

Fall 10-22-2014

Investigating the Impact of Financial Aid on Four-year College Enrollment among College-Qualified Students

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INVESTGATING THE IMPACT OF FINANCIAL AID
ON FOUR-YEAR COLLEGE ENROLLMENT
AMONG COLLEGE-QUALIFIEDSTUDENTS

by

Sisi Li

Submitted in partial fulfillment of the requirements for the degree

Doctor of Philosophy

Department of Education Leadership Management & Policy

Seton Hall University

Fall 2014

Doctoral Committee:

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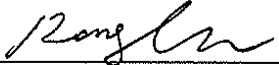
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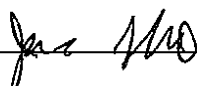
SETON HALL UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN SERVICES
OFFICE OF GRADUATE STUDIES


APPROVAL FOR SUCCESSFUL DEFENSE

Doctoral Candidate, **SiSi Li**, has successfully defended and made the required modifications to the text of the doctoral dissertation for the **Ph.D.** during this **Fall Semester 2014**.

DISSERTATION COMMITTEE
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The mentor and any other committee members who wish to review revisions will sign and date this document only when revisions have been completed. Please return this form to the Office of Graduate Studies, where it will be placed in the candidate's file and submit a copy with your final dissertation to be bound as page number two.

DEDICATION

To my husband,
Yaoguang Gao,
for his love, support and sacrifice.

ACKNOWLEDGEMENTS

Many people have contributed to the completion of my Ph.D. study and dissertation. I am very pleased to be able to extend my sincere appreciation to some of them.

I would like to thank Dr. Rong Chen, my committee chairman, whose invaluable guidance and support allowed me to move forward. You have provided enormous advice and help in my dissertation, from its conception to completion, and have allowed me to push my limits in this research inquiry. More importantly, you have helped strengthen my skills in undertaking approaches in studying financial issues in the field of higher education. This will continue to impact my research efforts in the future. Apart from being a mentor, you are also a great friend, who exemplified yourself to me as a successful scholar who balances family life and academic work nicely. I hope I can be a good scholar and a good mother like you in the future. For all of this, I am truly honored and thankful.

I want to thank Dr. Joseph M Stetar for continuing support and advice in my graduate study. I am grateful for your encouragement, and for your vast intellect and wisdom you have shared with me in the process of my academic search toward completion. You have also offered me invaluable research opportunities to work with you and learn from you. Your guidance and encouragement helped me smoothly adjust myself to the graduate study on this new land. Thank you for the endless love and care for us students.

I am thankful to Dr. Martin J Finkelstein for providing me with tremendously helpful advice on research. Your brilliant feedback for my course work papers and dissertation has helped me improve my research to a higher level. You have exerted a powerful influence over my intellectual development and will continue benefiting me.

I am grateful to my family too. I would not be able to finish my educational career if it were not for their love and support. I wish to thank my husband Yaoguang Gao, my son Patrick Gao, and my parents and parents-in-law. My husband has been my strongest supporter throughout this process. Your love, support and sacrifice made possible the Ph.D. successful completion. I also want to thank my son Patrick for his sweet smiles, which helped me keep going in the last stage of this process. I also wish to thank my parents and parents-in-law, who supported me and my husband all the time. Especially, I want to thank my mother, who came to the U.S. and provided much-needed help in taking care of Patrick in this busy and critical time.

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Abstract

Over the past decades, policymakers have developed numerous financial aid policies and programs with the goal of promoting college access and equity. However, access to American higher education is unduly limited by the complex interplay of inadequate preparation, lack of information about college opportunities, and persistent financial barriers (*The U.S. Department of Education, 2006*). Using Hossler and Gallagher's (1987) three-phase college choice model as a framework, this study analysis the restricted-use data from the National Education Longitudinal Study (NELS:88/2000) to investigate how financial aid influence four-year college enrollment among academically qualified students. This study also examined if this relationship varied across students with different social background. The findings demonstrate that low-income and middle-income college-qualified students tend to respond more to loans and work-study. The study findings have important implications for financial aid policy as well as future research on the role of financial aid policy in college choice of academically qualified students from different income backgrounds.

Keywords: financial aid, four-year college, college enrollment, college-qualified, logistic regression

Investigating the Impact of Financial Aid on Four-year College Enrollment
among College-Qualified Students

Chapter 1

Introduction

Importance of bachelor's degree for individuals and for society

It was widely acknowledged that a bachelor degree is a prerequisite to entering the middle class in the United States. Also, researchers have suggested that there are many monetary and non-monetary benefits of a four-year degree. The research evidence on the earnings gains from a college degree is substantial. College graduates' annual earnings rose about 20 percent compared to high school graduation (Hout, 2012). A college degree may not only raise annual earnings, but also improve job satisfaction, health, family stability, and social connections (Hout, 2012).

In addition to the mass of evidence on the gains for individuals, research indicated that social benefits of higher education exceed the private returns (Hout, 2012). There is a substantial evidence base on the positive association between education and productivity. Mas and Moretti (2009) indicated that education may not only boost individual productivity, but also create collective productivity by cooperative behavior. Also, higher education appears to be negatively associated with criminal activity. Research showed that the arrest rates of populations with college experience significantly below the general population (Belfield & Bailey, 2011). Last but not least, researchers found that a college degree raised participation in civic society and politics (Hout, 2012).

Trend of college student enrollment in recent decades

There are 21.0 million students enrolled in degree-granting colleges in fall 2010, total enrollment increased 37 percent between 2000 and 2010 (*Digest of Education Statistics*, 2011). Of those students, more than 13.3 million students actually enrolled in a four-year after high school graduation, as did about 7.7 million enroll in a two-year postsecondary degree-granting institutions (*Digest of Education Statistics*, 2011). Also, there are about 539,000 students attended non-degree-granting institutions (*Digest of Education Statistics*, 2011).

Even though enrollment in four-year higher education institutions increased dramatically during the last decades, many students who were academically qualified for four-year colleges didn't enroll. About 48% of the low-income college qualified students didn't enrolled in four-year colleges, so didn't 17% of the high-income students (St. John, 2002). Financial aid policies and programs were developed to fulfill the goal of promoting college access and equity. About two thirds of undergraduates received some type of financial aid (grants, loans, work-study, or aid of multiple types) these years. According to the U.S. Department of Education, students may use their grants at any one of approximately 5,400 participating postsecondary institutions.

Trend in financial aid policies

Since the passage of the Higher Education Act (HEA) in 1965, student financial aid has served as the primary federal policy tool that attempts to ensure students access to higher education (Doyle, 2006). There are seven titles in the HEA and the student aid programs authorized under Title IV are at the heart of the HEA (Stedman, 2003). The

largest Title IV student aid program is the Pell Grant program. The Pell Grant program is the central federal grant program providing funding for low- and moderate-income students. These grants are currently expected to assist 9.4 million students with \$ 34.5 billion in 2011-12 (*Trends in Student Aid*, 2012). In addition to the grants, federal tax credits, federal student loans, and federal work-study are responsible for a substantial portion of the federally supported aid currently available to higher education students. These federal aid programs are dedicated to achieving the primary goal of increasing access to higher education.

In addition to federal financial aid, state policies have promoted college access by providing various aid programs. As illustrated by Perna and Titus (2004), state policies may influence college enrollment by funding to higher education institutions, providing financial aid to students, influencing tuition, and promoting academic preparation policies. In terms of student financial aid, need-based and merit-based state grant programs are of most significance. In 2010-11, state grant expenditures constituted 12% of total state support for higher education. California and New York support the largest state need-based grant programs (*Trends in Student Aid*, 2012). However, scholars argued that policies have shifted to merit-aid at the state level (Doyle, 2006). Since the Georgia's HOPE Scholarship Program was implemented, state funding for merit-based financial aid programs has increased at a fast rate relative to need-based aid. Studies have been done to assess the effects of state merit-based financial aid programs in the United States. As implied by Perna and Titus (2004), merit-based financial aid programs may motivate students to become academically prepared to attend college. Doyle (2010) found that

although merit-based aid programs increased enrollment rates, these programs did little to impact long-standing gaps in college enrollment by income level.

Furthermore, the institutional grant aids have promoted the access to universities in large part. Both public and private institutions provided a large number of need-based grants to make higher education affordable for admitted students. In 2012-13, institutional grants constituted 38% of all undergraduate grants and 19% of financial aid (*Trends in Student Aid*, 2013).

Problem statement

Over the past decades, policymakers have developed numerous financial aid policies and programs with the goal of promoting college access and equity. Both student aids' average amount and coverage increased over-time. Total aid per full-time equivalent students increased from \$9,098 (in 2011 dollars) in 2001-02 to \$14,737 in 2011-12 (*Trends in Student Aid*, 2012). In addition, 70.3% of full-time undergraduates received financial aid in 2001-02, and 82.3% in 2010-11 (NCES, 2012). Despite of the substantial improvement, studies implied that the persistent opportunity gap between students from low-income and high-income families remains a problem (Fitzgerald, 2006). The U.S. Department of Education (2006) stated that “access to American higher education is unduly limited by the complex interplay of inadequate preparation, lack of information about college opportunities, and persistent financial barriers.” While the issue of postsecondary access has received extensive research attention in recent years, a consensus seems to have emerged on the importance of identifying the factors which may influence the high-achieving, low-income students' college decision-making.

Many leading researchers have made attempts to identify the relationship between students' social background and college enrollment. Perna (2000) implied that the enrollment rate of four-year higher education institutions varied by racial and ethnic group. African Americans and Hispanics were less likely to be enrolled in four-year higher education institutions compared with their whites and Asians counterparts (Perna, 2000). Pitre's empirical research (2006) examined how African American students' college aspirations were different from those of White student counterparts. Based on the survey data collected by the Maryland Bridge Project, Pitre's study (2006) aimed to find out if there is a significant difference between African American students' college aspirations and those of white peers. This research showed that there was no significant difference between African American and White in terms of aspiration to attend college.

