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Heterogeneous Paths Through College: Detailed Patterns and Relationships with Graduation and Earnings

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ABSTRACT

A considerable fraction of college students and bachelor's degree recipients enroll in multiple postsecondary institutions. Despite this fact, there is scant research that examines the nature of the paths – both the number and types of institutions – that students take to obtain a bachelor's degree or through the higher education system more generally. We also know little about enrollment in multiple institutions of varying quality relates to postgraduate life outcomes. We use a unique panel data set from Texas that allows us to both examine in detail the paths that students take towards a bachelor's degree and estimate how multiple institution enrollment is related to degree completion and subsequent earnings. We show that the paths to a bachelor's degree are diverse and that earnings and BA receipt vary systematically with these paths. Our results call attention to the importance of developing a more complete understanding of why students transfer and what causal role transferring has on the returns to postsecondary educational investment.

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The paths students take through the postsecondary sector are heterogeneous and have become more so over time. For example, in the high school class of 1972, 59.5% of students enrolled in one institution, and this proportion fell to 53.8% (a 9.6% decline) among the high school class of 1992. The majority of multi-institutional contact is due to student transferring.[1] Despite the increasing prevalence of transferring behavior, the extent and character of transferring, as well as the underlying reasons students change institutions, are poorly understood. A critical constraint in developing a better understand of student transferring behavior is the lack of datasets with sufficient detail and size to allow one to describe the myriad ways in which students transfer, what types of students are making different types of transfer decisions, and how transferring is related to long-run student outcomes such as BA completion and earnings. Ultimately of interest is understanding the reasons students make different transfer decisions and identifying the causal effect of transferring on student outcomes. Without a detailed description of these patterns, though, it is difficult to even generate plausible hypotheses about transfer behavior that can be tested.

Given the need to more fully examine how students transfer and the correlates of this decision with student characteristics and longer-run outcomes, this paper provides a comprehensive descriptive analysis of transferring using a large administrative dataset with detailed student information and earnings. Our analysis is split into two parts. First, using administrative data from the University of Texas at Dallas's Education Research Center, we provide a detailed description of the educational paths that students take through the postsecondary educational system in Texas. Our data contain rich information about all in-state postsecondary institutions attended by all students in Texas, which allows us to trace out the numerous ways in which students move through the state's higher education system. Somewhat akin to Adelman

[1] McCormick (2003) reports that about 2/3 of multi-institutional contact is due to student transferring, while the remainder is driven by summer and dual enrollment.

(2004) and Jargowsky, McFarlin, Jr. and Holovchenko (2005), we show that transferring is prevalent and that "traditional" transfer pathways – e.g., attending a two year school and then a four-year college or transferring once between four-year colleges – are inadequate to capture the multitude of ways that students progress through the system. Unlike these previous analyses, however, we have a sufficiently large sample size to examine a complex and comprehensive set of transferring patterns among postsecondary students. This descriptive analysis highlights the importance of many different forms of multi-institutional contact in higher education and is strongly suggestive that such issues deserve more consideration among education researchers.

The second goal of this paper is to offer descriptive evidence about the relationship between a student's pathway through college and subsequent outcomes. Our analysis focuses on the likelihood of graduating with a bachelor's (BA) degree and on subsequent earnings. There is evidence that school quality impacts the ability of students to obtain a BA (Bound, Lovenheim and Turner, 2010). There also is a sizable literature that seeks to estimate the labor market returns to college quality (e.g, Brewer, Eide and Ehrenberg, 1999; Dale and Krueger, 2002; Black and Smith, 2006; Hoekstra, 2009; Long, 2010; Andews, Li and Lovenheim, 2012). On the main, this literature finds large returns, as measured by subsequent wages or earnings, to attending a college of higher quality. Identification of the effect of higher education quality on BA receipt and future labor market success typically characterizes quality as a function of the first school attended by a student. However, a focus on the first institution attended ignores the fact that the first institution may not be sufficient to encapsulate a student's educational experience because of transferring. We show that a substantial portion of students have contact with multiple institutions, so it is not clear what the simple metric of first college affiliation used in the previous work actually represents.

There are few published papers that examine how the returns to college vary with transfer status. Hilmer (2000) finds that direct attendees (i.e., students who begin and graduate from the same institution), students who transfer to four-year schools from community colleges, and students who transfer from lower-quality universities to universities of high-quality (defined as a university with an average age SAT score of at least 1200 points) experience large and statistically significant wage gains from college. Students who transfer from high-quality universities to institutions of lower quality, however, experience significant wage penalties relative to these other groups. That students who "transfer down" perform worse in the labor market is notable and suggests that transferring behavior does impact the returns to investing in a college degree. But, because transfer students tend to have lower academic achievement and tend to be from lower socioeconomic backgrounds, it is difficult to interpret such evidence as causal.

Light and Strayer (2004) analyze data from NLSY79 and show that transferring is prevalent among BA and non-BA recipients as well as among eventual associates degree recipients. They also find evidence that transferring increases earnings relative to observationally-equivalent non-transfer students. The mechanisms hypothesized are that transferring increases match quality and also facilitates graduating. This analysis focuses on returns to different levels of schooling by transfer status, but due to sample size limitations, they cannot examine the role of institutional quality beyond the general two-year, four-year distinction. It also is not possible in the NLSY79 to trace out transfer paths with a high degree of specificity.[2]

Our analysis makes several contributions to the literature. First, with our large data set of over 1.1 million college students in Texas, we are able to examine a richer set of educational paths

[2] There is a literature as well on the effects of transferring from two-year to four-year schools. Long and Kurlaender (2009) and Reynolds (2012) show that students who begin at a two-year college are less likely to complete a BA. Kalogrides and Grodsky (2011) highlight the role of community colleges as "safety nets," however, which help mitigate against students dropping out of higher education. Agan (2013) shows lifecycle earnings differ substantially based on the paths students take through college as measured broadly across the two- and four-year sectors.

than in previous work (e.g., Hilmer, (2000) observes only 794 male graduates and Adelman (2006) uses the approximately 6,000 students with a postsecondary transcript file in the NELS:88). Our larger sample size combined with our use of state administrative data allow us to trace out in a detailed manner the heterogeneous ways in which students move through the postsecondary system.[3] Our data include state unemployment insurance earnings records as well, which permits us to link these pathways to differences in future earnings. Additionally, we are able to examine these relationships for the overall sample and differently by race and ethnicity. Such an analysis is novel in this literature.

Although we use a large and rich dataset, we only observe students in Texas. This is a more geographically-limited sample than has been used in prior work. But, the higher education system in Texas is very similar to those in most other states, with a large amount of heterogeneity in quality ranging from elite flagship universities to less-selective four-year schools and community colleges. This vertically-differentiated system is found in almost every state, and the high rates of public school enrollment in Texas are common throughout the US as well. The similar structure of the higher education market in Texas to the rest of the country suggests our estimates in Texas are likely to be reflective of patterns more generally in the United States.

Our findings uncover a large amount of heterogeneity in the paths students take through college that involve more than two-year to four-year transfers and single institution switches. In line with previous work, we find that, among those who eventually obtain a four-year degree, students who "transfer up" to more selective institutions, such as transferring from a non-flagship four-year school to a state flagship, have lower measured academic achievement in high school and are more likely to be black or Hispanic. Transfer students also tend to have slightly lower

[3] A drawback of using these data is that we are unable to observe private school attendance. However, higher education in Texas is dominated by the public institutions, so we do not miss many students due to the absence of private schools from our data.

college GPAs, take about 0.4 more years to graduate, and are less likely to major in technical subjects, such as engineering.

With respect to completion, we find that transfer students earn BAs at about the same rate as direct attendees. Transfers into UT-Austin from a community college have a BA attainment rate 3% lower than UT-Austin direct attendees, but these rates are identical for Texas A&M students. Among non-flagship students, transfers in from all other sectors are more likely to graduate than direct attendees. These estimates are inconsistent with the hypothesis that transferring has a deleterious effect on BA attainment. However, a caveat to these results is that we find large differences in completion likelihoods among students who transfer in their second year (compared to all second year students) versus those who transfer in their third year (compared to all third year students), with the latter group being far less likely to graduate. This result is suggestive that the timing of transferring is meaningfully related to college completion.

Despite its small and typically positive correlation with four-year graduation, we show evidence that transfers earn substantially less than direct attendees. Among UT-Austin graduates, transfer students from non-flagship four-year and community colleges who graduate earn between 11% and 14% less than direct attendee graduates, while among Texas A&M graduates this difference is about 6%. Those who transfer to a non-flagship four-year school from universities outside the flagship sector also earn between 2-4 percent less than direct attendees. Controlling for college major and GPA, however, significantly reduces these differences, indicating that differences in majors and college performance between transfer students and direct attendees can explain some of the earnings gaps we identify. Finally, we document a significant amount of heterogeneity in these patterns by race, ethnicity and gender.

The remainder of this paper is organized as follows. Section 1 describes the data. Section 2 presents detailed tabulations of transfer behavior, and Section 3 describes the relationship between the path to a BA, college completion and the earnings premium associated with graduating from different types of schools. The 4th Section concludes.

Section 1. Data

The data used in this study are derived from three sources: Pre-K to 12th grade administrative data from the Texas Education Agency (TEA), college administrative data from the Texas Higher Education Coordinating Board (THECB), and quarterly earnings data from the Texas Workforce Commission (TWC). The data are housed at the Texas Schools Project, a University of Texas at Dallas Education Research Center (ERC). Individual social security numbers allow us to link the data from these three sources. Thus, we can follow each Texas student from Pre-K all the way through college until entering into the job market as long as this student stays in Texas.[4]

Section 1.1. Sample to Study Transfer Behavior

Using the ERC data, we first generate a sample to investigate the transfer behavior of the college students enrolled in Texas public colleges or universities. Due to data availability, we focus on students who graduate from Texas public high schools between 1992 and 2002 and who start their college education in Texas public colleges or universities within two years after high school graduation.[5] We have a total of 1,141,186 students in our sample.

[4] This data set is the same one used in Andrews, Li and Lovenheim (2012). That paper shows detailed evidence that graduates from each college sector we consider are not missing from the data differentially with respect to their pre-collegiate observable characteristics. Individuals can be missing from our postsecondary data because they attend a private university or because they attend school out of state. They can be missing from our earnings sample because they do not work or because they leave the state after college. Table 2 in Andrews, Li and Lovenheim (2012) shows that there are no systematic differences in the characteristics of those excluded from our data across college sectors.

