The Pennsylvania State University

The Graduate School

College of Education

COLLEGE CHOICE AND DEGREE ATTAINMENT OF STUDENTS INVOLVED IN DIFFERENT EDUCATIONAL PATHWAYS

A Dissertation in

Higher Education

by

Dai Li

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

December 2008

The dissertation of Dai Li was reviewed and approved* by the following:

Donald E. Heller
Professor of Higher Education
Dissertation Advisor
Chair of Committee

Roger L. Geiger
Distinguished Professor of Higher Education

Patrick Terenzini
Distinguished Professor of Higher Education

Spiro E. Stefanou
Professor of Agricultural Economics

Dorothy Evensen
Professor of Higher Education
Professor-in-Charge, Higher Education

* Signatures are on file in the Graduate School

ABSTRACT

This dissertation examines the college choice and degree attainments among students who were originally enrolled in four-year institutions and involved in different educational pathways. Most prior research that investigated multi-institutional attendance patterns focused on two-year college students. This dissertation shifts the research focus to students starting at four-year institutions who need to attend other institutions to obtain a bachelor's degree. Three research questions regarding the students' decision process for enrollment were as follows: (a) What factors affect the students' choice of educational pathways; (b) what factors affect transfer students' choice of destination institutions; and (c) how do educational pathways affect the probability of bachelor's degree attainment among students involved in different educational pathways?

The interactionalist model which indicates that students filter institutional environments through their characteristics and pre-college experience and then make decisions of persistence or withdrawal serves as the overarching conceptual framework of this study. Student's outside-college experience is considered for students who have ever broken their enrollment in higher education. Each research question employs different research methods including logistic regression, the hurdle model, and Heckman's two-step model.

The major research findings of this study are that students who attended more selective institutions for their first matriculation have greater odds of returning to their original institutions than of transferring to other institutions after stopping out. Institutional attributes show a statistically significant but trivial influence on students' decisions. Moreover, transfer students have a much lower probability of bachelor's degree attainment than students who stayed until the

end of the sixth year of first matriculation. Students who broke their enrollments in higher education have an even lower probability of degree attainment than continuous transfers.

Students who are continuously enrolled in higher education, yet attend more than one institution, appear to be less likely to obtain a bachelor's degree than the ones who stay in one institution. Such results suggest that policy makers should encourage students to remain in their original institutions. Educational practitioners may inform students of the risk of degree incompletion by attending more than one institution on one hand, but assist transfer students in better integrating into destination institutions on the other. Given that this dissertation examined students who transferred only once, a future study may extend the current research by considering students who are involved in more complex educational pathways.

TABLE OF CONTENTS

LIST OF APPENDICES

ACKNOWLEDGEMENTS

I am grateful for the support and guidance of my committee members, especially my committee chair, Dr. Donald Heller, who spent much time and energy working closely with me to improve the quality of my dissertation. I appreciate the comments and suggestions provided by Dr. Patrick Terenzini. His feedback and suggestions greatly enriched this study. I would also like to thank Dr. Roger Geiger, who helped me develop this research idea and make it possible to be carried out. Last but not least, I want to express my appreciation to Dr. Spiro Stefanou, my external committee member, who not only polished my empirical skills but also encouraged me to re-think this study from an economic perspective.

I also extend my thanks to the Association for the Study of Higher Education, the Lumina Foundation, and the Association for Institutional Research, which provide financial assistance for this study and made it possible. In addition, the analytical sample of this study is drawn from the National Center for Education Statistics and the Integrated Postsecondary Education Data System. These two organizations allowed me to access the data source and provided empirical support for this study.

I would also want to thank Dr. Fredericks Volkwein and Dr. Betty Harper, who offered insightful comments on the last research question and strengthened this study. Additionally, I sincerely appreciate the assistance that Ms. Hazel Hunley, my copy editor, provided to make this dissertation more readable.

Finally, I want to thank my family and many other friends for their assistance and encouragement along my way to a doctoral degree in a foreign country. Without their support I could not have accomplished the task. Thank you all with my heartfelt appreciation.

Chapter One

INTRODUCTION

The image of a pipeline that channels students from high school to college and to baccalaureate degree attainment used to be the dominant view of college attendance. However, such a linear model – one student attending one institution and graduating in four years – does not capture the attendance pattern of many students. From the 1970s to the 1990s, the proportion of undergraduates attending more than one institution increased from 40% to 54%, and from 49% to 58% among bachelor's degree recipients (Adelman, 1999). A more recent research report from the National Center for Education Statistics (NCES) shows that nearly half (47.3%) of 1999-2000 first-time baccalaureate degree recipients who began in four-year institutions enrolled in more than one institution; 28.3% enrolled in two, 13% enrolled in three, and 6.1% enrolled in four or more institutions (Peter & Cataldi, 2005). Today's burgeoning higher education marketplace and flexible statewide transfer policies provide students with many more choices than ever before. Students can begin at one institution, simultaneously take courses from another provider, transfer to a second and third institution, and all the while enroll in distance learning courses at any of these or one institution. Sylvia Hurtado, Director of the Higher Education Research Institute at UCLA, has recommended "replac[ing] the pipeline metaphor with a transit-system one: Students get on the bus at one point, get off again, take the train to the next stop, walk for a while – and maybe get to their destination, eventually" (Miller, 2004).

The scenario of increasing numbers of students engaging in multi-institutional attendance patterns comes partially from the phenomenal demographic and social transformations in the past several decades. In the 1960s, most college students were traditional-aged, dependent, and recent

high school graduates who lived relatively homogeneous college lives. However, to open the college doors wider and to welcome all who could benefit from a postsecondary education, educators and policy makers have created rich opportunities and easier means for students from various backgrounds to participate in higher education in recent decades (Longanecker & Blanco, 2003). Today, 15 million students can choose from 4,000 institutions, ranging from open-door community colleges to private selective institutions, as well as for-profit proprietary institutions, to pursue a bachelor's degree (U.S. Department of Education, 2003). Students have taken this opportunity seriously and begun to define their college experience in very different ways. As Longanecker and Blanco have noted, "they may not be willing to have their higher education experience limited by the space and time boundaries set by traditional colleges and universities; they may care little about finding those experiences in a single institution over a four-year period" (p. 52). In sum, the burgeoning higher education marketplace has created a user-friendly environment where students can design their educational trajectories as they wish.

No one has concluded whether attending two or more institutions is better than attending just one. Whether attending multiple institutions increases or reduces the probability of obtaining a baccalaureate degree is still a question that merits further investigation. Degree completion is the goal shared by most parents and students, regardless of their backgrounds (Adelman, 2006). However, the literature has not clearly and consistently shown the effects of educational pathways on bachelor's degree attainment. Given that the unemployment rate for people without a bachelor's degree or higher keeps increasing, and the discrepancy between the wages of college degree holders and high school diploma holders has grown steadily (U.S. Census Bureau, 2003), a bachelor's degree brings a much higher capital return to the students' investment in education. If being involved in educational pathways other than staying in original institutions

until graduation results in a lower probability of attaining a bachelor's degree, students who have ever departed from original institutions may receive less economic return on their investment in education. Moreover, being involved in educational pathways other than staying at one institution may lengthen the time needed to obtain a bachelor's degree. Searching and re-enrolling in other institutions may take months or even years, and adjusting to a new institutional environment may also demand time and energy, and postpone students' graduation and in some cases, prevent them from completing. Therefore, students who depart from their original institutions may need a longer time to complete their degree than their peers in their original institution. Being involved in educational pathways other than staying may be a less effective and efficient choice in terms of degree completion.

Furthermore, the proportions of students engaged in transfer behaviors do not equalize across different gender, race, and socioeconomic groups. The literature has documented the fact that students from a lower socioeconomic background are more likely to be engaged in multi-institutional attendance patterns (Carroll, 1989; Goldrick-Rab, 2006; Rab, 2004). Whether these patterns represent an unsuccessful path to a college education in terms of degree attainment has become an urgent and significant question, because its attraction to low-income students may not only slow them on the path to degree attainment but also fail to assist them in advancing socio-economically by obtaining a higher education.

This dissertation follows students' choices of educational pathways and examines the effects of these pathways on the probability of their degree attainment. The purpose of this dissertation was to learn the factors associated with students' choice of departure alternatives from original institutions, and the choices of destination institutions among transfer students. The results of this study have implications for both theory and policy. The prior literature often ends

the examination of student behaviors at the point where students depart from a referent institution. Once students depart from the institution, what they do and whether they finally obtain the degree are not clear in the literature. Therefore, the results of this dissertation will shed light on future studies of student persistence in an institution and educational system as well as their choice of educational pathways. The findings of the dissertation may also enhance educators' current understanding of degree attainment among students who follow different educational pathways.

Additionally, the results of this dissertation may assist educational practitioners and policy makers in managing student mobility. Based on the patterns of student departure and re-enrollment, the practitioners may recognize the risks that students may face after they depart their original institutions and help students design educational pathways to achieve their academic goals. Additionally, the results may inform policy makers of the effects of student mobility in the educational system on their bachelor's degree attainment. The policy makers may introduce policies that encourage students to choose effective and efficient educational pathways.

This dissertation focuses on dependent students starting at four-year institutions. Because the students starting at two-year community colleges have to transfer to a four-year institution to receive their baccalaureate degree, the effect of this transfer on their degree attainment is positive for these students. The purpose of using these students was to constrain the analytical sample of this dissertation to those who do not necessarily depart from their original institutions to obtain their degree. The heterogeneous composition and outcomes of their educational pathways merit close examination.

Research Questions

This dissertation addresses the following research questions:

1. What affects the students' choice of educational pathways including stay, transfer, and stopout?
    - What affects the students' choice of departure alternatives when they decide to depart their original institutions?
    - What affects the students' choice of attendance patterns after they have departed their original institutions?
2. Which type of institutions do transfers choose to attend?
    - What affects the choice of destination institutions for continuous transfers?
    - What affects the choice of destination institution for interrupted transfers?
3. How do different educational pathways affect the probability of bachelor's degree attainment?

Definition of Terms

In order to avoid confusion in discussing students and their transfer patterns, the terms in the study are defined as the following:

1. *Transfer students/transfers* – students who leave the original institution and enroll at the destination institution for four or more months (BPS: 96/01).
2. *Continuous transfers* – transfers who continuously attend destination institutions without breaking enrollment in educational system (BPS: 96/01).
3. *Interrupted transfers* – transfers who attend destination institutions after they depart their original institutions and break their enrollment in the educational system for at least a year (BPS: 96/01).

4. *Horizontal transfer* – a transfer that occurs between institutions at the same level, for example, between four-year institutions (McCormick, 1997).
5. *Reverse transfer* – involves movement to a lower-level institution, for example, from a four-year institution to a two-year college (McCormick, 1997).
6. *Native students/natives* – students who originally attended the institution. Compared to transfers, they are "native" to the institution and begin their college career here (Porter, 1999).

Chapter Two

LITERATURE REVIEW

Following an educational pathway other than staying in one institution involves a multi-stage decision and cycle of choices. First, students decide whether they will depart their original institutions. Departing students have the choice of attending other institutions (continuous transfer) or leaving higher education.. Students who choose to leave higher education may attend other institutions (interrupted transfer) or return to their original institutions (stopout) if they still want to get a college education. Finally, transfer students search for and attend their destination institutions. Students who attend more than two institutions may repeat this process as many times as they choose or need to.

Even though few scholars have examined this multi-stage decision cycle or the effects of educational pathways on degree attainment, previous literature has documented abundant research findings on the key elements of the cycle, including departure, college choice, and degree attainment. The following sections review the literature on each stage and develop the proper theoretical framework and method by which this study will examine students' choice and degree attainment.

Stage One: Departure From Original Institutions

Students in their original institutions have the choice of staying until graduation or leaving. Educational pathways other than staying also start with departure from the original institutions. The reasons that drive students to depart their original institutions have long been the focal question of literature on higher education. Scholars have found that the critical factors motivating students to leave their original institutions include a poor match between the student

and the institution, the academic preparation and their capability, the way they finance their college education, and other personal reasons.

Poor Match of Students and Institutions

Cope and Hannah (1976) claimed that a considerable proportion of students decide to transfer from the institution of their first matriculation simply because they made a poor choice of institution. These researchers interviewed 1,256 leavers from 13 colleges and found that poor choice was the primary reason to transfer for up to 20% of the leavers. However, "poor choice" is such an obscure term that all college choice decisions that result in students' withdrawal could be referred to as a poor choice. Cope and Hannah did not specify their definition for "poor choice" but identified "poor assessment of the social and intellectual climate" and being "uninformed about rudimentary matters" as two reasons for poor choice (p. 33).

However, Cope and Hannah (1976) failed to propose reasons for students' poor choices of colleges, whereas other literature pertinent to student college choice (discussed later in this chapter) suggests four possible reasons for making poor choices. First, students are only partially informed. They are by no means able to consider all colleges and gather all the available information to evaluate colleges (Jackson, 1982); therefore, the most suitable colleges for them may not be on their college list. Second, students may be ill-informed. College applicants rely on different information sources, and the credibility of these sources varies considerably. Litten and Brodigan (1982) identified the six most preferred information sources for both students and parents: admission officers, college publications, high school counselors, commercial guides, alumni, and college students. Students with particular characteristics, including gender, race, socioeconomic status, and parent educational levels are more likely to consult one resource over another for college information and advice. Unfortunately, not all chosen sources are able to

provide the most recent and accurate information. Students who depend on an unreliable information source to make their college choice may attend a poorly matched institution. Third, students' college lists are homogeneous partly because they are unable to differentiate colleges with institutional attributes and partly because they have difficulty inferring benefits and costs of attending those colleges from the available information (Jackson, 1982). Fourth, the actual college experience is unforeseeable before matriculation. Students search for information and assess institutions in an aggregate manner, which may be of little use for predicting individual college experiences. The college experience is heterogeneous across individual students, depending on the courses they take, the activities they participate in, and the faculty and peers with whom they interact (Hearn, 1984). Students may also have either positive or negative perceptions of the same institutional circumstances (Baird, 2002). The poor match between the students' pre-matriculation expectations and their perceived institutional environment will finally drive them to leave.

Academic Performance

Academic underachievement and academic-related issues are most commonly reported reasons for voluntary departure (Cope & Hannah, 1976). Barger and Hall (1964) suggested that students under academic stress at the end of the semester were more likely to withdraw. Bean (1980, 1983) synthesized the industrial turnover model and the framework of student involvement and identified student academic achievement measured by grade point average as the most obvious indicator of intention to withdraw. Moreover, academic underachievement is not only a reason but also a result of the intention to depart (Stage & Hossler, 2002). Students who intend to leave an institution may receive less attention and encouragement from parents, peers, and instructors than students who want to stay in order to continue to perform well at the

institution. Thus, the academic underachievement and the intention to leave simultaneously reinforce each other and eventually drive students to withdraw from the institution.

Although academic preparation in high school is a direct indicator of academic achievement in colleges, researchers have found that academic preparation had a complex influence on students' decision to leave. The academic preparation usually measured by high school rank, high school grade point average, and SAT/ACT scores is the most extensively examined variable to explain student predisposition to depart (Chapman & Pascarella, 1983; Cope & Hannah, 1976; Pascarella & Terenzini, 1983; Stage & Hossler, 2002; Terenzini, Pascarella, Theophilides, & Lorang, 1985). The findings of campus-based studies have shown that the college grade point average has direct effects on student persistence although high school grade point average and other measures of ability do not (Benin, Brandt-Williams, & Okun, 1996; Nora & Cabrera, 1996; Stage, 1989). Such conclusions deemphasize the predictive power of pre-college academic preparation on college performance and imply that pre-college preparation has non-significant long-term effects on the decision making of withdrawal. However, these campus-based studies have limited scope because their samples are comprised of students from a single institution. Broader national studies have presented a contradictory result, however, indicating that high school academic performance is a reliable predictor of persistence (Astin, 1975; Williamson & Creamer, 1988). Despite the inconsistent findings on the effects of high school performance on persistence in college, the academic capability of students, based on past performance and measurement, can be regarded as a significant factor in determining students' decision to withdraw from an institution.

Financing College

Along with the substantial increase in tuition and subsidies, the concern about college affordability has motivated much of the research on the economic perspective of student persistence over three decades (St. John, 1994). In the 1970s, college costs barely increased. In the early 1980s, however, tuition and fees began to grow much more rapidly than the consumer price (The College Board, 2004). In constant 2004 dollars, the average tuition and fees rose 51% ($1,725) at public four-year colleges and universities over the 10-year period, 36% ($5,321) at private four-year colleges, and 26% ($426) at two-year public colleges (The College Board). Under such growing financial pressure, the matter of money has become a major concern for students remaining in institutions.

Tuition and fees.

Most studies show that tuition and fees are inversely associated with persistence (Paulsen & St. John, 1997; St. John, Andrieu, Oescher, & Starkey, 1994; St. John, Oescher, & Andrieu, 1992; St. John, Paulsen, & Starkey, 1996), and the effects varied across institutional types and student groups. Paulsen and St. John found that the increased tuition had a greater negative effect on persistence for students enrolled in public four-year institutions than on their counterparts in the private sector. Students from lower-income families have also demonstrated higher sensitivity to the increased tuition than students from affluent families (Heller, 1997). Moreover, Heller drew enrollment data from 50 states, from 1976 to 1994, and compared the price-sensitivity of first-time enrollees and continuing students to the changes in tuition and state grants. Employing cross-sectional and time-series methods, he found that rising tuition exerted greater negative influence on continuing students than on first-time enrollees. Moreover, minority students (except Asian) from both community colleges and public four-year institutions

demonstrated a higher sensitivity (negative) to rising tuition over time than White students. The results of Heller's study (1998) re-enforce the existence of a downward sloping demand curve for public higher education, and provide evidence of stronger price elasticity for students who have already been in higher education than for the newcomers.

Different forms of financial aid.

Financial aid in the forms of direct grants and scholarships, low-interest loans, and subsidized work-study programs is intended to equalize student opportunities to attend institutions. Consistent research results support the fact that financial aid improves persistence and retention by moderating student sensitivity, particularly among low-income students, to financial pressure from the costs charged by institutions (Astin, 1975; Cabrera, Stempen, & Hansen, 2002; Stampen & Cabrera, 1986, 1988). Evidence has also indicated that a particular package of financial aid did not exhibit an equivalent effect on persistence (Astin, 1975; Nora, 1990; Nora & Horvath, 1989; Olivas, 1985; St. John, 1990).

Except for a few studies, the majority of the research on persistence consistently indicated that direct grants and scholarships had positive but moderate effects on persistence (Pascarella & Terenzini, 2005). However, the U.S. General Accounting Office (1995) reported that grants decreased the probability of dropping out for low-income students and that the effectiveness of this financial support was stronger during the first school year than in subsequent years. It is estimated that an additional $1,000 in grants to low-income students reduces the probability of their dropping out by 23% in the first year, 8% in the second year, but has little effect in the third year.

In the 1990s, new loan programs were launched under the 1992 Reauthorization of the Higher Education Act with federal and state financial aid policy shifting from grants to loans

(Pascarella & Terenzini, 2005). The number of undergraduate recipients of federal loans grew by 125%, and the average amount increased by 70% after adjusting for inflation during the previous 10 years (The College Board, 2004). Loans have become an essential means to assist students with college access. However, the research results on the effects of loans on student persistence are mixed. Some studies have found that borrowing was negatively related to staying in institutions (Paulsen & St. John, 2002; Somers, 1996), but other studies have indicated that borrowing has either a positive or no statistically significant influence on persistence (Choy & Premo, 1996; St. John, 1990, 1991). Moreover, the simultaneous receipt of loans and other forms of financial aid further complicates the investigation because of the difficulty of isolating the effects of loan aid from other forms of financial aid. St. John, Hu and Weber (2001) solved this problem with a narrow scope by examining students who received loan-only aid in the state of Indiana. They failed to find any statistically significant effect from loan aid on student persistence. Finally, the research results of examining whether the *amount* of debt spurs or reduces the likelihood of students remaining in colleges appeared to be even more obscure (Pascarella & Terenzini). Thus, further examination of loan effects on persistence awaits future analysis.

Direct or indirect effects?

Whether financial pressure has a direct or indirect influence on attrition is still under debate. Two circumstances hamper the inquiry about financial effects on persistence. First, when scholars measure financial pressure, they seldom examine the financial variables by considering students' socioeconomic status. The research findings have frequently shown that the interaction of such financial variables as the parents' educational levels, occupation, and family income have negatively affected the probability of persistence and retention (Bowen, 1977; Cabrera,

Stampen, & Hansen, 1990; St. John, 1990, 1994). Further, the entering students who are of a lower socioeconomic status are more likely to drop out of institutions. However, such research methods give rise to doubt as to whether voluntary withdrawal is a direct result of increasing financial pressure, or if it is more likely due to the parents' parsimony. Moreover, some scholars have argued that lack of financial capital was more likely to be a barrier to entering college than a determinant factor in students' decision to persist (Cope & Hannah, 1976; Litten, 1982).

Second, researchers in earlier studies who relied on the price-response theory to examine persistence (Nora, 1990; St. John, 1990, 1994) were criticized for merely focusing on financial variables and neglecting the more complex interaction of financial variables with non-financial variables (St. John, Cabrera, Nora, & Asker, 2002). The economic studies seldom take into account student interaction with the institution such as student-support systems, communication with faculty, and other affective outcomes associated with college, which are known to affect persistence (Pascarella & Terenzini, 1991). Cabrera, Stampen, and Hansen (1990) suggested merging economic theories with the student-institution fit approach in order to differentiate the direct effects of financial pressure and the indirect effects of interweaving institutional variables on persistence and educational attainment. They drew data from the National Center for Educational Statistics (NCES) High School and the Beyond 1980 senior cohort and showed that adding college-related variables reduced the variance of persistence which had presumably contributed to financial indices (22.9% vs. 14.1%), but the effects of financial aid remained. Accordingly, they postulated that financial aid ameliorated the barriers for students to participate in academic and social collegiate activities by freeing them from the need to work and from financial concerns. Meanwhile, financially related factors have had direct effects on persistence

because of the cost-related benefits and indirect effects of mediating student adjustment to institutions.