Importantly, however, many policymakers and researchers cite factors such as academic achievement, the availability information about college and financial aid as explanations for these differences in college enrollment by family background. Numerous studies were focused on the income and race differences on students' college readiness (Klasik, 2012; Stearns, Potochnick, Moller, & Southworth, 2010). Most of the high-income students (86%) were qualified for college, while about half of the low-income group (48%) were not college qualified (St. John, 2002). Further, researchers confirmed that family income played a major role of determining college destination for college-qualified students (St. John, 2002; Buchmann, Condron, & Roscigno; 2010). The results were consistent with Klasik's argument (2012) that students from lower-income families were less likely to achieve minimal 4-year college qualification. Research confirmed that family income may influence students' academic access indirectly by influencing student

college expectations and plans (St. John, 2002; Buchmann et al., 2010). For example, students from higher income families are significantly more likely to prepare for the SAT than their counterparts from lower income families (Buchmann et al., 2010). Black and Hispanic students and students from lower socioeconomic status were less likely to have taken an advanced course during high school (Long, Conger, & Iatarola, 2012). In addition, race/ethnicity may influence college preparation to a great extent (St. John, 2002; Klasik, 2012). Research showed that Black students were less likely to attain minimal college academic qualifications than White students (Klasik, 2012).

A growing number of studies have identified how financial aid affects postsecondary educational attendance, especially for students from low-SES backgrounds and students of color. Kim, DesJardins and McCall (2009) examined the effect of financial aid expectations on student college choice. An effective sample of 86,133 students who submitted their ACT scores to the University of Iowa provided sufficient data for this research. The result showed that the difference between expected and actual financial aid may affect student choices significantly. African American and Hispanic students are less likely to attend college than their White and Asian counterparts even if more financial aid than expected was received. This study also indicates that the enrollment may decrease dramatically if students receive less aid than expected (Kim, DesJardins & McCall, 2009).

Regarding the continued gap in higher education opportunities (Engberg & Wolniak, 2010), researchers have particularly found unequal college choice across different income or socioeconomic backgrounds. Students from low-income families were found to be less likely to enroll in four-year colleges than their high-income

counterparts (Steinberg, Piraino, & Haveman, 2009). In particular, high-achieving, low-income students tend to apply to less selective institutions as compared with their high-income peers (Hoxby & Avery, 2012; Pallais, 2009).

In addition to studies on the persistent gap in college enrollment by student social background, there have been increased writings in the United States discussing how to balance financial aid distributed by federal and state government as well as individual institutions between need-aid and merit-aid. Numbers of studies concentrated on this topic concluded that cost is the main obstacle to access and equity (Perna, 2005). Many critics of need-based aid programs essentially argue on the declined purchasing power, suggesting that for both purposes of efficiency and equity the amount of need-based aid would have been sufficient to cover college's tuition and fees (Doyle, 2010; Rubin, 2011). The primary concern of merit-based aid programs is that whether the increased spending on merit-based aid result in lower spending on need-aid (Doyle, 2010). Also, another critic of merit-based aid programs is that these programs did little to address the income and racial gap in college enrollment (Doyle, 2010).

Since the adoption of different forms of financial aid programs, essential policy questions revolve around the effect of these programs on college enrollment and persistence after enrollment. Several studies of grants have found not only significant positive impacts on college enrollment, but also where they choose to go (Dynarski & Scott-Clayton, 2013). Previous studies also revealed mixed findings on the influence of loans and tax-based federal financial aid on four-year college enrollment (Dynarski & Scott-Clayton, 2013; Turner, 2011; LaLumia, 2012). In addition, research showed that

there is a positive effect on student retention of grants and subsidized loans (Chen & DesJardins, 2010).

A lot of research has focused on financial aid and college enrollment over the last decades. The vast majority of research (Baird, 2006; Cellini, 2010; Kim, 2012) examined the impact of financial aid on college access and choice; however, none has studied the effects of aid on college access across different income groups among academically qualified students. Similarly, although there have been some important studies on the effects of financial aid on four-year college enrollment, research focusing on understanding the role that different types and amount of aid play in increasing four-year college enrollment is very limited. In addition, these studies largely overlooked the fact that academic preparation played a vital role in college access and choice (St. John, 2002). Taken together, this body of research suggested that an assessment of the impact of financial aid on college-choice among academically prepared students is a crucial consideration for policymakers. And it is vital to explore whether the financial aid policies promote equal opportunity in higher education for college-qualified students across different income groups.

Purpose statement

By reviewing the recent literature of the impact of financial aid on college enrollment in the United States, this paper intends to examine the relationship between financial aid and four-year college enrollment among academically qualified students. In addition, this paper will pursue if this relationship varied across students with different social background. This research will add to our understanding of the income gap by

examining the indicators for 4-year college enrollment decision by college-qualified students. This study will also help educational policy-makers to adopt policies to promote four-year college enrollment.

Definition of key terms

It is vital to distinguish college enrollment, college access, and college choice before moving to the substance of this research. College choice was defined as the range of colleges that the student may attend, given the interests and abilities of the student (Perna & Titus, 2004). However, college access could be defined as the student reached the basic criterion to enter a college. According to this definition of college access, college enrollment could be replaced by college access to large extent.

Scholars have different definitions of “college-qualified students”. Among these definitions, Berkner and Chavez’s definition is one of the most widely-cited. Berkner and Chavez (1997) suggested that “college-qualified students” not only meet admission standards but also take a college entrance exam and submit an application to attend college. Different opinions showed in Daun-Barnett’s research (2013). Daun-Barnett (2013) indicated that students should both be academically prepared for college and able to pay for college.

Conley’s work (2007) on college readiness contained four main parts that are critical in shaping college readiness: Key cognitive strategies, academic knowledge and skills, academic behaviors, and contextual skills and awareness. As implied by Conley (2007), this definition is “a conceptual framework within which some of the most

important measurements of the ability of students to undertake and succeed in postsecondary coursework can be included and combined” (p. 22).

As stated by Roderick, Nagaoka, & Coca (2009), colleges assess students by checking students’ high school coursework, performance on college entrance exams, their relative class rank and GPA. Some policy makers define college qualified students as meeting the minimum entrance requirements for four-year colleges (Roderick et al., 2009).

As showed in Roderick et al. study (2009), measures of college qualified will vary depending on the choice of predictors and the what outcome is evaluated. In this study, I will use the more limited definition, stated as follows, because my purpose is to investigate the impact of financial aid policy on college enrollment: Four-year college-qualified students are students who may meet college entrance requirements of four-year institutions.

Research questions

Guided by the three-stage college choice model of Hossler and Gallagher (1987), indicators were chosen by reviewing relevant studies. Restricted-use data from the National Education Longitudinal Study (NELS) is utilized in this study. Also, descriptive and binary logistic regression analyses are used to address the research questions below:

1. How is financial aid related to four-year college enrollment among college-qualified students by controlling students’ academic preparation and student social background?
2. Is the relationship different across college-qualified students with different income backgrounds?

Significance of the study

The vast majority of research (Baird, 2006; Cellini, 2010; Kim, 2012) examined the impact of financial aid on college access and choice; however, little is known about the effects of aid on college choice across different income groups among academically qualified students. In addition, studies of financial aid policies largely overlooked the fact that academic preparation played a vital role in college access and choice (St. John, 2002). Taken together, this body of research suggested that an assessment of the impact of financial aid on college-choice among academically prepared students is a crucial consideration for policymakers. It is vital to explore whether the financial aid policies promote equal opportunity in higher education for college-qualified students across different income groups.

This research will fill this void in the literature by examining how the financial aid affects the four-year college enrollment among college-qualified students. This study will also explore the relationship between college enrollment and different income backgrounds to determine if the socioeconomic status gap presented in four-year college enrollment among college-qualified students.

This project may provide empirical evidence on the effectiveness of financial aid policies on four-year college enrollment, especially for college-qualified students. This dissertation will also present policy-makers with further knowledge on how financial aid can be used to promote academically prepared students choose to attend four-year institutions.

Chapter 2

Literature Review

This literature review synthesizes theories that have guided the field of research, and then discusses the three types of research upon which this study is drawn: the effect of financial aid on college enrollment, student preparation and college enrollment, and student social background and significant others. In this review, I first summarize research on the effect of financial aid on four-year college enrollment, as prior research has concentrated on this relationship. I then discuss research on the effect of student preparation, followed by student social background. This literature review will guide the research questions and the empirical research.

Theories/ models used for the study of college enrollment

To guide the study, I propose a conceptual framework based on Hossler and Gallagher's (1987) three-phase college choice model. Based on the previous literature, this three-phase model was developed at which each phase of college choice, individual and organizational factors interact to affect enrollment decisions. The first stage, called, the predisposition phase, is a development stage in which certain background characteristics are correlated with college aspirations. Individual factors such as socioeconomic status (SES), ability, and the attitudes of parents and peers are crucial to students' aspirations for college. In addition, high schools as well as colleges interact with students have an influence on the predisposition phase in terms of pre-college school experiences (Hossler & Gallagher, 1987). The second phase of Hossler and Gallagher's model is search, in which students begin to seek information on postsecondary

institutions. Numerous factors influence students' college search, including students' performance on college entrance examinations, students' socioeconomic status, parental education, and the availability of financial aid (Hossler & Gallagher, 1987). The final stage is the choice phase, in which the students' college choice is made and evaluated. Students' academic achievement and financial aid are essential to the choice stage of the process (Hossler & Gallagher, 1987).

This present study integrates important aspects of Hossler & Gallagher's (1987) theoretical framework to examine the effect of financial aid on college-qualified students' college choice decisions. Specifically, I propose to analyze whether the types of financial aid are related to college-qualified students' college-going behavior after controlling for other various factors. In addition, given the gaps in college choice between students of various income backgrounds, the analysis will also consider the possible interaction effects between financial aid and family income.

