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Who Transfers and Where Do They Go? Community College Students in Florida

BEN BACKES
ERIN DUNLOP VELEZ

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Ben Backes
American Institutes for Research/CALDER

Erin Dunlop Velez
Research Triangle Institute

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Ben Backes and Erin Dunlop-Velez
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Abstract

This paper utilizes a comprehensive longitudinal dataset containing a census of every public high school student in Florida to describe two- to four-year college transfer patterns. Our main finding is the significant degree to which community college transfer students are sensitive to distance: relative to recent high school graduates, community college transfer students are considerably less likely to choose a four-year institution located far away. In addition, students who attend a two-year college located far from any four-year institutions are less likely to transfer at all. This sensitivity is important given that for many community college transfer students, the nearest four-year institution is characterized by low instructional expenditures and graduation rates.

1 Introduction

The paths students take through postsecondary education are diverse and increasingly so, with less than half of college students completing their study in the same institution they attended initially (McCormick (2003)). Community colleges make up an especially important option, with one-third of community college entrants transferring to a four-year college and nearly half of all bachelor's degrees earned in the U.S. awarded to students who at one time attended a two-year institution.[1,2]

However, despite the massive flow of students from two- to four-year institutions, very little attention has been paid to how this sorting takes place. This lack of previous research is particularly surprising given the large body of work that measures how traditional high school students choose four-year colleges to attend (Bowen et al. (2011), Avery and Hoxby (2003), Long (2004)). Given the well-documented importance of both college quality and the quality of the match between students and institutions for later outcomes, the transfer decisions of community college students deserve more attention.[3]

The lack of research on the factors influencing the transfer destinations of community college students is particularly puzzling given the significant share of college students enrolling in two-year institutions - almost 40% of postsecondary students in the U.S. are enrolled at two-year colleges – and their demographics.[4] Community college students are disproportionately likely to be from low income and minority families: 58 percent of community college students come from families with below median income, compared to 14 percent of students at the most competitive four-year institutions. In addition, blacks and Hispanics comprise 33 percent of community college students,

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[1] NCES report, "Community College Students – Goals, Academic Preparation and Outcomes – Postsecondary Education Descriptive Analysis Reports." Retrieved August 2, 2013 from http://nces.ed.gov/pubs2003/2003164.pdf.

[2] National Student Clearinghouse Research Center, "Snapshot Report – Mobility." Retrieved August 12, 2013 from http://www.studentclearinghouse.info/snapshot/docs/SnapshotReport6-TwoYearContributions.pdf.

[3] For research pertaining to the returns to college quality, see Bound et al. (2010); Brewer et al. (1999); Dale and Krueger (2002); Black and Smith (2006); Hoekstra (2009); Long (2010); Andrews et al. (2012b).

[4] The 2012 Statistical Abstract, Table 278: Higher Education - Institutions and Enrollment 1980 to 2009 published by the U.S. Census Bureau.

compared to 12 percent of students at the most selective four-year institutions (Carnevale and Strohl, 2010).

This paper studies the determinants of community college students' choices of whether and where to transfer using a rich administrative dataset from the state of Florida. Florida is an ideal setting for a study on community college transfer students for a number of reasons. First, the state has developed a comprehensive system supporting community college students who hope to obtain a bachelor's degree, including articulation agreements and a common course numbering system across postsecondary institutions, which result in high community college to four-year institution transfer rates. Indeed, more than half of bachelor's degree recipients in Florida attended a two-year institution at some point in their studies.[5] In addition, Florida is large – ranking as the fourth-largest state in terms of the number of graduates from public high schools – and diverse, with higher shares of black and Hispanic students than the national average. With the share of white students falling nationwide, Florida provides a glimpse into the future of the nation's demographic makeup (Krogstad and Fry, 2014). Since community colleges are especially important for socioeconomically disadvantaged students (Century Foundation, 2013), it is important to study a diverse state.

We focus on two main questions. First, for students who begin their postsecondary studies at a community college, what are the determinants of eventual transfer to a four-year institution? We consider explanatory factors such as student characteristics, high school achievement, two-year college outcomes, and characteristics of the nearest four-year institution. Second, we examine the predictors of destination four-year institutions among two- to four-year college transfer students by employing a conditional logit framework to assess the apparent importance of the characteristics of each four-year institution, and how the importance of these factors varies across individuals with different characteristics, such as achievement and socioeconomic status. Finally, we measure heterogeneity in the degree to which two-year institutions send transfer students to a state flagship university.

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[5] National Student Clearinghouse Research Center, "Snapshot Report – Mobility."

Three important findings emerge from our analyses. First, community college transfer students appear to be especially sensitive to distance in making transfer decisions. After calculating the fraction of transfer students at a given four-year institution who came from each source two-year college, it is clear that most four-year institutions have one or two two-year colleges from which they draw most of their transfer students. For example, 90% of transfer students to Florida International University (FIU) come from either Miami-Dade College or Broward College.[6] In addition, access to the state flagship university, the University of Florida (UF), is not distributed equally across the state. Only 4 percent of students who transfer from Miami-Dade College, the largest source of transfer students in the state, choose UF as their destination. Instead, the vast majority of students who transfer from Miami-Dade attend FIU, which has about 40% of the instructional expenditures per student as UF and graduates under half of its incoming students within six years. Second, we show that even though all community college transfer students appear to be geographically constrained, high achieving students (as measured by either high school or community college performance) are still substantially more likely to transfer to UF. Third, students transferring from some community colleges are considerably more likely to transfer to a state flagship; these two-year institutions are generally characterized by being either small or located near a state flagship.

This paper proceeds as follows. In Section 2, we discuss the previous research in this area and the community college environment in Florida. In Section 3, we discuss our empirical strategy and in Section 4, our data. We present results in Section 5 and provide a discussion of the findings and concluding remarks in Section 6.

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[6] Both Miami-Dade and Broward Colleges are primarily two-year colleges. Because some two-year colleges in Florida have begun offering upper division classes, they have dropped the "Community" or "Junior" from their name, but they are still primarily two-year colleges in the sense that they offer certificates and associate's degrees, have open enrollment, and offer tuition prices that are significantly lower that public four-year colleges.

2 Background

2.1 Previous Work

There is a large body of evidence on whether community college students transfer (Bailey and Weininger (2002), Dougherty and Kienzl (2006), Doyle (2011), Dowd and Melguizo (2008)). Many of these studies use nationally representative datasets and examine how transfer behavior has changed over time, especially for low income students. Relative to these studies, our primary contributions stem from using a recent dataset of an entire state's students and a focus on where students transfer rather than considering a binary transfer outcome.

Hilmer (1997) and Andrews et al. (2012a) consider the impact of various pathways through college on students' postsecondary outcomes. Hilmer (1997) finds that students choose higher quality universities if they originally begin at community college, while Andrews et al. (2012a) finds that transfer students to UT Austin incur an earnings penalty relative to direct attendees. Finally, Dunlop (2011) finds that there are significant returns to four-year college quality (using a variety of metrics including selectivity and institutional resources) for the community college transfer population. This finding indicates that like traditional high school students, community college transfer students have improved postsecondary outcomes when they attend a higher quality school.

While this previous work describes the effects of transferring from a community college, it does not describe how students choose among four-year institutions, which is the focus of the current study. If community college transfer students choose among four-year colleges differently than traditional high school students, this could explain some of the variation in community college transfer student outcomes.

As mentioned previously, this paper also extends the literature on how first-time college students make choices between colleges (Bowen et al. (2011), Hoxby and Avery (2012), Long (2004)), a literature which pays particular attention to under-matching. While this paper is similar in motivation and methods, it is conducted on a sample of community college transfer students rather than the population of recent high school graduates.

