the sample. For these

individuals, we create a falsified definition of $Post_{it}$, which turns on at age 21 to match the average age of college entry in our main sample.

Table 6 adds to the sample 649 students who have a high school diploma, but do not pursue postsecondary education. The returns to enrolling in any associate's degree program are similar to our main sample of attendees at 5.6 percent, but are marginally less significant. The interaction on for-profit colleges $FP_i * Post_{it} * AnyCollege_i$ is both economically and statistically insignificant for all outcomes: we again observe no differential effects of for-profit attendance.[22]

As a final robustness check, we include students who complete a bachelor's degree in the time period we observe. In light of our need to observe earnings for several years after attendance and the young age of the NLSY97 cohort, our main sample drops individuals who go on to receive a bachelor's degree or higher and anyone completing 16 or more years of schooling, even if they do not have a bachelor's degree. This restriction creates a selection problem if the proportion of students pursuing bachelor's degrees differs across the two sectors.

In Table 7, we add 773 students who complete a bachelor's degree or 16 or more years of education, without a degree. In this sample, 15 percent of public students complete a bachelor's degree compared to 6.6 percent of for-profit students. This difference is perhaps unsurprising given the articulation agreements between public community colleges and state universities. Unsurprisingly, we observe post-education earnings for only a few years for these bachelor's degree graduates. By four years after graduation, we only observe earnings for 25 percent of graduates because the rest are still very young.

Our results are remarkably similar to the main sample. Individuals pursuing an associate's degree in either sector earn 6.7 percent more in either sector, with no significant differential effect

[22] As a robustness check, we also ran the Ashenfelter's dip analysis on this high school sample. Interestingly, including the high school graduates reduces the size and significance of the pre-education dip. While everyone experiences a dip in earnings (mostly from fewer hours worked per week), we find no differential effect for individuals that attend any college or for individuals that attend for-profit colleges.

of for-profit attendance. Relative to their counterparts in the public sector, for-profit students appear to work 4.2 percentage points fewer hours, but results are only significant at the 10 percent level. Individuals in either sector are more likely to be employed full time post-education.[23]

VI. Concluding Remarks

This study takes a first step in assessing the quality of for-profit postsecondary education, estimating the before-after earnings gains of students pursuing associate's degrees in for-profit institutions. We also compare the returns of for-profit students to those of their counterparts in public community colleges.

Using an individual fixed effects approach and data from the restricted-use 1997 NLSY, we find that students who enroll in for-profit institutions experience earnings gains of about 6 to 8 percent, but our confidence intervals and robustness checks yield a wide range of plausible estimates—as low as -2.7 percent and as high 17.6 when we account for dynamic patterns of earnings. In some, but not all specifications, we can rule out zero (and negative) returns, but in no specification can we rule out extremely low returns (e.g., 1 percent). Still, the possibility of relatively high returns to for-profit college attendance remains and more research must be done to narrow the range of estimates found here.

Nonetheless, if we assume no substantial bias from selection into the public and private sectors, our results on the differential returns to for-profit attendance relative to public community colleges are remarkably consistent across specifications, yielding point estimates that are typically very close to zero and never significant.

[23] For this sample, we also ran a specification dropping students who worked for a few years after completing an associate's degree, but then returned to college: the results were unchanged. Additional robustness checks (not shown, available on request), included dropping individuals with any missing earnings data, using alternate definitions of earnings (just the current/most recent job and all ten jobs), using the NLSY97 sampling weights, adding a measure of potential experience (age-schooling-6), and using self-reported "private college" attendance. Across all of these tests, the point estimates on for-profit attendance are never significant. In extensions, we looked at vocational certificate students in the NLSY97 and ran our specification on the 1979 panel of the NLSY, although measures of for-profit attendance were imprecise for these samples.

Interestingly, we find that degree completion is an important determinant of returns for associate's degree students in both sectors, but it may be more important for for-profit students than for community college students. Although completion is admittedly endogenous, when we control for it, we find that for-profit students completing associate's degrees generate earnings gains of about 22 percent, or about 11 percent per year of education. In some specifications, these gains can be shown to be slightly higher than gains for public sector graduates. Moreover, for-profit graduates also appear to work more hours and be more likely to work full-time relative to community college alumni. In contrast, for-profit dropouts appear to experience negative returns and fare considerably worse than their public sector counterparts. These results suggest that completion rates may be a particularly important determinant of the quality of a for-profit education.