Institutional Attributes

Students who leave institutions because of institutional attributes, which are usually indicated by institutional environment, type, size, and selectivity, may find themselves victims because these matters are beyond their scope of control. Students face an either-or situation: adjust to it or leave it. Tinto's (1987) student interactionalist model disclosed that interaction and integration with the institutional environment both played a determinant role in students' persistence and withdrawal decisions. Bean and Eaton (2002) further interpreted Tinto's model by using four psychological theories as frameworks: attitude-behavior theory, coping behavior theory, self-efficacy theory, and attribute theory. They described students as entering institutions with past experience and beliefs, through which they filter their perceptions of the institutional environment. With these initial perceptions, students then react to the new social and academic institutional environments. Their reaction depends on their personal characteristics, family socioeconomic backgrounds, and past experience, and the strategies that the students choose to interact with significant others. At this point, students will develop a revised assessment of the institutional environment and respond to future situations. If such a psychological process goes well, the students will re-establish their self-efficacy in adjusting to the academic and social environments of the institutions, which will reduce their stress, and increase their confidence in surviving the new environment. However, if the students negatively assess the institution and fail to choose appropriate strategies to adjust to the new environment, they may leave voluntarily.

Institutional type.

As Bean and Eaton (2002) pointed out, the interaction of institutional attributes and student characteristics plays a critical role in keeping students in the institutions. The institutional attributes that frequently appear to affect persistence include type (public vs. private), quality, and size. Pascarella and Terenzini's (2005) summary of many national reports on four-year institutions indicated that the average unadjusted rates of student persistence into the second year of public institutions were lower than those of private institutions. The difference varied depending on the definition of population, the census period, and the highest degree an institution offers. When students' pre-matriculation characteristics were taken into account, however, the advantage of a private institution in maintaining students into the second year disappeared (Horn, 1999). The effects of institutional type dropped to nonsignificant.

Institutional quality.

Research regarding the influence of institutional quality on student persistence relies on the debatable assumption that institutional quality is measurable. The indices that scholars have used to measure institutional quality evolved from the exclusively-used admission selectivity in the 1990s to various measures of the academic capability of entering students in most recent studies (Pascarella & Terenzini, 2005). Research results have consistently shown that, *ceteris paribus*, the more selective institutions are, the more likely students continually attend and proceed to obtain baccalaureate degrees in six years (Adelman, 1999; Dey & Astin, 1989; Ethington, 1997). Moreover, Dolan and Schmidt (1994) have contended that other measures of institutional quality, such as faculty quality, academic expenditure, and faculty-student ratio, were more influential than selectivity in predicting degree attainment.

Institutional size.

Institutional size has long been used as a control variable when researchers examined institutional effects (Pascarella & Terenzini, 2005). The literature after the 1990s offered a mixed conclusion regarding the indirect influence of institutional size on persistence (Astin, 1993; Astin, Tsui, & Avalos, 1996; Pascarella & Terenzini, 1991; Stoecker & Pascarella, 1991). Drawing from a large set of national representative data on 20,000 students and 25,000 faculty members at 200 institutions, Astin (1993) found that institutional size was the strongest institutional factor that negatively affected persistence and degree completion. However, Astin et al. (1996) claimed in their succeeding study that the negative and indirect influence from size could be small, possibly trivial. Ethington (1997) as well as Stocker and Pascarella (1991) used the same data set but failed to find significant direct effects of institutional size on persistence and degree attainment. Instead, they found that size was inversely associated with student social integration into the institutional environment. The larger an institution is (in terms of enrollment), the less likely that students are involved in the institutional social environment. According to Tinto's (1987) interactionalist theory, the less active students are in the institutional academic and social environments, the more likely they will choose to depart. Therefore, institutional size might have an indirect and negative influence on persistence.

Other Reasons to Depart

Besides academic, financial, and institutional reasons, students may also depart from an institution for emotional, psychological, and accidental reasons (Cope & Hannah, 1976; Hagedorn & Castro, 1999; Tinto, 1987). These umbrella terms include such factors as homesickness, inability to adjust to college life, irresponsible use of substances (Hagedorn & Castro, 1999), immaturity, confrontation of identities and values with the institution (Tinto,

1987), health, personal crisis in the family (Cope & Hannah, 1976), and so forth. Based on the national representative longitudinal data Beginning Postsecondary Students (BPS: 90/94), McCormick (1997) found that almost half (45%) of students who entered higher education in AY 1989/90 had enrolled at more than one institution by 1994. More than a quarter (28%) of students who began at a four-year institution had transferred. Transfer students who participated in the survey of Beginning Postsecondary Students were provided with 11 probable reasons for their transfer behaviors, including overall satisfaction with the first institution, cost of attending, intellectual growth, satisfaction with social and academic life, satisfaction with service/counseling, and so on. Of the reasons provided, dissatisfaction with intellectual growth in the original institutions had the strongest correspondence with transfer. Students in private institutions who were not satisfied with institutional prestige were more likely to transfer than those in the public sector. The cost of attending was a reason for transfers from private institutions but did not seem to be a significant reason for transfers from public institutions.

However, to exclusively examine the possible reasons for a student to leave an institution was not the sole purpose of this study. Rather, the purpose of this dissertation is to learn the factors associated with students' choice of departure alternatives from original institutions, and the choices of destination institutions among transfer students. A discussion of academic, financial, and institutional influences on persistence in this study assists with untangling these interweaving factors and how they motivate students to depart. Moreover, it also increases our understanding of the particular attendance pattern students may choose under a certain combination of academic, financial, and institutional influences. Other possible reasons for student attendance patterns will be considered but not closely examined in this study.

Stage Two: Transfer to Other Institutions or Leave Higher Education

After students decide to leave the original institution, they move to the second stage, which is to choose departure alternatives. They may transfer to other institutions or enter the labor market. Students who choose to enter the labor market when they leave their original institutions may return to higher education later. These students may return to their original institutions or transfer to other institutions after stopping out for a period. However, previous research has seldom distinguished different forms of departure, indicating all leavers as "dropouts" and ending their examination when students step out of the referent institution. This section reviews the patterns whereby leavers choose their form of departure based on their college experience and their pre-matriculation backgrounds.

The Generalized Behavior of Departure

Student departures from colleges and universities are often treated as happening for the same reason. Although scholars have made great effort to reveal why students choose to depart from institutions, few consider the patterns whereby the students choose one particular departure form over another when they decide to leave. Cope and Hannah (1976) commented that "research and reports that lump together all of these actions and reasons under the single heading of 'dropout' are likely to obscure or confuse quite distinct phenomena" (p. 9). In reality, students have the choices of transferring to another institution (continuous and interrupted transfer), taking a short time off school and returning to the original institution (stopout), and dropping out. Simply labeling all students who leave an institution as "dropouts" is especially inappropriate today when they have more choices and combinations of choices.

Choice of a Particular Departure Alternative

Economists generally consider the benefits, cost, and risk when they examine the behavior of people who face multiple choices. In the dynamic decision-making model of human capital investment, economists postulate that the benefits, cost, and risk of future option comprise the criteria for the current move (Becker, 1964; Comay, Melnik, & Pollatschek, 1973; Kane & Rouse, 1993). Accordingly, students will choose to transfer if they believe that staying in higher education and attending another institution will produce a higher utility in the future than not doing so. However, the pure economic approach has limited application to students who never seriously consider not attending college as an option and to the students who reluctantly or hesitantly enter higher education. The students in the middle generally embody the economic theories of value/cost assessment (Jackson, 1978).

At the individual decision-making level, the students' choice of departure alternatives may be closely related to their SES background, academic performance, college experience in original institutions, and the probability of completing the bachelor's degree in their original institutions. Students may compare the probability of degree attainment in their original institutions with that of other institutions they may attend, and then choose to transfer to or to attend other institutions. Certainly, students who do not want to return to college drop out from higher education altogether.

Depending on the process of choosing a departure alternative, students may choose to transfer to other institutions, to stay in original institutions, or to stopout as the first step. At the next step, students who have left higher education then choose to return to their original institutions or to transfer to other institutions if they still want a bachelor's degree. Such a process has been conceptualized as a hurdle model (Cameron & Trivedi, 2005). This model is

often used to examine the two-stage decision-making process because it considers the decision in the first step and constrains the sample in the second stage to the observations only if they had participated in the first-step decision stage. In this case, the model examines the patterns of students' choice of different forms of departure only if they make a two-step decision of departure alternatives (details will be discussed in Chapter Three).

Stage Three: Search and Attend Destination Institution

If leavers decide to transfer to another institution, they move to the next stage, which is to search, apply to, and enroll in their destination institutions. Because transfers have already had the experience of college choice and a taste of college life, their choice of destination institution may be influenced by their college choice experience in the first round and their experience at their original institutions. This section reviews the literature of college choice and develops a model to examine the college choice patterns of transfer students.

Where to Transfer

After students decide to transfer to another institution, they start another round of college search and choice. The hypothesis that the choice of destination institution has a correlation with the students' experience in the institution of first attendance is quite reasonable. McCormick (1997) reported a detailed description of the transfer behavior of students in Beginning Postsecondary Students (BPS: 90/94) who started their college education in AY 89/90. He discovered that more than half (55%) of the students who transferred from a four-year institution entered another four-year institution. Almost all the remainders (41%, who are defined as "reverse transfer students") went to two-year institutions. Moreover, McCormick also demonstrated that the destination institutions have a close relationship with the types of original institutions and certain student characteristics. Transfers who started at private four-year

institutions before age 20 and received financial aid at original institutions, or who earned at least a 2.50 GPA, were more likely to engage in a horizontal transfer. Not surprisingly, the students who were engaged in a horizontal transfer tended to gravitate toward public institutions.

As mentioned before, students who participated in the BPS survey provided the probable reasons for their transfers. However, there was little evidence in McCormick's report (1997) that transfers faithfully chose destination institutions in response to the BPS claimed reasons. For example, transfers who left the original institution due to dissatisfaction with institutional prestige may not necessarily have moved to an institution with higher prestige. In addition, the identified reasons from the BPS survey were somewhat ambiguous and overlapping, which may not have precisely captured the true motivation for the students' transfers. Therefore, these reasons may provide clues for students' transfers, but may not explain how transfers choose their destination institutions.

McCormick's statistical report (1997) on transfer behavior is all descriptive; thus, one is unable to see which variable shows a significant influence on the choice of destination institution. Rab (2004) who comprehensively examined multi-institutional attendance patterns found that the institution which transfers left was systematically associated with the institutions that transfers entered. Rab showed that students starting at four-year selective private institutions are three times more likely to move to another selective private school. Moreover, lower- and middle-class students were significantly less likely than upper-class students to move on to a selective institution, whereas lower class students have higher odds of moving to a community college. Non-black, upper-class, better academically prepared students were more likely to move "up" to a more selective institution and obtain a degree. These findings remained apparent even

when controlling for student gender, SES status, high school performance, and curriculum intensity.

The current literature has well documented the patterns of how transfers move among institutions. Nonetheless, which variables may affect a student's decision about where to transfer is still unknown. Even though the literature has shown that the original institution plays a significant role in determining the destination institution, the more extensive exploration of how college experience in the original institution is associated with a transfer's choice of destination institution has still not been addressed in the literature.

How transfers choose their destination institutions should not be treated as an isolated behavior. Because this is not likely the first time transfers have chosen a college, they may have obtained experience (or learned lessons) from the first round of searching and applying, when they enrolled in their original institutions. Their original experience may have had lasting effects on their choice of destination institutions. Personal preference, such as location or size of institutions, is also important for transfers in choosing destination institutions. However, such choice-specific personal preference is hard to identify and control in quantitative research. Moreover, because personal preference is probably correlated with other independent variables such as student SES status, simply excluding personal preference from the regression model may omit variable biases. As an improvement to previous research on transfer movement, a simultaneous regression model considers at the same time the processes of selecting the original institutions and the destination institutions, and control of the personal preference, which does not change over time (see Chapter Three for details). Thus, the estimation of the effects of the independent variables on transfers' choice of destination institutions will be more accurate.

College Choice in the First Round

College choice models have received considerable scholarly attention since the 1980s. Initially, the perspectives of sociologists and economists dominated the research on the structural models of student choice and attendance (Jackson, 1982). Sociologists who were concerned about social mobility and educational attainment attached great value to the process of how social environment and individual factors shape the educational level to which students aspire (Litten, 1982; Horvat, 1996; McDonough, 1994). Economists cared more about the efficiency of public policies involving enormous human and financial resources (Litten). They focused on the process whereby students excluded non-practical (unfeasible or too expensive) institutions and then ranked alternatives with the criteria being the students' family backgrounds, social contexts, academic experiences, and personal preference (Jackson, 1982).

Scholars variously described the college choice process (Johnson, 1982; Paulsen, 1990). Regardless of the different steps, phases, and definitions that scholars specified in their models, the focal issue has been how students develop a list of colleges and finally narrow the candidate institutions to a relatively small, stable list. Hossler, Schmit, and Vesper (1998) found that students started to develop a short list of colleges and had defined the characteristics of the preferred colleges by the time they had reached the 10^{th} grade. In their junior year, the students augmented the list and became active in gathering information and seeking advice from parents, family members, peers, teachers, guidance counselors, and college admission officers. During their senior year, the students reduced the number of colleges on their list and became more certain of the institutional characteristics most important to them. The types of institutions that the students considered remained relatively stable throughout their high school years.

College choice and attendance is a process of matching institutional attributes and student characteristics. The abundant literature has revealed the complex interaction between student

gender, race, socioeconomic status, and academic capability, and institutional quality, type, cost, and location. The essential factors influencing students' college choice have remained much the same since the 1960s (Kinzie et al., 2004). Holland and Richards (1965) found that four main factors determined the students' choice of college: intellectual emphasis, practicality, advice of others, and social emphasis. Practicality referred to factors such as "closeness to home" and "low cost." These research results were still applicable to the decision-making process of college choice (Hossler, Schmit, & Vesper, 1999)

Student socioeconomic status and academic capability play a significant role in developing a college list (McDonough, 1997). Students of high socioeconomic status and academic capability were more likely to attend a selective and affluent institution (McDonough, 1997; Zemsky & Oedel, 1983; Zemsky, Shaman, & Berberich, 1980). Moreover, students have a greater probability of choosing private four-year institutions over public ones if they come from a better socioeconomic background, with higher aspirations and better academic capability (Tierney, 1984; Zemsky & Oedel, 1983; Zemsky, Shaman & Berberich, 1980).

Race, income, and parental educational level also show a significant influence on which institutions students choose to attend (McDonough, 1997; Terenzini, Cabrera, & Bernal, 2001). White male students present a higher likelihood of attending selective private institutions than female minority students (Astin, Christian, & Henson, 1975; Hearn, 1984). Such results remain apparent even when the students' academic capability was controlled (McDonough). Further, race, income, and parental educational level indirectly affect student college choice by the ways that applicants seek information (McDonough, 1997; Paulsen, 1990). Paulsen indicated that African-American students consulted more information sources than White students, and appeared to be less likely to rely solely on family members or friends.

Some researchers have suggested that the cost of the institution has a more significant impact on whether or not students decide to attend a college rather than which institution they would attend (Mundy, 1976; Tillery & Kildegaard, 1973), while others argued that cost did make a difference in student college choice (Davis & Van Dusen, 1975; Hearn, 1984; Tiernery, 1984; Zemsky & Oedel, 1983). The Higher Education Research Institute survey reported that a growing percentage of first-year students acknowledged each year that they made college-choice decisions based on financial reasons (Geraghty, 1997). Moreover, as financial aid became increasingly important for adjusting the list prices of institutions after the passage of the Higher Education Amendments of 1976, the cost of attending a college could not be considered separately from the influence of financial aid in student choice (Chapman, 1981). In 1996, 33% of first-year students identified the availability of financial assistance as a "very important" factor when they select a college (Geraghty, 1997). Leslie and Fife (1974) anticipated that to distribute financial aid to individual students would drive them to attend non-two-year, private institutions. Their prediction has been supported by Tierney, Housang, and Henson (1979) who found that increased student aid to male students added to their probability of attending private institutions. The authors were not sure about the influence on female students. Heller (1997) showed that the price sensitivity of low-income students appeared to be stronger than that of middle- or upper-income students. Therefore, financial assistance may have greater impact on the college choice of low-SES students.

The location of an institution is another significant factor in the student college choice process. Attending an institution close to home is a way that many students can ameliorate the cost of attendance (Absher & Crawford, 1996; Terenzini, Cabrera, & Bernal, 2001). Living at home instead of on campus allows students to avoid paying rent and the various related costs,

such as moving and making friends. Ihlanfeldt (1980) found that over 50% of freshmen attended institutions within 50 miles of their home; 92% within 500 miles. However, student college choice may be restricted by the availability of a desired institution in proximity to home. Thus, students who reside in a geographic area with many colleges, such as California or New York, may prefer and are able to attend institutions near home. Further, academic ability and family financial strength may shape student preference and affect their mobility (Chapman, 1981). Academically capable students with little financial need are more likely to consider institutions in a wide range of areas (Ihlanfeldt, 1980; Tierney, 1984; Zemsky & Oedel, 1983; Zemsky, Shaman, & Berberich, 1980). Parents with higher education attainment may encourage students to apply to institutions far from home (Tierney; Zemsky, Shaman & Berberich).

From the 1980s to the present, choosing a college has become a more complex and "high stakes" decision-making process for students (Kinzie et al., 2004). At the end of the 1990s, 80% of suburban high school graduates and 67% of all graduating seniors applied to colleges and competed for seats at the nation's best colleges (Abel, 2000). However, a continuously increasing percentage of college students do not graduate from the institution of first matriculation and have to go through the college-choosing process again in their later college careers.

College Choice in the Second Round

Studies on college choice in the current body of literature primarily focus on the searching and attending process in the first round of college selection, but reveal little about how students choose institutions after they quit the institution of their first matriculation. One would expect that transfer students, after experiencing college life for a period, might have a clearer idea of which institution they would like to continue at than they did in the first round. The main

factors that impact the students' first college choice process may continue to affect their subsequent choice process.

The Ultimate Goal: Degree Attainment

No matter what educational trajectory a student follows, his or her ultimate purpose in higher education is to obtain a baccalaureate degree. How different educational pathways affect degree completion is the issue concerning students, policy makers, and educational practitioners. This dissertation does not consider students who drop out, but focuses on stopout students and transfer students, including both continuous transfers and interrupted transfers. This section reviews and discusses the literature related to the effects of transfer behaviors on degree completion.

Transfer as an Emerging Trend

The past two decades have witnessed the growing trend in multi-institutional attendance for an increasing proportion of students. Based on the attendance patterns identified by other authors, McCormick (2003) summarized and hypothesized nearly a dozen different categories of attendance patterns, which mainly consist of simultaneous enrollment in more than one institution and sequentially attending more than two institutions. Some categories can be further divided by the types of institution attended. Students may follow just one pattern or combine patterns to form their own educational pathways.

Studies of different national representative data samples have shown consistent results, in that a growing number of students have engaged in multi-institutional attendance. Based on the sample drawn from the High School and Beyond/Sophomore cohort longitudinal study (HS&B: 80/92), Adelman (1999) found that 16% of postsecondary students and 18% of bachelor's degree completers involved in alternating or simultaneous enrollment patterns. Seventy percent of these

students attended three or more institutions; 40% of them attended institutions in different states. Another data source, Baccalaureate and Beyond (B&B) revealed a similar pattern. McCormick (1999) examined the bachelor's degree recipients in 1992-93 (70% had graduated from high school in 1987 or later) drawn from the B&B longitudinal data set and found that 37% who started at four-year institutions attended more than one institution. Among these students, 22% finished postsecondary institutions at different institutions and 15% graduated from the institutions where they started. A statistical analysis of the Beginning Postsecondary Students (BPS: 90/94) presented a more recent picture of student attendance pattern. Horn and Carroll (1999) found that 64% of students who started at four-year institutions left and returned to higher education within 5 years. Among these students, 47% returned to their original institutions while the rest transferred elsewhere.

As a majority of the literature on student transfer behaviors focused on upward transfer from community colleges to four-year institutions, Burton Clark (1960) found a unique downward transfer pattern - from four-year institutions to community colleges - in his study of California junior colleges in the 1960s (Townsend & Dever, 1999). Today's downward transfer students constitute about 13% of students in community colleges, increasing from 9% in the late 1960s (Pusser & Turner, 2004). The *New Direction in Community Colleges* devoted a special issue discussing downward transfer students. Although most studies in this issue are descriptive and qualitative, they have provided adequate information demonstrating the scale of students engaged in a downward transfer pattern.

The literature has acknowledged that the multi-institutional attendance pattern is becoming a significant phenomenon in higher education. Yet, scholarly investigation has failed to keep pace with this trend. Researchers still attach more importance to the upward transfer

from community colleges to four-year institutions than to other forms of transfer behaviors, partially because of the limited national representative data source tracking every move of transfers. As a result, the current scholarly understanding of multi-institutional attendance and the transfer behaviors lags far behind the understanding of other scenarios in higher education.

Identifying These Transferring Students

The literature identified different patterns of how student characteristics relate to transfer behaviors. The mixed results largely depended on the analytical samples that researchers collected. Carroll (1989) examined how students' SES, gender, and ethnicity were related to their decisions to choose different educational pathways. He identified students with a high SES as being more likely to engage in horizontal transfer and to maintain continuous enrollment than low SES students. Female students were less likely to transfer down and to stop out than male students, and blacks were less likely than non-blacks to do either. However, the entire research of Carroll was descriptive; therefore, one cannot isolate the effects of each variable such as high school performance, SES, gender, or ethnicity on student movement patterns. Moreover, Carroll broadly defined the term "transfer" in his research. In some cases, the "transfer" in his study did not indeed refer to multi-institutional attendance (Adelman, 1999). As a result, his findings might have overestimated the effects of SES, gender, and ethnicity on student decisions to choose a certain attendance pattern.