2.2 The Community College Transfer System in Florida

The question of how well community colleges facilitate matching with four-year institutions is particularly pertinent to Florida, the source of our data. The Florida postsecondary system was designed to have two-year community colleges serve as transfer institutions for the four-year institutions. In fact, when many of the original four-year institutions were opened in Florida, they had severe restrictions on enrollment of freshman and sophomores or lacked lower division courses all together. As a result, the majority of baccalaureate degree students entered the system through community colleges (now known as the Florida College System). Even with the recent increases in lower division students attending state universities, over half of four-year degree recipients in Florida were once enrolled at a two-year college.[7]

Given Florida's history of two-year colleges serving as primarily transfer institutions, the state of Florida has established a number of laws and policies to ease the transition from two- to four-year colleges. In 1971, Florida established into law a Statewide Articulation Agreement. Since then, Florida has adopted a number of additional policies to assist students in smoothly transitioning between community colleges and four-year colleges and universities, such as a statewide course numbering system, general education core requirements, and common prerequisites for Limited Access majors.

In 2005, a transfer student Bill of Rights was created, mandating that students who graduate from Florida colleges (previously known as community colleges) with an Associate's degree are guaranteed a set of rights under the Statewide Articulation Agreement.[8] The rights include admission to one of the 11 state universities (except to limited access programs), acceptance of at least 60 semester hours by the state university, no additional general education requirements, and transfer of equivalent courses under the Statewide Course Numbering System.

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[7] National Student Clearinghouse Research Center, "Snapshot Report – Mobility."
[8] Transfer Student Bill of Rights, from the Florida Department of Education Office of Articulation: http://www.flvc.org/flvc/wcm/connect/Web+Content/flvc/advising/transferStudentBillOfRights. Statewide Articulation Agreement, from the Florida Department of State: https://www.flrules.org/gateway/ruleNo.asp?id=6A-10.024.

3 Empirical Strategy

The estimation strategy employed in this paper follows closely Long's (2004) analysis of college choice for recent high school graduates. There are many reasons to believe there may be large differences between recent high school graduates and community college students, including, but not limited to, initial two-year students having lower average achievement and family resources. Additionally, we focus on a more recent sample of students. While Long investigates students who graduate high school in 1972, 1982, and 1992, we focus on a cohort of students who graduate high school between 2002 and 2004. Given how quickly college tuition prices have risen in the past 20 years, relative to inflation, it is reasonable to assume that students may have varied how they make their four-year college choices over time.

Following Long (2004), consider an individual choosing between J four-year institutions characterized by characteristics Y_j, such as distance from the student's home, price, and quality. Also relevant to the individual's choice are his own characteristics, denoted by X_i. We then assume that the utility associated with attending a certain four-year institution, Y_j, for an individual with characteristics X_i, can be written as $U(Y_j,X_i)=f(Y_j,X_i)+\varepsilon_{ij}$, where ε_{ij} is a random error term. The individual then chooses among all possible four-year options along with the option of not ever transferring. Thus, institution Y_k is chosen if and only if $U(Y_k,X_i) \geq U(Y_j,X_i)$ $\forall k \neq j$ with $P_{ik} \leq I_i$, where I_i is the budget constraint of student i and P_{ik} is the individual-specific price associated with choice k.[9]

We estimate two separate choices. First, given initially attending a two-year institution, we estimate whether students ever transfer to a four-year institution. Second, if a student does transfer, we estimate which institution is the transfer destination.

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[9] It should be noted that the model assumes that students have choice between schools. In reality, because of the application and admission process, not all students can attend their first choice school. In order to account for the institution side selection, our models control for the difference between the average academic achievement of students at a particular school and the achievement of the transfer student.

We predict the choice of whether to transfer using a probit model. The key considerations for the choice of whether to transfer from a two- to a four-year institution are the likelihood of succeeding in a four-year institution (measured by achievement in high school and community college), family income (free- or reduced-price lunch status in high school), and characteristics of the nearest four-year institution (such as price and distance).

Estimating choices between colleges is less straightforward. Rather than a binary outcome of whether or not to transfer, there are 10 potential options in Florida.[10] These institutions differ wildly in distance from each community college, previous achievement of incoming students, and quality measures such as instructional inputs and graduation rates. We thus implement a conditional logit model. To estimate this model, the data are constructed in a manner such that each individual appears 10 times in the data – one for each potential match of four-year Florida institutions. Each of these 10 observations contains different values for the four-year institution-specific variables such as distance and cost. These measures can either be fixed values for a given institution, such as graduation rate or in-state tuition, or can vary depending on the individual, such as distance.

One drawback of the conditional logit model is that since the model is used to evaluate different transfer paths against each other, there must be variation within each individual. This requirement means that individual-specific controls – such as race or gender – cannot be included in the regression unless they are interacted with four-year institutional characteristics. Fortunately, due to our large sample size, we can split the sample by demographics and estimate separate regressions to compare coefficients across different groups.

One final note is that no causal inferences can be drawn from our results. While we control for many student and school factors that are related to school choice, there could be some unobserved factors we are not controlling for that are also correlated to school choice. Additionally, since we do not observe students' actual school preferences – we only observe actual enrollment – our findings

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[10] There are 11 public four-year institutions in our data, but the New College of Florida does not have available data on its graduation rate, and its full-time enrollment is smaller than the other institutions by an order of magnitude, so we exclude it from the analysis. We also drop the eight students who transferred to the New College of Florida from a community college.

can only serve as suggestive evidence of factors that are correlated with community college students' four-year transfer destinations, not their overall preferences.

4 Sample and Data Sources

4.1 Overview of Florida Data

We merge together two large administrative student-level data sets from the state of Florida: secondary public school data and postsecondary data. These data are linked together by the state of Florida using a unique individual identifier. With these data, we are able to follow students from eighth grade through college, provided the student does not leave the state of Florida.

The data for this paper follow two cohorts of students. The first wave comprises all students who began 8th grade at a Florida public school in 1997-98. Two years later, another 8th grade cohort is added to the data, so the second cohort began 8th grade in 1999-00. Our sample consists of 84,398 students who began their postsecondary work at a community college. The data set contains observations as recent as 2011-12, so we observe 8-10 years of postsecondary outcomes.

Our administrative secondary school student-level data include student demographic information (race, gender, free- or reduced-price lunch eligibility and limited English proficiency status), course taking, course grades, GPA, and standardized test scores (such as the FCAT, Florida's statewide standardized achievement test). Our rich postsecondary information includes date and institution of each enrollment instance, course taking, grades, major, and degree attainment.

The main drawback of the data is its limitation to a single state, which could have implications for both generalizability to other states and attrition (since individuals leaving the state are not observed). For generalizability, this drawback is somewhat mitigated by Florida's large and diverse makeup. According to the 2012 Digest of Education Statistics, Florida ranked as the fourth largest state in terms of the number of graduates from public high schools. In addition, 22 percent of its high school graduates were black and 23 percent Hispanic, compared to national averages of 15 and 16 percent, respectively. For attrition, our data only contain students in public Florida institutions. Thus,

students who attend a private postsecondary institution or who leave the state to attend college disappear from our data. We discuss this attrition problem in a later section below.

A more general concern is that Florida's well developed articulation system could place students who began at community college at an advantage relative to two-year students in other states. For example, according to the Education Commission of the States, as of 2001, 30 states had legislation on transferring, 26 states offered statewide articulation agreements, and eight states offered a common course numbering system. However, research on state articulation and transfer policy has found little effect of the existence of such policies on outcomes of community college students, such as the probability of transferring or obtaining a bachelor's degree (e.g., Goldhaber et al. (2008)). Thus, it is likely that results from Florida could generalize to other states, even though Florida does not structure its postsecondary system similarly to other states.[11]

Another limitation of the sample is its emphasis on tradition students: those whose postsecondary studies begin relatively soon after high school graduation. For example, if someone were to wait until their 30s to go back to school, he would not appear in our data. Thus, we miss this important part of the community college market. Even given these limitations, however, the Florida data is uniquely suited to measuring whether and where two-year college students transfer to four-year institutions, especially given its large sample size, recent observations, and rich data on educational outcomes.