Our results are robust to a number of different earnings measures, specification checks, and sample constructions. We find important dynamic patterns of earnings: our results suggest that associate's degree students in both sectors experience a decline in earnings both immediately before and after attendance. These "dips" are roughly the same magnitude, causing them to effectively cancel each other out, leaving us with estimates similar to our static estimates, at 7.5 percent.

If we accept that the returns to education are roughly equal for for-profit and public sector students, then our results beg the question as to whether the higher price of for-profit colleges can be justified. From a student's perspective, it would seem that given roughly similar returns, a lower-cost community college would likely be a better choice. It may be the case that students are unaware of the options available at local community colleges (Cellini 2009) and we cannot rule out that aggressive recruiters in the private sector might mislead students into believing that the earnings gains will be higher than in the public sector (GAO 2010). On the other hand, students may simply value other attributes of for-profit colleges. For example, some programs may be

offered in the private sector that are not offered in the public sector, and public institutions may be capacity constrained, making for-profit institutions the only viable option.

The more important question, then, is not why a student might choose a for-profit college, but whether the student's earnings gains are sufficient to offset both the private and social costs of education in this sector. Recent work assessing the costs of a for-profit college education (Cellini 2012) suggests that the earnings gains we find may be enough to offset the costs for associate's degree completers, but this is likely not the case among dropouts or attendees more generally. However, much more research is needed to determine definitively whether the benefits outweigh the costs for the average student.

This study is just a first step toward understanding the quality of education in the for-profit sector. More studies using alternative data sources and methods are needed to definitively assess student outcomes in for-profit postsecondary institutions. Future studies should closely examine degree completion and four-year college transfer rates, and assess whether returns differ by occupation, institution size, financial aid eligibility, and other characteristics of institutions and individuals. For now, however, our estimates demonstrate that for-profit colleges, on average, generate positive earnings gains that are similar to those experienced by students in the public sector. These institutions may indeed be worth the high price for some students—particularly those that cannot find their needs met in the public sector. However, in light of the much higher cost of a degree in the private sector, it is likely that at least some students who can find similar programs in the public sector would be better served in lower-cost community colleges.

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Figure 1. Time pattern of Log Earnings, NLSY97