Research on College Access

Financial aid and college access and choice

As higher education enrollment dramatically increased, essential policy questions revolve around the degree to which student financial aid improved college access. The movement to focusing on the affordability concerns of middle-class families represents one of the most pronounced policy shifts in higher education in the last 20 years.

However, scholars argued that this trend may limit policy impact on increasing college access for low-income students (Perna, 2005; Long & Riley, 2007). Perna's study (2005) showed that students from low-income and minority families were more sensitive to cost

of tuition and fees and financial aid. As stated by Long and Riley (2007), cost of tuition and fees is one of the major barriers to college access for students at the bottom of the income distribution, while the shift of financial aid policy toward loans and tax credits has been especially detrimental to low-income students. Long and Riley (2007) suggested that financial aid policy should address financial barriers which may negatively influence access to college.

Prior research reveals mixed findings on the influence of financial aid on college choice, and this effect seems to differ by types of financial aid (Kim, DesJardins, & McCall, 2009; Kim, 2012). Grants are likely to have a greater impact on college enrollment than loans (Cellini, 2010). Dynarski and Scott-Clayton's research (2013) indicated that a \$1,000 increase in grant aid was associated with a 4-percentage-point increase in college enrollment. The study of Linsenmeier, Rosen, and Rouse (2006) found that converting loans to grants had a significantly positive effect on enrollment among low-income minority students. In addition, the existing studies showed that the effect of financial aid seems to differ according to student background (Kim, 2012). Kim (2004) conducted a study to examine distinctive effects of different types of financial aid on students' college choice among different racial groups. The results showed that variation in attending college of their first choice differed across racial groups (Kim, 2004). For example, Asian American students tended to receive loans to attend their first-choice institutions while White students received grants. No significant effect of financial aid was found among African American or Latino students (Kim, 2004).

A substantial literature has addressed the effects of grants on increasing college enrollment in the United States (Perna, 2005; Baird, 2006). As implied by Perna (2005),

enrollment rates are negatively associated with tuition, but positively related to financial aid, especially aid in the form of grants. Many researchers also found that need-based financial aid has a positive impact on college enrollment (Baird, 2006; Kane, 2003). Kane's research (2003) indicated that Cal Grant program in California played a positive role in college-going. Cal Grant program, a need-based aid program, covers the cost of tuition and fees if a student meets academic and financial eligibility (Kane, 2003). As showed in Kane's study (2003), students who received Cal Grant were 3 to 4 percent more likely to choose to go to college.

Pell Grants are the primary form of federal need-based financial aid of the United States. Generally, the findings suggest a positive impact of Pell Grants in college enrollment (Seftor & Turner, 2002; Rubin, 2011). The maximum grant of \$5,550 in 2012-13 may cover 63% of average public four-year tuition and fees (*Trends in Student Aid*, 2013). Seftor and Turner's research (2002) aims to examine the impact of Pell Grants on adult college enrollment. By analyzing the Current Population Survey (CPS) data, this study showed that Pell Grants played a significant role in college enrollment of nontraditional students (Seftor & Turner, 2002). Also, Seftor and Turner's study (2002) implied that there is a positive effect of Pell Grants on college enrollment for traditional college-aged students. However, St. John (2002) indicated that the purchasing power of Pell Grants has declined since the early 1990s. Research further showed that the impact of Pell Grants on college enrollment declined due to the limited amount of the grants (Rubin, 2011). Rubin (2011) conducted a study to examine the effect of Pell Grants on college enrollment for traditional students. By utilizing a regression-discontinuity analysis, Rubin's research showed that there is no effect of Pell Grants on college

enrollment for traditional students (Rubin, 2011). Rubin's study (2011) also implied that the minimum Pell Grant amount was far from sufficient to cover college's tuition and fees.

Not only need-based aid, but also merit-based aid programs played a vital role in college access (Bergerson, 2009). Georgia's Helping Outstanding Pupils Educationally (HOPE) program was established to provide financial assistance to academically outstanding students (Bergerson, 2009). Dynarski (2000) conducted a research to examine the effect of Georgia HOPE scholarship on college enrollment. Dynarski's research (2000) showed that the HOPE largely increased college enrollment for Georgia students. In addition, the effects of the HOPE Program on four-year college enrollment were even stronger than the impact on total postsecondary enrollment (Cornwell, Mustard, & Sridhar, 2006). By using the data of Integrated Postsecondary Education Data System (IPEDS), Cornwell et al. (2006) found the freshmen enrollment rose by 5.9% because of the HOPE Program, and enrollment in Georgia's four-year public colleges increased by 8.7-9.0%. Also, this research found a positive enrollment effect of the Georgia HOPE scholarship to increase enrollment in 4-year private institutions (Cornwell et al., 2006).

Even though studies on the impact of loans on college access showed inconsistent results, loans became more commonly used than grants to finance college costs; federal loans constituted 37% of the total student aid received by undergraduate students while federal grants constituted 24% in 2012-13 (*Trends in Student Aid*, 2013). Evidence is mounting that the reliance of financial aid system on loans may limit college enrollment for lower income students (Perna, 2008; Long & Riley, 2007). For example, Dynarski (2002) found that the Stafford Loan may have roughly the same effect as grants on

college enrollment. Specifically, Dynarski's study (2002) addressed that the effect of the federal loan on college enrollment is 5.1 percentage points (with a standard error of 2.9) per \$1,000. However, prior research failed to identify American high school students' perception of loans and the forces that shape these perceptions (Perna, 2008). Perna (2008) conducted a study to test students and their families' perceptions of loans. By using data from descriptive case studies of 15 high schools in five states, this research found that students and their parents from high-resource schools were more willing to use loans to pay college expenses than students and their parents from low-resource schools (Perna, 2008). In addition, high school counselors and teachers played a vital role in shaping students' perceptions of loans (Perna, 2008).

Alongside loans, researchers have documented the important role of tax-based federal financial aid, a federal aid offered tax incentives for college enrollment for the middle class, in improving the likelihood of postsecondary enrollment (Turner, 2011; Turner, 2012). For instance, Turner's research (2011) examined the federal tax-based financial aid (the Hope Tax Credit, the Lifetime Learning Tax Credit, and the Tuition Deduction) for full-time students as well as part-time students using data from the U.S. Census Bureau's Survey of Income and Program Participation (SIPP). Turner's results (2011) demonstrated that tax-based aid increased full-time enrollment in the first two years of college by about 7 percent. However, the results of the literature have often been conflicting. LaLumia conducted a study to examine the impact of tax-based student aid on college enrollment. By using the National Longitudinal Survey of Youth-1979 (NLSY79) data, LaLumia's research (2012) implied that tax-based aid has no effect of on college enrollment for adult students.

The impact of financial-aid on college access is clearly an important part of the story. Equally important, however, is the impact of student aid on college choice. For instance, Dynarski and Scott-Clayton (2013) implied that grant aid may influence not only college enrollment, but also which college students choose to go. More recent studies have found similar results exploring the relationship between financial aid and college choice. Kim (2012) used the National Education Longitudinal Study (NELS) dataset to link the college choice to state financial aid. He found that need-based aid may remove financial barriers to selective colleges for low-income students (Kim, 2012). Also, the research of Cornwell et al. (2006) indicated that the Georgia HOPE scholarship appeared to induce students to choose 4-year postsecondary institutions over two-year colleges.

Apart from the impact of different types of financial aid on college access and choice, knowledge about financial aid is also found to affect students' opportunity to go to college. Inadequate knowledge of financial aid may be one barrier to higher education access; inadequate information may lead students to misjudge college opportunity because they overestimate the costs of college, and underestimate financial aid resources (Long & Riley, 2007; Fitzgerald, 2006; Luna De La Rosa, 2006; Grodsky & Jones, 2007). Research showed that students who have more information about college prices and financial aid are more likely to apply for college (Perna, 2006; Long & Riley, 2007). In addition, Perna (2006) implied that the levels of understanding of the college admissions process and financial aid system seem to vary across groups. To be specific, students from low-income and minority families appear to have less knowledge of college prices and financial aid (Perna, 2006). Although abundant literature determined the importance

of adequate information about financial aid, few of the research provided analysis on how to most effectively provide this information to college-qualified students and their families.

Student preparation and college enrollment

As stated by Hossler and Gallagher (1987), academic ability was one of the essential indicators which may affect college enrollment. As proved by the following research, students' high school academic preparation is positively related to four-year college enrollment (Kim, 2012; Engberg & Wolniak, 2010; Engberg & Allen, 2011). For instance, Engberg and Wolniak's (2010) research examined the variables of high schools in college decision-making. High school academic ability was explored as an influential indicator for postsecondary enrollment (Engberg & Wolniak, 2010). Similar research results are showed in Toldson, Braithwaite and Rentie's study. Toldson et al. (2009) illustrated that academic achievement strongly motivated students to go to college. In addition, past research also revealed that the underprepared students are less likely to attend college, especially four-year colleges (Lee, 1999; Long & Riley, 2007).

Researchers have generally accepted that high school GPA has appreciable effects on college enrollment, and the effect was considerably stronger for four-year college enrollment (Engberg & Wolniak, 2010). Kim's study (2012) implied that high school Grade Point Averages (GPA) and reading and math scores are positive factors for enrollment in four-year colleges and universities. Perna and Titus (2005) implied that college enrollment pattern differences could be largely attributed to differences in high school grade point average. Also, Engberg and Wolniak's research (2010) aimed to

examine high school influence on postsecondary institution attendance. By using the national data of the Educational Longitudinal Survey (ELS), Engberg and Wolniak's study (2010) indicated that students' high school academic performance was significantly associated with college enrollment, and among those indicators of academic performance, high school grade point average is one of the essential predictor.