4.2 Attrition

A major concern of using administrative data from Florida is its restriction to students who attend public in-state institutions. This restriction could lead our estimates to overstate the role of distance if, for instance, our data were less likely to include students who transfer far away.

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[11] Today, many community colleges in Florida offer baccalaureate degree programs. However, in 2005-06, the year after our analytical sample enters college, less than 3,000 students were enrolled in upper-division classes in the Florida College System, compared to about 70,000 community college transfer students and over 300,000 community college students in our data.

To assess how large of a problem this is, we would ideally measure the share of community college transfer students from Florida who transfer to a private or out of state institution. Unfortunately, to our knowledge, these data do not exist. However, by our calculations, approximately 80% of Florida four-year college students attend a public school. The fraction of students transferring to a public institution is likely even higher among community college transfer students, who are the focus of this study.[12] Regardless, it is important to remember that if students who attend private institutions move longer distances, attrition may lead our estimates to suggest that students are more sensitive to distance than they really are, as the students who travel long distances are more likely to fall out of the dataset.

In addition to attrition due to students attending private institutions, we also lose students who leave the state. However, only 10% of Floridian first-time degree or certificate-seeking undergraduates attend college out of state; the number is likely even lower for the population of transfer students.[13]

4.3 Variable Definitions and Sources

We classify students as beginning their postsecondary careers in community college if, once they have a high school diploma and are not dual enrolled, their first instance of appearing in postsecondary education is at a community college and they earn at least 10 non-remedial community college credits over the course of their postsecondary studies. In addition, we restrict the sample to be those students who are classified as ever attempting an AA or BA degree, so as not to include students with no intention of earning a degree in the regressions predicting four-year college transfer. Of these initial community college students, we consider transfer students to be those who

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[12] According to the 2012 Digest of Education Statistics, Tables 304.15 and 304.20, in Florida, 790,027 students attended a public institution and 335,442 students attended a private school. Additionally, according to IPEDS, 93% of first-time full-time students at public four-year schools were from Florida in 2010, compared to 56% for private four-year institutions. Both those facts imply that 80% of Florida four-year college students attended a public four year college ((.93*790,027)/ (.93*790,027 + .56*335,442)).

[13] Institute of Education Sciences, Digest of Education Statistics, Table 232. Retrieved May 21, 2014, from http://nces.ed.gov/programs/digest/d11/tables/dt11_232.asp.

ever appear at a four-year institution, and the transfer destination is the first four-year institution in which they enrolled.

Institutional characteristics such as average SAT scores of admitted students and tuition are taken from IPEDS measurements as of 2005, the modal year students in our analytical sample enter college. These college-level data are merged with our student-level data using the OPE ID and we additionally ensure a successful match using institution name. Distance between two- and four-year institutions is calculated by inserting each pairwise combination into Google Maps and recording the distance in miles of the fastest driving route.[14] Our measures of the characteristics of the closest four-year institution are based on this distance metric. Some of our explanatory variables concern the outcomes of students at the beginning of their two-year experience. For measures such as remedial courses and work experience, we take totals over the first two terms in which an individual was enrolled in a two-year institution to ensure all students' measures come from before students begin to transfer, thus ensuring the inclusion of the same number of terms for all students.

As with Long (2004), we do not control for a four-year institution's average incoming student SAT scores directly but rather the match between the institution and prospective student. The measure is created by dividing four-year institutions into percentiles based on the SAT math scores of incoming students and placing students into percentiles based on their 10th grade FCAT math scores (since most direct community college students do not have SAT scores). Two variables are generated: one for the case where the student's percentile is higher than the university, and one for the case where it is lower.

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[14] Results are extremely similar when simply measuring distance between the geographic coordinates of each school, instead of using the driving distance. Another alternative would be to use driving time instead of distance, but since Florida's four-year institutions are dispersed around the state hundreds of miles from each other, driving time is strongly related to distance (since the bulk of driving time is spent on highways). Additionally, even though community colleges (and some four-year institutions) in Florida have branch campuses, our data does not include the name of the specific branch attended. As such, we use the location of the main campus for all students attending a particular college unless otherwise noted.

5 Analysis

5.1 Summary Statistics

We first present summary statistics of community college students in Table 1, with the sample split between students who are ever later observed in a four-year institution – whom we refer to as transfer students – and those who are not. Students who transfer tend to be more successful in high school, as measured by both GPA and standardized test scores, and are less likely to have ever received free- or reduced-price lunch. In addition, differences in initial community college experience emerge. In the first two terms enrolled in community college, students who later transfer are less likely to take remedial classes, obtain more math credits, and have higher GPAs. On the other hand, while achievement in high school and community college appear to be associated with the likelihood of transfer, the characteristics of the closest four-year college do not.

These general patterns are consistent with Adelman (2005), who finds that in a nationally representative sample of 12th-graders in 1992, success in high school and advantaged family background are predictive of ever transferring. Adelman also finds that the number of courses in college-level math a student completes predicts transfer behavior.

Additionally, using unique student identifiers, we match each student's postsecondary records to earnings data from Unemployment Insurance (UI) records provided by Florida. Non-transfer students tend to have somewhat higher earnings in the first two terms of postsecondary enrollment.

Finally, we note that while the average distance from a student's initial two-year college to the nearest four-year institution is about 29 miles, there is considerable variation based on two-year college location. For example, about 10% of the students initially attending community college did so without a four-year institution within 55 miles.

5.2 Who Transfers?

We next present the results of a probit model predicting which students in the sample of initial community college-goers ever transfer to a four-year institution. Results are displayed in Table 2. The first column uses only explanatory variables which are set by the time an individual graduates from

high school. As revealed in the summary statistics table, success in high school – whether measured by taking AP courses, GPA, or standardized test scores – is predictive of eventually taking classes in a four-year institution. Interestingly, relative to Hispanic students, white students are less likely to transfer to a four-year institution.

The next column includes measures taken from the initial two terms of two-year postsecondary experience. Even controlling for high school achievement, course-taking patterns in community college are strongly predictive of whether a student eventually transfers. This is likely due to unobserved ability or motivation which is not fully captured by the high school controls, or differential behavior based on whether students have a bachelor's versus a terminal associate's degree goal.

At the same time, students with higher quarterly earnings are less likely to transfer. There are a number of possible explanations. For instance, students who do not intend to transfer to a four-year institution may be less invested in their schoolwork and thus spend more time working outside of school – that is, wages may be correlated with unobserved motivation to progress in school. On the other hand, increased time working could be directly harmful to students' academic achievement, and hamper their ability to transfer to a four-year institution.

Finally, in the third column, we include measures based on the characteristics of the four-year institution nearest to a student's initial community college.[15] Distance to the nearest four-year institution is a strong predictor of transferring. An increase in the distance from initial community college to nearest four-year institution from zero to 30 miles predicts a 30 percent decrease in the likelihood of transfer. That effect is nearly as large as the change associated with a student earning one additional point on his community college GPA (for example, moving from a 2.0 to a 3.0 GPA) and twice as large as the effect of taking an additional AP or IB class in high school.

Despite their sensitivity to distance, students also appear to be responsive to some measures of college quality. For example, students near institutions with higher instructional expenditures, lower

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[15] We do not include tuition because there is very little variation in the tuition charged to in-state students by public universities in Florida since they were not allowed to set their own prices during our sample period.

student-faculty ratios and more financial aid offered per student are more likely to transfer. However, a student's likelihood of transferring is estimated to be inversely related to the local four-year school's graduation rate.