[5] The time limit of college enrollment we impose allows us to focus on first-time, "traditional" college students. Note that because we do not observe out of state attendance, if students begin college in another state and transfer to

To observe the possible different transfer behaviors for students starting from different institutions, we group our sample into four subsamples: UT-Austin (UT), Texas A&M-College Station (TAMU), other 4-year colleges or universities, and community colleges.[6] There are 57,881, 58,618, 341,541, and 683,149 students that started their college education at UT, TAMU, other 4-year colleges or universities, and community colleges, respectively (See Table 1). These sectors also represent the different quality levels of public institutions in Texas.[7]

To observe the transfer behavior of the students in our sample, we use enrollment histories collected by the THECB for each semester. We stack all enrollment records of a student in order to sequence each student's enrollment history. Because college students take various lengths to finish their college education, we limit our observation of transferring behavior in an eight-year window by dropping any enrollments beyond eight years after high school graduation.[8] For the bachelor degree recipients, we drop all the enrollment records after they received their first bachelor's degree or from before high school graduation. Meanwhile, students often choose to take courses at community colleges or universities close to their homes in summer semesters, with the intention of returning to their full-time institution in the fall or spring. These types of enrollment changes are not traditionally viewed as transfer behaviors, and so we drop all the enrollment records in summer semesters and do not count such enrollment as part of our multiple institutional contact measure.

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a Texas public university within two years of high school graduation, we will not observe this behavior as a transfer. This will cause us to understate transferring prevalence to some degree.

[6] Hereafter, we will use "UT" to stand for UT-Austin and "TAMU" to stand for Texas A&M-College Station. These two flagship universities are distinguished from other UT campuses and other Texas A&M campuses, which are part of the other four-year, or "non-flagship" sector.

[7] College quality is very difficult to measure with a single variable or set of variables (Black and Smith, 2006). Our use of broad sectors to differentiate schools of different quality follows much of the previous literature (e.g., Brewer, Eide and Ehrenberg, 1999; Hoekstra, 2009; Bound, Lovenheim and Turner, 2010; Lovenheim and Reynolds, 2011, 2013).

[8] Bound, Lovenheim and Turner (2010) show that most "traditional" students who graduate do so within eight years of high school graduation.

We follow THECB's definition of a transfer. When a student's current enrolled institution is different from the institution she enrolled in during the previous semester in which we observe her, excluding summer semesters, we view that as a transfer. Sometimes, students enroll in multiple institutions simultaneously. In such cases, we do not count this student as having transferred. Combined with our exclusion of summer enrollment, this restriction on our definition of transferring leads to a conservative measure of the number of transfers.

Our definition of a transfer is similar to what has been done previously. Like Goldrick-Rab (2006), we exclude summer enrollment; however, the focus of that paper is on contact with multiple institutions, and a count of the number of institutions on the transcript is used to measure multi-institution contact. This measure thus conflates dual enrollment with transferring. Goldrick-Rab and Pfeffer (2009) first define one's "primary institution" as the institution where a student took the most credits for a given year. A transfer is defined as switching one's primary institution in the subsequent year. Overall, this definition is similar to our own; however, this definition could over-count transfers to the extent that the identity of the primary institution may switch without an actual transfer if there is dual enrollment and the proportion of credits is shifted across schools. Light and Strayer (2004) define transferring in the NLSY79 as a student attending multiple colleges within 12 months of each other. Our definition of transfer does not impose the time limit. Therefore, our measure classifies changes in institution that occur more than a year apart as a transfer while the definition used in Light and Strayer (2004) would not. Otherwise, the definitions match closely with one another.

Section 1.2. Sample to Study Differences in BA Receipt and Earnings

In order to examine how transferring relates to completion likelihoods and post-collegiate earnings, we use data on graduation timing, status, and institutions attended from the THECB and

first define a "direct attendee" as any student who begins and finishes at a given institution and who does not transfer. In categorizing multiple institution enrollment while examining outcomes, we only consider one's first postsecondary institution and one's graduating institution, which means we ignore the transfer paths in between starting and graduating from colleges. We simplify college paths in this manner in order to give us a tractable way to examine the heterogeneity in completion and earnings based on students' college paths. Examining these outcomes separately for each of the different paths we consider in the first part of the analysis would generate a large volume of estimates, many of which would be based on small sample sizes. Our simplification dramatically reduces the number of potential estimates while still allowing us to examine differences in earnings and BA receipt among students taking different core pathways to obtain a degree at a given institution type.

We focus on students who graduate from Texas public high schools during the years 1996 – 2002,[9] and for our earnings analysis we restrict our sample to those who have earned bachelor degrees from Texas' public colleges and universities. The sample includes all students in public universities in Texas over this time period who meet the following restrictions: 1) No missing data for any of the covariates, 2) The student must start college education within two years after high school graduation and must graduate no later than eight years after high school, 3) The graduate's earnings for a given year are included only if he or she worked for four consecutive quarters in the year, with the exception of 2009 where the requirement for inclusion is three consecutive quarters as we only have three quarters of available earnings data for 2009, and 4) The student must not be

[9] Our earnings and completion analyses exclude students who graduated between 1992 and 1995 because the state high school exams switched between the 1995 and 1996 cohorts. Given the importance of controlling for measured high school academic ability, we focus on students who take the same exam. We include the 1992-1995 cohorts in our tabulations of transfer paths due to the need to maximize sample size to identify the large number of different paths students take. Results are similar using only the 1996-2002 cohorts and are available upon request.

currently enrolled in graduate school when the earnings are measured.[10] These restrictions are meant to isolate the earnings of full-time workers, and they are similar to the sample restrictions imposed by Hoekstra (2009) and Andrews, Li and Lovenheim (2012).

The sample includes 155,345 graduates. Among the 20,886 UT-Austin graduates, there are 17,583 direct attendees, 1,286 transfers from Texas's other four-year public colleges and universities, and 2,017 transfers from Texas' community colleges. At Texas A&M, there are 27,036 graduates, with 20,153 direct attendees, 1,733 transfers from Texas' other four-year public colleges and universities, and 5,150 transfers from Texas' community colleges. Among the non-flagship public universities in Texas, we observe 107,423 graduates, 61,274 of whom are direct attendees, 9,524 are transfers from other non-flagship four-year public colleges and universities in Texas, 2,023 are transfers from UT or TAMU, and 34,602 are transfers from Texas' community colleges. There are 941 students who do not fall into any of the above groups. Because there are very few UT graduates who transferred from TAMU as well as TAMU graduates who transferred from UT, we do not include them in our earnings analysis.

We obtain records of each individual's quarterly earnings from the TWC and examine earnings data for the years 2007 – 2009. In order to generate one earnings estimate per respondent, we stack an individual's log quarterly earnings (subject to the inclusion criteria) and regress them on year, quarter-of-year, and high school cohort indicators. We use the within-graduate average residual from this regression as the earnings measure in our empirical models. This method isolates the constant component of earnings for each individual over the period for which we observe his earnings and allows us to control for time- and cohort-specific shocks as well as for seasonality.

[10] Students who earn a graduate degree are included. The fourth restriction ignores earnings while students are enrolled in graduate school because they are likely not reflective of the student's permanent earnings. Furthermore, note that there are very few private universities in Texas with graduate schools, and those programs tend to be quite small. Thus, there will be few earnings observations in our data that we include because we cannot observe private graduate school enrollment in Texas.

A major strength of our data from TEA is that they include a rich set of individual academic, demographic and high school information that allows us to control in a detailed manner for selection of students into universities of different quality. Individual information consists of fourth order polynomials in math, reading and writing TAAS scores,[11] within-high school relative rank on each exam, student race/ethnicity, Title I status, English proficiency, free and reduced price lunch status, enrollment in gifted/talented program, special education, and technology courses, whether the student has a college plan, and whether he was at risk of dropping out. High school campus variables include, for each year of graduation, the ethnic composition of the high school, the percentage of students in each economic status group, the percentage of gifted students and students at risk, the percentage of title I eligible students, and total school enrollment. These individual covariates represent a more powerful set of controls for student academic backgrounds that are correlated with college paths and with collegiate and post-collegiate outcomes than are available in the data sets used in previous analyses on transfer behavior. However, we underscore that even conditional on these student background measures transferring is likely to be endogenous with respect to BA and earnings outcomes. The results we present below thus are descriptive, rather than causal, in nature. But, any endogeneity between our outcomes of interest and transferring must be residual to the large volume of student characteristics and college preparation measures we observe, which highlights the value of our estimates in shaping hypotheses about transferring and its effects on student outcomes that could be examined in future work.

Section 2. Description of Transfer Behavior

Table 1 presents the distribution of transfers for both college attendees and for those who receive a BA degree within eight years of high school graduation. In the first two columns, we

[11] The Texas Assessment of Academic Skills (TAAS) are state standardized exams that were given to all students in Texas and were used, in part, to determine graduation eligibility. Thus, students have an incentive to perform well on these exams, and they provide important measures of student academic capabilities as of 11th grade.

show this distribution for all Texas public postsecondary students. Among all attendees, 31.4% of students transfer at least once. For BA recipients, almost half of the students transfer at least once, many from a community college. Thus, transferring is relatively common, particularly among eventual BA recipients, and many students transfer more than once. Among BA recipients, 16% transfer more than once, with 10% among attendees doing so. Thus, 1/6 of all college completers who begin college soon after high school transfer at least twice. In fact, 6.1% transfer three or more times. Overall, a large proportion of students have paths through the higher education system that are characterized by enrollment in multiple institutions. This pattern is evident both among the attendee sample as well as among the graduating sample.

In the remaining columns of Table 1, we examine transferring behavior by the first institution attended. At the flagship state universities, transferring is much less prevalent: between 81% and 84% of attendees do not transfer and between 87% and 89% of BA recipients do not transfer. However, between 10% and 12% of BA recipients at each school transfer once or twice, which highlights that even at elite institutions transferring is not uncommon. Among those who first attend a non-flagship four-year school, it is much more commonplace to switch institutions. Almost 40% of attendees at such schools transfer, and 17% transfer more than once. Among eventual BA recipients, over 19% transfer more than once and over 4% transfer more than twice.