Kinnick and her colleagues (1997), examining the flowing pattern of a random sample of 504 students in the Portland, Oregon, metropolitan area, found that more than half of the reverse transfer students were Asian American. These students were more likely than other minority students to "swirl" among institutions. In a more recent study focusing on the same area, Bach and her associates (1999) updated Kinnick and her colleagues' results by confirming the

reverse transfer pattern of Asian students, adding that male students were more likely than female students to be involved in a reverse transfer within the first six terms of enrollment; but females had a higher probability of alternating among institutions and spending substantially more time completing their baccalaureate degree. Moreover, Bach and others found that 40% of reverse transfer students were identified as being in different forms of academic distress, and were more likely to leave the original university after two or three terms rather than after their initial term of enrollment. The results of ethnicity difference in reverse transfer students in Oregon were similar to those of the state-level research in the Oklahoma State Regent for Higher Education (1997). An examination of 1,089 students who had transferred from Oklahoma State University indicated that Asian American students and Whites had the highest reverse-transfer rates (both 27%).

However, one has to bear in mind that these state-level studies were limited in that all students in the sample had transferred from urban public four-year universities, so the results only reflected the situation of reverse transfer students in certain states. For example, McCormick (1997) examined the spring 1994 follow-up data to the 1990 Beginning Post-secondary Students Longitudinal Study and determined that the rate of Asian and Pacific Island students who transferred from four-year institutions (14%) was significantly lower than that of other ethnic groups (29 to 31%).

Using the National Center for Education Statistics (NCES) postsecondary transcript file of a cohort from 10th grade in 1980 through 1993 (HS&B: 80/92), Adelman (1999) found that students beginning at highly selective four-year colleges and those starting at community colleges had the highest rates of multi-institutional attendance, though for very different reasons. A large percentage of students beginning at highly selective four-year colleges reported that

academic reasons were the strongest motivation driving them to leave, whereas students beginning at community colleges had to move to a four-year institution to obtain a baccalaureate degree. Additionally, family income had no effect on the different attendance patterns of these students.

Transfer and Degree Attainment

Although most previous studies have stopped at the point where students depart from their original institutions, some researchers have taken initial steps to examine the degree completion of students attending multiple institutions. Even though the pictures they presented are inconsistent, their research results provided useful reference information for the current study. Depending on the analytical data samples, methods, and definition of various educational pathways the researchers employed, they tell different stories of bachelor's degree attainment among transfer students.

Institutional research.

The natural controls over the effects from the institutional environment make the institutional research a good way to compare the academic success of transfer students with that of native students who stay in their original institutions after enrolling. The University of Missouri system documented a series of analyses examining the academic success of transfer students (Eimers & Mullen, 1997; Mullen & Eimers, 2002; Saupe & Long, 1996). In 1996, the University of Missouri-Columbia admitted transfer students (include those who transferred from both two-year colleges and four-year universities) in good academic standing whose overall grade point average for all college-level courses at previous institutions was at least 2.0 (on a 4.0 scale). Comparing 10,312 degree-seeking transfers with 14,351 native students who entered between fall 1983 and 1991, Saupe and Long (1996) regressed persistence and graduation rates

on the dummy variable of transfers with the numbers of transfer credits, transfer grade point average, and types of previous institution controlled for. They found that one-year persistence and graduation rates within six years of native students were consistently higher than those for transfers. Even though the differences were moderate, persistence and graduation rates for transfers from four-year institutions were significantly higher than those from two-year colleges; and the rates for students from public institutions were higher than those from private institutions. Eimers and Mullen replicated Saupe and Long's study (1996) and found consistent results in the persistence and graduation rate (Eimers & Mullen, 1997; Mullen & Eimers, 2001). In addition, Elmers and Mullen found that, holding credit hours and GPA constant, transferring minority students were less likely to graduate than White or Asian American students.

Based on his findings of academic performance of transfers at the University of Maryland, Porter (1999) asserted that some confusing results of performance differences between transfers and native students might have come from an inappropriate comparison. He argued that, because transfers had had a taste of college life before they entered the University of Maryland, their previous college experience might have had shadow effects on their social and academic integration into a new climate. On the other hand, transfers also need to adjust to "transfer shock" (Dougherty, 1992) as new students do to the new climate. Therefore, Porter believed that to sample returning transfers (both from two-year colleges and four-year universities) with returning natives served as a more promising method to place transfers and natives on an equal footing and thereby make a fair comparison possible. Controlling student characteristics and their academic and social experience in Maryland University, Porter found that transfers appeared to be 1 to 9% less likely to be retained within one year, 2 to 8% less likely to graduate within six years, and earned 0.1 to 0.2 lower GPAs than did natives.

National research.

Adelman (1999, 2006) thoroughly examined how multi-institutional attendance patterns influence the academic success of transfers at the national level. Drawing data from the High School and Beyond/Sophomore cohort longitudinal study (HS&B: 80/92) and the National Education Longitudinal Study of 1988 (NELS: 88/2000), Adelman concluded that academic resources indicated by a high school curriculum, test scores, and class rank contributed most to long-term baccalaureate degree completion. Adelman also claimed that the number of institutions that students attended did not have a significant influence on their educational outcomes, and students who attended more than one school and did not return to their first institution were less likely than transfers who did, to complete a baccalaureate degree within 11 years.

However, such research findings are likely to be obtained because of the restrictions Adelman (1999, 2006) imposed on sample selections. Adelman focused on students who had *ever* attended a four-year institution, which comprised both students who originally enrolled at a two-year college and then transferred to a four-year institution as well as students who originally enrolled in a four-year institution and then transferred to other institutions. One might expect to see the positive effects of transferring to a four-year institution on bachelor's degree attainment among students starting at two-year institutions. Nonetheless, such positive effects can conceal the effects of transferring to other institutions among students starting at four-year institutions. Therefore, including students starting from both types of institutions may lead to unclear results of bachelor's degree attainment among transfer students.

Moreover, Adelman (2006) defined transfer as when a student started from one institution and *graduated* from another, or earned at least 30 credits in destination institutions. Accordingly,

his analytical sample excluded the actual transfers who earned fewer than 30 credits and failed to graduate from destination institutions. What is more important is that such restriction incurred selection bias that transfers who were less likely to graduate from destination institutions were excluded from the analytical sample.

Rab (2004) used the same data sample as Adelman (2006) to comprehensively examine how multi-institutional attendance patterns influence educational trajectories and degree completion of transfers, but included only transfers who started at four-year institutions. Rab demonstrated that economically disadvantaged students were more likely to be involved in multi-institutional attendance patterns, which has been proved to be a less efficient educational pathway in terms of degree completion. More importantly, Rab observed that engaging low-level socioeconomic students in multi-institutional attendance pattern might result in new stratification in higher education. As she said, "Clearly, swirling represents a less successful route to degree completion for poor students, and they are disproportionately likely to follow it. Therefore, swirling assists in the continuing reproduction of class inequalities and helps create new forms of stratification within higher education" (p. 8).

However, previous research has neglected the consideration that transfer students could be very different from students who stay in their original institutions in term of potential capability to obtain a bachelor's degree. Students involved in multi-institutional attendance patterns may choose to do so because of their problematic integration into academic and social environments and/or their pending academic underperformance in original institutions. As the results have shown, transfer students may have a lower probability of obtaining a bachelor's degree at their original institutions and then self-select to be engaged in multi-institutional attendance patterns. Simply comparing the staying students and transfer students may incur the

sample selection bias and may not accurately estimate the effects of multi-institutional attendance patterns on degree completion. Heckman's two-step procedure (Cameron & Trivedi, 2005) may be a proper method to solve such a sample selection problem by considering students' departing behavior in the first step. Using an omitted regressor that estimates the "departing hazard" among students as an instrumental variable, the probability of degree completion of transfers and non-transfers can be more accurately predicted.

Summary

This chapter has established the connection between the current study and the literature, and identified the potential contribution of the study. The literature has well documented the student movement of choosing an institution, enrolling in it, and departing from it. The individual student characteristics such as SES, parental educational level, and academic capability show a considerable influence on the choices that students make at each step. Besides, institutions make great efforts to interact with students in recruiting and maintaining them in their institutions. The institutional attributes such as type, size, selectivity, and location exert significant effects on these choices.

However, the literature has documented little on student behaviors after they decide to depart from the institutions of their first matriculation. The important issues that students choose different departure alternatives and destination institutions where they can continue to pursue their baccalaureate degree are simply neglected by research. Examining student behaviors in the institutions of their first matriculation limits the research scope to one period of the students' college careers and fails to understand their behaviors after they leave their original institutions. Moreover, past research investigating the students' degree completion often focused on those who are continuously enrolled in one institution, whereas the degree completion of students

engaged in multi-institutional attendance patterns has not been sufficiently examined. Given the fact that an increasing number of students follow educational pathways that are not confined to one institution, examining how these students make choices and obtain a bachelor's degree has become an urgent task of higher education scholars.

This study reviews the research in the current literature on student departure, college choice, and degree attainment. Even though the reviewed literature does not focus on students who stop out from original institution or attend multiple institutions, the literature provides significant research findings on the key elements of students' choices and degree attainment and guides the research on the three research questions of this dissertation. Chapter Three develops a conceptual framework for the current study based on the findings of the previous literature, and describes the research variables according to the conceptual framework.

Chapter Three

CONCEPTUAL FRAMEWORK AND DATA

This chapter describes the overarching conceptual framework that guides the research of the dissertation based on the relevant literature and statistics of analytical data sample at large. Because this dissertation aims to answer three research questions, the conceptual frameworks and the analytical samples vary slightly across the research questions. The following sections will present detailed information on the research methods and samples, respectively.

Conceptual Framework

Appendix A presents a conceptual framework that guides the current study. As the figure illustrates, students' personal characteristics and pre-college performance determine which institutions they originally attend. Students who come from higher SES backgrounds with better pre-college academic performance may attend more selective and expensive institutions located far from their permanent home. After the students matriculate, their personal characteristics, academic capability, and the perceived institutional environments jointly influence their within-college experience. The higher the SES backgrounds, academic capability, and aspiration that students have, the higher the probability they will obtain a better GPA, attend as full-time students, and declare majors. Students from selective, expensive and small private institutions may perform well, attend full-time, and declare majors.

Students' choice of educational pathways may be simultaneously influenced by the constructs of their personal characteristics, institutional environment, and within-college performance. Students evaluate their within-college experience and predict the odds of

graduation based on their academic capability and the perceived institutional environment of their original institutions, then decide on their educational pathways. Students from higher-level SES backgrounds who maintain a good academic record may be more likely to stay in their original institutions than to transfer to another, or to leave higher education. If students choose to leave higher education, their outside-college factor may affect their decision about transferring to another institution or returning to their original institution. Because only limited information is available for students who stopped out, the only variable within the construct of outside-college factor is the number of stopout years. The longer the students stop out, the more likely they may choose to transfer to other institutions, because the memory of their experience in their original institutions may fade out over time.

As to students who transfer out of their original institution, including both continuous and interrupted transfers, the factors that influence their choice of educational pathway may influence their choice of destination institutions as well. Students who perform well in their original institutions are more likely to attend other four-year institutions than two-year colleges. The SES backgrounds and pre-college academic performance might show positive effects on the odds of attending four-year institutions. Additionally, students who stop out for a longer period may have a higher probability of attending two-year colleges, because their aspiration to obtain a bachelor's degree may gradually diminish.

Finally, all the previously-mentioned constructs may jointly affect the probability of bachelor's degree attainment. Students who transfer to two-year colleges are excluded from this research question. As to the results, only students who stayed in their original institutions transfer to other four-year institutions, stop out for a period, and then return to their original institutions are considered. Students who come from better SES backgrounds and perform well in both pre-

and within-college periods may have higher odds of obtaining a bachelor's degree. In addition, students who attend more selective and expensive institutions may be more likely to complete bachelor's degree requirements. Moreover, students who choose to depart their original institutions are likely to come from a lower SES background, possess less academic capability, and have problems integrating into the environment of their original institutions. These students may again have a lower chance of obtaining the degree later in their original institutions or in other institutions. Most importantly, transfer students have to become acquainted with new institutions, re-design their curriculum to meet new requirements, and learn to socialize with new peers and faculty members. The unfamiliar academic and social environments in destination institutions may hurt the transfers' probability of degree attainment. Students who break the enrollment in higher education have a similar experience in re-learning the institutional environment as well. Therefore, students who are involved in educational pathways other than staying may show a lower probability of bachelor's degree attainment than their counterparts who stay.

Data

This dissertation answers the research questions by using the data drawn from the national longitudinal data set of the Beginning Postsecondary Students Longitudinal Study (BPS: 96/01). The BPS is designed specifically to collect data related to student lives following enrollment and after graduation, and thus contains information on student college experience, persistence in school, degree completion, and employment following college enrollment. The BPS surveyed the students who are enrolled in a postsecondary institution for the first time and followed the same students two and five years later after their first enrollment. This dissertation uses the BPS data collected for students enrolled in higher education in AY 1995-96, with the

first follow-up in 1998 and the second in 2001. The final data set of BPS: 96/2001 contains around 10,300 individual students.

The BPS: 96/2001 contains postsecondary entry test scores, financial aid records, and complete information on student progress and persistence over their entire undergraduate period. Detailed information on student mobility that the BPS: 96/2001 maintained for over six years makes it an appropriate data set to investigate the effects of the transfer behaviors. McCormick (2003) compared the BPS data (BPS: 90/94 & BPS: 96/01) with two other national representative data sets (NELS: 88 & B&B: 92-93) and concluded that "[t]he data for the earlier BPS cohort are well-suited to examining the relationship between multiple attendance and transfer because they cover a sufficiently long period to observe transfer behavior, allowing for part-time attendance, stopout, and eventual return to the first institution" (p. 19-20). This dissertation uses the complete data set of the BPS: 96/01 to present the most updated information on student mobility within the postsecondary educational system.

Moreover, a supplementary data source of this dissertation is the Integrated Postsecondary Education Data System (IPEDs), from which information pertinent to institutional attributes is drawn. Because the IPEDs is designed to collect data from all primary providers of postsecondary education, it encompasses all institutions and educational organizations and may serve as a better data source of institutional level information than the BPS. The analytical sample includes only the dependent, degree-seeking, full-time students starting from four-year institutions.

Variables and Measures

Dependent variables.

This study examined students' choices of educational pathways, destination institutions, and the effects of educational pathways on their degree attainment. Appendix C shows the definitions and coding of all variables in the study. The three dependent variables of the study are: (a) the alternatives of departure, (b) types of destination institution, and (c) baccalaureate degree attainment. The departure alternatives include four choices: stay, continuous transfer, interrupted transfer and stopout. The choice of stay refers to a student who continuously enrolls in the original institution without taking a break for more than four months. The choice of continuous transfer occurs when a student leaves the original institution and continuously enrolls at the destination institution for four or more months; the interrupted transfer occurs when a student leaves the original institutions, he or she stay outside higher education for at least one year, and then enrolls at the destination institution for four or more months. The last choice of stopout is defined as a break in enrollment in the original institution of five or more consecutive months, after which the student comes back to the original institution. The second dependent variable indicates the types of destination institution that transfers choose to attend (binary variable, coded as 0=two-year colleges, 1=four-year institutions). The last dependent variable shows whether a student received the baccalaureate degree within six years after the first enrollment (binary variable, 0=no; 1=yes).

Independent variables.

The independent variables vary across research questions as well, but generally include two groups: students' pre-college characteristics and within-college experience. The pre-college characteristics are the variables of the students' SES backgrounds, academic aspiration, and

academic performance. The within-college experience includes the variables of the GPA in the original institutions, attendance pattern in the original institutions, declared majors, and institutional attributes. Additionally, the outside-college factor refers to the number of stopout years for students who have ever left higher education.

The student SES backgrounds include gender (binary variable; 1=male, 0=female), age (continuous), ethnicity (categorical variable; 1=White to 4=Asian/Pacific Islander), family annual income (continuous, in thousands), and parents' highest educational level (categorical variable: 1=not complete high school to 3=some postsecondary education). The academic aspiration is indicated by the highest degree that the students aspire to (categorical variables: 1=baccalaureate to 3=doctoral/professional). The pre-college academic performance is measured by the SAT combined score (continuous variable derived from agency-reported, institution-reported, and student-reported scores).

The construct of within-college experience includes the majors declared by students in the first academic year (categorical variable: 0=no major to 9=vocational/professional), the GPA in the first academic year (continuous), accumulative GPA until the last term as undergraduate students (categorical variable: 1=D- to D to 7=A- to A), attendance patterns in the original institution (binary variable: 0=a full-time student; 1=ever attended as a part-time student), and financial aid received from original institutions and/or state government (binary variable: 0=not received; 1=received). The sub-construct of institutional attributes includes the variables of types of original institution (binary variable: 1=public institution; 0=private institution), size measured as the total number of students enrolled in the academic year of 1995-96 (continuous variable, in hundreds), selectivity derived from the SAT/ACT score of freshman entering in Fall 1995 (categorical variable: coded as 1=least selective to 3=very selective), tuition and fees of original

institutions in the academic year of 1995-96 (continuous variable in hundreds of dollars), and the distance from the original institutions to the permanent home (continuous variable in hundreds of miles). Finally, the outside-college factor refers to the number of stopout years that students spend outside higher education (continuous variable). Not all variables are added to the regressions of each research question. The analytical models and variables will be described and explained in detail in following chapters.

Limitations of the Data

Even though the BPS is an appropriate data source to examine the transfer behaviors, it limits the analysis of the current study in several ways. First, the BPS used the interview as a data collection mechanism to gather a great deal of student-reported data. The interviewees may not have faithfully, accurately, or consistently reported the information; thus the self-reported data may potentially have biased statistics. Although the National Education Longitudinal Survey (NELS) has more reliable transcript data, it is out dated and lacks the comprehensive financial aid information that the BPS provides. Thus, I chose to use the BPS data instead of the NELS in order to use the timely and rich information that the BPS provides.

Second, the BPS tracked interviewees for only six years, from AY 1995-96 to AY 2000-01. This relatively short time frame raises the concern that student mobility that exceeded the observation period was not recorded. For example, a student who left the higher education system in 1997 and did not return to the original institution until 2002 is coded a "dropout" but he or she is actually a "stopout." The short time frame of the BPS also constrains the measurement of degree completion to six years. Students who spent more than six years obtaining a baccalaureate degree were coded as failed to complete the degree. The six-year-window particularly biases the measurement of transfer students because their degree completion

usually takes them longer than native students. As a result, the measurement of degree completion and student mobility is truncated at the end of the sixth year.

Third, the BPS: 96/2001 offers comprehensive financial aid information only in AY 95-96. After that, it is reported each year. The state- and institutional-level financial aid information is very limited. Given that the focal group of this dissertation is students who attend more than one institution, the financial aid from the federal government is portable with those students, which may not significantly affect their transfer decisions. Nonetheless, information about financial aid from institutions and state government, which is importable, is not available after the first year. As a result, the financial aid from the original institutions and state government in the first academic year are included in the empirical analysis of this dissertation, whereas the financial aid information after that is not considered.

Chapter Four

WHICH WAY TO GO?

STUDENTS' CHOICE OF EDUCATIONAL PATHWAYS

This chapter addresses the first research question – what factors are associated with students' choice of educational pathways, especially pathways other than staying in their original institutions. The students' choice of an educational pathway leads them to stay, switch schools, or stop out. Their following behaviors depend on their decisions at this point. The results in this chapter are intended to show the patterns in which students choose certain educational pathways and may assist with understanding of the research results on the questions regarding transfer students' choice of destination institution and bachelor's degree attainment.

Research Method

Depending on the complexity of their situation, the students' choice of an educational pathway is considered a two-step decision. In the first step, the students in the original institution decide whether to stay, continuously transfer to other institutions, or leave higher education. Students who choose to leave break their enrollment in college and create a gap in their educational pathway. If these students want to return to college, they must take the second step of decision-making, which is to return to their original institution or to transfer to another.

As Appendix B illustrates, all students in their original four-year institutions are considered "participants" who make decisions for their educational pathways. On the first occasion, a student has three choices: to stay, continuously transfer, or leave. The decision function associated with each of these alternatives is represented as

$$(1) \qquad P_{ij} = \frac{e^{xi'\beta j}}{\sum_{l=1}^{3} e^{xi'\beta l}} + \sigma_{ij}, \qquad j = \begin{cases} 1 = \text{stay} \\ 2 = \text{continuously transfer} \\ 3 = \text{stop out} \end{cases}$$

Where P_{ij} = the j^{th} alternative that i^{th} student chose; the alternatives include stay, continuously transfer, or leave.

X_i = the independent variables that may influence the students' choice of departure alternatives may include the student's age, gender, ethnicity, SAT score, highest degree aspired to, family income in 1995, the highest educational level of the parent(s), the student's declared major in their original institutions, their GPA in AY 1995-96, any part-time attendance in AY 1995-96, institutional type, size, selectivity, tuition and fees, and financial aid.

σ_{ij} = the error term for the i^{th} student who chose j^{th} alternative

Students who have left but want to return to higher education are in a second choice occasion. They have two choices: to return to the original institution (stopout) or transfer to another institution (interrupted transfer). The second choice model seems to be a binomial logit. However, in this particular choice setting, the error term may not satisfy the assumption of the binomial logistic regression, which assumes that the error terms are identically and independently distributed (IID). Nonetheless, because the students who participated in the second choice occasion made choices repeatedly, their first choice of leaving the original institution and the second choice of returning to college could be correlated according to the individuals' specific preferences that have persisted over time. When the students' preferences are unobserved and therefore included in the error term, it is intertemporally correlated. As a result, the IID assumption of the binomial logit can be violated.