Columns 4-6 repeat the regressions of columns 1-3 with a sample restricted to black and Hispanic students, a high interest population due to their relatively low bachelor's degree attainment rates (Backes et al. 2014). We find very similar patterns, although high school achievement (as measured by GPA or FCAT scores) is slightly more predictive of transfer for minority students.[16]

5.3 Where do Students Transfer?

To motivate the importance of the choice between four-year institutions, we first display the considerable heterogeneity that exists between the public universities in our sample. Table 3 shows the average characteristics of each four-year institution in Florida as measured in the 2005 IPEDS, with institutions sorted by the number of full-time enrolled students. The flagship university, the University of Florida, contains the highest-achieving students and has the highest graduation rate, share of students receiving financial aid, and instructional expenditures. However, its tuition is similar to the other institutions since Florida public colleges are unable to set their own tuition.[17] Because there is so little variation in sticker tuition price, we do not control for tuition in our analysis. In addition, as mentioned earlier in a footnote, we exclude the New College of Florida due to its extremely small contribution to the overall transfer market (only eight students in our sample transferred there) and its missing 6-year graduation rate in the IPEDS data.

With the above in mind, as a first cut of two- to four-year institution transfer patterns in Florida, we plot the source and destination campuses for each of the transfer students in the data, displayed in Figure 1. Each vertical bar represents the sum total of students transferring from a source two-year college (named on the x-axis). The different shading of the vertical bars represents the destination institutions, labeled in the right-side legend. At the top of each bar is the Herfindahl index, a measure

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[16] A Chow test rejects equality of coefficients across racial groups.
[17] The Florida legislature is currently considering a proposal which would allow UF and FSU to set "market-rate" tuition in line with flagship universities in other states.

of the diversity of the four-year institutions to which a given community college sends its students.[18]

A Herfindahl index of 1 would mean that all students from a given community college transfer to the same four-year institution, while an index of 0.10 (the reciprocal of 10, the number of destination options) would mean that transfer students from a given source two-year college were equally distributed among the four-year universities. Most of the largest two-year sources of transfer students have one main destination and relatively high Herfindahl indices. For example, of students leaving Miami-Dade College for a four-year institution, 80% move to nearby (14 miles) Florida International University. Only 4% transfer to the state flagship university, the University of Florida, 336 miles away.

Similarly, many of the four-year institutions have one or two two-year institutions from which they draw most of their transfer students. For example, 90% of transfer students to Florida International University come from either Miami-Dade College or Broward College. However, this pattern is not as strong for all schools; the University of Florida draws students from around the state. Still, its largest contributor, Santa Fe State College – which is one of 28 community colleges in the state – makes up a third of its transfer students.[19]

Hilmer (1997) uses data from the High School and Beyond survey to show that students choose higher quality universities if they first attend community colleges, especially poor and low achieving students. The paper argues that community colleges are thus successful at preparing students for transfer and play a beneficial role in the sorting process for disadvantaged students. If the same were true of these recent cohorts in Florida, one might expect each community college to send its students

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[18] The formula to create the index is $H = \sum_{i=1}^{N} s_i^2$, where s_i is the share of students who choose four-year institution i and N is the number of possible four-year destinations, in this case 10.

[19] The pattern of some two-year to four-year pipelines (e.g. Santa Fe State College to University of Florida) is due in part to initial two-year choice: some students who plan to eventually transfer to UF choose Santa Fe State College even if Santa Fe State College is far from their homes. We find that a disproportionally high number of students who attend two-year institutions near UF or FSU move long distances from their high schools to attend a community college near one of these flagships. However, distance from high school to four-year institution and distance from initial community college to four-year institution are very high correlated (r = 0.93) and the findings in this paper are qualitatively similar when using distance from high school to four-year institution in place of distance from two-year institution to four-year institution.

to a wide variety of four-year institutions, depending on student ability and match quality. Looking at the Florida data displayed in Figure 2, this does not appear to be the case for many of the largest community colleges. Thus, our results are partially consistent with Hilmer (1997) with the caveat that there is substantial heterogeneity in the ability of community colleges to prepare students for success at a wide variety of four-year institutions. We explore this heterogeneity in a later section.

5.3.1 Conditional Logit Results

Results from the conditional logit model predicting transfer destinations among transfer students are displayed in Table 4, with coefficients displayed as odds ratios. The first column shows results from the entire sample. Distance continues to play an important role, with institutions further away being much less likely to receive students. For 1992 high school graduates, Long (2004) reports an odds ratio of 0.267 associated with an increase in distance of 100 miles. For our sample of community college transfers who were 2002-2004 high school graduates, if distance were measured in 100s of miles for comparison, our odds ratio would be 0.110. All else equal, a 1992 high school graduate would be 73 percent less likely to choose a four-year college 100 miles farther away (Long's estimate), while a community college transfer student who had graduated in high school in 2002-2004 would be 89 percent less likely to choose a four-year college 100 miles farther away.[20]

Of the remaining explanatory factors, students appear to be most responsive to instructional expenses. However, interpretation of these quality measures is difficult in light of the high correlation between measures and the limited number of potential transfer destinations.[21]

Finally, the additional columns restrict the sample to students with strong high school achievement, students with high two-year college achievement, black and Hispanic students and free- or reduced-price lunch eligible students, respectively. These students appear to be about as

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[20] In principle, we could use our data to estimate a similar model in an attempt to measure the sensitivity to distance for recent high school graduates. However, these students are likely to dis-proportionally choose out-of-state or private institutions (relative to community college transfer students), making interpretation of any results difficult.

[21] The correlation between: instructional expenses and the student/faculty ratio is -0.36, instructional expenses and the share of students receiving financial aid is 0.33, instructional expenses and the 6-year graduation rate is 0.54, and the share of students receiving aid and the graduation rate is 0.66.

adverse to making a long distance transfer as the full sample, with free- or reduced-price lunch eligible students being the most distance-adverse and high achievers in high school being the least adverse.

5.3.2 Who Transfers to the State Flagship?

We measure access to the premier in-state public institution, University of Florida, by regressing transfer to UF on our set of controls in a probit specification for the sample of community college students who transfer. Results are displayed in Table 5.[22] As with the results predicting whether a student transfers at all, high school and community college achievement are both positively related to choosing UF as a transfer destination. In addition, relative to Hispanic students and controlling for high school achievement, black students are less likely and white students more likely to transfer to UF, respectively. This could be partially due to our limited demographic controls (we do not observe parental education or family income other than the free- or reduced-price lunch indicator variable).

As transfer decisions are driven by both application behavior on the part of the student and admissions behavior on the part of the university, we attempt to isolate application behavior by considering students who would be most likely to gain admission to UF. In Table 6, we re-run the previous model, limiting the sample to two groups of high achievers: those who scored in the top quintile on the 10th grade FCAT math test (columns 1-3), and those whose achievement in their first two terms at community college was in the top quintile by grade point average. These students are the most likely to be accepted to UF, and therefore their choice of UF as a transfer destination is more likely related to student rather than institution preferences.[23] Even among this high achieving

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[22] We also estimated this model considering transfer to either the University of Florida or Florida State University as choosing a state flagship. Results are similar and available from the authors.

[23] While we are unable to observe admissions decisions, public four-year institutions state that transfer students are given preference in admissions. For example, from UF's website: "*Florida public community college graduates who have completed a university-parallel program and an Associate of Arts degree will receive priority consideration for admission to on-campus programs IF they meet the requirements for admission to their UF college/major*". For several majors in UF's College of Liberal Arts and Sciences, the largest college in UF, a 2.5 grade point average is the minimum required to be "a competitive applicant for admission" (e.g., English, Computer Science, Biology, Political Science, Sociology, etc.): http://advising.ufl.edu/prospective/transfer.html. Over 75 percent of community college transfer students in our sample have a community college GPA above 2.5 upon transfer, and the cutoff for the top quintile of

group, being located an additional 30 miles away is associated with a decrease in the likelihood of transferring to UF by 31% (based on FCAT achievement) and 20% (by community college achievement). Since many two-year institutions are located hundreds of miles from UF, this association is substantial in magnitude.

In terms of access to the premier in-state public institution, these results are mixed. On the one hand, there is some evidence that the highest-achieving students do sort into UF, even if they begin their studies at a community college. On the other hand, distance continues to have a very large discouragement effect for this population.