For those who enter the postsecondary system at community colleges, transferring among the attendee sample is prevalent, and the transfer distribution is similar to the non-flagship transfer distribution.[12] Among eventual BA recipients, all community college students must transfer, but over 17% do so more than once and 11.5% do so more than twice. These paths through the higher education system point to considerable heterogeneity that makes it difficult to classify simply the types of schools students attend.

[12] We do not count transferring across community colleges as a transfer.

Table 1 suggests that it is not easy to characterize how students move through the post-secondary system as well as the quality of the institution to which they are exposed during college. However, Table 1 masks a considerable portion of students' heterogeneous experiences because it is not clear what types of schools students are transferring into and out of. We now show the full distribution of transfers by institution type for students who transfer once (Table 2) and twice (Table 3). We do not examine these distributions for those who go to more than 3 schools because of the complexity of the possible paths students can take does not allow for a parsimonious description. Furthermore, with 4% of the attendee sample and 6% of the BA sample transferring more than twice, our analysis captures the majority of students in Texas.

Table 2 shows the distribution of school types among those who transfer once. In the table, each column sums to one and shows, conditional on first institution attended, the distribution of attendance at other institution types. For example, among those who first attend UT and transfer, 51.3% transfer to a non-flagship four-year school and 44.7% transfer to a community college. A similar pattern holds for TAMU students, although community college transferring is slightly larger. While there is some movement between flagship universities, the predominant pattern is movement downward in quality, with a relatively large amount of transferring into the two-year sector. Among eventual BA recipients, the transferring to non-flagship schools is more dramatic, although there are much fewer of such students. As Table 1 shows, there are not a lot of BA recipients who transfer once and who start at UT-Austin or Texas A&M. The proportion of attendees at these schools who transfer once is larger, although it still is below 10%. Thus, at the flagship universities, there is a sizable group of students who transfer to a non-flagship school or a community college, and a majority of these students do not obtain a BA.

Among students who begin college at non-flagship schools, the 20.7% of attendees who transfer once do so predominantly to community colleges as well as to other non-flagship four-year universities in Texas. Among the 11% of eventual graduates who transfer once, however, over 26% transfer to a flagship university. Thus, for over a quarter of these students, transferring is associated with an increase in college quality, while the rest of these students transfer laterally.[13] As in Table 1, this pattern suggests that some transferring may be positively correlated with the likelihood of graduating and with subsequent earnings, while other transfers may be negatively correlated with such outcomes. We examine these relationships more formally below.

Most community college students who transfer switch to a non-flagship university. However, 11% of attendees and 14% of BA recipients transfer to a flagship university. For many students, the community college is a viable gateway to a BA degree, but the quality of schools to which students transfer varies considerably.

In Table 3, we examine the distribution of transfers among students who transfer twice. The percents in each block refer to the first institution attended, and they sum to 100.[14] The first line of schools shows the first institution attended, the second line of schools shows the second institution attended, and the schools listed in the second column show the third institution attended. For example, 8.17% of UT attendees transfer to a non-flagship four-year school and then back to UT. Focusing on UT, the most common paths are to transfer to a community college and then either back to UT or to a non-flagship four-year school. A similar pattern holds for TAMU students, with many students transferring to a community college and then back to Texas A&M. In general, it is quite common among those who transfer twice and who start at a flagship university

[13] Of course, students may view their transfer as a change in quality, especially if they are switching institutions for match-specific reasons.

[14] The ** marks in the table indicate means drawn from fewer than 5 observations. Our data use agreement with the Texas Higher Education Coordinating Board specifies that we cannot show any means with cell sizes less than 5.

to transfer back to the original flagship school.[15] This pattern is even more prevalent among BA recipients (Panel B). Thus, to the extent that transferring has an effect on postsecondary outcomes as well as on future earnings, it is important to pay attention to the fact that even those who enter or graduate from a flagship university may have significant contact with another institution.[16]

The pattern of transferring back to one's original institution is prevalent among those who first attend a non-flagship university as well. Over 57% of these students in Panel A and 55% in Panel B transfer away from their original university only to return later in their postsecondary career. Much of the remainder of the students transfer to a community college and then to a different non-flagship school or to two different non-flagship, four-year universities. A very small proportion of students transfers to a flagship university and then transfers away.

Among community college students, the most common path is to transfer to two non-flagship universities for eventual graduates. For all attendees, students typically either transfer to a non-flagship and then transfer back to a community college or transfer to another non-flagship university. Interestingly, among both attendees and BA recipients, some students transfer to a flagship university and then transfer to a non-flagship university. For BA recipients, 11.7% of the community college sample and 4.9% of the non-flagship sample follow this path. Such transfers could be due to a lack of academic training for the higher rigor at flagship universities; this finding is suggestive that flagship universities do not provide a good match for many students who transfer in from community colleges.

[15] Some of these transfers could be caused by students taking "time off" from college and taking classes at other institutions while not formally enrolled at their original school. As long as these courses were taken during the normal academic year, we count this behavior as transferring. We believe that it is appropriate to include these students as transfers because they are changing the school in which they are taking courses towards a degree. As discussed in Section 1.1, prior work on student transfers also would count such institutional switches as transfers (Goldrick-Rab, 2006; Goldrick-Rab and Pfeffer, 2009; Light and Strayer, 2004).

[16] As discussed above, we have taken care not to count dual enrollment or summer enrollment as transferring. Thus, student transferring back to a flagship does not simply reflect taking courses over the summer at a local college or enrolling in a course at a community college while enrolled in one of the flagship universities.

Tables 1-3 show multi-institution enrollment is highly prevalent in Texas. Given this heterogeneity in college paths, it is of interest to know how these paths relate to subsequent student outcomes. Next, we examine how transferring correlates with four-year college completion and with post-collegiate earnings in order to shed some light on these relationships.

Section 3. The Relationship Between College Path, College Graduation and Future Earnings

Section 3.1. Conceptual Model and Empirical Methods

The goal of the analysis in this section is to estimate the differences in postsecondary completion rates and in subsequent earnings for students who take different paths through college. Most previous studies that examine the effect of institutional quality on educational attainment and earnings measure the quality either of the first college or university one attended or of the college or university from which one graduated.[17] Both of these measures impose the assumption that students accomplish their college education at one institution, which the estimates in the previous section show is problematic. Thus, it is necessary to explore how transfer behavior correlates with the education earnings premiums as well as with the likelihood of obtaining a four-year degree.

In order to highlight the difficulty in identifying the causal relationship between transferring and student outcomes, it is instructive to consider a conceptual model of a student's decision to transfer. A straightforward model of the transfer decision would lead to a rule that a student will transfer if her expected net present value of the transfer is higher than the expected cost. This framework suggests that transferring behavior will be a function of students' perceived returns to attending different school types, which themselves depend on observed and unobserved attributes of students, as well as (typically unobserved) preferences for different majors and social environments correlated with student attributes that lead to different earnings later in life. For

[17] For example, see Black and Smith (2004, 2006), Dale and Krueger (2002), Hoekstra (2009), Bound, Lovenheim and Turner (2010), Kane and Rouse (1999), Andrews, Li and Lovenheim (2012), and Kinsler and Pavan (2011).

example, the best students at lower-quality schools may "transfer up" because they have the academic skills or the motivation to be able to take advantage of a higher quality academic environment. However, if the most academically capable or most motivated students transfer up, then these students may be more academically capable or motivated than direct attendees at the school from which they came but less academically able or motivated than the students at schools into which they transfer. It also could be the case that incoming students who transfer up are more highly motived than direct attendees at the higher quality school, since transferring itself requires a lot of work on the student's part. Selection based on academic ability or motivation makes it very difficult to identify causal impacts of transferring on academic and labor market outcomes, because accurate counterfactuals for the transferring students cannot be estimated.

Furthermore, transferring could be driven by shocks to the match-specific quality between students and institutions. Students gain information about their own academic interests and about the school in which they are enrolled over time. If students gain information that suggests their own school is a poor match for them, either academically or socially, then they may transfer. Students also can experience changes in their personal lives, such as sickness and family troubles, that may change their locational preferences. Such shocks are likely related to the ability of students to finish college and to their subsequent earnings.

Given the fact that the transfer decision is based on several variables that we cannot observe, and since we lack an instrument that would affect the decision to change schools but not BA receipt or earnings, we focus on providing a descriptive analysis of how earnings and BA attainment correlate with various paths through school. Such correlations have received little attention in previous work, which lacks the large samples and detailed earnings information

contained in our data, so our descriptive analysis reveals much new and important information about how transferring behavior relates to important academic and labor market outcomes.

As Tables 1-3 demonstrate, transfer behavior is not easy to characterize succinctly — students take many different paths through the postsecondary sectors that vary significantly from person to person. In order to make our analysis tractable, we only examine where one starts and where one ends his college education. Therefore, in our earnings equations, we allow the returns to college quality to differ by the quality of the higher education institution in which a student first enrolls and the quality of institution from which the same student graduates. When examining completion, we allow the likelihood of BA attainment to vary by where students first entered the postsecondary system and where they left, where leaving includes BA receipt or dropping out. Though a simplification, Tables 1-3 show that this characterization of transferring captures a large amount of the variation in transferring behavior across students. One notable shortcoming of this method is that we are not able to examine separately the returns of students who begin and end at the same place but who transfer in between. We ignore the relationship between this set of paths and subsequent earnings because of the small proportion of our sample who take such paths, even though they represent a sizable fraction of those who transfer three times.

We first examine the relationship between transferring and the likelihood of obtaining a four-year degree. To assess whether the likelihood of degree attainment varies by transfer path, we estimate linear regressions of the following form:

$$C_{is} = \alpha + \phi T_i + \beta X_{is} + \gamma_s + \varepsilon_{is}, \qquad (1)$$

where C_{is} is an indicator variable equal to 1 if student i from high school s graduates by the age of 25, T_i is an indicator variable equal to 1 if the student transfers, and X_{is} is a vector of individual and high school-by-graduation year socioeconomic and academic background characteristics

discussed in Section 1. The model also includes high school fixed effects (γ_s). We estimate equation (1) separately using pairings of final and original institution attended. For example, to test whether UT-Austin students who transferred from a non-flagship university were less likely to finish than direct attendees, we estimate equation (1) using the sample of students who transfer in this manner and the direct UT-Austin attendees. The coefficient ϕ then yields the correlation of interest. We estimate such regressions for all pairings of direct attendees and transfers who leave higher education at that same institution but who begin in another institution type. Note that this method nests a specification in which we use all students and include a set of indicators for transfer paths for non-direct attendees as well as indicators for final institution attended. Estimating equation (1) separately by sector provides a more flexible specification that allows the coefficients on the *X* variables and the school fixed effects to vary across sectors.