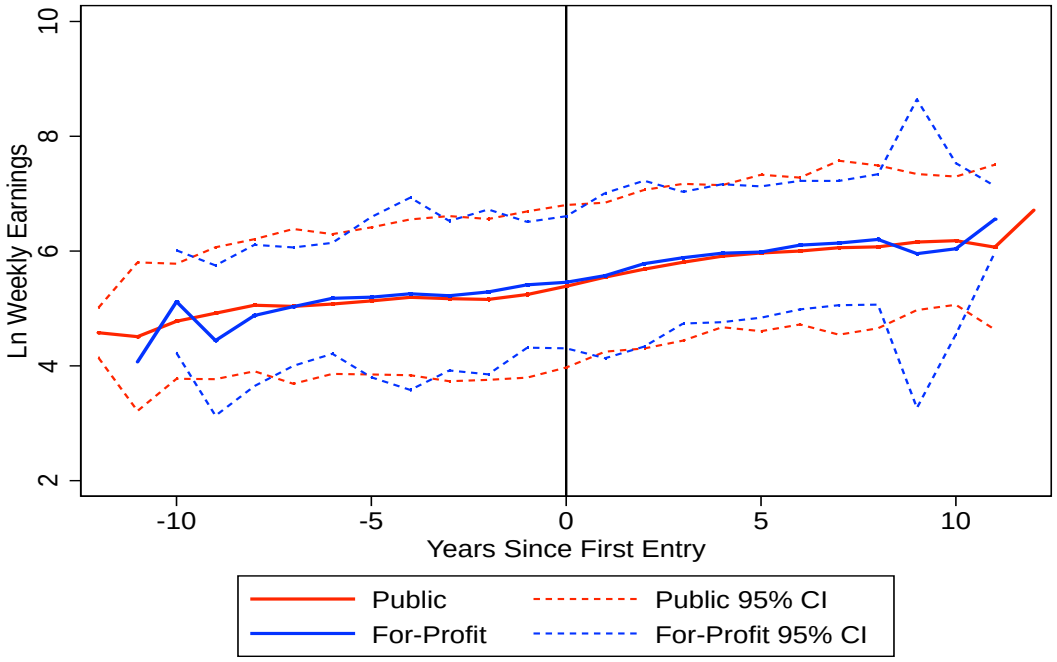

Figure 2. Age Profile of Earnings, NLSY97

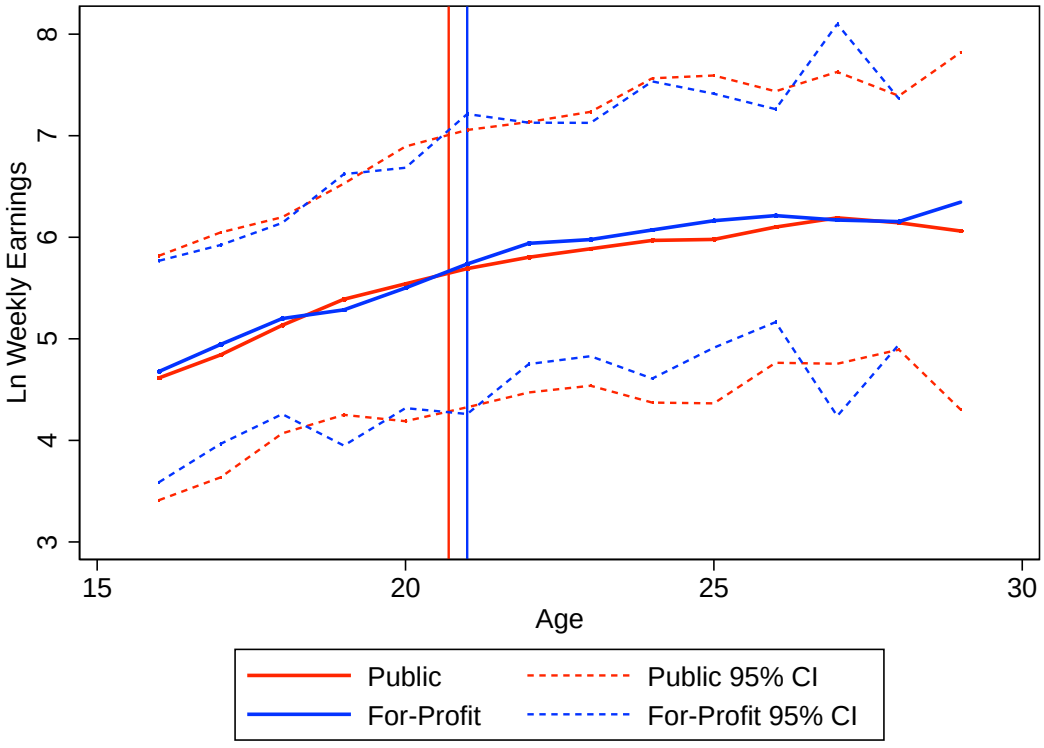

Table 1. Summary Statistics, NLSY97

	Pre-Education			*Post-Education*		
	Public (sd)	For-Profit (sd)	Diff (t-stat)	Public (sd)	For-Profit (sd)	Diff (t-stat)
Weekly Earnings	$254	$293	-$39	$482	$509	-$27
	($626)	($1,499)	(0.85)	($1,325)	($1,822)	(0.43)
Avg Wage	$9.13	$9.49	-$0.36	$14.45	$17.70	-$3.25
	($28)	($34)	(0.34)	($47)	($121)	(0.80)
Avg Hrs Worked/Week	28.2	29.7	**-1.5**	34.6	34.9	-0.27
	(10.8)	(11.0)	**(4.16)**	(10.3)	(9.7)	(0.79)
Full Time Employment	26.0%	29.4%	**-3.4%**	47.5%	50.2%	-2.7%
	(0.44)	(0.46)	**(2.67)**	(0.50)	(0.50)	(1.76)
Any Employment	76.6%	76.8%	-0.3%	77.7%	79.9%	-2.2%
	(0.42)	(0.42)	(0.23)	(0.42)	(0.40)	(1.71)
Age	19.0	19.1	**-0.2**	23.3	24.0	**-0.6**
	(2.5)	(2.4)	**(2.45)**	(2.6)	(2.4)	**(7.51)**

