

PROMOTING OR PERTURBING ACCESS: AN EVENT HISTORY ANALYSIS OF THE
EFFECTS OF FINANCIAL AID ON LATINO STUDENTS' EDUCATIONAL ATTAINMENT

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Dedication

To my partner and dearest friend, Melissa Jane, whose constant encouragement, support, and patience helped me renew my energy each day to maintain my pace in this endurance event. Go, baby, go!

Acknowledgments

Though our institutions of higher education confer degrees upon individuals, earning a doctorate is an act of many people: partners, family, friends, mentors, critics, and communities. Without this support, no person would earn the privilege to enter the apprenticeship that begins once the dissertation is defended, formatted, submitted, bound, and shelved. As I embark on this apprenticeship I am grateful to those who have supported me this far and who continue to encourage me as I pursue a career in the academy.

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Abstract of the dissertation

At a time when Latinos make up an increasing proportion of the U.S. school population and increasingly seek entrance to postsecondary education the role of financial aid in postsecondary access remains in flux and uncertain. Though federal, state, and institutional grants have historically helped the lowest income students pay for their educational costs, grants have generally not kept pace with increasing costs (Advisory Committee on Student Financial Assistance, 2001; Ficklen & Stone, 2002). Therefore, education costs have increasingly shifted to students and their families via loans. This shift has a disproportionately negative effect on Latinos (as well as African Americans), who are more likely to come from low- to low-middle income families (Price, 2004). Moreover, recent data suggest that concerns about affordability and access are not the sole domain of low-income families. While the net price (total costs less total grant aid) paid by low-income (<\$40,000) students as a proportion of total income remained constant between 1992-1993 and 2003-2004 for students enrolled at public four-year institutions, students from low-middle income (\$40,000 to \$69,999) families in the same sector paid more as a proportion of total income. Although low-income students still pay a disproportionately high percent of family income for school (particularly when room and board is included), grant aid helps reduce the net price relatively more for them than for low-middle income students (Baum, Brodigan, & Ma, 2007).

It is in this context that this study responds to calls from Carter (2006) and others (Nora, 1990; Nora & Cabrera, 1996; St. John, Paulsen, & Carter, 2005) for more research on the effects

of financial aid on underrepresented students. Specifically this study asks, “To what extent do loans, grants, institutional aid, and work-study affect the educational attainment of Latinos and how do these effects change over time?” In addition, this study seeks to address limitations in cross-sectional approaches to studying financial aid use among underrepresented students by employing event history analysis (EHA), a longitudinal method to ascertain the effects of aid in differing time periods. The goal, therefore, is to not only understand more about *whether* aid promotes or perturbs access for Latinos, but as importantly *when* those effects occur and how they may vary over time.

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Contents

Contents	ix
List of Tables	xi
List of Figures	xii
List of Equations	xiii
Chapter One: The Need for Longitudinal Studies of Financial Aid and Latino's Educational Attainment.....	1
Latinos in Postsecondary Education	6
Indiana: A Newcomer State	9
Persistence as a Temporal Process.....	10
Purpose of the Study	12
Chapter Overview	13
Chapter Two: Review of the Literature	15
Student Retention Theories	15
Student Integration Models.....	15
Student Attrition Models.....	16
Critiquing and Revising Integration Models.....	16
Student Adjustment and College Impact	18
Empirical Components of the Retention Models.....	19
Financial Aid.....	20
Student Background/Characteristics	26
Academic Preparation	31
College Experiences.....	32
Chapter Three: Methodology	37
Persistence as a Temporal Process.....	39
Data Sources	42
Sample Selection Criteria	43
Models.....	43
Chapter Four: Findings	50
Descriptive Findings	50
Student Characteristics at Origin	50
Patterns of Aid Receipt Over Time.....	52
Distributions of Aid by Type Over Time.....	56
Descriptive Findings for Timing to First Departure	59
Inferential Findings for Timing to First Departure	60

Main effects of time and proportional hazards model	60
Effects of Differentiated Aid on Likelihood of First Departure	61
Findings From Non-proportional Hazards Model	62
Effects of Student Background, Academic Preparation, and College Enrollment on Likelihood of First Departure	63
Consideration of Competing Events	65
Effects of Aid Packaging on Academic Success and Momentum	69
Descriptive Findings for Credits Attempted, Aid Packages, and Academic Performance...	69
Inferential Findings	70
Conclusions	76
Chapter Five: Conclusions	79
Major Findings	80
The effects of Grants and Loans	80
Applying for Aid	82
Sensitivity to Sticker Prices	84
Contexts Matter	85
Implications	89
Research	89
Policy	94
The Road Ahead	96
References	97
Curriculum Vita	110

List of Tables

Table 1. United States Per Capita Income by Race/Ethnicity, 2006	20
Table 2. Variables Included in the Discrete-time Event History Models by Conceptual Blocks.	44
Table 3. Variables Included in Academic Momentum and Academic Success Models	47
Table 4. Selected Student Characteristics, Year of First Entry.....	51
Table 5. Prevalence of First Departure	59
Table 6. Selected Regression Results from Proportional Hazards Model Showing Effects of Differentiated Aid on Likelihood of First Departure.....	62
Table 7. Partial Regression Results, Proportional Hazards Model, Likelihood of Departure for Full- and Part-time Students	65
Table 8. Partial Regression Results, Competing Risks Model Testing Joint Probability of Departure and Completing a Postsecondary Credential	67
Table 9. Average Credits, Aid Package, Cost, and GPA by Institution Type	69
Table 10. Regression Results for Effects of Aid Packaging on Credits Attempted	74

List of Figures

Figure 1. The postsecondary enrollment gap between Latino, African American, and White high school completers, ages 18-24 from 1972-2006	7
Figure 2. The postsecondary enrollment gap between Latinos, African Americans, and Whites, ages 18-24 from 1972-2006	8
Figure 3. Receipt of Aid by Type, First Year of Entry	53
Figure 4. Receipt of Aid by Type over Time.....	54
Figure 5. Average Amount of Federal Grant Aid Received Over Time by Institution Type	55
Figure 6. Average Credits Attempted By Years of Enrollment, 1999-2005	56
Figure 7. Distribution of Federal Grants by Type, Over Time, Among Aid Recipients	57
Figure 8. Distribution of State Grants by Type, Over Time, Among Aid Recipients	58
Figure 9. Distribution of Loans by Type, Over Time, Among Aid Recipients	58
Figure 10. Fitted Hazard Profiles for Main Effects of Time & Proportional Models	61

List of Equations

Equation 1. General Form of Discrete-Time Survival Model	44
Equation 2. Educational attainment models with continuous outcomes.....	47

Chapter One: The Need for Longitudinal Studies of Financial Aid and Latino's Educational Attainment

At a time when Latinos¹ make up a growing proportion of the U.S. school population and increasingly seek entrance to postsecondary education, the role of financial aid in postsecondary access remains in flux and uncertain. Though federal, state, and institutional grants have historically helped the lowest income students pay for their educational costs, grants have generally not kept pace with increasing costs (Advisory Committee on Student Financial Assistance, 2001; Ficklen & Stone, 2002). Therefore, education costs have increasingly shifted to students and their families via loans. This shift has a disproportionately negative effect on Latinos (as well as African Americans), who are more likely to come from low- to low-middle income families (Price, 2004). Moreover, recent data suggest that concerns about affordability and access are not the sole domain of low-income families. While the net price (total costs less total grant aid) paid by low-income (<\$40,000) students as a proportion of total income remained constant between 1992-1993 and 2003-2004 for students enrolled at public four-year institutions, students from low-middle income (\$40,000 to \$69,999) families in the same sector paid more as a proportion of total income. Although low-income students still pay a disproportionately high percent of family income for school (particularly when room and board is included), grant aid helps reduce the net price relatively more for them than for low-middle income students (Baum, et al., 2007).

In addition, increased reliance on criteria other than financial need in awarding aid potentially further threatens affordability. The most recent indication of a policy shift toward

¹ For simplicity throughout, I use the term *Latinos* generally to refer to both men and women. When differences by gender are observed, I differentiate explicitly between men (Latinos) and women (Latinas).

using merit criteria in awarding aid is the federal government's National Science and Mathematics Access to Retain Talent Grant, known as the National SMART Grant. Also illustrative of this shift is Georgia's Helping Outstanding Pupils Educationally (HOPE), which began in the 1990s and served as a model for other states. Findings from research on the initial years of HOPE's implementation (e.g., Dynarski, 2002) raise questions about the implications of such programs for socioeconomic equity in access to higher education. Along with other programs, HOPE initially contributed to the redistribution of financial aid resources from underrepresented, lower-income students to white, middle-class students. While more research is needed on new programs such as National SMART Grants—as well as on changes to existing programs such as HOPE—it appears that Latinos are competing for a shrinking pool of aid awarded by criteria favoring historically privileged groups (i.e., high-income, White).

The cumulative effect of these changes is the erosion of postsecondary financial access for those with limited financial resources. The Advisory Committee on Student Financial Assistance estimates that during the first decade of this century 4.4 million college-qualified low- and moderate-income high school graduates will be unable to attend a four-year college and 2 million will attend no college whatsoever—because of insufficient financial resources. Moreover, low- and moderate-income students who do attend college struggle each year to meet the cost of attendance (Ficklen & Stone, 2002). Although certainly not all Latino students come from low- or moderate-income families, their numbers are disproportionately high. Latinos over the age of 25 have the lowest per-capita income of any racial or ethnic group in the United States (*American Community Survey*, 2007),

Concurrently, profound demographic changes underway in the United States ensure that postsecondary institutions throughout the country will be increasingly called to respond to more

and more Latino students knocking at their doors. The rapid growth of the Latino population in the United States since the 1970s has been called ‘the great demographic change of our era’ (Suro, 2006). Much of this change has been fueled by immigration. During the unprecedented expansion of the United States economy following the 1991 recession, the number of immigrants from all countries to the United States averaged about 1.1 million per year, peaking in 1999 and 2000 with somewhere between 1.5 and 1.8 million immigrants then declining in 2001 after considerable slowing of economic growth. During this period, Mexicans accounted for about one-third of the total number of immigrants –around 400,000 each year--with the majority arriving in the United States outside legal channels.

Important shifts have occurred in the settlement patterns of immigrants. Traditional settlement states include California, Florida, Illinois, New Jersey, New Mexico, New York, and Texas. However, so-called ‘new growth’ states, located primarily in the South and the Midwest, were designated as such because the growth of the foreign-born populations exceeded growth in the largest traditional settlement state of Texas during the immigration wave of the 1990s. New growth states received about 19 percent of the immigrants each year from the period between 1992 and 1999 and as much as 23 percent during the peak between 1999 and 2000. In total, new growth states received 25 percent of all new immigrants from Latin America (Passel & Suro, 2005). New settlement states, including Arizona, Nevada, Georgia, North Carolina, Oregon, Virginia, Washington, and Massachusetts each received more than 200,000 Latino immigrants between 1980 and 2000, more than tripling their Latino populations (Suro & Tafoya, 2004). Though Indiana received fewer than 200,000 immigrants during this period, it is considered to be among the newcomer states.

Included in these demographic changes are important changes in the educational profiles of Latino immigrants. Latino immigrants are more likely now than in the past to have completed primary and secondary school. Moreover, increasing numbers of immigrants are educating their children in the US schools. In addition, second-generation Latinos are attending school in greater numbers than in past years. All of these factors combine to close the education gap at the primary and secondary levels between Latino immigrants and the native population (Lowell & Suro, 2002). It is important to also keep in mind differences in the characteristics of immigrants from the diverse countries throughout Latin America and the Caribbean. For example, the educational, economic, and employment profiles of immigrants from Cuba are more similar to native-born White U.S. citizens than they are to immigrants from Mexico (Kochhar, 2005; Suro & Passel, 2003). In addition, immigrants from South America and Cuba are more likely to traverse legally authorized channels when coming to the U.S.

The growth in the Latino population, fueled by the immigration boom and higher fertility rates among immigrants compared to the native population, also combine to ensure that Latinos, who now represent 25% of the elementary school population, will constitute a larger share of the public school population. The rise of these second-generation Latinos sets the stage for the profound demographic changes that the educational systems in the United States will increasingly need to address in the early decades of the 21st century. During the first 20 years of the 21st century, the number of second-generation Latinos in U.S. public schools is expected to double and second-generation Latinos will account for nearly 25 percent of labor force growth. About one in seven children enrolling in U.S. schools up to 2020 will be a second-generation Latino. Overall, the Latino population is expected to grow by 25 million people by 2020, with second-generation Latinos accounting for 47 percent of that growth. These children will be the

products of U.S. schools, will be largely bilingual, and will achieve higher levels of education, including more students pursuing postsecondary education, than their first-generation parents. By 2050, it is projected that third-generation plus Latinos will again comprise the majority of the U.S. Latino population (Suro & Passel, 2003) and will be a major demographic presence throughout the country.

The convergence of these demographic and financial trends suggests that Latinos may be increasingly marginalized with respect to access to postsecondary education and subsequently be denied economic opportunity and opportunities for full democratic participation—despite being the ascendant majority. The trajectory of financial aid programs described above along with the growth in new nativism sets the stage for an intensification of educational apartheid unseen in the United States since the days of *de jure* segregation. Indeed, recent research that looks at the demographic and socioeconomic make-up of our schools suggests this may already be happening (Fry, 2005a, 2006, 2007).

The educational marginalization of Latinos should be a matter of great concern across the ideological spectrum. From a utilitarian perspective a cost-benefit analysis of the potential losses to economic competitiveness yields an unfavorable ratio. Those who increasingly form the foundation of the U.S. economy—and those who will play a central role in replacing baby boomers in the workforce—are now least likely to be formally educated. This threatens the U.S. supply of human capital, historically our competitive advantage, a vital resource in an economy relying more and more on knowledge workers. From a social equity perspective, should current trends in the education of Latinos continue, progress made in the U.S. prior to and especially as part of the civil rights movement toward altering the nation's landscape of racial apartheid and

caste systems will continue to erode, leaving a nation still more deeply divided racially, socially, and economically.

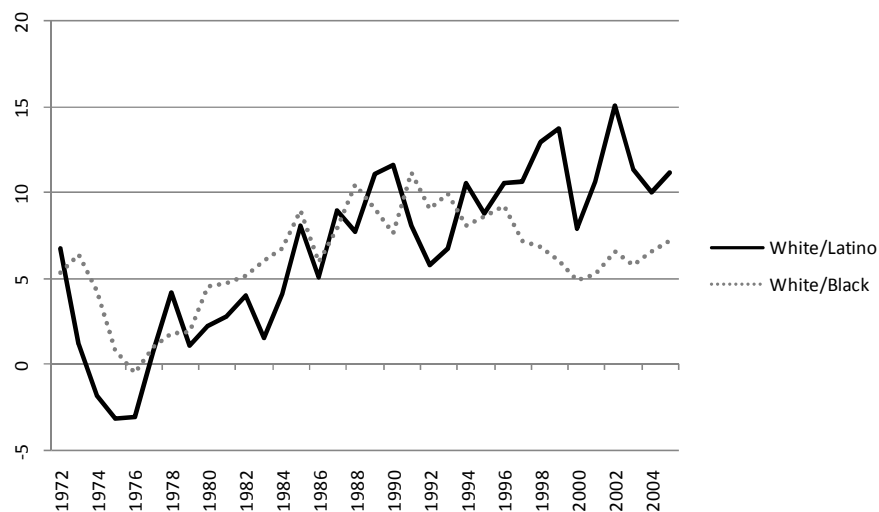
It is in this context that this study responds to calls from Carter (2006) and others (Nora, 1990; Nora & Cabrera, 1996; St. John, et al., 2005) for more research on the effects of financial aid on underrepresented students. Specifically, this study asks, “To what extent do differentiated forms of aid—loans, grants, institutional aid, and work-study—affect the educational attainment of Latinos and how do these effects change over time?” This study seeks to address limitations in common approaches to studying financial aid use among underrepresented students by employing event history analysis (EHA). The goal is to not only understand more about *whether* aid (or the lack thereof) promotes or perturbs access for Latinos, but as importantly *when* those effects occur and how they vary over time. Knowing more about the relationships between timing of aid and academic success among Latinos has practical implications for policy makers and campus financial aid practitioners who—empowered with knowledge about when aid is most effective—might be able to more effectively distribute scarce resources to students. For postsecondary education scholars this project seeks to expand the literature on financial aid by more closely studying how financial aid works for one segment (albeit a very heterogeneous one) of the student population. Moreover, this study will add to the growing body of work that conceptualizes and studies persistence as a temporal process via EHA methodological approaches.

Latinos in Postsecondary Education

Despite the fact that more Latinos are graduating from high school prepared for college, the college completion gap between Latinos and the native population continues to widen. This gap (perhaps better described as a *gulf*) at the postsecondary levels represents what Suro and Fry

call “the greatest disparity in educational outcomes between the nation’s largest minority group and the White majority,” (2005, p. 174). Though there has never been complete equity between Whites and Latinos with respect to college-going, greater parity did exist in past periods. For example, if we compare the proportion of Latinos, Whites, and Blacks who complete high school and then enroll in college we find relative equity existed during the mid-1970s (see Figure 1). Though since that time the gap in college enrollment among completers has increased, particularly so between Latinos and Whites.

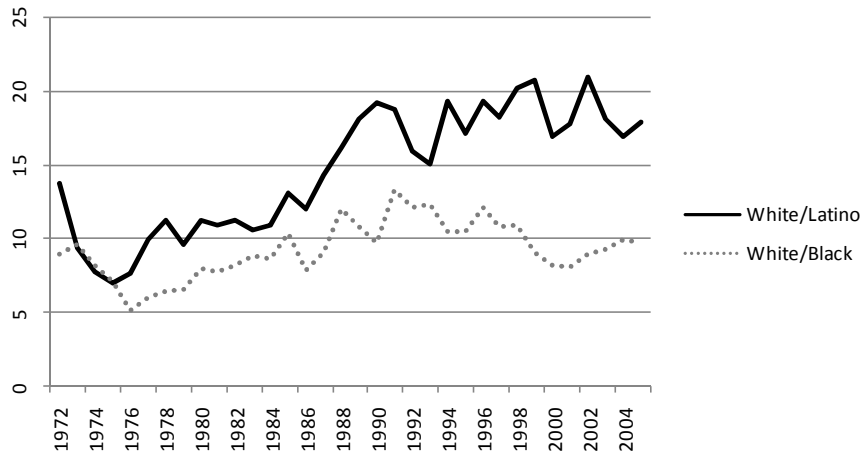
Figure 1. The postsecondary enrollment gap between Latino, African American, and White high school completers, ages 18-24 from 1972-2006



‘White/Latino’ and ‘White/Black’ denote differences between racial/ethnic groups in postsecondary enrollment. From National Center for Education Statistics, Digest of Education Statistics, Table 189, Author’s calculations

Though it is informative to note that greater equity in college-going once existed among Latinos and Whites who completed high school, this portrait overlooks the disparities in education outcomes at the high school level as well as differences in college-going patterns between the two groups. When we compare college-going between Latinos and Whites as a proportion of all 18-24 year olds, we find that parity has never existed in college access (see Figure 2). Moreover, though there have been brief periods of decline, overall the postsecondary enrollment gap has been growing since the mid-1980s.

Figure 2. The postsecondary enrollment gap between Latinos, African Americans, and Whites, ages 18-24 from 1972-2006



'White/Latino' and 'White/Black' denote differences between racial/ethnic groups in postsecondary enrollment. From National Center for Education Statistics, Digest of Education Statistics, Table 189, Author's calculations

However, the disparity in college completion rates between Latinos and Whites is stark. In the 1988 NELS cohort, Latinos were half as likely as their White peers to leave postsecondary education with a degree or certificate (Suro & Fry, 2005). Though even the most competitive, elite, and well-funded postsecondary institutions fail to graduate Latinos in equal proportions to White students (Fry, 2004), the attainment gap is particularly pronounced at two-year institutions where the majority of Latinos enroll. As Suro and Fry (2005) point out, the completion gap is a result of many factors, including academic preparation in high school and characteristics of the Latino population in the United States. However, part of the gap can also be explained by characteristics and climates of the institutions in which Latinos enroll.

The majority of Latinos enrolled in higher education attend two-year colleges in one of the traditional settlement states. Nearly 80 percent of all Latinos enrolled in higher education are enrolled in one of the traditional settlement states. Moreover, within these states nearly 40 percent of Latinos are enrolled in *Hispanic Serving Institutions* (HSIs). Unlike Historically Black College and Universities and Tribal Colleges, HSIs are defined not by their missions, but by the

characteristics of the student body. The majority of HSIs are located in traditional settlement states and most of the institutions are open-access community colleges. Some research (Santiago, 2007) suggests that open-access community colleges (e.g., those that are often designated as HSIs) are attractive to Latino students for a variety of reasons, most notably their proximity to Latino communities, their affordability, and flexibility in schedules. These characteristics, especially proximity to family, may be particularly attractive to Latino students and help explain some of the differences in enrollment patterns between Latinos and Whites from similar economic backgrounds. Low-income White students attend community colleges at lower rates than their low-income Latinos peers. Regardless of the many reasons for attending a two-year institution, Latinos who begin in a community college are much less likely to earn any kind of degree (Suro & Fry, 2005).