5.3.3 Heterogeneity in Community Colleges Sending Students to Flagships

The beginning of Section 5.3 presented evidence that some two-year institutions send their students to a wide range of four-year institutions, while others send the bulk of their students to the closest four-year university. We explore this pattern further by quantifying which community colleges are especially likely to send students to either the University of Florida or Florida State University, the two leading institutions in terms of the ability of incoming students (as measured by SAT scores) and graduation rates.

We begin by performing a simple OLS regression of whether a student transfers to either UF or FSU on a set of community college indicator variables, conditional on the student transferring to any four-year institution. The institution fixed effects from this regression are shown as the "Fixed Effect" bars of Figure 2 and reveal substantial variation between institutions. Unsurprisingly, many of the institutions with large fixed effects – such as Santa Fe State College and Tallahassee Community College – are located near UF or FSU. However, there are several other two-year colleges – most of them smaller institutions – with large shares of students transferring to a flagship.

The next set of bars in Figure 2 display the fixed effects after controlling for student demographic characteristics (gender, FRL eligibility, race, and U.S. born) and performance in high school (GPA and standardized math and reading scores). Results are broadly similar to those with no demographic

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community college GPA is 3.3.

controls, providing evidence that the factors contributing to the high flagship-sending rates of certain institutions are mostly unrelated to the observable characteristics of their student bodies.

Finally, we consider the importance of distance in explaining the institution fixed effects estimated above. We cannot identify both distance to the nearest flagship and institution fixed effects in the same regression since distance does not vary within institutions. Instead, we regress the institution fixed effects estimated above on distance and then display the residual. A large residual for a given institution indicates that taking distance and student characteristics into account, students attending that institution are relatively more likely to transfer to UF or FSU.[24] Adding distance considerably compresses the distribution of institution effects as most of the large institution fixed effects are partially explained by being near a flagship; distance explains about 65 percent of the variation in the fixed effects.[25]

The patterns in Figure 2 underline the importance of taking into account student demographics and location when considering the "performance" of an institution. For example, Miami-Dade College has a large and negative fixed effect that becomes less negative when student characteristics are included and even switches to positive and ranked seventh of 28 institutions after adding the contribution of its large distance to a state flagship.

Our results stand in contrast to Clotfelter et al. (2013), who find little evidence of institutional differentiation among two-year schools in terms of associate's degree receipt or whether a student transfers. The results in this section demonstrate that even if community colleges are relatively indistinguishable in their ability to prepare students to transfer, considering where their students transfer to is an important next step given the large variation in quality between four-year institutions.

However, it is important to remember that the results in this paper – including those presented in this section – do not represent causal estimates. While it is certainly possible that the two-year

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[24] Since the regression of fixed effects on distance contains only 28 observations – one per two-year institution – standard errors are very large and not reported. None of the residuals are statistically different from zero.

[25] As Gulf Coast State College (GCSC) shares a location with an FSU branch campus (FSU – Panama City) and large shares of students transfer from GCSC to FSU, we impute zero miles as the distance from GCSC to a flagship.

institution "effects" estimated in this section reflect underlying differences in institutional quality, estimates could also be measuring unobserved differences in student motivation, ability, or resources to be able to move long distances.

6 Discussion

In the face of large college wage premiums and rising college drop-out rates nationally, increasing baccalaureate degree attainment has become a top priority of politicians, foundations, and educators. Given the prevalence of rising tuition costs at four-year institutions and budget-constrained financial aid programs nationwide, community colleges in particular represent an important pathway toward this goal. The transfer from two- to four-year colleges is a crucial step in community college students' eventual bachelor's degree attainment, but surprisingly little is known about how community college students choose their transfer destinations. Understanding the transfer decisions of community college students is especially important given that nearly half of all bachelor's degrees earned in the U.S. are awarded to students who began their postsecondary careers at two-year colleges.

The goals of this paper are twofold: first, to determine which factors are most predictive of four-year college transfer; and second, to determine how transfer institutions are selected. Not surprisingly, we find that high school and community college achievement are strong predictors of transferring to a four-year institution. In addition, characteristics of the closest four-year college such as location and expenditures also affect the likelihood that a community college student transfers. While students do appear to be sensitive to local four-year college quality, one of the largest factors predicting two- to four-year college transfer is the distance to the closest four-year college.

Similarly, we also find that conditional on transferring, distance predicts four-year college choice. When comparing our estimates to others in the literature, we find that community college students are more sensitive to distance when making their four-year college choices than traditional first time students. While this finding may not be surprising, given that community college transfer students did not choose their first postsecondary institution based on quality, it is important to consider that

while there is little research showing meaningful variation in two-year college quality, previous research has documented significant returns in four-year college quality, particularly for community college transfer students (Dunlop (2011)).

These rigidities in the community college transfer process have meaningful implications for student outcomes. Recent work has found that all else equal, beginning one's postsecondary education at a two-year college reduces the probability of baccalaureate degree attainment (Long and Kurlaender (2009)). If community college transfer students prioritize distance more than traditional high school students, as our findings suggest, many such students restrict their choice set of transfer destinations. Students with no nearby high-quality four-year institution (such as the large population of students in the Miami area) are unlikely to land at a top-tier four-year institution.

Our findings are especially relevant as community colleges become an increasingly attractive option in this period of rising college tuition and declining state financing. Community colleges are receiving increasing attention from both students and policy makers as offering an alternative, lower-cost path to a four-year degree. The average annual tuition and fees for a student attending a community college is about one-third the cost of attending a public four-year institution.[26] This '2+2' option is particularly attractive to socioeconomically disadvantaged students, who predominantly utilize the community college option and whose college degree attainment rates lag behind the rest of the country. However, the results from this study suggest that encouraging an increase in community college enrollment – especially to community colleges located farthest from high quality four-year institutions – may cause a side effect of pre-destining large numbers of students to local lower-tier universities. This could be harmful to students who would have attended a higher quality four-year college had they attended a different two-year college.

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[26] Institute of Education Sciences. Closer Look 2008. Retrieved August 10, 2012, from http://nces.ed.gov/programs/coe/analysis/2008-sa02e.asp.

To illustrate, consider four of the high schools in the Central Region of Miami-Dade County Public Schools (M-DCPS).[27] M-DCPS is the fourth largest school district in the country and the Central Region contains large shares of black and free or reduced-price lunch eligible students. Of the 892 observed graduates of these high schools who enroll in a community college, 772 (87 percent) chose Miami Dade College.[28] As discussed above, a large majority of students who transfer from Miami Dade College choose Florida International University, a school with substantially fewer resources and lower graduation rates than other in-state public four-year institutions.

Thus, students in this high-poverty, urban area appear to have the deck stacked against them in two important ways. First, they are likely to end up in community colleges with low graduation and transfer-out rates (31 percent and 10 percent at Miami Dade College, respectively, according to IPEDS). Second, even if they overcome the odds and transfer to a four-year institution, it is not likely to be one of high quality, which lowers their expected likelihood of ever earning a bachelor's degree (Light and Strayer (2000), Long (2008)). While the data used to generate these results are from one state, Florida is not unique in having its flagship universities located large distances from urban population centers. Taken together, these results suggest that racial gaps in flagship university attendance, bachelor's degree attainment, and labor market earnings in certain states may be partially due to states' landscapes of urban population centers and high resource universities.

Finally, the results of this paper are not necessarily evidence of irrational acting by community college transfer students. In the simple model presented in this paper, students choose the college that will provide the highest utility, subject to their budget constraint. Nearby institutions may relax budget constraints by allowing students to live at home or reducing commuting costs. Additionally, they may provide more utility if many peers from the student's community college are transferring to the same school, if the transfer process and requirements are less opaque at the local four-year institution, or if the student benefits from staying near family and friends. More research is needed

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[27] These schools are Miami Central High School, Miami Edison Senior High School, and Miami Northwestern High School, all located within seven miles of each other.