	Time-Invariant Variables		
	Public (sd)	For-Profit (sd)	Diff (t-stat)
Male	46.0%	41.2%	**4.8%**
	(0.50)	(0.49)	**(4.1)**
White, Non-Hispanic	37.5%	34.3%	**3.3%**
	(0.48)	(0.47)	**(2.9)**
Black, Non-Hispanic	22.3%	26.0%	**-3.7%**
	(0.42)	(0.44)	**(3.6)**
Asian, Pacific Islander	1.0%	0.8%	0.2%
	(0.10)	(0.09)	(1.0)
Hispanic	19.9%	18.6%	1.2%
	(0.34)	(0.39)	(1.3)
Other Race	4.1%	5.6%	**-0.01**
	(0.20)	(0.23)	**(2.7)**
Foreign Born	6.9%	5.6%	**1.3%**
	(0.25)	(0.23)	**(2.3)**
Primary Language Not English	6.1%	8.2%	**-2.1%**
	(0.24)	(0.27)	**(2.9)**
Math Scores (ASVAB)	0.70	0.74	**-0.04**
	(0.52)	(0.54)	**(2.8)**
Reading Scores (ASVAB)	0.69	0.68	0.01
	(0.51)	(0.57)	(0.5)
Household Income	$43,713	$38,531	**$5,181**
	($35,814)	($31,767)	**(5.4)**
No. of Individuals	1,933	226	2,159

Notes: See text for details on the sample. Individuals in the samples are age 16 or older. Weekly earnings, hourly wage and hours worked per week are means across the first five jobs worked in the year.

Table 2A. Returns to For-Profit College Attendance, Log Weekly Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	Individual FE					
FP*Post	0.0354	-0.00608	-0.000214	0.0195	-0.0272		
	[0.0370]	[0.0389]	[0.0383]	[0.0421]	[0.0438]		
Post	0.0911***	0.0680***	0.0639***	0.0293	0.0576**	0.110**	0.0634***
	[0.0194]	[0.0202]	[0.0203]	[0.0221]	[0.0225]	[0.0509]	[0.0210]
Notes	Loaded OLS	Baseline FE	FE with flexible controls	Age 18 and over only	Dropping years in school	For-Profits Only	Publics Only
No. Obs.	18,767	18,767	18,767	15,742	16,355	2,002	16,765
No. Individuals		2,153	2,153	2,141	2,146	226	1,927

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include age and year fixed effects, and other than specification (5) they also include dummies for the years in school. Specification (1) is the fully loaded OLS including controls for race, gender, region, ability, foreign language and income. Specification (2) is our baseline individual FE model with age and year FE, as well as controls for years in school. Specification (3) adds interactions of age with race, gender and region to the baseline FE in (2). Specification (4) restricts the baseline FE in (2) to age 18 and over. Specification (5) drops the years in school. Specification (6) includes only for-profit students and specification (7) includes only public sectors students. Log weekly earnings are the natural log of mean earnings across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after the last observed enrollment and every year thereafter. Estimates are conditional on employment and observations with missing earnings are dropped.

