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The Effect of State Financial Aid Policies on College Completion

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Abstract

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MPA, Columbia University, 2009

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Doctoral Study Submitted in Fulfillment

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Abstract

In 2008, state legislatures provided $6 billion in financial aid to 2 million low-income young adults. When low-income young adults receive state financial aid and do not complete college, states lose their investment because fewer people with degrees will contribute to the state's economy. Declining states' budgets have led to (a) the rising cost of higher education, (b) state merit-based aid that has targeted nonminority students from affluent backgrounds, and (c) state need-based aid that has targeted students further along in their college career. State need- and merit-based aid may contribute to the lack of college completion among low-income freshman students who rely on financial aid. The purpose of this study was to explore the differences between state need- and merit-based aid as enrollment factors of low college completion among low-income students in the U.S. This study was grounded on Tinto's model of social integration. Secondary data collected by the National Center for Education Statistics on 101,000 freshmen who attended 1,360 postsecondary institutions in 2003-04 and 2008-09 were used for this study. Logistic regression was used to test and compare two models. Logistic regression tested the relationship between the predictor variables of state need- and merit-based aid and degree completion. This study's results revealed that state merit-based aid had a greater predictive value than state need-based aid as enrollment factors of college completion among low-income young adults. This study contributes to positive social change by providing state policy makers with research results to evaluate and formulate state financial aid policies that will increase access to financial aid and college completion rates among low-income freshman students.

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Dedication

This research is dedicated to my parents, who were the greatest humanitarians I have known and gifts from God. I witnessed their tireless inspiration to hundreds of underserved minority youth and adults by providing excellent medical services, counseling, education, mentoring, scholarships, sponsorships, time, and care to their community. This research is also dedicated to minority students who have a vision to succeed in higher education and lack the resources to do so.

Acknowledgments

First, I would like to thank God for helping me to complete this doctoral journal by faith. In Him, all things are possible. I am very thankful for a supportive family and husband who understands that education should be an affordable opportunity as well as a choice and not a privilege for all who want to pursue it. Thanks to the National Center for Education Statistics for guidance on data the institution provided for this study. I also want to thank Dr. Singh as an inspiring mentor throughout the dissertation review and Dr. Shepeard with thoughtful feedback and guidance on the doctoral process. I would like to thank Walden University's support staff for making the doctoral process an achievable goal.

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Chapter 1: The Background of State Financial Aid Policies

Introduction to the Study

College completion is an important topic for a number of key stakeholders, such as students, parents, postsecondary institutions, corporations, communities, and state legislatures. The topic is especially important to state legislatures because they are the largest providers of financial aid to college students attending public institutions (Douglass, 2010). State financial aid is defined as need-based, merit-based, and loan programs. Even though enrollment for college students has increased since 2010, college completion for low-income young adults still remains low (Institute for Higher Education Policy [IHEP], 2010). State financial aid policies may contribute to low college completion among low-income young adults (Singell & Stater, 2006). Therefore, state legislatures are challenged with finding policy solutions to increase college completion among low-income young adults in order to protect their investment.

The issue of college completion for state legislatures is complex and requires further research and analysis on the effect of state financial aid on college completion among low-income young adults. Chapter 1 includes the rationale for this study, supported by the research on the condition of state financial aid policies with a detailed analysis on need-based versus merit-based programs. Chapter 2 provides the literature review, which includes the student retention model as the theoretical framework and current student retention research as the conceptual framework for this study. The literature review led to the development of the methodological approach for the research design and the identification of the dependent and independent variables for this study.

Chapter 3 includes the quantitative research rationale, the research questions, hypotheses, data collection, and analysis. The variables for the research were identified in a data set taken from a longitudinal study conducted by the National Center for Education Statistics (NCES) a division of the U. S. Department of Education. This study included variables for first-time, full-time students enrolled during the 2003-04 academic year at two- and four-year postsecondary institutions in the United States. This study consisted of one cohort of students surveyed and tracked at two instances in their postsecondary career. The first instance occurred upon enrollment during the 2003-04 year. The second instance occurred during the 2008-09 academic year. For this study, the independent variables included grade point average for the 2003-04 academic year, attendance intensity pattern for the 2008-09 academic year, state aid total for the 2003-04 academic year, state merit grants during the 2003-04 academic year, price of attendance at various institutions for the 2003-04 academic year, transcript: type of transfer for the first transfer, income as percentage of poverty level during the 2003-04 year, first institution control for the 2003-04 academic year, gender, and race/ethnicity. The dependent variable was degree attainment or level at the last institution enrolled through the 2008-09 academic year. This study included transfer students for a more accurate picture of student mobility. Chapter 4 includes the results of a predictive model that used binary logistic regression to test the relationship between the predictor variables mentioned and the dependent variable. Chapter 5 includes recommendations for further research, strategies for state legislatures to possibly implement, and insight for key stakeholders, such as postsecondary institutions, taxpayers, parents, and students.

State Financial Aid Policies: Need-based Versus Merit-based Aid

By the 1980's, state legislatures began reevaluating financial aid policies, due to decreasing federal support, declining state revenue, and low college enrollment (Bound & Turner, 2004; Douglass, 2010). State legislatures shifted their focus from need-based to merit-based programs. As a result, state legislatures implemented merit-based scholarship programs to inspire bright students to attend college, to encourage students to perform well in college (McKinney, 2009), and to offset tuition increases faced by students from middle-class families (Ness & Mistretta, 2010). The Georgia Hope Scholarship Program was the first state-administered merit-based student aid program to award students on the sole criteria of academic achievement (McKinney, 2009) and served as a bench mark for other merit-based programs, such as the Florida's Bright Futures Scholarship Program. Other state legislatures, such as Alabama, Kentucky, Louisiana, Maryland, Michigan, New Mexico, Texas, and Washington followed a similar merit-based aid model (Heller, 2002; Heller & Marin, 2004; National Association of State Student Grant and Aid Programs [NASSGAP], 2007). By 2003, 16 states had implemented merit-based scholarship programs to raise state revenue for higher education. This revenue came from various sources, including land-grant endowment funds, general state revenues, state lotteries, National tobacco settlement trust fund, and legislative appropriations (Mckinney, 2009). However, by 2009, the recession had hindered the progress of state financial aid goals across the nation (Douglas, 2010). The lack of state progress has further challenged postsecondary institutions to find creative ways to increase enrollment and college completion among students of diverse backgrounds.

During the 2000s, the drop in state appropriations to higher education led to tuition increases by postsecondary institutions to offset the loss in revenue (Ness & Mistretta, 2010). The consistent rise in tuition prices has affected student college enrollment, with the greatest impact on those from different ethnic and socio-economic backgrounds. Increases in tuition prices and the lack of financial aid by institutions promoted a lack of responsiveness from low-income, minority students regarding college choices while attending college (Ellwood & Kane, 2000; Paulsen & St. John, 2002). Students of specific socioeconomic and ethnic backgrounds have been more sensitive to changes in financial aid and tuition increases based on state and institutional policies. For instance, Black students reacted to changes in financial aid and the cost of college education process based on their knowledge of financial aid changes (Perna & Titus, 2005; St. John, Paulsen & Carter, 2005), while race, income, and types of financial aid created different student responses to college enrollment (Kim, Desjardins, & McCall, 2009). Low-income, minority groups responded to Pell Grants more favorably than loans, due to financial need (Linsenmeier, Rosen, & Rouse, 2006). As institutions increased merit-based aid, the amount of Pell Grants offered to low-income students decreased as well as their enrollment to college (Ehrenberg, Zhang, & Levin, 2005).

Statement of the Problem

In 2008, 2.3 million low-income young adults enrolled in college (IHEP, 2011) and received $6 billion in state financial aid (NASSGAP, 2009). Low-income young adults enrolled in college are the largest recipients of state financial aid (NASSGAP, 2009). Of these students, Blacks, Hispanics, and Native Americans had college

completion rates of 6%, 7%, and 6% respectively (IHEP, 2010). Asian/Pacific Islanders and Whites had college completion rates of 20% and 14% respectively (IHEP, 2010). Although enrollment for low-income young adults has increased at two- and four-year public and private institutions (Goldrick-Rab & Roksa, 2008), minimal changes have occurred in college completion and degree attainment for these students between 2000 and 2010 (IHEP, 2010).

State financial aid has declined by 10%, since 2005, while the lack of college completion among low-income young adults continues to persist in the United States. Multiple stakes holders are affected by the issues. States can lose their investment in the form of future tax revenues for every low-income young adult who enrolls in college, receives state financial aid, and does not complete college (Oliff, Palacios, Johnson, & Leachman, 2013). Public and private colleges and universities lose revenue, which could lead to the reduction of student programs, courses, faculty, diversity, and the staffing necessary to promote educational equality among low-income young adults (Zhang, 2009). Therefore, colleges and universities may raise tuition prices to offset the loss in revenue (Ness & Mistretta, 2010). Tax payers lose their investment as well as states and may pay increased tuition costs, which can limit educational opportunities (Oliff et al, 2013). Low-income young adult students lose the opportunity for financial stability, career options, and the freedom to make informed choices that could lead to social equality. Therefore, college completion is an important policy issue for state legislatures as well as postsecondary institutions, students, parents, and tax payers.

The extant literature does not include information on the effect of state financial aid as an enrollment factor to predict college completion. This study will explore the effect of state financial aid policies on low-income young adult students in two- and four-year public and private institutions in the United States. Transfer students will also be included in this study.

State Budgets and Higher Education

Since 1990, state legislatures tried to find creative ways to fund higher education, while state budgets continued to decline (Douglass, 2010). Therefore, state performance in higher education is increasingly important to state legislatures as well as postsecondary institutions, parents, students, tax payers, and the higher education community. Measuring Up 2008 is a fifty-state analysis on state performance based on five indicators, which included: preparation, participation, affordability, completion, and benefits. According to Callan (2008), the most significant state improvements occurred in preparation and tracking benefits, while the least significant changes occurred in affordability and college completion for bachelor's degrees. Although data indicated that state financial aid policies affect student enrollment among low-income young adults, little is known about state financial aid as an enrollment factor to predict college completion. There is a need for a theoretical framework to guide state legislatures in implementing equitable financial aid policies that will promote college completion for low-income young adults at two- and four-year public and private institutions.

Shifting State Financial Aid Policies

State financial aid policies have targeted nonminority students from affluent backgrounds who have enrolled in college (Ness & Mistretta, 2010) and have contributed to lower enrollment rates for high-risk students, such as low-income, minorities, who have relied on financial aid (Hossler & Kalsbeek, 2010). Financial aid may also contribute to the college success of low-income, minority students. According to Hughes (2012), the college completion gap existed due to higher college dropout rates among low-income young adults. This gap occurred from a lack of academic preparedness and a lack of financial and institutional support. Student dropout rates were affected by the type of financial aid, such as Pell Grants, loans, and work study that were available to students (Chen & DeJardins, 2008).

Purpose of the Study

The purpose of this study was to identify the effect of state financial aid policies during enrollment on low-income young adults later in their college career. It may also provide additional knowledge for state legislatures to consider when evaluating and formulating alternative financial aid policies that could positively influence degree attainment among these students. State legislatures set state financial aid policies that affect institutional policies and practices. These policies may affect student persistence in the college career process. Therefore, this study may add to the knowledge state legislators need to implement one or more best practices regarding financial aid policies.

This study is a quantitative design that included state financial aid data and secondary data collected from the NCES. The nonexperimental research design was used

to explore the relationship between state financial aid of freshman students at public and private four-year institutions and college completion defined by degree attainment. The cohort consisted of beginning postsecondary students who were tracked for six years, from 2003-04 to 2008-09. The independent variables were grade point average for the 2003-04 academic year, attendance intensity pattern for the 2008-09 academic year, state aid total for the 2003-04 academic year, state merit grants during the only 2003-04 academic year, price of attendance at various institutions for the 2003-04 academic year, transcript: type of transfer for first-time transfer, income as percentage of poverty level during the year 2003-04, first institution control for the 2003-04 academic year, gender, and race/ethnicity. The dependent variable was degree attainment or level at the last institution enrolled through the 2008-09 academic year.

Research Questions

This following research questions addressed in this study are:

1. Does state need-based aid during the first year of enrollment significantly impact college completion?
2. Does state merit-based aid during the first year of enrollment significantly impact college completion?

Research Hypotheses

The null and alternative hypotheses are indicated below.

1. Null Hypothesis *(H_o1):* State need-based aid during the first year of enrollment does not significantly impact college completion.

2. Research Hypothesis *(H_a1):* State need-based aid during the first year of enrollment does significantly impact college completion.
3. Null Hypothesis *(H_o2):* State merit-based aid during the first year of enrollment does not significantly impact college completion.
4. Research Hypothesis *(H_a2):* State merit-based aid during the first year of enrollment does significantly impact college completion.

Theoretical Framework

Student retention research has served as the theoretical framework for this study, which focuses on the first two years of a student's college education. Tinto (1993) argued that students were at the greatest risk of leaving college in the first two years. Astin (1975) identified institutional selective institutions and their effect on minority undergraduates. Astin (1975) argued that minority students are more likely to graduate from selective institutions. St. John's nexus model (St. John et al., 1996) linked tuition and financial aid to student success. Desjardins, Ahlburg, and McCall (1998) hypothesized that exogenous factor, such as race, gender, high school rank, and age affect student choices at various points within his or her college career. Desjardins et al. argued that it is important for institutions to define when students are at risk of dropping out of college and to implement preventive measures.

The hypotheses for this study were influenced by the understanding of college student types as noted in Tinto's 1993 study. The hypotheses considered institution type and minority undergraduates as they were understood in Astin's (1975) study and financial aid constructs from St. John's nexus model (St. John et al., 1996). Race and

gender understandings were drawn from Desjardin, Ahlburg, and McCall (1998). These major student retention studies and their link to this study will be described in greater detail in Chapter 2.

Conceptual Framework

The student retention model led to research, such as Heller (1999), Hillman, Lum, and Hossler (2008), and Hossler, Lund, Ramin, Westfall, and Irish (1997), which focused on financial aid and its effects on student enrollment and persistence. These studies served as the conceptual framework for this study. The studies from the authors have served to refine the hypotheses to support the research questions as well as helped identify the key independent and dependent variables for this study. Current research has also provided insight for determining that the NCES' beginning postsecondary students longitudinal study conducted during the 2003-04 academic year contained the appropriate data set for this study, which included enrollment data. These current student retention studies and their link to this study will be described in greater detail in Chapter 2.

Nature of the Study

For the quantitative section, secondary data were collected from a sample of first-year, full-time freshmen who attended two- and four-year public and private institutions from 50 states by NCES through a survey. The institutions included in the study reported and submitted yearly student data to NCES based on standards and procedures required by the U. S. Department of Education. Data fields included variables from (a) academic, (b) enrollment, (c) financial aid, (d) institutional characteristics, (e) transcripts, (f) student

characteristics, and (g) persistence and attainment. Member institutions adhered to NCES policies to maintain data integrity and reliability.

Assumptions

For the purpose of this study, it was assumed that:

1. Receiving state financial aid increases a student's ability to complete college.
2. Low-income, minority students are less likely to complete college without state financial aid.
3. Low-income, minority students often start at two-year community colleges and then transfer to four-year institutions.

The assumptions provided further context for understanding the progress of low-income young adult students toward college completion and the relationship of this progress to the receipt of financial aid and the type of institution they attended.

Scope and Delimitations of the Study

The scope of work included a national longitudinal study conducted by NCES a division of the U. S. Department of Education from 2004 to 2009 of first-year, full-time freshmen at two- and four-year public and private institutions from 50 states. This study consisted of one cohort of students surveyed and tracked at two instances in their postsecondary career. The first instance occurred upon enrollment during the 2003-04 academic year. The second occurred during the 2008-09 academic year. A sample of the population was obtained from NCES on freshman students enrolled in degree-granting public and private postsecondary institutions that were tracked for six years for persistence and degree attainment. It cannot be assumed that the data for the sample

population were representative of data from all two- and four-year degree-granting public and private institutions.