Though seldom discussed in the literature, differences in advanced high school course-taking have serious implications for higher education institution enrollment (Stearns, Potochnick, Moller, & Southworth, 2010). Recent research on Florida public school students, for instance, indicated that taking an advanced course in math, English, science, foreign languages, and social studies in 9th or 10th grade is associated with a greater possibility of going to college, especially a four-year college (Long, Conger, & Iatarola, 2012). While the result offered important evidence about high school course-taking patterns, this study were limited by the lack of generalizability of the data. Also, by utilizing the National Longitudinal Survey of Youth 97 (NLSY97) data, Aughinbaugh (2012) indicated that the students who took math, science, and foreign languages courses in high school were more likely to enroll in a postsecondary institution. Especially, students who took an advanced academic math course were about 20% more likely to attend a four-year college (Aughinbaugh, 2012).

Moreover, the number of Advanced Placement (AP) courses taken is one of many aspects of high school experience relevant to college enrollment (Roderick et al., 2009). Some analysts argue that students who took AP courses were more likely to enroll in higher education relative to their peers who did not take those courses (Long & Riley, 2007). Research also indicated that the number of AP courses taken was significantly

positively associated with 4-year postsecondary institution enrollment (Engberg & Wolniak, 2010). However, prior studies showed that low-income and minority students were less likely to take AP courses. As showed in the study of Roderick et al. (2009), White graduates were more likely to take an AP course than African American and Latino graduates. And this research also indicated that only 16.3 percent of students of low SES had taken an AP course, compared with 50.9 percent of high SES high school graduates in the 2003-04 academic year (Roderick et al., 2009).

Researchers have demonstrated that high school context may be associated with students' academic outcomes (Engberg, & Wolniak, 2010). Engberg and Wolniak's (2010) empirical research emphasized the essential role high schools played in college decision-making. Specifically, high school variables such as human, cultural and social capital, together with institutional characteristics, showed significant influence on college enrollment. On the contrary, the learning environment of the high school failed to reveal a vital effect on students' college-decision making in Engberg and Wolniak's study. Another study conducted by Wolniak and Engberg (2007) focused on how institutional networks influence college choice. A positive and significant correlation was shown in this research between the high school's connection with a particular postsecondary institution and students enrolled from that high school (Wolniak & Engberg, 2007).

It has been well established in a large body of research that high schools may promote 4-year college enrollment by influencing academic preparation (Engberg, & Wolniak, 2010). Evidence of the link between the quality of high schools attended and college enrollment is strong (Baird, 2006; Berkowitz, & Hoekstra, 2011). For instance, Perna and Titus (2005) found that differences in quality of resources at school attended

helped explain differences in college enrollment rate. And Baird (2006) found that the high school graduation rate is one of the most important factors explaining college enrollment. Roderick, Coca, and Nagaoka (2011) concluded that high school college-going climate exerted a positive influence on students' four-year college enrollment. Moreover, Berkowitz and Hoekstra (2011) found significant returns of attending a highly selective private high school. By utilizing exceptional administrative data from an independent elite high school, Berkowitz and Hoekstra's study (2011) showed that students who attended the most selective private high school were more likely to attend more selective colleges than students who graduated from other top public and private schools.

In addition, researchers found that taking college entrance exams (SAT or ACT) was one of the most vital predictors of college enrollment, especially 4-year college enrollment (Long & Riley, 2007; Klasik, 2013). For instance, Berkowitz and Hoekstra (2011) likewise attributed some of the explanation of the selectivity of the college subsequently attended to differences in higher SAT scores. And Klasik (2013) conducted a study to measure the effects of state-required college entrance exams on college enrollment. By analyzing the Integrated Postsecondary Educational Data System (IPEDS) data, Klasik (2013) found that students were significantly more likely to enroll in 4-year institutions after the state enactment of the entrance exam requirement. The study of Buchmann et al. (2010) addressed the effect of SAT scores on college enrollment, and this literature showed that SAT scores played a positive effect in college enrollment, and this effect grows more significant at each level of institutional selectivity. However, this literature suffers from several problems. For example, as stated by St. John (2002), exam

taking is not a criterion of college enrollment, but an indicator of which students are able to pay the costs of colleges. That is, students who were concerned about college costs would be less likely to take the entrance exams (St. John, 2002).

Researchers have also examined the impact of state programs that aim at promoting academic preparation for college access. Research demonstrated that state policies that related to academic preparation may influence students' motivation to attend college. The nation's first intervention program, the California Student Opportunity and Access Program, was created in 1978 to provide academic preparation and motivation support services for students from socioeconomically disadvantaged backgrounds to attend college (CSAC, 2013). Similar programs were implemented by other states thereafter, such as Indiana and Oklahoma. The Indiana 21st Century Scholars Program provides up to four years of in-state tuition to income-eligible students who enrolled in the program. St. John, Musoba, Simmons, Chung, Schmit and Peng (2004) conducted a study to examine the impact of Indiana's 21st Century Scholars Program. This study indicated that the Indiana program significantly improved the academic preparation and college enrollment of low-income students. To be specific, students who participated in the program were 4.8-5.3 times more likely to enroll in a college than non-participants (St. John et al., 2004).

Literature on student social background

The third strand of literature and its researchers frame the world of college enrollment in light of student social background. This literature views postsecondary education access as a question of how to shrink the "access gap" between the rich and the

poor and Whites and minorities. By reviewing the literature, we may better understand how student social background influences college enrollment, especially four-year college enrollment.

Research showed that socioeconomic status (SES) is a major factor associated with college access; family income and parent educational attainment plays critical roles in college enrollment (Ward, 2006; Charles, Roscigno, & Torres, 2007; An, 2010). The study of Charles et al. (2007) addressed that parental income and education were significantly positively associated with college enrollment. An's research (2010) investigated the impact of family background in college choice. Analysis of the Educational Longitudinal Study of 2002 (ELS: 2002) data shows that family income is positively associated with college application (An, 2010). Research has shown that students whose parents without college experience are less likely to go to college than their peers. Engle's empirical research (2007) demonstrated that the probability of students going to college may reduce if their parents haven't attended college. Similarly, the research of Bettinger et al. (2012) illustrated that student whose mother with college experiences was more likely to attend a college. The research of Toldson, et al. (2009) implied that father's education had a significant influence on a black male's postsecondary aspirations. Also, recent evidence suggested that parents' college degrees are positively related with attending a college (An, 2010; Luna De La Rosa; 2007). Luna De La Rosa's study (2007) showed that students whose parents have less education than high school were less likely to discuss financial aid information with their parents.

Furthermore, social scientists found that college choice differs by family background. Although the evidence is mixed regarding the effect of family income on

college enrollment, studies generally agree that high-income family background positively affects four-year college enrollment and enrollment in more selective colleges (An, 2010; Klasik, 2012). Klasik's research (2012) demonstrated that students from high-income families were significantly more likely to be enrolled in four-year higher education institutions. Specifically, this literature indicated that students from higher income groups were more likely to complete the college application process than lower income group students (Klasik, 2012).

A substantial body of research documents the powerful effect of family socioeconomic status and family background on four-year college enrollment (Charles, Roscigno, & Torres, 2007; Klasik, 2012). Charles et al. (2007) suggested that Whites and Asians are better performing groups in terms of high school GPA and college entrance exam scores than African American, Native Americans, and Hispanics. Klasik (2012) conducted research to identify students from different social backgrounds complete the steps to four-year college enrollment. Compared with the White and Asian students, Hispanic and Native American students were less likely to take college entrance exams to enroll in a four-year college (Klasik, 2012).

In addition to parental income and education, research has shown that parental involvement is a strong predictor of college enrollment (Perna & Titus, 2005; Engberg & Allen, 2011). Engberg and Allen (2011), for example, demonstrated the importance of parental involvement in relation to four-year college enrollment, highlighting the role of parent-to-student, and parent-to-school involvement in improving the likelihood of college enrollment. The empirical research of Engberg and Wolniak (2010) also proved the importance of parent-to-school, as well as parent-to-parent contact in increasing the

odds of four-year college enrollment. To examine the relationship between parental involvement and college enrollment, Perna and Titus (2005) utilized the multinomial extension of hierarchical linear modeling (HLM) to analyze the NELS data. This research found the frequency of parent-student discussion on education-related topics is positively associated with the odds of enrolling in two-year or four-year colleges. Especially, the odds of enrolling increase as the frequency of parent-school contact about academic issues increased (Perna & Titus, 2005). Also, Smith (2009) conducted qualitative research to understand the college choice involvement of low-SES African American parents. Smith's research found that the information that low-SES African American parents sent is the value of college embraced vocational preparation and potential income. Instead of participating in college-participatory programs, the college choice involvement of low-SES African American parents represented that they guided their children to complete a high school program (Smith, 2009).

Nevertheless, there is conflicting evidence regarding whether parental saving for college has a significant impact on postsecondary enrollment (Charles et al., 2007; An, 2010; Engberg & Allen, 2011). Some researchers found that parents who saved for college expenses significantly increase the odds of their children college enrollment. For instance, Charles et al. (2007) illustrated that family investment played a strong and positive role in college enrollment, especially four-year college enrollment. Also, researchers demonstrated that parental investment influenced not only college access but also college choice (Charles et al., 2007; An, 2010). An's study (2010) showed that parental saving for college were positively associated with where students apply. However, other studies found that parental saving for college may not influence college

enrollment. As showed in Engberg and Allen's study (2011), there is no significant effect in terms of parental investment on students' college enrollment.

Studies generally showed that number of siblings was associated with college access. The resource dilution hypothesis indicated that more siblings a student have, the lower odds of the student attending a postsecondary institution (An, 2010). In other words, siblings may share the finite amount of resources of the family (An, 2010). Nevertheless, siblings can also play the role of information source of college choice and financial aid which may positively impact academic achievement (Sandefur, Meier, & Campbell, 2006). Further research is needed to evaluate the impact of number of siblings on postsecondary enrollment.