Indiana: A Newcomer State

Though not a traditional settlement state, Indiana provides an important context for understanding the postsecondary pathways of Latinos students. Indiana is among those states that have seen the greatest growth in its Latinos population over the past 15 years. Moreover, most population growth in the state over the past few years is attributable chiefly to the growth in Latinos. Although Indiana has fewer Latinos than other states (just over 273,000) the rates of growth in the state have been higher than those of any of its Midwestern neighbors except Illinois. Like new settlement states in the South, most of this growth has been fueled by Mexicans and Mexican-Americans (Fry, 2005b). Much of this increase has been concentrated in northwestern Indiana, near Chicago, and in Indianapolis. Between 2000 and 2004, Indianapolis had the fifth-highest Latino growth rate of any metropolitan area in the country (Clark & Heet, 2006). Furthermore, the growth rate in Indiana among school-age Latino children has outpaced

that of Whites. However, there are considerable gaps in educational outcomes between Whites and Latinos. For example, nearly half of all Mexicans in Indiana did not complete high school. All other racial and ethnic groups in Indiana were nearly twice as likely to have completed a postsecondary degree as Mexicans. Clark and Heet assert, “The single most important policy issue confronting Indiana vis-à-vis the growing Mexican population is in the realm of education. Mexican educational attainment suffers woefully compared to non-Mexican attainment,” (2006, p. 33).

As more and more Latino children enter the educational systems throughout Indiana and given the existing gap in education outcomes, it is increasingly important to understand how public policy affects educational opportunity. By 2020, it is projected that Latino students will comprise 22 percent of the total U.S. undergraduate population and eight percent of the Indiana undergraduate population (Santiago & Cunningham, 2005).

Persistence as a Temporal Process

The temporal, longitudinal nature of persistence is implicitly recognized in the literature on educational attainment (e.g., Bean, 1980; Braxton & Lien, 2000; Pascarella & Terenzini, 1980; St. John, 1992; St. John, Paulsen, & Starkey, 1996; Tinto, 1975, 1982, 1988). yet most researchers of persistence continue using a cross-sectional analytic approach and relatively few persistence studies employ methods that incorporate temporal aspects into their conceptual and analytic models(DesJardins, McCall, Ahlburg, & Moye, 2002). Cross-sectional models of longitudinal processes artificially constrict variables—such as financial aid—that change over time. St. John, Cabrera, Nora, and Asker (St. John, Cabrera, Nora, & Asker, 2000) draw attention to the time varying nature of explanatory factors of student persistence, noting that “...changes over time in financial-aid packages can influence students’ academic and social integration

processes, as well as their subsequent persistence decisions,” (p. 41). To address this shortcoming education scholars have begun applying event history analysis techniques developed in other fields to the study of persistence (DesJardins, Ahlburg, & McCall, 1994, 2002; DesJardins, Kim, & Rzonca, 2003; DesJardins, McCall, et al., 2002; Doyle, 2006). Event history analysis (EHA), in its most basic form, is the longitudinal analysis of individuals’ or organizations’ experiences of events of interest over time (Allison, 1984). EHA explicitly incorporates the temporal dimension in estimating coefficients and the overall fit of the model, while allowing for variation from time period to time period in explanatory variables.

Blosfeld and Rohwer (2002) argue that event history analysis of social processes addresses a number of shortcomings with cross-sectional approaches, namely that EHA (a) does not assume statistical equilibrium across time with regard to the probabilities of moving from one state to another, (b) it allows consideration of the ways in which explanatory variables affect inflows and outflows of a given state, (c) it enables researchers to better understand directionality of causal relationships, (d) it permits modeling of processes of change, and, finally (e) EHA does not restrict as time-constant explanatory variables that in fact change over time. Cross-sectional methods of studying the effects of finances on persistence assume that the likelihood of persistence remains constant across time (i.e., statistical equilibrium); that grants have the same effect on keeping students continuously enrolled as they do on encouraging a student who has stopped out to re-enroll (i.e., inflow and outflow of a given state); or that changes in costs and aid from year to year do not weigh into student’s decisions/ability to persist (i.e., time-varying covariates), as a few examples. Event history modeling, then, offers significant conceptual and analytic improvements over commonly used approaches in the field which tend to overlook time as a component of educational attainment.

Purpose of the Study

In the context of major demographic changes, a widening gap in postsecondary completion, and shifts in educational financing this study seeks to understand the effects of financial aid on Latino students' academic success. The central research questions are:

1. To what extent do institutional, state, and federal grants affect timing to departure, and how do these effects change over time?
2. To what extent do need- and non-need-based loans affect timing to departure and how do these effects change over time?
3. To what extent does participation in state and federal work-study affect timing to departure and how do these effects change over time?
4. To what extent does receipt of aid affect timing to first departure and how do these effects change over time?
5. To what extent does net price affect timing to departure and how do these effects change over time?

In addition, two exploratory research questions are considered to help better understand the mechanisms through which aid affects educational attainment.

1. To what extent does the composition of aid package (i.e., loans and grants) affect academic performance as measured by college grade point average?
2. To what extent does the composition of aid package (i.e., loans and grants) affect academic momentum as measured by credits attempted in each semester?

The research presented in this paper applies event history analysis to student-level data to explore the longitudinal effects of financial aid on the academic success of Latino students who

enrolled in public postsecondary education between 1999-2000 and 2005-2006 (seven academic years in all) in a new settlement state—Indiana. Prior research has demonstrated that financial aid is a necessary, but not sufficient, element of student academic success, particularly for underrepresented students. Though financial aid alone may not remove barriers to success for students from low-income families (Stinebrickner & Stinebrickner, 2003), studies have shown that it can have an equalizing effect across racial and ethnic groups (Nora, 1990; St. John, et al., 2005) by removing financial constraints to access, encouraging preparation, and enabling students to focus more fully on academic concerns—although the effects of aid likely vary among different underrepresented racial groups (Heller, 1997). Moreover, as St. John, Paulsen, Starkey (1996) and others (Cabrera, Nora, & Castaneda, 1993; Nora, 1990) suggest, financial aid affects the actions of individual students directly (e.g., making school attendance possible for low-income students) and indirectly (e.g., freeing students from worries about tuition bills so they can focus on academics).

Chapter Overview

Though a growing body of research looks at financial aid and college success, relatively little work has been done that looks specifically at the effects of aid on underrepresented students (Dowd, 2006). Even less work has been done that models the longitudinal effects of aid (DesJardins, Ahlburg, & McCall, 1999). Chapter two reviews the existing literature on financial aid, college going, and underrepresented students in order to lay the conceptual foundations for the empirical work. Chapter three builds the argument for longitudinal analysis of data and describes the methods to be used in this study—principally event history analysis. Findings from the event history analysis are presented in chapter four.

To explore the underlying processes that contribute to a student remaining enrolled in college, components of academic success—such as academic momentum (Adelman, 1999, 2006) and academic achievement (defined here as cumulative grade point average)—are considered as well. Conceptually, momentum and achievement are included in the event history models as explanatory variables, but it is important to recognize the potentially recursive relationships between financial aid, academic momentum, academic achievement, and student persistence. Therefore, momentum and achievement are also modeled as outcome variables using ordinary least-squares regression analysis. Findings from these models are presented at the end of chapter four. The final chapter focuses on the implications of the findings for education policy-making and extends the discussion by considering implications for future research.

Chapter Two: Review of the Literature

The study of student retention has been dominated by *Student Integration Model* (2005). Spady's conceptual (1970) and empirical (1971) work paved the way for Tinto's subsequent revisions (1975, 1982, 1988, 1993) which focused on the mechanisms by which students integrate into the social and academic spheres of the institution. These revisions included more explicit consideration of the role of students' educational aspirations and goals as well as the importance of institutional contexts in modifying academic and social integration. Spady and then Tinto based their work about student persistence on Durkheim's empirical study in which he analyzed the relationships between suicide rates and social structures. Though a variety of theoretical approaches and frameworks—for example, Attinasi's (1989) use of ethnomethodology and symbolic interactionism, Tierney's (1992) use of critical theory, or Torres' (2006) use of social cognitive theory—have been utilized in studying persistence in postsecondary education, I devote more attention in the following discussion to the integration model, particularly two of its close derivatives: The student adjustment and the college-impact model. These models provide the conceptual foundations for this study.

Student Retention Theories

Student Integration Models

The student integration model focuses on the ways in which family background, pre-college schooling, and individual attributes contribute to students' initial institutional and goal commitments. In turn, these commitments act upon the students' experiences in the social and academic systems of the institution, specifically grade performance, intellectual development, peer group interactions, and faculty interaction, which subsequently act on social and academic integration. In turn, academic and social integration impact institutional and goal commitment,

leading ultimately to a student's decision to remain at or depart from the institution. Higher levels of integration in the social or academic sphere are hypothesized to be positively related to institutional or goal commitment, thereby decreasing the likelihood of student departure. The focus of the student integration model is the ways in which student characteristics interact with the institution toward persistence or voluntary withdrawal.

Student Attrition Models

Bean's work critiqued the Spady-Tinto model for its minimal inclusion of the influence of environmental factors and the de-emphasis of student behavior and choice. Moreover, he argued that existing methodological approaches made it difficult to determine the causal relationships in prior work. Using path analytic techniques, Bean (1980) found that surrogate measures for pay (grades, institutional quality, development, and practical value) were significantly related to intent to leave for both sexes and that the theories developed to explain turnover in work organizations were useful for studies of student attrition. In sum, Bean's work emphasized that behaviors are shaped by attitudes and beliefs and therefore students' intentions to persist, which are shaped by institutional (or organizational) factors as well as factors external to the institution (environmental factors), are important predictors of actual persistence. Subsequent work extended our understandings of the role of students' intentions to persist (Bean, 1982), interactions among important variables, including external environments (Bean, 1985), and the relative importance of social and academic integration when extending persistence research beyond traditional students (Bean & Metzner, 1985).

Critiquing and Revising Integration Models

Tinto (1982) was among the first to outline the limitations of the student integration model of departure, noting that it does not account for the role of finances in student departure, it

does not differentiate between permanent withdrawal from higher education and transfer among institutions, and that it does not account for difference in transfer behaviors among groups, particularly racial/ethnic groups and men and women, as a few examples. Others (Baird, 2000; Guiffrida, 2006; Hurtado, 1992, 2002; Hurtado & Carter, 1997; Kuh & Love, 2000; Nora & Cabrera, 1996) have extended our understandings of the ways in which student characteristics interact with institutional contexts and cultures through focusing on the contributions of campus climate to persistence. Research on the effects of campus climate and the role of campus culture have highlighted potential differences in factors affecting student persistence along racial/ethnic and class lines (Nora & Cabrera, 1996; Tierney, 1992). In addition, a growing body of evidence suggests that factors such as mentoring (Torres, 2006), faculty interaction (Anaya & Cole, 2001), familial support (Hernandez, 2000) and financial aid (Paulsen & St. John, 2002; St. John, et al., 2005; St. John, et al., 1996; Stinebrickner & Stinebrickner, 2003; Titus, 2006), as a few examples, contribute to student persistence in college differently for underrepresented students than for White, higher-income students. Rendon and colleagues (2000) have offered a particularly poignant critique of integration models of student persistence for its assumptions of assimilations, its focus on failure, its exclusion of historical and social factors, its failure to consider systemic barriers to success, and a failure to challenge dominant paradigms and assumptions.

More recently, Braxton and others have undertaken a systematic evaluation of the validity of the integration model. Braxton et al (2000; 1997) found modest empirical support for the concept of academic integration, noting that, contrary to the way it was originally operationalized by Tinto, the strongest evidence for the validity of academic integration comes from multi-institutional (rather than single institution) studies. These shortcomings of integration

models of persistence are not surprising, especially given the limitations set out by Tinto (1982) in the explication of his model and the early testing of the model on traditional, predominantly White students (e.g., Pascarella & Terenzini, 1979, 1980). Moreover, as Giddens (1971) points out, Durkheim was not concerned with individual explanations of behavior in his study of suicide. Rather his typology of suicide was based in a functionalist approach concerned primarily with understanding *social facts* evident from observing social structures. Therefore, it is appropriate and necessary that scholars revise and refine the model as one tool among many in helping to better understand what factors contribute to persistence.

Nonetheless, the student integration model serves as one reasonable foundation from which to build and test empirical models given the empirical support found for its primary concepts (Braxton & Lien, 2000; Pascarella & Terenzini, 1979), even among underrepresented students (Nora & Cabrera, 1996). What remains vital, however, is critical evaluation of the partial nature of findings from such models, particularly when employed in understanding the persistence of the incredibly diverse population of students— *Latinos*.

Student Adjustment and College Impact

This turn toward more explicit consideration of contexts, evident in much of the more recent scholarship on persistence (e.g., St. John, et al., 2005; St. John, et al., 1996; Titus, 2006; Torres, 2006), is in part a response to previously unacknowledged shortcomings with integration and attrition models, particularly as they were applied to understanding the experiences of underrepresented students. A thread of persistence research has developed seeking to integrate, synthesize, and extend retention theory.

Building on prior work that looked at the effects of environmental factors on persistence (Cabrera, Stammen, & Hansen, 1990) Cabrera and colleagues (1992; 1993) developed and tested

an integrated model that incorporates elements from both the integration and attrition models. Nora and Cabrera (1996) further developed this *Student Adjustment Model* in testing the effects of prejudice and discrimination on the adjustment of underrepresented students. The Student Adjustment Model conceptualizes colleges as having academic and social domains in which students' experiences can negatively or positively affect their cognitive and affective development, which in turn affects academic and intellectual development, commitment to degree attainment, and institutional commitment. In this model the academic and social domains are seen as interdependent, with students' experiences in one sphere reinforcing experiences in the other. Compared to earlier retention theory, the adjustment model incorporates greater consideration of student contexts as a major factor in persistence.

Extending the theoretical foundations for discerning the role of contexts on persistence, Berger and colleagues (2000; 1998) investigate the ways in which organizational attributes interact with student characteristics to affect retention. The college impact model (Berger & Milem, 2000) focuses on student peer culture and institutional structural-demographic characteristics—such as selectivity and institution type—as they interact with student behaviors, characteristics, and ultimately educational outcomes. Titus (2006) extends this model to include institutional resources, including revenue and expenditure patterns.

Empirical Components of the Retention Models

As Braxton and colleagues note (2000; 1997), one of the difficulties with assessing and applying variants of the integration model is that the concepts are operationalized in different ways and with varying definitions of persistence (e.g., graduation, year-to-year, or within-year). Moreover, a variety of datasets (i.e., institutional, state, and national) have been used to test the many flavors of the empirical models. Although it is worth noting that application of the models to

traditional four-year, predominantly White, residential institutions has been remarkably consistent with some exceptions (Arbona & Nora, 2007; Nora & Cabrera, 1996; Nora & Rendon, 1990; Somers, 1995; Torres, 2006). Nonetheless, there is considerable overlap in the variables used to operationalize constructs such as academic and social integration or academic performance. Though findings for some variables have been conflicting—likely due in part to variations in methods, datasets, and definitions of persistence—there are also points of agreement. These contradictions and commonalities, discussed in detail next, serve as a foundation for constructing the empirical models used in this study. I begin by considering extant research on financial aid.

Financial Aid

Adequate financing is a necessary but not sufficient condition to attend and complete postsecondary education. Carter (2006) and others (Nora, 1990; Nora & Cabrera, 1996; St. John, et al., 2005) note the particular importance of studying the relationships between financial aid, and educational attainment for underrepresented students, along with other factors such as educational preparation, mentoring, and college support networks. This is not surprising given the complex and nonlinear ways in which race/ethnicity, income, and education are intertwined and interact in U.S. society (See Table 1).

Table 1. United States Per Capita Income by Race/Ethnicity, 2006

Race/Ethnicity	Per capita income	Bachelor's degree holders
Whites (not Latino or Hispanic)	\$29,406 (+/-50)	19%
African American	\$16,559 (+/-74)	11%
Latino	\$14,736 (+/-71)	8%
Asian American	\$27,884 (+/-188)	30%
American Indian or Alaskan Native	\$15,736 (+/-295)	8%

Note. Per capita income based on the previous 12 months and is calculated in 2006 inflation-adjusted dollars. Proportion of bachelor's degree holders is calculated for men and women over age 25. From American Community Survey, 2006, U.S. Census Bureau, Custom Tables, Author's Calculations.

Highlighting the interaction between income and attainment, the Advisory Committee on Student Financial Assistance estimates, for example, that during the first decade of the Twenty-First century among college-qualified low- and moderate-income high school graduates, 4.4 million will be unable to attend a four-year college and 2 million will attend no college whatsoever. Moreover, those low- and moderate-income students who do attend college may struggle each year to meet the cost of attendance (Ficklen & Stone, 2002). Though certainly not all underrepresented students come from low- or moderate-income families, they are disproportionately represented. Moreover, it is reasonable to believe that in addition to having different pecuniary effects, the psycho-social effects of financial aid also likely differ by race and ethnicity. However, Dowd (Dowd, 2006) notes that only recently have researchers begun to estimate effects of aid using interaction terms or as separate groups for different income groups and race/ethnicities.

In addition to relatively little research existing on the particular effects of financial aid on the attainment of racial and ethnic minorities, the extant empirical record—which tends to aggregate all students or at best may include race and ethnicity as a dummy variable—is mixed with regard to the overall effects of financial aid. Alon (2005) and others (Dowd, 2006; Singell & Stater, 2006) have suggested that methodological problems, specifically the lack of controls for student self-selection, may in part be the cause of conflicting findings about financial aid. In addition, a variety of methodological approaches (e.g., structural equation modeling, logistic regression, ordinary least squares regression, event history analysis) and data sets (e.g., institutional, state, and national) have been employed in understanding varied definitions of persistence (e.g., within-year, year-to-year, continuous, degree attainment, eight-year). Nonetheless, the research suggests that (a) grants have a positive effect on persistence, more so

than loans, though they interact and are moderated by other important variables, such as academic performance; (b) loans may enable students to persist who would have been otherwise unable, though they may be more effective for White than other students and a number of studies have found negative effects of borrowing; (c) work-study is perhaps among the most unambiguously positive forms of financial aid with respect to persistence; and (d) relatively little is known about institutional scholarships, with the generally positive observed effects likely a function of the ways in which institutions award their need- and non-need-based aid. Before considering in more detail the empirical record on different forms of aid it is helpful to consider more broadly what the research literature says with respect to the forms and functions of financial aid vis-à-vis persistence.

The complex relationship of aid, costs, and persistence.

The substantial and growing body of research on the effects of finances and financial aid on persistence suggests direct and indirect effects (e.g., Bean, 1980; Cabrera, et al., 1990; Lichtenstein, 2002; Nora, 1990; Olivas, 1985; Perna, 1998; Santiago & Cunningham, 2005; St. John, Andrieu, Oescher, & Starkey, 1994; St. John, et al., 1996). The direct effect of aid on persistence is to enable students to pay tuition, fees, and all other costs associated with attendance (including transportation). Costs are generally found to be negatively associated with persistence and enrollment absent the financial wherewithal to pay, either in the form of aid, personal wealth, or employment (Adelman, 1999; Santiago, 2007; St. John, et al., 2005; St. John, et al., 1996; Stinebrickner & Stinebrickner, 2003). Generally, financial need is thought to have a negative relationship with persistence (Alon, 2005; Bresciani & Carson, 2002; Singell & Stater, 2006), particularly for low-income students (Paulsen & St. John, 2002). Indirect effects on persistence may include enhancing social (Cabrera, et al., 1990) and academic (Cabrera, et al.,

1993) integration as well as affecting academic performance as measured by cumulative Grade Point Average (Cabrera, et al., 1993; Lichtenstein, 2002). Put another way, aid is thought to have psycho-social as well as pecuniary effects (DesJardins, Ahlburg, et al., 2002). A notable example of the ways in which aid may affect enrollment and persistence via psycho-social mechanisms comes from the empirical research on merit-based aid which suggests that offers of aid may have more to do with enticing students' attendance than actually making college more affordable for these students (Baum & Schwartz, 1988; Price & Davis, 2006; Singell & Stater, 2006)

So-called nexus-studies extend consideration of the psycho-social and pecuniary effects of aid by looking at the connections between perceptions of ability to pay, aid awarded, enrollment and ultimately persistence. Studies that look at the choice-persistence nexus (Somers, 1995; Somers & St John, 1997; St. John, et al., 1996) posit that enrollment and persistence are interrelated processes, noting that initial commitments to the institution—which are shaped by costs and aid—likely affect intentions with regard to degree attainment. This perspective on exploring the role of finances in persistence is distinct from earlier approaches, notably price-response theory, which focused on net price or total aid absent any consideration of the complex nature of student persistence theorized in integration, attrition, and adjustment models (St. John, et al., 2000).