[28] Of these students, 84 percent are black, 14 percent Hispanic, and 83 percent qualify for free or reduced-price lunch.

to understand why community college transfer students prioritize distance more than traditional high school students when making decisions among four-year institutions and how important these decisions are for later outcomes.

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Tables and Figures

Transfer Pattern Visualization
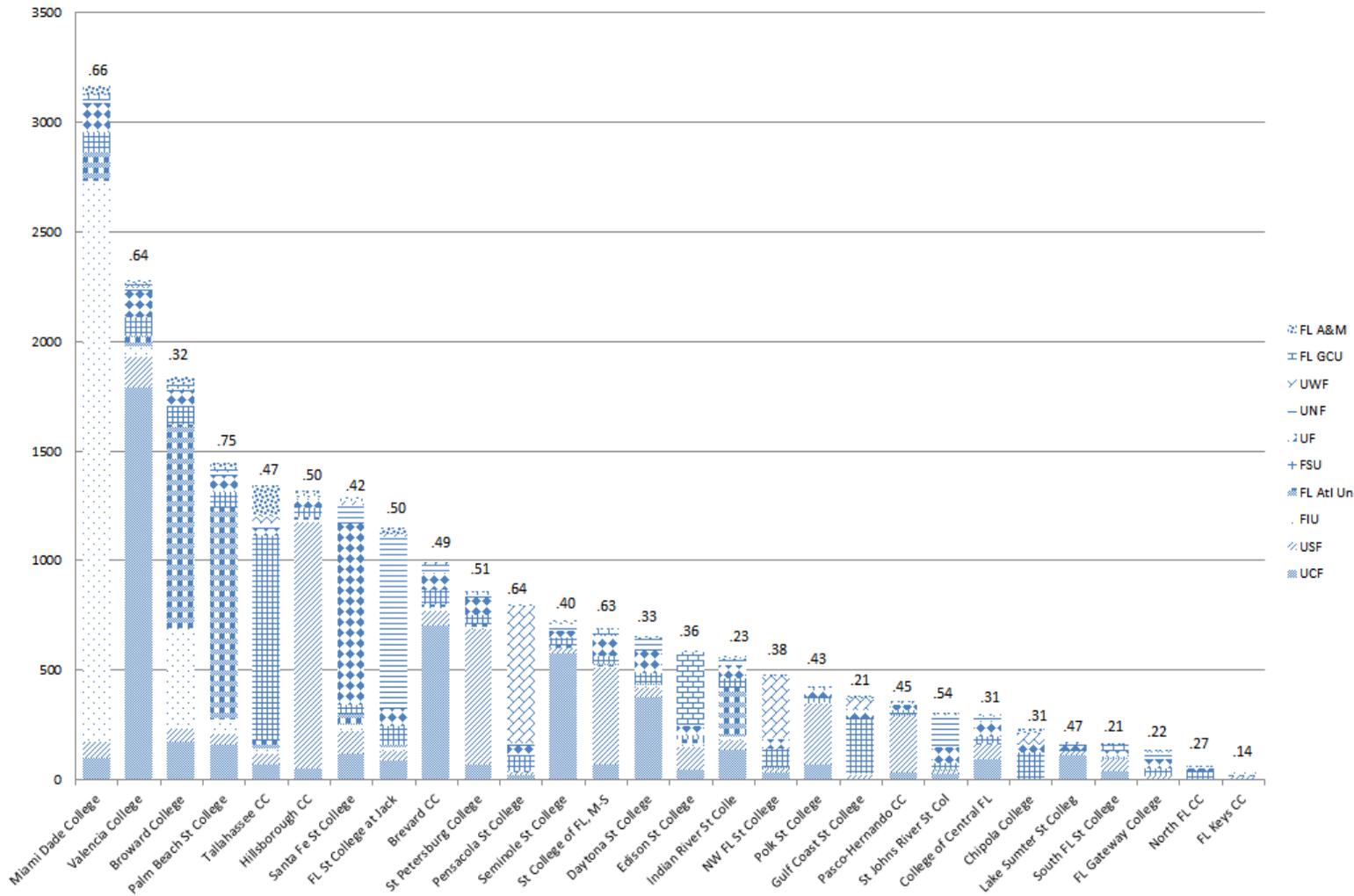
Figure 1: **Transfer patterns in Florida.** Source (x-axis) and destination (legend) institutions for two-year to four-year transfers in Florida. Number above each bar represents the Herfindahl index measuring the diversity of destination campuses for a given community college.
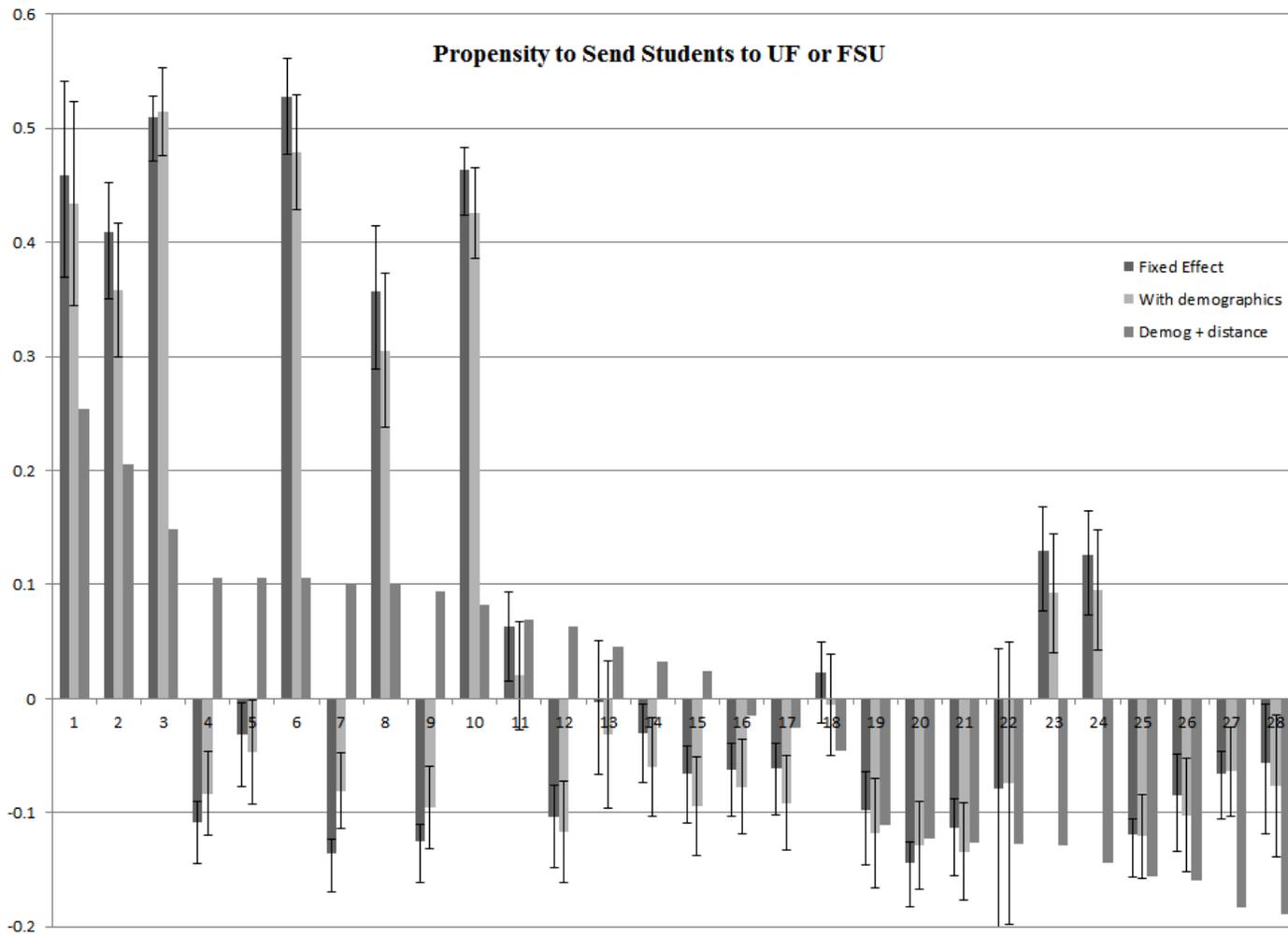
Figure 2: Institutional fixed effects of regression predicting transfer to either UF or FSU. See text.