The hurdle model relaxes the assumption of the error terms generated from repeated choices made by the same individuals. It reflects a two-stage decision-making process. In the first stage, the students decide whether they will leave higher education. Students who stop out will participate in the second choice occasion. The hurdle model is then given by

$$(2)\ \Pr[y_1|x_i]=\begin{cases} \Pr[d=0|x_i] & \text{If } y_1 = \text{did not leave higher education} \\ \Pr[d=1|x_i]\, f(y_1|d=1, x_i) & \text{If } y_1 = \text{left higher education} \end{cases}$$

Where $f(y_1|d = 1, x_i)$ for the participants on the second choice occasion is a binomial logistic regression, given by

$$(3)\qquad \Pr[y_2|x_i]= \frac{e^{xi'\beta}}{1+e^{xi'\beta}} + \varepsilon_i\ , \qquad y_2= \begin{cases} 1 \text{ if transferred to other institutions} \\ 0 \text{ if returned to original institutions} \end{cases}$$

Where $\Pr[y|x_i]$ = the choice made by the i^{th} student who left higher education but wanted to return to college

X_i = the independent variables for i^{th} students, including age, gender, ethnicity, SAT score, highest degree aspired to, family income in 1995, the highest educational level of the parent(s), GPA in AY 1995-96, any part-time attendance in AY 1995-96, institutional type, size, selectivity, tuition and fees of original institution, and financial aids received in original institutions.

ε_i = the error term for the i^{th} student

Considering the choices just for the students who have passed the first hurdle (left higher education), the hurdle model provides a more accurate estimation of the influences on the students' succeeding choices.

Results

Descriptive Statistics

A total of 3,562 students participated in the first-step choice, including 2,627 (73.8%) staying students, 671 (18.8%) continuous transfers, and 264 (7.4%) leavers. Among the students who left their original institutions, 122 (46.2%) returned to their original institutions (stopouts) after taking a period off, and 142 (53.8%) students attended other four-year institutions (interrupted transfers). Figure 2 shows the numbers and percentages of students involved in each educational pathway.

Appendix D shows the description of the independent variables related to this research question. The average age of all the surveyed students was 18.4 when they first enrolled in 1995-96. Male students made up 43.7% of the total students. Most students were White (77.4%), and the rest of the students were Black (7.5%), Hispanic (8.6%), and Asian (6.4%). The average SAT score of all students was 970, which is a little lower than the national average of 1,010 in 1995 (College Board, 2007). Because the students attended four-year institutions for their first matriculation, the majority wanted to receive post-baccalaureate degrees. Only 18.1% students reported the bachelor's degree as the highest degree they aspired to, but 52.1% students reported a master's degree and 29.1% students reported a doctoral degree. Nearly 77% students came from the families where parents had some level of college education. Their average family income in 1996 was $66,403. Given that the overall median household income in 1996 was $42,235 and the median household income of families with a bachelor's degree was $63,357 (U.S. Census Bureau, 2003), most of the students in the sample came from relatively high income families. Moreover, 30% of students had not declared any major in 1996 at their original institutions. Business management was the most popular major among the students, which

attracted over 10% of the students. Besides, 9.5% students declared the humanities and 9.3% declared computer or engineering sciences as their major in their first academic year. The average GPA in the first academic year was 2.8. Sixty percent of the students attended public four-year institutions, 32.6% attended very selective institutions, and the majority was full-time students during 1995-1996. The average tuition and fees of the students' original institutions in 1995 was $7,147, compared with the national average in-state tuition and fees in 1995 for public four-year institutions at $2,860, and out-of-state tuition at $4,508 (The College Board, 2007). Thus, the students in the sample attended quite expensive institutions. Fortunately, 46.6% students received various kinds of institutional aids, including grants and scholarships, tuition waivers, and graduate fellowships; 26.3% received state aid, and 22.3% received Pell grants from the federal government.

Some transfer and stopout students reported the top reason for their transferring and stopping out behaviors in 2001. Students were provided with 13 reasons and they chose one that described their motivation to transfer or stop out in the most appropriate way. Three hundred and eight-one students reported the top reasons for their transferring behavior. Appendix E shows that 22% students transferred because the destination institutions offered their desired programs or coursework. Sixty-nine students (18%) earned a degree or certificate at their original institution and then transferred to another institution. Other academic-related reasons included the students' concerns about their reputation, preparation for a new degree, and academic problems elsewhere. Only 8% of the students reported financial reasons as the top motivation for transferring. According to the percentages in Appendix E, five academic-related reasons (offered their desired program/course work; could earn degree/certificate; reputation of program/faculty/school; preparation for new career/degree; academic problems elsewhere)

explained the motivations of 52% of the transfer students. The affordability and financial reasons explained only 8%. The rest of the reasons mainly centered on the students' personal preference and family issues. Therefore, academics were the major motivation for students to leave and attend other institutions.

Students who stopped out for a period and then came back to their original institutions also participated in the survey and reported their top reasons for their stopping out behavior. Appendix F shows the percentages and reasons for stopout. Seventy-six stopout students participated in the survey. The largest portion of students (24%) stopped out because of the need to work; "taking time off from studies" and "other financial reasons" motivated 13% and 12%, respectively, to stop out from higher education. The academic-related reasons (taking time off studies; deciding on a different program; and academic problems) explain the motivation of 21% of stopout students. They were more likely to have left their original institutions for financial reasons (need to work and other financial reasons) than transfer students. In addition, reasons of family concerns (change in family status and conflicts with demands at home) also appeared to be important to stopout students.

According to the reported reasons by transfer and stopout students, the key reasons for students to choose a certain educational pathways are mainly academic, financial, and family related. Because the data on family concerns were less likely to be observed, collected, and controlled, the observed academically- and financially-related variables are added to the regressions to examine the students' choice of educational pathways. The unobserved family reasons and personal preferences are controlled in the first-step of the hurdle model when the students' choice of stopout and interrupted transfer are examined.

Regression Results

First-choice regression. Appendix Ga shows the multinomial regression results on the first choice occasion in which the students elected to stay in their original institution, continuously transfer to another institution, or leave higher education. The base choice of the multinomial regression was to stay in the original institution. The independent variables are added to the regression by the construct of the students' personal characteristics, their family socioeconomic status and academic capability, and their experience in their original institutions. Each model reports two comparison results: the odds of transfer or stay, and the odds of leaving or staying. Model 1 regresses the students' choices of staying in the original institution, continuously transferring to other institutions, and leaving higher education using the variables of age, gender, and race. The results show that older students have higher odds of transferring or leaving higher education than staying in their original institutions. Black and Hispanic students appear to be more likely to transfer than to stay, but minority students do not show higher odds of leaving higher education over staying in their original institutions. Male students are more likely to leave higher education than female students.

The construct of the students' socioeconomic status and academic capability is added to the multinomial regression in Model 2, which increases the pseudo r-square from 0.014 to 0.062. In the comparison of the students' choice of transferring and staying, the influence of their age and race on their choice of transferring disappears with their academic capability and socioeconomic status being controlled. The SAT score is negatively associated with the odds of transferring. The higher the SAT score a student receives, the less likely he or she is to transfer to another institution. Their academic aspirations also negatively influence the students' choice of transferring. Nonetheless, in the comparison of leaving higher education and staying, the

influence of the students' age and gender remains. The older male students are more likely to leave higher education than stay. Students who receive a higher SAT score and aspire to more advanced degrees may have higher odds of staying in their original institutions. Additionally, students from wealthy families are more likely to stay in their original institutions.

Model 3 includes the construct of college experience in the regression. In the comparison of transferring to other institutions and staying in original institutions, the influence of the SAT score disappears when the students' college experience is controlled for. Academic aspiration still negatively affects the choice of transferring. Students who declare physics, mathematics, or business management as majors have lower odds of transferring to other institutions than students with no major. The GPAs in the first academic year also reduce the odds of transferring. Students who attend expensive, public, selective institutions during their first matriculation appear to be more likely to stay in their original institutions than to transfer. When it comes to comparison of leaving higher education and staying in their original institutions, the results to a broad extent are consistent with the findings in the literature on students' departure. Older students are more likely to leave higher education. Students who come from families of a higher socioeconomics status and aspire to more advanced degrees have higher odds of staying in their original institutions. Moreover, students who declared majors in their first academic year appear to have higher odds of staying in their original institutions than students who do not. Students who obtain higher GPAs in the first academic year have a much higher probability of staying in their original institutions. The public, expensive, and selective institutions of first matriculation may also raise the odds of staying. Students who receive financial aid from their state governments also appear to have a higher likelihood of staying in their original institutions.

To make the research results more straightforward, Appendix Gb presents the predicted *delta-p* values of three choices based on Model 3, the most comprehensive multinomial regression. Three columns of results in Appendix Gb show the percentage of change by each choice according to one unit increase of an independent variable. For example, the first column of independent variables in Appendix Gb shows that a one-year increase in the students' age leads to a 1% higher likelihood of their leaving higher education. One can see from Appendix Gb that not all independent variables influence the odds of the three choices at the same time. A one-year increase in the students' age results in a change in the odds of their leaving higher education, but does not influence the odds of their staying and transferring. The independent variables show a significant influence from three choices, academic aspiration, physical/mathematical sciences, business Management, on GPA in 95-96, tuition and fees in 95-96, public school, and selectivity.

As to the independent variables at the individual level, the results show that students who aspire to an advanced degree are 5% more likely to stay in their original institutions, 4% less likely to continuously transfer to other institutions, and 1.9% less likely to leave higher education. Students who declared a major in physical/mathematical sciences have 12.8% higher odds of staying in their original institutions, 9.3% lower odds of continuously transferring to other institutions, and 3.9% lower odds of leaving higher education than students who did not declare a major in the first academic year. The major of business management also shows influences the students' choices, although the magnitude of its influences is slightly smaller than the major of physical/mathematical sciences. Students who declared a business management major in their first academic year are 5.9% percent more likely to stay, 4.7% less likely to continuously transfer, and 2.2% less likely to leave higher education than students who did not declare a major. Consistent with research results in the previous literature, the GPA in the first academic year is

positively correlated with the odds of staying but negatively correlated with the odds of transferring and leaving. A one-point higher GPA leads to a 13.7% greater probability of staying in their original institutions, 11.8% lower probability of continuously transferring, and 5.9% lower probability of leaving higher education.

On the institutional level, tuition and fees in 95-96 show small effects on the odds of choices. A $1,000 increase in tuition and fees in 95-96 shows a 1.6% higher likelihood of staying in their original institutions, a 1.1% lower likelihood of continuously transferring, and a 0.8% lower likelihood of leaving higher education. Students who attended public institutions originally are 13.1% more likely to stay, 8.3% less likely to continuously transfer, and 9% less likely to leave higher education than their counterparts who attended private institutions originally. Moreover, the selectivity of their original institutions also results in 4.5% higher odds of staying, 2.7% lower odds of continuously transferring, and 1.4% lower odds of leaving higher education.

Besides, other variables show an influence on one or two departure alternatives. Students whose parents receive more advanced education appear to be 4.4% more likely to stay in the original institution and 2.6% less likely to leave higher education. However, their parent's highest educational level does not significantly influence their odds of continuous transfer. Social/behavioral sciences leads to 5.7% higher likelihood of staying and 3.1% lower likelihood of leaving, but does not show significant influence on the likelihood of continuous transfer. A similar situation happens to the majors of computer/engineering sciences and vocational/technical/professional. Students in the departments of computer/engineering sciences are 5.1% more likely to stay and 2.6% less likely to leave than students without a major, while students in the vocational/technical/professional are 5.5% more likely to stay and 2.3% less likely to leave. Finally, students who received financial aid from state government are 3.9%

more likely to stay in their original institutions and 2.3% less likely to leave higher education. Yet receiving financial aid from state government does not change the odds of continuous transfer.

Second-choice regression. The research results of students' choice after they take time off from higher education are presented in Appendix Gc. This Appendix shows the second-step of the hurdle model which controls the students' decision of leaving higher education. The dependent variable is dichotomous with their choice of interrupted transfer coded as 1 and choice of stopping out coded as 0. The constructs of the students' characteristics, their family background and academic capability, and institutional experience and attributes are incrementally added to the regression.

In Model 1, the choices of interrupted transfer and stopping out are regressed by the students' age, gender, and ethnicity. However, it shows that none of the independent variables significantly influence the students' choice after they take a period off from higher education. Thus, the students' family background and academic capability are added to Model 2. Adding these increases the explanatory power from 0.014 of Model 1 to 0.043 of Model 2. Students' ethnicity and SAT scores show significant influences on their choices in Model 2. Black students are 27.2% more likely to return to their original institutions than White students after taking time off from higher education. One hundred more points in their SAT scores lead to 5.4% higher likelihood of returning to their original institutions. Nonetheless, students' socioeconomic status indicated by their family income and parents' educational level do not significantly influence students' choice of returning to their original institutions or interrupted transfer.

Model 3 presents the results with the students' college experience in their original institutions with institutional attributes added to the regression. Even though the explanatory

power of regression is increased from 0.043 in Model 2 to 0.069 in Model 3, the significant influences of being Black and the SAT score disappeared. The college experience and institutional attributes do not show any significant influence on the students' choices. Instead, the distance between the students' permanent home and the location of their original institutions is positively correlated with the odds of their transferring to other institutions. As for students who attend institutions 100 miles or farther from their permanent homes, they may have a 2.2% higher likelihood of transferring to other institutions.

One more variable is added to Model 3, and the regression result is displayed in Model 4. The number of stopout years is the only variable that controls the students' experience after they leave higher education. It is finally added to the regression and makes selectivity of their original institutions statistically significant to their choice of returning and transferring, although it does not show significant effects on the students' choice. Students who attended more selective original institutions are 12.1% more likely to returning than students who attended less selective original institutions. Again, distance between the students' permanent home and their original institutions are positively correlated with their choice of transferring. However, the magnitude of this effect remains small.

Discussion

This chapter has examined the first research question of the dissertation, which is to find out what factors affect students' decisions regarding their educational pathways. Two major regressions that examine the students' choice in their original institutions and their choices after taking time off from higher education are reported in this chapter, respectively. In the first regression, the research results of the multinomial regression are consistent with the findings in prior literature that students' aspirations, GPAs, tuition and fees of original institutions, and

institutional type significantly influence students' choice of staying in their original institution or leaving higher education. The results contribute to the literature by including the choice of continuous transfer into the regression and showing the different influences of students' characteristics, socioeconomic status, academic capability, college experience, and institutional attributes on three departure alternatives.

The influences of the independent variables on the students' choice of continuous transfer are more like those on the choice of leaving higher education than the choice of staying in their original institutions, even though continuous transfer students simply change to another institution and remain in higher education. As demonstrated in Appendix Gb, students' aspiration, GPAs, tuition and fees, and selectivity of original institutions positively affect their odds of staying in their original institutions but negatively affect their odds of continuous transfer and leaving higher education. In addition, students who declare physical/mathematical sciences or business management as their majors in their original institutions may effectively increase the odds of staying in their original institutions, and decrease the odds of transferring or leaving higher education. Therefore, continuous transfers can be motivated by their low academic aspirations, academic underperformance, and unmet financial needs in their original institutions, which is similar to students who leave higher education.

Moreover, not all variables show a significant influence on the three choices of educational pathways. Students' socioeconomic status, their majors in social/behavioral sciences and vocational/technical/professional, and receiving financial aid from state government improve the likelihood of staying in their original institutions and reduce the likelihood of leaving higher education, but they do not affect their likelihood of continuous transfer. Students who are not satisfied in their original institutions but still want a bachelor's degree choose to continuously

transfer to other institutions. Thus, the choice of continuous transfer is the middle choice between staying in and leave higher education. Accordingly, the variance between continuous transfer and staying or leaving is more subtle than the variance between staying and leaving.

In the second regression, the choice of returning to their original institutions or transferring to other institutions are regressed by the students' characteristics, family socioeconomic status, their academic capability, experience in their original institutions, institutional attributes, and their number of stopout years. The majority of independent variables show no effect on the students' choice after they leave higher education except for institutional selectivity and distance from their permanent home. Students who attend a selective original institution may be more likely to return to their original institution because of the financial and intellectual investments they have devoted to the original institution. Taking a period off from the original institution may offer students an opportunity to further prepare themselves psychologically, academically, and financially. A bachelor's degree from a selective institution may then attract students to go back and try to obtain the degree. Nonetheless, students who attend and leave their original institutions that are a considerable distance from their permanent homes may go back to their permanent home. They may also find a job near home. After they take a period off from higher education, if students decide to continue in order to obtain a bachelor's degree, they are likely to attend an institution near their permanent home or work location. Therefore, the distance between their permanent home and original institution is negatively correlated with the likelihood of returning to the student's original institution, even if the magnitude of influence is quite small.

Students who decide to transfer will experience the process of college choice for a second time, no matter whether they take time off from higher education or stop out. Students may

attend another four-year institution or a two-year college. The research results of factors that influence students' decisions about destination institution are reported in next chapter.

Chapter Five

WHERE TO START NEXT?

TRANSFER STUDENTS' CHOICE OF DESTINATION INSTITUTIONS

This chapter addresses the second research question – what factors are associated with transfer students' choice of destination institutions between two-year colleges and four-year institutions. Chapter Four describes students facing choices of staying in their original institutions, stopping out, or transferring to other institutions. Staying students and stopout students have known their destination institutions, but transfer students need to decide which institutions to transfer to. This chapter examines transfer students' choice of destination institutions in term of type: two-year colleges or four-year institutions.

Following the same vein of Chapter Four, the results in this chapter continue to present the educational pathways for students who leave their original four-year institutions. The results may inform policy makers and institutional administrators of students' mobility patterns and the policy implications of mobility management. In the meantime, because students who transfer to two-year colleges lose opportunities to obtain a bachelor's degree (for those who transfer only once), the results reveal the factors that are associated with students' failure of degree completion because of transfer patterns, which supplements the research results of the Chapter Six.

Research Method

This study focuses on transfer students, including both continuous and interrupted transfers. According to the conceptual framework, the major factors that may influence students' choices consist of their socioeconomic backgrounds, academic capabilities and performance,

experience in their original institutions, and the institutional attributes. For interrupted transfer students, their experience outside higher education also plays a critical role in influencing their choice of destination institution. Accordingly, the binomial logistic regression of the choice of destination institutions for transfer students is given by

$$(4) \qquad \Pr[y|x_i] = \frac{e^{xi'\beta}}{1+e^{xi'\beta}} + \varepsilon_i , \qquad y = \begin{cases} 0 = \text{transfer to two-year colleges} \\ 1 = \text{transfer to four-year institutions} \end{cases}$$

Where $\Pr[y|x_i]$ = the type of destination institution chosen by i^{th} transfer students

X_i = the independent variables for i^{th} transfer students including age, gender, ethnicity, SAT score, highest degree aspired to, family income in 1995, the highest educational level of the parent(s), GPA in AY 1995-96, any part-time attendance in AY 1995-96, declared major if any, type, size, selectivity, tuition and fees of original institutions, and distance from original institution to students' permanent home. For interrupted transfer students, the number of stopout years is also included.

ε_i = the error term for i^{th} student

Results

Descriptive Statistics

Variables description. Because of the different educational pathways that continuous and interrupted transfer students follow, the descriptive statistics of continuous and interrupted transfers are reported, respectively. Appendix H describes the variables in logistic regression for continuous transfers and shows that 162 (25.4%) of continuous transfers attend two-year colleges, while 475 (74.6%) attend four-year institutions after they depart from their original four-year institutions. The average age of continuous transfers is 18.4. Two hundred and seventy are male, which accounts for 42.4% of total continuous transfers. There are 473 (74.3%) White

students, 62 (9.7%) Black students, 66 (10.4%) Hispanic students, and 36 (5.7%) Asian students continuously attend other institutions after departure. The average SAT score among continuous transfer is 906, and the highest academic degree among continuous transfers on average is a master's degree. Parents of 11 students did not complete high school, parents of 170 students completed high school but did not attend college, and the majority of parents (71.6%) received some college education. The average family income among continuous transfer is $62,900.

As to their college experience, about 70% of continuous transfers claim majors in their first academic year, but the percentages are diverse across majors. Business management attracts the highest portion of continuous transfers. More than 10% claim business management as their major in the first academic year. Humanities and education also attract about 9% of continuous transfers. Only 1.6% of continuous transfers claim physical/mathematical sciences as a major, as happens among all students. The average GPA of the first academic year is 2.6 on a 4.0 scale. More than 15% continuous transfers have ever attended as a part-time student in the first academic year in their original institutions. The tuition and fees of their original institutions are $6,344 on average for continuous transfers.

Among institutional attributes, Appendix H shows that 65% continuous transfers originally attended public institutions. Their original institutions enroll 12,358 students on average in academic year 95-96. More than half (63.7%) of their original institutions are least selective, 16.8% of continuous transfers attend selective original institutions, and 19.5% attend very selective institutions. In addition, about 40% continuous transfers receive institutional financial aid, and 25.3% receive state financial aid in the first academic year.

Compared with the descriptive statistics of all the students in the sample, continuous students present a similar situation with total students. However, Appendix I depicts a different

picture of 125 interrupted transfers. Fifty-six out of 125 interrupted transfers attend two-year colleges after taking a period off from higher education. More than half (55.2%) of them attend other four-year institutions. The average age of interrupted transfers is the same with continuous transfers, but the male interrupted transfers occupy 56.8%, which is a much higher percentage than among continuous transfers. White students again take the largest portion of all interrupted students. Only 6 interrupted transfers are Black, 13 are Hispanic, and 5 are Asian students. The average SAT score of interrupted transfer is 883, which is also lower than continuous transfers. About 37% of interrupted transfers believe that a bachelor's is the highest academic degree they want, 40.8% want a master's, and 20.8% want a doctoral or professional degree. Moreover, not a single interrupted transfer student's parents did not complete high school. Thirty percent of their parents completed high school, and 70% had some college education. In addition, the average family income in 1996 of interrupted transfers was $47,408, which was 30% lower than continuous transfers. Therefore, the interrupted transfers may come from lower socioeconomic status families than the continuous transfers.

The ones that did not declare any major in their first academic year comprise more than 35% of the interrupted transfers. Humanities is the most popular major among the interrupted transfers, while computer/engineering sciences and business management are the second most popular majors. Like continuous transfers, students who declare a physical/mathematical science major comprise the lowest portion of all majors. The average GPA in the first academic year among interrupted transfers (2.3) is a little lower than among continuous transfers (2.6). Twenty-one interrupted students have attended part time in their original institution. More importantly, the interrupted transfers attend less expensive original institutions on average than continuous

transfers. The average tuition and fees paid by the interrupted transfers is $4,567, which is 38.9% lower than the average tuition and fees paid by continuous transfers ($6,344).