Olivas' (1985) work on aid packaging for Latino students was among the first empirical work that sought to understand the distinct ways in which different forms of aid are combined and the subsequent effects on educational outcomes. More recently known as differentiated-price theory, scholars who approach the study of aid from this perspective hypothesize that students' may be more or less responsive to different forms of aid (e.g., loans versus grants) and therefore aid ought to be measured in terms of amount received, amount offered, type of aid received,

ratios of the different forms of aid, or the combination of aid forms (or aid packages) (DesJardins, et al., 1999; Perna, 1998; St. John & Starkey, 1995). It is from this perspective that much of the extant research on the effects of aid on persistence has developed.

Grants.

As is expected given that financial aid, especially grants, are allocated based on some measure of need, students with lower socioeconomic status generally receive higher amounts of grant aid (Baum & Schwartz, 1988). Given the interrelated nature of race and class in the United States, African Americans and Latinos appear to be more likely to receive grants than their White counterparts (Baum & Schwartz, 1988; Olivas, 1985). On the whole, the research seems to suggest that grants have a positive effect on persistence (Alon, 2005; Perna, 1998), in part through their effects on grades (Lichtenstein, 2002) and enrollment choice (Singell & Stater, 2006). Moreover, receiving more rather than less grants relative to other forms of aid was associated with greater likelihood of persistence (Perna, 1998). However, the effects of grants may be moderated by academic performance and preparation (Alon, 2005; DesJardins, Ahlburg, et al., 2002). Some evidence suggests that the effects of grants may be greater for Latinos and African Americans (St. John, et al., 2005). Contradictory findings do exist. Adelman (1999) found no relationship between any form of financial aid and graduation and DesJardins et al (1999; 2002) found no significant relationship between grants and likelihood of stopping out.

Loans.

Not surprisingly, costs and borrowing are related. As costs increase students tend to rely more on loans (Baum & Schwartz, 1988). Aid policy has shifted significantly over the past few decades from a regime in which grant aid was dominant to one in which loans have become the most commonly relied upon means of paying for school (Somers & St John, 1997; St. John,

2003) with distinct differences in borrowing by race and class, notably higher rates of borrowing among students of color and lower-income students (Price, 2004). In this context, it is important to understand the ways in which loans affect student persistence. On sum, loans appear to be positively related to persistence (DesJardins, et al., 1999; DesJardins, Ahlburg, et al., 2002; Perna, 1998) perhaps because they reduce the need to work (Cuccaro-Alamin, Choy, & Carroll, 1998). Alon (2005) found a positive effect for loans even after controlling for possible endogeneity in their receipt. However, some evidence suggests that the effects of loans may differ based on race and ethnicity (Price & Davis, 2006; St. John, et al., 2005). For example, Lichtenstein found a negative relationship between receipt of loans and academic performance among Latino students at a traditional, four-year institution (2002).

Work-study.

Work-study is hypothesized to affect persistence directly through pecuniary effects and indirectly through helping students integrate to the academic or social spheres of campus. The majority of studies report a positive relationship between persistence and work-study (Alon, 2005; DesJardins, et al., 1999; DesJardins, Ahlburg, et al., 2002; Lichtenstein, 2002; Perna, 1998; St. John, et al., 1994), though the relationships between work-study and persistence may vary by gender (Bean, 1980). DesJardins and colleagues (2002) found the effects of work-study may also vary over time, noting that they found an initial negative relationship between work-study awards and degree completion, though the effect reversed over time.

Institutional scholarships.

Relatively little research has looked at the effects of institutional scholarships (need and non-need based) on student persistence despite their prevalence in four-year, but particularly private, institutions (Price & Davis, 2006). Institutional scholarships appear to be positively

related to persistence (DesJardins, et al., 1999; Gross, Hossler, & Ziskin, 2007), though this may be an artifact of the scholarships attracting students who would have been more likely to persist anyway (Singell & Stater, 2006). Interestingly, two studies found that institutional scholarships had a negative relationship with persistence, specifically stopping out at a traditional four-year public flagship (DesJardins, et al., 1999) and within-year persistence at an urban, commuter institution (Somers, 1995).

Student Background/Characteristics

The characteristics and experiences—including gender, race/ethnicity, age, relationships with family, experiences with educational encouragement, and socioeconomic status—are conceptualized as playing an important role in persistence (Bean, 1980; Pascarella & Terenzini, 1980, 2005; Tinto, 1975, 1993), though the relative contributions of background to persistence may vary based on students' interactions with college environments and contexts (e.g., Berger, 2000; Cabrera, et al., 1993; Titus, 2006). Clearly, each of these characteristics or attributes affects student persistence in different ways at different times in different environments. Moreover, though each of these characteristics or attributes is discussed next as distinct constructs, the extant literature demonstrates considerable interaction among these factors (e.g., Bean, 1980; Carter, 2006; Pascarella & Terenzini, 1979; Somers & St John, 1997).

Gender.

Though many recent studies include gender as an explanatory variable in predicting persistence much of our understanding about the direct and indirect effects of gender come from earlier research. This earlier research suggests that gender affects persistence through institutional commitment (Bean, 1980), educational aspirations (Pascarella & Terenzini, 1979), social and academic integration (Spady, 1971) and external environments (via family) (Bean &

Metzner, 1985). Contemporary studies have found conflicting results with respect to the likelihood of men and women persisting. A number of studies found no difference in likelihood of persistence between men and women (Adelman, 2006; Anaya & Cole, 2001; Arbona & Nora, 2007), while others have found that men are less likely to persist than women (Perna, 1998; St. John, et al., 1994), though the differences may decrease over time (DesJardins, McCall, et al., 2002) and may be moderated by college experiences (St. John, et al., 1994). Still other studies have found that women are less likely to persist (Singell & Stater, 2006; St. John, et al., 1996). In sum, the record with respect to gender and persistence is uneven, though it appears that in certain contexts women may be less likely to persist than men.

Race/ethnicity.

While race and ethnicity have long been hypothesized to affect students' persistence (e.g., Tinto, 1982) with some exceptions (e.g., Nora, 1987; Olivas, 1982, 1985) only recently have scholars begun to interrogate in-depth the ways in which students' racial and ethnic contexts and backgrounds affect persistence (e.g., Attinasi, 1989; Hurtado, 1992, 2002; Perna, 2000; St. John, et al., 2005). As mentioned above, this focus has lead to important revisions and reconceptualizations of the ways in which student background and institutional contexts interact. Notably this line of research has helped to complicate our understandings of the roles of academic preparation, particularly the relative contributions of high school preparation versus college experiences (Adelman, 1999; Bean & Metzner, 1985; Nora & Cabrera, 1996); academic integration, specifically mentoring and relationships with faculty and staff (Attinasi, 1989; Nora & Cabrera, 1996; Torres, 2006); campus climate, especially cultural congruence, development of peer networks, cognitive maps, and prejudice/discrimination,(Anaya & Cole, 2001; Attinasi, 1989; Hernandez, 2000; Hurtado, 2002; Kuh & Love, 2000; Nora & Cabrera, 1996); and

financing postsecondary education (Baum & Schwartz, 1988; Price & Davis, 2006; Somers, 1995; St. John, et al., 2005).

From this growing body of research a few conclusions can be drawn. On the whole underrepresented students, specifically African Americans and Latinos, on balance are less likely to persist than their White peers (DesJardins, McCall, et al., 2002; Nora & Cabrera, 1996; Perna, 1998), though the likelihood may change over time, especially for African Americans (DesJardins, et al., 1999) and may vary depending on the way in which persistence is defined or the type of institution being considered. For example, studies (Somers, 1995; St. John, et al., 1996) that look at within-year persistence at commuter or urban institutions have found, in some cases that students of color were more likely to persist from fall to spring than Whites. Somers and colleagues (Somers, Woodhouse, & Cofer, 2004) also found differences in persistence between first-generation and continuing-generation Latino college students, again suggesting the complex interactions of student background characteristics and attributes. By contrast, DesJardins et al (1999) found that Asian American students were more likely than their White peers to persist, while Singell and Stater (2006), after controlling for self-selection related to college enrollment found no difference in likelihood of persistence among racial and ethnic groups. Adelman (2006) similarly found no difference in likelihood of persistence by race/ethnicity. However, the authors of both studies acknowledge potential methodological and data weaknesses that may contribute to their findings. Finally, an emerging strand of research—building from work on campus climate (Hurtado, 1992) and social and cultural capital (Berger, 2000; Berger & Braxton, 1998)—has begun to demonstrate the ways in which structural diversity in postsecondary institutions interacts with student diversity to affect persistence (Titus, 2006).

Age.

Though relatively few studies have incorporated age as a background characteristic of students (Cofer & Somers, 2000; DesJardins, et al., 1999; Singell & Stater, 2006; Somers, 1995; St. John, et al., 2005; St. John, et al., 1996), much of the empirical scholarship has focused on age by virtue of the exclusion of nontraditional students, which is generally defined as those older than 24 (Bean & Metzner, 1985). Because of this focus on traditional age students as well as differences in defining persistence, relatively little is known about the ways in which age affects persistence. At traditional, four-year institutions age was found to be positively related to the likelihood of stopping out (DesJardins, et al., 1999) and negatively related to graduation (Singell & Stater, 2006). However, age may be positively related to within-year persistence (Cofer & Somers, 2000; Somers, 1995; St. John, et al., 1996) or persistence year-to-year at an urban, commuter institution (Somers, 1995). St. John and colleagues (2005) found that age was positively related to year-to-year persistence for African Americans, but not Whites. Overall, the relationship between age and persistence may differ based on the institutional context. At nontraditional institutions, age and persistence appear to be positively related whereas at traditional institutions a negative relationship seems to exist.

Family and encouragement.

Tinto (1993) and Bean and Metzner (1985) posit that external pulls may impede integration by preventing student's transitions into the academic and social spheres of the institution. From this perspective, family is viewed as negatively related to likelihood of persistence. Spady's earlier work (1970, 1971), however, suggested that family support may be positively related to retention. More recent research particularly that which looks at the effects of family on Latino students' academic success is consistent with Spady's findings. Overall, family

support and encouragement is thought to have a positive effect on remaining enrolled (Cabrera, et al., 1993; Hernandez, 2000; Nora & Cabrera, 1996; Santiago, 2007; Torres, 2006) though familial expectations may exert pressure on students with respect to college choice (Santiago, 2007) and concerns about disappointing the family (Hernandez, 2000). Anaya (2001) found that living with family or relatives had no effect on persistence, perhaps complicating the notion that living on-campus is important for social integration.

Of course being emotionally or geographically close to family may have a different relationship to persistence than being a parent while enrolled. Although relatively few studies have looked at the effects of parenthood on undergraduate persistence, some evidence (DesJardins, McCall, et al., 2002) suggests it may be negatively related, with the effect being constant over time. Bean's earlier conceptual work suggested that family responsibilities may have indirect effects on attrition, particularly for women (Bean, 1980). Finally, St. John et al (1994) suggest that the federal formula for determining financial need may underestimate the costs to students, including those who are married

Encouragement to attend and ultimately persist in postsecondary education is not limited to one's family. Attinasi (1989) and others (Arbona & Nora, 2007; Attinasi, 1989; Hernandez, 2000) have found that having peers in high school can influence the whether a student goes to college as well as where the student goes (i.e., two- versus four-year).

Socioeconomic status.

The literature with respect to the relationship between socioeconomic status and educational attainment is remarkably consistent: Persistence is positively correlated with higher levels of socioeconomic status (SES). A host of studies have found a strong positive relationship with income and retention (Cabrera, et al., 1990; Cofer & Somers, 2000; Lichtenstein, 2002;

Perna, 1998; Spady, 1971; Stinebrickner & Stinebrickner, 2003; Titus, 2006). Parental education has also been found to exert a strong positive effect over persistence (Anaya & Cole, 2001; Arbona & Nora, 2007). Very few studies have found no relationship between socioeconomic status and persistence (Adelman, 1999; Bean, 1980). Interestingly, one study (St. John, et al., 1994) that looked at the relationship between SES and within-year persistence found a negative relationship, which the authors attribute to students whose parents had higher levels of formal education were less troubled at the prospect of stopping out for a semester. The relationship between parental education and nontraditional students, as Bean and Metzner (1985) pointed out is, however, less clear.

Academic Preparation

Academic preparation has been measured in terms of high school curriculum, for example standardized test scores (Somers, 1995), high school rank (DesJardins, et al., 1999), and high school grade point average (Adelman, 1999). Academic preparation is thought essential to postsecondary academic success (Cofer & Somers, 2000; Pascarella & Terenzini, 2005), though its relative contributions to persistence may vary by race and ethnicity (Torres, 2006). Generally more academic preparation, in the form of a college preparatory curriculum or Advanced Placement classes, is associated with greater likelihood of persistence (Adelman, 1999; DesJardins, et al., 1999; Nora & Cabrera, 1996; Perna, 1998; Somers, 1995; Somers, et al., 2004). Arbona and Nora (2007) provide more nuanced findings with respect to preparation noting that standardized math scores were significantly related to persistence, whereas reading scores had no effect among Latino students.

College Experiences

Although the operationalization of academic and social integration has varied a great deal in empirical studies (Braxton & Lien, 2000; Braxton, et al., 1997), some commonalities exist with regard to what college experiences are thought to influence persistence (negatively or positively). These include academic performance, campus climate, major choice, campus residence, class level, and participation in developmental education.

Academic performance.

College grade point average is among the most consistently included factor in studies of persistence, though the relationship between grades and persistence remains a subject of debate and research (Pascarella & Terenzini, 2005). Early research (Spady, 1971; Tinto, 1975) conceptualized GPA as representing extrinsic rewards for individual's congruence with the academic norms of the institution and therefore a component of academic integration. As students receive positive feedback via grades, their academic integration improves, according to this perspective. Bean (1985), however, suggested that academic integration precedes receipt of grades. Adding to the debate, the meaning of grades or GPA is not always clear. As Pascarella and Terenzini (2005) note grades likely vary from institution to institution or even within departments and are probably confounded by factors such as personal motivations or academic preparation, making it difficult to ascertain the causal relationships between grades, performance, academic integration, and ultimately student persistence. For example, Saupe, Smith, and Xin (1999) found that institutional selectivity was the strongest predictor of grades (which they equated to a proxy measure of institutional performance), along with student characteristics. Nonetheless, there are at least two points of relative clarity in the discussion about grades and persistence. First, falling below a certain GPA set by institutional policy is generally cause for

academic dismissal or suspension. In this sense, grades have a clear relationship to persistence, specifically involuntary withdrawal. The second point is that college grades, with few exceptions, are strongly and positively related to persistence (Adelman, 1999, 2006; Anaya & Cole, 2001; Cabrera, et al., 1993; DesJardins, et al., 1999; DesJardins, McCall, et al., 2002; Gross, et al., 2007; Lichtenstein, 2002; Perna, 1998; Singell & Stater, 2006; St. John, et al., 2005; Thomas, 2000). However, the relationship between academic performance and retention may differ based on institution type (St. John, et al., 1994), race and ethnicity (Nora & Cabrera, 1996), and whether the student is traditional or nontraditional (Bean & Metzner, 1985).

Campus climate.

The effects of campus climate on student persistence, particularly with respect to racial climate, lead in part to the rethinking and revising of traditional retention theory. Hurtado (1992) was among the first to document campus racial climates and assert that racial incidents were common on college campuses. Nora and Cabrera (1996) extended this work by testing the ways in which prejudice among faculty and peers affected academic performance, especially among underrepresented students. Though they found that discrimination had a total effect on GPA that was significant, overall discrimination did not directly affect academic performance. Interestingly, though minority students were more likely to perceive discrimination in the classroom, the effect of discrimination on academic performance was greater for nonminorities than minorities. Nora and Cabrera (1996) attribute this to socialization of minority students in the United States that has made them relatively more resilient to racial discrimination and prejudice. They conclude that discrimination may not be a direct cause of attrition, however it likely affects the cognitive and affective development of underrepresented students.

Some research suggests that campus climate, structural diversity, and student retention are interrelated in complex ways with diversity improving persistence by providing students opportunities to break down environments (Hernandez, 2000; Hurtado, 2002; Kuh & Love, 2000), develop cognitive maps for navigating institutions via connections with peers or faculty/staff (Attinasi, 1989; Torres, 2006), and affording students opportunities to find welcoming communities (Attinasi, 1989; Hernandez, 2000; Titus, 2006; Torres, 2006). Of course, as Berger (Berger, 2000; Berger & Braxton, 1998) and others (Titus, 2006) have noted, institutional wealth and racial and ethnic diversity are not independent of one another. Given the intersections of race and class in the United States, often it is those institutions with relatively less wealth that are the most diverse in terms of race and ethnicity (e.g., Hispanic Serving Institutions). Titus' (2006) work has found a significant and positive relationship between institutional wealth and student persistence.

Academic major.

The underlying relationship between persistence and academic major remains unclear (Pascarella & Terenzini, 2005), though overall having a declared major appears to have a positive relationship with remaining enrolled. Major declaration status (that is, having a declared major or not) and choice of major might be viewed as indicators of goal commitment (Bean, 1980) or mechanisms of academic (Bean, 1980; Spady, 1970; Tinto, 1975) or social integration (Kuh & Love, 2000). Regardless, research suggests that major plays a positive role in persistence (Bean & Metzner, 1985), though the effects may differ by area of major (Anaya & Cole, 2001; Singell & Stater, 2006). At worst, academic major appears to have no effect on persistence (Adelman, 1999; Bean, 1980).

Campus residence.

Overall, living on campus appears to be positively related to likelihood of persistence, that differences may exist according to institutional contexts and student background. Somers, Woodhouse and Cofer (2004) found a positive effect for first-generation students, but no effect for students whose parents had attended college. Lichtenstein (2002) similarly found that living on-campus had a positive effect on persistence for Latino students at a traditional, four-year institution. Perna (1998) noted a positive relationship between on-campus residence and persistence, controlling for race/ethnicity and a variety of other factors. Others have found no significant effect (Anaya & Cole, 2001; Bean, 1980). Singell and Stater (2006) found a positive relationship, even after controlling for self-selection. They hypothesize that living on-campus afford students greater access to social and support networks.

Class levels.

Because much of the retention research has restricted its sample to first-year students, relatively little is known about the ways in which class level (i.e., being a freshman, sophomore, junior, or senior) affects persistence. Bean (1985), who found modest differences in ‘dropout syndrome’ by class, was among the first to conduct analyses in this area. Not surprisingly, the empirical findings are mixed. Cofer and Somers (2000) found a positive relationship between class level and persistence while Somers, Woodhouse, and Cofer (2004) found different effects based on whether a student’s parents had attended college. Anaya and Cole (2001) found no effect for Latino students, whereas St. John and colleagues (1994) found that seniors were less likely to persist within-year than freshmen.

Developmental education.

Findings for the effects of development education on persistence are similarly sparse and equally inconclusive. Somers (1995) found a positive effect, whereas Adelman's work has shown neutral (2006) as well as negative effects (1999).

Academic momentum.

The term academic momentum—which is defined as a combination enrollment intensity and credit accumulation--comes from Adelman's (1999, 2006) relatively recent work which looks longitudinally at the enrollment patterns of two different high school cohorts through graduation. Though the term may be a recent addition to the scholarly lexicon, retention scholars have long looked at the effects of enrollment intensity and have generally found positive relationships between full-time attendance and persistence (Arbona & Nora, 2007; Cofer & Somers, 2000; Cuccaro-Alamin, et al., 1998; Fry, 2007; Somers, 1995; St. John, et al., 1994; St. John, et al., 2005). In addition, researchers have found that remaining enrolled continuously or without interruption also has a strong positive effect on persistence (Adelman, 2006; Arbona & Nora, 2007; DesJardins, et al., 1999). Adelman's contribution complicating our understandings about the relationship between intensity and persistence include finding a positive relationship with earning at least 20 credits by the end of the first year and that having a high ratio of withdrawals to attempted courses significantly decreases likelihood of graduation.

Chapter Three: Methodology

Carter (2006) and others (Nora, 1990; Nora & Cabrera, 1996; St. John, et al., 2005) have noted the importance of studying the relationships between financial aid and educational attainment for underrepresented students, especially given the growing disparity in postsecondary completion among Latino students. Consistent with prior research (Cabrera, et al., 1993; Hernandez, 2000; St. John, et al., 2000), financial aid is hypothesized in this study to have direct and indirect effects on degree attainment. Direct effects include the ability to pay for tuition, fees, and other educational expenses. Indirect effects may include more time to focus on one's studies, greater certainty about the ability to remain enrolled, and affecting the cost-benefit ratio of the utility of remaining enrolled compared to other options, such as working (Becker, 1965; DesJardins, McCall, et al., 2002).

Dowd (2006) and others (Alon, 2005) have pointed out that estimating and interpreting the effects of financial aid on education attainment are subject to theoretical and methodological shortcomings. For example, it is unclear whether receipt of aid is a function of student motivations, aspirations, or other unobserved characteristics. Moreover, the directionality of the cause and effect relationship between aid and persistence is opaque at best. While financial aid may encourage a student to remain enrolled in college it is also likely that progress toward a degree encourages a student to rely on financial aid, particularly as the student nears completion of the degree. In addition, as DesJardins and colleagues (1999; DesJardins, Ahlburg, et al., 2002; DesJardins, et al., 2003; DesJardins, McCall, et al., 2002) have pointed out it is vital that research on financial aid consider the *timing* of aid receipt as well as the amount.