For the purpose of this study, NCES data were used because of data reliability. NCES established written standards for the U. S. Department of Education mandated by Congress in 1987 and revised from1992 to 2002. The 2002 NCES statistical standards were released as policy guidelines for collecting, coding, and analyzing data from postsecondary institutions and transferring data to third parties as well. The Disclosure Review Board of NCES followed confidentiality procedures to restrict the use of specific data identifiers of student and institutional information by external researchers as required by federal laws and statutes.

Limitations of the Study

Analyses of data are available and do indicate that a relationship may exist between state financial aid policies and student persistence during college, however, other factors may influence college completion rates. Data was limited to 14,900 full- and part-time freshman students enrolled at 985 two- and four-year public and private institutions. The results of this study may not apply to students enrolled before 2003 and after 2009. This study employed a large data set, which included variables such as grade point average for the 2003-04 academic year, attendance intensity pattern for the 2008-09 academic year, state aid total for the 2003-04 academic year, state merit grants during the 2003-04 academic year, price of attendance at various institutions for the 2003-04 academic year, transcript: type of transfer for the first transfer, income as percentage of poverty level during the 2003-04 academic year, first institution control for the 2003-04

academic year, gender, race/ethnicity, and degree attainment or level at the last institution enrolled through the 2008-09 academic year.

Significance of the Study

State legislatures provide the largest amount of revenue to postsecondary institutions through appropriations and financial aid to students in the form of grants, scholarships, and or loans (NASSGAP, 2009). Even though enrollment for students overall has increased, tuition prices continue to rise, and inequality continues to exist among students, especially for low-income young adults trying to pay for and complete college. With limited resources, states have focused on institutional accountability and performance (Conner & Rabovsky, 2011) and students further along in their college career, which could lead to lower enrollment rates for high-risk students who rely on financial aid (Hossler & Kalsbeek, 2010). Low-income young adults have relied on financial aid for a college education more than other students (Perna & Titus, 2005; St. John, Paulsen & Carter, 2005). Students who received less financial aid than expected were less likely to attend college (Desjardins, Ahlburg, & McCall 2002). However, when students do not complete college and obtain gainful employment, states incur losses in tax revenue, which are difficult to recuperate (Douglass, 2010). Such losses make it difficult for states to reinvest in future college students. It is possible that state financial aid policies may affect low-income young adults later in their college career as well.

States as Key Stakeholders in Higher Education

Financial aid was implemented to increase enrollment, affordability, and equity for students that were at a financial disadvantage (Gillen, 2009). Therefore, financial aid

may be a major factor in attracting low-income students to attend college (Long, 2008) and possibly complete college. As a major financial contributor, states have supported higher education by investing in students' college careers (Titus, 2009). States have obtained a long-term return on investments through a lucrative tax base from college graduates who have obtained employment (IHEP, 2005).

Since states have been key stakeholders in higher education and have provided support to postsecondary institutions, their higher education policies should directly target stakeholders (Sponsler, Kienzl, & Wesay, 2010). According to Heller (1997), state finance policies have provided the context for implementing student aid policies as a result of appropriations and set tuition prices. In addition to states' increased institutional accountability, the federal government has also increased state accountability (Connor & Rabovsky, 2011; Heller, 2001, McClendon, Deaton, & Hearn, 2007; Palaich, Griffin, Good, & van der Ploeg, 2004). The federal government will hold state legislatures as well as institutions accountable for managing appropriations.

Summary

Chapter 1 included an introduction to the persistent problem of low college completion rates among low-income young adults within the United States. The effect of state financial aid on college completion will be addressed in this study. A literature review was conducted to establish the theoretical and conceptual frameworks for the research problem and research questions presented in Chapter 2. The research method selected to study the problem and address the research questions were presented in Chapter 1 and further discussed in Chapter 3. Literature related to the research method

used is presented in Chapter 3. The quantitative study results are presented in Chapter 4. Conclusions and recommendations for further research and application of this study results are discussed in Chapter 5.

Chapter 2: Literature Review

Introduction

The literature review presented in this chapter was grounded in the student retention model, which provided theoretical and conceptual support for this study's problem statement and research questions. An analysis of state financial aid policies and bachelor's degrees awarded at public and private institutions for support was provided in Chapter 2. The literature review also included an analysis of state finance policies, financial aid policies, enrollment factors, student mobility, institutional practices, and state strategies that have affected college completion among low-income, minority students.

The literature review provided insight into the complexities of state financial aid policies within a dynamic higher education environment. Complex factors that have effected college completion for low-income young adults include economic, social, technological, and global changes that have occurred from 2000 to 2010 (Douglass, 2010; Shaw & Heller, 2007). In response to those changes, state legislatures have struggled to craft financial aid strategies in light of budget shortfalls to effectively address the issue of college completion among low-income young adults in the United States (Douglass, 2010). Economic growth requires a skilled and educated workforce that is prepared to meet societal and global demands (Lotkowski, Robbins, & Noeth, 2004; Merisotis, 2008; Spellings, 2006). Students awarded a bachelor's degree in higher education are afforded more choices and opportunities in life, such as a committing to community involvement (Dee, 2004; McGlynn, 2005), work-place productivity and receiving higher paying

positions (Fatima & Paulsen, 2004; Henderson, 2007; McGlynn, 2005). These students maintained a higher standard of living as well (Hill, Hoffman, & Rex, 2005).

The following topics are addressed in the literature review:

1. Individual benefits from obtaining a bachelor's degree.
2. Public, private, and social benefits of individuals with a college degree.
3. Economic and societal benefits from individuals who obtain a bachelor's degree.
4. Income and race as factors of bachelor's degree completion.
5. Lack of an educated workforce in the United States.
6. State public polices for higher education.
7. The effect of state funding on institutional policies and practices.
8. The effect of need-based aid on bachelor's degree completion.
9. Graduation rate as a public policy.
10. Student retention models.
11. State strategies for increasing bachelor's degree completion among low-income, minority students.

The relationship of these issues and their connection to state financial aid policies and bachelor's degrees awarded was synthesized and described in further detail in this chapter.

Literature Search Strategy

The literature search strategy included primary sources, government publications, websites, and databases. I used the Walden University library to research databases

across multiple disciplines, such as education, sociology, higher education policy, and economics. The databases cross-referenced included ERIC, Academic Research Complete, and SocINDEX. Search terms used to retrieve articles, abstracts, and bibliographies include; *college completion*; *college enrollment*; *financial aid* and *college completion*; *state funding policies*; and, *student retention theories*.

I also used primary sources, such as books, journal articles, and government publications. Secondary sources used included journal articles and websites. Current peer-reviewed literature includes over 50 percent of publications within the past 5 years on college completion, enrollment, and student retention. I used state government sites to find information on yearly expenditures for higher education.

Individual Benefits from Obtaining a Bachelor's Degree

Individuals who have obtained a bachelor's degree are more likely to receive higher incomes and benefits over the course of their lifetime than those with less education (Goldrick-Rab, 2006; Strayhorn, 2008). In 2009, the average yearly earnings for full-time, year-round workers over the age of 25 were $33,000 for high school graduates, $56,000 for individuals with bachelor degrees, and $75,000 for individuals with graduate degrees (Crissey, 2009). Individuals with higher levels of education were less likely to be unemployed (Astin, 1987; Braxton, 2000; Seidman, 2005; Strayhorn, 2008).

The overall average yearly earnings did not reflect the disparities in earnings that continued to vary across ethnic groups and gender (McGlynn, 2005). Disparities in earnings for graduates with bachelor's degrees occurred across ethnic groups and gender

for full-time, year-round workers. Asian males earned an average of $51,300, White males $46,900, Hispanic males $46,400, and Black males earned $36,300 with a bachelor's degree based on full-time, year-round work for individuals between the ages of 25 and 34 (Baum & Ma, 2007). Baum and Ma found that White females earned on average $37,500, Black and Hispanic females both earned $36,500 based on full-time, year-round work for young adults. Overall, females completed more associate's, bachelor's, and master's degrees because they perceived greater monetary benefits to be a result of higher education (Perna, as citied in McGlynn, 2005, p. 2, para. 2). Bailey, Borkoski, Kienzl, and Marcott (2005) found that females with associate's degrees earned twice as much as men with an associate's degree who attended community colleges. Even though income disparities existed slightly among females of different ethnic groups, they were more significant for males of different ethnic groups.

According to Baum and Ma (2007), Black males lagged behind all other ethnic groups and females in earnings. Zhang (2008) attributed earnings disparities to the lack of minority and female representation in technical majors, such as engineering and sciences, and at selective institutions. However, McGlynn (2004) attributed lower earnings for females to less hours worked, greater periods away from work, and the types of jobs taken (p. 2). Even though educational attainment did not prevent earnings disparities from occurring across ethnic groups and gender, it did reduce the disparities, as noted in Stoops' (2004) study.

Public, Private, and Social Benefits of Individuals with a College Degree

There are public, private, and social benefits associated with obtaining a college degree. Private benefits for students in the short-term have included "enjoyment of learning experiences, involvement in extracurricular activities, participation of cultural and social events, and enhancement of social status" (Perna, 2003, p.451). College graduates reduced social costs through "improved health, lower crime, reduced welfare, and employment" (Merisotis, 2008, p. 27). College graduates obtained better paying jobs, increased work responsibility, performed at a higher level, and received more promotions (McGlynn, 2005). Students who have completed at least a bachelor's degree smoked fewer cigarettes and engaged more regularly in civic activities, such as voting and volunteering (McGlynn, 2005). College graduates were healthier and had a higher quality of life, due to job satisfaction (Perna, 2004; Vila, 2005). In spite of the earning disparities, college graduates live better.

Economic and Societal Benefits from Individuals Who Obtain a Bachelor's Degree

Society as a whole benefits from individuals who have obtained a bachelor's degree. These benefits have included federal, state, and local revenue in the form of taxes received from working college graduates (Baum & Ma, 2007; Merisotis, 2008). Based on the average earnings of full-time, year-round workers, high school graduates with a diploma paid an average of $6,600 in taxes; individuals with an associate's degrees paid $9,100; individuals with a bachelor's degree paid $11,900 (Baum & Ma, 2007). The higher the degree obtained, the higher the taxes paid. Society also benefits from college graduates through reduced crime, increased support of cultural differences, engagement

in civic activities (Dee, 2004), increased worker productivity (Fatima & Paulsen, 2004; Henderson, 2007), and reduced poverty (Hill, Hoffman, & Rex, 2005).

Hammond (2003) indicated that societal benefits were less likely to occur from individuals who have obtained vocational education and taken personal development courses. However, Bailey, Kienzl, and Marcott (2004) argued that sub-baccalaureate degrees provided economic returns that were greater than other forms of educational learning. According to Grubb (1995; 1999), there were instances where sub-baccalaureate degrees did not have positive economic returns because of job-specific characteristics, such as training across fields of study and whether or not jobs were related to the field of study. However, Crissey and Bauman (2010) found earnings to be higher for individuals with computer/technical, business, and health-related sub-baccalaureate degrees than for high school graduates and some bachelor's degrees. Therefore, the earnings for sub-baccalaureate degrees, like other degrees, can vary based on level of training and field of study.

Income and Race as Factors of Bachelor's Degree Completion

Low-income, minority students have enrolled predominantly in community colleges as an entry point to postsecondary education (Hagedorn, 2010; Strayhorn, 2009), and did not plan to attend college because they believed it was not affordable (Grodsky & Jones, 2004; Luna De La Rosa, 2006; Tierney & Venegas, 2007). These students had higher college dropout rates than high-income students due to the lack of academic preparedness (Perna, in press) and a lack of financial and institutional support (Carey, 2004; Kirwan, 2007). According to Adelman (2006), high income students completed

45% more bachelor's degrees than low-income students in less than an 8-year period. Schneider (2008) found fewer than 60% of college graduates from public institutions were minority students. According to the NCES (2010), bachelor's degrees awarded to Asians, Whites, Blacks, and Hispanics students between the ages of 25 and 29 were 52.5%, 39.6%, 19.4%, and 13.5% respectively (p. 74). Low-income, minority students had the lowest college completion rates of all ethnic groups. Race and gender disparities have continued to exist in higher education for enrollment and college completion (Carey, 2008; Engle & Theokas, 2010; Strayhorn, 2009). Persistently low college completion among low-income, minority students could have future implications for low economic growth in the United States.

Lack of an Educated Workforce in the United States

The need for a highly educated workforce, economic growth, and racial advancement in response to societal demands are topics of concern for institutions and states (Bowen, Chingos, McPherson, & Tobin, 2009; Hess, Schneider, Kelly, & Carey, 2009; Schneider, 2008). Low college completion has led to a shortage of skilled labor for corporations, which have begun "recruiting heavily overseas in critical workforce sectors like technology, and by 2020 an estimated a gap of about 14 million people will be needed to fill jobs that require a college education" (Merisotis, 2008, p. 29).

The growth in technology requires a new workforce ready to support the dynamic changes of market demands through relevant skills and knowledge (Douglass, 2010, Lotkowski, Robbins, & Noeth, 2004; Spellings, 2006) associated with a bachelor's degree (Wellman, 2002). As a result, millions of low-income students are not prepared to

meet anticipated workforce shortages, due to the lack of college completion (Callan, 2008; Carnevale, Smith, & Strohl, 2010; IHEP, 2010).

Differentiated State Finance Policies for Higher Education

State public policies for higher education vary from state to state and limit college choices for low-income students (Kipp, Price, & Wohlford, as cited in Perna & Titus, 2004, p. 502). In addition to these policies, social, economic, and educational factors, such as access to financial aid have affected student choices (Heller, 1999; Hillman et al., 2008; Hossler et al., 1997; Hossler, Schmit, & Vesper, 1999). However, changing state financial aid policies could result in lower graduation rates among low-income, minority students (Singell & Stater, 2006). These policies have also affected institutional financial aid policies and practices. Institutions that have increased merit-based aid and decreased need-based aid to low-income students have created low enrollment for these students (Ehrenberg et al., 2005).

A state's ability to influence college success rates is based on the financial status of the state's higher education funding policies, institutional financial aid policies, and student characteristics at state institutions (Titus, 2006, p. 294). College students of specific socio-economic and ethnic backgrounds are more sensitive to changes in financial aid based on state and institutional policies. However, there has been limited research on financial aid as a policy tool for college completion (Singell, 2004; Titus, 2009). Therefore, financial aid could be a major factor in encouraging low-income students to attend college and successfully complete it (Long, 2008).

According to Heller (2003), the formulation of state finance policies by state legislatures have not led to effective financial aid policies that consider changes in appropriations and tuition prices. With limited resources, states have considered focusing on institutional accountability and performance (Conner & Rabovsky, 2011) and on students already enrolled in college, which could lead to lower enrollment rates for high-risk students who rely on financial aid (Hossler & Kalsbeek, 2010, p. 6). The public has pressured state legislatures and postsecondary institutions to seek better performance measures that will ensure accountability (Connor & Rabovsky, 2011; Heller, 2001, McClendon et al., 2007; Palaich et al., 2004).

The Effect of State Funding on Institutional Policies and Practices

Institutions also play an important role in the college completion process. States affected by budget deficits and changing state financial policies, will impact the financial stability of institutions and their mission (Marginson, 2011). State legislatures and the higher education community have placed more pressure on institutions to better serve students and reduce the disparities between ethnic groups and persons of a variety of genders.