Eighty-five (68%) interrupted transfers originally attend public institutions. Their original institutions enroll 1,387 students. Similar to continuous transfers, the majority (64%) of interrupted transfers attend the least selective original institutions, but 20.8% attend selective and 15.2% attend very selective original institutions. Fewer interrupted transfers receive financial aid from their original institutions and state government than the continuous transfers do. Among interrupted transfers, 33.6% receive institutional aid and 18.4% receive state aid, while 40.5% of the continuous transfers receive institutional aid and 25.3% receive state aid. Finally, the interrupted students stay 1.4 years on average outside higher education before they return.

Therefore, based on the descriptive statistics, more interrupted transfers attend two-year colleges after leaving original institutions than the continuous transfers do. Male students occupy a higher percentage of the interrupted transfers than continuous transfers. The interrupted transfers may be less ambitious students than the continuous transfers in terms of academic degrees. Even though the parents of the interrupted transfers may not receive less education than the parents of the continuous students, the average family income of the interrupted transfers is lower. A higher percentage of the continuous transfers declare a major and receive better grades in the first academic year than the interrupted transfers. Thus, the fact that more continuous transfers receive financial aid from institutions and state government seems reasonable.

Original and destination institutions. Appendices Ja/b and Ka/b display the types of destination institutions by the type and selectivity of the original institutions for continuous and interrupted transfers, respectively. Appendix Ja shows that among 416 interrupted transfers who are originally enrolled in public institutions, nearly 30% of them attend two-year colleges after

departing from original four-year institutions, and the rest attend other four-year institutions. Furthermore, 67.3% of interrupted transfers from least selective public institutions attend other four-year institutions, 78.6% from selective public institutions, and 73.8% from very selective public institutions. Appendix Jb shows the situation among interrupted transfers originally enrolled in private institutions. This demonstrates that 82.8% of interrupted students from private institutions attend other four-year institutions after departure, while only 17.2% attend two-year colleges. The percentage of these students who attend four-year institutions is much higher than those from public institutions. In selectivity categories, 76% of interrupted transfers from least selective private institutions attend other four-year institutions, 92% from selective private institutions, and 91.5% from very selective institutions, which is much higher than the percentages from public institutions.

In the same vein, Appendix Ka and Kb show the percentage matrix of destination institutions and selectivity categories among interrupted transfers, respectively. Appendix Ka shows the percentage matrix of interrupted transfers from public institutions. Less than half (49.1%) of the interrupted students from the least selective public institutions attend four-year institutions after taking a period off from higher education, 66.6% from selective public institutions, and 60% from very selective public institutions. In total, 54.1% of interrupted transfer students who originally attend public four-year institutions attend four-year destination institutions. Similar to the attendance patterns among continuous transfers, the interrupted transfers originally from private institutions present a higher percentage that attend four-year institutions than those in public institutions; however the percentage gap is not as wide as it is among continuous transfers. Appendix Kb shows that 57.5% of interrupted transfers from private institutions attend four-year institutions in total. Furthermore, 47.8% from the least selective

private institutions, 62.5% from selective private institutions, and 77.8% from very selective institutions attend four-year institutions.

Comparing Appendices J and K, students who originally attend private institutions show higher percentages that transfer to four-year institutions, no matter whether they break enrollment in higher education or not. However, the gap is much wider among the continuous transfers than among the interrupted transfers. In addition, both Appendices show that students from the least selective institutions demonstrate the lowest percentages of four-year institution attendance, but the percentages of students from very selective institutions are not always the highest. In most cases, the students from selective institutions show the highest percentages of choosing four-year institutions as their destination. Appendices J and K illustrate the relationship between type and selectivity of original and destination institutions, yet whether the type and selectivity account for the variance among percentages will be answered by the results of the following regressions.

Regression Results

Continuous transfers. Appendix L shows the logistic regression results for the types of destination institutions for continuous transfers. The dependent variable in the four models is the indicator of the types of destination institution (1=four-year institutions, 0=two-year colleges). The independent constructs are incrementally added to the models. In Model 1, the types of destination institution are regressed only by the construct of students' characteristics including age, gender, and ethnicity. The results show that male students are 11.2% less likely than female students to continuously transfer to four-year institutions. Black students are 15.2% less likely than White students to attend four-year institutions after departure from their original institutions,

and Hispanic students are 28.9% less likely to do so. Model 1 only explains 5.1% of the variance of types of destination institutions.

In Model 2, the students' academic aspiration, capability, and socioeconomic status are added into the regression. The negative influence of being male students on choosing four-year institutions is increased from 11.2% to 12.6% when students' academic capability and socioeconomic status are controlled for. In addition, the probability gap among White students and minority students of choosing destination institutions is also changed. The likelihood of Black students attending four-year institutions is no longer significantly different from White students. However, Hispanic students appear to be 25.7% more likely to attend two-year colleges. Moreover, a 100-point increase in the SAT score leads to 3.4% lower odds of attending four-year institutions, and students who are academically ambitious may have a 9% higher likelihood of attending four-year institutions. Because the students' academic capability and aspiration, and their socioeconomic status are added to the model, the explanatory power of the regression increases from 0.051 in Model 1 to 0.103 in Model 2.

Finally, all the independent variables are added to the regression; thus, the explanatory power of the regression increases to 0.323. In Model 3, male students appear to have 7.8% higher odds of attending two-year colleges than female students. Hispanic students show 24.9% higher likelihood of attending two-year colleges than White students, while no statistically significant difference is found between White students and other minority (Black and Asian students). Students who have higher academic aspirations still appear to be 8.7% more likely to attend four-year institutions. Furthermore, declaring a major also shows significant influences on students' choice of destination institutions. Students who have declared a social/behavioral science major in their first academic year in their original institutions are 10.9% more likely to attend four-year

institutions than students who have not declared a major. Students whose major is business management also show 9% higher odds of attending four-year institutions than students without a major. One point higher GPA in the first academic year increases the likelihood of attending four-year institutions by 21.9%, and students who have ever attended part-time in their original institutions demonstrate a 22.9% lower probability of attending four-year institutions. The selectivity of their original institutions is positively associated with their odds of attending four-year institutions. Students who attend more selective original institutions are 7.7% more likely to attend four-year institutions.

Interrupted transfers. Appendix M displays the logistic regression results of interrupted transfers. Similar to Appendix L, the constructs of the independent variables are incrementally added to the regression. In Model 1, the only significant variable is being Black. These students are 38.5% more likely to attend two-year colleges than White students after they take a period off from higher education. This regression only explains the 6.2% variance among types of destination institutions.

The independent variables of Model 2 are comprised of constructs of students' characteristics and their academic and socioeconomic backgrounds. Because students' academic and socioeconomic backgrounds are added to the regression, its explanatory power is increased from 0.062 to 0.124. Again, the probability of transferring to two-year colleges among Black students is still significantly different from among White students. Black interrupted transfers have 35.9% higher odds of attending two-year colleges than White interrupted transfers. No significant influence is found among students' academic and socioeconomic backgrounds; even SAT scores do not present a significant influence on the interrupted students' choice in Model 2.

Model 3 adds the students' experience and the institutional attributes of their original institutions to the regression, in addition to the students' characteristics, academic and socioeconomic backgrounds. Several variables that do not show significant influences on the interrupted students' choice in Models 1 and 2 appear to be significant in this model, such as gender, SAT score, and family income. When students' experience and institutional attributes of their original institutions are controlled for, their gender, SAT scores, and family incomes account for the variance among their choices. Male interrupted transfers appear to be 47.9% more likely to attend four-year institutions than female students after they break enrollment in higher education. Black students are still 38% more likely to attend two-year colleges than White students. However, students who earn100 points more on their SAT score have a 12.8% higher likelihood of attending two-year colleges, which counters the results in previous literature on students' college choice. Students' family income is positively associated with their odds of attending four-year institutions, but the magnitude of its effect is quite small. Thus, the influence of students' family income on their choice of destination institution can be trivial. Moreover, students who have declared business management as their major in their first academic year appear to be 42.8% more likely to attend four-year institutions. Higher GPA in their first academic year also leads to 47.7% higher odds of attending four-year institutions. Yet students who have ever attended part time in their original institutions are 28.3% more likely to attend two-year colleges. Students who originally attend more selective institution are 43.9% more likely to attend four-year institutions, which is consistent with the results in Appendix J. The explanatory power of this model is greatly increased to 0.419 by adding the students' experience and the institutional attributes of their original institutions.

In the last model, only one variable is added to the regression. The number of stopout years is the only variable that indicates students' experience outside higher education, and thus increases the explanatory power of the regression to 0.449 and adjusts the coefficients of many other independent variables. In Model 4, the most comprehensive model, male students appear to be 48.6% more likely to attend four-year institutions than their female peers. The difference in college choice between Black students and White students still exists, as Black students are 39.8% more likely to attend two-year colleges than White students. However, Hispanic students now show a 28.3% higher likelihood of attending two-year colleges than White students, though such difference is significant at a 10% level. A 100-point higher SAT score leads to 12.1% better odds of choosing two-year colleges, which is still inconsistent with the results in previous literature. The magnitude of the influence of family income on interrupted transfers' choice is still small and trivial. In Model 3, business management is the only major that shows a significant influence on the students' college choice. Nonetheless, the effects of social/behavioral sciences and education become significant. Students who have declared social/behavioral sciences are 40.8% more likely to attend four-year institutions than students who have not declared a major, students who have declared education are 43.7% more likely, and students who have declared business management are 41.3% more likely to attend four-year institutions. Students who earn a one-point higher GPA in the first academic year are 45.5% more likely to attend four-year institutions. The type of original institutions also influences students' choice of destination institutions. Students who depart from public original institutions are 33.7% more likely to attend four-year institutions, even though such an effect is significant at the 10% level. The size of their original institutions is negatively correlated with the probability of attending four-year institutions, but the magnitude of its influence is also small and trivial. The influence

of selectivity of original institutions is still significant and increased from 43.9% in Model 3 to 48% in Model 4, which means that students who attend more selective original institutions are now 48% more likely to choose four-year institutions as destination institutions after they break enrollment in higher education. Not surprisingly, the number of stopout years show negative effects on the odds of choosing four-year institutions. Students who stop out one more year are 22.8% less likely to attend four-year institutions when they return to higher education.

Discussion

This chapter investigates the choice pattern of transfer students and their destination institutions. Because of their different educational pathways, the patterns of continuous transfers and interrupted transfers are described and analyzed, respectively. Nonetheless, the research results show the choice patterns of these two groups of transfers as having several points in common. First, minority students are less likely to attend four-year institutions after their departure from their original institutions, especially Hispanic and Black students. The results are consistent with the findings in previous literature. However, minority students occupy a small percentage among all transfer students. Black, Hispanic, and Asian students share 25.7% of continuous transfers, and 19.2% of interrupted transfers. Thus, the different probability of attending four-year institutions between minority and White students needs to be considered carefully because of the small percentage shared by minority students.

Second, students who have declared majors in social/behavioral sciences or business management in their first academic year appear to have higher odds of attending four-year institutions than students who have not. A probable explanation is that the screening system of these majors keeps out students who cannot prove their academic capability. Students who have passed the screening and declared these majors may be well-prepared and clear on their

academic goals. Therefore, these students may be more likely to aspire to achieving a bachelor's degree and therefore transfer to four-year institutions after departing their original institutions. Additionally, the GPA in the first academic year positively influences the likelihood of attending four-year institutions, which is also consistent with the literature.

The results of this chapter contribute to the literature with the findings of the relationship between the attributes of students' original institutions and the type of destination institutions they choose. The interrupted transfers who originally attended public institutions appear to have a higher likelihood of attending four-year institutions, although the original public institutions show no influence on continuous transfers' choice of destination institutions. The selectivity of the original institutions is found to be positively associated with the likelihood of attending four-year institutions. It is reasonable that students who originally attended selective institutions may have higher academic capability and aspirations, and thus are inclined to attend four-year institutions after they leave their original institutions.

Additionally, the length of time that students take off from higher education is negatively associated with the odds of returning to four-year institutions. The longer the interrupted transfers leave higher education, the lower the academic aspiration they may hold, and less likely they may attend other four-year institutions and continue to pursue a bachelor's degree.

However, it seems that their financial situation during attendance at their original institution is not a key reason when transfers choose their destination institutions. Students' family income, the tuition and fees of their original institutions, and the financial aid from institutions and state government present little or no effect on the type of destination institutions of transfers. Transfers who leave their original institutions may no longer be concerned about

their financial experience in the past, but consider financial pressure in a new situation when they choose their destination institutions.

Transfers who choose to attend other four-year institutions may have a second chance to obtain a bachelor's degree after departing their original four-year institutions, even though they follow different educational pathways. However, attending one more four-year institution does not guarantee that they will still have the same possibility of obtaining a bachelor's degree than if they choose not to transfer. The next chapter examines how different educational pathways influence the possibility of obtaining the degree for staying students, transfers to four-year institutions, and stopout students.

Chapter Six

DEGREE ATTAINMENT OF STUDENTS ON DIFFERENT EDUCATIONAL PATHWAYS

This chapter addresses the last research question of the study – how educational pathways affect bachelor's degree attainment. Given that the previous literature on degree attainment attaches importance to persistence in a single institution, this chapter examines the bachelor's degree attainment of students who follow different educational pathways, including those staying in original institutions until graduation, or up to six years; continuous and interrupted transfer students, and stopout students. The results of this study may assist educational practitioners and policy makers in managing student mobility and in helping students design their educational pathways efficiently in term of attaining a bachelor's degree.

Research Methods

Heckman (1976, 1979) first proposed a two-step procedure, which has been known as a standard econometric method to correct the sample selection bias (Greene, 2003). Such bias may be due to the endogenous sampling method with which individuals are segmented from the available sample based on their decision or choice that in part contains information on the dependent variable (Cameron & Trivedi, 2005). In such cases, the probability distribution of the endogenous variables is correlated with the dependent variable *y*, and the parameter estimates of interest may be inconsistent unless corrective measures are taken. For example, in a study of the effect of drinking wine on health, individuals with serious health problems may quit drinking under their doctors' advice. However, the positive effects of drinking wine on health may be upwardly biased because individuals with a serious health problem do not drink. In the current

study, transfer students may be observed to be less likely to obtain a bachelor's degree because students who are less likely to obtain the degree in their original institutions tend to transfer to other institutions. Thus, Heckman's two-step model is employed to correct this sample selection bias.

In the first step, the students' likelihood of departing their original institutions is regressed by their personal characteristics, pre- and within-college experience, and the attributes of their original institutions. Based on a first-step regression, an Inverse Mills Ratio is calculated to measure the "departure hazard" of each student as an indicator of the selection bias. The first-step logistic regression is represented as:

$$(5) \qquad \Pr[y_1|x_1] = \frac{e^{F1(x1'\beta 1)}}{1+e^{F(x1'\beta 1)}} + \sigma_1 , \qquad y_1 = \{ \begin{matrix} 1 \text{ if departed} \\ 0 \text{ if stayed} \end{matrix} \}$$

While, $F_1(x_1'\beta_1) = f_1$ (C, F, A, E, I), where

C = students' characteristics indicated by age, gender, and ethnicity;

F = students' socioeconomic backgrounds indicated by family annual income in 1996 and the higher educational level of the parents;

A = students' academic performance and aspiration indicated by SAT score and the highest degree aspired to;

E = students' experience in their original institution indicated by the student's declared major, GPA in AY 1995-96, part-time attendance in AY 1995-96, and tuition and fees;

I = institutional attributes of original institutions indicated by type, size, and selectivity;

σ_1 = the error term

The first-step regression estimated an inverse Mills ratio of $\lambda(x_1'\beta_1)$. This ratio was used in the second-step regression as an instrumental variable to control the correlation between the

errors in the first- and second-step regressions. The second-step regression was to predict if the students were able to graduate with a bachelor's degree within six years:

$$(6) \quad \Pr[y_2|x2] = \frac{e^{[F2(x2'\beta2) + \sigma12\lambda(x1'\beta1)]}}{1 + e^{[F2(x2'\beta2) + \sigma12\lambda(x1'\beta1)]}} + \sigma_2 , \qquad y_2 = \begin{cases} 1 \text{ if graduated} \\ 0 \text{ if not graduated} \end{cases}$$

$y_2 = 1$ if the students graduated, and $y_2 = 0$ if not. $F_2(x_2'\beta_2) = f_2(C, F, A, E, I)$, where:

C = the students' characteristics indicated by age, gender, and ethnicity;

F = the students' socioeconomic backgrounds indicated by family annual income in 1995, and the higher educational level of the parents;

A = the students' academic performance and aspiration indicated by their SAT scores and the highest degree that the students aspired to;

E = the students' college experience indicated by their GPAs in the academic year 1995-96, part-time attendance in the academic year 1995-96, and their accumulative GPAs in the last academic term;

I = the attributes of the original institutions indicated by tuition and fees, type, size, selectivity, and location;

σ_2 = the error term

With the selectivity bias controlled by the Inverse Mills Ratio, the probability of bachelor's degree attainment can be accurately estimated in the second-step regression.

Results

Descriptive Statistics

Appendix N shows the descriptive statistics of the analytical sample of this study. There are 2,990 students in total; 2,359 of them are staying students, 97 are stopout students, 77 are interrupted transfers, and 457 are continuous transfers. The average age of all of these students is

18.3 when they first enrolled in 1995-96. Nearly 55.3% of these students are female and 80% are White. The average SAT score of the students is 987. When asked their degree aspiration in the first academic year, more than half (53%) wanted a master's degree, 16.6% wanted a bachelor's degree, and 30% wanted a doctoral degree. Seventy-eight percent of the students' parents have some college education; 1.4% did not finish high school, and 19.8% completed high school and have some more training. The average family income in 1996 is $69,252. The average GPA in the first year is 2.9. Eighty-seven percent of the students attended original institutions full-time during the first academic year. The students attended four-year institutions where the average tuition and fees are $7,926 and the average student enrollment is 13,838 in 1995. Nearly 60% of the students attended public institutions, whereas 34% attended very selective institutions, 18.9% attended selective, and 47.1% attend least selective institutions.

Appendix O presents the percentages of degree attainment within six years among the students by different educational pathways. Four pathways are shown in the Appendix: stayed, stopped out, interrupted transfer, and continuous transfer. Appendix O shows that 91.3% of the students who stayed in the original institution obtained a bachelor's degree within six years, whereas only 19.6% of the stopout students obtained a degree. Among transfer students, continuous transfers show a much higher probability of obtaining a degree within six years than interrupted transfers. Nineteen interrupted students who comprise only 24.7% of all interrupted students obtained the degree, while 272 continuous transfers or 59.5% of all continuous transfers obtained the degree within six years. The graduation rate of all students in the sample is 82.4%.

Appendix P shows the students' characteristics and family backgrounds by educational pathways. Except for the students' age, the average family income, SAT scores, academic aspirations, and parents' educational level are significantly different across the educational

groups. The average age of the students who stayed is the youngest (18.3) among all the groups, while the average age of the stopout students is the eldest (18.6). However, the average ages are not significantly different across the groups. The average family income in 1996 for staying students was $70,590, which is the highest among all the groups. The average family income of the continuous students is the second highest, and that of stopout students is the lowest among all the groups. Similarly, the staying students obtain the highest average SAT score, but the SAT score of the continuous students is the lowest among all the groups. Because all the students originally attended four-year institutions, the majority aspired to obtain post-baccalaureate degrees. The difference in academic aspirations is small but significant across the groups. Once again, the average aspiration of staying students is the highest. The majority of staying students want to obtain post-master's degrees. Moreover, the parents' of staying students also achieved a higher educational level than the parents of stopout and interrupted transfer students. Therefore, the staying students come from a better socioeconomic background and show higher academic capability and aspirations than the students who followed other educational pathways.

Appendix Q shows the numbers of students by gender and race across the various educational pathways. Female students are more likely to stay in their original institution or continuously transfer to other institutions than male students. Because only 20% of the total students in the sample are minorities, the number of White students engaged in each educational pathway is much higher than other ethnic groups. Thus, 1,879 White students, and only 154 Black, 178 Hispanic, and 148 Asian students remained in their original institution. Three hundred and seventy-two White students, and only 35 Black, 28 Hispanic, and 22 Asian students continuously enrolled in other four-year institutions. The number of Asian students engaged in each educational pathway is the lowest among all the ethnic groups.

Regression Results

Appendix R presents the results of the second step of Heckman's two-step model of degree attainment within six years among students who follow different educational pathways[1]. Model 1 includes attendance patterns and student characteristics. The results show that, compared with the staying students, the stopout students are 71.4% less likely to attain a degree within six years; the interrupted transfer students are 70.1% less likely; and the continuous transfers are 31.9% less likely. Besides attendance patterns, student age, gender, and race significantly influence degree attainment. With other variables being equal, older students are 2.5% less likely to complete a degree than younger students. Male students are 5.1% less likely to attain a degree than their female counterparts. Hispanic students appear to be 11.1% less likely to obtain a degree than White students.

Student socioeconomic backgrounds and academic preparation are added to the regression in Model 2. A gap in degree attainment between staying students and students involved in other educational pathways remains significant, and the magnitude of the difference stays almost the same. The younger students still have 2.3% lower likelihood of degree completion than the older students, whereas female students are 5.3% more likely to attain a degree than males. The gap in degree attainment between Hispanic and White students slightly decreases when their socioeconomic backgrounds and academic capability are added to the model. White students now are 9.1% more likely than Hispanic students to complete the degree. Rab (2004) found that economically disadvantaged students were more likely to be involved in multi-institutional attendance patterns and showed a lower probability of degree attainment. Nonetheless, the findings of Model 2 in this study do not support Rab's results. The variables of

[1] The interaction effects among students' age, gender, and ethnicity have been tested, but do not show significant effect. Therefore, Appendix 16 does not present such results.

the students' socioeconomic backgrounds and academic preparation do not show any significant influence on degree completion.