It is in this context that this study responds to calls for more research on the effects of financial aid on underrepresented students. Specifically this study asks to what extent loans,

grants, institutional aid, and work-study affect timing to first departure from postsecondary education for baccalaureate-degree-enrolled Latinos and how do these effects change over time? In addition, this study seeks to extend existing approaches to studying financial aid use among underrepresented students by employing event history analysis. The goal is to not only understand more about *how* aid promotes or perturbs access for Latinos, but as importantly *when* those effects occur and how they may vary over time. The primary research questions include:

1. To what extent do institutional, state, and federal grants affect timing to departure, and how do these effects change over time?
2. To what extent do need- and non-need-based loans affect timing to departure and how do these effects change over time?
3. To what extent does participation in state and federal work-study affect timing to departure and how do these effects change over time?
4. To what extent does receipt of aid affect timing to first departure and how do these effects change over time?
5. To what extent does total cost of attendance (including room, board, fees, and tuition) affect timing to departure and how do these effects change over time?

In addition, two exploratory research questions are considered to help better understand the mechanisms through which aid affects educational attainment.

1. To what extent does the composition of aid package (i.e., loans and grants) affect academic performance as measured by college grade point average?
2. To what extent does the composition of aid package (i.e., loans and grants) affect academic momentum as measured by credits attempted in each semester?

Persistence as a Temporal Process

The temporal nature of persistence is implicitly recognized in the extant literature on educational attainment (e.g., Bean, 1980; Braxton & Lien, 2000; Pascarella & Terenzini, 1980; St. John, 1992; St. John, et al., 1996; Tinto, 1975, 1982, 1988). For example, Tinto's (1993) revision of the student integration model was based on Van Gennep's anthropological work on rites of passage in traditional societies. Specifically, Tinto argued that student persistence was in part conditioned on passage through stages of separation, transition, and finally incorporation. Time is measured not by a clock in this case, but rather by stages of cultural passage. Other examples of temporal theories of the nature of student persistence exist as well. Bean's (1985) inclusion of class levels (i.e., freshman, sophomore, junior) incorporate credits earned or academic progress as the measure of time. In fact, Tinto noted over 20 years ago that

Comparative studies need to also take account of the longitudinal character of dropout. Although this appears to be self-evident in most studies, we have yet to ask to what degree different types of dropout behavior vary over time. Past studies of dropout, with very few exceptions, have taken a quite limited time perspective. (Tinto, 1982, p. 692)

Similarly, St. John et al draw attention to the time varying nature of explanatory factors of student persistence, noting that "...changes over time in financial-aid packages can influence students' academic and social integration processes, as well as their subsequent persistence decisions," (St. John, et al., 2000, p. 41). Yet despite acknowledging the longitudinal nature of persistence, most researchers continue to approach analyses in cross-sectional fashion. In fact, relatively few persistence studies employ methods that incorporate temporal aspects into their conceptual and analytic models (DesJardins, McCall, et al., 2002).

To address this shortcoming, a handful of education scholars have begun applying event history analysis techniques developed in other fields—notably, demography, biology, and

engineering—to the study of persistence (DesJardins, et al., 1994; DesJardins, Ahlburg, et al., 2002; DesJardins, et al., 2003; DesJardins, McCall, et al., 2002; Doyle, 2006). Event history analysis (EHA), in its most basic form, is the longitudinal analysis of when individuals or organizations experience events of interest (Allison, 1984). Unlike traditional approaches to regression, EHA explicitly incorporates temporal dimensions in estimating coefficients and the overall fit of the model while allowing for variation from period to period in explanatory variables. Perhaps more importantly than the technical improvements offered by EHA, the technique does not constrain the conceptual models we use to understand and map the social process of interest. Rather than modeling persistence in a temporally flat fashion, EHA enables us to specify and account for the temporal aspects of the events of interest.

Blosfeld and Rohwer (2002) argue that event history analysis of social processes addresses a number of shortcomings with cross-sectional approaches, namely that EHA (a) does not assume statistical equilibrium across time with regard to the probabilities of moving from one state to another, (b) it allows consideration of the ways in which explanatory variables affect inflows and outflows of a given state, (c) it enables researchers to better understand directionality of causal relationships, (d) it permits modeling of processes of change, and, finally (e) EHA does not restrict as time-constant explanatory variables that in fact change over time. Cross-sectional methods of studying the effects of finances on persistence assume that the likelihood of persistence remains constant across time (i.e., statistical equilibrium); that grants have the same effect on keeping students continuously enrolled as they do on encouraging a student who has stopped out to re-enroll (i.e., inflow and outflow of a given state); or that changes in costs and aid from year to year do not weigh into student's decisions/ability to persist (i.e., time-varying covariates), as a few examples.

Like all methodological approaches, EHA has its own central concepts and terminology, much of which differs from logistic regression and path analytic approaches to studying persistence. Allison (1984) notes that event history analysis—which encompasses a broad range of analytic methods—is fundamentally concerned with when individuals or organizations experience events of interest. The dependent variable in all EH models is the *hazard rate*, that is the rate of occurrence of a particular event at a particular moment in time (Yamaguchi, 1991).

Of course analysis of duration data requires a time metric or *clock* with which to mark the occurrence of the event of interest. Theoretical assumptions about the temporal nature of the substantive process of interest generally dictate which clock is appropriate (e.g., minutes, years, age). Depending on the process under study as well as availability of data, event history analysis models fall into one of two categories: discrete-time or continuous time models. Different but related statistical assumptions underlie these two approaches (for example, assumptions about the distributions of event occurrence). Model specification in EHA requires careful selection of an appropriate clock as well as definition of the *risk period*, that is when the units of analysis are at risk of experiencing the event of interest. Under the rubric of EHA, the units of analysis are known as the *risk set*, or the sample of people who are at risk of experiencing a specified event during the risk period (Yamaguchi, 1991).

Finally, another central concept in EHA is *censoring*. According to Yamaguchi (1991), censoring occurs when data about the event of interest are missing during the risk period. Like any form of missing data it is important to know whether censored data are missing systematically or at random. Data can be censored because of the limited time period under observation or because of non-independent or *competing* events. A variety of censoring can occur related to the observational period, including left-censoring (e.g., a student starting college

prior to the observational period) and right-censoring (e.g., a student graduating from college after the observational period). Theoretical frameworks and operationalization of constructs help determine whether an observation is considered censored. A major strength of EHA is its ability to incorporate information about censored data.

Competing events (or risks) are important to consider because they can affect transition to and from the primary state of interest. For example, in this study we might conceptualize stopping out as a competing event with earning a bachelor's degree. Much like determining the risk period and risk set, competing events are defined according to theoretical frameworks and substantive process under study.

Data Sources

Data for this study come from the Indiana Commission for Higher Education (ICHE) statewide student information system (SIS) unit record database and the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS). SIS data are collected from all public universities, colleges, and community colleges in Indiana for enrollment-related transactions—for example, courses taken, grades received, race, ethnicity, and all other information necessary for institutional business. SIS data represent the universe of students enrolled in public postsecondary institutions (PSIs) and include information on standardized testing, family income, and financial aid from institutional, state, and federal sources.

Institutional price data from IPEDS along with receipt of aid data from SIS are used to calculate the net price of attending college (total costs less total aid) for each student. Costs are calculated based on students' enrollment and residency status, i.e., resident or nonresident of the state, on- or off-campus, including with family if a dependent. Total college costs included

tuition, room, board, fees, books, supplies, and other on-campus expenses as reported by the institutions. Total aid was calculated as the sum of all forms of aid received by the student: loans and grants from private, state, and federal sources.

Sample Selection Criteria

The substantive questions of interest guided development of criteria for selecting the study sample. Only Latino students were included in this sample. SIS data include a simple dichotomous variable to denote identification as a Latino and do not differentiate between ethnic or national heritage. To prevent left censoring (i.e., not observing the first point at which a student enrolled in postsecondary education), only first-time, first-year students from 1999-2004 were selected. Because the event of interest was first departure (defined below), students who first enrolled in 2005 were excluded from the sample because by definition they could not have observed the event of interest. To differentiate degree-seeking course students from casual course takers, students who earned fewer than six credits during the course of their first academic year enrolled were excluded from the sample, as suggested by Adelman (2006, 2007). Finally, because so few baccalaureate-degree-enrolled students were enrolled in community colleges (less than 30), all community college students were excluded from the study. The final sample size for the event history models was 4,963 students representing 11,863 person-periods (i.e., periods of enrollment).

Models

First departure is the event of interest in this study. Students who did not attempt to earn any credit during the course of an entire academic year—including fall, spring, and summer—were considered departers at the end of the last year in which they earned credit. Analysis time was measured as academic years because only annual data were available. Students remained in

the risk pool until first departure or graduation. Multiple spells of enrollment (e.g., taking courses every other year) were excluded as events of interest for the purposes of this study.

A discrete-time model was used to estimate the effects of financial aid on timing to first departure. As suggested by Allison (1984), in instances where time is measured in discrete units it is appropriate to employ discrete-time methods. Equation 1 denotes the general form of the model where $h(t_j)$ represents the hazard rate at a discrete point in time, D represents the baseline hazard intercept parameter at time periods one through seven, and β_1 through β_5 represent the slope coefficients for the predictor variables.

Equation 1. General Form of Discrete-Time Survival Model

$$\text{logit } h(t_j) = \frac{[\alpha_1 D_1 + \alpha_2 D_2 + \dots + \alpha_7 D_7] + [\beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5]}{}$$

The models control for factors posited by theory and previous research to affect academic success, including: (a) student background variables (β_1), (b) academic preparation variables (β_2), (c) college experience variables (β_3), (d) measure of academic momentum (β_4), and (e) financial aid (β_5). See Table 2 for a detailed listing of the variables included in the event history models.

Table 2. Variables Included in the Discrete-time Event History Models by Conceptual Blocks

Student background	Academic preparation	Academic momentum	College enrollment	Financial aid
Gender	High school rank	Credits attempted ^a	Campus residence ^a	Institutional aid
Income ^a	Combined SAT score	20 Credits in year one	State residency	State grants
Age ^a	High school diploma		Declared major ^a	Federal grants
			Developmental education ^a	Private grants
			Institutional type ^a	Need-based loans
			College GPA	Non-need-based loans
			Twenty-first Century Scholar	Work-study
				Total cost
				Applied for aid ^b
				Received aid ^b

^a Time-varying explanatory variables. ^b Denote categorical indicators of applying for and/or receiving aid.

A series of three discrete-time models were estimated, beginning with a main effects (ME) of time model, as suggested by Singer and Willett (2003). The ME model generates a fitted hazard profile against which subsequent models with additional control variables can be compared. Next, a proportional hazards model was estimated. This included time-constant and time-varying variables hypothesized to affect timing to departure. Like the ME model, a proportional hazards model provides a point of comparison against which additional hypotheses and models can be tested. Finally, a nonproportional hazards model was estimated. A key feature of non-proportional models is that the effects for focal variables is allowed to vary in each time period, thereby foregoing the assumption that hazard is proportional across time.

Of course once a student begins postsecondary education there are several outcomes or potentially competing events a student might experience: Obtaining an associate's degree, taking time off school, or leaving school all together prior to receiving a formal credential. Such events might be conceptualized as competing with degree attainment, though DesJardins et al (2002) note conflicting evidence from their own work (e.g., DesJardins, et al., 1999) with regard to whether stop-out, departure, and graduation are best estimated via EHA as competing events. Therefore, a competing risks model was estimated via multinomial logistic regression to jointly model the effects of financial aid on likelihood of first departure or earning a postsecondary credential equivalent to an associate's degree or higher. It is reasonable to assume that likelihood of first departure may be related to earning a postsecondary credential because virtually all students (n=309) who earned an associate's degree or higher also experienced first departure (n=297).

Consistent with research focused on educational mobility and social stratification (Spady, 1970) and in recognition of increasingly complex patterns of student enrollment (Adelman, 1999,

2006), this study focuses on student outcomes across institutions rather than at a single institution. In other words, a student who attends multiple institutions in order to earn a degree is coded the same as a student who attended only one institution (though the event history methodology employed here allows the institutional type to vary year to year thereby controlling for multiple institutional attendance).

Data for key variables—including SAT score, high school rank, and income—were missing for some cases in the data set. To preserve information and because data were not likely to be missing completely at random (MCAR), missing values were imputed via multiple random imputation (MI). Familiarity with the campus data reporting mechanisms, admissions requirements, and conceptual knowledge of the phenomena of interest (i.e., persistence and financial aid) lead us to conclude that data were missing at random (MAR) and that the missing data mechanism was ignorable, therefore making MI an appropriate approach. As Allison (2002) notes, in instances where data are not thought to be MCAR techniques such as listwise deletion, pairwise deletion, dummy variable adjustments, and conditional mean imputation can lead to underestimated standard errors, overestimated tests of significance, and possibly even bias.

The MI procedure was implemented using PROC MI in SAS v.9. Continuous data were transformed prior to imputation using the natural logarithm in order to approximate a normal distribution and then transformed back prior to analysis to facilitate interpretation. Key variables correlated with the missing data as well as the dependent variable (persistence) were included in the imputation procedure. Imputed values, particularly for dichotomous variables were not rounded or bounded to sets of plausible values because doing so can lead to biased results (Allison, 2002; von Hippel, 2005). Six data sets were imputed, with one data set reserved for model building and testing. The five remaining data sets were used to estimate the final logistic

regression models. Final estimates were obtained via the MIANALYZE procedure in SAS, which combines the parameter estimates and calculates standard errors from all five data sets.

Using the same sample selection criteria from the event history analysis, two OLS models were run to explore the ways in which aid packaging affects components of education attainment, specifically the relationship between gift and loan aid on academic success and momentum. Academic success is measured as cumulative grade point average while academic momentum is measured as the number of credits attempted in each term. The relationships between forms of aid and academic momentum and performance were explored using linear regression, which enabled controls for factors posited by theory and previous research to affect attainment, including: (a) student background variables ($\beta 1$), (b) academic preparation variables ($\beta 2$), (c) college experience variables ($\beta 3$), and (d) financial aid ($\beta 4$).

Equation 2. Educational attainment models with continuous outcomes

$$Y_i = \beta_0 + \beta_1 x_i + \beta_2 x_i + \beta_3 x_i + \beta_4 x_i + \varepsilon_i$$

The dependent variables analyzed through a model of the form shown in equation (1) were cumulative college grade point average (academic performance) and cumulative credit hours earned at time of census (academic momentum). Specific variables included in the models are listed in Table 3.

Table 3. Variables Included in Academic Momentum and Academic Success Models

Student background	Academic preparation	Academic momentum	College enrollment	Financial aid
Gender	High school rank	Credits attempted	Campus residence	Institutional aid
Income	Combined SAT score	20 credits in year	State residency	State grants
Age	High school diploma	one?	Declared major?	Federal grants
			Developmental education	Private grants
			Institutional type	Need-based loans
			College GPA	Non-need-based loans
			21 st Century Scholar	Work-study
				Total cost
				Received aid

In total, four models were run to ascertain the unique effects of aid packaging on the outcomes of interest. Two models focused on academic success and two explored academic momentum with the focal independent variables being the ratio of gift aid or loan aid to total aid. Gift aid was defined as aid which did not have to be repaid, including (a) federal grants (i.e., Pell, Supplemental Equal Opportunity, veteran's, and other); (b) state grants (i.e., Twenty-first Century Scholar, State Higher Education Award, Freedom of Choice Award, and other); (c) institutional scholarships (i.e., need and non-need based aid); and (d) private scholarships (e.g., Kiwanis) . Loans included all forms of aid which had to be repaid by the students or the student's parents/guardians. This included need (i.e., Stafford and Perkins) and non need-based loans. In order to calculate the proportion of the student's aid package comprised of loans or gift aid it was also necessary to calculate the total amount of financial aid utilized by a student during each academic year. Total aid received was equal to the sum of all loans, all gift aid, and federal and state work-study. Finally, as a control variable in the inferential models it was also necessary to calculate total costs of attendance. Cost of attendance was calculated for each year of enrollment according to (a) whether a student was a resident or non-resident, (b) lived on- or off-campus, (c) the number of credit hours in which a student was enrolled, and (d) the fees paid per credit hour.

Finally, it is important to note that all models included a dichotomous indicator of whether a student had applied for aid. Students who apply for financial aid may differ systematically from students who do not apply. Although relatively little is known about students who do not apply for aid, King (2006), found that the most common reasons for not applying for financial aid were that the student or student's family could afford to pay for school, the family income was too high, or the student simply missed the deadline. King also found differences in aid application by

type of institutions attended (private or public four-year as well as community colleges) and by enrollment intensity (i.e., full- or part-time enrollment). Also, it is possible that applying for aid is indicative of higher educational aspirations, earlier commitment to attend college, or relatively greater access to information resources on the aid application process—such as high school counselors or college-educated family members. Students’ self-selection in applying for aid introduces the prospect of sample selection bias in my models of academic momentum and performance. Because factors that contribute to propensity to apply for aid are unobserved in my data, I include a dichotomous indicator of aid application as a modest control for the effects of self-selection. The implications of this are discussed in more detail later in this paper.

Chapter Four: Findings

The effects of different forms of financial aid (e.g., state grants, federal loans) on timing to first departure were the focus of this study. Based on theory and prior research the conceptual model included variables to control for student background, academic preparation, and college enrollment characteristics. Empirical model-building began with descriptive analysis of the sample population. Patterns of aid receipt over time were of particular interest. A brief description of the student sample, including patterns of aid receipt over time, is provided first, followed by findings from the discrete-time survival models.

Descriptive Findings

Student Characteristics at Origin

In total, 4,963 Latino students enrolled as first-time entrants in baccalaureate degree programs and attempted at least six credits in their first year throughout Indiana's public postsecondary institutions from 1999-2004. The majority of students were male (56%) and had a declared major (80%) during their first year. Most students enrolled in regional universities (49%), followed by research universities (34%), state universities (9%), and finally the urban university (8%) (see Table 4).

With respect to other college enrollment characteristics the majority of students lived off-campus (59%), followed by living on-campus (36%), and living with parents (4%). The distribution of combined SAT scores (math and verbal) appears nearly bimodal with the highest proportion of students having combined scores less than or equal to 910 (43%) and the second highest percent (32%) scoring at 1030 or more. The cumulative grade point of most students during the first year of enrollment was a C average or less (45%) followed by a B average (42%).

Relative to the statewide average of five to six percent a high proportion of Latinos were Twenty-first Century Scholars (13%).

Table 4. Selected Student Characteristics, Year of First Entry

Variables		Number of Students	Column %
Institution type	State universities	434	9
	Regional universities	2453	49
	Urban university	387	8
	Research universities	1689	34
Applied for Aid		3882	78
Received Aid		3589	72
Received Need-Based Aid		2818	57
Gender	Female	2199	44
	Male	2764	56
Combined SAT Score	Low SAT (≤ 910)	2124	43
	Mid SAT (920-1020)	1226	25
	High SAT (≥ 1030)	1606	32
College GPA	A	657	13
	B	2064	42
	C or Less	2242	45
Student housing	On-campus housing	1807	36
	Off-campus housing	2931	59
	Lived with parents	185	4
	Housing unknown or lived overseas	40	1
Major Declared	No	1003	20
	Yes	3960	80
Twenty-first Century Scholar	Yes	649	13
	No	4314	87
Total		4963	100.0

Generally, baccalaureate-degree-enrolled Latinos tended to enroll in lower-cost institutions and lived off-campus, although a significant portion also lived on-campus and attended the state's most selective (i.e., research) public institutions. How does this profile compare to that of Latinos enrolled in public, four-year institutions nationwide? Interestingly, in 2004 among first-time, first-year undergraduates, Latinas constituted a greater proportion of all enrollees compared to Latinos (55.5% compared to 44.5%). A lower proportion of Latinos

across the country lived on-campus compared to Indiana (26% versus 36%). In addition, a much greater proportion of Latinos lived with their parents (36% nationally compared to 4% in Indiana). However, about 59 percent of Indiana Latinos reported living off-campus compared to about 36 percent of Latinos nationwide (NPSAS, 2003-04). This apparent and sizeable difference in the proportion of students living with their parents may be an artifact of how data are reported. For example, students who lived with their parents in Indiana may have been reported as off-campus students by some institutions.