The performance of public institutions in the United States between 2006 and 2011 (Conner & Rabovsky, 2011) has been important to state legislatures as they continue to focus on higher education policy strategies to increase college enrollment, retention, and college completion among low-income, minority students to support economic growth. Heller (1999), Hillman et al. (2008), and Hossler et al. (1997) conducted studies that considered the impact of state appropriations on enrollment. Blose,

Porter, and Kokkelenber (2006), Ehrenberg and Zhang (2005), and Scott, Bailey, and Kienzl (2006) studied the effects of institutional expenditures on graduation rates. Titus (2009) and Zhang (2009) studied the effects of state funding on bachelor's degrees awarded at four-year institutions. Titus concluded that there was a positive relationship between state funding and graduations rates. Zhang concluded that state need-based aid and state funding positively affected the number of bachelor's degrees awarded. Bound and Turner (2004) found that the reduction in state funding also affected graduations based on state cohorts. However, Kelly and Jones (2005) used state-level data and concluded that there was a weak relationship between state funding and graduation rates. Doyle, Delaney, and Naughton (2009) studied the effects of state finance policies on institutional aid at public degree granting institutions using data from the National Postsecondary Student Aid Survey collected by NASSGAP. Doyle et al. analyzed the relationship between student characteristics, family income, academic information, and institutional financial aid awarded and discovered that institutional behaviors regarding financial aid were a reaction to state financial aid policies and concluded that when states focus on need-based policies, then institutions focused on merit-based policies. State financial aid policies have led to increased research on the negative effects of unfair eligibility criteria on low-income, minority students enrolling in college (Cornell, Mustard, & Sridhar, 2006; Dee & Jackson, 1999; Dynarski, 2004; Heller & Marin, 2002, 2004; Ness & Tucker, 2008).

Research has shown that state public policies, such as state finance or appropriations policies have affected institutional outcomes for college completion.

Doyle et al. (2009) studied the effects of state finance policies on institutional aid at public degree granting institutions using data from the National Postsecondary Student Aid Survey collected by (NASSGAP). Doyle et al. analyzed the relationship between student characteristics, family income, academic information, and institutional financial aid awarded and discovered that institutional behaviors regarding financial aid have been a reaction to state financial aid policies and concluded that when states focused on need-based policies, institutions focused on merit-based policies. The authors argued that the data collected by NASSGAP did not account for different amounts of financial aid awarded to institutions, such as two-year institutions that receive extensive state financial aid. Several researchers have argued that state financial aid polices have changed from need-based to merit-based aid (Baum, 2006; Dowd & Coury, 2006; Heller, 1999; Hossler & Kalsbeek, 2010) and from grants to loans (Tierney & Venegas, 2009; Toutkoushian & Shafiq, 2010). Research on state financial aid policies has revealed the negative effects of unfair eligibility criteria on low-income, minority students enrolling in college (Cornwell, Mustard, & Sridhar, 2006; Dee & Jackson, 1999; Dynarski, 2004; Heller & Marin, 2002; Ness & Tucker, 2008).

A number of factors affect institutional characteristics and their service to students. Berger and Milem (2000) identified the complex relationship between state finance policies and institutional practices. Institutions have reacted to the lack of state funding by increasing tuition, which has led to increased financial responsibility for students as well as increased institutional selectivity, high dropout rates, and low college completion rates (Zhang, 2009). The lack of state funding for universities and colleges

has led to higher operational costs, which has caused higher education institutions to seek funding from other revenue sources (Connor & Rabovsky, 2011), such as institutional endowments (Small & Winship, 2007). Institutional policies and practices have been affected by the changing student population and the local economy (Braxton & Hirschy, 2005). As student populations become more diverse, institutions may need to consider how their institutional policies and practices address and meet the needs of students from different socio-economic groups so that they are welcomed into the academic environment.

Institutions have engaged in selective and non-selective practices (Zhang, 2009), such as using merit-based aid to solicit top performing students (Doyle et al., 2009). According to Newman, Couturier, and Scurry (2004), need-based aid should be used as an incentive to promote access to college and college completion. However, a decrease in state funding has caused institutions to engage in hiring more short-term faculty positions rather than long-term or tenured positions (Zhang, 2009), which could negatively affect graduation rates (Ehrenberg & Zhang, 2005; Jacoby, 2006). Institutional environments that have included peer and faculty relationships, positively affects whether or not a student persists in college (Nakajima, Dembo, & Mossler, 2012; Oseguera & Rhee, 2007). State funding that supports institutional hiring practices for short-term or long-term faculty can positively or negatively affect whether or not students persist in college. Cragg (2009) argued that the relationship between four-year institutions and students have defined the context of college graduation rates.

The Selective Practices of Flagship Universities

Flagship institutions often focus on selecting students with stronger academic credentials for college success than students that have a greater need for academic, financial, and campus services after enrolling in college. Singell and Stater (2006) analyzed the institutional practices of three flagship institutions, which were Indiana University at Bloomington, the University of Colorado at Boulder, and the University of Oregon, to determine how financial aid at the institutional level affected graduation rates. The authors identified a positive relationship between need-based aid and graduation rates. However, Singell and Stater argued that merit-based aid used to attract students with strong academic credentials, may not increase graduation rates. "Shifts in U.S. aid policy from need-based to merit-based aid could relate to stagnating graduation rates alongside increasing enrollment rates in recent decades" (Singell & Stater, 2006, p. 382). Braunstein, McGrath, and Pescatrice (2001) found that financial aid had little significance on student persistence in college, while St. John and Starky (1995) argued that financial aid had a negative effect on student persistence. According to Gerald and Haycock (2006), flagship universities have underserved low-income, minority students more than their White counterparts. With declined budgets, institutions were less likely to risk investing in students were not likely to succeed in college. Conner and Rabovsky (2011) argued that decreasing state support has affected institutions differently based on whether they are public or private and institutions with less selective practices will struggle to provide quality to students, especially underrepresented students. However,

funding support to higher education has been important for promoting equitable student outcomes and social progress (Mumper, 2003; Ryan, 2004; Titus, 2006).

The Effect of Need-Based Aid on Bachelor Degree Completion

Federal Student Aid (FSA), a branch of the U.S. Department of Education, has oversight of financial aid for postsecondary education. FSA has predicted that there will be an increase in financial aid, due to state and institutional revenue shortfalls, a decrease in student and family income, and the rise in tuition. However, federal deficits have negatively affected state budgets as a result of fewer grants to states (Archibald & Feldmand, 2006; Kane, Orzag, & Apostolov, 2005). "From 2001 to 2011, the cost of college expenses for undergraduates attending public institutions increased by 42 percent, while the cost for private nonprofit institutions increased by 31 percent (U.S. Department of Education, 2012). The U.S. Department of Education's largest single source of financial aid provided to low-income students is the Pell Grant followed by loans.

Title IV of the Higher Education Act of 1965 (HEA) was implemented to increase college access for low-income, minority students. Title IV was complicated and included tax credits, grants, scholarships, loans, loan forgiveness for teachers, and tax deductions for high achieving students in Mathematics, Science, Technology, and Engineering (Hossler & Kalsbeek, 2010, p. 4). During the 2009-10 fiscal year, the federal government contributed $107.3 billion to student aid, which included $28.2 in Pell Grants, $12.0 billion in other grants, $1.3 billion in work-study, $65.8 billion in loans, and $6 billion in education tax credits and deductions; while, institutions provided $26

billion in grants, states provided $8.6 billion in grants, and grants from private sources totaled $6.6 billion (The College Board, 2010, p. 3).

The federal government used the Pell Grant formally called the Basic Education Opportunity Grant (BEOG) created in 1972 to help low-income students finance their college education (Heller & Rogers, 2006). The number of individuals that received Pell Grants between 2008 and 2010 increased by 26%, while the average grant received by an individual increased by 25% and the percentages took the rate of inflation into consideration to account for 58% of Pell Grant spending (The College Board, 2010, p. 22). Low-income students receive a mix of federal aid that includes grants, loans, and work study. Chen and DeJardins (2008) argued that student dropout rates were a result of financial aid type, such as Pell Grants, loans, and work study. Chen and Dejardins discovered that the change in the dropout gap was reduced based on the availability of Pell Grants to low and middle income students. Chen and Dejardins' work also revealed that loans and work study had the same effect on all ethnic groups. Bettinger (2004) used incremental imposed limits of $1,000 for Pell Grants given to families based on size to measure the degree of changes in students dropping out of college. Bettinger discovered that for each incremental increase in $1,000 in Pell Grant thresholds of incremental increases of $1,000, the probability of students dropping out of college decreases by 3 to 4%. Seftor and Turner (2002) analyzed student responses to changes before and after the Pell Grant based on incremental changes of $1,000 and discovered that decreases by $1,000 led to a reduction in college enrollment by approximately 1.4%. Ness and Tucker (2008) analyzed the perceptions of low-income, minority students on whether or not they

did or did not receive merit-based aid for college. Ness and Tucker discovered that low-income, minority students react positively or negatively to perceptions on whether or not they will receive merit-based aid.

During the 2007-08 academic year, over 3,000,000 undergraduate students who received federal grant aid, loans, and work study were dependents from low-income families below $40,000, while over 5,000,000 were independents with incomes less than $30,000 (NCES, 2009). According to NCES, nearly 3,000,000 Black undergraduates received the largest amount of federal aid followed by nearly 3,000,000 Hispanic undergraduates. For Hispanic college success, college preparation, and student goals were factors (Arbona & Nora, 2007). However, the study did not consider other factors of college access, such as state financial aid and socio-economic status (SES).

Early research has focused on financial aid and its effect on a student's access to college (Heller, 1997; Hilmer, 2001; Jackson, 1978; St. John, 1990; Schwartz, 1985; St. John & Noell, 1989). St. John, Paulsen, and Starkey (1996) used the St. John's et al.'s nexus model and found tuition costs, financial aid, and grant aid to be strong indicators for students continuing or persisting in college. Singell and Stater (2006) argued that changes in financial aid policies from need-based to merit-based programs could result in lower graduation rates. Titus (2009) found that changing state finance policies positively affected bachelor's degree awarded. Zhang (2009) found that state funding positively affected graduation rates as well. However, Kelly and Jones (2005) found that funding had very little effect on graduation outcomes.

Graduation Rate as a Public Policy Measure

In 1990, the Student Right-to-Know (SRK) and Campus Security Act were implemented to obtain annual state data on graduation rates from institutions receiving Title IV funding. Under the SRK, parents and students are encouraged to compare graduation rates of institutions to choose a college for attending. The data were collected by NCES, which is a federal entity that analyzes and reports data results to the U.S. Department of Education. In 1997, NCES implemented the Integrated Postsecondary Data System (IPEDS) to collect graduation rates as calculated by public, private, for-profit, and not-for profit institutions. IPEDS data were considered to have limitations (Horn & Nevill, 2006; Hillman et al., 2008; Titus, 2006; Zhang, 2009). According to Astin (2006), graduation rates alone did not provide the full context of institutional outcomes for students to make an informed decision on which college or university to attend. Data were collected on first-time, full-time, degree-focused students attending at least 150% of the normal time or six years or less to obtain a bachelor's degree at four-year institutions (NCES, 2010). Normal time constituted four years, while the U.S. Department of Education considered the average time to graduate as 150% of the normal time (NCES, 2010). For students that pursued an associate's degree at a two-year institution, they were tracked six years or less (NCES, 2010). Bailey, Crosta, and Jenkins (2006) used IPEDS data collected from the Graduate Rate Survey (GRS) on twenty-eight Florida's community colleges and found the data (a) had inconsistent definitions, (b) lacked the ability to capture transfer students, (c) differed in student time to degree rates,

(d) differed in institutional characteristics, and (f) excluded part-time students (Ishitani, 2006). Bailey et al. concluded that SRK rates did not accurately reflect institutional performance by community colleges. As of 2008, IPEDS was revised to obtain data to track students at 200% of the normal time or eight years or less to comply with the Higher Education Opportunity Act (NCES, 2010).

States and institutions have been challenged by the complexities of student retention as it relates to college success (Hossler & Kalsbeek, 2010). Hicklin (2007) and Park (2010) argued that the effect of state and federal policies on institutions and student enrollment significantly limited the ability of public institutions to promote student equity and diversity for students starting their college career. However, different state governance structures have significantly affected institutional outcomes (Knott & Payne, 2004; McGuiness, 2003; McClendon et al., 2007) as well. Carey (2004) further confirmed that institutions calculated and reported graduation rates differently and presented challenges in analyzing data as a result of the SRK Act. According to Bailey et al. (2006), the SRK graduation rate has not consider transfer rates of students between two- and four-year institutions. Students within the first two years of enrollment were more likely to transfer from one institution to another institution for a number of reasons, such as academic, family, work, cost, faculty, courses, and so forth and data did not capture these attributes (Hillman et al., 2008). Data collection methods and interpretation may have created inconsistencies in calculating and reporting SRK rates and have not accounted for transfer rates (Adelman, 2006; Bailey et al., 2006; GAO, 2003; Gold & Albert, 2006) or "reverse transfer" rates (Hillman et al., 2008). "Reverse transfer" occurs

when students move from a four-year to a two-year postsecondary institution. It also occurs when a student moves from a two-year postsecondary institution to one less than two-years. According to a number of critics, the SRK graduation rate has not been a reliable instrument for measuring graduation rates of all types of institutions.

Student Retention Models

Student retention models posited that grade point average, enrollment status, and college major have affected student persistence in college (Bean & Eaton, 2001; Tinto, 1987). The student retention studies that support this study include Tinto's (1975) study, Tinto's (1993) social integration model (SIM), Astin's (1975) study, and St. John et al., (1996). Tinto's (1975) study was based on the rationale that a student's ability to persist in college is due to the strength of social ties. Astin (1975), St. John et al. (1996), and Hillman (2008) further refined Tinto's models by considering other factors that may affect student persistence. Astin's research focused on the effect of postsecondary intuitions on student persistence. St John et al. further analyzed Tinto's work and argued that the effect of financial aid on student persistence should be considered. Hillman analyzed freshman cohorts at the University of Indiana and concluded that a more accurate picture of student persistence should include and analysis of student mobility, such as "reverse transfer" students. Hillman argued that these students leave college and could be considered high risk.

Tinto's (1975) Study

Tinto (1975) based his early research findings of attrition on the behavioral patterns of students withdrawing from the academic process due to the lack of social ties

at college. Tinto's research was qualitative and limited to traditional full-time students that resided on a college campus. Tinto identified three variables to predict a student's ability to persist and they were (a) pre-college attributes; (b) social integration attributes; and, (c) membership attributes. Tinto discovered that social integration early in the college process is a strong predictor of a student's ability to persist or complete college and it required the support of the institution during and after the enrollment to increase student retention.

Astin (1975) and Tinto's (1975) Studies

Astin's (1975) study differed from Tinto's (1975) because it included three hundred and fifty-eight institutions with different Carnegie classifications. Astin discovered (a) that nearly half of the students tracked for four years obtained a bachelor's degree; (b) that smaller institutions had higher attrition rates than larger ones due to lack of services; and, (c) that the more selective the institution, the higher the graduation rate for minority students. However, Adelman (2006) conducted a study on selective and non-selective institutions and discovered that selective institution had little influence on college graduation. Melguizo (2007) conducted a study on institutions that considered categories of selectiveness to determine how they influence college graduation; and, discovered that selective institutions positively influence minority graduation rates as well as the completion gap. Tinto argued that students needed to separate themselves from all cultural ties that have prevented them from forming social ties within an institutional context. Critiques have argued that minorities and other students had strong ties outside of college and they strongly depend upon traditional, family, religious, and

cultural ties for support (Guiffrida, 2005; Kuh & Love, 2000; Rendon, Jalomo, & Nora, 2000; Tierney, 1992; Walker & Schultz, 2001). Like other economists, Aitken (1982) concluded that Tinto's (1993) model lacked mathematical development needed to evaluate structural relationships of variables known and unknown and that such models were better at producing outcomes on student retention.