Model 3 includes student academic performance and attendance pattern in the original institution regression. The stopout and transfer students still have a much lower probability of degree attainment within six years than the staying students. The stopout students and interrupted transfers are 72% less likely to attain a degree, whereas the continuous transfers are 32.5% less likely. The younger students still have a slightly (2.4%) higher probability of completing a degree. The difference in degree attainment between male and female students decreases to 2.6%. Hispanic students are 7.3% less likely than White students to obtain a degree. Students' socioeconomic backgrounds, academic aspiration, and their performance in the first academic year have no influence on their degree attainment. The cumulative GPAs in the last academic term are positively associated with degree attainment. A better GPA leads to a 6.2% greater likelihood of degree attainment. Therefore, the results of Model 3 are consistent with the findings of Adelman (1999, 2006) that students' experiences in original institutions do not have a direct influence on their degree attainment.

In the final model, the attributes of the original institutions are added to the regressions. The probability gap of degree attainment among students involved in different attendance patterns remains the same as in prior models. In this model, stopout students appear to be 71.1% less likely than staying students to obtain a degree; the interrupted transfers are 72.1% less likely, and the continuous transfers are 33.4% less likely. The influence of age on degree attainment disappears when the institutional attributes are added, but the gender influence remains. Male students have a 4% lower likelihood of degree completion than their female peers. In addition, Hispanic students still have an 8.2% higher probability of degree attainment than White students.

When the attributes of the original institution are controlled, the positive influence of the cumulative GPAs in the last academic term decreases slightly to 5.9%, but is still significant. Moreover, the size of the original institution appears to be the only variable that shows significant influence on degree completion. However, this finding should be carefully interpreted. Given the large sample size of the regression, it is easier to obtain significant influence. Additionally, the measurement unit of institutional size is 100, that is, the original institution that enrolls 100 more students might decrease the possibility of degree attainment by 0.1%. Such magnitude of influence is quite trivial. Therefore, the results of Model 4 support the conclusion of Adelman (1999, 2006) that the influence of the original institutions on the degree attainment of students involved in different educational pathways is so small that it can be ignored. Finally, the Mills Inverse Ratio appears to be consistently significant across models, which means that the "departure hazard" calculated in the first step has a significant influence on degree attainment, and should be controlled in the second-step regression.

Discussion

Even though Adelman (1999) claimed that attendance at a four-year institution is one of the most reliable predictors of students' attainment of a bachelor's degree, this rule cannot be applied to the current research that examines bachelor's degree attainment among students who originally attend four-year institutions. However, students who start at the same level of institution do not necessarily exhibit an equal likelihood of earning a bachelor's degree. Completion of a degree varies, depending on the educational pathways students take.

The results from this study have shown that students staying in their original four-year institution have the highest possibility of obtaining a bachelor's degree. The possibility for students who leave their original institution and continuously enroll in another four-year

institution is second to the possibility of staying students. Students who leave their original institution and stay out for a period before they re-enroll in a four-year institution appear to have the lowest possibility of degree attainment, regardless of whether they come back to the original institution or attend another four-year institution.

Adelman (2006) concluded that "[p]ost-matriculation behaviors and attendance patterns that were strongly and positively associated with bachelor's degree attainment [included] continuous enrollment" (p. 9). The result of this study, showing that students who break the continuous enrollment in a four-year institution (i.e., stopout students and interrupted transfers) have a much lower possibility of degree attainment than those who stay in the original four-year institutions, re-enforces Adelman's finding. However, the current study also finds that the continuous transfers who simply change institutions but do not break their continuous enrollment still have a 33.4% lower probability of bachelor's degree attainment than the staying students.

Rab (2004) found that students from economically disadvantaged families were more likely to be engaged in multi-institutional attendance patterns, and therefore less likely to complete a bachelor's degree. The descriptive statistics of this study also demonstrate that students from lower socioeconomic backgrounds are more likely to break their enrollment at their original institution. However, students' family income and parents' educational level show no significant effects on the students' degree attainment. Yet Hispanic students and male students are less likely to complete the bachelor's degree.

School size is the only variable in the construct of institutional attributes of original institutions that shows a significant influence on degree attainment. However, such a result should be considered carefully. First, because of the large analytical sample size (2,990 observations), the influence of the school size may be trivial. Thus, the institutional attributes of

the original institutions may have no significant influence on the degree completion among students involved in different educational pathways. Second, one should bear in mind that the institutional attributes in the regression measures the environment of the students' original institutions. The attributes of the destination institutions for transfers are not considered in this regression. Therefore, the conclusion of Adelman (1999, 2006) that institutional environments have no influence on bachelor's degree attainment for students who attend more than one institution is partially supported by the results in this chapter. However, whether the institutional attributes of destination institutions may influence the bachelor's degree attainment among student engaged in multi-institutional attendance patterns may need to be analyzed again in the future.

Chapter Seven

IMPLICATIONS AND FUTURE STUDY

This chapter discusses the implications for policy makers and institutional administrators based on the findings of focal research questions of this dissertation. It aims to enrich the knowledge of policy makers and institutional administrators on student mobility and the bachelor's degree attainment among mobile students. Accordingly, policy makers and administrators are able to assist students receiving the degree more effectively and efficiently. At eh end of this chapter, recommendations for future study is also discussed.

Implications

This dissertation describes educational pathways that students who are originally enrolled in four-year institutions may follow, examines the choices of destination institutions among transfer students, and analyzes the influence of educational pathways on bachelor's degree attainment for students who follow several different educational pathways. The research findings, especially those in Chapter Six, merit the attention of policy makers and educational practitioners who respond to the needs of students involved in educational pathways other than staying in their original institutions.

The findings in Chapter Six have shown that students who leave their original institutions, no matter which they attend next, have a much lower probability of bachelor's degree attainment than students who are continuously enrolled and stay in their original institution. The negative consequence of transferring and stopout, i.e., failing to complete a bachelor's degree, suggests that the policy makers and institutional administrators should further encourage students to stay in their original institutions until graduation. Even though

continuously transferring to another four-year institution seems to provide a second chance for students' degree completion, it may not provide the same likelihood of degree attainment as remaining in their original institution. Students who transfer to a new institution have to spend time and energy adjusting to "transfer shock" (Dougherty, 1992) and adapting to the new academic and social environment. Such transitions may weaken their possibility of degree attainment at the new institution. Thus, college students should be encouraged to remain in their original institution until graduation. Strauss and Volkwein (2004) found that students at four-year institutions were more sensitive to the social integration to the institutional environment. Therefore, institutional administrators may consider engaging students at four-year institutions in more active out-of-class activities in order to improve the institutional commitment and retain students in the original institutions.

Longanecker and Blanco (2003) pointed out that "Both federal and state governments have failed to respond to the needs of 'swirling' students, who receive their education at multiple institutions, even though this practice has become commonplace. Our policies still assume that these are the institutions' students, rather than the students' education." The education that a student receives in one institution can hardly be transferred to the next. The policy makers may consider the best practice of the K-12 system as one that reduces mobility among students. The state policies in the K-12 system have developed programs such as outreach to parents and teachers regarding the effects of mobility, standardizing curricula across geographic areas, improving record-keeping systems to track students across schools, and educating schools and teachers about the needs of mobile students (Staresina, 2004). The policy makers of higher education may need to consider similar policies for the postsecondary level in order to encourage students to persist in original institutions until graduation.

Although students at four-year institutions should not be encouraged to attend more than one institution, some students who have to transfer to other institutions need attention and encouragement from both institutional administrators and policy makers. The institutional administrators may develop programs to help nonnative students succeed in their new institutional environment. Because transfer students have already experienced college life, they attract less attention in destination institutions than first-coming students, and receive less help to become familiar and integrated into a new institutional environment.

The research findings of this dissertation show that continuous transfers have a lower probability of degree completion than staying students, with other variables being equal and the self-selection bias corrected. Less assistance in destination institutions to help transfers' academic and psychological transaction could be one explanation. Institutional practitioners could improve consulting programs to connect transfers' lives in their original institution to their destination institution, and invite transfers to join first-year seminars in order to help them overcome the "transfer shock" and better fit into their new institutional environment.

However, the current state transfer policy still focuses on two-to-four transfers (students who transfer from two-year community colleges to four-year institutions) (Wellman, 2002), and does not assist transfer students to achieve academic success. How to use state-level policy to manage the mobility among college students may not be a key issue of state governments today, however. Only a few state governments have developed the student-based cohort tracking system that records the mobility of full-time students from both public and private sectors (Wellman, 2002). As a result, questions such as who the transfers among four-year institutions are, how those transfers perform in their destination institutions, and what those students need in order to improve their success have no answers at the state-level governing board. But policy makers

should include transferring behaviors among four-year institutions when they consider and introduce two-to-four transfer policies. Some two-to-four transfer policies are also applicable among four-to-four transfers. For example, state government could develop an information system to collect and record student-based data, set clear goals, clarify state policy and plans, and develop baseline information to improve the students' transfer performance. In order to improve transfer convenience, the state government could forge articulation and credit transfer agreements among four-year institutions as they do for two-year to four-year transfers. Thus, transfer students need not have to argue their credit transfer with four-year institutions on an individual base.

Another important finding highlighted in Chapter Six is that students who break enrollment in higher education have an even lower likelihood of bachelor's degree completion than students who continuously transfer to other institutions. There are three reported reasons for stopout: to work, to take time off from study, and to address financial reasons. Moreover, the results of students' choice of departure also show that those who receive financial aid from their state government have a slightly lower probability of stopout and a higher probability of staying in their original institutions. Accordingly, state government could offer financial aid to encourage students to stay in their original institutions and discourage students from breaking their enrollment in higher education.

Institutional administrators could also inform students of the notable gap in degree completion between students with continuous enrollment and those with interrupted enrollment. Students should be educated that broken enrollment in higher education is the major reason for the lower probability of degree completion. Even if students have to transfer to other institutions, they should be encouraged to try not to break their enrollment in higher education.

Finally, Adelman (1999) contended that "Institutional graduation rates are not very meaningful. It is not wise to blame a college with superficial low graduation rates for the behavior of students who swirl through the system" (p. ix). He argued that the emphasis on student retention should be switched from the retention in an individual institution to the broader system of higher education. However, the findings of this dissertation imply that the mobility within the system of higher education also hurts degree attainment among students, even for those who are continuously enrolled. The policies that protect the mobility within the system may encourage more students to be involved in educational pathways other than staying, but may not promote the outcomes of students moving across institutions. Furthermore, Rab (2004) corroborated the arguments of Adelman (1999), suggesting that all institutions should be given credit if their students eventually complete their degree, even if their graduation occurs at another institution. However, such policies may promote students' mobility across institutions and discourage institutions from focusing on ensuring student success.

The individual higher education institution has had significant reasons to be concerned about student success. The funding of state universities is increasingly tied to degree completion rates as the role of accountability in higher education broadens (Gross, Shaw & Shapiro, 2002; Heller, 2001). Institutions which attach higher importance to their degree completion rates may receive more funding from government, and improve institutional success. The policies that tie institutional success to student success should be further promoted so that students will be encouraged to stay in one institution, which has been proved to be a more effective and efficient way of attaining a bachelor's degree than moving across institutions.

Future Study

This study is restricted to the students who transfer only once to other four-year institutions, but in fact, some students may transfer to two-year colleges (reverse transfer) and transfer again to another four-year institution. Kinnick and her colleagues (1997) have described the reverse transfer behaviors but have not concluded how these behaviors influence educational outcomes. The educational pathways in real life are much more complex than those described in this dissertation. McCormick (2003) identified a dozen different educational pathways a student can follow. Therefore, a future study could consider more complicated educational pathways and examine their influence on educational outcomes, for example, the role of two-year colleges in the attainment of a bachelor's degree.

Moreover, additional research could aim to better understand why students choose a certain departure alternative and a type of destination institution. In the BPS data base, the participants were asked to choose a reason for their departure or transferring behaviors. The top two were financial and academic. However, as Cope and Hannah (1976) claimed, financial and academic reasons obscure other motivations that students do not want to declare. Therefore, a direction of future study is to find out the driving reasons for students' choice of certain educational pathways. Such research findings could better assist policy makers and educational practitioners to improve student retention and persistence in original institutions.

REFERENCES

Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment*. Jessup, MD: U.S. Department of Education.

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*: U.S. Department of Education.

Alon, S. (2001). *Racial, ethnic, and socioeconomic disparities in college destinations, 1982 and 1992*. Office of Population Research: Working Paper, Princeton, NJ: Princeton University.

Astin, A. (1975). *Preventing students from dropping out*. San Francisco: Jossey-Bass.

Astin, A. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.

Astin, A., Tsui, L., & Avalos, J. (1996). *Degree attainment rates at American colleges and universities: Effects of race, gender and institutional type*. Los Angeles: University of California, Higher Education Research Institute.

Astin, A. W., Christian, C. E., & Henson, J. W. (1975). *The impact of student financial aid programs on student choice*. Los Angeles: Higher Education Research Institute.

Bach, S. K., Banks, M. A., Blanchard, D. K., Kinnick, M. K., Ricks, M. F., & Juliette, M. S. (1999). Reverse transfer students in an urban postsecondary system in Oregon. *New Direction for Community Colleges, 106*(summer), 47-56.

Baird, L. L. (2002). College climate and the Tinto model. In J. M. Braxton (Ed.), *Reworking the Student Departure Puzzle* (2nd ed., pp. 62-80). Nashville: Vanderbilt University Press.

Barger, B., & Hall, E. (1964). Personality patterns and achievement in college. *Educational and Psychological Measurement, 24*(2), 339-346.

Bean, J. P. (1980). Dropouts and turnover: The synthesis and test of a causal model of student retention. *Research in Higher Education, 12*, 155-187.

Bean, J. P. (1983). The application of a model of turnover in work organization. *Review of Higher Education, 6*, 129-148.

Bean, J. P., & Eaton, S. B. (2002). A psychological model of college student retention. In J. M. Braxton (Ed.), *Reworking the Student Departure Puzzle* (pp. 48-61). Nashville: Vanderbilt University Press.

Benin, M., Brandt-Williams, A., & Okun, M. A. (1996). Staying in college: Moderations of the relation between intention and institutional departure. *Journal of Higher Education, 67*(5), 577-596.

Berker, G. (1964). *Human capital*. New York: National Bureau of Economic Research.

Bowen, H. (1977). *Investment in learning*. San Francisco: Jossey-Bass.

Cabrera, A., Stampen, J., & Hansen, W. (1990). Exploring the effects of ability to pay on persistence in college. *Review of Higher Education, 13*(3), 306-336.

Cameron, A. C., & Trivedi, P. K. (2005). *Microeconometrics: Methods and applications*. Cambridge, NY: Cambridge University Press.

Carroll, C. D. (1989). *College persistence and degree attainment for 1980 high school graduates: Hazards for transfers, stopouts and part-timers*: OERI: U.S. Department of Education.

Chapman, D. W. (1981). A model of student college choice. *Journal of Higher Education, 52*(5), 490-505.

Chapman, D. W., & Pascarella, E. (1983). Predictors of academic and social integration of college students. *Research in Higher Education, 19*, 295-322.

Choy, S., & Premo, M. (1996). *How low-income undergraduates financed postsecondary education: 1992-93*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Clark, B. R. (1960). The 'Cooling-Out' function in higher education. *American Journal of Sociology, 65*(6), 569-576.

Comay, Y., Melnik, A., & Pollatschek, M. A. (1973). The option value of education and the optimal path for investment in human capital. *International Economic Review, 14*(2), 421-435.

Cope, R., & Hannah, W. (1976). *Revolving college doors*: John Wiley.

Davis, J. S., & Van Dusen, W. D. (1975). *A survey of student values and choice: A pilot study of the relationships of student values, perceptions, and choice of institutions*. New York: College Entrance Examination Board.

DesJardins, S. L., McCall, B. P., Ahlburg, D. A., & Moye, M. J. (2002). Adding a timing light to the "Tool Box." *Research in Higher Education, 43*(1), 82-114.

Dey, E., & Astin, A. (1989). *Predicting college student retention: Comparative national data from the 1982 freshman class*. Los Angeles: University of California, Higher Education Research Institute.

Dolan, R., & Schmidt, R. (1994). Modeling institutional production of higher education. *Economics of Education Review, 13*, 197-213.

Ethington, C. (1997). A hierarchical linear modeling approach to studying college effects. In J. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 12, pp. 165-194). New York: Agathon.

Goldrick-Rab, S. (2006). Following their every move: An investigation of social-class

differences in college pathways. *Sociology of Education, 79*, 61-79.

Gross, S. J., Shaw, K. M. & Shapiro, J. (2002). Deconstructing accountability through the lens of democratic philosophies: Toward a new analytic framework. *Journal of Research for Educational Leaders.*

Hagedorn, L. S., & Castro, C. R. (1999). Paradoxes: California's experience with reverse transfer students. *New Direction for Community Colleges, 106*, 15-26.

Hearn, J. C. (1984). The relative roles of academic, ascribed, and socioeconomic characteristics in college destination. *Sociology of Education, 57*(January), 22-30.

Heller, D. (1997). Student price response in higher education: An update to Leslie and Brinkman. *Journal of Higher Education, 68*, 624-659.

Heller, D. (1998). *A comparison of the tuition price and financial aid responsiveness of first-time enrollees and continuing college students.* Paper presented at the Annual Meeting of the Association for the Study of Higher Education, Miami, FL.

Heller, D. (2001). *Debts and decisions: Student loans and their relationship to graduate school and career choice*. Indianapolis: Lumina Foundation for Education: New Agenda Series.

Horn, L. J., & Carroll, C. D. (1999). *Stopouts or stayouts?: Undergraduates who leave college in their first year*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Ihlanfeldt, W. (1980). *Achieving optimal enrollments and tuition revenues*. San Francisco: Jossey-Bass.

Jackson, G. A. (1978). Financial aid and student enrollment. *Journal of Higher Education, 49*(6), 548-574.

Jackson, G. A. (1982). Public efficiency and private choice in higher education. *Educational*

Evaluation and Policy Analysis, 4(2), 237-247.

Kane, T. J., & Rouse, C. E. (1993). *Labor market returns to two- and four-year colleges: Is a credit a credit and do degrees matter?* NBER Working Papers 4268. Cambridge, MA: National Bureau of Economic Research.

Kinnick, M. K., Ricks, M. F., Bach, S. K., Walleri, D., Stoering, J., & Tapang, B. (1997). *Student transfer and outcomes between community colleges and a university within an urban environment.* Orlando: Association for Institutional Research.

Kotler, P. (1976). Applying marketing theory to college admissions. In The College Entrance Examination Board (Ed.), *A Role for Marketing in College Admissions*. New York: College Entrance Examination Board.

Leslie, L. L., & Fife, J. D. (1974). The college student grant study: The enrollment and attendance impacts of student grant and scholarship programs. *Journal of Higher Education, 45*(December), 651-671.

Litten, L. H. (1982). Different strokes in the applicant pool: Some refinements in a model of student college choice. *Journal of Higher Education, 53*(4), 383-402.

Litten, L. H., & Brodigan, D. L. (1982). On being heard in a noisy world: Matching media and messages in college marketing. *College and University, 57*(3), 242-263.

Longanecker, D. A., & Blanco, C. D. (2003). Public policy implications of changing student attendance patterns. *New Direction for Higher Education, 121*, 51-68.

McCormick, A. C. (1997). *Transfer behavior among beginning postsecondary students: 1989-94*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

McCormick, A. C. (2003). Swirling and double-dipping: New patterns of student attendance and

their implication of higher education. *New Direction for Higher Education, 121*, 13-24.

Miller, M. A. (2004). Student on the move. *Change, 36*(2), 4.

Mundy, L. A. (1976). *Impact of educational development, family income, college costs, and financial aid in student choice and enrollment in college*. Iowa City: American College Testing.

Nora, A. (1990). Campus-based aid programs as determinants of retention among Hispanic community college students. *Journal of Higher Education, 61*(3), 312-330.

Nora, A., & Cabrera, A. (1996). The role of perceptions of prejudice and discrimination on the adjustment of minority students to college. *Journal of Higher Education, 67*, 119-148.

Nora, A., & Horvath, F. (1989). Financial assistance: Minority enrollments and persistence. *Education and Urban Society, 21*(3), 299-309.

Oklahoma State Regents for Higher Education. (1997). *Student transfer matrix, Fall 1996*. Oklahoma City: Oklahoma State Regents for Higher Education.

Olivas, M. A. (1985). Financial aid packaging policies: Access and ideology. *Journal of Higher Education, 56*, 462-475.

Pascarella, E., & Terenzini, P. (1983). Predicting voluntary freshman year persistence/withdrawal behavior in a residential university: A path analytic validation of Tinto's model. *Journal of Educational Psychology, 75*(2), 215-226.

Pascarella, E., & Terenzini, P. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.

Pascarella, E., & Terenzini, P. (2005). *How college affects students: A third decade of research* (Vol. 2). San Francisco: Jossey-Bass.

Paulsen, M. B., & St. John, E. P. (1997). The financial nexus between college choice and

persistence. In r. Voorhees (Ed.), *Researching student financial aid (New Directions for Institutional Research)* (Vol. 95, pp. 65-82). San Francisco: Jossey-Bass.

Paulsen, M. B., & St. John, E. P. (2002). Social class and college costs: Examining the financial nexus between college choice and persistence. *Journal of Higher Education, 73*(2), 189-236.

Peter, K., & Cataldi, E. F. (2005). *The road less traveled? Students who enroll in multiple institutions*. Washington, DC: National Center for Education Statistics.

Porter, S. R. (1999). *Assessing transfer and native student performance at four-year institutions.* Paper presented at the Association of Institutional Research, Seattle, Washington.

Pusser, B., & Turner, J. K. (2004). Changing patterns challenging policymakers. *Change, 36*(2), 36-44.

Rab, S. Y. (2004). *Swirling students: Putting a new spin on college attrition.* University of Pennsylvania, Philadelphia.

Somers, P. (1996). The freshman year: How financial aid influences enrollment and persistence at a regional comprehensive university. *College Student Affairs Journal, 16*, 27-38.