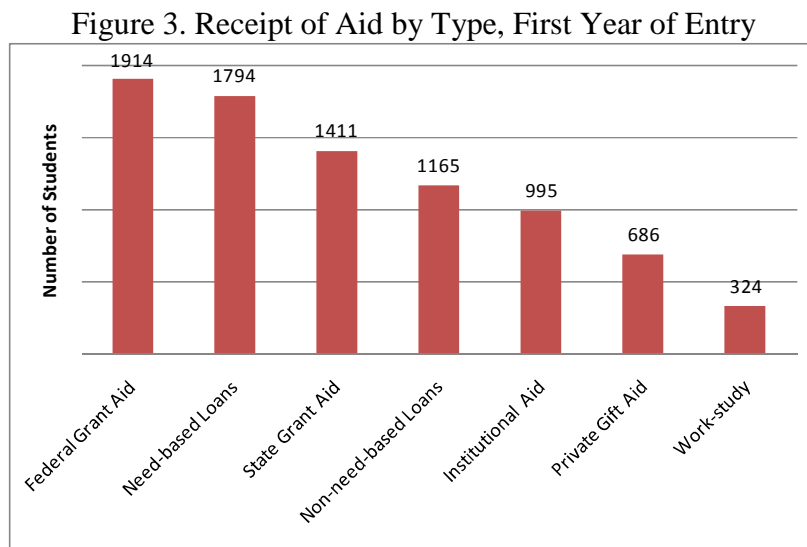
How does Indiana compare to the nation with respect to postsecondary attendance (at both two- and four-year institutions) among Latinos? Indiana lags behind the nation as well as many of its neighboring states. Among 18-24 year olds, around 15 percent of Latinos in Indiana attended college (Clark & Heet, 2006) compared to a national average of about 22 percent in 2000 (NCES, Digest of Education Statistics, Table 189). Ohio, Illinois, and Michigan's rates of attendance among Latinos ranged from 17 to 21 percent. Kentucky had the lowest rates—around eight percent.

Looking at financial aid and income we find that 87 percent of Latinos nationwide who were enrolled in public four-year institutions in 2004 applied for aid (NPSAS, 2003-04) compared to 78 percent of Latinos in Indiana from 1999-2004. When we compare median income at time of first entry by race/ethnicity for Indiana and the nation some differences emerge (see Table 2). Median income was just over \$3,000 higher for Latinos in the Indiana sample in comparison to national figures.

Patterns of Aid Receipt Over Time

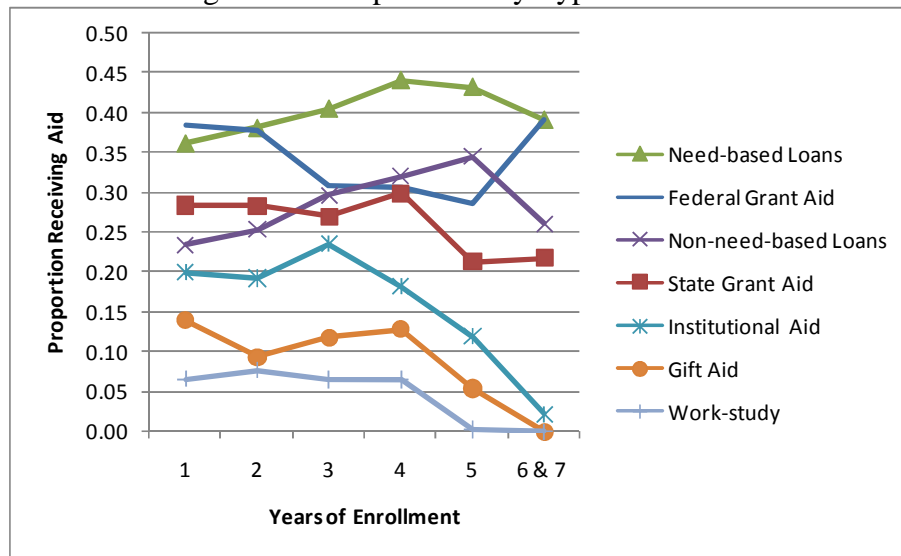
Nearly three-quarters (72%) of students received financial aid during their first year. The most frequently received form of aid was federal grants (39%), followed by need-based loans (36%),

state grants (28%), non-need-based loans (23%), institutional aid (20%), private gift aid (14%) and work-study (7%) (see Figure 3).



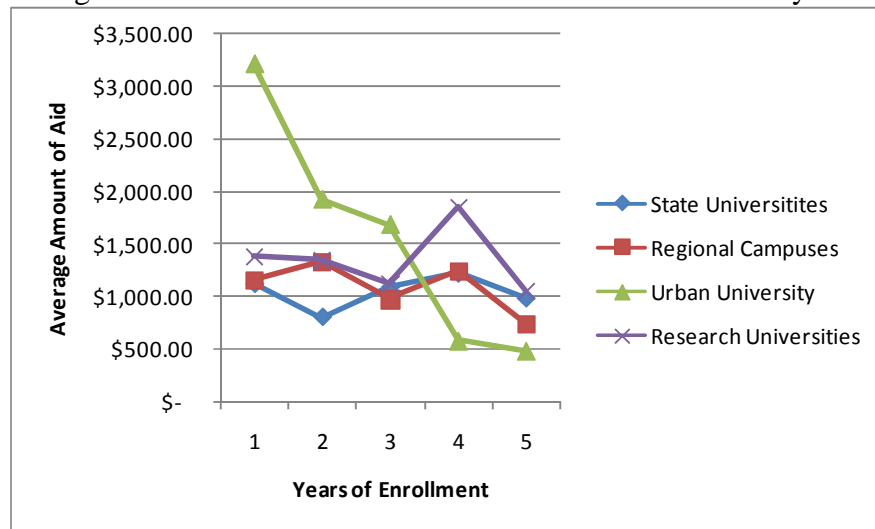
When we look at the frequency of aid receipt by type among across years of enrollment we find, however, that the proportion of students receiving need-based loans increases until year four then decreases somewhat, passing federal grant aid as the most common form of aid (see Figure 2). This increasing reliance on loans and decreasing use of grants among those who remained enrolled is consistent with prior research (Nora, Barlow, & Crisp, 2006). Nonetheless, federal grant aid and need-based loans remained the most frequently used form of aid during most years, although more students relied on non-need-based loans in years four and five than federal grant aid. State grant aid, institutional aid, private gift aid, and work-study were generally utilized by a higher proportion of students initially, but then trended toward decreased usage toward the end of the observation period, suggesting these forms of aid might have a decreasing effect on likelihood of not departing as the number of years of enrollment increased.

Figure 4. Receipt of Aid by Type over Time



Looking at average amounts of aid received over time by institution type shows that while the proportion of students relying on different forms of aid may vary from year to year, generally the dollar amount received decreased over time. For example, the average amount of federal grant aid received from 1999 to 2004 decreased across all institution types with the exception of research universities where it increased in year four then decreased again the following year (see Figure 4).

Figure 5. Average Amount of Federal Grant Aid Received Over Time by Institution Type

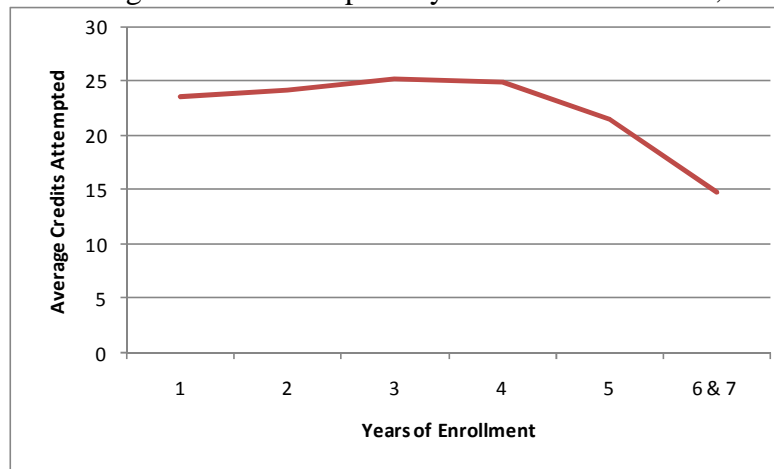


*Average amounts are shown for only the first five years of enrollment because the relatively small number of students enrolled at each institution in years six through seven.

The average amount of state grant aid decreased fairly uniformly across each type of institution. By contrast the average amounts of need and non-need based loans peaked in the fourth year across all institutions. Average institutional aid award was generally highest in the first year though tended to increase again in year four. The average amount of all forms of aid increased at research universities during the fourth year.

It is likely that decreases in the amount of aid received over time are related to changes in enrollment patterns among those students who remained enrolled. Specifically, the average amount of credits attempted across the entire sample decreased significantly after year four, suggesting that students who have not experienced first departure or graduated after four years are more likely to enroll part-time, thereby decreasing costs of attendance (see Figure 5).

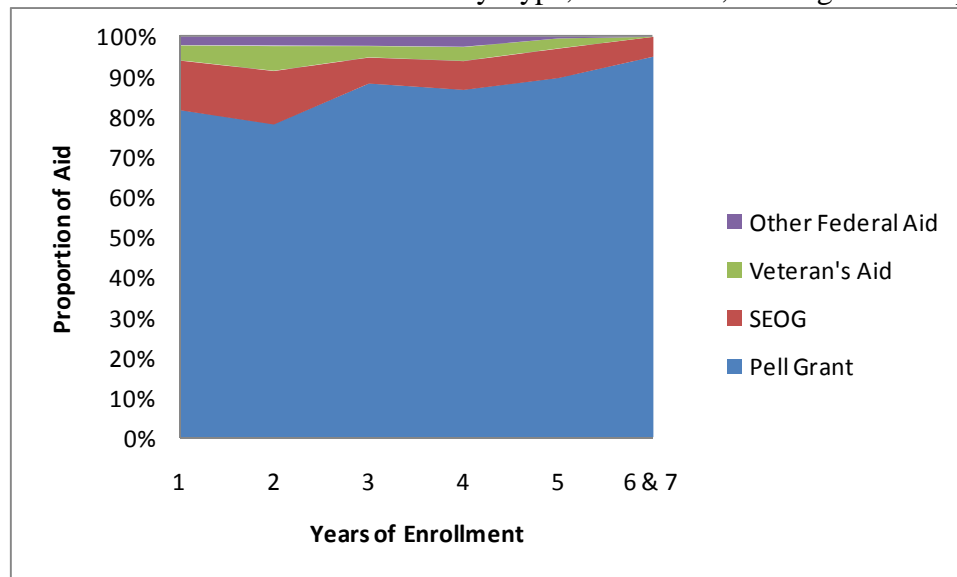
Figure 6. Average Credits Attempted By Years of Enrollment, 1999-2005



Distributions of Aid by Type Over Time

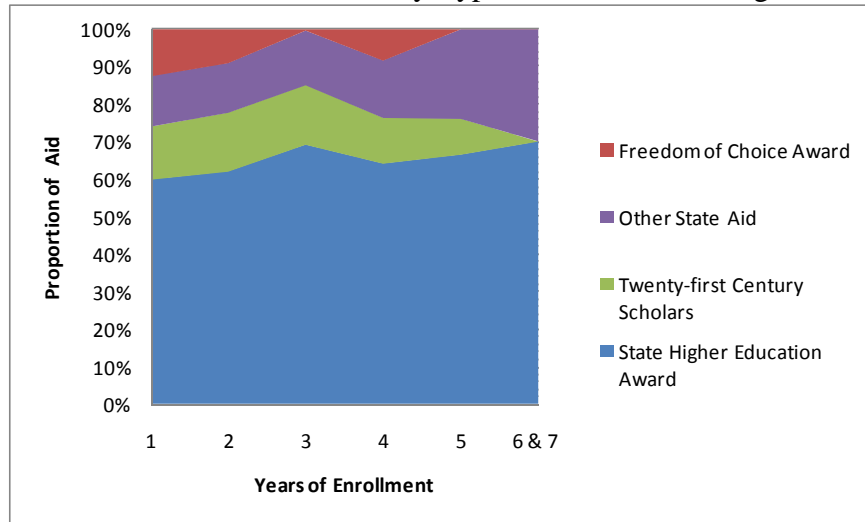
Finally, in endeavoring to better understand the relationships between aid differentiated by type and likelihood of first departure, it is important to also consider how specific forms of aid (e.g., Pell Grants, Stafford Loans) change over time. Pell Grants constituted nearly 80 percent of all federal aid received (among those who received federal grants) initially and increased to constitute nearly 90 percent of the total amount of federal grants received by the last years of enrollment (see Figure 6). This finding is consistent with prior research (e.g., Olivas, 1985) showing that Latinos are more reliant upon Federal aid compared to those from state or institutional sources.

Figure 7. Distribution of Federal Grants by Type, Over Time, Among Aid Recipients



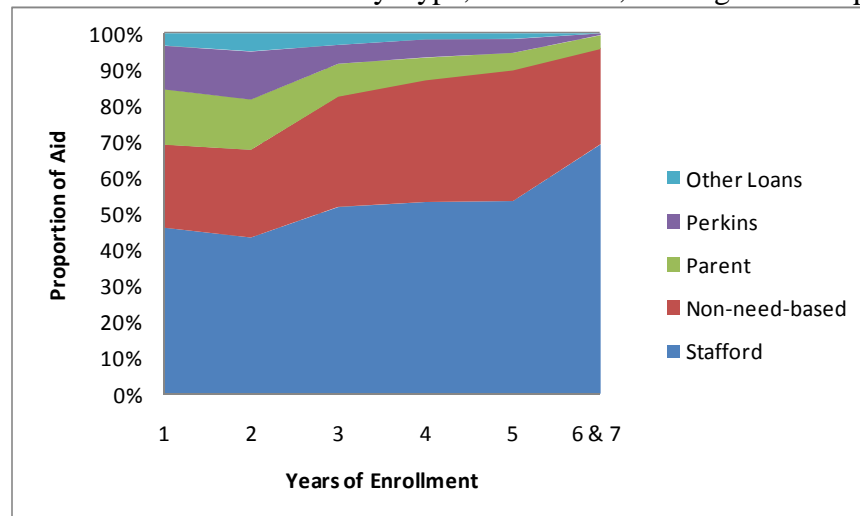
We find greater diversity of sources among state compared to federal grants. The greatest proportion of state grants came from the Indiana State Higher Education Award (ranging from 60% to 69%) followed by the Twenty-first Century Scholars scholarship (ranging from about 14% to 17%) (see Figure 7). Comparing the proportion of federal and state grants to total grants received each year shows that federal grants comprised a larger share of total grants (51% to 75%).

Figure 8. Distribution of State Grants by Type, Over Time, Among Aid Recipients



With respect to types of loans received, Stafford Loans represented the single largest source of loan dollars among students who received loans in every year (see Figure 8). Perkins Loans comprised a relatively small proportion of total loans received, decreasing over time. Non-need-based loans and parent loans initially constituted 38 percent of the loans received during the first year, increasing as a percent of total loans until years six and seven. Generally, need-based loans constituted about 60 percent of total loans.

Figure 9. Distribution of Loans by Type, Over Time, Among Aid Recipients



Several patterns of aid use over time emerged from descriptive examination of the sample. Among those who remained enrolled, students relied most heavily on federal grants and need-based loans during the first year of enrollment, though state grant aid also constituted a significant portion of aid packages for many students. Over time, reliance on federal aid—especially the Pell Grant—increased, particularly after four years of enrollment. Reliance on non-need-based loans as a proportion of total loans also increased over time. This may have been a function of decreased use of Perkins and Parent loans during the later years of enrollment. Stafford Loans represented the single largest source of loan aid across all years of enrollment. Generally, an increasing reliance on loans over time is consistent with prior research (Nora, et al., 2006). Finally, very few students received private grant aid or state or federal work-study money. In addition, these sources of aid constituted a very small proportion of total aid dropping to nearly zero by the end of the observation period.

Descriptive Findings for Timing to First Departure

Looking at the prevalence of first departure we see that by the end of the observation period just over 10 percent of students had not departed (see Table 5). This indicates that it was common among this sample of students to depart (i.e., not attempt to earn credits) postsecondary education for at least a year once they had begun. The greatest proportion of students departed after year two.

Table 5. Prevalence of First Departure

Time	Beginning Total	Survivor Function	Std. Error
1	4963	0.72	0.01
2	3571	0.56	0.01
3	2041	0.38	0.01
4	923	0.26	0.01
5	319	0.16	0.01
6	37	0.10	0.01
7	9	0.10	0.01

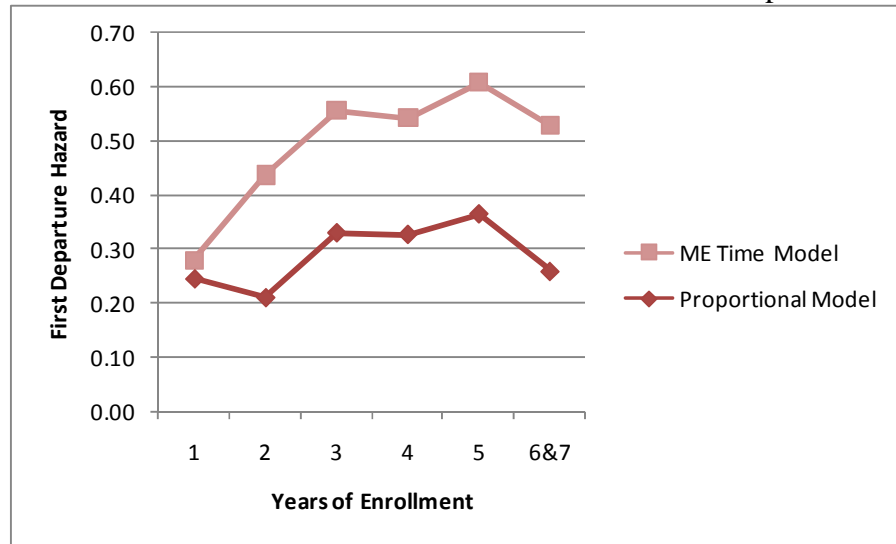
Inferential Findings for Timing to First Departure

Three discrete-time models were estimated to discern the effects of differentiated forms of financial aid on timing to first departure. As recommended by Singer and Willett (2003), a baseline model accounting only for the main effects (ME) of time was first estimated. The baseline model generates a fitted hazard profile against which subsequent models with additional control variables can be compared. Next, a proportional hazards model was estimated. This included time-constant and time-varying variables hypothesized to affect timing to departure. Similarly to the ME time model, a proportional hazards model provides a point of comparison against which additional hypotheses and models can be tested. Finally, a non-proportional hazards model was estimated. A key feature of non-proportional models is that the effect for focal variables is allowed to vary in each time period, thereby foregoing the assumption that hazard is proportional across time.

Main effects of time and proportional hazards model

Findings from the ME time model show that likelihood of departure increased significantly with each additional year of enrollment, excepting years six and seven. If first departure had not occurred after five years of enrollment, the likelihood of it occurring in years six and seven was not significantly different from the first year of enrollment in the ME time model, though there was a significant difference in the proportional hazards model. We see from Figure 8 that hazard for departure increased from the first to third years, decreased slightly in year four, finally peaking in year five. Statistics for the overall fit of the model (Chi-square=84.40; - 2 Log Likelihood=13,969) indicate that likelihood of first departure varies with time, making survival analysis and appropriate method for further analysis.

Figure 10. Fitted Hazard Profiles for Main Effects of Time & Proportional Models



Comparing the hazard profile for the ME time model in Figure 8 above to the proportional model which controls for student background, academic preparation, financial aid, and college enrollment characteristics yields a noticeable difference. Although initial hazard rates are similar in year one (near 28%), when we control for variables hypothesized to affect student departure we see an overall downward shift in the profile. Most noticeably, the likelihood of departure actually decreased in the second year of enrollment, but then increased in year three, stabilized in year four, and finally peaked in year five. The difference in peak hazard rates (during year five) between the ME time and proportional hazards model was 24 percent. This considerable difference coupled with the superior fit of the proportional compared to the ME time model highlight the importance of considering how factors—including financial aid—affect first departure in addition to time.

Effects of Differentiated Aid on Likelihood of First Departure

A central assumption of the proportional hazard models is that the effects of independent variables do not vary over time, resulting in one estimate for the effects of each variable in the model. The results for the effects of differentiated forms of financial aid are presented in Table 6.

Table 6. Selected Regression Results from Proportional Hazards Model Showing Effects of Differentiated Aid on Likelihood of First Departure

Variables	Significance	Odds-Ratio
Total Cost	**	1.03
Federal Grants	*	0.99
State Grants		1.00
Need-based Loans	**	0.99
Non-need-based Loans	****	0.99
Institutional Aid		1.00
Private Gift Aid		1.00
Work-study		0.99
Received Aid	****	0.82
Applied for Aid	****	0.77
Person Periods=11,863		
- 2 Log Likelihood		12722.64
Model Chi-Square		1331.31
Correctly Predicted		65.30

****p<0.001, ***p<0.01, **p<0.05, *p<0.10

Total cost, federal grants, and need- and non-need-based loans were all significantly related to likelihood of departure, though in each case the effect was relatively small. A \$1,000 increase in total costs was associated with a 3 percent increase in the likelihood of departing in any year, holding all else constant. By contrast, a \$1,000 increase in any type of loan or federal grants was associated with a decreased likelihood of departure, controlling for all else. Receipt of aid was associated with a decreased likelihood of departure, ceteris paribus. Applying for aid was also associated with decreased likelihood of departure. The effect for this categorical indicator was greater than those for the amount of loans or federal grants.