Moreover, current research indicated that racial/ethnic group is a vital predictor of college enrollment; African American and Hispanic high school students were less likely to go to college than their White counterparts (Ward, 2006; Charles et al., 2007). Perna's study (2000) indicated that the higher education enrollment rate varied by racial and ethnic group. In addition, African-American and Latino students were more likely to attend less selective four-year institutions and two-year colleges than their White counterparts (Charles et al., 2007; Stearns et al., 2010). By utilizing multinomial logistic regression, the literature of Charles et al. (2007) indicated that African Americans, Native American, and Hispanic students are significantly less likely to attend college than White students. To be specific, Black students are 54% less likely to attend 4-year institutions and 72% less likely to attend 2-year colleges than their white counterparts (Charles et al., 2007). And the study of Charles et al. (2007) illustrated that African American, Hispanics, and Native Americans are as likely or even more likely to attend colleges than their white

peers after controlling for family background (family income and parental education) and educational investments.

A related strain of research has examined the effect of gender on college-going patterns. For instance, male students were less likely to expect to earn a college degree than their female schoolmates (Wells, Seifert, Padgett, & Umbach, 2011). Several studies have been done to explore the origin of the gender gap in college enrollment. The research of Wells et al. (2011) aimed to examine the effects of gender on students' higher educational expectations. This research suggested that social capital in terms of parental expectations, parental involvement, and peer influences played a significant role in postsecondary expectation formation, and female high school students enjoyed a higher level of these forms of social capital than male students (Wells et al., 2011). Also, the study of Long et al. (2012) implied that female students were more likely to have taken advanced academic courses in high school than their male peers, and advanced course-taking was significantly positively associated with 4-year college enrollment.

Literature on significant others influences

Peer network may affect students' college application and enrollment (Roderick et al., 2011). Research has highlighted the importance of peers' influence in relation to postsecondary attendance. Engberg and Allen (2011) for instance, demonstrated that students with higher numbers of friends with 4-year college plans were significantly more likely to attend four-year institutions. The results were consistent with Engberg and Wolniak's argument (2010) that peer networks proved an important factor in increasing the chances of attending a four-year institution. However, as stated by Engberg and

Wolniak (2010), students were significantly less likely to attend four-year colleges as the number of friends attending a two-year college increased.

High school counseling played an important role in increasing college enrollment by providing college information and supporting the application process (Roderick, Coca, & Nagaoka, 2011). High school counselors represent a vital form of college and financial aid information for high school students and families. Evidence from current research demonstrated that the frequency of meeting with high school counselors is positively related to students' 4-year college enrollment (McDonough, & Calderone, 2006). Moreover, evidence abounds that the relatively lower higher education enrollment of low-income students and minority students may be largely explained by the lack of counseling (McDonough, & Calderone, 2006). The study of Bryan, Moore-Thomas, Day-Vines, and Holcomb-McCoy (2011) provided further information on the impacts of school counselors in college enrollment. Analyzing a subset of Educational Longitudinal Study of 2002 (ELS) data, Bryan et al. (2011) empirically identified that students who contacted their school counselor for college information by 10th grade had significantly higher odds of applying to college than who did not see the counselor for information about college. The research of Bryan et al. (2011) also indicated that the school counselor may be one major source of college-related information for some students from lower socioeconomic backgrounds.

Conclusion

This literature review has focused on financial aid, academic preparation, student social background and significant others influences issues which are associated with four-

year college enrollment. The review has used the literature to investigate the research on factors impacting students' college choice. Although some limits exist in the literature, the evidence collectively points in a similar direction. Overall, the studies I have reviewed provide empirical support for the claim that financial aid in general has a positive impact on college enrollment. Also, almost all of the studies we reviewed showed that student social background played a vital role in postsecondary attendance; low-income and minority students were less likely to go to college, especially four-year colleges than their high-income and white counterparts. Finally, for student academic preparation, almost all the studies reviewed showed that students who are academically qualified were more likely to enroll in a four-year postsecondary institution.

This review proposes that in order for the research to be more extensive identify the factors which may impact four-year college enrollment decision-making, several scholarly strides need to be made. The following are some conclusions made as a result of the gap of the literature.

First, although research has examined the consequences of financial aid for students' postsecondary attendance, previous studies on financial aid and college enrollment are limited in several respects. For example, much of what is known about the impact of a particular kind of financial aid on college enrollment, only a few studies have compared the influence of different kinds of financial aid. In addition, these studies often mask the role of academic preparation (St. John, 2002). Developing a better understanding of the role of academic readiness in college enrollment is particularly important. Future research should also examine whether financial aid policies make a difference in the type of institution that college-qualified students attend. This review

suggests that in this area, special attention should be paid to the situation of low-income students.

Second, research is needed to measure the four-year postsecondary entry gap between the low-income students and high-income students, the minority students and the white students. Although past research found that low-income students and minority students were less likely to enroll in a four-year college, additional measures of students' academic preparation are needed to provide more insight into the relationship between family income and four-year college enrollment.

This dissertation will fill the gap in the literature by examining the factors which may impact students' four-year college enrollment. The objective of this dissertation is to further our understanding of these factors and recommend possible solutions. The most widely cited and used process model, the three-phase college choice model developed by Hossler and Gallagher (1987) will guide this study.

Chapter 3

Methodology

This study intends to focus on college-qualified students and examine how financial aid policies related to their four-year college enrollment behavior. Research questions that guide this inquiry are as follows:

1. How is financial aid related to four-year college enrollment among college-qualified students by controlling students' academic preparation and student social background?
2. Is the relationship different across college-qualified students with different income backgrounds?

Data source and sample

Restricted-use data from the National Education Longitudinal Study (NELS) will be utilized to answer the research questions. The NELS is a nationally representative, survey-based dataset designed to track a cohort of high school students from eighth grade in 1988 through college and as they enter the workforce in 2000. Data for this study came from the second follow-up of NELS data collection, which surveyed students in 1992 when the students complete high school.

NELS, although is less recent than other national data, is an ideal dataset for this study for several major reasons. First, the longitudinal data enable us to control for students' social background, and high school academic achievement while examining the college choice process. Second, NELS provides quality data on financial aid possible for understanding the effects of student aid on student decision for college choice. Third, the college-qualification index Berkner and Chavez (1997) developed using NELS data is

available for the study to focus on college-qualified students. The analytic sample for this study is based on the students who were observed in the first four rounds (base year through third follow-up) of data collection. The sample is limited to students who met college entrance requirements of four-year institutions. The sample selection variable, college qualification index, comes from NELS 1992, indicating that the minimally qualified for 4-year colleges students are those GPA were above 2.7 on a 4.0 scale, class rank percentile ≥ 54 , combined SAT ≥ 820 , composite ACT ≥ 19 , NELS 1992 aptitude test percentile ≥ 56 (Berkner & Chavez, 1997).

Like any data source, NELS database is not perfect. First of all, the NELS sample included some oversampling of Asian and Hispanic students in the first year, and disproportionate retention in the 1990 follow-up (Perna & Titus, 2005). Second, missing data varies across the different items contained in the surveys. Despite such limitations, we are afforded confidence by both the nationally representative sample of high school students and the ample information they provide regarding students and their educational experiences.

Variables and Methodology

The key dependent variable in this study is college enrollment. The independent variables represent students' characteristics and their high school experiences, and will be chosen based on significant factors found in prior literature. Literature indicates that financial aid, student academic preparation, and student social background exerted a great influence on students' college decision-making. In order to effectively understand the impact of financial aid policy on college enrollment, I incorporated three groups of

variables, including student academic preparation, student social background, and financial aid.

- Student academic preparation (high school GPA, college entrance examination scores, high school course-taking, class rank percentile in high school)
- Student social background (gender, family income, parents' education, parents' involvement, high school counselors' influence, high school teachers' influence, peers' influence, high school characteristic, and race/ethnicity)
- Financial aid (types and amount of financial aid received)

Student Ability

In terms of student ability, I included high school grade point average, SAT/ACT scores, high school course-taking, and class rank percentile in high school. As stated before, I defined college-qualified students for four-year colleges as students who may meet college entrance requirements of four-year institutions. Based on the college qualification index of NELS 1992, the minimally qualified for 4-year colleges students are those GPA were above 2.7 on a 4.0 scale, class rank percentile=54, combined SAT=820, composite ACT=19, NELS 1992 aptitude test percentile=56 (*U.S. Department of Education, 2013*). In order to include as many students as possible who were potentially qualified for 4-year college, this study utilized Berkner, and Chavez's (1997) formula that the minimal criteria for college qualified students were who had reached any of the five criteria to select sample. Even though the sample focuses on college qualified students only, there is still a lot of variation in their academic preparation, which can affect their college enrollment decision, so it is important to include the academic

preparation variables, such as high school course-taking. All of the information in this category was taken directly from the student's official high school transcript contained in the restricted NELS dataset.

Student Social Background

In addition, I use several measures to capture student social background: gender, family income, parents' education, parents' involvement, parental saving for college, race/ethnicity, and high school characteristic. High school counselors' influence, high school teachers' influence, and peers' influence are three of the vital predictors of college enrollment, and it will be categorized in the student social background in this study.

- Race was measured as White (reference group), African American, Asian American, and Hispanic.
- Family income was measured as high-income family (above \$75,000), middle-income family (\$15,000-\$75,000), and low-income family (\$15,000 or less; reference group) (Berkner & Chavez, 1997).
- Parents' education is classified by following categories: less than high school, high school graduate/GED, some college, baccalaureate degree (BA), and graduate degree (reference group).
- Parental involvement was measured by parent-child discussions about school-related topics, how often parents discussed with college entrance exams preparation, and parent-child discussion about going to college.