Tinto's (1993) Social Integration Model (SIM)

Tinto's (1993) SIM was a refined version of an earlier model proposed in 1975. Tinto's (1993) SIM has led to a wealth of qualitative and quantitative research that has considered other factors that have affected student retention. These factors included environmental, background, academic, social, racial, and behavioral. Berger and Milem's (2000) model identified institutional characteristics, such as bureaucratic, collegial, political, symbolic, and systemic as organizational influences that impact student outcomes. These characteristics included organizational staffing, expenditures, policies, programming, activities, and faculty. Berger and Milem's study measured concepts of Astin's model as well as Tinto's model. Berger and Milem's study revealed that specific forms of involvement did influence student's perception of institutional support. Titus (2006a) conducted a study on the effects of state finance policies on college completion referencing Hauptman's (2000) model to further evaluate the aspects of financial aid at the federal, state, and institutional levels. Titus also referenced Hauptman's study on state financial structures, which defined the context of his study. Hauptman's study of state financial structure consisted of variables that defined funding on higher education institutions, financial aid levels, and tuition policies of public

institutions which was applied to the levels of selective institutions. Titus concluded that there was a relationship between need-based aid and graduation rates of four-year institutions. Based on study results, Titus stressed the importance of state policy development that focused on college completion as an important step in the progress of students in higher education. Titus (2006b) also identified that the level of institutional revenue affected the college completion rates of low-income students at four-year institutions.

St. John et al.'s (1996) Nexus Model

St. John (1990, 1992) and St. John and Noell (1989) conducted research on financial aid and how it has affected students' access to college. St. John's nexus model (St. John et al., 1996) considered tuition costs, financial aid, and grant aid to be strong indicators for student's persisting in college. Hillman et al. (2008) used St. John's (1992) model to analyze the relationship between student characteristics, such as "academic preparation, financial aid, and college experience variables to predict reverse transfer enrollment" (p. 117) using data from the Indiana Commission of Higher Education of enrolling freshman and sophomore students. Hillman et al. studied two freshman and one sophomore cohorts during the 2000-01 academic year at all four-year public universities in the state of Indiana. Hillman et al. used multinomial logistic regression as a predictive model and identified college major and high school preparation as the strongest predictors of "reverse transfer." Hillman et al. captured student choices, which included the lack of academic preparation as a reason for leaving a four-year college to attend a two-year and that students did not drop out. Hillman et al. argued that the college career

path has not considered “transfer” and “reverse transfer” students for more accurate research data. The research of Hillman et al. led to the need to consider the mobility of low-income young adults in their college career. The student retention studies analyzed led to the need to consider current studies on other educational factors that may affect college completion not considered in the past, such as state funding policies, institutional policies, enrollment, and financial aid.

Current Studies of Student Retention Models

Current research on student retention served as the conceptual framework for this study. The research for this study included the works of Heller (1999), Hossler (2005), Hillman, Lum, and Hossler (2008), and Hossler, Lund, Ramin, Westfall, and Irish (1997), Hossler and Kalsbeek (2010), Hossler, Ziskin, Moore, and Wakhunga (2008), Singell and Stater’s (2006), Stage and Hossler (2000), Titus (2009), and Zhang (2009). The current student retention studies considered educational factors, such as enrollment status, financial aid, state funding, transfer students, institutional control, gender, and race/ethnicity. These factors were important to this study because they have provided insight for identifying the appropriate dependent and independent variables that supported the research questions, hypotheses, and research design.

Heller (1999), Hillman et al. (2008), and Hossler et al. (1997) contended that social, economic, and educational factors as well as access to financial aid affect student choices. Hossler (2005), Stage and Hossler (2000), and Hossler et al. (2008) studied the relationships between student characteristics and institutional norms and concluded that they have affected student retention in higher education institutions. Hossler and

Kalsbeek (2010) concluded that financial aid led to lower enrollment rates for high-risk students who have relied on financial aid. Hillman et al. (2008) argued that institutions were responsible for students at risk in the college completion process as well. Collectively, the authors argued that the likelihood of low-income young adults who received financial aid increased access to college. The "twenty-first century community college" has not been considered as an integral part of the college success process, since the majority of low-income, minority students start their postsecondary education at community colleges (Hagedorn, 2010). However, college completion for these students is a higher education policy issue for state legislatures and postsecondary institutions.

Singell and Stater's (2006) study defined financial aid based on need-based and merit-based aid. Singell and Stater found that the changing pattern of financial aid policies from need-based to merit-based programs may have resulted in lower graduation rates. Singell and Stater also showed that "need-based and merit-based aid increased graduation rates at large public institutions" (p. 1). However, Titus' (2009) study took into account changing state finance policies and their effects on college degrees. Titus also used Integrated Postsecondary Education Data System (IPEDS) sponsored by the NCES to obtain financial aid and finance information obtained from surveys. Titus' study included entering freshman at four-year institutions, need- and non-need based aid, and state expenditures. Zhang (2009) included IPEDS data as well as data from the College Board. Zhang concluded that a positive correlation existed between state funding and graduation rates for full-time students enrolled at public or private institutions. Zhang also showed that a positive correlation often exists between tuition and the selectivity of

an institution, which has led to higher student financial responsibility. Although, Titus found that state need-based aid and state appropriations directly affected the number of bachelor degrees awarded. Titus found that the IPEDS data were found to be a limitation due to the lack of grant information, inconsistent, and missing data.

The works of Heller (1999), Hossler (2005), Hillman, Lum, and Hossler (2008), and Hossler, Lund, Ramin, Westfall, and Irish (1997), Hossler and Kalsbeek (2010), Hossler, Ziskin, Moore, and Wakhunga (2008), Singell and Stater's (2006), Stage and Hossler (2000), Titus (2009), and Zhang (2009) have provided a solid foundation for deriving the variables, research design, and methodology for this study. The authors' works have been carefully considered to analyze the limitations of their studies for this study's research design.

State Strategies for Increasing Bachelor's Degree Completion among Low-income, Minority Students

During the 1980s, enrollment increases led to the early stages of state reform for higher education that began with the redesign of governance structures (Leslie & Novak, 2003; Marcus, 1997; McGuiness, 1997; McClendon, 2003b). Further changes in enrollment led to increased state strategies for higher education (Doyle, 2006; Doyle, McClendon, & Hearn, 2005; McClendon et al., 2007; McClendon, Heller, & Young, 2005). McClendon et al. (2007) studied governance reform in forty-nine states between 1985 and 2000 and determined how states affected higher education using data from the State Higher Education Executive Offices (SHEEO). McClendon et al. found governance reform to be more "political than socioeconomic, structural, or emulative" (p. 666).

Tandberg (2006) studied the relationship between state governance reform and accountability using Measuring Up data between 2000 and 2006 and found little effect on student outcomes. Richard and Martinez (2008) conducted a case study on five states, which included New Mexico, California, South Dakota, New Jersey, and New York. Richard and Martinez concluded that states positively influenced the amount of appropriations made to K12 and higher education entities through state governance systems that support state educational strategies. According to Perna and Titus (2004), Alaska, Arkansas, Hawaii, Kentucky, and Wyoming were the only states that made attending public four-year institutions affordable for low-income students (p. 502).

South Dakota implemented the State Policy Incentive Funding, which was a performance fund tied to an institution's budget to measure higher education outcomes based on strategic goals that aligned to state goals between 1997 and 2002 (Martinez & Nilson, 2006). According to Measuring Up 2008, South Dakota received a grade of B for preparation and participation; F for affordability; B for college completion; and, D+ for benefits (Callan, 2008). State goals included (a) enrollment, (b) economic growth, (c) academic improvement, (d) non-state revenue, (e) collaboration with institutions, and (f) external revenue. South Dakota University System used a centralized approach, which included a single governance board that created a higher education policy agenda through collaboration and participation (Falconetti, 2009). Callan (2008), Falconetti (2009), and Martinez & Nilson (2006) concluded that the strong role of the board and collaboration led to a successful system-level strategy for higher education reform.

Falconetti (2009) analyzed the effects of Florida's decentralized governance structure on baccalaureate education through a qualitative study. Falconetti included the analysis of Florida's two plus two articulation program, which is a partnership between community colleges and four-year institutions. Falconetti also identified Florida community colleges as an important factor that has met the course needs of students, since four-year institution have not. Falconetti examined institutional commitment, transfer students, administrative compliance, and student access to undergraduate education. Falconetti found limited access to programs within universities and colleges for students that were academically challenged, due to the lack of partnership support for the two plus two policy by community colleges and universities. Falconetti also found that the two plus two policy lacked consideration for the success of transfer students pursuing a baccalaureate education due. According to Wellman (2007), Florida had the strongest two plus two or baccalaureate education in the United States. According to Measuring Up 2008, Florida earned a grade of C in preparation; D in participation; F in affordability; B+ in college completion; and, C in benefits (Callan, 2008). States that have been recognized for their effective baccalaureate programs were California, Florida, Illinois, New York, Texas, and Oklahoma (Falconetti, 2009).

According to Measuring Up 2008*,* California was the only state out of fifty to receive a C- for affordability (Callan, 2008). The report showed that all other states received a failing grade of F. Governor Brown of California issued a notice of closure for September of 2011 for the California Postsecondary Edition Commission (CPEC) reporting that the agency did not receive funding for the 2011-2012 fiscal year (CPEC,

2011). Although California state policies provided access to low-income, minority students through community colleges, the same policies impeded college completion rates (Shulock & Moore, 2007). Barriers included (a) lack of incentives for student success, (b) regulated college spending on support for students, (c) limitations on hiring, financial aid and fee policies that provide institutions and students with substandard resources, and (d) lack of eagerness from institutions to guide students (Shulock & Moore, 2007). Shulock & Moore argued that states have not reformed finance policies and provided institutional autonomy for funding more student-centered success programs; promoted student advancement through the hiring of the appropriate faculty and staff; provided better student guidance; and, redefined policies on financial aid and student fees that have encouraged students to attend full time (Shulock & Moore, 2007).

Measuring Up 2008 is a fifty-state analysis of state performance in terms of the student progress in higher education based on five indicators, which included: preparation, participation, affordability, completion, and benefits. According to Callan (2008), the most significant improvements occurred in preparation and tracking benefits, while the least significant change occurred in affordability and college completion for bachelor's degrees. Jones (2008) found the data for college completion to be flawed for community colleges because it did not include part-time and transfer students to four-year institutions.

In 2003, Tennessee Higher Education Commission implemented (THEC) the Education Lottery Program based on the Georgia Hope Scholarship program. THEC considered the advice of research experts, such as Heller and Marin (2002) who argued

that eligibility criteria have not included more lower-income students (Ness, 2010, p. 47). As a result of expert feedback, THEC developed and implemented a "blended" state funding approach that included merit-based and need-based aid as a new model that considered state financial aid alternatives (Mckinney, 2010, p. 95). Merit-based aid programs have focused on attracting students that met specific criteria for enrolling in college, which has excluded low-income students (Heller, 2004; Ness & Noland, 2007; St. John & Chung, 2004).

According to Measuring Up 2008, Tennessee earned a grade of C in preparation; D in participation; F in affordability; C in college completion; and, C- in benefits (Callan, 2008). THEC (2011) implemented state-wide strategies in 2011 that produced a college completion agenda, which included performance funding as an incentive for institutions to increase outcomes to align to the Complete College Tennessee Act (CCTC) of 2010. The state-wide strategies called the Master Plan 2010 -2015, contained the goals of the CCTC for increased institutional accountability in response to Tennessee's need to provide postsecondary education to more than half of the workforce by 2018 (THEC, 2010). The primary goal of the plan was to track student success in reference to efficiency in the completion of degrees and the quality of institutions (THEC, 2010).

State legislatures are key stakeholders in the college completion agenda. According to Hossler and Kalsbeek (2010), state college completion agendas have varied in scope and strategies. State legislatures have had little opportunity to evaluate the effectiveness of other successful state governance reform prior to implementing their own (Marcus, 1997). As a result, state legislatures have implemented state college completion

strategies with little knowledge of long-term effects of a dynamic environment. Recently, state legislatures have started to link financial aid policies to overall state goals (Weeden, 2015).

Literature of the Selected Research Method

A relational quantitative research design was selected for this study. Relational research is also called correlations research and is used to identify changes in one or more variables (McNabb, 2008). Multiple regression analysis is an example of a relational design often used in various disciplines, such as economics, social science, and education (Kerlinger & Pedhazur, 1973). Multiple regression technique is used to analyze the strength of a relationship between a dependent variable and multiple independent variables (Knoke, Bohrnstedt, & Potter-Mee, 2002). Postsecondary institutions have used multiple regressions as a strategy in their admissions processes to predict degree completion rates (McNabb, 2008). In this study, I examined the potential relationship between the independent variables, which were grade point average during the 2003-04 year, attendance intensity pattern through the 2008-09 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, price of attendance at various institutions for the 2003-04 year, transcript: type of transfer for the first transfer, income as percent of poverty level during the 2003-04 year, first institution control during the 2003-04 year, race/ethnicity, and gender. The dependent variable was degree attainment or level at the last institution enrolled through the 2008-09 year. Binary logistic regression technique was used to test the strength of the variables to predict college completion as defined by degree attainment.

Secondary longitudinal databases, such as IPEDS were used by NCES to collect yearly data from postsecondary institutions in the United States as a requirement for bachelor's degree completion (SRK, 1997). Secondary data, such as student characteristics were gathered from longitudinal databases, such as IPEDS and were used to predict institutional outcomes on graduation rates (Titus, 2006a; Zhang, 2009). Adelman (2006) used longitudinal data for his research on graduation rates as a measure of institutional outcomes. Studies that have used longitudinal data had the ability to observe multiple variables as related to student retention at different points in time (Astin, 1975; Bean, 1980; Desjardins et al., 2002; St. John et al., 1996; Tinto, 1993).

Titus (2006a) used student-, institutional-, and state-level data for predicting college completion rates. Titus included longitudinal data from IPEDS for fiscal year 1996 financial and enrollment information collected from institutional- and student-level data. Titus also used NASSGAP for collecting state-level data. Titus limited his study to 5,667 first-time, full-time students seeking a degree at 400, four-year institutions in 48 states. Titus' study included students who entered colleges and universities in the fall of 1995.

Zhang (2009) used longitudinal and cross-sectional data from IPEDS and data from the College Board on graduation rates for the 2003-04 academic year. Zhang also used state-level data as well as data from the Enrollment Survey to calculate state appropriations based on students enrolled full time. Zhang used a cohort of students entering college from 1991-92 to 1998-99 to account for a six-year graduation rate. Zhang adjusted for the exclusion of students who left school for various reasons, such as

death and disability. Zhang also used cross-sectional data from four-year institutions to evaluate to the effects of institutional practices on cohort graduation rates. Other studies that have included cross-sectional data were (Blose, Porter, & Kokkelenberg, 2006; Ehrenberg & Zhang, 2005; Scott et al., 2006). Zhang's model considered student persistence (Astin, 1993; Berger & Milem, 2000; Braxton & Hirschy, 2005; Elkins, Braxton, & James, 2000) as affected by changes in state revenue (Ehrenberg & Zhang, 2005).

Singell and Stater (2006) used longitudinal data for a regression model to determine the effect of financial aid on graduation rates. Singell and Stater used longitudinal data from Indiana University at Bloomington, the University of Colorado at Boulder, and the University of Oregon for 1994, 1995, and 1996. Data were drawn from Educational Testing Services (ETS) for pre-college student information, FAFSA for financial aid information, and first-year GPA of college students from the institutions were used for the study. Singell and Stater's final sample included 28,712 student applicants born in the United States. Singell and Stater's referenced other studies that considered the effects of financial aid on college access using regression (Jackson, 1978; St. John, 1990; St. John & Noell, 1989) and graduation rates (DesJardin, Ahlburg, & McCall, 1999; Singell, 2004).

The literature of selected research studies was synthesized to derive research questions and methodology that supported the use of regression analysis as the appropriate research tool (Adelman, 2006; Singell & Stater, 2006). The literature also included the use of secondary data collected from longitudinal studies used by (Adelman,

2006; Singell & Stater, 2006; Titus, 2006a; Zhang, 2009), which led to the identification of independent and dependent variables to develop a predictive models for college completion. The literature for the research review provided a guide for developing the research questions for this study that addressed the effect of state need-based and merit-based aid on college completion for low-income young adults.