To study the relationship between transferring and earnings, we begin with an earnings function for BA recipients that specifies the relationship between entering or graduating from a specific Texas college sector and earnings:

$$Y_{is} = \alpha + \vartheta_1 Q_i^F + \vartheta_2 Q_i^G + \beta X_{is} + \gamma_i + \varepsilon_i, \quad (2)$$

where Y_{is} is the log quarterly earnings residual of student *i* from high school *s* that was discussed in Section 1, Q_i^F is the sector of the higher education institution in which student *i* first enrolls, Q_i^G is the sector of institution from which the student graduates, and all other variables are as previously defined. We specify Q_i^F as a set of fixed effects for an individual's sector of first attendance, with the non-flagship public sector as the omitted category. The variable Q_i^G is similarly defined for the sector of graduation. This earnings function differs from previous work on the returns to education quality in allowing for earnings to differ by the quality of the first and

graduating institution, which permits estimation of differences in earnings between groups of students taking different paths.

We first investigate whether, conditional on graduating from a given sector, there are earnings difference between direct attendees and students who transferred in from another type of university or colleges. The differences in earnings among graduates between direct attendees and transfer students is important from a policy perspective because many students who are academically capable of attending a four-year or flagship university choose not to do so, perhaps due to cost considerations. If the earnings are the same for those who transfer in and graduate as compared to direct attendees, then beginning college at a two-year or less selective four-year school may be sensible for many students. However, if there are earnings penalties associated with such paths, it could point to a value for policies that induce academically capable students to enroll directly in four-year schools.

To identify the differences between earnings among transfer students as compared to direct attendees *who graduate from the same sector*, we first condition on graduating from a given sector. Then, we estimate the following regression for these graduates:

$$Y_{is} = \alpha + \sigma T_i + \beta X_{is} + \gamma_s + \varepsilon_{is}, \qquad (3)$$

where T_i is a set of indicator variables that is equal to 1 if the graduate transferred in from a given sector and is equal to zero otherwise. The coefficients of interest in equation (3) are σ, which show the average difference in earnings between transfer students from a given sector and direct attendees. We estimate this model separately for each of the three four-year sectors in our data, which allows us to compare how the relationship between earnings and transferring differ by the quality of the postsecondary sector from which one earns a degree. Thus, our estimates show not only how transferring *per se* is related to earnings but how this relationship differs by the specific

path the transfer takes. For the non-flagship estimates, we include fixed effects for each university from which a student graduates and cluster standard errors by this institution.

In order to interpret σ as causal, the extensive controls for student background characteristics in our data must be sufficient to control for the selection of students with different underlying earnings potentials into different paths through the higher education system. Our administrative data contain rich controls for such selection, including quartics in math, reading and English state exams, relative rank within each high school on these exams, high school fixed effects and detailed information regarding one's track through high school. These controls are more extensive than have been used in most previous "selection on observables" studies of the returns to college quality (e.g., Black and Smith, 2004, 2006; Brewer, Eide and Ehrenberg, 1999) and transferring studies, but as discussed above we believe it unlikely that they will be able to control fully for the endogeneity of the transfer decision. While our control variables will give us some insight into the character of the selection that is occurring, we do not seek to make strong causal claims about the effect of transferring on earnings in this analysis. Rather, we describe how the returns to college are correlated with the path one takes, after accounting for a detailed series of covariates designed to measure students' academic achievement prior to college and their socioeconomic status. Because little previous work has been done in this area, and because our observable background characteristics and the transfer patterns we consider are more detailed than those used previously,[18] such correlational evidence is informative.

In addition to estimating how earnings relate to transferring behavior among graduates of schools in the same sector, we also wish to know how earnings differ among those who begin college at the same type of institution and who take different paths through the higher education

[18] Both Light and Strayer (2004) and Agan (2013) examine the correlation between transferring and earnings. These analyses use NLSY79 data, which while rich in covariates, only contains one measure of precollegiate academic ability – AFQT scores – and contains samples that are too small to examine the types of transfers we analyze.

system. This part of the analysis will show whether, for example, two observationally equivalent students who begin at a community college but who transfer to different school types have different subsequent earnings. To explore this question, we estimate a model akin to equation (3) but condition on first sector attended rather than on the last sector attended. The coefficients on the transfer indicators represent the differences in earnings between any two groups of students who start their college education at the same institution but who graduate at different institutions.

As discussed above, the educational "paths" that we consider are a coarse presentation of some of the paths described in the previous section. Still, we offer a more diverse set of paths than is contained in the two existing papers most similar to this one: Hilmer (2000) and Light and Strayer (2004). Because we are not forced to treat all transfers similarly, we can examine whether certain types of transfer paths correlate with higher or lower earnings, which previous research has not been able to study.

Section 3.2. Descriptive Characteristics of Transfers and Direct Attendees

Table 4 presents summary statistics of observable individual characteristics for our analysis sample, separately by college paths to bachelor degrees. For both UT graduates and Texas A&M graduates, the direct attendees have higher high school test scores in every subject than transfer students. The direct attendees are much more likely to be in the top 10^{th} percentile of their school in each of these tests. They also are more likely to be gifted and less likely to be at risk of drop-out in high school than transfer students. These estimates are in-line with previous work showing that transfer students have lower academic achievement than their peers at the institutions to which they transfer (McCormick, 2003; Adelman, 2006; Goldrick-Rab, 2006; Goldrick-Rab and Pfeffer, 2009). Interestingly, the background characteristics of transfers into UT look very similar with respect to average TAAS scores and the percentage who are economically disadvantaged across

those who begin at a non-flagship university and those who begin at a community college. However, the transfers in from community colleges are more likely to be white. Similar patterns are evident for those transferring into Texas A&M, and those transferring into the flagships are comparable on observables across the two schools. Finally, among non-flagship graduates, the direct attendees and those who transfer across non-flagship institutions look very similar with respect to high school test scores, but those who transfer in from a community college appear less academically qualified than those who start at a four-year school. The students who "transfer down" from a flagship have higher high school achievement scores, and they also are more likely to be white and are less likely to be economically disadvantaged than direct attendees at non-flagship, four-year institutions.

Unsurprisingly, direct attendees at UT and Texas A&M earn more than transfer students. Among the non-flagship graduates, it is those who transfer in from a flagship who earn the most, followed by direct attendees and then by transfers from other four-year and community colleges. These raw differences in log earnings residuals are driven, at least in part, by the fact that these groups all differ on observable characteristics that are correlated with future earnings. Our empirical analysis below seeks to understand what part of this difference remains once we control for our extensive set of background characteristics.

That transfers and direct attendees differ with respect to academic and socioeconomic backgrounds suggest these groups also may have systematically different preferences over courses of study and may perform differently in college. To the extent that different majors and/or college performance are valued more or less by the labor market, any differences along these margins may translate into differences in the returns to graduating from a given university sector. Table 5 shows the distribution of majors, mean college grade point averages (GPAs), and time to BA by sector of

graduation and by broad transfer path. Several patterns are evident in the table. First, at UT and Texas A&M, the GPAs of transfers are lower than those of direct attendees, although the differences are not large.[19] For non-flagship graduates, GPAs among all groups are ostensibly the same, with the exception of those who transfer in from flagships. These students have higher GPAs, which are higher on average than GPAs among direct attendees at flagship schools. This result suggests those who transfer out of the flagship sectors may not be doing so because of academic struggles.

Transferring also is correlated with time to degree. Across all institution types, transfers who earn a BA take about 0.3 to 0.4 more years than direct attendees to do so. These estimates are consistent with transferring elongating the length of time it takes one to obtain a degree, and the large amount of transferring we document could contribute to rising degree times in the US (Bound, Lovenheim and Turner, 2012).[20] In addition, the longer time it takes transfers to obtain a degree means they will have slightly less experience, on average, than direct attendee graduates.[21]

Transfers and direct attendees differ in their majors as well. At UT-Austin and Texas A&M, transfers are less likely to major in engineering and business and more likely to be in liberal arts, communications, agriculture and social sciences. At non-flagship schools, the distribution of majors differs little between direct attendees and transfers.

The choice of college major, and the GPA one attains while in college, may be endogenous to the transfer decision. If a student transferring has a causal effect on her GPA, perhaps due to the disruption of switching institutions or if students transfer because of preferences for a degree

[19] These grade point averages are calculated for all schools attended in Texas, not just one's graduating institution.
[20] The increased time to degree could be coming about due to students "stopping out" between institutions or due to a reduced pace of credit accumulation while enrolled. Decomposing the increased degree time into these constituent parts is beyond the scope of our analysis, but we view this as an important question for future research.
[21] While differences in experience could drive some of the earnings differences we document, we show in Appendix Tables A-2 and A-3 that the estimates for oldest two cohorts in our sample are very similar. Since the effects of the differences in experience should decline over time, these estimates suggest that differential experience is not a primary driver of any earnings effects we find.

program that is stronger at another school, majors and GPAs may themselves be an outcome of transferring behavior. As such, it would be improper to include them as controls. Nonetheless, we control for major choice and GPA in some specifications below in order to give a descriptive accounting of how these variables impact the estimated earnings differences across groups. Although we view them as informative about the role of college major and college performance in driving differences in earnings by transfer type, we urge some caution in interpreting these estimates due to the potential endogeneity of college majors and GPAs to transferring decisions.

Further descriptive information about the composition of transfer students is shown in Table 6, where we present estimates from OLS models that estimate the probability of transferring as a function of student pre-collegiate observables. We also examine the likelihood of transferring as a function of the distance between one's high school and the first college attended. In the first column, we present results using all attendees from the 1996-2002 high school cohorts, and in the subsequent columns we show estimates for all BA recipients and for graduates by sector.