- High school counselor and teachers' influence were measured by whether counselor and favorite teacher suggested students to go to college after high school.
- Influence of peers was measured by whether the student have friends chose to attend either two-year or four-year institutions.
- High school characteristic was measured by high school type (public and private) and high school urbanity (urban, suburban, and rural; reference group).

Financial aid

In examining aspects of financial aid, I included two different scales representing the impact of financial aid. The first scale examined the effect of different kinds of financial aid, for instance, grants, loans, work-study, and other financial-aid. The second scale examined the total amount of financial aid the student received in college.

Descriptive and logistic regression analyses are used to address the research questions. Descriptive analyses are used to describe and compare the characteristics of the sample students. Logistic regression is used for dependent variables that are categorical. The dependent variable in this study, college enrollment, containing two distinct categories: enrolled in two-year institutions, and enrolled in four-year institutions. This study will use logistic regression analysis to investigate the effects of financial aid on four-year college enrollment among college-qualified students.

Data analysis

Different analytic techniques will be employed to answer the research questions. First, in order to understand financial aid differences among college-qualified students who attended 4-year colleges, as well as 2-year postsecondary institutions, I will produce descriptive analyses such as frequencies, means, and standard deviation. In addition, I will employ Crosstabs to examine the means on the dependent variable for various categories of the independent variables to determine whether there are significant mean differences among these groups of students.

The second analytic stage involved using a logistic regression to test which of the independent factors in the model may influence the likelihood attending a four-year college versus a two-year. Also, in order to answer the second research question, separate analysis will be conducted for each income group to determine whether the relationship between financial aid and 4-year college enrollment different across these groups.

In the final stage of analysis, a series of tests for interaction effects will be involved to examine the variation of income differences in enrollment as a function of financial aid.

Logistic regression is appropriate because it allows to simultaneously assessing the probability of 4-year college enrollment relative to 2-year college enrollment, and it also allows the independent variables to differ for each outcome.

Limitations

This research has several limitations as well. First of all, parental saving for children's college has been shown to be a key factor in influencing college enrollment decisions, especially for academically prepared students who choose not to attend four-year colleges and low-income students. Although I would like to include this indicator, there are no relevant data available in NELS.

Another limitation is that this study highlights the type of college which students attended within two years after finished high school. However, students who chose to enroll in a two-year college and then transferred to a four-year institution might be beyond the scope of this study.

This study also limits measures of parental involvement; the NELS data focused on the role of parental involvement in the senior year (1992) of high school. Also, measures of the quality of parental involvement are not available in the NELS dataset (Perna & Titus, 2005). Based on these limitations, this study may not fully account for the impact of parental involvement on four-year college enrollment.

Chapter 4

Results

The objective of this study was to examine the impact of financial aid on four-year college enrollment among college-qualified students. In addition, this study investigated the relationship between financial aid and four-year college enrollment across different income backgrounds. As such, factors which the college enrollment literature identified as being associated with four-year college enrollment were examined. These factors included student academic preparation, student social background, and financial aid. The results in this chapter are presented in two sections which correspond with the steps used in the analysis. The first section presents descriptive statistics which lists all of the variables included in this study using a crosstabs, which serves as the baseline for the analysis. The second section presents key findings to provide a better understanding of major factors associated with four-year college enrollment among college-qualified students. Also, the subgroup analyses and interaction effects used to test my second research question concerning the different impact of financial aid by income on 4-year college enrollment.

Descriptive Analysis

The final sample of this study consists of 4904 academically qualified students for 4-year colleges. VIF tests were conducted and there was no evidence of multicollinearity; the VIF values are less than 10. As such, all of the variables initially discussed were featured in the model. The dependent variable contained in the dataset measured whether

the four year college-qualified student attended either a two or four year institution. Table 1 illustrates the frequency of distribution of the dependent variable.

Sample used for this research consisted of students that were considered to be qualified for 4-year colleges, and attended either a two or four year institution in the two years following their graduation from high school in 1992. More than half of the students in the sample attended a four year institution (62.7%), whereas the rest enrolled in two-year institutions.

The sample is predominately White (79.5%), with Asians comprising of (4.7%), African Americans (8.1%), Hispanics (6.9%) and Native American (0.9%). Females were represented at higher rates than males (52.9% to 47.1%). In terms of income, which is reported as high (above \$75,000), medium (\$15,000-\$74,999) and low (\$14,999 or less); 11.4% of the respondents were from high income families, 65.5% were from middle income, and 23.1% were from the low income group. In terms of parental education, 41% of the respondents reported having parents that earned at least a bachelor's degree.

With regard to the parental involvement, specifically how often the respondent had conversations regarding various topics, it was found that 17% often discussed school courses, 29% discussed school activities, 22% discussed things studied in class, 42.8% discussed grades, 21.6% discussed SAT/ACT, and 51.4% discussed going to college with parents in the senior year of high school.

In terms of friends' college-going patterns, 97.6% of the respondents reported that have friends went to four-year colleges, 77.9% of the respondents have friends attended

2-year colleges. In addition, 81.5% and 78.9% of the respondents reported that high school counselors and teachers suggested them to go to college after high school.

With regard to high school characteristic variables suggest that 89.2% of the respondents reported the high school type is public. 24.6% of the respondents attended high school in urban area, 43.8% attended high school in suburban area, and 31.6% in rural area.

Finally, descriptive for financial aid variables suggest that 47.9% of the respondents received grants, 29.7% received loans, 10.9% received work-study, 2.8% received other financial aid, and 41.9% didn't receive financial aid.

Crosstabs was also conducted for financial-aid variables and family income. As showed in Table 2, only small shares of high-income received financial aid comparable to middle and low income. For example, 5.9% of high-income graduates received loans, compared with 65.1% of middle-income and 29% of low-income.

Table 1

Descriptive Statistics of the Sample (4904) Categorical Variables

| Variable name | Variable description | Percent |
|--|---------------------------------|----------------|
| Dependent Variable | | |
| College enrollment | Enrolled in 4-year institutions | 62.7 |
| | Enrolled in 2-year institutions | 37.3 |
| Independent Variables (Student Social Background) | | |
| Race | White | 79.5 |
| | African American | 8.1 |

| | | |
|-----------------------|--|------|
| | Hispanic | 6.9 |
| | Asian | 4.7 |
| | Native American | 0.9 |
| Gender | Male | 47.1 |
| | Female | 52.9 |
| Family Income | Low-income: \$15,000 or less | 23.1 |
| | Middle-income: \$15,000-\$75,000 | 65.5 |
| | High-income: above \$75,000 | 11.4 |
| Parental Education | Less than High School | 4.4 |
| | High School/GED | 13.9 |
| | Some College | 40.8 |
| | Bachelor Degree | 20.4 |
| | Graduate Degree | 20.6 |
| Parental Involvement | Often discussed school courses | 17.0 |
| | Often discussed school activities | 29.0 |
| | Often discussed things studied in class | 22.0 |
| | Often discussed grades | 42.8 |
| | Often discussed prepare for the ACT/SAT test | 21.6 |
| | Often discussed going to college | 51.4 |
| High School Counselor | Suggested to go to college after high school | 81.5 |
| High School Teacher | Suggested to go to college after high school | 78.9 |
| Friends | Attended 4-year college | 97.6 |
| | Attended 2-year college | 77.9 |
| High School Type | Public | 89.2 |
| | Private | 10.8 |

| | | |
|--|---|------|
| High School Urbanity | Urban | 24.6 |
| | Suburban | 43.8 |
| | Rural | 31.6 |
| Independent Variables (Financial Aid) | | |
| Grants | Received grants in college | 47.9 |
| Loans | Received loans in college | 29.7 |
| Work-study | Received work-study in college | 10.9 |
| Other Financial Aid | Received other financial aid in college | 2.8 |
| No Financial Aid | Did not received financial aid in college | 41.9 |

Note. Percentages may not sum to 100 due to rounding.

Table 2

Cross Tabs of Financial-aid Variables with Family income

| Financial-aid Variables | High-income | Middle-income | Low-income |
|--------------------------------|--------------------|----------------------|-------------------|
| Grants | 7.7 | 57.8 | 34.5 |
| Loans | 5.9 | 65.1 | 29.0 |
| Work-study | 4.5 | 61.4 | 34.3 |
| Other Financial Aid | 8.1 | 55.1 | 36.8 |
| No Financial Aid | 16.6 | 71.6 | 11.8 |

In terms of student academic preparation variables, the mean of total high school credits in mathematics is 3.46. The mean value of total science credits received in high

school is 3.26. And the mean of total social science credits received in high school is 3.56. With regard to financial aid variables, the mean of total amount of financial aid is about \$2086.

Table 3

Descriptive Statistics of the Sample (4904) Continuous Variables

| Variable Name | Variable description | Mean | SD |
|---|---|-------------|-----------|
| Independent Variables (Student Academic Preparation) | | | |
| Mathematics Credits | Total high school credits in mathematics | 3.46 | .84 |
| Science Credits | Total high school credits in science | 3.26 | 1.03 |
| Social Science Credits | Total high school credits in social science | 3.56 | .87 |
| Independent Variables (Financial Aid) | | | |
| Aid Amount/100 | Total amount of financial aid received | 20.86 | 38.68 |

Crosstabulations were also conducted for the categorical variables and institutional type (Table 3). In terms of demographic variables, 64.2% of White students, 72.2% of Asian students, 58% African Americans, 49.1% Hispanic, and 25.6% of Native American students were enrolled in four year institutions. 62.6% of the male college-qualified students enrolled in a four year institution, and 62.7% of the female college-qualified students were enrolled in four year institutions.

Table 4 shows that, smaller shares of low income level students than high income and middle income students enrolled in a 4-year college (54.4% vs. 89.2% and 61%). 10.8% of high-income graduates were enrolled in a 2-year college after high school, compared with 39% of low-income and 45.6% middle-income.