Findings From Non-proportional Hazards Model

Next, a non-proportional hazards model was estimated. Unlike the prior models, the non-proportional model allows the effects of aid to vary in each time period via an interaction between types of aid and time indicators. Forms of financial aid that were statistically significant in the proportional model, i.e., total cost, need- and non-need-based loans, as well as federal

grants, were included in the non-proportional model. The omnibus hierarchical test (Jaccard, 2001) was used to determine whether the non-proportional model was a better fit to the observed data than the proportional model. Results indicate the non-proportional model significantly improved model fit (at the 0.005 level of significance), enabling us to conclude that the effects of aid on likelihood of departure vary over time.

Among the variables for which effects were allowed to vary over time, total cost was the only predictor that was statistically significant in each time period. Generally a \$1,000 increase in total cost in each time period was associated with an increased risk of departure compared to the preceding time period, excepting year four. In the fourth year the effects of total cost declined somewhat compared to the prior year but was still associated with an increased likelihood of departure, controlling for all else (see Table 6 for partial regression results).

Effects of Student Background, Academic Preparation, and College Enrollment on Likelihood of First Departure

It is worth noting that several other variables were significantly related to likelihood of departure. As age increased, the likelihood of first departure increased, *ceteris paribus*. Men were less likely than women to depart. Interestingly, students who earned a Core 40 diploma or a GED were more likely to experience departure than students with a regular high school diploma. High school rank was statistically related to departure, but the effect so small as to be practically insignificant. Students who attended research universities or state universities were more likely to depart than those who attended a regional university. Living on campus was associated with a decreased likelihood of departure compared to those who lived off-campus or with their parents. An increase in the number of developmental education credits was associated with increased likelihood of departure. Finally, having a declared major, attempting at least 20 credits in the first

year of enrollment, and attempting more rather than fewer credits overall were each associated with a decreased likelihood of departing, holding all else constant.

This last finding suggests that likelihood of departure may vary for students who were enrolled full- compared to part-time. Two additional proportional hazards models were run to explore the relationships between intensity of enrollment, financial aid, and likelihood of departure. Full-time enrollment was defined as attempting at least 12 credits in each academic year. Students who attempted less than 12 credits each year were considered part time. Given the selection criteria for the sample (having attempted at least six credits during the first academic year), most students (81.8%) met the criteria for full-time enrollment in each time period. The findings (see Table 7) suggest that aid may have different effects for students based on their intensity of enrollment. For example, federal grant aid was not statistically significant for full-time students, but was marginally so for those enrolled part-time. Interestingly, loans of any kind were not significantly related to likelihood of departure for part-time students. Finally, state grants were negatively related to likelihood of departure for part-time students, but not significant for full-time students. Overall, these findings suggest that it may important to consider the effects of aid for full- and part-time students as distinct in future work.

Table 7. Partial Regression Results, Proportional Hazards Model, Likelihood of Departure for Full- and Part-time Students

Variables	Full-time*		Part-time**	
	Signifi- cance	Odds- Ratio	Signifi- cance	Odds- Ratio
Total Cost	**	1.030		0.998
Federal Grants		0.997	*	0.976
State Grants		1.002	*	1.023
Need-based Loans	**	0.992		0.990
Non-need-based Loans	**	0.985		0.996
Institutional Aid		0.995		1.000
Private Gift Aid		0.992		0.774
Work-study		0.995		0.565
Received Aid		0.903	**	0.609
Applied for Aid	**	0.825	****	0.569
Person Periods		9,705		1,360
- 2 Log Likelihood		997.14		1613.50
Model Chi-Square		19.97		7.64
Correctly Predicted		64.10		67.70

****p<0.001, ***p<0.01, **p<0.05, *p<0.10

*Attempted 12 or more credits each year

**Attempted <12 credits each year

Consideration of Competing Events

Educational outcomes like stopping out, departing, graduating, or re-enrolling after a period of stop-out may be related. For example, a student who enrolls continuously may be more likely to graduate than one who does not. Single-risk event hazard models assume that such events are independent. Yet, prior research (DesJardins, et al., 1999; DesJardins, Ahlburg, et al., 2002) suggests that such events may be interdependent, making it important to estimate competing events models as a check of the robustness of the single-risk models. Therefore, a competing risks model was estimated here to jointly estimate the effects of financial aid on likelihood of first departure or earning a baccalaureate degree. It is reasonable to assume that likelihood of first departure may be related to earning a postsecondary credential because virtually all students (n=309) who earned a degree also experienced first departure (n=297).

A multinomial logit model was used to estimate departure and graduation as competing events. Because so few students had earned a postsecondary credential by the end of the observation period, it was necessary to estimate a reduced model. Findings from the competing risks model with respect to the effects of differentiated forms of aid on likelihood of first departure are generally similar to the single-risk model (see Table 8). An increase in total cost was associated with a decreased likelihood of graduating and an increased likelihood of first departure. Need-based loans were positively associated with graduating, but not with first departure. Non-need-based loans decreased likelihood of first departure, but were not significantly related to graduating. Interestingly, the dichotomous indicators of receiving aid or applying for aid were both related to an increased likelihood of departure, but were not significantly related to graduation.

Table 8. Partial Regression Results, Competing Risks Model Testing Joint Probability of Departure and Completing a Postsecondary Credential

Variables	First Departure		Graduation	
	Signifi- cance	Odds- Ratio	Signifi- cance	Odds- Ratio
Compared to Year One				
Year Two	****	1.26	****	0.03
Year Three	****	0.69	****	0.01
Year Four	****	0.56	****	0.00
Year Five	****	0.33	****	0.00
Year Six & Seven		1.12	****	0.00
Total Cost	**	1.03	****	0.87
Federal Grants		0.99		0.99
State Grants		1.00		0.96
Need-based Loans		1.00	**	1.01
Non-need-based Loans	**	0.99		1.00
Institutional Aid		1.00		0.99
Private Gift Aid		1.00		0.95
Work-study		0.99		0.99
Received Aid	**	1.16		0.93
Applied for Aid	****	1.24		0.98
SAT Combined		1.00		1.00
Cumulative College GPA	****	0.56	****	5.43
Total Credits Attempted	****	0.96	*	1.02
Compared to Research Universities				
Regional	****	1.35	****	5.51
State	**	0.80		1.01
Urban		1.13	**	2.49
Compared to Living On-Campus				
Housing Missing, Overseas	****	0.54		2.25
Off-Campus	****	0.48		1.16
With Parents	****	0.47		1.37
Resident	**	1.39	****	12.59
Person Periods= 11,863 - 2 Log Likelihood =14,114.862 Model Chi-Square= 2558.116				

*Reference group is students who did not depart or graduate during the risk period.

****p<0.001, ***p<0.01, **p<0.05, *p<0.10

The most consistent finding from the preceding survival models is the negative relationship between total cost and remaining enrolled. Across the departure models, a \$1,000 increase in total cost was associated with increased likelihood of departing for at least one year. Moreover, cost was found to have a negative relationship with earning a postsecondary

credential in the competing risks model. Findings from the non-proportional model suggest that cost may have the greatest effect on likelihood of departing during the third and fifth year of enrollment.

Though the effects were modest, federal grants and loans (both need- and non-need-based) reduced the likelihood of departing. However, like cost, these forms of aid may have different effects on likelihood of departing at different points in time. Results from the non-proportional model showed that non-need-based loans were significantly related to reducing likelihood of departure in year two while need-based loans played a role in the fourth year. Interestingly, the effect of federal grants on departure did not vary across time and was not statistically significant.

While different forms of financial aid affected likelihood of departing, other variables also played important roles, and in some cases had a greater effect. Men were less likely than women to depart. Students with declared majors, who attempted 20 credits in their first year of enrollment, or who attempted more (rather than fewer) credits each year were less likely to depart overall. Earning a regular high school diploma compared to a Core 40 (i.e., college prep) or GED was associated with a decrease in propensity to depart. Students who attended regional institutions were less likely to depart than their peers at research universities. Finally, it is worth noting that applying for aid was negatively associated with departing in each of the survival models. The finding for this dichotomous indicator warrants further discussion in the next chapter, but briefly this may suggest an element of self-selection with respect to receipt of aid and the academic outcomes explored in this study.

Effects of Aid Packaging on Academic Success and Momentum

Relatively little research has focused on the particular mechanisms through which aid affects persistence, though prior work has suggested it has direct (i.e., enabling students to pay for school) and indirect effects. Indirect effects of aid on persistence may include enhancing social (Cabrera, et al., 1990) and academic (Cabrera, et al., 1993) integration as well as affecting academic performance as measured by cumulative Grade Point Average (Cabrera, et al., 1993; Lichtenstein, 2002). To explore the ways in which aid packaging may affect components of education attainment the relationship between gift and loan aid on academic success and momentum is modeled next. Academic success is measured as cumulative grade point average while academic momentum is measured as the number of credits attempted in each term.

Descriptive Findings for Credits Attempted, Aid Packages, and Academic Performance

Looking at average aid packages and costs by institution type we see that Latinos who attend state or research universities have the highest proportion of gift aid (40.2% and 39.8%, respectively) followed by regional campuses (34.4%) (see Table 9).

Table 9. Average Credits, Aid Package, Cost, and GPA by Institution Type

	State universities	Regional campuses	Urban university	Research universities
Credits Attempted	28.0	19.3	20.1	29.0
Proportion Gift Aid	40.2%	34.4%	32.6%	39.8%
Proportion Loans	38.8%	26.9%	30.1%	36.1%
Total Cost	\$ 11,162.34	\$ 3,255.35	\$ 3,965.23	\$ 12,292.81
Cumulative GPA	2.59	2.43	2.51	2.71

Loans comprise a greater proportion of aid packages at state universities (38.8%) than any other type of institution. Students who attended regional campuses had the lowest proportion of loans to total aid (26.9%). In addition, students who attended regional campuses also had the lowest average cost (\$3,255.35), followed by the urban university (\$3,965.23), state universities (\$11,162.34) and research universities (\$12,292.81). Likely, the higher average cost of

attendance at state and research universities is related to more students living on-campus and attempting more credits annually. Students who attended a regional campus attempted 10 fewer credits on average than their peers at research universities and nine fewer credits than those who attended a state university. This suggests that students who enrolled in regional campuses or the urban university were taking fewer than 12 credits per semester. Finally, the average cumulative GPA was lowest among students who attended regional campuses (2.43) and highest among those who attended a research institution (2.71).

Inferential Findings

Effects of aid packaging on cumulative grade point average

Two models explored the effects of aid packaging on cumulative GPA controlling for the factors mentioned above. The first model included the ratio of gift aid total aid whereas the second model included the loan to total aid ratio. Since student aid was either in the form of gift aid or loans separate models were necessary. Both models were statistically significant at the 0.0001 level, though they explained a relatively small proportion of the overall variance in cumulative GPA (the Adjusted R-square for both models was 0.2523).

With respect to the effects of aid packages on cumulative GPA, a one point increase in the ratio of gift aid to total aid resulted in a 0.13 increase in cumulative GPA, *ceteris paribus*. By contrast, a one point increase in loans to total aid was associated with a 0.14 decrease in cumulative GPA, controlling for all else. Both variables were statistically significant at the 0.0001 level (see Table 9). Interestingly, however, receiving aid was negatively related to GPA in the gift aid model, whereas it was positively related in the loan model. Specifically, students who received any form of financial aid in the gift aid model had a cumulative GPA 0.06 points lower than students who did not receive any form of aid, holding all else constant. In

comparison, students who received aid in the loan model had a cumulative GPA 0.07 points higher than those who did not. However, receipt of aid was significant at the 0.05 level.

It is worth noting that gift aid may have different sources depending on the type of institution attended and while some controls for institutional context are included here others, such as peer effects, are not. For example, a larger portion of gift aid at research universities comes from institutional scholarships than is the case at regional institutions. In the first year of enrollment at research universities the average amount of institutional aid was just under \$5,000 compared to \$500 at regional institutions. Research universities in Indiana tend to be more selective, attract better academically-prepared students, and require all first-year students to live on-campus. The combination of these and other factors at research universities may contribute to higher GPAs among students via peer effects, for example, that cannot be completely controlled for in this study.

The direction and effect of the remaining control variables were similar across both models. With respect to academic preparation, a positive relationship was observed between high school rank, combined SAT score and GPA, though the effect for SAT was quite small with little practical significance. Interestingly, students who took the Core 40 college preparatory curriculum had a somewhat lower GPA (0.07 points) than their peers who had completed the Regular high school diploma. As the proportion of students receiving free/reduced federal lunch at the high school from which the student graduated increased the average cumulative GPA decreased (0.01 points). An increase in age was positively associated with GPA whereas men had an average GPA 0.11 points lower than women.

Several college enrollment characteristics were significantly related to GPA. Students who attended regional universities or the urban university had higher average GPAs than

students who attended research universities, controlling for all else. It is interesting to note that after controlling for student background, academic preparation and other factors we find a positive relationship between attending a regional institution and GPA despite the descriptive finding above that regional university attendees had the lowest average GPA during the period of study. Living off-campus or with one's parents was associated with a lower GPA compared to students who lived on-campus, *ceteris paribus*. A negative relationship was observed between the number of developmental education courses completed and GPA. Finally, the number of credits attempted as well as earning 20 credits in the first year were positively associated with GPA. In fact, crossing the 20 credit threshold during the first year was associated with an increased GPA of 0.22 points, holding all else constant.

Effects of aid on credits attempted

Similarly to the aid packaging and GPA models, two models were estimated to explore the effects of aid packaging on academic momentum, measured as the number of credits attempted. Both models were statistically significant at the 0.0001 level. A higher proportion of total variance was explained in the academic momentum models (Adjusted R-square=0.6608) than the academic performance models. However, given the strong relationship between credits attempted, costs of attendance, and financial aid this is not surprising.

Like the GPA models we find a positive relationship with gift aid and a negative relationship with loans and the outcome of interest. A one point increase in the proportion of gift to total aid was associated with a 0.97 increase in the number of credits attempted, controlling for all else. A one point increase in the proportion of loans to total aid, by comparison, was associated with a 1.04 decrease in credits attempted. Both gift aid and loan aid ratio were significant at the 0.0001 level. Receiving aid had a relatively larger effect on academic

momentum than the ratio of gift aid or loans. Students who received aid—in both models—attempted more credits on average than students who had not received aid (from 4.83 to 5.80 credits). Receipt of aid was statistically significant at the 0.0001 level in both cases (see Table 10).

Table 10. Regression Results for Effects of Aid Packaging on Credits Attempted

Variable	Gift Aid Model		Loan Aid Model	
	Coefficient	Significance	Coefficient	Significance
Net Price (\$1000s)	0.00		0.00	****
Gift Aid Ratio	0.97	****	-	-
Loan Ratio	-	-	-1.04	****
Received Work-Study	0.01		0.00	
Received Aid	4.83	****	5.80	****
Age	-0.69	****	-0.68	****
Men compared to women	0.53	**	0.53	**
Income scale	0.00		0.00	
High school rank	0.00		0.00	
Compared to Regular HS Diploma				
Honors	0.76	**	0.76	**
Core 40	0.54	**	0.54	**
Missing	0.50	*	0.49	*
Other	-5.65	*	-5.64	*
SAT Combined	0.00		0.00	
Compared to Research University				
Regional University	-7.24	****	-7.24	****
State University	0.13		0.13	
Urban	-7.01	****	-7.01	****
Compared to Living On-Campus				
Housing Missing	2.11	****	2.13	****
Off Campus	1.34	****	1.35	****
With Parents	2.28	****	2.29	****
Compared to Dependent Students				
Indeterminate	-0.60	**	-0.63	**
Self	-0.93	**	-0.94	**
Students with a Declared Major	1.74	****	1.74	****
Developmental Education Credits	0.31	****	0.31	****
Cumulative GPA	2.32	****	2.32	
Twenty-first Century Scholar	0.30		0.28	****
Resident	0.90		0.88	
Proportion HS Receiving Free/Reduced Lunch	-0.01	**	-0.01	**
N=7,902				
Model One Adjusted R-square= 0.6608				
Model Two Adjusted R-square= 0.6608				

****p<0.001, ***p<0.01, **p<0.05, *p<0.10

Academic preparation appeared to have a modest effect on the number of credits attempted. High school rank and combined SAT were not significantly related to credits attempted. Having completed an Honors Diploma (i.e., took more college preparatory courses)

was associated with attempting more credits (0.76 more than students who completed a Regular diploma), *ceteris paribus*. Not having a reported diploma type (more common among students who attended less selective institutions, who delayed college enrollment, or who were non-residents) was positively related to credit taking. Earning a GED or other type of high school diploma was associated with attempting fewer credits compared to students who completed a Regular high school diploma. Finally, as the proportion of students receiving free/reduced federal lunch at the high school from which the student graduated increased the credits attempted decreased, though by only a very small amount (0.01).

Several student background variables were significantly related to credit taking. As age increased the number of credits attempted decreased, holding all else constant. Men were more likely than women to attempt a somewhat greater number (0.53) of credits. Finally, dependency status was significantly related to attempting more credits. Students with an indeterminate status (those who likely did not apply for aid) and those who were self-supporting attempted fewer credits on average than students who were dependents.

College enrollment variables appeared to have the greatest effects on credits taken. Students who lived off-campus or with their parents attempted more credits per year compared to students who lived on-campus. Having a declared major, completing more developmental education, an increase in GPA, and being a Twenty-first Century Scholar were associated with attempting more credits. Finally, the institution at which a student began was also significantly related to course taking. Students who began at a regional or urban university took fewer credits than students who began at a research university. In comparison, students who began at the state universities attempted slightly more credits than their peers at research institutions.

Looking across the findings at the relationships between aid packaging and two components of academic success we see that an increase in the proportion of gift aid received was associated with moderate increases in GPA and credits attempted, controlling for all else. By contrast, aid packages comprised more of loans were associated with taking fewer credits and a lower GPA. It is also interesting to note—given findings from the survival models—that students who attended regional institutions had the highest proportion of gift aid to total aid, though students attending these same institutions took fewer credits on average and had lower average GPAs compared to students at other institutions. Nonetheless, when we control for student background, college enrollment characteristics, academic preparation, and financial aid, we find that receiving more aid in the form of grants has a positive effect on academic outcomes.

Conclusions

Results from the analyses show that financial aid has a significant, but modest effect on the likelihood of Latino students remaining enrolled from one year to the next. More specifically, various types of aid affect propensity to persist in unique ways at different points in time. Federal grant aid to Latinos—mostly in the form of the Pell Grant—was the most relied upon (in terms of total dollars as a proportion of total aid) and most frequently used source of aid overall, but especially in the initial years of enrollment. Findings from the survival models suggest that federal grants reduced the likelihood of departure, albeit modestly. The size of the effect did not change over time, however, indicating that federal grants provided a foundation of financial support for Latino students that is relatively constant across time.

Loans, both need- and non-need-based, made up the other pillar of financial support. Among those who remained enrolled, reliance on loans increased over time. Need-based loans, Stafford Loans in particular, made up the bulk of loan aid drawn upon by Latino students in this

study. Reliance on non-need-based loans and parent loans as a proportion of total loans was greatest in the first two years of enrollment, but decreased over time. Results from the survival models suggest that the effects of need-based and non-need-based loans vary over time. Non-need-based loans had a significant effect on reducing likelihood of departure at the end of year two. Need-based loans reduced the likelihood of departure at the end of the fourth year. Again, the effects were modest for both. Indeed, what students experienced and did in college seemed to have the largest effect on remaining enrolled.

Overall, college experience variables showed the greatest effect on persistence. Results from the survival models suggest that (a) what type of institution a student attended, (b) how many credits the student attempted, (c) whether a student lived on- or off-campus, (d) whether the student had a declared major, and (e) academic performance in college all had significant effects in decreasing the likelihood of departure. Interestingly, once we controlled for college experiences the effects of academic preparation in high school, specifically the high school curriculum and the high school rank, diminished or were no longer significant. For example, an increase in high school rank reduced the likelihood of departure, but when we controlled for college experiences, high school rank was only marginally related to departing.

Interestingly, Core 40 recipients—despite having presumably taken a more rigorous college preparation curriculum—were more likely than regular high school diploma recipients to depart. In fact, the likelihood of departure for Core 40 diploma recipients actually increased once we controlled for college enrollment characteristics. This seemingly counterintuitive finding might be explained by institutional contexts. Most students who earned a regular high school diploma attended a regional institution, where they were more likely to persist than their peers at other institutions. A larger proportion of Core 40 than regular diploma recipients attended

research universities where they were less likely to persist. In short, findings regarding the effects of high school diploma may suggest an interaction between institution type attended and high school curriculum, with the type of institution attended by a student ultimately playing a greater role in promoting or perturbing persistence.

We see the potential interaction of contexts and student characteristics in other ways too. For example, Latinas were more likely to depart than Latinos, controlling for all else. Descriptively, we found that a higher proportion of Latinas enrolled in research universities, which are further away from the geographic centers of the Latino population in Indiana. By contrast, Latinos were more likely to be enrolled in regional institution closer to larger communities of Latinos. Although the survival models control for institution type, it is possible that there exists an interaction effect between gender and type of institution. Moreover, characteristics of institution type that are not controlled for in these analyses—such as campus climate or distance from home—may be at play differently for men and women and thus partially explain the finding that women are more likely to depart overall.