Table 2B. Returns to For-Profit College Attendance and Degree Completion, Log Weekly Earnings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	Individual FE					
FP*Post*Degree	0.0934	0.0981	0.0834	0.0970	0.157*	0.284***	
	[0.0683]	[0.0601]	[0.0586]	[0.0599]	[0.0854]	[0.0590]	
FP*Post	-0.0402	-0.0797*	-0.0674	-0.0461	-0.151***	0.0581	
	[0.0437]	[0.0445]	[0.0437]	[0.0466]	[0.0582]	[0.0503]	
Post*Degree	0.131***	0.152***	0.151***	0.139***	0.189***		0.149***
	[0.0333]	[0.0313]	[0.0308]	[0.0314]	[0.0369]		[0.0315]
Post	0.0831***	0.0533***	0.0490**	0.0145	0.00560		0.0430**
	[0.0196]	[0.0206]	[0.0207]	[0.0226]	[0.0243]		[0.0212]
Notes	Loaded OLS	Baseline FE	FE with flexible controls	Age 18 and over only	Dropping years in school	For-Profits Only	Publics Only
No. Obs.	18,767	18,767	18,767	15,742	16,355	2,002	16,765
No. Individuals		2,153	2,153	2,141	2,146	226	1,927

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

(1) is the fully loaded OLS including controls for race, gender, region, ability, foreign language and income. Specification (2) is our baseline individual FE model with age and year FE, as well as controls for years in school. Specification (3) adds interactions of age with race, gender and region to the baseline FE in (2). Specification (4) restricts the baseline FE in (2) to age 18 and over. Specification (5) drops the years in school. Specification (6) includes only for-profit students and specification (7) includes only public sectors students. Log weekly earnings are the natural log of mean earnings across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Degree = 1 if the individual graduated with an associate's degree. Estimates are conditional on employment and observations with missing earnings are dropped.

Table 3A. Effects of For-Profit College Attendance on Labor Market Outcomes

	Log Wkly Earn	Log Hrly Wages	Log Hrs/Week	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Post	-0.00608	0.0257	-0.0305	-0.0101	0.00119
	[0.0389]	[0.0286]	[0.0247]	[0.0264]	[0.0231]
Post	0.0680***	0.0153	0.0500***	0.0633***	0.0578***
	[0.0202]	[0.0164]	[0.0126]	[0.0131]	[0.0114]
No. Obs.	18,767	18,767	18,767	24,287	24,287
No. Individuals	2,153	2,153	2,153	2,159	2,159

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include age and year fixed effects, and a control for the years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Cols. (1)-(3) are conditional on employment. In all specifications, observations with missing earnings are dropped.

Table 3B. Effects of For-Profit College Attendance and Degree Completion on Labor Market Outcomes

	Log Wkly Earn	Log Hrly Wages	Log Hrs/Week	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Post*Degree	0.0981	-0.0178	0.103***	0.112**	-0.00716
	[0.0601]	[0.0542]	[0.0397]	[0.0466]	[0.0383]
FP*Post	-0.0797*	0.0121	-0.0852***	-0.0679**	-0.000738
	[0.0445]	[0.0345]	[0.0287]	[0.0292]	[0.0273]
Post*Degree	0.152***	0.101***	0.0508**	0.0493**	0.0237
	[0.0313]	[0.0263]	[0.0223]	[0.0207]	[0.0176]
Post	0.0533***	0.00300	0.0472***	0.0604***	0.0547***
	[0.0206]	[0.0168]	[0.0127]	[0.0131]	[0.0117]
No. Obs.	18,767	18,767	18,767	24,287	24,287
No. Individuals	2,153	2,153	2,153	2,159	2,159

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include age and year fixed effects, and a control for the years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Cols. (1)-(3) are conditional on employment. Degree = 1 if the individual graduated with an associate's degree. In all specifications, observations with missing earnings are dropped.

Table 4. Effects of For-Profit College Attendance on Pre-Education Outcomes

	Log Wkly Earn	Log Hrly Wage	Log Hrs/Wk	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Pre-Ed	0.00414	-0.0211	0.0379	-0.0200	-0.0126
	[0.0348]	[0.0264]	[0.0243]	[0.0254]	[0.0220]
Pre-Education	-0.0727***	-0.0186*	-0.0552***	-0.0384***	0.000876
	[0.0141]	[0.0105]	[0.0103]	[0.00883]	[0.00849]
No. Obs.	18,767	18,767	18,767	24,287	24,287
No. Individuals	2,153	2,153	2,153	2,159	2,159

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: All the regressions include age and year fixed effects, as well as a control for years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Pre-Education = 1 for the two years before individuals enroll in an associate's degree program. Cols. (1)-(3) are conditional on employment. In all specifications, observations with missing earnings are dropped.