In terms of the parental education variables, 73% of students enrolled in a four year institution had parents' whose higher educational level was that of a bachelor's degree whereas 32.6% of the students had parents who had less than a high school degree were enrolled in a four year institution.

The variables that represent parental involvement ask how often a student had various school related discussions with their parents. 67.3% of the respondents that often discussed school courses with parents attended a four year institution. 71% of the students that often discussed school activities with their parents attended at a four year institution. 69.9% of the respondents reported discussing things studied in class with parents attended a four year institution. 63.4% of the respondents that reported discussing grades often with parents attended a four year institution. 72.6% of the respondents that reported discussing test preparation for SAT/ACT examinations attended a four year institution. 74.9% of the students that often discussed going to college with their parents attended a four-year institution.

In terms of significant others' influence variables, 63.7% of the respondents who have friends went to four-year colleges chose to attend a four-year institution, 55.3% of the respondents who have friends attended 2-year colleges chose to attend a four-year institution. In addition, 66.1% and 67.3% of the respondents whose high school

counselors and teachers suggested them to go to college after high school chose to go to four-year colleges.

In terms of high school characteristic variables, 61.1% of the respondents who graduated from public high school went to four-year colleges, whereas 75.7% of private high school graduates.

Cross tabs of financial aid variables show that bigger shares of 4-year college-qualified graduates who received grants, loans, and work-study than of whom received other financial aid and did not receive financial aid chose to attend a four-year college after high school (72.9%, 82.7%, 90.7% vs. 55.1%, 49.5%). About half (50.5%) of college-qualified graduates who did not receive financial-aid were enrolled in a 2-year college, compared with about one fourth of whom received grants (27.1%), 17.3% of whom received loans, 9.3% of whom received work-study, and 44.9% received other kind of financial aid.

Table 4

Cross Tabs of Variables with College Enrollment

| Variables | 4-year % | 2-year % |
|----------------------------------|----------|----------|
| Student Social Background | | |
| Race: White | 64.2 | 35.8 |
| Race: African American | 58.0 | 42.0 |
| Race: Hispanic | 49.1 | 50.9 |
| Race: Asian | 72.2 | 27.8 |
| Race: Native American | 25.6 | 74.4 |
| Gender: Male | 62.6 | 37.4 |

| | | |
|--|------|------|
| Gender: Female | 62.7 | 37.3 |
| Family Income: Low | 54.4 | 45.6 |
| Family Income: Middle | 61.0 | 39.0 |
| Family Income: High | 89.2 | 10.8 |
| Parental Education: Less than High School | 32.6 | 67.4 |
| Parental Education: High School/GED | 52.1 | 47.9 |
| Parental Education: Some College | 55.0 | 45.1 |
| Parental Education: Bachelor Degree | 73.0 | 27.0 |
| Parental Education: Graduate Degree | 81.2 | 18.8 |
| Parental Involvement: Often discussed school courses | 67.3 | 32.7 |
| Parental Involvement: Often discussed school activities | 71.0 | 29.0 |
| Parental Involvement: Often discussed things studied in class | 69.9 | 30.1 |
| Parental Involvement: Often discussed grades | 63.4 | 36.6 |
| Parental Involvement: Often discussed prepare for the ACT/SAT test | 72.6 | 27.4 |
| Parental Involvement: Often discussed going to college | 74.9 | 25.1 |
| High School Counselor | 66.1 | 33.9 |
| High School Teacher | 67.3 | 32.7 |
| Friends: Attended 4-year college | 63.7 | 36.3 |
| Friends: Attended 2-year college | 55.3 | 44.7 |
| High School Type: Public | 61.1 | 38.9 |
| High School Type: Private | 75.7 | 24.3 |
| High School Urbanity: Urban | 67.1 | 32.9 |
| High School Urbanity: Suburban | 60.5 | 39.5 |
| High School Urbanity: Rural | 62.1 | 37.9 |

| Financial Aid | | |
|----------------------|------|------|
| Grants | 72.9 | 27.1 |
| Loans | 82.7 | 17.3 |
| Work-study | 90.7 | 9.3 |
| Other Financial Aid | 55.1 | 44.9 |
| No Financial Aid | 49.5 | 50.5 |

Logistic Regression

This study focused on the student academic preparation, student social background, and financial aid variables of college qualified students that attended either a two or four year institution, especially the impact of financial aid factors on college choice. Financial aid variables are whether received grants, loans, work-study, other financial aid in college, and the total amount of financial aid received in college. Student social background variables of interest are gender, race/ethnicity, family income, parents' level of education, how often parents discussed academics and academic related topics, high school counselors' influence, high school teachers' influence, peers' influence, and high school characteristic.

The logistic regression was conducted to assess whether the independent variables significantly predicted students' college choice. 4826 participants were eligible for this study, and were considered in this particular regression. Table 4 presents the odds ratios, which suggest that the odds of going to four-year colleges are increasingly greater as independent variables increase.

Table 5

Logistic Regression Predicting the Attendance of 4-year Institutions

| Variable | Odds ratio | Standard Error | Significance |
|---|-------------------|-----------------------|---------------------|
| Race: Asian | 1.362 | .202 | |
| Race: African American | .856 | .143 | |
| Race: Hispanic | .925 | .159 | |
| Race: Native American | .328 | .418 | ** |
| Gender: Male | .937 | .080 | |
| Family Income: High | 4.604 | .187 | *** |
| Family Income: Middle | 1.115 | .102 | |
| Parental Education: Less than High School | .187 | .229 | *** |
| Parental Education: High School/GED | .425 | .147 | *** |
| Parental Education: Some College | .461 | .118 | *** |
| Parental Education: Bachelor Degree | .874 | .132 | |
| Parental Involvement: Often discussed school courses | .753 | .124 | * |
| Parental Involvement: Often discussed school activities | 1.012 | .106 | |
| Parental Involvement: Often discussed things studied in class | 1.153 | .119 | |

| | | | |
|--|-------|------|-----|
| Parental Involvement: Often discussed grades | .695 | .096 | *** |
| Parental Involvement: Often discussed prepare for the ACT/SAT test | 1.238 | .117 | |
| Parental Involvement: Often discussed going to college | 2.206 | .094 | *** |
| High School Counselor | 1.197 | .122 | |
| High School Teacher | 1.700 | .117 | *** |
| Friends: Attended 4-year college | 4.230 | .287 | *** |
| Friends: Attended 2-year college | .211 | .123 | *** |
| High School Type: Public | .836 | .151 | |
| High School Urbanity: Urban | 1.040 | .115 | |
| High School Urbanity: Suburban | .846 | .091 | |
| Grants | 1.531 | .158 | ** |
| Loans | 2.754 | .127 | *** |
| Work-study | 2.782 | .187 | *** |
| Other Financial Aid | .866 | .265 | |
| No Financial Aid | 1.053 | .173 | |
| Aid Amount/100 | 1.016 | .002 | *** |

| | | | |
|------------------------|-------|------|-----|
| Mathematics Credits | 1.490 | .053 | *** |
| Science Credits | 1.687 | .046 | *** |
| Social Science Credits | .987 | .045 | |

Note. Significance: * $p < .05$; ** $p < .01$; *** $p < .001$

Logistic regression analyses reveal that the odds of enrolling in a four-year college or university are lower for Native Americans (odds ratio=.328) than for Whites. This finding suggests that for college-qualified students who attended a 4-year college, the odds of Native Americans were 67.2% lower than the odds for Whites. There is no significant difference in four-year college enrollment between male and female students.

Parental income level was significant ($p < .001$) for high income students. After controlling for other variables, the odds of enrolling in a 4-year college or university are higher for high-income graduates (odds ratio=4.604) than for low-income. This suggests that there is a greater advantage for students from the higher income level of attending a four year institution.

Parental education is another significant variable related to 4-year college enrollment for college-qualified students, with higher parental educational levels being associated with higher enrollment rates. For instance, the odds of students whose parental education level is less than high school were just 18.7% of the odds of their peers whose parents have graduate degree of attending a four year institution.

Of the parental involvement variables, three were considered significant. Parent-student conversation regarding school courses is significantly ($p < .05$) and negatively related to the odds of going to four-year institutions. Students that often had conversations with their parents regarding going to college was statistically significant ($p < .001$). Students that often discussed going to college with their parents were more than twice (odds ratio = 2.206) likely than their peers that did not discuss the topic with their parents to attend a four year institution. The variables that represented the frequency at which the student discussed grades with their parents were significant ($p < .001$). For students who often discussed grades with their parents, the odds of attending a four year institution is 69.5% of the odds for their peers who did not have discussions with their parents regarding grades. A student have discussions with their parents regarding school activities, things the student studied in class, and SAT/ACT test preparation were not statistically significant.

As demonstrated in Table 5, peers' influence is significantly related to college enrollment. In particular, for student that had friends went to four-year colleges, the odds of go to four-year institutions was about four times more (odds ratio = 4.230) than their peers who had no friends went to four-year institutions. Table 4 also indicated that there is a significant relationship between high school teachers' influence and college going patterns. To be specific, for students whose teacher suggested going to college after high school, the odds of attending a four-year institution are 70% higher than the odds for those whose teacher didn't suggest attending higher education institutions. High school counselor's influence has a non-significant effect on the odds of four-year college enrollment. In terms of high school characteristics variables, Table 4 shows that none of

the two measures is a statistically significant predictor of 4-year college enrollment after controlling for other variables.

The results also demonstrate that grants, loans, and work-study were significantly related to going to 4-year colleges ($p < .01$, $p < .001$, and $p < .001$ respectively). The odds of attending a four year institution for students who received loans and work-study were almost twice (odds ratio = 2.754, 2.782 respectively) higher than the odds for those who did not receive. Other kind of financial aid and no financial aid variables were not significant. The amount of financial aid received was significantly associated with four-year college enrollment ($p < .001$). A \$100 increase in the amount of financial aid is related to a 1.6% increase in the odds of going to a 4-year institution.