In sum, what a student does and experiences in college appears to play the largest role in promoting persistence. Financial aid appears to be a necessary but not sufficient condition of academic success. Moreover, the role of aid may be mostly indirect, allowing students to take more credits and to perform better academically by focusing on their studies rather than focusing on paying the bills.

Chapter Five: Conclusions

Using event history analysis this study explored the effects of different forms of financial aid on likelihood of departure among baccalaureate degree-enrolled Latinos in public postsecondary institutions across Indiana from 1999-2005. Three discrete-time models were estimated: (a) a proportional hazards model, (b) non-proportional hazards model, and (c) a competing risks model. The proportional hazards model assumed that the effects of different forms of aid did not vary over time whereas the non-proportional hazards model allowed the effects of selected forms of aid to vary in each academic year. For example, need-based loans—a major source of funding for Latinos in this study—were found to play a greater role in persistence later in the enrollment period. Both models controlled for student background, academic preparation, and college enrollment characteristics. Although not the focus of this study, a competing risks model was also estimated to test the robustness of the findings for the departure models. Because departing may be related to other events—like graduating—a multinomial logit model with proportional hazards was estimated with departure and earning a postsecondary credential modeled as two mutually exclusive outcomes. The substantive findings from the single-risk models of departure did not differ from the competing risks model. Finally, four OLS models were estimated to explore how the composition of aid packages (i.e., proportion loans and proportion grants) impacted academic performance and academic progress as measured by grade point average and credits attempted, respectively.

Considered collectively, the findings from the descriptive analyses, event history, and OLS regression models paint a complex picture of educational attainment. This is not surprising given the complex nature of people's lives and the milieu of experiences, sociocultural contexts, and personal choices in which educational pathways are laid. While this complexity is certainly

evident in prior research on the relationships between financial aid and attainment, adopting a longitudinal approach amplifies and expands the dimensions we must consider and attempt to make sense of. Cross-sectional approaches to studying attainment are temporally unidimensional. Yearly changes in enrollment characteristics, familial circumstances, and receipt of aid are replaced with assumptions about invariant factors and time-constant effects. Inclusion of temporal dimensions of persistence along with time-varying variables and time-varying effects can expand our understanding of the ways in which financial aid relates to attainment, yet the interpretive exercise becomes more challenging. The remainder of this chapter begins this process of sense-making by weaving the major findings together thematically then outlining the implications for policy making, practice, and additional research.

Major Findings

The effects of Grants and Loans

Consistent with prior work (Olivas, 1985; Santiago & Cunningham, 2005) this study finds that Latinos are most reliant upon federal sources of aid (i.e., Pell and Stafford) in paying for school. However, the overall contribution of grants and loans to promoting persistence was modest, though not insignificant. Federal grants reduced the likelihood of departure over time, though the effect did not vary across time. In other words, federal grants did not appear to play a more or less important role in persistence in any given year. State and institutional grant aid were not significantly related to persistence, perhaps in part because the amounts were fairly small compared to federal grants. Pell Grants constituted the single largest source of any form of grant aid on average. This suggests that federal grant aid and more specifically Pell Grants provided a moderate foundation of financial support for Latino students and had a positive effect on persistence.

Loans also affected students' propensity to persist, but unlike federal grants their effects varied over time. Descriptively we find that students relied on parent and non-need-based loans more in their initial two years of enrollment than in subsequent years. Need-based loans (especially the Stafford Loan) constituted the single largest source of loans throughout all years of enrollment, however. In addition, usage of all forms of loans increased over time, with need-based loan amounts peaking after the fourth year. This descriptive portrait suggests that Stafford Loans—like Pell Grants—provide a consistent foundation of financial support that is supplemented early in their academic pathways via non-need-based loans. The greater reliance on parent and other forms of loans initially may be indicative of initial feelings of certainty on the part of students and their parents about the likelihood of academic success. For those who persisted, financial need in subsequent years of enrollment may have been met in part by increased Stafford Loan amounts (e.g., \$3,500 for a first-year and \$4,500 for a sophomore).

Findings from the non-proportional survival model which control for other factors known to affect persistence bear out the impressions from descriptive analyses: Need-based loans were significantly related to decreased likelihood of departure after the fourth year and non-need-based loans had a similar effect at the end of year two, *ceteris paribus*. In comparison to the role of federal grants it appears that Latinos relied on loans at different points in time. Need-based loans appeared to provide a consistent measure of financial support, but were particularly impactful in reducing the likelihood of departure at the end of the fourth year. Non-need-based loans were important sources of aid early on but their usage decreased as students remained enrolled.

Finally, the results from the exploratory analysis of the effects of aid packaging on key components of academic success—credits attempted and cumulative grade point average—

further illustrate the complex relationships between aid and success. Recall that we found a positive relationship between aid packages comprised of a higher proportions of grant aid (compared to loans) and GPA and credits attempted. Findings from each of the event history models suggest a positive relationship between having a higher GPA, attempting more credits, and propensity to persist. Therefore, we can conclude that grants play a positive but indirect role on attainment, perhaps by enabling students to focus on their academics instead of meeting financial obligations through work or attending part-time.

Applying for Aid

It appears that college-going Latino students in Indiana did not apply for aid in proportion to their financial need, and may have been less likely to apply for aid than their peers nationally. Despite a more than \$16,000 difference in median income between Whites and Latinos in Indiana, data from the state's student information systems show that only 6 percent more of Latinos enrolled in public institutions applied for aid than their White peers. Data from the National Postsecondary Student Aid Study show that nearly 87 percent of Latinos nationwide applied for aid compared to just 72 percent of Latinos in Indiana. King (2006) suggests that students who have the greatest financial need may be less likely than their higher-income peers to apply for aid, in part because of a lack of familiarity with the lengthy and often complicated process. She notes that findings from a Department of Education survey of students indicates that other reasons low-income students may not have applied for aid were because (a) they could afford to pay or (b) they received a form of aid that did not require completion of the Free Application for Federal Student Aid (e.g., employer assistance, private grant aid, or institutional non-need-based aid).

Although we cannot be certain of why students in this study did not apply for aid, the available data suggest that lack of information is among the top reasons. With regard to ability-to-pay, students' sensitivity to prices (discussed in greater detail below) indicates that affordability is an issue for students. Moreover, given the low number of students in this study who received private grant aid and institutional aid it seems unlikely that not applying for aid was related to receiving these forms of financial support. Applying for aid matters because in this study students who applied for aid were less likely to depart than students who did not. This may suggest that students who applied for aid were more certain of the outcome of their enrollment and/or had access to more information about types of aid and how to apply. Absent clear information about what types of aid are available, low-income Latinos—who are likely to be more loan averse than their higher-income peers—may forego applying for aid because they assume aid comes in the form of loans.

Propensity to apply for aid may also be important to understand from a methodological perspective. A persistent and growing concern in financial aid research is the problem of endogeneity (DesJardins, et al., 1999; Dowd, 2006). As Cellini (2008) notes, endogeneity—caused by reverse causality or self-selection bias within models—blunts our ability to make causal inference. Both aspects are likely at play in this study. For example, Latinos who did apply for aid may hold different educational aspirations than their peers. If this is the case, then the modest effects of aid observed here may be partially a function of unobserved motivation. Moreover, it is difficult to ascertain, for example, whether excellent academic performance prompted additional aid or whether additional aid enabled superior performance.

However, results from this study suggest that financial aid promotes educational attainment among Latinos even after addressing concerns about endogeneity. First, the inclusion

of a dichotomous indicator of aid receipt may serve as a proxy variable to help control for omitted variables (Cellini, 2008). In this case, applying for aid is hypothesized to be related to unobserved characteristics, such as motivation, parental encouragement, and access to information about college, consistent with prior research (DesJardins, 2001). In addition, reverse causality—at least with respect to academic performance—is unlikely to be a substantial problem. Although a floor exists for academic progress and performance to maintain any type of financial aid, the common forms of aid on which Latinos relied in this study (Stafford and Pell) were not subject to strict grade point or other performance metrics. The problem of reverse causality is less clear with regard to academic momentum. As calculated here, total cost is a function of the number of credit hours enrolled. Therefore, there is likely a strong bidirectional relationship between attempting more credits, paying more in tuition, and utilizing greater amounts of financial aid. However, as is discussed in more detail below, a goal of the exploratory OLS analyses was to consider the ways in which other mechanisms—such as institution type and academic progress—interact with financial aid to impact timing to departure.

Sensitivity to Sticker Prices

The most consistent finding in this study is the negative relationship between total cost and remaining enrolled. A \$1,000 increase in total cost was associated with increased likelihood of departing for at least one year across all of the hazard models. Moreover, cost was found to have a negative relationship with earning a postsecondary credential in the competing risks model. Findings from the non-proportional model suggest that cost may have the greatest effect on likelihood of departing during the third and fifth year of enrollment.

The combination of a consistently significant relationship between cost and attendance and a weaker and less consistent relationship between financial aid and attendance is intriguing.

Economic theory posits that financial aid alters students' assessments of the relative costs and benefits of attending postsecondary education by reducing the net price paid. Therefore, it is reasonable to assume that if total cost were found to have a significant effect on enrollment total aid would have an equally strong relationship. This is not the case in this study.

Recall, however, that the effects of aid extend beyond the pecuniary to the psychosocial. A substantial and growing body of research has demonstrated that price responsiveness varies by student characteristics (Heller, 1997). For example, low-income students may be more responsive to different forms of aid than their higher-income peers (Paulsen & St. John, 2002). Moreover, some research (St. John, et al., 2005) suggests that price responsiveness may be different for racial and ethnic groups and that students may be more responsive to costs than to aid (St. John & Starkey, 1995).

Overall, this suggests that the larger effects for total cost relative to aid found in this study may be an example of aversion to higher costs or *sticker shock* among Latinos. If this is the case, receipt of financial aid may be insufficient to offset the perceptions of cost. Indeed, prior research (Nora, et al., 2006) suggests that Latinos, particularly those who are low-income, may be more responsive to perceptions of cost than offers of aid. This warrants additional research. DesJardins, Ahlburg, and McCall (2002) attempt to address the relationship between costs and perceived ability-to-pay by modeling the effects of aid *offered* on students' decisions to reenroll, controlling for total costs of attendance. This may be a fruitful direction for this study since aid award data are available.

Contexts Matter

College experience variables showed the greatest effect on persistence. The effects for many of the college experience variables were larger than many financial aid and academic

preparation variables. Entering variables into the model as sequential blocks (e.g., financial aid variables, followed by academic preparation variables) shows that, collectively, college experience variables significantly improved overall model fit and explanatory power. Moreover, the inclusion of college experience variables impacted findings for variables previously entered into the models. For example, once we controlled for college experiences the effects of academic preparation in high school—as measured by high school curriculum and high school rank—diminished or were no longer statistically significant. High school rank was only marginally related to departing after including college experience variables. Overall, results from the survival models suggest that (a) what type of institution a student attended, (b) how many credits the student attempted, (c) whether a student lived on- or off-campus, (d) whether the student had a declared major, and (e) academic performance in college all had significant effects in decreasing the likelihood of departure.

Core 40 recipients—despite having presumably taken a more rigorous college preparation curriculum—were more likely than regular high school diploma recipients to depart. In fact, the likelihood of departure for Core 40 diploma recipients actually increased once we controlled for college enrollment characteristics. This seemingly counterintuitive finding might be explained by institutional contexts. Most students who earned a regular high school diploma attended a regional institution, where they were more likely to persist than their peers at other institutions. A larger proportion of Core 40 than regular diploma recipients attended research universities where they were less likely to persist. In short, findings regarding the effects of high school diploma may suggest an interaction between institution type attended and high school curriculum, with the type of institution attended by a student ultimately playing a greater role in promoting or perturbing persistence.

We see the potential interaction of contexts and student characteristics in other ways too. For example, Latinas were more likely to depart than Latinos, controlling for all else. Descriptively, we found that a higher proportion of Latinas enrolled in research universities, which are further away from the geographic centers of the Latino population in Indiana. By contrast, Latinos were more likely to be enrolled in regional institution closer to larger communities of Latinos. Although the survival models control for institution type, it is possible that there exists an interaction effect between gender and type of institution. Moreover, characteristics of institution type that are not controlled for in these analyses—such as campus climate or distance from home—may be at play differently for men and women and thus partially explain the finding that women are more likely to depart overall. The influence of campus contexts is further illustrated by taking a closer look at Latinos enrolled in regional institutions.

Consistent with nationwide patterns Latinos in this study were more likely to enroll in regional institutions, probably near their homes. Most baccalaureate-degree-enrolled Latinos attended a regional institution followed by research universities. The geographic concentration of Latinos in Northwest Indiana near several regional campuses is likely a contributing factor to the relatively high proportion of students enrolled in a regional institution, though it is interesting to note that the second highest concentration of Latinos in the state is closest to the urban university, yet the smallest proportion of students attend that institution. Significant differences emerged with respect to educational attainment depending on the institutional context. Interestingly, Latinos who attended regional institutions tended to enroll less intensely, had lower cumulative grade point averages, and also received a greater proportion of their total aid in the form of grants compared to their peers at the research institutions. On the one hand, according to

some measures and definitions of academic success and progress Latinos at regional institutions appeared to be doing worse than those enrolled in the state's most selective public institutions (i.e., research universities).

Yet, once we control for factors thought to affect persistence we found that regional-institution-attending Latinos were less likely to depart and more likely to graduate. This suggests that particular aspects of attending a regional institution may be conducive to promoting educational attainment. Possible explanations include proximity to family and more cultural and social support derived from living within an area of greater Latino concentration. Perhaps most important for the purposes of this study is the possibility that a constellation of financial factors—that is, lower tuition, a higher proportion of gift aid, reduced costs through less intense attendance, and living off-campus—contribute to an environment in which financial aid plays a more instrumental role in enabling attendance. To test this possibility a series of exploratory models with interactions between receipt of aid and institution type were run. An omnibus hierarchical test (Jaccard, 2001) of the various models with interaction terms lead to the conclusion that there is an interaction effect between receipt of aid and type of institution attended. Although additional work is necessary to flesh out the particular ways in which institutional context and financial aid interact, we can conclude that financial aid has differential effects on attainment by institution type. For example, perhaps students who attend college at the regional institutions have a longer period to develop a college-going identity because they grew up around the postsecondary institutions (Perna, 2006). Another possible explanation is that regional institutions—especially those in Northwest Indiana—had the highest proportion of Latinos enrolled. This suggests that Latinos who enrolled in these institutions were more likely

to have Latino peers who could help them navigate the institutions by creating what Attinasi (1989) refers to as mental maps.

Implications

Research

As is the nature of research, this study raises as many questions as it answers. Foremost, the findings from this study lend support to the commonsense notion that students' decisions to remain enrolled (or not) are made year-to-year, semester-to-semester, and perhaps day-to-day. Put differently, persistence is inherently a temporal process to which we must apply appropriate longitudinal methodologies. Here we have looked at one component of that longitudinal process: financial aid. The results of this study lend support to those who argue that we need to look at financial aid and educational attainment through the lens of time if we hope to understand how aid promotes or perturbs persistence among underrepresented students. Need-based aid, propensity to apply for aid, college experiences, sensitivity to costs, and the importance of contexts emerge as the thematic areas that each warrant further exploration.

The consistently negative relationship between costs of attendance coupled with the findings for the effects of loans may suggest that—although aid may provide some financial support in promoting attainment—ultimately students still struggle to pay the bills. For example, findings from the non-proportional hazards model suggest that while non-need-based loans may be particularly important in helping a student remain enrolled at the end of year two, costs may *catch-up* with a student at the end of the third year. Data on total debt incurred year-to-year as well as a broader picture of students' financial obligations beyond school (e.g., credit cards, familial responsibilities) could help tell whether the cumulative financial burden finally becomes

too much for a student after the third year. A fuller financial picture may be especially important for Latino students since so many of them lived off-campus and their total costs may be understated compared to students who lived on-campus (and for whom room and board data are available). Findings from the National Postsecondary Student Aid Study suggest that to pay for school Latino students may rely on earnings from work more than their White counterparts do (Santiago & Cunningham, 2005). Additional research is needed to gain a better understanding of the trade-offs between incurring debt and engaging in other efforts to control costs and the effects of these strategies on persistence. Receipt of loans may initially have a causal effect on enrollment decisions and choice of college, as prior research suggests (e.g., Dowd, 2006). However, as a student develops a college-going identity (Tierney, Corwin, & Colyar, 2005) through year after year of success, perhaps the causal relationship becomes more reciprocal. In other words, persistence may more confidence which leads to more commitment, which in turn leads to taking out more loans to persist until graduation.

Future research on the relationships between aid, debt, and persistence should look at the accumulation of debt year-to-year, the academic progress of students, and the ‘non-academic’ financial obligations that may be as pertinent to persistence as students’ ability to pay tuition. In addition, it will be important in future work not to ignore the psychosocial aspects of financial aid and total cost of attendance. The strong negative relationship between cost and departure at the end of year three may be equally attributable to a loss of self-efficacy and self-confidence with respect to earning a degree. Given the low number of Latinos who completed a postsecondary degree in this study it is reasonable to assume that slow progress toward one’s goals coupled with few peers attaining a degree may make students more averse to paying the cost of tuition. Put differently, students’ cost-benefit calculation may change if the perceived

benefits continue to be more fiction than reality. Conversely, the positive relationship between Stafford Loans in year five and likelihood of remaining enrolled suggests that students who see the benefits of persistence are willing to rely on loans. The relationship between the pecuniary and psychosocial effects of aid over time is likely a rich area for mixed-methods research. Rich, qualitative data about Latino students' perceptions of loans, grants, and costs of attendance as they progress through school coupled with econometric modeling using event history techniques has potential to further illuminate the complex relationships which this study has only begun to bring into relief.

Another area that warrants additional research is the propensity to apply for aid among Latinos. As mentioned above, the findings from this study suggest that Latinos are less likely to apply for aid and, moreover, that lack of information may be among the chief reasons for not applying. Future research should explore whether Latino students are less likely than their peers to apply for all forms of financial aid and whether there are generational differences; for example, if second- or third-generation Latino students are more likely to apply for aid, controlling for income. Such research should focus on three distinct but related points. First, it is important to explore whether Latinos are more or less likely to apply for aid prior to college entrance. As Paulsen (Paulsen & St. John, 1997, 2002) and St. John (St. John, et al., 1996) have noted in their nexus studies, the relationship between aid and persistence may be related to the initial relationships between aid and college enrollment, which ultimately are related to students' educational aspirations. It is important to contextualize students' application for aid in the nexus of initial college enrollment decisions.

Next, applying for aid is also a temporal process which can and does vary year-to-year. Research into the application behaviors of Latinos would benefit from a longitudinal approach

that looks at the relationships between academic progress, academic success, and re-applying for aid from year-to-year. So little is known about temporal differences in aid application patterns that a simple descriptive analysis could help to identify crucial points in time when Latinos may be less likely to apply for aid. Future event history models might include applying for aid as a time-varying factor including tests for the relationship between applying for aid and persistence at each point in time.

Finally, future research into whether Latinos are applying for aid in proportion to their need should consider the sociocultural complexity of students' educational contexts. For example, high school characteristics may impact likelihood of applying for aid. High schools with few counselors and small numbers of college-going students may not have the resources necessary for students to learn about the aid application process. Missing out on their chances to apply for aid in high schools these same students may be less likely to apply for aid once they are in college. While the process of applying for aid is an individual act, decisions about whether or not to apply for aid occur in specific contexts, contexts which must be considered, interrogated, and explored if we hope to gain better understanding of aid application behaviors.

The importance of contexts is not limited to the aid application process. As discussed above, students' college experiences—where they lived, how well they performed academically, and more—exerted the greatest influence on persistence in this study. While the complexity of students' lived experiences cannot be fully modeled via event history analysis, there are some clear ways in which longitudinal analyses can be applied to extend this study. For example, having a declared major in year one was positively related to remaining enrolled, however, it is likely that students' major status changes from year-to-year. Future research might allow major to vary during each period in time.

Perhaps one of the most intriguing findings in this study is the interaction between receiving aid at a regional institution and likelihood of persistence. Overall, Latinos who were enrolled in regional institutions did better than their peers who enrolled elsewhere, including research universities. Next steps in this line of research might first examine the distinct relationship within educational sectors between differentiated forms of aid and persistence. It is possible that student loans play a more important role in persistence for students enrolled in a research institution whereas federal grants might be more instrumental in promoting persistence at a regional campus. In addition, building on *student adjustment models* (Cabrera, et al., 1992) which suggest that campus contexts are central to understanding persistence, greater controls for institutional characteristics should be included in future work. The Integrated Postsecondary Education Data System offers a rich starting point for such data. Better controls for institutional contexts will enable a richer understanding of how financial aid fits into the college experience puzzle.