Several patterns emerge from Table 6. First, student transferring is not very sensitive to how far away from home their first school is located. [22] Although the estimates often are statistically significant and typically are positive, they are small in magnitude. Second, across all columns of Table 6, there is a strong negative correlation between the likelihood of transferring and high school test scores; more academically capable students transfer less frequently. Third, except among Texas A&M graduates, black students are much less likely to transfer than white students and across all sectors Hispanic students are far more likely to transfer. In addition, economically-disadvantaged attendees are more likely to transfer, but this relationship does not hold among graduates. This finding could reflect a higher dropout likelihood among economically-

[22] We also note that when students transfer, they do not tend to move to institutions that much close to home: the mean distance between a student's high school and first university is 101 miles, while the mean distance with respect to the second institution is 86 miles.

disadvantaged students who transfer. Finally, LEP and special education students are, on the whole, less likely to transfer and males are slightly more likely to transfer than females. Overall, these descriptive patterns are consistent with those shown in Table 4 as well as those from prior work (e.g., Goldrick-Rab, 2006; Goldrick-Rab and Pfeffer, 2009).

Section 3.3. Transferring and the Likelihood of BA Attainment

Table 7 presents estimates of equation (1) by last institution attended. Panel A shows estimates using the full sample, and each cell is from a separate regression that compares completion rates among direct attendees and transfers in from another school. Results in the first row include high school fixed effects only and those in the second row add observable student and high school characteristics. There are two important findings shown in Table 7. First, without exception the differences in graduation rates between transfer students and direct attendees are small: they are at most 3% when all high school and demographic controls are added. These findings suggest that transferring is not strongly correlated with BA completion. Second, the estimates suggest much heterogeneity in any such correlations. Those who transfer *from* a community college are 3% less likely to graduate at UT-Austin than direct attendees, and they are 3% more likely to graduate than direct attendees at non-flagship schools. Those who transfer from a non-flagship university, however, are more likely to graduate than either UT-Austin direct attendees or other four year direct attendees. For TAMU students, there is no relationship between transfer status and BA attainment. Students who begin at a flagship university and transfer to a non-flagship four-year school are about 1% more likely to graduate than non-flagship direct attendees at the same school. Thus, for all but community college students transferring to UT-Austin, transferring is positively associated with BA completion, although these relationships are not strong.

The estimates in Panel A are potentially misleading because they compare transfers to all direct attendees, some of whom will drop out in their first couple years while the transfer students are less likely to drop out in this time frame. In Panel B, we compare transfer students who transfer in their second year to direct attendees who are present in their second year, and in Panel C we provide the same comparisons for third year transfers and students. Though less precise, the estimates in Panel B are very similar to those in Panel A, with the notable exception that the estimate for community college students transferring to UT-Austin now is ostensibly zero. For all other groups, the estimates are the same or somewhat larger in magnitude, indicating that transferring in one's second year of college is positively correlated with BA receipt relative to direct attendees who persist to their second year.

In contrast, in Panel C we see consistent evidence that transfers in their third year are significantly less likely to graduate than are direct attendees who have persisted until their third year. Interestingly, community college students who transfer after they obtain an Associate's Degree are most likely to be in this group, and they fare far worse in terms of degree completion across the different college sectors than direct attendees. That the estimates in Panel A are much closer to those in Panel B highlights the fact that student who transfer in their second year are much more prevalent, but the results in Panel C underscore the large amount of heterogeneity in student outcomes associated with when in the college career a student transfers.

Section 3.4. Earnings Estimates

Table 8 contains the estimates of equation (3), which shows the differences in earnings between bachelor degree recipients who are direct attendees and bachelor degree recipients who graduate from the same college type but who started college in a different sector. Estimates are shown separately by graduating sector, and each set of two to three estimates in a row are from the

same regression. For all estimates in Table 8, the reference group is the direct attendees from the given college sector. For example, in the first row of Table 8, those who transfer into UT-Austin from a non-flagship university earn 14.8% less than direct UT graduates. Community college transfers earn 18.9% less. The first row includes only high school fixed effects, the second row adds in individual and high school-by-cohort controls, and in the third row we add in controls for college major and GPA.

The results show that transfer students earn less than direct attendees, even among graduates. This is the case for all sectors except for flagship students who transfer into a non-selective four-year school. Focusing on the estimates in the second row, which are our preferred estimates, the coefficients are fairly consistent within sectors. For UT-Austin graduates, transfer students earn between 11 and 14 percent less than direct attendees, and for TAMU graduates the earnings penalty is about 6%. There is little variation across those who enter from a non-flagship school or a community college. Among graduates from non-flagship universities, the earnings difference between transfer students and direct attendees is much smaller, at -2 to -4%, which suggests at least some of the flagship estimates may be due to unobserved skill differences that are likely to be larger at more elite schools.

One method for further controlling for unobserved characteristics that are valued by the labor market is to include measures of college GPA and major into the regression. For example, one reason why the UT-Austin earnings differences are so much larger than those at Texas A&M is that Texas A&M is more focused on engineering and technical areas, which could have higher average returns (See Andrews, Li and Lovenheim (2012) for evidence on earnings in Texas by college major). The third row of Table 8 adds controls for college GPA and college major to provide some evidence on this question. Because of the potential endogeneity of major and GPA

with respect to transferring, however, we stress that these estimates are merely suggestive. The results are consistent with a large role for college major and performance in explaining earnings differences by transfer status. At UT, the earnings differences drop considerably in absolute value, to between 7 and 9 percent, but they remain both sizable and statistically significant. At Texas A&M, all earnings differences between direct attendees and transfers disappear, as do all differences in the non-flagship sector except for a small earnings penalty among those transferring in from a community college. Thus, GPA and major differences, from an accounting standpoint, explain much of the residual differences in earnings between direct and transfer students in all sectors. These results are due to some combination of transfer students selecting majors with lower returns and performing worse than their direct attendee counterparts. The earnings estimates show the importance of examining earnings rather than just BA completion in developing an understanding of how transferring behavior affects long-run student outcomes.

It also is instructive to compare earnings among graduates based on their initial institution rather than on their graduating institution. Such comparisons are informative because to the extent that students who start at the same type of school but who graduate at different places earn different amounts, it highlights the value of assessing not only whether students transfer, but to where they transfer. Table 9 contains these estimates. In the first two columns, we compare earnings of direct attendees among our three postsecondary four-year sectors. Once one controls for background characteristics, UT graduates earn 9% more than non-flagship graduates, and Texas A&M graduates earn 15% more. When we control for college major and GPA, these estimates change to 10% and 12%, respectively. Despite the potential endogeneity of major and GPA, these results again underscore the importance of courses of study and college performance in driving subsequent earnings of graduates, particularly for Texas A&M graduates.

In the next set of columns, we compare students who begin at a non-flagship school and transfer to one of the flagships to direct non-flagship graduates. Here, there are large differences by whether one transfers to UT or to TAMU, with TAMU graduates earning 9.6% more than non-flagship direct attendees and UT transfers earning 2.2% less. These estimates suggest that those who transfer into UT-Austin earn considerably less than their counterparts who transfer into Texas A&M, even though the transfer students are similar to each other on observables. In the third row, once we control for college GPA and major, the UT-Austin coefficient flips signs and the Texas A&M estimate becomes larger. These results are consistent with those in Table 8 in suggesting that UT-Austin transfer students in particular might be majoring in "low return" subjects and/or are performing worse in ways that reduce their future earnings. Unconditional on college major and GPA, non-flagship four-year students who transfer into UT-Austin are not better off in terms of earnings than their counterparts who did not transfer.

These patterns are similar when we compare those who begin at non-flagship schools and transfer to a flagship to those who begin at a non-flagship and transfer to another non-flagship or to students who start at a community college and transfer to a non-flagship. Relative to both comparison groups, UT-Austin transfers earn about the same and Texas A&M transfers earn 12-15 percent more. Controlling for GPA and college majors makes the UT transfer estimates positive and significant at the 5% level, with coefficients that range from 3-6 percent, and the Texas A&M estimates become slightly smaller. Thus, even relative to other transfer students, those who transfer into UT-Austin from the non-flagship or community college sectors appear to select less lucrative majors and perform worse in college (as Table 5 indicates).

Taken together, Table 8 and Table 9 demonstrate that there is significant heterogeneity in relationship between earnings and transferring behavior that is not simple to characterize with the

quality of the starting or finishing institution. In effect, movement towards institutions of higher quality are not universally positive. These estimates show that any decision rule that attempts to ascertain whether a particular inter-college move is optimal depends greatly on the point of reference, the course of study a student selects and his performance in that course of study. Understanding more fully how institutional quality and college major map to earnings is a ripe area for future research given these findings.

Section 3.5. Earnings Estimates by Race/Ethnicity and Gender

Finally, we explore heterogeneity by race/ethnicity and gender in the earnings estimates in Tables 10 and 11. In Table 10, we show results similar to Table 8 across different groups that exclude college GPA and major. Estimates that include college controls are shown in Appendix Table A-1. Given that white students constitute the majority of the sample, it is unsurprising that the estimates we observe closely mirror the estimates we see in Table 8. The only notable difference is a coefficient of -0.022 for flagship transfers into non-flagship schools. Though the estimate is imprecise, it suggests white students who transfer in this way earn less than direct non-flagship attendees.

The estimates for Hispanic students are largely similar to those for white students, except community college transfers into UT and other four year schools earn the same as direct attendees. Hispanic students who begin at a flagship university and transfer also earn about 2.6% more than non-flagship direct attendees. Even though most of the estimates are statistically insignificant for black students, the estimates for these students are substantively very different than for Hispanics and whites. The earnings premiums associated with transferring into UT from either the non-flagship or community college sectors are positive and large, at 14 and 6 percent, respectively. Conversely, African American transfers into Texas A&M earn substantially less than direct

attendees of the same race. Among those transferring to non-flagship schools, there is a small negative earnings difference associated with those who transfer in from another four year school or from a community college, but there is a sizable (though not significant) positive difference between flagship transfers and non-flagship direct attendees. These results are suggestive of a large amount of heterogeneity in returns to college across sectors and transfer type among African American students, but the lack of sufficient sample sizes precludes us from drawing more definitive conclusions.

The estimates for Asian students typically indicate a negative relationship between transferring and earnings compared to direct attendees, with the estimates for those who transfer into a non-flagship school from another non-flagship school or a community college being the only estimates that are statistically significantly different from zero at even the 10% level.