Summary

Chapter 2 included the literature review which supported the problem statement and research questions for this study. Student retention models served as the theoretical and conceptual framework for this study. The gap in the current literature failed to evaluate the effect of state financial aid policies as an enrollment factor to predict college completion. Therefore, the purpose of this study is to develop a predictive model to identify the effect of state financial aid policies on college completion for low-income young adults in the United States. This study will include transfer students for a more accurate picture of student mobility as well as enrollment factors. Chapter 3 includes a description of the research design, the population, state financial aid policies, data collections procedures and analysis, and the reliability and validity measures used for this study. Relevant literature for this study included a quantitative methods approach and the use of binary logistics regression to analyze the relationship between the dependent and independent variables, which also appears in chapter 3.

Chapter 3: Research Methods

Introduction

In this chapter, the methodology that guided this study is grounded in the student retention model. Conceptual models from the literature review in Chapter 2, such as Hossler, Hu, and Schmidt (1998) on student enrollment statuses and Titus' (2009) model of college completion were used to identify and classify variables in the college completion studies. A quantitative research method was considered the method of choice to develop a predictive model that used secondary data files gathered by the NCES. The variables for this study were selected from NCES' postsecondary data. The variables included (a) academics, (b) enrollment, (c) financial aid, (d) institutional characteristics, (e) persistence, (f) degree attainment, (g) student transcripts, and (h) student characteristics. The variables were collected from the beginning postsecondary students longitudinal study conducted during the 2003-04 academic year and were used to predict college completion.

The results of this study will add to existing research through the development of procedures that will enable state legislatures and public and private two- and four-year institutions to formulate equitable financial aid policies that will increase college completion rates among minority students. Chapter 1 established the background for this study. The literature review in Chapter 2 provided the justification for this study supported by theoretical and conceptual research. In this chapter, I describe the procedures for a secondary data study of freshman full- and part-time students attending two- and four-year public and private postsecondary institutions from 2003-04 to 2008-

09. This chapter includes independent and dependent variables, instrumentation, description of the sample population, the reliability and validity study, and data collection and analysis procedures.

Research Design and Approach

Quantitative research used to develop a predictive model of college completion rates (Singell & Stater, 2006; Titus, 2009; Zhang, 2009) considered the importance of college GPA, financial aid, tuition, student status, and state funding. Three studies used logistic regression (Goenner & Pauls, 2006; Hossler, Hu, & Schmidt, 1998; Hossler, Ziskin, Moore, & Wakhunga, 2008) to support the development of a predictive model that identified students at risk based on enrollment status in the college career process. The research in this study will examine the potential relationship between grade point average during the 2003-04 year, attendance intensity pattern through the 2008-09 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, price of attendance at various institutions for the 2003-04 year, transcript: type of transfer for the first transfer, income as percent of poverty level during the 2003-04 year, first institutional control during the 2003-04 year, gender, race/ethnicity, and degree attainment or level at the last institution enrolled through the 2008-09 year.

A nonexperimental quantitative research design included the use of secondary data (DesJardins et al., 2002; Dugan, Garland, Jacoby, & Gasiorski, 2008; Hossler, Ziskin, Moore, & Wakhunga, 2008). In previous studies, the researchers examined potential relationships between the independent variable, such as financial aid and dependent variables, such as full status, religion, SAT score, ACT score, AP exam, AP

course, major, and highest planned degree for students using financial aid during 2008-09. A quantitative research method was considered appropriate for addressing the research questions for this study. Secondary data allowed for a large data set that would have been difficult to obtain through a new research design.

Population

The population for this study consisted of 101,000 first-time undergraduates enrolled during the 2003-04 academic year. This study also included 1,360 private and public two- and four-year institutions throughout the United States. A sample of 14,900 full- and part-time freshman students enrolled at 985 institutions in the United States was defined as significant for this study.

Setting and Sample Population

For this study, I used a secondary data set, collected by NCES between the years 2004 and 2009, of eligible full- and part-time freshman students enrolled at two- and four-year public and private institutions across the 50 states. NCES conducted a longitudinal study of first-time beginning postsecondary students, which were tracked at enrollment and six years after enrollment and included data on undergraduate enrollment changes, transfers, stop-out intervals, attendance patterns, and degree attainment. Population characteristics for analysis included sex, race/ethnicity, dependency status, enrollment status, level of income, transfer status, full- and part-time, institutional type and selectivity financial aid, and degree expectations. This study included males and females 18 years and older at the time of enrollment and vertical, horizontal, and reverse transfer students. The same cohort of students was surveyed during the 2008-09 year for

the highest degree attained at a postsecondary institution. Associate's and bachelor's degrees conferred and certificates awarded were included in this study as well.

A nonprobability method for sampling the freshman full- and part-time students was considered appropriate because the secondary data were collected from existing and available data resources of NCES. First-time, full-time students who attended two- and four-year public and private institutions during the 2003-04 year and received state financial aid were included in this study. Binary logistic regression technique was used to test hypotheses one and two of this study. For logistic regression of a binary dependent variable, a power analysis of 80% was used for multiple continuous independent variables with a 0.05 level of significance (Campbell, Julious, & Altman, 1995). An odds ratio of 1.00, a sample size of 14,900 was sufficient for this study with .05 as the level of significance.

Students were surveyed in 2009 by NCES for information regarding their retention and degree attainment at the last institution they attended. The debt burden of college graduates increased each year by 6% from 2004 to 2008 (Reed & Cheng, 2009). According to NCES (2010), 78.2% of students were concerned about paying for college, which caused an increase in loans by 3.9%. The average loan amount for entering freshmen ranged from $3,000 to $6,000 (Franke et al., 2009). Fifty-seven percent of college graduates that obtained a bachelor's degree in 2009 received over $3,000 in state aid, while 6% obtained an associate's degree, and 5% obtained a certificate (NCES, 2009). According to Franke et al. (2009), there was less than a 1% increase in need-based aid, but the amount of aid per student increased by 2% for students receiving amounts

over $10,000 during 2008-09. Even though there was very little change in the number of individuals who received need-based aid, the amount of aid for each student increased significantly. Students who received a bachelor's degree received the largest amount of state aid, while students who obtained an associate's degree and a certificate received less aid. Of the students who received an average of $3,000 in financial aid during the 2003-04 year to obtain a bachelor's degree during the 2008-09 year, 2.8% were Hispanic, 2.3% were White, 2.2% were Asian, and 1.2% were Black (Franke et al., 2009).

Instrumentation and Materials

Data were extracted from NCES' DataLab for this dissertation. I used the cohort for first-time part- and full-time undergraduates enrolled during the 2003-04 year at NCES member institutions in the United States. The cohort included transfer students who were surveyed again in during the 2008-09 year by NCES as part of the beginning postsecondary students longitudinal study. NCES has collected longitudinal data on postsecondary institutions since 1989 and has administered a yearly survey to collect data taken from a sample of two- and four-year public, private, for-profit institutions from 50 states as required by federal law. The NCES data set included over 100 variables that identified information from (a) academic preparation, (b) academics, (c) community service, (d) degree programs and goals, (e) employment, (f) enrollment, (g) financial aid (h) institutional characteristics, (i) persistence and attainment, (j) reasons for transferring, (k) students' characteristics, and (l) experiences.

This study employed longitudinal data collected by NCES. This study included independent variables, such as grade point average during the 2003-04 year, attendance

intensity pattern through the 2008-09 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, price of attendance at various institutions during the 2003-04 year, transcript: type of transfer for the first transfer, first institution control during the 2003-04 year, income as percent of poverty level during the 2003-04 year, gender, and race/ethnicity. The dependent variable was degree attainment or level at the last institution enrolled through the 2008-09 academic year. The scale of measurement for grade point average during the 2003-04 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, degree attainment or level at the last institution enrolled through the 2008-09 year, and price of attendance at various institutions for the 2003-04 academic year were ordinal. Attendance intensity pattern through the 2008-09 academic year, transcript: type of transfer for the first transfer, first institutional control during the 2003-04 year, and gender were nominal. Income as percentage of poverty level during the 2003-04 year was an included ratio. Table 1 includes variables and their measurements.

Table 1

Variable Names and Measurements

Variable Names	**Data Type**	**Score Range**	**Data Source**
Grade point average 2003-04	Continuous	1=D, 2=C, 3=C+, 4=B-, 5=B, 6=B+, 7=A-, 8=A or A+	Institutional Data File
State aid total 2003-04	Continuous	No Score Range	Institutional Data File
State merit only grants 2003-04	Continuous	No Score Range	Institutional Date File
Price of Attendance 2003-04	Continuous	No Score Range	Institutional Data File
Attendance intensity pattern through 2008-09	Continuous	1=Full time undergraduate 2=Part-time undergraduate 3=Mixed	Institutional Data File
Income as percent of poverty level 2003-04	Continuous	No Score Range	Institutional Data File
Gender	Dichotomous	1=Male 2=Female	Institutional Data File
Transcript: Type of transfer for first transfer	Continuous	1=Horizontal 2=Vertical 3=Reverse	Institutional Data file
First institution control 2003-2004	Continuous	1=Public 2=Private-for-profit 3=Private-not-for-profit	Institutional Data File
Race/ethnicity	Continuous	1=White 2= Black 3=Hispanic 4=Asian 5=American Indian or Alaska Native 6=Native Hawaiian / other Pacific Islander 7= More than one race 8=Other	Institutional Data File
Attainment or level at last institution enrolled through 2008-09	Dichotomous	1=Degree 2=No Degree	Institutional Data File

Measurements for Variables

For the purpose of this study; students were organized according to grade point average during the 2003-04 year, attendance intensity pattern through the 2008-09, state aid total during the 2003-04 year, state merit grants only during the 2003-04 year, price of attendance at various institutions during the 2003-04 year, transcript: type of transfer for the first transfer, income as percentage of poverty level during the 2003-04 year, first institution control during the 2003-04 year, gender, race/ethnicity, and degree attainment or level at the last institution enrolled through the 2008-09 year. The variables grade point average during the 2003-04 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, price of attendance at various institutions during the 2003-04 year, attendance intensity pattern through the 2008-09 year, first institution control 2003-04, race/ethnicity, income as percent of poverty level during the 2003-04 year and transcript: type of transfer for the first transfer were continuous. Gender and degree attainment or level at the last institution enrolled through the 2008-09 year were dichotomous.

NCES used a survey to obtain information from 15,000 students enrolled, full-time during 2008-09 year as part of longitudinal data taken from entering freshman students at two- and four-year public and private institutions, while the National Clearing House provided transcript information on 1,500 students surveyed (NCES, 2010). The NCES code book published in 2009 defined the variables used in this study. Full-time status was defined as freshman students enrolled 12 or more hours who have taken the survey in 2009. Part-time status was defined as freshman students enrolled less than 12

hours who took the survey in 2009. Mixed included a combination of full- and part-time statuses. Grade point average during the 2003-04 year was the cumulative letter grade received for freshmen in their first year of enrollment. State aid total during the 2003-04 year was defined as aid (a) from the student's personal resources; (a) that did not need to be paid back in the form of scholarships, grants, military, etc.; and, (c) loans. State merit only grants during the 2003-04 year were defined as aid intended for students who showed academic excellence in spite of financial need. Attendance intensity pattern through the 2008-09 year included freshmen who entered two- and four-year public and private institutions and were enrolled full-, part-time, and mixed. The price of attendance during the 2003-04 year was defined as tuition, room and board, and additional expenses for full-time undergraduates at two- and four-year public and private institutions. Gender was defined as male or female. Transcript: type of transfer for the first transfer was defined as horizontal, vertical, and reverse student mobility from one postsecondary institution to another. Horizontal transfer was defined as a student who moved from one four-year institution to another. It was also defined as a student who moved from one two-year to another. Horizontal transfer also included students moving from a less than two-year to another. Vertical transfer was defined as a student who moved from a less than two-year to a two-year institution. It was also defined as a student who moved from a two-year to a four-year institution. Reverse transfer was defined as a student who moved from a four-year to a two-year institution. Reverse transfer was also defined as a student who moved from a two-year to a less than two-year institution. Income as a percent of attendance during the 2003-04 year was defined as a percentage of the 2002

thresholds set by the federal government. First institution control during the 2003-04 year was defined as an institution that was classified as public, private for-profit or private not-for-profit. Race/ethnicity was defined as a student who was White, Blacks, Hispanics, Asian, American Indian or Alaska Native, Native Hawaiian/ other Pacific Islander, More than one race, or Other. Degree attainment or level at the last institution enrolled through the 2008-09 year was defined as a student's enrollment status after six years at the last institution attended. The types of degrees earned were certificate, associates, and bachelors. No degrees were tracked as well.

Data Analysis

Arrangements were made to retrieve data in an electronic format from NCES as required by the institution. As the researcher, I used public-usage data through NCES' DataLab interface. The researcher used NCES' statistical tool called PowerStats to select the dependent and independent variables as outlined in this study. The researcher ran the logistic regression for models 1 and 2. The researcher ran model 1 and excluded the independent variable state merit only grants during the 2003-04 year. The researcher ran model 2 and excluded the independent variable state aid total during the 2003-04 year. The researcher analyzed the regression results of both models and reported the results in Chapter 4. The public-usage data from NCES was pre-coded for access through the DataLab interface. Terms and conditions for data usage were provided online. The researcher provided a copy of the NCES' Data Usage Agreement to IRB as required for retrieving the public-usage data for this study.

Research Questions

The following research questions informed data collection and analysis for this study:

1. Does state need-based aid during the first year of enrollment significantly impact college completion?
2. Does state merit-based aid during the first year of enrollment significantly impact college completion?

Research Hypotheses

This section of this study includes the hypotheses and the analyses method that was used to test hypotheses one and two.

Null Hypothesis (H_o1): State need-based aid during the first year of enrollment does not significantly impact college completion.

Research Hypothesis (H_a1): State need-based aid during the first year of enrollment does significantly impact college completion.

Analysis Hypothesis One: Binary logistic regression was used to determine the relationship of the predictor variable to predict the criterion variable. The logistic regression formula for state need-based aid during the first year of enrollment and college completion used in this study was:

Z college completion= B0 Intercept + B1X1 state aid total during the 2003-04 year + B2X2 GPA during the 2003-04 year + B3X3 attendance intensity pattern through the 2009-09 year + B5X5 Price of attendance at various institutions for the 2003-04 year + B6X6 transcript: type of transfer for the first transfer + B7X7 + income as percent of

poverty level during the 2003-04 year + B8X8 gender + B9X9 first institution control during the 2003-04 year + B10X10 race/ethnicity + independent variable + *e* (Kleinbaum et al., 2008).

Null Hypothesis (H_o2): State merit-based aid during the first year of enrollment does not significantly impact college completion.

Research Hypothesis (H_a2): State merit-based aid during the first year of enrollment does significantly impact college completion.

Analysis Hypothesis Two: Binary logistic regression will be used to determine the relationship of the predictor variable to predict the criterion variable. The logistic regression formula for state merit-based aid during the first year of enrollment and college completion used in this study is:

Z college completion= B0 Intercept + B1X1 state merit only grants during the 2003-04 year + B2X2 GPA during the 2003-04 year + B3X3 attendance intensity pattern through the 2008-09 year + B5X5 price of attendance during the 2003-04 year + B6X6 transcript: type of transfer for the first transfer + B7X7 + income as percent of poverty level during the 2003-04 year + B8X8 gender + B9X9 first institution control during the 2003-04 year + B10X10 race/ethnicity + independent variable + *e* (Kleinbaum et al., 2008).