Table 5. Dynamics Patterns in Earnings for For-Profit College Attendance

	Log Wkly Earn	Log Hrly Wage	Log Hrs/Wk	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Post*1/k	0.0652	-0.0754	0.122***	0.0686	-0.0521
	[0.0604]	[0.0531]	[0.0369]	[0.0445]	[0.0338]
FP*Post	-0.0213	0.0609	-0.0658**	-0.0477	0.0132
	[0.0513]	[0.0410]	[0.0327]	[0.0341]	[0.0289]
Post*1/k	-0.113***	-0.0533**	-0.0604***	-0.0422**	0.0408***
	[0.0264]	[0.0233]	[0.0155]	[0.0169]	[0.0143]
Post	0.0958***	0.0368	0.0550***	0.0782***	0.0602***
	[0.0311]	[0.0275]	[0.0181]	[0.0186]	[0.0157]
FP*Pre-Ed	0.00635	-0.00532	0.0289	-0.0293	-0.0137
	[0.0368]	[0.0277]	[0.0262]	[0.0254]	[0.0225]
Pre-Education	-0.0584***	-0.0168	-0.0449***	-0.0133	0.0365***
	[0.0171]	[0.0130]	[0.0121]	[0.0105]	[0.00971]
No. Obs.	18,767	18,767	18,767	24,287	24,287
No. Individuals	2,153	2,153	2,153	2,159	2,159

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: All regressions include age and year fixed effects, and a control for the years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. 1/k = the reciprocal of the number of years since leaving school. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Pre-Education = 1 for the two years before individuals enroll in an associate's degree program. Cols. (1)-(3) are conditional on employment. In all specifications, observations with missing earnings are dropped.

Table 6. Effects of For-Profit College Attendance: Adding High School Graduates

	Log Wkly Earn	Log Hrly Wages	Log Hrs/Week	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Post*Any College	-0.00835	0.0242	-0.0314	-0.0140	-0.00529
	[0.0390]	[0.0287]	[0.0247]	[0.0264]	[0.0232]
Post*Any College	0.0349*	-0.00403	0.0311**	0.0279**	-0.0107
	[0.0203]	[0.0159]	[0.0127]	[0.0127]	[0.0113]
Post	0.0206	0.0106	0.0128	0.0465***	0.0949***
	[0.0174]	[0.0141]	[0.0112]	[0.0119]	[0.0106]
No. Obs.	24,323	24,323	24,323	31,560	31,560
No. Individuals	2,797	2,797	2,797	2,808	2,808

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: The sample includes all individuals with a high school diploma or equivalent. All regressions include age and year fixed effects, and a control for the years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. Any College = 1 if the individual attended any type of postsecondary education. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Cols. (1)-(3) are conditional on employment. In all specifications, observations with missing earnings are dropped.

Table 7. Effects of For-Profit College Attendance: Adding 4-yr College Graduates

	Log Wkly Earn	Log Hrly Wages	Log Hrs/Week	FT Employ	Any Employ
	(1)	(2)	(3)	(4)	(5)
FP*Post	-0.0431	-0.00678	-0.0415*	-0.00248	0.00923
	[0.0361]	[0.0263]	[0.0226]	[0.0240]	[0.0212]
Post	0.0673***	0.0308**	0.0375***	0.0505***	0.0448***
	[0.0171]	[0.0130]	[0.0114]	[0.0109]	[0.00953]
No. Obs.	25,452	25,452	25,452	33,045	33,045
No. Individuals	2,925	2,925	2,925	2,932	2,932

Robust standard errors clustered at the individual level in brackets. *** p<0.01, ** p<0.05, * p<0.1

Notes: The sample adds individuals who report completing a bachelor's degree or more than 16 years of education in the time period we observe. All regressions include age and year fixed effects, and a control for the years in school. Weekly earnings, hourly wage, and hours worked per week are means across the first five jobs worked in the year. FP = 1 if the individual attended a for-profit institution. Post = 1 in the year after we observe attendance and thereafter. Cols. (1)-(3) are conditional on employment. In all specifications, observations with missing earnings are dropped.