We also show estimates by gender in Table 10, which are particularly of interest because we cannot disentangle unemployment from non-labor force participation in our data. As women are much more likely to not be in the labor force, and since women are an increasingly large proportion of college graduates, understanding the extent of heterogeneity in our results by gender is important. The estimates in Table 10 do not point to large differences between men and women. For UT-Austin graduates, the coefficients for men are larger in absolute value, with the opposite pattern among Texas A&M graduates. Aside from the 11% lower earnings experienced by women who transfer into Texas A&M from the non-flagship sector, these estimates are qualitatively very similar across genders. Among the non-flagship graduates, the estimates also are similar across genders, with the estimates for men being slightly larger in absolute value.

Table 11 shows results akin to those in Table 9 for men and women separately.[23] On the whole, earnings differences are smaller in magnitude for women than for men. This is particularly true comparing earnings among direct attendees as well as for the estimates examining earnings among those who transfer into Texas A&M. Males who transfer to Texas A&M earn significantly more than other transfer students, while the earnings differences for women either are zero or are much smaller (as is the case for the community college to TAMU transfers). That these differences persist after college GPA and major are included in the regressions suggest this difference cannot be explained by these college outcome measures.

Section 4. Conclusion

With student transferring becoming more prevalent and multiple institutional contact becoming more the norm in higher education, it is critically important to understand the different paths students take through the postsecondary system and how these paths relate to college outcomes and earnings. We use detailed administrative data in Texas to examine these questions. Our data contain sample sizes that are sufficient to detect very complex paths that students take, and our ability to link these paths to subsequent earnings is rather unique in the literature.

We first show that transferring is prevalent in Texas and that looking only at where students begin or exit college is not sufficient to characterize their college experiences. There are many students who transfer more than once and have complex transfer patterns.

We next show that transferring is correlated with both BA completion rates and future earnings in interesting ways. In particular, aside from transfers to UT-Austin from community college, transfer students graduate at the same rate or higher than direct attendees. However, these positive correlations are reversed when examining students who transfer after their second year. These estimates highlight the significant heterogeneity that exists with respect to when students

[23] Similar results by race/ethnicity are available from the authors upon request.

transfer and their likelihood of completion. That transfer students are more likely to graduate than observationally equivalent direct attendees suggests a role for match quality as well.

When we examine earnings, the broad finding is that direct attendee graduates earn more than transfers into their institutions, but for the non-flagship sector, this difference is small. We provide suggestive evidence that some of the differences across institutions are due to the different major choices of transfers relative to direct attendees.

Overall, this paper describes the heterogeneous paths students take through college and demonstrates that these paths relate in interesting ways to both college completion and to subsequent earnings. The goal of this paper is to describe these patterns and how they relate to student outcomes, but an important limitation of this work is that we are unable to examine why these patterns look the way they do; that is, we are unable to identify a causal relationship between transferring and college completion or earnings. That we are able to control for detailed student background and pre-collegiate academic characteristics indicates that the graduation and earnings effects we find must be driven by other factors, such as match quality, adverse life outcomes affecting both transfer and graduation/earnings, or a signaling model in which transferring itself is treated as a signal of lower productivity. Given the increasing prevalence of multiple institutional enrollment and the importance of understanding the economic returns to college quality and the process by which students decide to complete college or drop out, investigating the relevance of such mechanisms in future research would be of high value.

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Table 1. Distribution of the Number of Transfers among All Attendees and for BA Recipients

Number of Transfers	Full Sample		First Institution Attended: UT		TAMU		Other Four-Year		Community College	
	Attendee	BA	Attendee	BA	Attendee	BA	Attendee	BA	Attendee	BA
0	68.61	51.1	80.57	86.56	83.54	88.57	61.93	69.68	69.66	—
1	21.07	32.66	8.52	3.71	7.26	3.69	20.67	10.99	23.52	82.67
2	6.62	10.15	8.65	8.03	6.93	6.18	12.79	14.91	3.33	5.80
3	2.56	4.17	1.24	0.83	1.23	0.72	2.48	1.96	2.82	9.57
4	0.80	1.31	0.84	0.74	0.87	0.70	1.64	1.92	0.36	0.89
5	0.25	0.45	0.10	0.08	0.12	0.08	0.28	0.30	0.26	0.91
6	0.07	0.13	0.05	0.04	0.04	0.04	0.17	0.21	0.03	0.09
7	0.02	0.03	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.06
8	0.01	0.01	0.01	0.01	—	—	0.01	0.02	0.00	0.01
9	0.00	0.00	—	—	—	—	0.00	0.00	0.00	0.01
Observations	1,141,186	429,992	57,881	50,083	58,615	49,014	341,541	190,813	683,149	140,082

[1] The "Attendee" sample consists of all students who attend college within two years of high school graduation. The "BA" sample consists of all BA recipients who obtain a degree within 8 years of high school graduation. First institution attended is the first post-secondary institution at which a student enrolls after high school graduation. Transfers are the number of times a student changes the post-secondary school at which he enrolls in non-summer semesters.

[2] The value 0.00 stands for a value that is too small to be shown and "—" stands for no observations.

Table 2. Distribution of Transfers among Students Who Transfer Once

Second Institution Attended	First Institution Attended: UT		TAMU		Other Four-Year		Community College	
	Attendee	BA	Attendee	BA	Attendee	BA	Attendee	BA
UT	—	—	6.11	14.89	4.44	13.33	4.35	5.08
TAMU	3.97	9.07	—	—	4.16	13.11	6.92	8.90
Other Four	51.34	90.93	42.52	85.11	31.03	73.56	88.73	86.02
CC	44.69	—	51.37	—	60.37	—	—	—
Observations	4,256	1,809	4,929	1,860	70,613	20,973	160,705	115,803

The "Attendee" sample consists of all students who attend college within two years of high school graduation. The "BA" sample consists of all BA recipients who obtain a degree within 8 years of high school graduation. First institution attended is the first post-secondary institution at which a student enrolls after high school graduation. The second institution attended is the subsequent institution in which the student enrolls in a non-summer semester. "—" stands for no observations.

Table 3. Distribution of Transfers among Students Who Transfer Twice

Panel A: Full Sample:

	Second Institution Attended:	First Institution Attended: UT			TAMU			Other Four-Year				Community College		
		TAMU	4-Year	CC	UT	4-Year	CC	UT	TAMU	4-Year	CC	UT	TAMU	4-Year
Third Institution Attended:	UT	0.27	8.17	50.33	—	0.28	1.74	—	0.03	0.30	1.62	—	0.10	1.97
	TAMU	—	0.27	1.92	0.24	5.77	44.26	**	—	0.31	2.94	0.10	—	1.59
	Different 4-Yr.	**	3.47	33.87	**	3.17	42.70	0.20	0.14	3.10	31.54	2.01	2.85	40.92
	Original 4-Yr.	—	—	—	—	—	—	0.62	0.48	6.50	49.28	—	—	—
	CC	**	1.48	—	**	1.72	—	**	0.13	3.35	—	1.39	1.65	47.41
Observations			4,063			5,009			43,683				22,747	

Panel B: BA Recipient Sample

	Second Institution Attended:	First Institution Attended: UT			TAMU			Other Four-Year				Community College		
		TAMU	4-Year	CC	UT	4-Year	CC	UT	TAMU	4-Year	CC	UT	TAMU	4-Year
Third Institution Attended:	UT	0.30	9.54	49.04	—	0.35	1.96	—	0.03	0.42	2.42	—	0.23	4.04
	TAMU	—	0.30	2.34	**	6.67	48.25	**	—	0.48	4.42	0.28	—	5.16
	Different 4-Yr.	**	3.63	34.84	**	3.01	39.39	**	0.16	3.27	33.93	5.06	6.60	78.64
	Original 4-Yr.	—	—	—	—	—	—	0.90	0.66	7.45	45.65	—	—	—
	CC	—	—	—	—	—	—	—	—	—	—	—	—	—
Observations			2,620			4,021			28,492				8,130	

[1] Source: Authors' calculations from the University of Texas at Dallas Education Research Center data as described in the text. The "Attendee" sample consists of all students who attend college within two years of high school graduation. The "BA" sample consists of all BA recipients who obtain a degree within 8 years of high school graduation. First institution attended is the first post-secondary institution at which a student enrolls after high school graduation. The second institution attended is the subsequent institution in which the student enrolls in a non-summer semester. The third institution attended is similarly defined. Dual enrollment does not count as transferring nor does switching across community colleges.

[2] ** refers to the cell being too small to report without violating confidentiality: we are unable to report any tabulations that include less than 5 people. Each 3x5 block in Panel A and 3x4 block in Panel B would sum to 1 if the ** percentages were included in the table. "—" stands for no observations.

Table 4. Means of Selected Earnings and Background Characteristics for Earnings Sample

	UT Graduates			TAMU Graduates			Other Four-Year Graduates			
Variable	Direct Attendee	Other 4 → UT	CC → UT	Direct Attendee	Other 4 → TAMU	CC → TAMU	Direct Attendee	Other 4 → Other 4	Flagship → Other 4	CC → Other 4
Log Quarterly Earnings	0.132	-0.025	-0.068	0.175	0.092	0.086	-0.040	-0.066	0.004	-0.091
TAAS Math Score	56.339	54.218	53.251	56.045	54.034	53.313	53.079	52.519	55.559	51.597
TAAS Reading Score	45.479	44.726	44.181	45.350	44.274	43.811	43.696	43.462	45.008	42.710
TAAS Writing Score	37.727	36.841	36.315	37.453	36.160	35.835	36.043	35.844	37.266	35.178
Math Rank										
Top 10%	0.495	0.302	0.268	0.474	0.293	0.254	0.271	0.224	0.417	0.182
70^{th}-90^{th} %	0.330	0.320	0.313	0.343	0.344	0.319	0.325	0.319	0.377	0.301
Below 70^{th} %	0.176	0.378	0.419	0.183	0.363	0.427	0.403	0.457	0.206	0.517
Reading Rank										
Top 10%	0.466	0.324	0.315	0.455	0.297	0.260	0.291	0.250	0.427	0.206
70^{th}-90^{th} %	0.319	0.348	0.31	0.335	0.353	0.316	0.323	0.325	0.342	0.302
Below 70^{th} %	0.215	0.328	0.375	0.210	0.350	0.425	0.386	0.425	0.232	0.492
Writing Rank										
Top 10%	0.483	0.321	0.304	0.456	0.259	0.25	0.302	0.265	0.446	0.222
70^{th}-90^{th} %	0.321	0.353	0.316	0.330	0.346	0.316	0.320	0.321	0.329	0.298
Below 70^{th} %	0.197	0.326	0.379	0.214	0.395	0.434	0.378	0.415	0.225	0.480
Race/Ethnicity										
White	0.684	0.696	0.763	0.875	0.887	0.932	0.624	0.688	0.748	0.694
Hispanic	0.120	0.173	0.148	0.074	0.082	0.047	0.203	0.172	0.136	0.209
Black	0.036	0.024	0.022	0.023	0.009	0.007	0.126	0.104	0.029	0.057
Asian	0.158	0.107	0.065	0.027	0.019	0.012	0.045	0.035	0.086	0.038
Male	0.440	0.439	0.252	0.449	0.504	0.493	0.377	0.347	0.415	0.364
Gifted	0.439	0.259	0.252	0.393	0.208	0.168	0.228	0.191	0.394	0.135
At Risk	0.040	0.064	0.089	0.033	0.079	0.087	0.131	0.122	0.049	0.183
Not Econ. Disadvantaged	0.936	0.935	0.941	0.965	0.968	0.975	0.850	0.893	0.931	0.860
Observations	17,583	1,286	2,017	20,153	1,733	5,150	61,274	9,524	2,023	34,602