Binary logistic regression was considered as the appropriate statistical tool to evaluate the two hypotheses. In binary logistic regression analysis, the relationships between the continuous or dichotomous independent and the dichotomous dependent variables are considered more optimal than linear regression to analyze a dichotomous dependent variable in longitudinal data (Allison, 2012). Binary logistic regression

technique was used to analyze the relationship between (a) state aid total during the 2003-04 academic year, (b) GPA during the 2003-04 academic year, (c) state merit only grants during the 2003-04 academic year, (c) attendance intensity pattern through the 2008-09 academic year, (d) price of attendance at various institutions during the 2003-04 academic year, (e) transcript: type of transfer for the first transfer, (f) income as percent of poverty level during the 2003-04 academic year, (g) first institution control during the 2003-04 academic year, (h) gender, (i) race/ethnicity, and (j) degree attainment or level at the last institution enrolled through the 2008-09 academic year.

Descriptive Analysis

Descriptive statistics were used to determine frequency distributions for the sample population, which included race/ethnicity, gender, institution type, type of transfers, state financial aid percentages, state merit only grant percentages, type of degree obtained at the end of six years, income as percent of poverty level, and first year attendance pattern.

Inferential Statistics

Binary logistic regression was used as the technique for data analysis in this study. Binary logistic regression technique best lends itself to (a) easily interpreting the coefficients or predictor variables as odds ratios, (b) maximum sampling characteristics, and (c) adaptabillity to multiple categories of an independent variable (Allison, 2012, p. 18). Binary logistic regression was used to predict an outcome limited to two possibilities, such as “yes” or “no.” The logit or log of odds, which is a function of the probability or P is used to estimate the occurrence of an event (Agresti, 2007; Babby,

2007), such as college completion. Log of odds is best used for multiple combinations of predictors. The variable y is defined as

$$y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots. + e$$

where b0 is the intercept, while b1, b2, b3, and so forth, are the regression coefficients of x1, x2, x3 respectively, and e is for the error of prediction (Kleinbaum et al., 2008). *B* is the regression coefficient for the constant and is called the "intercept" as well.

S. E. is the standard error for coefficient of the constant. *Wald* and *Sig.* or the Wald chi-square tests the null hypothesis. If the p-value is less than or equal to .05, the null hypothesis is rejected. There is one degree of freedom or *df* for the Wald chi-square test because there is one predictor or constant. The *Exp (B)* or exponential of the B coefficient is an odds ratio, which is interpreted in log-odds unit for simplicity of analysis (Hosmer & Lemeshow, 2000). The further away the odds ratio is from one, the stronger the relationship between variables. The Score and Sig. is used to determine the significance of the independent variable in the model in terms of the p-value located under the Sig column. A positive and significant regression coefficient or B increases the contribution to the outcome or event. Conversely, a negative and less than significant regression coefficient B decreases the contribution to the outcome or event. "Although the Wald chi square test is adequate for large samples, the likelihood-ratio test was more powerful and more reliable for smaller sample sizes used in practice" (Argesti, 2007, p. 107). Both the Wald chi-square and likelihood-ratio tests require high computations for high a coefficient, whereas the Score test is used for smaller sample sizes and does not require such computations and tests for variable significance used for log outcomes (Hosmer &

Lemeshow, 2000, p. 16). Due to the sample size, Wald chi-square and likelihood-ratio tests were used to define significance.

Reliability and Validity of the Study

Quantitative studies have been used to increase rigor through validity and reliability and predict relationships in controlled environments (Ulin, Robinson, & Tolley, 2004). Babbie (2007) argued that reliability is a method used to establish consistency under the same conditions and produce the same outcomes. Chen and Desjardins (2008) contended that validity ensured accuracy in measurement. Therefore, data reliability was established by NCES through compliance requirements met by each member institution as outlined by the institution's guidelines to ensure consistency in data submission and reporting. The survey instrument used by NCES to collect data from member institutions was considered to be reliable according to the Department of Education's policies for managing educational information. Validity was established through research design and replication for this study.

The dependent variable used in this study was degree attainment or level at the last institution enrolled through the 2008-09 year. The independent variables for this study were grade point average during the 2003-04 year, attendance intensity pattern through 2009, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, price of attendance at various institutions during the 2003-04 year, transcript: type of transfer for the first transfer, first institution control during the 2003-04 year, income as percent of poverty level during the 2003-04 year, gender, and race/ethnicity. Nominal and ratio measures were used to analyze the hypothesized

relationship between degree attainment or level at the last institution enrolled through the 2008-09 year, state aid total during the 2003-04 year, state merit only grants during the 2003-04 year, and the transcript: type of transfer for the first transfer.

Participants Rights

NCES maintains strict confidentiality procedures as defined by the Statistical Standards Program to remove institutional and student identifiers from public-usage data to protect institutional and student-specific information as required by federal law. NCES provided data through a data interface called DataLab on first-time, full-time students enrolled in a postsecondary institution. Data was obtained through PowerStats for running multivariate analyses. The appropriate documentation was obtained to secure data from NCES as required by the IRB.

Data Collection

NCES received all institutional files from a securely stored site that used encrypted file transfers. The researcher retrieved the public-usage secondary data through NCES' data interface called DataLab. The public-usage information was pre-coded by NCES to protect the private information of students, such as student ID, name, and social security numbers. Therefore, the researcher did not have to code or sort data for this study.

Dissemination of Findings

NCES, SHEEO, and the Council of State Governments were contacted regarding this study. Summary reports will be made available to each stakeholder upon completion of this dissertation.

Summary

Chapter 3 provided an explanation of the methodology that guided this study. The research supported a quantitative, nonexperimental research design that considered binary logistic regression as the appropriate method to test the hypotheses in Chapter 4. In Chapter 3, the variables were identified for freshmen enrolled at two- and four-year public and private postsecondary institutions. In Chapter 4, the variables will be used to predict college completion among low-income young adults. Chapter 4 also provides the results of the study. Chapter 5 provides conclusions, recommendations, and suggestions for further research as well as suggested strategies for state legislatures to consider for implementation.

Chapter 4: Results

Introduction

In Chapter 3, an outline of the purpose, the research questions, hypotheses, and quantitative methodology were explained as well as the population, sample, variables, data analysis, and data collection. In this chapter, data collection, data analysis, descriptive statistics, inferential statistics--which includes results of the binary logistic regression-- are reported and explained. Data using the beginning postsecondary students longitudinal study were accessed through DataLab based on predetermined variables within the data set. For data analysis, descriptive statistics consisted of frequencies and percents of the variables in this study. Data analysis also consisted of inferential statistics, which included binary logistic regression results. A final summary of the results are provided at the end of this chapter.

Data Collection

For this study, data were accessed through NCES' DataLab. Through DataLab, the researcher extracted data from the beginning postsecondary students longitudinal study, which is a data-user interface. The NCES study consisted of one cohort of students surveyed and tracked at two instances during their postsecondary career. The researcher used PowerStats to select the dependent and independent variables as outlined in Chapter 3. In Chapter 3, binary logistic regression was used for statistical analysis of models 1 and 2. Model 1 included the state aid total during the 2003-04 year as an independent variable. In model 1, state merit-only grants for the same year was excluded. Model 2

included state merit only grants during the 2003-04 year as an independent variable. In model 2, state aid total for the same academic year was excluded.

When the researcher ran the binary logistic regression based on the selected variables through PowerStats, the sample size stated in Chapter 3 was reduced from 14,900 to 13,800 by DataLab to further maintain privacy of student data for statistical purposes. The adjusted sample size of 13,800 was sufficient for the logistic regression in this study.

Data Analysis

Descriptive statistics were used to determine frequency distributions for the sample population. The frequency distribution included (a) grade point average, (b) race/ethnicity, (c) gender, (d) institution type, (e) type of transfers, (f) state financial aid percentages, (g) state merit only grant percentages, (h) type of degree obtained at the end of six years, (i) income as percent of poverty level, and (j) first year attendance pattern of respondents enrolled in postsecondary institutions during the 2003-04 academic year. Inferential statistics included the use of binary logistic regression results for data analysis reported in this study.

Descriptive Statistics

For this study, frequencies and percents were computed using NCES' PowerStats through DataLab on the enrollment data of approximately 16,500 first-year, full-time freshmen at two- and four-year public and private institutions from 50 states. The students were also interviewed during the 2005-06 and 2008-09 years of the beginning postsecondary students longitudinal study. The data were computed on 16,100

respondents at WTB000, which was the recommended weight based on data collected during the of 2003-04 and 2008-09 academic years. The frequency explained the number of instances for each value shown in each table presented. The percents were rounded up to one decimal place for consistency for each variable in this study. The grade point average for the 2003-04 year variable had minimum, maximum, and average values of 4.0, 400.0, and 293.3 respectively, with a standard deviation of 82.3. The state aid total for the 2003-04 year variable had minimum, maximum, and average values of 100.0, 13653.0, and 2163.3 respectively, with a standard deviation of 1854.7. The state merit-only grants for 2003-04 variables had minimum, maximum, and average values of 111.0, 10000.0, and 1859.7 respectively, with a standard deviation of 1341.0. The price of attendance at various institutions during the 2003-04 year variable had minimum, maximum, and average values of 1337.0, 56740.0, and 12720.1 respectively, with a standard deviation of 8752.4. With respect to attendance pattern through the 2008-09 year, the majority of respondents were always full-time, 49.9%, followed by mixed, 39.8%, and always part-time, 10.3%. The findings are summarized in Table 6. With respect to income as percent of poverty level for 2003-04, the percent of positive values for the variable was 97.4%, while 2.6% of the values were zero. The income as percent of poverty level variable had minimum, maximum, and average values of 1.0, 1000.0, and 314.2, with a standard deviation of 235.6. With respect to gender, the majority of the respondents, 57.4% were female, while 42.6% were male as summarized in Table 8. With respect to transfer type for the first transfer, the majority of the respondents skipped the question, 56.9%, followed by horizontal, 14.1%, vertical, 13.8%, missing, 9.7%, reverse,

5.3%, and multiple values possible was 2%. The findings are summarized in Table 9. With respect to enrollment within state institutions, 71.3% of respondents in 2003-04 were enrolled in public, 15.2% in private not for profit, and 13.5% in private for profit postsecondary institutions as summarized in Table 10. With respect to race/ethnicity, the majority of the respondents were White, 61.5%, followed by Hispanics, 14.9%, Blacks, 13.8%, Asian, 4.7%, More than one race, 2.8%, Other, 1.3%, American Indian or Alaskan Native, 0.6%, and Native Hawaiian/other pacific islander, 0.4%. The findings are summarized in Table 11. With respect to degree attainment at the last institution enrolled through the 2009 year, the majority of the respondents attained no degree and were not enrolled, 35.5%, followed by attained bachelor's degrees, 30.7%, attained certificates, 9.5%, attained associate's degree, 9.4%, no degree, enrolled at less than a 4-year, 7.9%, and no degree, enrolled at a 4-year institution, 7.1%. The findings are summarized in Table 12.

Table 2

Percents of Total Grade Point Average for2003-04

Label	Percent	Value
Positive values	99.9	Continuous
Zero	0.1	0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 3

Percents of State Aid Total Received by Respondents for 2003-04

Label	Percent	Value
Positive values	20.9	Continuous
Zero	79.1	0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 4

Percents of State Merit Grants Only Received by Respondents for 2003-04

Label	Percent	Value
Positive values	5.7	Continuous
Zero	94.3	0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 5

Percents of Price of Attendance for 2003-04

Label	Percent	Value
Positive values	94.6	Continuous
-3	5.44	Skipped

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 6

Frequencies and Percents by Attendance Intensity Pattern through 2008-09

Label	Frequency	Percent
Always full-time	8026	49.9
Always part-time	1660	10.3
Mixed	6414	39.8
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 7

Percents of Income as Percent of the Federal Poverty Level of Thresholds for 2002

Label	Percent	Value
Positive values	97.4	Continuous
Zero	2.6	0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 8

Frequencies and Percents by Gender

Label	Frequency	Percent
Male	6851	42.6
Female	9249	57.4
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 9

Frequencies and Percents by Transfer Type for First Transfer

Label	Frequency	Percent
Vertical	2227	13.8
Reverse	848	5.3
Horizontal	2264	14.1
Skipped	9159	56.9
Missing	1563	9.7
Multiple values possible	39	0.2
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 10

Frequencies and Percents by Institution Control

Label	Frequency	Percent
Public	11479	71.3
Private Not for Profit	2447	15.2
Private for Profit	2174	13.5
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 11

Frequencies and Percents by Race/ethnicity

Label	Frequency	Percent
White	9908	61.5
Black	2220	13.8
Hispanic	2399	14.9
Asian	758	4.7
American Indian or Alaska Native	101	0.6
Native Hawaiian/other Pacific Islander	60	0.4
Other	211	1.3
More than one race	443	2.8
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Table 12

Frequencies and Percents by Degree Attainment at Last Institution Enrolled through 2008-09

Label	Frequency	Percent
Attained bachelor's degree	4948	30.7
Attained associate's degree	1505	9.4
Attained certificate	1521	9.5
No degree, enrolled at 4-year	1137	7.1
No degree, enrolled at less than 4-year	1277	7.9
No degree, not enrolled	5712	35.5
Total	16100	100.0

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09

Inferential Statistics

The final sample size computed through DataLab was reduced from 14,900 to 13,800 to further maintain privacy of student data for statistical purposes. The adjusted sample size by DataLab was sufficient for the logistic regression in this study with a recommended weight of WTD000.

Binary logistic regression was the method employed to test the hypotheses listed.

Null Hypothesis (H_o1): State need-based aid during the first year of enrollment does not significantly impact college completion.

Research Hypothesis (H_a1): State need-based aid during the first year of enrollment does significantly impact college completion.

Analysis Hypothesis One: Binary logistic regression was used to determine the relationship of the predictor variable to predict the criterion variable. The logistic regression formula for state need-based aid during the first year of enrollment and college completion used in this study was:

Z college completion= B0 Intercept + B1X1 state aid total during the 2003-04 year + B2X2 GPA 2003-04 + B3X3 attendance intensity pattern through 2009 + B5X5 Price of attendance at various institutions during the 2003-04 year + B6X6 transcript: type of transfer for the first transfer + B7X7 + income as percent of poverty level during the 2003-04 year + B8X8 gender + B9X9 first institution control during the 2003-04 year + B10X10 race/ethnicity + independent variable + *e* (Kleinbaum et al., 2008).

Null Hypothesis (H_o2): State merit-based aid during the first year of enrollment does not significantly impact college completion.

Research Hypothesis (H_a2): State merit-based aid during the first year of enrollment does significantly impact college completion.

Analysis Hypothesis Two: Binary logistic regression was used to determine the relationship of the predictor variable to predict the criterion variable. The logistic regression formula for state merit-based aid during the first year of enrollment and college completion used in this study was:

Z college completion= B0 Intercept + B1X1 state merit only grants during the 2003-04 year + B2X2 GPA 2003-04 + B3X3 attendance intensity pattern through 2009 + B5X5 price of attendance at various institutions during the 2003-04 year + B6X6 transcript: type of transfer for the first transfer + B7X7 + income as percent of poverty level during

the 2003-04 year + B8X8 gender + B9X9 first institution control during the 2003-04 year + B10X10 race/ethnicity + independent variable + *e* (Kleinbaum et al., 2008).

Hypothesis 1

The null hypothesis (H_o1) stated that state need-based aid during the first year of enrollment does not significantly impact college completion, while the alternate hypothesis (H_a1) assumed that state need-based aid during the first year of enrollment does significantly impact college completion.

To examine hypothesis 1, binary logistic regression was conducted through PowerStats to test the significance of state aid total during the 2003-04 year (continuous) as a predictor variable for degree attainment or level at the last institution enrolled through 2009 (degree versus no degree) in model 1. The results for the logistic regression coefficient were reported for the t statistics, instead of the z statistics by PowerStats. For state aid total during the 2003-04 year, $t = 2.077$, $p < .05$. The variable had an Exp(B) (b) odds ratio factor of .000, which implies no influence (Allison, 1999). The p-value of .039 was less than .05 and was statistically significant at the 95% confidence level. The null hypothesis was rejected because there was significant relationship between state aid total during the 2003-04 year and degree attainment. The regression coefficients for model 1 are summarized in Appendix A – Odds Ratio Results for Model 1.