One final area that warrants more work is the complex enrollment patterns of Latinos. An interesting question that emerges from this study is whether pathways to successful academic outcomes for baccalaureate-degree-enrolled Latinos may differ from a traditional portrait of college-going. For example, consider the relative success of Latinos enrolled at regional institutions vis-à-vis their enrollment patterns. These students tended to attempt fewer credits per year than peers at other institutions, yet they were also less likely to depart, controlling for all else. Moreover, virtually all students who completed a postsecondary credential departed public higher education at some point along the way. Recall that only 10 percent of the students in this study did not depart postsecondary education for at least one year during the period of study. Stopping-out at least once, therefore, is the norm among Latino students in Indiana. The scope of

this study was limited to the first instance of departure, however future work should further differentiate the numerous ways Latinos may attend school. Descriptive analysis using McCormick and Carroll's (McCormick & Carroll, 1997) typology of enrollment patterns (e.g., concurrent enrollment, serial transfer, rebounding enrollment, supplemental enrollment) may prove a useful tool. With a better descriptive sense of the ways in which students enrolled in postsecondary education it is then possible to develop event history models with a greater variety of enrollment events.

Policy

Over two decades ago in a study of financial aid packaging for Latino students, Olivas (1985) found that Latinos were most dependent on need-based forms of federal aid and, therefore he warned, were more vulnerable to shifts in the federal government's aid policies. It is remarkable how little this reality has changed in the intervening time, despite seismic shifts in ideology around the purposes of financial aid and profound changes in the demographic make-up of college-goers across the country. The Pell Grant was then and is today the central source of aid for Latinos. As such, deliberations about affordability and the place of the Pell program in promoting persistence should be evaluated carefully for their unique effects on Latino students. Moreover, analyses of the Pell program should be conducted with an eye toward the effects on Latinos. For example, the relative decrease in the purchasing power of Pell due to rising college costs and stagnant Pell amounts likely has a disparate impact on the enrollment and persistence decisions of Latino students. Although it would be an overstatement—based on the findings of this study—to suggest that the Pell Grant is the key to academic success for Latino students, the modest effects of the program indicate that on the margins the program serves its intended

purpose: to provide a foundation of financial support for low-income students on which other sources of aid must be added.

Findings regarding applying for aid point to the potential importance of current policy discussions to simplify the aid application process. With over 100 questions to complete on the Free Application for Federal Student Aid, a variety of lenders competing for students' business, institution-specific methods of awarding aid, as well as thousands of aid sources (from the local Kiwanis club to the Gates Foundation), lack of information and subsequent confusion about how to apply for aid and manage one's aid application seems not only reasonable, but rather inevitable. This may be especially true for students who lack access to college counselors or family members with prior experience playing the aid application game. Simplification of the aid process may be a partial solution to correcting disparities in aid application behaviors.

Ultimately, failing to consider, understand, and address the factors that influence whether Latinos apply for aid render ineffective even the most progressive and generous aid policies. For example, Indiana's relatively successful Twenty-first Century Scholars grant program can have no effect on closing the completion gap between Whites and Latinos (in fact, it could contribute to a widening of the gap) if low-income Latinos are less likely to apply to the program than their White peers because, for example, Latinos are concentrated in high schools with fewer college counselors. Sound policy research on how aid policies are "appropriated" at the local level can inform the design and implementation of new or revised aid policies with understandings that can help disentangle the interactions of race, class, historical contexts, and other sociocultural structures (Sutton & Levinson, 2001).

The Road Ahead

Closing the postsecondary completion gulf between Latinos and Whites is an ethical imperative as well as a social, economic, and democratic requirement. To find practical solutions to the dominant patterns and problems that have created and widened this gulf, researchers, policy makers, educators, students, and communities need to work together. As Suro and Fry (2005) note, the United States is in the midst of a demographic shift as significant as the mass migrations around the turn of the 20th century or the baby boom following World War II. Latinos, both foreign and domestic born, are at the center of this wave. Concurrently, and for a variety of reasons, access to postsecondary education is eroding for Latinos. The confluence of these currents has the potential to speed the erosion of the equity ground gained during the civil rights era, creating a de facto state of segregation where economic mobility and full participation in democracy follow racial and ethnic lines.

Financial access to postsecondary education, a necessary but not sufficient component of educational equity, will not alone bridge the education gulf between Whites and Latinos—the minority group becoming the majority. Nonetheless, ensuring that college-qualified Latinos are able to attend postsecondary education regardless of their financial wherewithal is arguably an easier first step than overcoming persistent issues such as institutional racism and the cross-generational persistence of poverty. As part of the long-term effort to overcome these and other barriers, we must continue to find ways to make college affordable for all.

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- von Hippel, P. T. (2005). How many imputations are needed? A comment on Hershberger and Fisher (2003). *Structural Equation Modeling*, 12(2), 334-335.
- Yamaguchi, K. (1991). *Event history analysis* (Vol. 28). Newbury Park: Sage Publications.

Curriculum Vita

JACOB P.K. GROSS

Project on Academic Success, Indiana University
1900 E 10TH ST, Suite 630, Bloomington, IN 47406
paugross@indiana.edu

EDUCATION

Indiana University Bloomington, IN

Ph.D., History, Philosophy and Policy Studies in Education, Expected December 2008

Concentration: Higher Education

Dissertation Title: Promoting or perturbing access: An event history analysis of the effects of financial aid on Latino students' educational attainment

Chair: Don Hossler

Post-Master's Certificate in Institutional Research, 2006

M.P.A, 2004

Concentration: Policy Analysis

DePauw University Greencastle, IN

B.A., Anthropology & Spanish, with Honors, 2000

Honors Thesis Title: Beauty as a cultural mirror: Perceptions of feminine beauty in two Latin American cultures

AREAS OF RESEARCH & TEACHING INTEREST

Educational attainment of underrepresented groups; student retention; the role of education in social inequality; raced-based privilege in education; research methods; social theory and social foundations; program assessment; policy analysis; action-inquiry; research ethics; and finance and economics

TEACHING EXPERIENCE

Indiana University

Instructor, School of Education, *Diversity Matters* (U212), Fall 2005-Fall 2007

This *on-line* course for undergraduates surveyed diversity in terms of race, ethnicity, gender, sexual orientation, socioeconomic class, nationality, and physical and mental ability. Responsibilities included course design, facilitation of learning, and evaluation of students.

Co-Instructor, School of Education, *Beyond White Privilege* (U212), Spring 2006

In this seminar, undergraduate students were asked to engage in reflection and analysis of their own identities, reflect on their social positions relative to Whiteness, and consider the nature of systemic

inequalities, particularly as related to formal education. Responsibilities included course design, facilitation of learning, and evaluation of students.

Teaching Assistant, SPEA, *Statistical techniques* (K300), Summer 2004

Responsibilities included conducting labs to help students learn SPSS statistical software, holding help sessions three times per week in addition to regular instruction hours, and grading all exams and projects.

Teaching Assistant, SPEA, *Statistical analysis and modeling* (V507), Spring 2004

Responsibilities included conducting weekly lab sessions to help students learn SAS statistical software, holding help sessions outside of regular instruction hours, grading projects and exams, maintaining class web interface, and working individually with students for this graduate level course.

DePauw University

Teaching Assistant, Department of History, *Globalization: Historical context to contemporary crisis* (History 290), January 2001

Traveled to Mexico City, Guerrero, and Chiapas during this month-long intensive undergraduate seminar to assist in teaching, translate for students, and lend expertise in traveling in rural areas of Latin America.

EXTERNAL GRANT FUNDING

Assisted in submitting the following grants and overseeing implementation upon receipt

Hossler, D. (PI). The mobile working students in Northwest Indiana: A policy oriented study of dynamics and factors associated with academic success. This project is funded by the Lumina Foundation for Education for \$621,000 for two years from January 2008-January 2010.

Hossler, D., Toutkoushian, R., & Kuh, G. (PIs). Bridges, maps, and fare: How underrepresented students use educational equity programs. This project is funded by the Spencer Foundation for \$497,575 for May 2008- May 2010.

Obtained the following doctoral fellowships

ASHE/Lumina Dissertation Fellowship (\$14,000), 2008-2009

Discipline-Based Scholarship in Education Associateship from Spencer Foundation/Indiana University, (\$4,000), August 2006 – May 2008

Association for Institutional Research/National Center for Education Statistics Graduate Fellowship Recipient (\$3,000), 2007-2008

PUBLICATIONS

Referreed

Gross, J. P. K., Cekic, O., Hossler, D., & Hillman, N. (Under review). What matters in student loan default: A review of the research literature. *Journal of Student Financial Aid*.

Reynolds, P. R., **Gross, J. P. K.**, Millard, B., & Pattengale, J. (Under Review) Discovering life purpose: Retaining undeclared Students. *Journal of the First-Year Experience and Students in Transition*.

Hernandez, E., Ziskin, M., **Gross, J. P. K.**, & Fasholsa, O. (Under review). Making meaning of work for undergraduate students who are employed. *NASPA Journal*.

Gross, J. P. K., Hossler, D., & Ziskin, M. (2007). Institutional aid and student persistence: An analysis of the effects of campus-based financial aid at public four-year institutions. *Journal of Student Financial Aid*, 37(1), 28-39.

Editor Reviewed

Gross, J. P. K. (Forthcoming). Gramsci and education: Hegemony, contradictory consciousness, and intellectuals. In B. A. U. Levinson (Ed.), *Critical social theory and education: Relationships and possibilities*. Boulder, CO: Paradigm Publishers.

Hossler, D., Ziskin, M., & **Gross, J. P. K.** (In Press). Getting serious about institutional performance in student retention. *About Campus*.

Hossler, D., Ziskin, M., **Gross, J. P. K.**, Kim, S., & Cekic, O. (In press). Student aid and its role in encouraging persistence. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research*. New York: Kluwer Academic Publishers.

Gross, J. P. K. (In Press). Patterns, problems, and possibilities: Trends in Latino students' receipt of financial aid. In D. Hossler, J. P. K. Gross & M. Ziskin (Eds.), *Readings on Equal Education* (Vol. 23). New York: AMS Press.

Hossler, D., **Gross, J. P. K.**, & Dadashova, A. (In Press). Not all college attendance is linear: Comparing lateral transfer students, reverse transfer students, and non-persisting students. In D. Hossler, J. P. K. Gross & M. Ziskin (Eds.), *Readings on Equal Education* (Vol. 23). New York: AMS Press.

Hossler, D., **Gross, J. P. K.**, & Ziskin, M. (Eds.). (In Press). *Readings on Equal Education* (Vol. 23). New York: AMS Press.

Ziskin, M., Hernandez, E., & **Gross, J. P. K.** (In Press). Academic support, equity and cooperative learning: Supplemental Instruction practices at IPAS institutions. In D. Hossler, J. P. K. Gross & M. Ziskin (Eds.), *Readings on Equal Education*. New York: AMS Press.

Musoba, G., Gross, J. P. K., & Hossler, D. (2008). Confronting ambiguity, anarchy, and crisis in institutional research: Using student unit record databases in extra-institutional research. *New Directions for Institutional Research*, 139(Autumn), 95-116.

St. John, E. P., **Gross, J. P. K.**, Musoba, G., & Chung, A. S. (2006). Postsecondary Encouragement and Academic Success: Degree Attainment by Indiana's Twenty-First Century Scholars. In E. P. St. John (Ed.), *Public Policy and Equal Educational Opportunity: School Reforms, Postsecondary Encouragement, and State Policies on Postsecondary Education* (Vol. 21). New York: AMS Press.

St. John, E. P., **Gross, J. P. K.**, Musoba, G., & Chung, A. S. (2005). Improving Academic Success: Degree attainment by Indiana's Twenty-First Century Scholar [Electronic Version]. Research Reports from <http://www.luminafoundation.org/publications/collegesuccess.pdf>.

In Preparation

Gross, J. P. K. (In progress) Learning to be activists: A case study in Latin American solidarity organizing.

Gross, J. P. K., Hossler, D., & Ziskin, M. (In progress) *Promoting, preventing, or perturbing access: The effects of institutional merit aid on student persistence.* Review of Higher Education.

Dadashova, A., **Gross, J.P.K., & Hossler, D.** (In progress) Where You Go May Depend on Where You Start: Does Community College Locale Affect Transfer to a Four-Year Institution?

RELEVANT PROFESSIONAL EXPERIENCE

Associate Director for Research, Project on Academic Success in the Center for Postsecondary Research at Indiana University, January 2006- present

Responsible for overseeing activities for research funded through Lumina Foundation for Education and Spencer Foundation including significant administrative duties, such as supervising a team of six doctoral research assistants, collaborating closely with senior director of research and project PIs, preparing annual reports for funding agencies, hiring and training new project staff, maintaining an extensive statistical code library, and preparing reports and articles for external audiences. Significant research responsibilities include developing and maintaining a statewide longitudinal education data system containing nearly 2 million student records, conducting and leading multivariate statistical analyses, assisting with qualitative research, and presenting work via presentations and publications to scholarly audiences.

Research Associate, Project on Academic Success in the Center for Postsecondary Research at Indiana University, July 2004 – December 2005

Major responsibilities involved conducting and sometimes leading multivariate statistical analyses as well as preparing reports and articles for publications. Duties also included working with campus partners to develop and implement action-inquiry projects designed to enhance student success.

Posse Mentor, DePauw University Student Services, August 2002 - May 2004

Posse Foundation recruits, selects and trains multicultural teams of students (called Posses) from New York, Boston, Chicago and Los Angeles to attend the nation's top liberal arts colleges. I met weekly with students to discuss academic progress, campus adjustments, and state of the Posse. In addition, I facilitated weekly meetings and workshops on issues such as multicultural communication, time management, adjusting to college, wellness, and critical thinking for education.

Director, Russell J. Compton Center for Peace and Justice, DePauw University Student Services, June 2000 – July 2002

Responsible for programming, arranging speakers, traveling with students to conferences and workshops, providing training for students, advising student groups, publicizing resources, developing print and audiovisual library, working with local, state and national organizations engaged in issues of peace and justice.

INVITED WORKSHOPS

Beyond White privilege: A professional development workshop for student services educators. (January 27, 2007). Association of College Personnel Administrators Higher Education Webinar Series.

Beyond White privilege: A professional development workshop for student services educators. (Spring 2006). DePauw University. *This workshop focused on race-based privileges among students, staff, faculty, and organizational policy. Twenty-five participants were divided into self-identified Whites and staff of color to engage in a six-week long series of conversations.*

HONORS & AWARDS

ASHE/Lumina Dissertation Fellowship, 2008-2009

Spencer Foundation/Indiana University Discipline-Based Scholarship in Education Associateship, August 2006 – May 2008

AIR/NCES Graduate Fellowship Recipient, 2007-2008

AIR/NCES/NSF National Summer Data Policy Institute Fellow, June 2005

Poynter Center/NSF Graduate Research Ethics Education in Social Sciences Fellow, June 2005

Michael Schwerner Activist Award from the Gleitsman Foundation, 2000

Walker Cup, DePauw University, 2000 (*awarded to the senior who has done most to change the institution as decided by graduating class*)

PROFESSIONAL SERVICE

Review Team Member, Journal of College Student Development *On Campus & Research in Brief*, August 2008-present

Editorial Board Member, Association for Institutional Research Professional Files, May 2008-present

Editorial Board Member, Education Policy Analysis Archives, January 2007-present

Annual Conference Proposal Reviewer, Association for the Study of Higher Education, January 2006-present

Annual Conference Proposal Reviewer, Association for Institutional Research, January 2006-present

Graduate Student Editorial Board Member, Education Policy Analysis Archives, Spring 2005-December 2006

PROFESSIONAL MEMBERSHIPS & COMMUNITY SERVICE

Association for the Study of Higher Education

Association of College Personnel Administrators

Association for Institutional Research

Indiana Latino Institute, Volunteer Workshop Leader and Researcher

REFEREED CONFERENCE PRESENTATIONS

- Hossler, D., & **Gross, J. P. K.** (2008, November 19). The effects of campus policies, student experiences, and financial aid on student persistence. Paper presented at the American Association of Collegiate Registrars and Admissions Officers Strategic Enrollment Management Conference, Anaheim, CA.
- Dadashova, A., **Gross, J. P. K.**, & Hossler, D. (2008, November 8). Where you go may depend on where you start: Does community college locale affect transfer to a four-year institution? Paper presented at the Association for the Study of Higher Education Annual Conference, Jacksonville, FL.
- Gross, J. P. K.** (2008, November 7). Promoting or perturbing access: An event history analysis of the effects of financial aid on Latino students' educational attainment. Paper presented at the Association for the Study of Higher Education Annual Conference, Jacksonville, FL.
- Gross, J. P. K.** (2008, May 27). Promoting or perturbing access: Longitudinal effects of financial aid on Latino students' academic success. Paper presented at the Association for Institutional Research Annual Forum, Seattle, WA.
- Hossler, D., **Gross, J. P. K.**, & Ziskin, M. (2007, November 10). Promoting, preventing, or perturbing access: The effects of institutional merit aid on student persistence. Paper presented at the Association for the Study of Higher Education Annual Conference, Louisville, KY.
- Gross, J. P. K.**, Ziskin, M., & Hossler, D. (2007, November 10). How much is too much: The effects of working on the persistence of working students. Symposium presentation at the Association for the Study of Higher Education Annual Conference, Louisville, KY.
- Hossler, D., **Gross, J. P. K.**, & Henderson, S. (2007, October 31). Developing the big picture: How postsecondary institutions support student persistence. Session presented at the Strategic Enrollment Management, American Association of Collegiate Registrar and Admissions Officers, New Orleans, LA.
- Hossler, D., & **Gross, J. P. K.** (2007, June 14). Patterns, problems, and possibilities: Trends in Latino students' receipt of financial aid. Session presented at the College Board Preparate Conference, Los Angeles, CA.
- Gross, J. P. K.** (2007, June 6). Patterns, problems, and possibilities: Trends in Latino students' receipt of financial aid. Session presented at the Association for Institutional Research Annual Forum, Kansas City, MO.
- Hossler, D., **Gross, J. P. K.**, & Ziskin, M. (2007, June 5). The utility and effectiveness of using state unit record systems to study campus-based transfer behaviors. Session presented at the Association for Institutional Research Annual Forum, Kansas City, MO.

Toutkoushian, R., Moore, J., **Gross, J. P. K.**, & Hossler, D. (2007, June 4). Effects of nonresident market size on public institution pricing and enrollments. Paper presented at the Association for Institutional Research Annual Forum, Kansas City, MO.

Bull, B., & **Gross, J. P. K.** (2007, February 24). Privacy and the public sphere II: practical considerations. Education-student unit record databases. Panel presentation at the Annual Meeting of the Association for Practical and Professional Ethics, Cincinnati, OH.

Gross, J. P. K. (2007, January 27). Learning to be activists: Latin American solidarity organizing to close the School of the Americas. Paper presented at the Rocky Mountain Conference on Latin American Studies, Santa Fe, New Mexico.

Hossler, D., **Gross, J. P. K.**, & Ziskin, M. (2006, November 2-4). A Multi-Institution Analysis of the Effects of Campus-Based Financial Aid on Student Persistence at Public Four-Year Institutions. Paper presented at the Association for the Study of Higher Education, Anaheim, CA.

Hossler, D., Musoba, G., McKinney, J., **Gross, J. P. K.**, Daun-Barnett, N., & St. John, E. P. (2006, May 14-18). Change Follows Action: Using Action Inquiry to Involve Campus Administrators in Institutional Change and Research. Panel presentation at the Association for Institutional Research, Chicago, IL.

Gross, J. P. K., Reynolds, P. R., Millard, B., & Pattengale, J. (2006, May 14-18). Discovering Life Purpose: Retaining Undeclared Students. Paper presented at the Association for Institutional Research, Chicago, IL.

Musoba, G., **Gross, J. P. K.**, & Hossler, D. (2006, May 14-18). Using State Databases for State and Institutional Policy Research: The Good, The Bad, and the Ugly. Session presented at the Association for Institutional Research, Chicago, IL.

Hossler, D., Ziskin, M., & **Gross, J. P. K.** (2006, November 2-4). Institutional Practice and Student Persistence: Examining the Empirical Record. Paper presented at the Association for the Study of Higher Education, Anaheim, CA.

Hossler, D., **Gross, J. P. K.**, & Ziskin, M. (2006, November 12-15). Affecting Student Persistence Via Institutional Levers: A Report on the Pilot Study on Student Retention. Session presented at the American Association of Collegiate Registrars and Admissions Officers Strategic Enrollment Management Conference Phoenix, AZ.

Hossler, D., Ziskin, M., & **Gross, J. P. K.** (2006, November 9-12). Affecting Student Persistence Via Institutional Levers: A Report on the Pilot Study on Student Retention. Session presented at The College Board Forum, San Diego, CA.

Rago, M., **Gross, J. P. K.**, & McKinney, J. (2006, March 18-22). Think You're Making a Difference? Prove It! Session presented at the Association of College Personnel Administrators Annual Conference, Indianapolis, IN.

Gross, J. P. K. (2006, February 22-26). Practiced Identities and Creating Change: Latin American Solidarity Organizing as a Vehicle for Affecting Agency and Sociocultural Systems. Paper presented at the Rocky Mountain Conference on Latin American Studies Annual Conference, Denver, CO.

Gross, J. P. K., & Musoba, G. (2005, July 17-19). Persistence at Four-Year Institutions by Transfer Students from Two-Year Colleges. Paper presented at the 3rd Biennial Conference on Transfer and Articulation, Indianapolis, IN.