Staresina, L. N. (2004). Student mobility. *Education Week*. February 11. www.edweek.org.

St. John, E. P. (1990). Price response in persistence decision: An analysis of the High School and Beyond senior cohort. *Research in Higher Education, 31*, 387-403.

St. John, E. P. (1991). The impact of student financial aid: A review of recent research. *Journal of Student Financial Aid, 35*, 455-480.

St. John, E. P. (1994). *Prices, productivity, and investment: Assessing financial strategies in higher education*. Washington, DC: George Washington University.

St. John, E. P., Andrieu, S., Oescher, J., & Starkey, J. (1994). The influence of student aid on within-year persistence by traditional college-age students in four-year college. *Research in Higher Education, 35*, 445-480.

St. John, E. P., Cabrera, A., Nora, A., & Asher, E. H. (2002). Economic influences on persistence reconsidered: How can finance research inform the reconceptualization of persistence models. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 29-47). Nashville: Vanderbilt University Press.

St. John, E. P., Hu, S., & Weber, J. (2001). State policy and the affordability of public higher education: The influence of state grants on persistence in four-year colleges. *Research in Higher Education, 35*, 455-480.

St. John, E. P., Oescher, J., & Andrieu, S. (1992). The influence of prices on within-year persistence by traditional college-age students in four-year colleges. *Journal of Student Financial Aid, 22*, 27-38.

St. John, E. P., Paulsen, M. B., & Starkey, J. (1996). The nexus between college choice and persistence. *Research in Higher Education, 37*, 175-220.

Stage, F. K. (1989). Reciprocal effects between the academic and social integration of college students. *Research in Higher Education, 30*(5), 517-530.

Stage, F. K., & Hossler, D. (2002). Where is the student? Linking student behaviors, college choice, and college persistence. In J. M. Braxton (Ed.), *Reworking the departure puzzle* (2nd ed., pp. 170-195). Nashville: Vanderbilt University Press.

Stampen, J., & Cabrera, A. (1986). Exploring the effects of student aid on attrition. *Journal of Student Financial Aid, 16*(2), 28-40.

Stampen, J., & Cabrera, A. (1988). The targeting and packaging of student aid and its effect on

attrition. *Economics of Education Review, 7*(1), 29-46.

Stoecker, J., & Pascarella, E. (1991). Women's colleges and women's career attainments revisited. *Journal of Higher Education, 62*, 394-406.

Terenzini, P., Pascarella, E., Theophilides, C., & Lorang, W. G. (1985). A replication of a path analytic validation of Tinto's theory of college student attrition. *Review of Higher Education, 8*(4), 319-340.

The College Board. (2004). *Trends in student aid 2004*. Trends in Higher Education Series, Washington, DC.

The College Board. (2007). *2007 college-bound seniors: Total group profile report.* Washington, DC. http://www.collegeboard.com/prod_downloads/about/news_info/cbsenior/yr2007/national-report.pdf.

The College Board. (2007). *Trends in college pricing.* Trends in Higher Education Series, Washington, DC. http://www.collegeboard.com/prod_downloads/about/news_info/trends/trends_pricing_07.pdf

The U.S. General Accounting Office. (1995). *Higher education: Restructuring student aid could reduce low-income student drop-out rate*. Washington, DC: U.S. General Accounting Office, Health, Education, and Human Service Division.

The U.S. Census Bureau. (2003). *Educational attainment and median household income.* Washington, DC. http://www.census.gov/hhes/income/histinc/h13.html

Tierney, M. L. (1984). Competitive structure of selected college student markets. *College and*

University, 59, 229-244.

Tierney, M. L., Houang, R., & Henson, J. W. (1979). *Alternative estimation procedures for studies of student college choice behavior: A cross-validation analysis.* Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Tillery, D., & Kildegaard, T. (1973). *Educational goals, attitudes and behaviors: A comparative study of high school seniors*. Cambridge, MA: Ballinger.

Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.

Townsend, B. K., & Dever, J. T. (1999). What do we know about reverse transfer students? *New Direction for Community Colleges, 106*, 5-14.

U.S. Census Bureau. (2003). *Current population survey: March 2002*: http://ferret.bls.census.gov/marcro/032002/perinc/new03_006.htm.

U.S. Department of Education. (2003). *Digest of education statistics*. Washington, DC: National Center for Education Statistics.

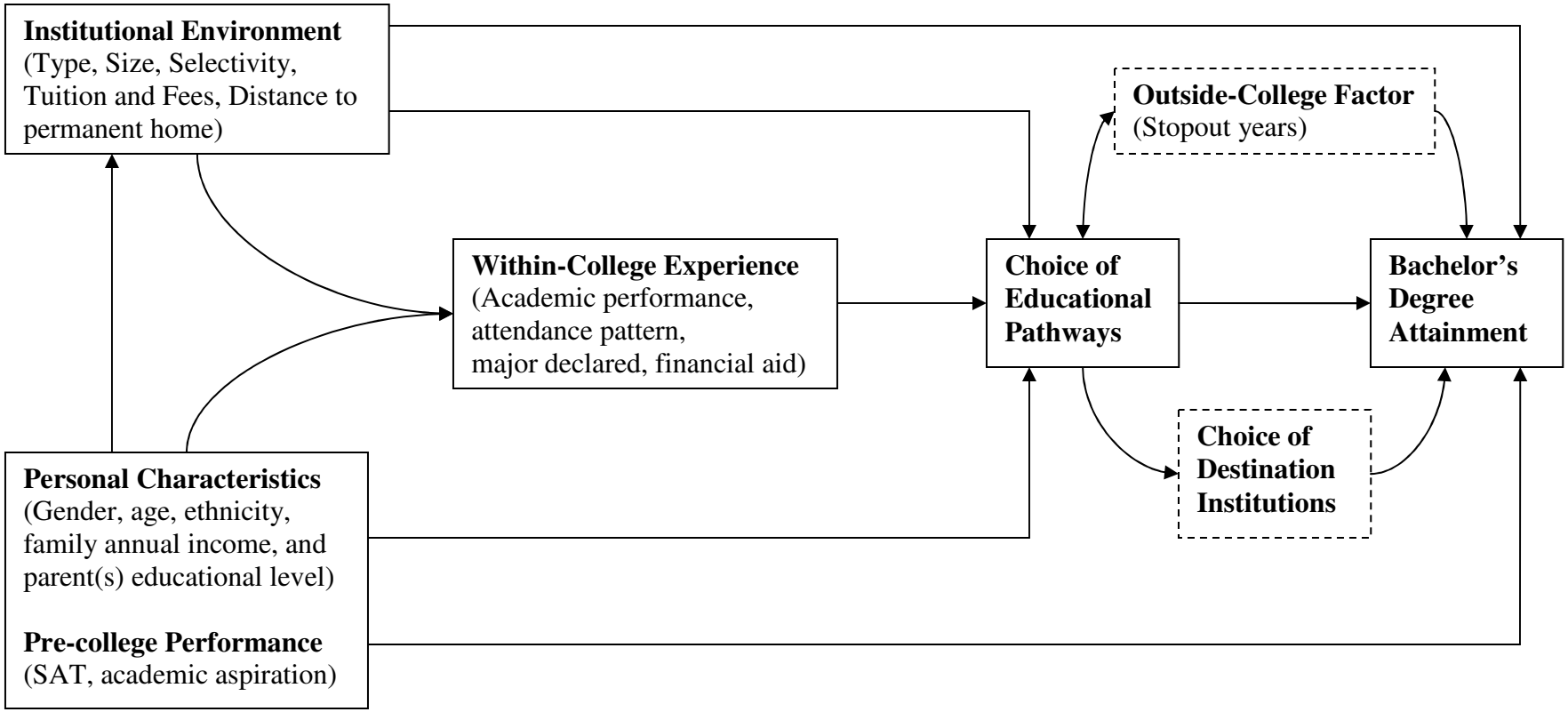
Wellman, J. V. (2002). *State policy and community college/baccalaureate transfer*. San Jose, CA: National Center for Public Policy and Higher Education.

Williamson, D. R., & Creamer, D. G. (1988). Student attrition in 2- and 4-year colleges: Application of a theoretical model. *Journal of College Student Development, 29*(3), 210-217.

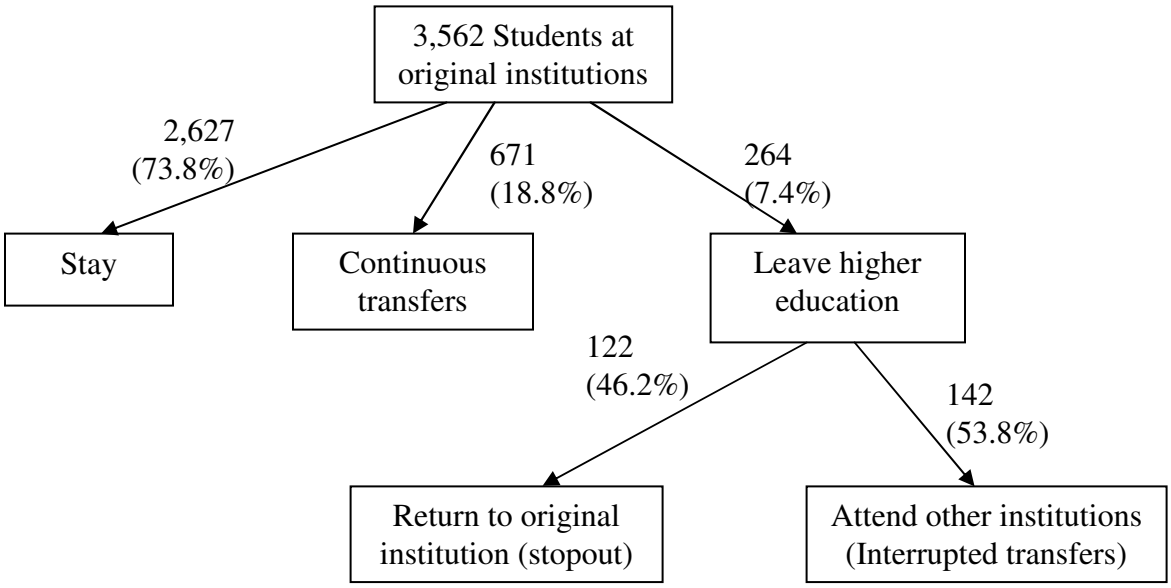
Zemsky, R., & Oedel, P. (1983). *The structure of college choice*. New York: College Entrance Examination Board.

Zemsky, R., Shaman, S., & Berberich, M. (1980). Toward an understanding of collegiate

enrollment: A first test of the market segment model. *Journal of Education Finance, 5*, 355-374.



Appendix A: Conceptual framework that guides three related but different research questions.



Appendix B: Percentages of students who participated in each educational pathway (weighted)

Appendix C

Definition and Coding of Variables

Variables	**Definition and coding**
Stay	A stay refers to a student who continuously enrolls in the original institution without taking break for more than four months
Stopout	A stopout is defined as a break in enrollment in the original institution of five or more consecutive months, and a student comes back to the original institution.
Transfer	A transfer occurs when a student leaves the original institution and enrolls at the destination institution for four or more months.
Degree attainment	Dichotomous indicator, coded "1" if a student received a bachelor's degree by AY 2000-01, otherwise "0"
Male	Dichotomous indicator of gender, coded "1" if a student is male
Age	Continuous measure of a student's age (by 12/31/1995)
Race	Continuous measure of a ethnic group that a student belongs to, coded from 1=White, non-Hispanic to 4=Asian/Pacific Islander
SAT (in hundreds)	Continuous measure of derived combined SAT score
Aspiration	Continuous measure indicating the highest degree expected by AY 1995-96, coded from 1=less than four-year degree or no degree to 6=doctoral degree or first professional degree
Parent's highest ed. level	Continuous measure indicating the higher educational attainment of parent, coded from 1=did not complete high school to 3=some college education or more
Family income in 1996 (in thousands)	Continuous measure indicating parents' income for students under 30 for 1995 calendar year
Major in AY 1995-96	Continuous measure of the major a student declared during AY 1995-96, coded as 0=undeclared/no major to 9=vocational/technical
GPA in AY 1995-96	Continuous measure indicating the grade point average in 1995-96, standardized to a 4.00 point scale
Accumulative GPA when last enrolled	Continuous measure indicating the actual or estimated GPA in the last term as an undergraduate, coded as 1=most Ds or below (below 1.24) to 7=most As (3.75 or above)

Variables	Definition and coding
Ever attended part-time	Dichotomous indicator of pattern of enrollment intensity for months enrolled during AY 1995-1996, coded "1" if a student attended as a part-time student.
Public school	Dichotomous indicator of type of 1st institution that a student attended, coded "1" as a public institution
Tuition and fees in AY 1995-96 (in thousand)	Continuous measure indicating amount of tuition charged a student for the terms attended. If tuition amounts were not reported they were estimated based on the average per credit or per term charges for other students at the institution according to their class level, degree program, and attendance status.
Size (in hundred)	Continuous measure of the total number of students enrolled for credits in 1995
Selectivity	Continuous measure derived from two variables: the category of "very selective" identifies institution in which the 25 percentile of SAT I and ACT scores of freshmen entering in Fall 1995 was greater than 1000. The remaining institutions were divided into "selective" and "least selective" categories based on selective Carnegie classifications (1994 classification): coded as 1=least selective to 3=very selective
Institutional aid	Dichotomous indicator, coded "1" if a student received institutional grant aid including all grants and scholarships, tuition waivers, and graduate fellowships during academic year 1995-96; otherwise "0".
State aid	Dichotomous indicator, coded "1" if a student received state grant, scholarships and fellowship/traineeships, including the federal portion of State Student Incentive Grants (SSIG) during academic year 1995-96; otherwise "0".
Distance to home (in hundreds)	Continuous measure indicating mile distance from the original school to a student' permanent home 1995-96
Stopout years	The total number of years that a student stay outside higher education

Appendix D

Descriptive Statistics of Independent Variables in Choice of Educational Pathways (1st research question)

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Age		3,562	18.3	0.7	16	25	
Gender		3,562	0.4	0.5	0	1	
Male	1	1,558					43.7
Female	0	2,004					56.3
Race		3,562	1.4	0.9	1	4	
White, non-Hispanic	1	2,758					77.4
Black, non-Hispanic	2	268					7.5
Hispanic	3	307					8.6
Asian/Pacific Islander	4	229					6.4
SAT		3,562	970	208	430	1550	
Aspiration		3,562	4.0	0.7	1	5	
Certificate	1	5					0.1
Associate's degree	2	21					0.6
Bachelor's degree	3	643					18.1
Master's degree	4	1,857					52.1
Doctoral or first-professional degree	5	1,036					29.1
Parent highest ed. level		3,562	2.8	0.5	1	3	
Did not complete high school	1	66					1.9
Completed high school or equivalent	2	768					21.6
Some college or more	3	2,728					76.6
Family income 96		3,562	66,403	61,022	100	1,000,000	
Major declared 96		3,562	3.5	3.2	0	9	
No major	0	1,068					30
Humanities	1	339					9.5

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Social/Behavioral Sciences	2	264					7.4
Life Sciences	3	313					8.8
Physical/Mathematical Sciences	4	94					2.6
Computer/Engineering Sciences	5	327					9.2
Education	6	270					7.6
Business Management	7	386					10.8
Health	8	273					7.7
Vocational/Technical/professional	9	228					6.4
GPA 96		3,562	2.8	0.7	0.2	4	
Ever part-time 96		3,562	0.1	0.3	0	1	
Attended part-time	1	476					13.4
Not attended part-time	0	3,086					86.6
Tuition & fees		3,562	7,147	5,843	50	34,040	
Public school		3,562	0.6	0.5	0	1	
Public institutions	1	2,127					60
Private institutions	0	1,435					40
Size 96		3,562	14,122	11,939	133	51,445	
Selectivity		3,562	1.8	0.9	1	3	
Least selective	1	1,731					48.6
Selective	2	671					18.8
Very selective	3	1.160					32.6
Institutional aid		3,562	0.4	0.5	0	1	
Received	1	1.658					46.6
Not received	0	1,904					53.5
State aid		3,562	0.2	0.4	0	1	
Received	1	935					26.3
Not received	0	2,627					73.8

Note: Means are weighted.

Appendix E

The Top Reported Reason for Transferring Behaviors

	# of Transfers	**Percentage (%)**	**Reasons**
	82	22	Offered desired program/coursework
	69	18	Earn degree/certificate
	64	17	Logistics
	42	11	Personal interest/enrichment
	40	10	Other
	31	8	Affordable/other financial reasons
	27	7	Reputation of program/faculty/school
	19	5	Prepare for new career/degree
	6	2	Academic problems elsewhere
	1	0	Advance in current job
Total:	381	100	

Appendix F

The Top Reported Reasons for Stopping Out

	# of Stopouts	**Percentage (%)**	**Reasons**
	18	24	Needed to work
	10	13	Taking time off from studies
	9	12	Other financial reasons
	7	9	Change in family status
	7	9	Other
	6	8	Conflicts with demands at home
	5	7	Deciding on different program
	5	7	Conflicts with job/military
	5	7	To pursue other interests
	3	4	Academic problems
	1	1	Participated in co-op/internship
Total:	76	100	

Appendix Ga

Multinomial Regression Results of First Choice Occasion –Continuously Transfer vs. Stay; and Leave vs. Stay (odds shown)

	Model 1		Model 2		Model 3	
Base outcome = Stay	**Transfer**	**Leave**	**Transfer**	**Leave**	**Transfer**	**Leave**
Age	0.203**	0.421***	0.116	0.323***	0.079	0.194*
	(0.092)	(0.097)	(0.110)	(0.104)	(0.108)	(0.105)
Male	-0.006	0.391**	0.063	0.461***	-0.051	0.280
	(0.104)	(0.166)	(0.107)	(0.170)	(0.115)	(0.185)
Omitted group = White students						
Black	0.440**	0.199	0.051	-0.262	-0.040	-0.471
	(0.204)	(0.262)	(0.208)	(0.268)	(0.213)	(0.306)
Hispanic	0.328*	0.451	0.112	0.129	0.179	0.266
	(0.183)	(0.294)	(0.191)	(0.331)	(0.195)	(0.339)
Asian	0.039	-0.572	0.150	-0.632	0.293	-0.326
	(0.244)	(0.372)	(0.255)	(0.390)	(0.248)	(0.419)
SAT score			-0.222***	-0.149***	-0.026	0.124**
			(0.032)	(0.043)	(0.043)	(0.053)
Aspiration			-0.322***	-0.558***	-0.246***	-0.419***
			(0.083)	(0.122)	(0.093)	(0.135)
Parents' highest ed. level			-0.117	-0.222	-0.195*	-0.433***
			(0.107)	(0.163)	(0.107)	(0.165)
Family income in 95			0.0001	-0.011***	0.000	-0.011***
			(0.001)	(0.003)	(0.001)	(0.003)
Omitted group = No major						
Humanities					-0.027	0.130
					(0.218)	(0.284)

	Model 1		Model 2		Model 3	
Base outcome = Stay	**Transfer**	**Leave**	**Transfer**	**Leave**	**Transfer**	**Leave**
Social/Behavioral Sciences					-0.318	-0.477
					(0.229)	(0.328)
Life sciences					0.155	-0.855**
					(0.199)	(0.376)
Physical/mathematical sciences					-0.918**	-1.106
					(0.409)	(0.683)
Computer/engineering sciences					-0.235	-0.625**
					(0.223)	(0.317)
Education					-0.091	-0.209
					(0.205)	(0.386)
Business management					-0.367*	-0.356
					(0.197)	(0.305)
Health					0.145	-0.475
					(0.259)	(0.333)
Vocational/technical/professional					-0.293	-0.505
					(0.219)	(0.367)
GPA in 95-96					-0.683***	-1.110***
					(0.108)	(0.141)
Ever attended part-time 95-96					0.272	0.270
					(0.173)	(0.250)
Tuition and fees 95-96					-0.072***	-0.145***
					(0.023)	(0.038)
Public school					-0.520**	-1.275***
					(0.245)	(0.375)
School size					-0.001	0.000
					(0.001)	(0.001)
Selectivity					-0.258**	-0.241**

	Model 1		Model 2		Model 3	
Base outcome = Stay	**Transfer**	**Leave**	**Transfer**	**Leave**	**Transfer**	**Leave**
					(0.102)	(0.138)
Institutional aid					-0.136	-0.193
					(0.121)	(0.207)
State aid					-0.165	-0.476**
					(0.156)	(0.198)
Observations		3562		3562		3562
Psuedo R^2		0.014		0.062		0.126

Note: *Robust standard errors in parentheses; regressions are weighted and standard errors are adjusted for design effects*
**** p<.01, ** p<.05, * p<.1*

Appendix Gb

Multinomial Regression Results of First Choice Occasion – Stay, Continuously Transfer and Leave (delta-p shown)

	Stay	Continuous Transfer	Leave
Age	-0.018	0.007	0.010*
	(0.016)	(0.016)	(0.006)
Male	-0.004	-0.021	0.007
	(0.019)	(0.017)	(0.010)
Omitted group = White students			
Black	0.022	-0.005	-0.014
	(0.033)	(0.030)	(0.013)
Hispanic	-0.037	0.026	0.003
	(0.034)	(0.031)	(0.019)
Asian	-0.033	0.029	-0.021
	(0.043)	(0.040)	(0.017)
SAT score	-0.002	-0.006	0.007**
	(0.007)	(0.006)	(0.003)
Aspiration	0.050***	-0.040***	-0.019***
	(0.015)	(0.013)	(0.007)
Parents' highest ed. level	0.044**	-0.018	-0.026***
	(0.018)	(0.016)	(0.009)
Family income in 95	0.000**	0.000	0.000**
	(0.000)	(0.000)	(0.000)
Omitted group = No major			
Humanities	-0.002	0.018	-0.004
	(0.035)	(0.033)	(0.014)
Social/behavioral sciences	0.057*	-0.011	-0.031***
	(0.031)	(0.035)	(0.012)
Life sciences	0.002	0.024	-0.026**
	(0.033)	(0.033)	(0.012)
Physical/mathematical Sciences	0.128***	-0.093**	-0.039**
	(0.036)	(0.043)	(0.016)
Computer/engineering sciences	0.051*	-0.027	-0.026**
	(0.031)	(0.033)	(0.012)
Education	0.020	-0.024	-0.016
	(0.032)	(0.029)	(0.017)
Business management	0.059**	-0.047*	-0.022*
	(0.027)	(0.025)	(0.012)
Health	-0.005	0.037	-0.025**
	(0.044)	(0.043)	(0.012)
Vocational/technical/professional	0.055*	-0.042	-0.023*
	(0.030)	(0.030)	(0.013)
GPA in 95-96	0.137***	-0.118***	-0.059***
	(0.017)	(0.017)	(0.007)
Ever attended part-time 95-96	-0.050	0.056*	0.014
	(0.031)	(0.031)	(0.015)