Other predictor variables analyzed were reverse and vertical transfers as defined by transcript: type of transfer for the first transfer. Horizontal transfer was used as a reference category. As part of the odds ratio results for vertical transfer, $t = 8.931$, $p < .001$. The vertical transfer variable was statistically significant to the model. For reverse

transfer, t = 1.084, p > 0.05 and was statistically nonsignificant to model 1. For race/ethnicity, White was used as the reference category. For Blacks, t = |-4.641|, p < .001 and were statistically significant to model 1. For Hispanics, t = |-1.245|, p > 0.05 and was statistically nonsignificant to model 1. For Asians, t = 1.049, p > 0.05 and was statistically nonsignificant to model 1. For American Indians or Alaska Natives, t = 0.590, p > 0.05 and was statistically nonsignificant to model 1. For Native Hawaiians/other Pacific Islanders, t = |-0.060|, p > 0.05 and was statistically nonsignificant to model 1. For Others, t = |-2.176|, p < 0.05 and was inversely statistically significant to model 1. For More than one race, t = |-1.993|, p = 0.05 and was statistically nonsignificant to model 1. The odds ratio results for each variable are summarized in Appendix A for Model 1.The estimated full sample regression coefficients are summarized in Appendix C for Model 1.

For the measures of fitness results for model 1, the full model log likelihood was -2005644.761 and the negative log-likelihood (Pseudo R^2) -2 log-likelihood was 0.183. The Pseudo R^2 showed that the 18 variables accounted for 18.3% of the variance in degree attainment or level at the last institution enrolled through the 2008-09 academic year. The results for model 1 are summarized in Table 13 as well. Appendix B provides the results for hypothesis testing for model 2.

Table 13

Measures of Fitness for Model 1

	Negative log-likelihood (Pseudo R^2) -2 log-likelihood	Log likelihood, intercept-only model	Log Likelihood full model	Likelihood (Cox-Snell)	Likelihood (Cox-Snell) Maximum
Measures of fitness	0.183	-2455206.075	-2005644.761	0.224	0.750

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Hypothesis 2

The null hypothesis (H_o2) stated that state merit-based aid during the first year of enrollment does not significantly impact college completion, while the alternate hypothesis (H_a2) assumed that state merit-based aid during the first year of enrollment does significantly impact college completion.

To examine hypothesis 2, binary logistic regression was conducted through PowerStats to test the significance of state merit only grants during the 2003-04 year (continuous) as a predictor variable for degree attainment or level at the last institution enrolled through 2009 (degree versus no degree) in model 2. For state merit only grants during the 2003-04 year, $t = 3.792$, $p < .001$. The variable had an Exp(B) (b) odds ratio factor of .000, which implies no influence (Allison, 1999). The p-value < .001 and was statistically significant at the 99.9% confidence level. There was significant relationship between state merit only grants during the 2003-04 year and degree attainment, which caused the null hypothesis to be rejected. The regression coefficients are summarized in Appendix D – Odds Ratio Results for Model 2.

Other predictor variables analyzed were reverse and vertical transfers as classified under the variable transcript: type of transfer for the first transfer. Horizontal transfer was used as a reference category. As part of the odds ratio results for vertical transfer, $t = 8.919$, $p < .001$ and was statistically significant to the model. For reverse transfer, $t = 1.1088$, $p > 0.05$ and was statistically nonsignificant to model 2. For race/ethnicity, White was used as the reference category. For Blacks, $t = |-4.693|$, $p < .001$ and was statistically significant to model 2. For Hispanics, $t = |-1.183|$, $p > 0.05$ and was statistically nonsignificant to model 2. For Asians, $t = 1.103$, $p > 0.05$ and was statistically nonsignificant to model 1. For American Indians or Alaska Natives, $t = 0.605$, $p > 0.05$ and was statistically nonsignificant to model 2. For Native Hawaiians/other Pacific Islanders, $t = |-0.006|$, $p > 0.05$ and was statistically nonsignificant to model 2. For Others, $t = |-2.225|$, $p < 0.05$ and was statistically significant to model 2. For More than one race, $t = |-2.007|$, $p = 0.05$ and was statistically nonsignificant to model 2. The odds ratio results for each variable are summarized in Appendix D for Model 2 and the estimated full sample regression coefficients are summarized in Appendix F for Model 2.

For the measures of fitness results for model 2, the log likelihood for the full model was -20003805.320. The negative log-likelihood (Pseudo R^2) -2 log-likelihood was 0.184. The Pseudo R^2 showed that the 18 variables accounted for 18.4% of the variance in degree attainment or level at the last institution enrolled through the 2008-09 academic year. The results for model 2 are summarized in Table 14. Appendix E provides the results for hypothesis testing for model 2.

Table 14

Measures of Fitness for Model 2

	Negative log-likelihood (Pseudo R^2) -2 log-likelihood	Log likelihood, intercept-only model	Log Likelihood full model	Likelihood (Cox-Snell)	Likelihood (Cox-Snell) Maximum
Measures of fitness	0.184	-2455206.076	-20003805.320	0.225	0.750

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Summary

In Chapter 4, a summary of the data analysis, which described the variables and sample population as well as addressed the research questions and hypotheses were presented. Descriptive statistics were summarized for each variable used in this study. Binary logistic regression was used to test the two hypotheses, which caused the null hypotheses to be rejected. The significance of the two predictor variables state aid total during the 2003-04 year in model 1 and state merit only grants during the 2003-04 year for model 2 on degree attainment or level at the last institution enrolled through 2009 were presented. Grade point average during the 2003-04 year, price of attendance at various institutions during the 2003-04 year, and vertical transfer were statistically significant to the models 1 and 2 as well. However, reverse transfer was statistically nonsignificant to models 1 and 2. Blacks were statistically significant to models 1 and 2, while Hispanics were statistically nonsignificant to models 1 and 2. With respect to gender, males were statistically significant to models 1 and 2. For model 1, the Pseudo R^2 showed that the 18 variables accounted for 18.3% of the variance in degree attainment or level at the last institution enrolled through 2009. For model 2, the Pseudo R^2 showed that the 18 variables accounted for 18.4% of the variance in degree

attainment or level at the last institution enrolled through the 2009 academic year. Chapter 5 includes a summary of the discussion of findings presented in Chapter 4, conclusions, and recommendations for further studies and public policy implementation.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

This chapter provides a summary, conclusions, and recommendations containing the following sections: (a) interpretation of findings, (b) limitations of the study, (c) implications for social change, (d) recommendations for further study, and (e) recommendations for action as a result of the findings presented in Chapter 4. A discussion of the study findings as related to each research question will be presented and will include references to previous and current research, limitations experienced during analysis, implications for social change, suggestions for model improvements, and recommendations for state legislatures to possibly implement one or more best practices for state higher education policies.

The problem addressed in this study was persistently low college completion for low-income young adults. Chapter 4 included the results of the analysis. State need-based aid, state merit-based aid, vertical transfer students, and Blacks were significant to models 1 and 2. Models 1 and 2 were not a perfect statistical fit. Key findings of this study are further summarized in the interpretation of findings.

Interpretation of Findings

In Chapter 2, the student retention models focused on persistence based on institution type (Astin, 1975), while Tinto (1993) focused on social integration and reasons for lack of persistence. Astin discovered that Blacks who attended selective institutions had a greater a chance for obtaining a college degree. Tinto found that social integration early in the college process was important to a student's college success.

Tinto also argued that social integration required the support of the institution during and after the enrollment. Both Astin and Tinto's studies provided the theoretical framework for this study.

The current student retention studies (Heller, 1999; Hillman et al., 2008; Hossler, 2005; Hossler et al., 1997; Hossler and Kalsbeek, 2010; Hossler et al., 2008; St. John et al., 1996; Singell and Stater, 2006; Stage and Hossler, 2000; Titus, 2009; Zhang, 2009) provided the conceptual framework for this study. These authors observed other educational factors, such as (a) enrollment status, (b) financial aid, (c) state funding, (d) status of transfer students, (e) institutional control, (f) gender, and (g) race/ethnicity that were considered key to this study. The research of Heller (1999), Hillman et al. (2008), and Hossler et al. (1997, 2008) on financial aid and its effects on student enrollment and persistence contended that social, economic, and educational factors, as well as access to financial aid, affect a student's educational choices. Hillman et al. argued that the college enrollment statuses for students have not considered student mobility for more accurate research data in terms of a student's risk assessment for succeeding in college. As stated in Chapter 2, state financial aid policies have targeted nonminority students from prosperous backgrounds (Ness & Mistretta, 2010). These policies have contributed to lower college enrollment rates for low-income, minority students who rely on financial aid (Hossler & Kalsbeek, 2010). In this study, the researcher sought to develop a student retention model as a template using a national data set from the NCES beginning postsecondary students longitudinal study that included state need-based and state merit-based aid, as well as transfer students as key variables to predict college completion.

The results of this study were insightful and significant. Student retention models from 40 years ago lacked insight on factors of state financial aid and student mobility. Although Astin (1975) and Tinto's (1975, 1993) models were influential in defining the early dimensional aspects of student retention, later research conducted by Heller (1999), Hillman et al. (2008), and Hossler et al. (1997, 2008) considered other critical factors to a student's ability to persist, such as enrollment, financial aid, state funding, race/ethnicity, the status of transfer students, as well as identifying high risk students early in the college career process. Hossler and Kalsbeek (2010) concluded that financial aid led to lower enrollment rates for high-risk students who have relied on financial aid. Aitken's (1982) study concluded that Tinto's (1993) model lacked the mathematical dimension needed to evaluate structural relationships of variables known and unknown. Aitken further argued that statistical models were better at producing outcomes of student retention. New student retention concepts will expand the existing theories of Astin and Tinto as well as the current research of Heller, Hillman et al. and Hossler et al. by considering the effect of state financial aid as an enrollment factor for predicting college completion as defined by degree attainment. The findings of this study showed that there was a statistical significance for the two research hypotheses.

Research Question 1:

Does state need-based aid during the first year of enrollment significantly impact college completion?

The null hypothesis (H_o1) stated that state need-based aid during the first year of enrollment does not significantly impact college completion, while the alternate

hypothesis (H_a1) assumed that state need-based aid during the first year of enrollment does significantly impact college completion.

A binary regression test found a significant relationship ($p < .05$) between state need-based aid and degree attainment for model 1. Therefore, the researcher rejected the null hypothesis (H_o1). The results of the regression suggested that state need-based aid during the first year of enrollment does significantly impact college completion. The findings were consistent with current research on state need-based aid and college completion (St. John et al., 1996; Singell & Stater, 2006; Titus, 2006a, 2009; Zhang, 2009, St. John et al., 1996). Titus (2006a, 2009) and Zhang (2009) concluded that there was a positive relationship between state funding and graduations rates, state need-based aid, and state funding, which affected the number of bachelor degrees awarded. Jones (2005) concluded that there was a weak relationship between state funding and graduation rates.

Research Question 2:

Does state merit-based aid during the first year of enrollment significantly impact college completion?

Hypothesis 2

The null hypothesis (H_o2) stated that state merit-based aid during the first year of enrollment does not significantly impact college completion, while the alternate hypothesis (H_a2) assumed that state merit-based aid during the first year of enrollment does significantly impact college completion.

A binary regression test found a significant relationship ($p < .000$) between state merit-based aid and degree attainment for model 2. Therefore, the researcher rejected the null hypothesis (H_o2). The results of the regression suggested that state merit-based aid during the first year of enrollment does significantly impacts college completion. The findings were consistent with current research on state merit-based aid and college completion (Singell and Stater, 2006). Singell and Stater concluded that merit-based aid positively affected degree attainment at public postsecondary institutions and that the changing financial aid policies from need-based to merit-based programs could result in lower college completion. This study's findings supported existing research that state merit-based aid affects college completion among students.

Limitations of the Study

As stated in Chapter 1, even though this study provided insight on the effect of state financial aid policies on college completion during enrollment, it was challenging to determine the precise effects those polices had on student persistence after enrollment. The data analysis did indicate that a significant relationship existed between state financial aid policies and college completion. However, it did not mitigate that other state factors may influence college completion rates, such as changing state policies.

Sample data was calculated at 14,900 full- and part-time freshman students enrolled at 985 two- and four-year public and private institutions according to DataLab. The sample size was further reduced to 13,800 by DataLab to protect the identity of students and institutions. Therefore, the sample size was manipulated outside of the researcher's control.

The results of this study were bound by data collected by NCES from its member institutions through a survey instrument provided to students between the years 2003-04 and 2008-09. Without access to the raw data, it was difficult to tell whether or not the sample data was representative of the population. This study employed a large data set of secondary data that contained missing data for race/ethnicity, transfer students, and price of attendance at various institutions attended, which were variables used in this study. Therefore, the missing data may have affected the statistical results for models 1 and 2. The findings in this study require further investigation based on the following recommendations.

Recommendations For Further Research

There are three recommendations for further research. First, the NCES beginning postsecondary students longitudinal study is a large data set that has provided insight on the first-time, first-year college students for this study. Because the statistical analysis was computed through DataLab using public-usage data, the data provided limitations that were outside of the researcher's control. As a result, it was difficult to understand to what degree the limited or missing data may have affected the results of this study. The data set of variables used in this study requires further analysis to identify any possible differences in the results of the public-usage and raw data with particular focus on state need-based aid, state merit-based aid, race/ethnicity, and vertical transfer students as predictor variables of college completion. Therefore, I recommend analyzing the raw data from the beginning postsecondary students longitudinal study using statistical software to rerun the regression for models 1 and 2. Based on this study results, nonsignificant

variables should be removed from models 1 and 2 to strengthen the predictive model. Other enrollment factors should be considered for further analysis as well.

Second, current community colleges have not been considered as influential stakeholders in the college career process (Hagedorn, 2010). Falconetti (2009) found that vertical transfer students who were academically challenged lacked the programming support by postsecondary institutions for a baccalaureate education. Hillman et al. (2008) argued the importance of studying reverse transfer students to prevent students from disenrollment. Therefore, I recommend further qualitative and quantitative analysis to be conducted on vertical transfer students, since community colleges are a point of entry for minority students. States that do not support a strong partnership between two- and four-year institutions, such as Florida, Texas, and California should consider evaluating state higher education policies that will include community colleges as strategic partners in the college success process. State higher education policies with strong two plus two programs could possibly address the issue of reverse transfer students.

Finally, Singell and Stater (2006) argued that the changing financial aid policies could result in college completion rates. Even though state need-based aid and state merit-based aid were found to be statistically significant to college completion in this study, it is still unclear to what degree changing state financial aid policies may affect college completion, especially among low-income, minorities. Furthermore, state higher education policies are complex and multi-dimensional because they differ from state to state, institution to institution, and require comparative analyses on the effects of these policies on college success (Shaw & Heller, 2007). Further insight is needed on the

effects of changing state financial aid policies to identify whether or not they result in lower graduation rates for college students. I recommend qualitative as well as quantitative research on the effects of changing state financial aid policies on college completion as an extension of the findings of this study. A comprehensive analysis of state-level research should include data from state postsecondary two- and four-year institutions to support research- and data-driven decision making that is collaborative and effective for all stakeholders.

State higher education policies are complex and require focused research that embraces existing and current research in order provide solutions that consider all stakeholders. The recommendations provided were based on the findings of this study and are meant to (a) expand the existing knowledge base through replicable research on state financial aid policies; (b) encourage discussions between state legislatures; and (c) inspire stakeholders to seek solutions to create and implement state financial aid policies that promote equitable higher education opportunities for all students, especially low-income, minority students.