Key

1: North FL CC	2: Chipola C	3: Tallahassee CC	4: Palm Beach St C
8: FL Gateway C	9: Broward C	10: Santa Fe St C	11: NW FL St C
15: Pensacola St C	16: St Petersburg C	17: Brevard CC	18: Daytona St C
22: Fl Keys CC	23: St J Riv. St C	24: C Central Fl	25: Valencia C

5: Indian River St C   6: Gulf Coast St C   7: Miami Dade C
12: Edison St C   13: South FL St C   14: St C of FL, M-S
19: Polk St C   20: Hillsborough CC   21: Seminole St C
26: Pasco-Hernando C   27: FL St C at Jacks.   28: Lake Sumter St C

	Do not transfer	Transfer
Number of AP/IB courses	.0452	.136
	(.262)	(.467)
HS GPA	2.55	2.95
	(.586)	(.521)
10th grade FCAT math	-.123	.333
	(.993)	(.942)
10th grade FCAT reading	-.107	.289
	(.997)	(.95)
Male	.44	.419
Asian	.0208	.0337
Black	.227	.153
Hispanic	.216	.211
White	.536	.602
Born in US	.878	.873
FRL	.401	.283
Remedial Math Courses First 2 terms	.241	.0949
	(.5)	(.316)
Remedial Reading Courses First 2 terms	.224	.108
	(.52)	(.373)
Math Credits First 2 terms	3.09	4.86
	(3.07)	(3.36)
CC GPA First 2 terms	2.16	2.77
	(.971)	(.767)
Terms Worked First 2 terms	1.38	1.45
	(.793)	(.785)
Wages First 2 terms	3.59	3.01
	(3.97)	(3.1)
Distance to nearest 4-year inst / 30	.99	.93
	(.70)	(.69)
Tuition of nearest 4-year (1000s)	3.06	3.07
	(.288)	(.284)
FTE of nearest 4-year (1000s)	28.2	28.8
	(10.7)	(10.9)
Percent white of nearest 4-year	59	60.3
	(19)	(17.9)
6-yr graduation rate of nearest 4-year	50.9	51.9
	(11.4)	(11.9)
Instructional expenses of nearest 4-year (1000s)	5.49	5.55
	(1.52)	(1.56)
S/F ratio of nearest 4-year	25.2	25.4
	(3.66)	(3.8)
Share students fin aid at nearest univ	84.7	85.8
	(8.44)	(8.57)
Pct Points Student Higher than Nearest Univ	12.9	18.3
	(19.8)	(22.1)
Pct Points Student Lower than Nearest Univ	16.7	10.2
	(22.1)	(17.8)
Observations	61595	22803

Notes: Contains all Florida students from the high school graduation cohorts of 2002 and 2004 who initially enrolled in a public two-year college in Florida. Institution characteristics obtained from 2005 values of IPEDS data.

Table 2: Probit Prediction of Whether a Student Ever Transfers

	All Students			Black or Hispanic		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of AP/IB courses	1.175***	1.158***	1.159***	1.176***	1.130***	1.120***
	(0.016)	(0.016)	(0.017)	(0.031)	(0.030)	(0.030)
HS GPA	1.923***	1.504***	1.550***	2.025***	1.605***	1.653***
	(0.019)	(0.016)	(0.017)	(0.033)	(0.028)	(0.029)
Male	1.024**	1.068***	1.068***	1.006	1.032*	1.031*
	(0.010)	(0.011)	(0.011)	(0.016)	(0.017)	(0.017)
FRL	0.797***	0.817***	0.820***	0.857***	0.878***	0.868***
	(0.009)	(0.010)	(0.010)	(0.014)	(0.014)	(0.015)
Born in US	0.894***	0.918***	0.954***	0.918***	0.938***	0.977
	(0.014)	(0.015)	(0.016)	(0.017)	(0.018)	(0.019)
10th grade FCAT math	1.112***	1.026***	0.979	1.109***	1.030***	1.003
	(0.008)	(0.007)	(0.014)	(0.012)	(0.011)	(0.022)
10th grade FCAT reading	1.080***	1.054***	1.054***	1.085***	1.058***	1.056***
	(0.007)	(0.007)	(0.007)	(0.011)	(0.011)	(0.011)
Black	0.942***	0.960**	1.004	0.934***	0.944***	0.994
	(0.015)	(0.016)	(0.018)	(0.015)	(0.016)	(0.018)
White	0.806***	0.788***	0.878***			
	(0.011)	(0.011)	(0.014)			
Asian	1.053*	0.969	1.056*			
	(0.033)	(0.031)	(0.035)			
Remedial Math Courses First 2 terms		0.800***	0.830***		0.828***	0.863***
		(0.011)	(0.012)		(0.017)	(0.019)
Remedial Reading Courses First 2 terms		0.921***	0.916***		0.962**	0.959**
		(0.011)	(0.011)		(0.016)	(0.016)
Math Credits First 2 terms		1.067***	1.069***		1.068***	1.071***
		(0.002)	(0.002)		(0.003)	(0.003)
CC GPA First 2 terms		1.378***	1.389***		1.330***	1.357***
		(0.009)	(0.009)		(0.013)	(0.013)
Wages First 2 terms (1000s)		0.969***	0.971***		0.975***	0.977***
		(0.001)	(0.001)		(0.002)	(0.002)
Distance to nearest 4-year inst / 30 miles			0.702***			0.667***
			(0.018)			(0.033)
6-yr graduation rate of nearest 4-year			0.978***			0.982***
			(0.003)			(0.005)
Instructional expenses of nearest 4-year (1000s)			1.291***			1.465***
			(0.049)			(0.105)
S/F ratio of nearest 4-year			0.954***			0.969***
			(0.006)			(0.011)
Share students fin aid at nearest univ			1.035***			1.029***
			(0.004)			(0.007)
Observations	84398	84398	84398	35597	35597	35597
R-squared	0.100	0.155	0.164	0.099	0.149	0.158
Dep var mean		0.26			0.23	

Notes: Additional controls include squared term of distance, full-time enrollment and its square, the square of instructional expenditures, the closeness of the ability match between student and university (see text), and a cohort fixed effect. Odds ratios reported.

Table 3: University Characteristics

	SAT V 75th pctile	SAT M 75th pctile	In-state Tuition	Full-time Enrollment	% White	% Black	% Hispanic	6-yr grad rate	Any fin. aid	Instructional Expenditures	S/F Ratio
University of Florida	670	690	3094	45946	66	7	11	79	98	9633	21
University of Central Florida	610	620	3339	36757	68	8	12	57	94	4407	32
Florida State University	620	630	3208	35043	71	11	9	66	95	5710	26
University of South Florida	600	610	3310	33574	66	11	10	48	79	6471	24
Florida International University	590	590	3062	27799	18	13	56	48	74	4011	26
Florida Atlantic University	560	570	2607	18220	58	17	16	37	79	5493	23
University of North Florida	610	600	2615	12154	76	10	6	49	86	3743	20
Florida A&M University	510	520	2958	11249	5	91	2	45	70	6201	19
The University of West Florida	600	600	2782	7507	77	10	5	42	93	6021	23
Florida Gulf Coast University	560	570	3373	5767	80	5	9	38	82	5666	22
New College of Florida	720	670	3616	761	83	2	9	.	96	7604	10

Note: Institution characteristics from IPEDS, 2005.