	Stay	Continuous Transfer	Leave
Tuition and fees 95-96	0.016***	-0.011***	-0.008***
	(0.004)	(0.003)	(0.002)
Public school	0.131***	-0.083**	-0.090***
	(0.042)	(0.038)	(0.025)
School size	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)
Selectivity	0.045***	-0.027*	-0.014*
	(0.016)	(0.015)	(0.007)
Institutional aid	0.026	-0.013	-0.010
	(0.019)	(0.019)	(0.011)
State aid	0.039*	-0.034	-0.023**
	(0.023)	(0.022)	(0.009)
Observations	3562	3562	3562
Psuedo R^2	0.014	0.062	0.126

Note: *Robust standard errors in parentheses; regressions are weighted and standard errors are adjusted for design effects*
**** p<.01, ** p<.05, * p<.1*

Appendix Gc

Logistic Regression Results of Second Choice Occasion – Interrupted Transfer vs. Stopout (delta-p shown)

	Interrupted Transfer = 1 vs. Stopout = 0			
	(1)	(2)	(3)	(4)
Age	-0.028	-0.020	-0.022	-0.021
	(0.044)	(0.044)	(0.059)	(0.060)
Male	-0.004	0.004	-0.015	-0.010
	(0.078)	(0.081)	(0.091)	(0.091)
Omitted group = White students				
Black	-0.169	-0.272**	-0.247	-0.239
	(0.124)	(0.124)	(0.151)	(0.150)
Hispanic	-0.008	-0.044	0.028	0.022
	(0.126)	(0.137)	(0.139)	(0.138)
Asian	-0.187	-0.227	-0.161	-0.167
	(0.158)	(0.159)	(0.188)	(0.189)
SAT score		-0.054**	-0.049	-0.044
		(0.021)	(0.041)	(0.041)
Aspiration		-0.013	0.027	0.017
		(0.049)	(0.081)	(0.082)
Parents' highest ed. level		0.093	0.114	0.109
		(0.074)	(0.083)	(0.083)
Family income in 95		0.000	-0.000	-0.000
		(0.001)	(0.001)	(0.001)
GPA in 95-96			0.056	0.029
			(0.206)	(0.209)
Ever attended part-time 95-96			-0.058	-0.043
			(0.110)	(0.113)
Tuition and fees 95-96			0.018	0.016
			(0.028)	(0.028)
Public school			0.108	0.091
			(0.213)	(0.214)
School size			0.000	0.000
			(0.000)	(0.000)
Selectivity			-0.113	-0.121*
			(0.070)	(0.070)
Institutional aid			-0.042	-0.043
			(0.101)	(0.102)
State aid			-0.108	-0.110
			(0.101)	(0.101)
Distance to home			0.022*	0.023*
			(0.013)	(0.013)
Stopout years				-0.032
				(0.047)
Mills	-0.091	-0.065	-0.229	-0.183
	(0.089)	(0.103)	(0.513)	(0.515)
Observations	264	264	243	243

	Interrupted Transfer = 1 vs. Stopout = 0			
	(1)	(2)	(3)	(4)
Psuedo R^2	0.014	0.043	0.069	0.072

Note: *Robust standard errors in parentheses; regressions are weighted and standard errors are adjusted for design effects*

**** p<.01, ** p<.05, * p<.1*

Appendix H

Descriptive Statistics of Variables for Continuous Transfers' Choice of Destination Institutions (2nd research question)

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Types of destination institutions		637			0	1	
Two-year colleges	0	162					25.4
Four-year institutions	1	475					74.6
Age		637	18.4	0.7	17	25	
Gender		637	0.4	0.5	0	1	
Male	1	270					42.4
Female	0	367					57.6
Race		637	1.5	0.9	1	4	
White, non-Hispanic	1	473					74.3
Black, non-Hispanic	2	62					9.7
Hispanic	3	66					10.4
Asian/Pacific Islander	4	36					5.7
SAT		637	906	195	430	1460	
Aspiration		637	4.0	0.8	1	5	
Certificate	1	1					0.2
Associate's degree	2	11					1.7
Bachelor's degree	3	165					25.9
Master's degree	4	309					48.5
Doctoral or first-professional degree	5	151					23.7
Parent highest ed. level		637	2.7	0.5	1	3	
Did not complete high school	1	11					1.7
Completed high school or equivalent	2	170					26.7
Some college or more	3	456					71.6
Family income 96		637	62,900	56,810	1,500	762,000	

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Major declared 96		637	3.6	3.2	0	9	
No major	0	195					30.6
Humanities	1	61					9.6
Social/behavioral sciences	2	42					6.6
Life sciences	3	54					8.5
Physical/mathematical sciences	4	12					1.9
Computer/engineering sciences	5	53					8.3
Education	6	57					9.0
Business management	7	68					10.7
Health	8	53					8.3
Vocational/technical/professional	9	42					6.6
GPA 96		637	2.6	0.8	0.2	4	
Ever part-time 96		637	0.2	0.4	0	1	
Attended part-time	1	98					15.4
Not attended part-time	0	539					84.6
Tuition & fees		637	6,344	5,445	50	27,908	
Public school		637	0.7	0.5	0	1	
Public institutions	1	416					65.3
Private institutions	0	221					34.7
Size 96		637	12,358	10,932	133	51,445	
Selectivity		637	1.6	0.8	1	3	
Least selective	1	406					63.7
Selective	2	107					16.8
Very selective	3	124					19.5
Institutional aid		637	0.4	0.5	0	1	
Received	1	258					40.5
Not received	0	379					59.5
State aid		637	0.3	0.4	0	1	

Variable		Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
	Received	1	161					25.3
	Not received	0	476					74.7

Note: Means are weighted.

Appendix I

Descriptive Statistics of Variables for Interrupted Transfer's Choice of Destination Institutions (2nd research question)

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Types of destination institutions		637			0	1	
Two-year colleges	0	56					44.8
Four-year institutions	1	69					55.2
Age		125	18.4	0.7	17	22	
Gender		125	0.6	0.5	0	1	
Male	1	71					56.8
Female	0	54					43.2
Race		125	1.3	0.8	1	4	
White, non-Hispanic	1	101					80.8
Black, non-Hispanic	2	6					4.8
Hispanic	3	13					10.4
Asian/Pacific Islander	4	5					4.0
SAT		125	883	175	530	1340	
Aspiration		125	3.8	0.9	1	5	
Certificate	1	1					0.8
Associate's degree	2	1					0.8
Bachelor's degree	3	46					36.8
Master's degree	4	51					40.8
Doctoral or first-professional degree	5	26					20.8
Parent highest ed. level		125	2.7	0.5	2	3	
Did not complete high school	1	0					0
Completed high school or equivalent	2	38					30.4
Some college or more	3	87					69.6
Family income 96		125	47,408	54,737	235	700,000	

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Major declared 96		125	301	3.2	0	9	
No major	0	44					35.2
Humanities	1	15					12.0
Social/behavioral sciences	2	10					8.0
Life sciences	3	6					4.8
Physical/mathematical sciences	4	1					0.8
Computer/engineering sciences	5	12					9.6
Education	6	11					8.8
Business management	7	12					9.6
Health	8	6					4.8
Vocational/technical/professional	9	8					6.4
GPA 96		125	2.3	0.9	0.3	4	
Ever part-time 96		125	0.2	0.4	0	1	
Attended part-time	1	21					16.8
Not attended part-time	0	104					83.2
Tuition & fees		125	4,567	4,506	282	20,478	
Public school		125	0.8	0.4	0	1	
Public institutions	1	85					68.0
Private institutions	0	40					32.0
Size 96		125	1,387	1,158	478	51,445	
Selectivity		125	1.4	0.6	1	3	
Least selective	1	80					64.0
Selective	2	26					20.8
Very selective	3	19					15.2
Institutional aid		125	0.3	0.5	0	1	
Received	1	42					33.6
Not received	0	83					66.4
State aid		125	0.1	0.3	0	1	

Variable		Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
	Received	1	23					18.4
	Not received	0	102					81.6
Stopout years			125	1.4	0.8	1	4	

Note: Means are weighted.

Appendix Ja

Types of Destination Institution Among Continuous Transfers Originally Enrolled in Public Institutions

	Public Institutions (416)			
	Least selective	Selective	Very selective	Total
Two-year College	92 (32.7%)	15 (21.4%)	17 (26.2%)	124 (29.8%)
Four-year Institution	189 (67.3%)	55 (78.6)	48 (73.8%)	292 (70.2%)
Total	281	70	65	416

Appendix Jb

Types of Destination Institution Among Continuous Transfers Originally Enrolled in Private Institutions

	Private Institutions (221)			
	Least selective	Selective	Very selective	Total
Two-year College	30 (24%)	3 (8.1%)	5 (8.5%)	38 (17.2%)
Four-year Institution	95 (76%)	34 (92%)	54 (91.5%)	183 (82.8%)
Total	125	37	59	221

Appendix Ka

Types of Destination Institution Among Interrupted Transfers Originally Enrolled in Public Institutions

	Public Institutions (85)			
	Least selective	Selective	Very selective	Total
Two-year College	29 (50.9%)	6 (33.3%)	4 (40%)	39 (45.9%)
Four-year Institution	28 (49.1%)	12 (66.6%)	6 (60%)	46 (54.1%)
Total	57	18	10	85

Appendix Kb

Types of Destination Institution Among Interrupted Transfers Originally Enrolled in Private Institutions

	Private Institutions (40)			
	Least selective	Selective	Very selective	Total
Two-year College	12 (52.2%)	3 (37.5%)	2 (22.2%)	17 (42.5%)
Four-year Institution	11(47.8%)	5 (62.5%)	7 (77.8%)	23 (57.5%)
Total	23	8	9	40

Appendix L

Logistic Regression Results of Destination Institutions Among Continuous Transfers (delta-p shown)

	(1)	(2)	(3)
Age	-0.039	-0.040	-0.021
	(0.029)	(0.035)	(0.024)
Male	-0.112***	-0.126***	-0.078**
	(0.040)	(0.042)	(0.038)
Omitted group = White students			
Black	-0.152*	-0.101	0.028
	(0.086)	(0.094)	(0.059)
Hispanic	-0.289***	-0.257***	-0.249***
	(0.083)	(0.080)	(0.087)
Asian	-0.067	-0.072	0.024
	(0.105)	(0.098)	(0.070)
SAT score		0.034***	0.008
		(0.012)	(0.012)
Aspiration		0.090***	0.087***
		(0.027)	(0.025)
Parents' highest ed. level		0.034	0.022
		(0.039)	(0.035)
Family income in 95		0.000	-0.000
		(0.000)	(0.000)
Omitted group = No major			
Humanities			0.023
			(0.065)
Social/Behavioral Sciences			0.109**
			(0.046)
Life sciences			-0.125
			(0.094)
Physical/mathematical sciences			-0.099
			(0.206)
Computer/engineering sciences			-0.041
			(0.067)
Education			0.009
			(0.067)
Business management			0.090*
			(0.047)
Health			0.066
			(0.055)
Vocational/technical/professional			-0.046
			(0.082)
GPA in 95-96			0.219***

	(1)	(2)	(3)
			(0.028)
Ever attended part-time 95-96			-0.229***
			(0.069)
Tuition and fees 95-96			0.007
			(0.006)
Public school			0.091
			(0.064)
School size			-0.000
			(0.000)
Selectivity			0.077**
			(0.035)
Institutional aid			0.044
			(0.043)
State aid			-0.079
			(0.049)
Observations	637	637	637
R-squared	0.051	0.103	0.323.

Note: *Robust standard errors in parentheses; regressions are weighted and standard errors are adjusted for design effects*

**** p<.01, ** p<.05, * p<.1*

Appendix M

Logistic Regression Results of Destination Institutions Among Interrupted Transfers (delta-p shown)

	(1)	(2)	(3)	(4)
Age	-0.107	-0.075	-0.001	-0.017
	(0.065)	(0.063)	(0.066)	(0.071)
Male	0.087	0.091	0.479***	0.486***
	(0.128)	(0.125)	(0.135)	(0.143)
Omitted group = White students				
Black	-0.385***	-0.359***	-0.380***	-0.398***
	(0.131)	(0.131)	(0.113)	(0.084)
Hispanic	-0.125	-0.236	-0.244	-0.283*
	(0.174)	(0.165)	(0.179)	(0.153)
Asian	-0.169	-0.247	-0.247	-0.201
	(0.224)	(0.172)	(0.196)	(0.201)
SAT score		0.024	-0.128***	-0.121**
		(0.031)	(0.047)	(0.050)
Aspiration		0.120	0.070	0.016
		(0.089)	(0.092)	(0.092)
Parents' highest ed. level		0.051	0.149	0.096
		(0.115)	(0.142)	(0.147)
Family income in 95		0.002	0.001*	0.002*
		(0.002)	(0.001)	(0.001)
Omitted group = No major				
Humanities			0.028	0.002
			(0.246)	(0.237)
Social/behavioral sciences			0.279	0.408**
			(0.209)	(0.202)
Computer/engineering sciences			-0.104	-0.046
			(0.195)	(0.212)
Education			0.289	0.437**
			(0.187)	(0.183)
Business management			0.428**	0.413*
			(0.189)	(0.215)
Vocational/rechnical/professional			0.027	0.036
			(0.277)	(0.269)
GPA in 95-96			0.477***	0.455***
			(0.096)	(0.100)
Ever attended part-time 95-96			-0.283**	-0.171
			(0.130)	(0.165)
Tuition and fees 95-96			0.033	0.035
			(0.022)	(0.023)
Public school			0.318	0.337*

	(1)	(2)	(3)	(4)
			(0.198)	(0.183)
School size			-0.001	-0.001*
			(0.001)	(0.001)
Selectivity			0.439***	0.480***
			(0.140)	(0.145)
Institutional aid			-0.096	-0.097
			(0.223)	(0.215)
State aid			0.016	-0.049
			(0.185)	(0.175)
Stopout years				-0.228**
				(0.099)
Observations	125	125	112	112
R-squared	0.062	0.124	0.419	.0.449

Note: *Robust standard errors in parentheses; regressions are weighted and standard errors are adjusted for design effects*

*** p<.01, ** p<.05, * p<.1*

Appendix N

Descriptive Statistics of Independent Variables (staying students, stopout students, transfers who attend four-year institutions)

Variable	Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Age		2990	18.3	0.7	16	24	
Gender		2990	0.5	0.5	0	1	
Male	1	1334					44.6
Female	0	1656					55.3
Race		2990	1.4	0.8	1	4	
White, non-Hispanic	1	2391					80.0
Black, non-Hispanic	2	199					6.7
Hispanic	3	222					7.4
Asian/Pacific Islander	4	178					6.0
SAT		2990	987	203	430	1550	
Aspiration		2990	4.1	0.7	1	5	
Certificate	1	3					0.1
Associate's degree	2	9					0.3
Bachelor's degree	3	495					16.6
Master's degree	4	1585					53
Doctoral or first-professional degree	5	898					30
Parent highest ed. level		2990	2.8	0.4	1	3	
Did not complete high school	1	42					1.4
Completed high school or equivalent	2	591					19.8
Some college or more	3	2357					78.8
Family income 96		2990	69,252	65,227	100	100,000	
GPA 96		2990	2.9	0.7	0.2	4	
Ever part-time 96		2990	0.1	0.3	0	1	
Attended part-time	1	380					12.7
Not attended part-time	0	2610					87.3
GPA when last enrolled		2990	5.4	1.0	1	7	
Tuition & fees		2990	7,926	6,302	50	34,040	

Variable		Code	Obs	Mean	Std. Dev.	Min	Max	Percent %
Public school			2990	0.6	0.5	0	1	
	Public institutions	1	1771					59.2
	Private institutions	0	1219					40.7
Size 96			2990	13,838	11,424	133	51,445	
Selectivity			2990	1.8	0.9	1	3	
	Least selective	1	1407					47.1
	Selective	2	566					18.9
	Very selective	3	1017					34
Distance to home			2990	292	604	1	6300	

Note: Means are weighted.

Appendix O

The Number of Degree Attainments Within Six Years by Attendance Patterns

	Stay	Stopout	Interrupted Transfer	Continuous Transfer	Total
# Obs	2359	97	77	457	2990
Attained	2153	19	19	272	2463
Not attained	206	78	58	185	527
% of Attainment	91.3	19.6	24.7	59.5	82.4

Appendix P

The Averages by Educational Pathways

	Stay	Stopout	Interrupted Transfer	Continuous Transfer
Age	18.3	18.6	18.4	18.4
Family income 96**	70,590	49,729	60,437	68,474
SAT ***	1003	938	927	925
Aspiration ***	5.1	4.8	4.9	5.0
Parent's highest ed. level **	2.8	2.6	2.7	2.8

Note: Means are weighted. The group differences are tested, *** p<0.01, ** p<0.05, * p<0.1

Appendix Q

The Numbers of Observations by Educational Pathways

	Stay	Stopout	Interrupted Transfer	Continuous Transfer
Male	1059	50	41	184
Female	1300	47	36	273
White	1879	75	65	372
Black	154	7	3	35
Hispanic	178	10	6	28
Asian	148	5	3	22

Appendix R

Results of Heckman's Two-step Test of Degree Attainment Among Students Involved in Different Educational Pathways (Delta-p Shown)

	Degree Attainment			
	(1)	(2)	(3)	(4)
Omitted group = stay				
Stopout	-0.714***	-0.713***	-0.714***	-0.711***
	(0.043)	(0.045)	(0.045)	(0.046)
Interrupted transfer	-0.701***	-0.701***	-0.719***	-0.721***
	(0.053)	(0.053)	(0.053)	(0.056)
Continuous transfer	-0.319***	-0.319***	-0.325***	-0.334***
	(0.033)	(0.034)	(0.035)	(0.037)
Age	-0.025**	-0.023*	-0.024*	-0.019
	(0.012)	(0.013)	(0.013)	(0.013)
Male	-0.051**	-0.053**	-0.026**	-0.040**
	(0.017)	(0.017)	(0.017)	(0.020)
Omitted group = White students				
Black	-0.023	-0.014	0.002	0.001
	(0.042)	(0.042)	(0.039)	(0.04)
Hispanic	-0.111***	-0.091**	-0.073**	-0.082**
	(0.042)	(0.042)	(0.039)	(0.041)
Asian	0.046	0.039	0.021	-0.044
	(0.051)	(0.049)	(0.044)	(0.047)
SAT		0.002	0.001	-0.004
		(0.006)	(0.006)	(0.006)
Aspiration		-0..017	-0.016	-0.025
		(0.013)	(0.013)	(0.017)
Parent's highest ed. level		0.024	0.025	0.023
		(0.021)	(0.019)	(0.020)
Family income in 1995		0.0002	0.0001	0.0001
		(0.0002)	(0.0002)	(0.0001)
GPA in AY 1995-96			0.012	0.077
			(0.022)	(0.062)
Ever attended part-time in AY 1995-96			-0.031	-0.001
			(0.023)	(0.026)
Cumulative GPA in the last term			0.062***	0.059***
			(0.010)	(0.010)
Tuition and fees in AY 1995-96				0.004
				(0.006)
Public school				-0.030
				(0.038)
School size				-0.001*
				(0.0001)

	Degree Attainment			
	(1)	(2)	(3)	(4)
Selectivity				0.006
				(0.021
Distance to home				0.001
				(0.002)
Mills	-0.446***	-0.451***	-0.336***	-0.771***
	(0.062)	(0.074)	(0.106)	(0.374)
Observations	2990	2990	2990	2990
Pseudo R2	0.272	0.275	0.2956	0.3124

Note: *Robust standard errors in parentheses, regressions are weighted, and standard errors are adjusted for design effects*
**** p<.01, ** p<.05, * p<.1*

CURRICULUM VITA
Dai Li

Education

2008 Ph.D., Higher Education
The Pennsylvania State University
2008 M.S., Applied Economics
The Pennsylvania State University
2004 M.A., Center for the Study of Higher Education
The University of Arizona
2001 B.A., English Language and Literature,
The University of International Relations (UIR), Beijing, China

Grants Received

2007 – **ASHE/Lumina Foundation Dissertation Fellowship** ($14,000)
Proposal Title: College Choice and Bachelor's Degree Attainment Among Transfer Students

2007 – **Association of Institutional Research Dissertation Fellowship** ($15,000)
Proposal Title: College Choice and Bachelor's Degree Attainment Among Transfer Students

2006 –**NASFAA's Sponsored Research Grant Program** ($750)
Proposal Title: Educational Outcomes of Undergraduate Student Borrowers in Four-year Institutions

Publications

Li, D. (2008). Educational outcomes of undergraduate student borrowers in four-year institutions: A multilevel analysis. The *Journal of Student Financial Aid*, 37(3).

Li, D. (2006). Book review of policy options for student loans schemes: Lessons from five Asian case studies. *Comparative Education Review*, 50(2), 306-08.

Professional Experience

8/2006 – present Managing Editor of *Comparative Education Review*
The Pennsylvania State University

9/2004 – 5/2006 Research Assistant for Prof. Roger L. Geiger
The Pennsylvania State University

9/2002 – 5/2004 Research Assistant for Prof. Gary Rhoads and Prof. Sheila Slaughter
The University of Arizona