The Social Implications

As stated in chapter 1, low-income young adults are the largest recipients of state financial aid, which has declined by 10%, since 2005. Low college completion among low-income young adults continues to persist in the United States. A gap in literature has not considered the effect of state financial aid policies as an enrollment factor on complete college. The purpose of this study was to explore the effect of state financial aid policies on first-time, full-time students' abilities to complete college including transfer

students. In this study, I tested two research questions utilizing the data set from the NCES' beginning postsecondary students longitudinal study. This study's results provided insight to encourage (a) state legislatures to consider reevaluating financial aid policies for effectiveness based on research-driven decision making, and (b) discussions between state legislatures and their stakeholders. There are several social implications as a result of this study.

The social implications of this study can provide legislatures with additional knowledge to consider reevaluating financial aid polices that address the needs of stakeholders, especially low-income young adults. First, state financial aid policies should be fair and inclusive of all students who want to attend college regardless of race/ethnicity and socio-economic backgrounds. State financial aid policies have favored nonminority students from wealthy backgrounds who have attended college (Ness & Mistretta, 2010). As an extension of this study, research should be conducted on existing state financial aid policies in conjunction with tuition and finance policies that are aligned to state agendas to possibly produce better college completion results for low-income young adults (Weeden, 2015). Quantitative data in addition to existing qualitative research can be used to better inform state legislatures on the performance of state financial aid policies that are linked to state agendas. When state legislatures support research driven-decision making, they may increase their chances of formulating financial aid policies that are effective and possibly benefit multiple stakeholders, such as postsecondary institutions, taxpayers, parents, and students.

Second, state legislatures provide a large source of funding to postsecondary institutions and low-income young adults in the form of financial aid, grants, and student loans (NASSGAP, 2009). Therefore, state legislatures are in a position to leverage state higher education policies that can encourage postsecondary institutions to create policies that will promote college success among low-income young adults. State legislatures can leverage financial aid policies to provide public postsecondary institutions with incentives to create institutional policies that will promote college success for all students. State legislatures also provide researchers with the right opportunities to explore the effects of their policies on how well postsecondary institutions perform (Shaw & Heller, 2007, p. 2). When state legislatures focus more on institutional accountability and performance (Conner & Rabovsky, 2011) merit-based aid will not be used as a mechanism to exclude students by selective institutions (Zhang, 2009). Therefore, need-based aid can be used as an incentive to promote access to college and college completion for low-income, minority students (Newman, Couturier, & Scurry, 2004). Effective state financial aid policies should promote access, persistence and college completion for low-income young adults.

Third, state legislatures should strengthen their partnerships with two- and four-year postsecondary institutions to provide opportunities for shared resources and focused programming that will better address the needs of low-income, minority students for college success (Falconetti, 2009; Weeden, 2015). Therefore, the transfer process from community colleges to four-year institutions should be supported to increase the success of college students (Jenkins & Fink, 2015). Community colleges are important to the

college success of students who have additional academic needs that have not been met by four-year institutions (Falconetti, 2009). Low-income, minority students may be more likely to attend colleges and universities that provide social and academic support for their college success. Strong partnerships between community colleges and four-year public institutions may provide increased educational opportunities for tax payers, parents, and students in the form of lower educational costs.

Finally, for every student that depends on state financial aid and completes college, their opportunity for a quality lifestyle is an obtainable goal. These students have increased opportunities for financial stability, career options, and the freedom to make informed choices that could lead to social equality.

The social implications were provided to encourage further thought, reflection, and discussion between state legislatures and their stakeholders. Recommendations for next steps are provided.

Recommendations For Action

The recommendations for actions include disseminating this study's findings to key stakeholders, who can influence public policy changes, help raise awareness, and provide forums through engaging opportunities. First, disseminating the study's findings will include sending a two-page summary of the key results to NCES, SHEEO, and the Council of State Governments upon completion of this dissertation study. Second, the findings will also be published in journals to raise awareness and to add to the knowledge-base of existing research on college completion. Finally, presentations will be made to engage stakeholders on the effect of state financial aid on college completion as

it relates to this study's outcomes. Further research will be conducted on state financial aid policy alternatives as an extension of this study through collaborative efforts and independent research opportunities to continue to add to the existing knowledge base state legislatures and their stakeholders.

Based on this study's findings and social implications, I recommend further actions for state legislatures. First, I recommend that state legislatures evaluate current financial aid polices for effectiveness by considering this study's results for further qualitative and quantitative research. Although this study used a quantitative analysis, a qualitative analysis may also provide further insight on other state factors that may influence college completion, such as changing state financial aid policies. State-level research may better support research- and data-driven decision making to formulate effective state financial aid policies that are equitable for all students in light of the changing economic, social, and technological needs (Douglass, 2010). Second, I recommend that state legislatures strengthen their partnerships between postsecondary institutions to consider and implement state higher education policies that will support postsecondary institutions to stabilize education costs in the form of lower tuition charges (Falconetti, 2009; Weeden, 2015). Strong partnerships may also strengthen the process for vertical transfer students that begin with community colleges and move to four-year institutions. The strategies and planning vary from state to state and are based on individual state-level qualitative and quantitative analyses as well. State legislatures should align financial aid policies with state goals that will provide incentives for postsecondary institutions, tax payers, parents, and students (Weeden, 2015). This course

of action will take short- and long-term planning based on state research findings. Finally, I recommend that state legislatures evaluate state higher education policies that consider a P-16 educational continuum as lever for economic development (Baum & Ma, 2007: Stedron et al., 2010). Considering a P-16 model may identify high-risk students earlier in the educational process for academic development and may better protect a state's financial investment in the future. Educational success for each student does not start in high school or college; but should begin in pre-kindergarten or kindergarten. Therefore, state educational policies should include a P-16 continuum that better bridges the learning gap between primary, secondary, and postsecondary education to ensure the success of all students, especially low-income, minority students and to possibly protect future investments of states.

The recommended three action steps are based on this study's findings and are provided to encourage state legislatures and their stakeholders to engage in the discussions that will inform decision making that may lead to effective state higher education policies for all students to succeed in college and in their professional career. These recommendations are meant to be reflective and thought provoking for the stakeholders involved in the higher education process as well as add to the existing body of knowledge for state higher education research. The recommendations should be viewed in light of existing and current student retention theories.

Further actions for the researcher include journal publications, presentations of findings, and conducting qualitative and quantitative research to encourage collaborative

projects as an extension of this study's findings. The final conclusions are provided for this study.

Conclusion

This study's findings support the need to further evaluate state financial aid policies, race/ethnicity, and vertical transfer students at two- and four-year institutions to increase college completion among low-income, minority students. In this study, I focused on variables that impact college completion as supported by theoretical and conceptual theories of student retention. The goal is for state legislatures to use this study to conduct state-level research that includes data from postsecondary institutions for comparative analyses. The recommendations for action are based on this study's findings and were provided to encourage state legislatures and their stakeholders to engage in thoughtful discussions to strengthen partnerships and formulate effective state financial aid policies that are linked to state agendas and consider the economic, social, and technological demands. Further research should also consider the need for evaluating the effect of shifting state financial aid policies as well as state funding alternatives for college completion among students, especially low-income, minority students

With declining state budgets, state legislatures must find solutions to address the persistent problem of low college completion for students, especially low-income, minority students. There are several strategies state legislatures can consider when evaluating public policies. First, state legislatures with the support of their stakeholders can create and formulate effective state financial aid policies based on research-driven decision making that are fair and inclusive for all students regardless of race/ethnicity and

socio-economic backgrounds. Second, stronger partnerships between state legislatures and postsecondary institutions could lead to effective state public policies that may provide social benefits for postsecondary institutions, tax payers, parents, and students. Finally, these social benefits may provide greater economic stability for state legislatures through thoughtful policy making that includes incentives for postsecondary institutions and all students who want successful and affordable college careers.

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Appendix A: Odds Ratio Results for Model 1

Odds Ratio Results for Model 1

	Odds Ratio	Lower 95%	Upper 95%	*t*	*p*-value	*b*
Intercept	0.102	0.073	0.143	-13.449	0.000	-2.278
Grade point average 2003-04	1.006	1.005	1.007	13.293	0.000	0.006
State aid total 2003-04	1.000	1.000	1.000	2.077	0.039	0.000
Price of attendance 2003-04	1.000	1.000	1.000	11.969	0.000	0.000
Attendance intensity pattern through 2008-09						
Always part-time	0.162	0.110	0.238	-9.283	0.000	-1.823
Mixed	0.522	0.460	0.593	-10.082	0.000	-0.649
Income as percent of poverty level 2003-04	1.001	1.001	1.001	7.566	0.000	0.001
Gender						
Male	0.778	0.682	0.887	-3.776	0.000	-0.251
Transcript: Type of transfer for first transfer						
Vertical transfer	2.109	1.789	2.487	8.931	0.000	0.746
Reverse transfer	1.146	0.894	1.469	1.084	0.279	0.137
First institution control 2003-04						
Private not-for-profit	0.672	0.538	0.839	-3.530	0.001	-0.398
Private for-profit	0.542	0.429	0.684	-5.181	0.000	-0.613
Race/ethnicity						
Blacks	0.636	0.524	0.771	-4.641	0.000	-0.453
Hispanic	0.879	0.716	1.079	-1.245	0.215	-0.129
Asian	1.153	0.882	1.508	1.049	0.295	0.143
American Indian or Alaska Native	1.184	0.674	2.079	0.590	0.556	0.169
Native Hawaiian / other Pacific Islander	0.970	0.353	2.663	-0.060	0.953	-0.031
Other	0.645	0.433	0.960	-2.1759	0.031	-0.439
More than one	0.710	0.506	0.996	-1.993	0.048	-0.342

race

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Appendix B: Hypothesis Testing Results for Model

Hypothesis Testing Results for Model 1

Variable	WaldF	Num. DF	Denom. DF	Probability F
Overall Fit	71.571	18	183	0.000
Grade point average 2003-04	176.701	1	200	0.000
State aid total 2003-04	4.313	1	200	0.039
Price of attendance 2003-04	143.261	1	200	0.000
Attendance intensity pattern through 2009-09	104.083	2	199	0.000
Income as percent of poverty level 2003-04	57.248	1	200	0.000
Gender	14.261	1	200	0.000
Transcript: Type of transfer for first transfer	39.829	2	199	0.000
First institution control 2003-04	16.614	2	199	0.000
Race/ethnicity	4.147	7	194	0.000

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Appendix C: Estimated Full Sample Regression Coefficients for Model 1

Estimated Full Sample Regression Coefficients for Model 1

	Std.B	S.E.	t	p-value
Intercept				
Grade point average 2003-04	0.182	0.01	13.851	0.000
State aid total 2003-04	0.028	0.01	2.913	0.004
Price of attendance 2003-04	0.233	0.02	13.195	0.000
Attendance intensity pattern through 2008-09				
Always part-time	-0.213	0.01	-14.483	0.000
Mixed	-0.138	0.01	-10.353	0.000
Income as percent of poverty level 2003-04	0.096	0.01	7.810	0.000
Gender				
Male	-0.046	0.01	-3.7073	0.0003
Transcript: Type of transfer for first transfer				
Vertical transfer	0.107	0.01	9.849	0.000
Reverse transfer	0.013	0.01	1.147	0.253
First institution control 2003-04				
Private not-for-profit	-0.061	0.02	-3.941	0.000
Private for-profit	-0.081	0.02	-4.895	0.000
Race/ethnicity				
Black or African American	-0.0645	0.01	-4.917	0.000
Hispanic or Latino	-0.019	0.01	-1.305	0.193
Asian	0.010	0.01	0.980	0.329

American Indian or Alaska Native	0.003	0.01	0.363	0.717
Native Hawaiian / other Pacific Islander	-0.002	0.01	-0.162	0.872
Other	-0.020	0.01	-2.1957	0.029
More than one race	-0.022	0.01	-1.905	0.058

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Appendix D: Odds Ratio Results for Model 2

Odds Ratio Results for Model 2

	Odds Ratio	Lower 95%	Upper 95%	t	p-value	b
Intercept	0.104	0.074	0.145	-13.416	0.000	-2.266
Grade point average 2003-04	1.006	1.0045	1.007	13.184	0.000	0.006
State merit only grants 2003-04	1.000	1.000	1.000	3.792	0.000	0.000
Price of attendance 2003-04	1.000	1.000	1.000	12.357	0.000	0.000
Attendance intensity pattern through 2009						
Always part-time	0.163	0.111	0.240	-9.231	0.000	-1.814
Mixed	0.522	0.469	0.593	-10.081	0.000	-0.650
Income as percent of poverty level 2003-04	1.001	1.001	1.001	7.278	0.000	0.001
Gender						
Male	0.777	0.682	0.886	-3.792	0.000	-0.252
Transcript: Type of transfer for first transfer						
Vertical transfer	2.113	1.791	2.493	8.919	0.000	0.748
Reverse transfer	1.147	0.895	1.470	1.088	0.278	0.137
First institution control 2003-04						
Private not-for-profit	0.683	0.547	0.852	-3.395	0.001	-0.381
Private for-profit	0.545	0.433	0.687	-5.192	0.000	-0.606
Race/ethnicity						
Black or African American	0.633	0.522	0.767	-4.693	0.000	-0.458

Hispanic or Latino	0.884	0.720	1.086	-1.183	0.238	-0.123
Asian	1.163	0.888	1.524	1.102	0.272	0.151
American Indian or Alaska Native	1.188	0.678	2.082	0.605	0.546	0.172
Native Hawaiian / other Pacific Islander	0.997	0.360	2.761	-0.006	0.995	-0.003
Other	0.640	0.431	0.950	-2.225	0.027	-0.447
More than one race	0.708	0.504	0.994	-2.007	0.046	-0.345

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Appendix E: Hypothesis Testing Results for Model 2

Hypothesis Testing Results for Model 2

Variable	WaldF	Num. DF	Denom. DF	Probability F
Overall Fit	74.908	18	183	0.000
Grade point average 2003-04	173.805	1	200	0.000
State merit only grants 2003-04	14.378	1	200	0.000
Price of attendance 2003-04	152.691	1	200	0.000
Attendance intensity pattern through 2009	103.266	2	199	0.000
Income as percent of poverty level 2003-04	52.974	1	200	0.000
Gender	14.376	1	200	0.000
Transcript: Type of transfer for first transfer	39.711	2	199	0.000
First institution control 2003-04	16.097	2	199	0.000
Race/ethnicity	4.274	7	194	0.000

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

Appendix F: Estimated Full Sample Regression Coefficients for Model 2

Estimated Full Sample Regression Coefficients for Model 2

	Std.B	S.E.	t	p-value
Intercept				
Grade point average 2003-04	0.181	0.01	13.739	0.000
State merit only grants 2003-04	0.038	0.01	4.951	0.000
Price of attendance 2003-04	0.237	0.02	13.566	0.000
Attendance intensity pattern through 2009				
Always part-time	-0.213	0.01	-14.390	0.000
Mixed	-0.138	0.01	-10.361	0.000
Income as percent of poverty level 2003-04	0.090	0.01	7.437	0.000
Gender				
Male	-0.046	0.01	-3.713	0.000
Transcript: Type of transfer for first transfer				
Vertical transfer	0.109	0.01	9.858	0.000
Reverse transfer	0.013	0.01	1.186	0.237
First institution control 2003-04				
Private not-for-profit	-0.059	0.02	-3.796	0.000
Private for-profit	-0.082	0.02	-4.890	0.000
Race/ethnicity				
Black or African American	-0.065	0.01	-4.978	0.000
Hispanic or Latino	-0.018	0.01	-1.246	0.214
Asian	0.012	0.01	1.043	0.298
American Indian or Alaska Native	0.004	0.01	0.379	0.705

Native Hawaiian / other Pacific Islander	-0.001	0.01	-0.093	0.926
Other	-0.020	0.01	-2.252	0.025
More than one race	-0.022	0.01	-1.914	0.057

Source: U.S. Department of Education, National Center for Education Statistics, 2003-04 Beginning Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).