Table 4: Conditional Logit Predicting Transfer Destination

	All Students (1)	Top 20% FCAT Math 10th (2)	Top 20% CC GPA (3)	Black or Hispanic (4)	FRL (5)
Distance (30 mi)	0.513***	0.541***	0.509***	0.517***	0.490***
	(0.003)	(0.005)	(0.006)	(0.005)	(0.006)
Instructional expenses (1000s)	1.161**	0.772**	1.239	2.475***	2.155***
	(0.080)	(0.095)	(0.185)	(0.322)	(0.305)
Student-to-faculty ratio	0.986	0.928***	0.877***	1.036	1.062*
	(0.015)	(0.023)	(0.028)	(0.032)	(0.034)
Share students fin aid	1.012***	1.060***	1.061***	0.966***	0.959***
	(0.004)	(0.008)	(0.009)	(0.007)	(0.007)
6-yr graduation rate	0.992**	0.952***	0.966***	1.039***	1.033***
	(0.004)	(0.006)	(0.008)	(0.007)	(0.008)
Observations	228030	77370	54390	82990	64520
R-squared	0.445	0.416	0.443	0.466	0.484
Unique students	22803	7737	5439	8299	6452

Notes: Additional controls include those mentioned in the notes to Table 2. Odds ratios reported. Sample restricted to students who transferred from a two-year to four-year institution.

Table 5: Determinants of Transfer to the University of Florida

	All Students			Black or Hispanic			FRL		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Number of AP/IB courses	1.171***	1.185***	1.184***	1.092*	1.086	1.093	1.175***	1.177***	1.192***
	(0.025)	(0.026)	(0.027)	(0.055)	(0.057)	(0.060)	(0.064)	(0.065)	(0.067)
HS GPA	1.375***	1.163***	1.152***	1.472***	1.217***	1.199***	1.302***	1.073	1.012
	(0.036)	(0.033)	(0.037)	(0.082)	(0.073)	(0.079)	(0.074)	(0.066)	(0.067)
Male	1.259***	1.291***	1.287***	1.282***	1.319***	1.234***	1.184***	1.221***	1.181***
	(0.032)	(0.033)	(0.036)	(0.067)	(0.071)	(0.072)	(0.066)	(0.071)	(0.072)
Black	0.784***	0.774***	0.789***	0.784***	0.768***	0.748***	0.817***	0.805***	0.796**
	(0.043)	(0.043)	(0.050)	(0.044)	(0.045)	(0.051)	(0.062)	(0.063)	(0.071)
FRL	0.901***	0.912***	0.943	0.936	0.949	1.025			
	(0.030)	(0.031)	(0.035)	(0.048)	(0.050)	(0.059)			
Born in US	1.178***	1.186***	1.102*	1.120*	1.122*	1.048	1.228***	1.232***	1.144*
	(0.056)	(0.057)	(0.057)	(0.068)	(0.070)	(0.070)	(0.087)	(0.090)	(0.088)
10th grade FCAT math	1.109***	1.090***	0.960	1.091***	1.079**	0.828**	1.056	1.038	0.842**
	(0.018)	(0.019)	(0.035)	(0.036)	(0.038)	(0.072)	(0.037)	(0.039)	(0.071)
10th grade FCAT reading	1.105***	1.100***	1.073***	1.105***	1.094***	1.075**	1.132***	1.127***	1.084**
	(0.017)	(0.018)	(0.018)	(0.035)	(0.037)	(0.039)	(0.039)	(0.040)	(0.041)
White	1.219***	1.198***	1.127***				1.192**	1.150**	1.032
	(0.045)	(0.045)	(0.051)				(0.081)	(0.081)	(0.087)
Remed. M. First 2 terms		1.128***	0.984		1.262***	1.030		1.213**	1.013
		(0.051)	(0.050)		(0.109)	(0.104)		(0.105)	(0.100)
Remed. R. First 2 terms		1.044	1.001		1.101	1.020		1.059	0.986
		(0.040)	(0.042)		(0.071)	(0.076)		(0.074)	(0.078)
Math Credits First 2 terms		1.059***	1.040***		1.068***	1.038***		1.062***	1.040***
		(0.004)	(0.004)		(0.008)	(0.009)		(0.008)	(0.009)
CC GPA First 2 terms		1.230***	1.306***		1.286***	1.311***		1.301***	1.350***
		(0.025)	(0.029)		(0.052)	(0.057)		(0.057)	(0.064)
Wages First 2 terms		0.962***	0.976***		0.972***	0.983*		0.973***	0.983*
		(0.004)	(0.005)		(0.009)	(0.009)		(0.009)	(0.009)
Distance to UF (30 mi)			0.738***			0.848			0.844
			(0.031)			(0.102)			(0.089)
Observations	22803	22803	22803	8299	8299	8299	6452	6452	6452
R-squared	0.085	0.118	0.249	0.067	0.111	0.232	0.072	0.113	0.210
Dep var mean		0.102			0.046			0.055	

Notes: Additional controls include those mentioned in the notes to Table 2. Odds ratios from probit regression reported. Sample restricted to students who transferred from a two-year to four-year institution.

Table 6: Determinants of Transfer to the University of Florida, by Achievement

	Top FCAT M Quintile			Top CC GPA Quintile		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of AP/IB courses	1.163***	1.184***	1.175***	1.163***	1.188***	1.211***
	(0.028)	(0.029)	(0.030)	(0.036)	(0.038)	(0.040)
HS GPA	1.418***	1.231***	1.237***	1.260***	1.105**	1.052
	(0.054)	(0.052)	(0.058)	(0.061)	(0.056)	(0.058)
Male	1.253***	1.255***	1.270***	1.421***	1.409***	1.419***
	(0.046)	(0.047)	(0.051)	(0.063)	(0.064)	(0.068)
Black	0.704***	0.703***	0.739**	0.905	0.894	0.895
	(0.086)	(0.088)	(0.100)	(0.106)	(0.107)	(0.116)
FRL	0.849***	0.864***	0.879**	0.883**	0.897*	0.908
	(0.045)	(0.047)	(0.051)	(0.053)	(0.055)	(0.058)
Born in US	1.246***	1.272***	1.176*	1.125	1.137	1.036
	(0.100)	(0.104)	(0.102)	(0.096)	(0.098)	(0.093)
10th grade FCAT math	0.992	0.977	0.878**	1.042	1.029	0.874**
	(0.034)	(0.034)	(0.045)	(0.030)	(0.030)	(0.049)
10th grade FCAT reading	1.124***	1.119***	1.091***	1.114***	1.109***	1.083***
	(0.025)	(0.026)	(0.027)	(0.030)	(0.030)	(0.031)
White	1.194***	1.185***	1.076	1.156**	1.165**	1.062
	(0.071)	(0.072)	(0.076)	(0.079)	(0.081)	(0.086)
Remedial Math Courses First 2 terms		1.166	1.068		0.857	0.906
		(0.213)	(0.215)		(0.123)	(0.140)
Remedial Reading Courses First 2 terms		1.007	0.948		0.842	0.784*
		(0.115)	(0.116)		(0.118)	(0.116)
Math Credits First 2 terms		1.049***	1.039***		1.055***	1.049***
		(0.005)	(0.005)		(0.007)	(0.007)
CC GPA First 2 terms		1.138***	1.233***		1.176**	1.181**
		(0.034)	(0.041)		(0.077)	(0.082)
Wages First 2 terms		0.965***	0.980***		0.966***	0.978***
		(0.006)	(0.006)		(0.007)	(0.007)
Distance to UF (30 mi)			0.687***			0.801***
			(0.043)			(0.054)
Observations	7737	7737	7737	5439	5439	5439
R-squared	0.046	0.069	0.209	0.050	0.073	0.177
Dep var mean		0.169			0.168	

Notes: Additional controls include those mentioned in the notes to Table 2. Odds ratios from probit regression reported. Sample restricted to students who transferred from a two-year to four-year institution.