The Earnings sample consists of graduates from a public Texas college or university who attend college within two years of high school graduation and who graduate within eight years. All earnings are measured from 2007-2009 and are restricted to those not concurrently enrolled in graduate school and for whom we observe at least three consecutive quarters of earnings. The Log Quarterly Earnings measure is the residual from a regression of quarterly earnings that fit our sample criteria on year, quarter, and birth cohort indicators.

Table 5. GPA, Time to Degree, and College Major Distribution for Earnings Sample

	UT Graduate			TAMU Graduates			Other Four-Year Graduates			
Variable	Direct Attendee	Other 4 → UT	CC → UT	Direct Attendee	Other 4 → TAMU	CC → TAMU	Direct Attendee	Other 4 → Other 4	Flagship → Other 4	CC → Other 4
GPA	3.12	3.07	3.03	3.07	2.95	2.94	2.99	3.01	3.18	3.02
Time To Degree	4.472	4.784	4.892	4.574	4.971	4.956	4.729	5.123	5.141	5.134
Agriculture	0.00	0.00	0.00	11.65	20.08	24.97	2.81	2.24	1.94	3.09
Liberal Arts	13.13	14.21	16.16	6.54	7.97	7.93	11.74	11.65	11.40	11.39
Interdisciplinary Studies	5.12	4.74	7.19	8.96	11.66	13.46	9.97	11.05	8.26	15.55
Communications	13.26	14.35	15.07	2.16	2.25	1.94	6.31	5.66	5.57	4.60
Computer Science	2.93	1.32	1.24	1.30	0.92	0.49	1.82	0.99	3.11	1.13
Engineering	12.31	6.61	6.35	19.10	14.65	11.17	6.32	4.02	7.17	3.31
Biology	5.15	6.74	3.62	4.57	5.71	4.17	4.88	3.73	4.60	2.92
Math and Statistics	1.62	1.40	1.49	2.95	1.90	1.42	0.99	0.68	1.24	0.88
Physical Sciences	1.30	1.56	1.14	1.15	1.10	0.74	0.77	0.58	1.04	0.37
Social Sciences	21.65	32.50	30.90	12.80	16.39	15.38	13.20	14.61	11.92	13.57
Business & Support Serv.	23.17	17.18	16.86	28.53	17.37	18.35	41.18	44.78	43.77	43.18

Source: Authors' calculations from the University of Texas at Dallas Education Research Center data as described in the text. The sample consists of graduates from a public Texas college or university who attend college within two years of high school graduation and who graduate within eight years. Major refers to major at graduation, and the GPA measure is calculated using grades from all institutions attended. Time to degree is measured relative to first enrollment in college in Texas.

Table 6. The Relationship Between Student Observable Characteristics and the Likelihood of Transferring

	Full	Full	Graduating School Sector:		
	Sample	Sample	UT	Texas	Other 4
Variable	Attendees	Graduates	Austin	A&M	Year
Distance to First School	0.007**	-0.002**	0.009**	0.007**	0.005**
(100 Miles)	(0.001)	(0.0001)	(0.002)	(0.002)	(0.001)
TAAS Math Score	-0.004**	-0.006**	-0.005**	-0.003**	-0.004
	(0.0002)	(0.0002)	(0.001)	(0.001)	(0.003)
TAAS Reading Score	-0.003**	-0.006**	-0.006**	-0.005**	-0.004**
	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.001)
TAAS Writing Score	-0.004**	-0.006**	-0.002**	-0.005**	-0.004**
	(0.0003)	(0.0004)	(0.001)	(0.001)	(0.001)
Native American	-0.025	-0.012	0.058	-0.056*	-0.018
	(0.018)	(0.021)	(0.043)	(0.033)	(0.029)
Asian	-0.003	-0.025**	0.016	-0.004	-0.004
	(0.004)	(0.004)	(0.010)	(0.004)	(0.006)
African American	-0.029**	-0.053**	0.028**	-0.026**	-0.085**
	(0.003)	(0.004)	(0.012)	(0.009)	(0.004)
Hispanic	0.036**	0.033**	0.053**	0.033**	0.007**
	(0.002)	(0.003)	(0.007)	(0.005)	(0.003)
Male	0.001	0.006**	0.013**	0.016**	0.007**
	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)
At Risk	0.0003	0.013**	0.027**	0.019**	0.002
	(0.003)	(0.003)	(0.010)	(0.008)	(0.004)
Economically	-0.029**	0.0001	0.001**	0.0004	0.0000
Disadvantaged	(0.003)	(0.0001)	(0.0004)	(0.0003)	(0.0002)
Gifted	-0.032**	-0.033**	0.002	-0.009**	-0.027**
	(0.002)	(0.002)	(0.004)	(0.003)	(0.003)
LEP	-0.035**	-0.064**	-0.130*	-0.035	-0.059**
	(0.012)	(0.016)	(0.079)	(0.038)	(0.018)
Special Education	-0.042**	-0.021**	0.026	-0.004	-0.034**
	(0.008)	(0.011)	(0.031)	(0.031)	(0.013)
Vocational Education	0.017**	0.010**	0.005**	0.007**	0.001
	(0.002)	(0.001)	(0.002)	(0.002)	(0.013)

[1] Each column is a separate regression, using data from 1996-2002. Estimates are from linear probability models with an indicator for whether a student ever transfers as the dependent variable. The first column includes all attendees, while the subsequent columns include only those students who obtain a BA within 8 years.

[2] Robust standard errors are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table 7. Differences in BA Attainment Rates by First and Last Institution Attended

Panel A: Full Sample

	Last Institution Attended:						
	UT		TAMU		Other Four-year		
Controls	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
HS Fixed Effects	0.006	-0.048**	-0.002	-0.013**	0.035**	0.069**	0.005*
	(0.007)	(0.006)	(0.005)	(0.003)	(0.004)	(0.007)	(0.003)
Demographic & HS	0.018**	-0.030**	0.004	-0.006	0.032**	0.013**	0.030**
	(0.007)	(0.006)	(0.005)	(0.004)	(0.004)	(0.006)	(0.003)
Observations	35,842	37,671	34,520	39,563	178,749	157,510	261,275

Panel B: Second Year Students

	Last Institution Attended:						
	UT		TAMU		Other Four-year		
Controls	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
HS Fixed Effects	0.008	-0.017	0.002	-0.007	0.047**	0.067**	0.036**
	(0.014)	(0.011)	(0.009)	(0.006)	(0.007)	(0.013)	(0.004)
Demographic & HS	0.018	0.001	0.008	0.002	0.045**	0.013	0.059**
	(0.014)	(0.011)	(0.010)	(0.006)	(0.007)	(0.013)	(0.004)
Observations	33,512	34,187	32,084	33,476	146,269	142,526	166,535

Panel C: Third Year Students

	Last Institution Attended:						
	UT		TAMU		Other Four-year		
Controls	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
HS Fixed Effects	-0.113**	-0.177**	-0.011	-0.059**	-0.110**	-0.106**	-0.133**
	(0.047)	(0.028)	(0.026)	(0.026)	(0.012)	(0.031)	(0.005)
Demographic & HS	-0.106**	-0.158**	-0.004	-0.050**	-0.106**	-0.125**	-0.107**
	(0.047)	(0.029)	(0.025)	(0.016)	(0.011)	(0.023)	(0.005)
Observations	31,396	31,561	30,120	30,403	116,506	115,245	129,280

[1] Demographic and High School (HS) variables are as described in Section 1. Each cell is a separate regression, and in each column the sample is the set of direct attendees in the given sector and the set of students who begin at the given sector and whose last sector or sector of BA completion is the same as the direct attendees. Completers are those who complete college within 8 years of high school graduation.

[2] Robust standard errors in the first four columns and clustered at the last institution level in the final three columns are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table 8. Differences in Earnings Between Direct Attendees and Transfers, Conditional on Graduation

	UT Graduates		TAMU Graduates		Other Four-year Graduates		
Controls	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
HS Fixed Effects	-0.148**	-0.189**	-0.092**	-0.100**	-0.029**	0.024	-0.055**
	(0.018)	(0.015)	(0.013)	(0.009)	(0.007)	(0.014)	(0.005)
Demographic & HS	-0.105**	-0.138**	-0.064**	-0.060**	-0.024**	-0.004	-0.039**
	(0.018)	(0.015)	(0.013)	(0.010)	(0.007)	(0.014)	(0.005)
Demographic, HS & College	-0.067**	-0.092**	-0.014	0.005	-0.002	0.004	-0.017**
	(0.018)	(0.014)	(0.013)	(0.010)	(0.001)	(0.013)	(0.004)
Observations	18,869	19,600	21,886	25,303	70,793	63,292	95,873

[1] Demographic controls and High School (HS) variables are as described Section 1. The college controls are college GPA at graduation and college major indicators. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.
[2] Robust standard errors in the first four columns and clustered at the last institution level in the final three columns are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table 9. Differences in Earnings between Direct Attendees and Transfer Students Using Varying Reference Groups

	Reference Group:							
	Other 4 Direct Attendees		Other 4 Direct Attendees		Other 4 → Other 4		CC → Other 4	
Controls	UT Direct Attendee	TAMU Direct Attendee	Other 4 → UT	Other 4 → TAMU	Other 4 → UT	Other 4 → TAMU	CC → UT	CC → TAMU
HS Fixed Effects	0.147**	0.200**	-0.001	0.116**	0.044**	0.141**	0.026*	0.171**
	(0.006)	(0.005)	(0.018)	(0.013)	(0.020)	(0.015)	(0.014)	(0.009)
Demographics & HS	0.092**	0.153**	-0.022	0.096**	0.027	0.122**	0.005	0.149**
	(0.007)	(0.005)	(0.018)	(0.013)	(0.021)	(0.015)	(0.014)	(0.009)
Demographics, HS & College	0.105**	0.118**	0.038**	0.108**	0.058**	0.097**	0.033**	0.125**
	(0.007)	(0.005)	(0.017)	(0.012)	(0.022)	(0.016)	(0.013)	(0.009)
Observations	78,885	81,425	62,558	63,005	10,807	11,254	36,618	39,751

[1] Demographic controls and High School (HS) variables are as described Section 1. The HS Controls include HS fixed effects. The college controls are college GPA at graduation and college major indicators. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.
[2] Robust standard errors are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table 10: Differences in Earnings between Direct Attendees and Transfer Students Conditional on Graduation Using HS and Demographic Controls, By Race/Ethnicity and Gender

	UT Graduates		TAMU Graduates		Other Four-year Graduates		
Group	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
White	-0.116**	-0.160**	-0.076**	-0.071**	-0.015	-0.022	-0.050**
	(0.023)	(0.017)	(0.016)	(0.010)	(0.009)	(0.016)	(0.006)
Observations	12,920	13,564	19,164	22,428	44,794	39,755	62,273
Hispanic	-0.163**	-0.007	-0.075	-0.054	-0.020	0.026	-0.005
	(0.053)	(0.051)	(0.064)	(0.042)	(0.018)	(0.036)	(0.010)
Observations	2,326	2,402	1,629	1,727	14,056	12,696	19,640
Black	0.138	0.058	-0.319	-0.138	-0.018	0.058	-0.035*
	(0.138)	(0.126)	(0.234)	(0.103)	(0.022)	(0.072)	(0.018)
Observations	664	678	480	501	8,723	7,788	9,708
Asian	-0.035	-0.108	0.038	-0.111	-0.058	0.017	-0.103**
	(0.057)	(0.059)	(0.134)	(0.112)	(0.050)	(0.071)	(0.030)
Observations	2,916	2,910	577	606	3,103	2,947	4,083
Males	-0.147**	-0.166**	-0.033	-0.066**	-0.034**	-0.004	-0.059**
	(0.026)	(0.025)	(0.020)	(0.015)	(0.010)	(0.019)	(0.007)
Observations	8.306	8,565	9,913	11,580	26,419	23,953	7,120
Females	-0.080**	-0.123**	-0.111**	-0.073**	-0.012	-0.009	-0.035**
	(0.024)	(0.021)	(0.018)	(0.013)	(0.008)	(0.016)	(0.005)
Observations	10,563	11,035	11,973	13,723	44,379	39,344	60,155

[1] All estimates include demographic controls and High School (HS) variables that are as described Section 1. The HS Controls include HS fixed effects. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.

[2] Robust standard errors in the first four columns and standard errors clustered at the last institution attended level in the final three columns are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table 11. Differences in Earnings between Direct Attendees and Transfer Students Using Varying Reference Groups and Including HS and Demographic Controls, by Gender

	Reference Group:							
	Other 4 Direct Attendees		Other 4 Direct Attendees		Other 4 → Other 4		CC → Other 4	
Controls	UT Direct Attendee	TAMU Direct Attendee	Other 4 → UT	Other 4 → TAMU	Other 4 → UT	Other 4 → TAMU	CC → UT	CC → TAMU
Males:								
Demographic & HS	0.119**	0.191**	-0.034	0.163**	0.046	0.200**	0.023	0.193**
	(0.010)	(0.080)	(0.027)	(0.019)	(0.032)	(0.023)	(0.023)	(0.012)
Demographic, HS & College	0.134**	0.136**	0.047	0.152**	0.112**	0.142**	0.051**	0.162**
	(0.080)	(0.008)	(0.026)	(0.018)	(0.034)	(0.024)	(0.023)	(0.014)
Observations	30,855	32,153	23,677	23,986	3,870	4,179	13,431	15,148
Females:								
Demographic & HS	0.065**	0.111**	-0.023	0.001	0.014	0.018	-0.011	0.072**
	(0.009)	(0.006)	(0.023)	(0.008)	(0.028)	(0.022)	(0.019)	(0.011)
Demographic, HS & College	0.079**	0.106**	0.022	0.055**	0.030	0.051*	0.013	0.085**
	(0.009)	(0.006)	(0.023)	(0.018)	(0.029)	(0.023)	(0.018)	(0.012)
Observations	48,002	49,274	38,883	39,021	6,940	7,078	23,188	24,604

[1] Demographic controls and High School (HS) variables are as described Section 1. The HS Controls include HS fixed effects. The college controls are college GPA at graduation and college major indicators. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.

[2] Robust standard errors are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table A-1: Differences in Earnings between Direct Attendees and Transfer Students Conditional on Graduation Controlling for All Observables, By Race/Ethnicity and Gender

	UT Graduates		TAMU Graduates		Other Four-year Graduates		
Group	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
White	-0.077**	-0.102**	-0.014	0.001	0.007	-0.011	-0.024**
	(0.022)	(0.017)	(0.013)	(0.010)	(0.018)	(0.016)	(0.005)
Observations	12,920	13,564	19,164	22,428	44,794	39,755	62,273
Hispanic	-0.110**	-0.047	-0.044	-0.029	0.002	0.048	0.003
	(0.049)	(0.049)	(0.058)	(0.042)	(0.017)	(0.033)	(0.010)
Observations	2,326	2,402	1,629	1,727	14,056	12,696	19,640
Black	0.141	0.088	-0.258	-0.057	0.005	0.080	-0.011
	(0.134)	(0.124)	(0.190)	(0.120)	(0.022)	(0.072)	(0.017)
Observations	664	678	480	501	8,723	7,788	9,708
Asian	0.026	-0.087	-0.004	-0.057	0.028	0.054	-0.059**
	(0.052)	(0.052)	(0.130)	(0.095)	(0.045)	(0.060)	(0.028)
Observations	2,916	2,910	577	606	3,103	2,947	4,083
Males	-0.094**	-0.111**	0.023	0.012	0.011	0.037	-0.024**
	(0.026)	(0.022)	(0.018)	(0.014)	(0.012)	(0.021)	(0.007)
Observations	8.306	8,565	9,913	11,580	26,419	23,953	7,120
Females	-0.054**	-0.082**	-0.047**	-0.008	-0.002	-0.010	-0.018**
	(0.024)	(0.021)	(0.019)	(0.013)	(0.009)	(0.018)	(0.006)
Observations	10,563	11,035	11,973	13,723	44,379	39,344	60,155

[1] Demographic controls and High School (HS) variables are as described Section 1. The college controls are college GPA at graduation and college major indicators. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.

[2] Robust standard errors in the first four columns and standard errors clustered at the last institution attended level in the final three columns are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table A-2. Differences in Earnings Between Direct Attendees and Transfers, Conditional on Graduation, 1996 & 1997 Cohorts

	UT Graduates		TAMU Graduates		Other Four-year Graduates		
Controls	Other Four	CC	Other Four	CC	Other Four	Flagship	CC
HS Fixed Effects	-0.112**	-0.178**	-0.072**	-0.077**	-0.016	0.063**	-0.045**
	(0.039)	(0.031)	(0.029)	(0.021)	(0.015)	(0.029)	(0.010)
Demographic & HS	-0.058	-0.116**	-0.024	-0.022	-0.013	0.043	-0.029**
	(0.040)	(0.033)	(0.030)	(0.020)	(0.015)	(0.029)	(0.010)
Demographic, HS & College	-0.045	-0.065**	0.024	0.049**	-0.002	0.039	-0.015
	(0.038)	(0.032)	(0.038)	(0.022)	(0.015)	(0.027)	(0.010)
Observations	4,530	4,811	5,599	6,512	16,613	14,836	22,392

[1] Demographic controls and High School (HS) variables are as described Section 1. The college controls are college GPA at graduation and college major indicators. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.
[2] Robust standard errors are in parentheses: ** indicates statistical significance at the 5% level and * indicates statistical significance at the 10% level.

Table A-3. Differences in Earnings between Direct Attendees and Transfer Students Using Varying Reference Groups, 1996 & 1997 Cohorts

	Reference Group:							
	Other 4 Direct Attendees		Other 4 Direct Attendees		Other 4 → Other 4		CC → Other 4	
Controls	UT Direct Attendee	TAMU Direct Attendee	Other 4 → UT	Other 4 → TAMU	Other 4 → UT	Other 4 → TAMU	CC → UT	CC → TAMU
HS Fixed Effects	0.158**	0.203**	0.010	0.142**	0.056	0.169**	0.037	0.201**
	(0.013)	(0.011)	(0.036)	(0.046)	(0.042)	(0.030)	(0.028)	(0.018)
Demographics & HS	0.101**	0.154**	-0.006	0.126**	0.034	0.158**	0.001	0.173**
	(0.014)	(0.011)	(0.036)	(0.026)	(0.043)	(0.031)	(0.028)	(0.019)
Demographics, HS & College	0.112**	0.106**	0.032	0.122**	0.054	0.129**	0.042	0.164**
	(0.014)	(0.011)	(0.035)	(0.026)	(0.045)	(0.035)	(0.028)	(0.019)
Observations	18,547	19,438	14,647	14,825	2,596	2,774	8,656	9,466

[1] Demographic controls and High School (HS) variables are as described Section 1. The HS Controls include HS fixed effects. The college controls are college GPA at graduation and college major indicators. Each cell presents results from a separate regression. Definitions of "Direct Attendee" and "Transfer Students" follow the description in Section 1.