With regard to the effects of academic preparation, the results demonstrate that high school math credits and science credits are statistically significantly ($p < .001$, and $p < .001$ respectively) and positively related to 4-year college enrollment. A one-credit increase in math or science in high school is related to a 49%, 68.7% increase respectively in the odds of going to four-year colleges or universities. However, the total high school social science credits variable was not significant ($p < .396$).

Sub-Group Analyses

At this stage of the data analysis, separate analyses using the baseline model were conducted for each income group. The major purpose of these analyses was to test the hypotheses of differential aid effects on college going patterns for students from different income backgrounds. Interaction effects will be tested based on the results of this step.

Table 6

Logistic Regression Predicting the Attendance of 4-year Institutions of High Income Students (619)

| Variable | Odds ratio | Standard Error | Significance |
|---|-------------------|-----------------------|---------------------|
| Race: Asian | 6.106 | 1.237 | |
| Race: African American | .402 | 1.074 | |
| Race: Hispanic | .043 | .772 | *** |
| Race: Native American | .446 | 1.855 | |
| Gender: Male | 1.104 | .400 | |
| Parental Education: Less than High School | .079 | 1.670 | |
| Parental Education: High School/GED | .120 | .769 | ** |
| Parental Education: Some College | .283 | .508 | * |
| Parental Education: Bachelor Degree | 1.080 | .481 | |
| Parental Involvement: Often discussed school courses | 1.138 | .639 | |
| Parental Involvement: Often discussed school activities | 2.317 | .569 | |
| Parental Involvement: Often discussed things studied in class | .449 | .564 | |
| Parental Involvement: Often discussed grades | .872 | .507 | |

| | | | |
|--|--------------|-----------|-----|
| Parental Involvement: Often discussed prepare for the ACT/SAT test | 2.717 | .756 | |
| Parental Involvement: Often discussed going to college | 5.809 | .484 | *** |
| High School Counselor | 5.926 | .610 | ** |
| High School Teacher | .798 | .592 | |
| Friends: Attended 4-year college | .000 | 15113.747 | |
| Friends: Attended 2-year college | .508 | .451 | |
| High School Type: Public | 1.120 | .553 | |
| High School Urbanity: Urban | .954 | .703 | |
| High School Urbanity: Suburban | .248 | .629 | * |
| Grants | 3.114 | 1.203 | |
| Loans | .185 | 1.064 | |
| Work-study | 36026769.242 | 7224.734 | |
| Other Financial Aid | 9513552.658 | 10172.915 | |
| No Financial Aid | 1.014 | 1.239 | |
| Aid Amount/100 | 1.014 | .015 | |
| Mathematics Credits | 1.190 | .262 | |

| | | | |
|------------------------|-------|------|---|
| Science Credits | 1.624 | .228 | * |
| Social Science Credits | 1.099 | .240 | |

Note. Significance: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 6 presented the results of the model for high income group. Controlling for other factors, Hispanic had significant impacts on 4-year college enrollment for high income group. Specifically, for Hispanic students, the odds of attending a four year institution were just 4.3% of the odds of their White peers. Among students whose annual family income was higher than \$75,000, parental education level with high school graduates and some college are statistically significantly related to the odds of going to four-year colleges. In terms of parental involvement variables, students report that often discussed going to college with parents are more likely to enroll in a four-year college (odds ratio=5.809). High school counselors' influence is significantly and positively related to the odds of 4-year institution enrollment for high income group. For high income students whose counselor suggested attending higher education institutions after high school, the odds of going to a 4-year college are about five times (odds ratio=5.926) higher than the odds whose counselor did not suggest going to college. However, high school teachers and peers' influence is not significantly related to four-year college enrollment for high-income group students. With regard to high school characteristic variables, suburban is significantly related to 4-year college attendance. None of the financial aid variables is significantly associated with college going patterns for high income students. Although the odds ratio and standard error of work-study and other financial aid were extremely large, they were not significant indicators in this study. The extreme numbers may due to the limited numbers of high-income students who received

work-study and other financial aid in my sample. Finally, science credits had a positive effect on four-year college enrollment for the high income group students. A one-credit increase in science credits in high school is related to a 62.4% increase in the odds of enroll in a four-year college among student with annual family incomes above \$75,000.

Table 7

Logistic Regression Predicting the Attendance of 4-year Institutions of Middle Income Students (2994)

| Variable | Odds ratio | Standard Error | Significance |
|--|-------------------|-----------------------|---------------------|
| Race: Asian | 1.225 | .256 | |
| Race: African American | .900 | .204 | |
| Race: Hispanic | 1.130 | .222 | |
| Race: Native American | .131 | .611 | *** |
| Gender: Male | .891 | .099 | |
| Parental Education: Less than High School | .227 | .397 | *** |
| Parental Education: High School/GED | .442 | .179 | *** |
| Parental Education: Some College | .514 | .135 | *** |
| Parental Education: Bachelor Degree | .973 | .152 | |
| Parental Involvement: Often discussed school courses | .867 | .156 | |

| | | | |
|--|-------|------|-----|
| Parental Involvement: Often discussed school activities | .830 | .131 | |
| Parental Involvement: Often discussed things studied in class | 1.386 | .145 | * |
| Parental Involvement: Often discussed grades | .621 | .118 | *** |
| Parental Involvement: Often discussed prepare for the ACT/SAT test | .992 | .143 | |
| Parental Involvement: Often discussed going to college | 2.606 | .116 | |
| High School Counselor | 1.203 | .151 | |
| High School Teacher | 1.765 | .146 | *** |
| Friends: Attended 4-year college | 8.177 | .394 | *** |
| Friends: Attended 2-year college | .164 | .157 | *** |
| High School Type: Public | .813 | .187 | |
| High School Urbanity: Urban | .841 | .150 | |
| High School Urbanity: Suburban | .737 | .112 | |
| Grants | 1.385 | .192 | |
| Loans | 2.934 | .171 | *** |
| Work-study | 2.374 | .254 | *** |
| Other Financial Aid | .665 | .353 | |

| | | | |
|------------------------|-------|------|-----|
| No Financial Aid | .987 | .214 | |
| Aid Amount/100 | 1.017 | .003 | *** |
| Mathematics Credits | 1.637 | .067 | *** |
| Science Credits | 1.717 | .058 | *** |
| Social Science Credits | 1.044 | .056 | |

Note. Significance: * $p < .05$; ** $p < .01$; *** $p < .001$

The model for middle income group shows consistent results with the model for all income groups. For instance, Native Americans are less likely to go to four-year colleges than their White peers. Parental educational level is a significant variable related to 4-year college enrollment for middle income students. Among middle income students, for students whose parents have graduate degree, the odds of attending a four year institution are significantly lower than the odds for the students whose parental educational level lower than a bachelor degree.

Of the parental involvement variables, parent-student discussion regarding things studied in class and grades are statistically significant ($p < .05$ and $p < .001$ respectively). For middle income students who often discussed things studied in class with parents, the odds of going to four-year institutions were 38.6% higher than the odds of those that did not discuss the topic with their parents. For middle income college-qualified students who often discussed grades with their parents, the odds of attending a four year institution is 62.1% of the odds for those who did not have discussions with their parents regarding grades.

The results demonstrate that teacher and peers' influence were significantly related to going to 4-year colleges for middle income students. In particular, for students whose teacher suggested going to college after high school, the odds of attending a four-year institution are 76.5% higher than the odds for those whose teacher didn't suggest attending higher education institutions. Also, among students from families with an annual income between \$25,000 and \$74,999, student that had friends went to four-year colleges variable is more strong; the odds of go to four-year institutions was about seven times higher (odds ratio= 8.177) than their peers who had no friends went to four-year institutions.

As demonstrated in Table 7, among middle-income groups, loans, and work-study are significantly related to 4-year college enrollment. Also, the amount of financial aid received is significantly associated with four-year college enrollment ($p < .001$). A \$100 increase in the amount of financial aid is related to a 1.7% increase in the odds of going to a 4-year institution.

With regard to academic preparation variables, the results show that high school math credits and science credits are statistically significantly ($p < .001$, and $p < .001$ respectively) and positively related to 4-year college enrollment. A one-credit increase in math or science in high school is related to a 49%, 68.7% increase respectively in the odds of going to four-year colleges or universities. However, the total high school social science credits variable was not significant ($p < .396$).

Table 8

Logistic Regression Predicting the Attendance of 4-year Institutions of Low Income Students (1213)

| Variable | Odds ratio | Standard Error | Significance |
|---|------------|----------------|--------------|
| Race: Asian | 1.618 | .387 | |
| Race: African American | 1.017 | .217 | |
| Race: Hispanic | 1.071 | .252 | |
| Race: Native American | 1.116 | .701 | |
| Gender: Male | 1.095 | .159 | |
| Parental Education: Less than High School | .132 | .515 | *** |
| Parental Education: High School/GED | .341 | .482 | * |
| Parental Education: Some College | .343 | .468 | * |
| Parental Education: Bachelor Degree | .439 | .522 | |
| Parental Involvement: Often discussed school courses | .483 | .242 | ** |
| Parental Involvement: Often discussed school activities | 1.232 | .210 | |
| Parental Involvement: Often discussed things studied in class | .952 | .247 | |
| Parental Involvement: Often discussed grades | .865 | .192 | |

| | | | |
|--|-------|------|-----|
| Parental Involvement: Often discussed prepare for the ACT/SAT test | 1.781 | .233 | * |
| Parental Involvement: Often discussed going to college | 1.580 | .191 | * |
| High School Counselor | .819 | .240 | |
| High School Teacher | 1.829 | .235 | * |
| Friends: Attended 4-year college | 2.210 | .463 | |
| Friends: Attended 2-year college | .304 | .246 | * |
| High School Type: Public | .610 | .420 | |
| High School Urbanity: Urban | 1.337 | .206 | |
| High School Urbanity: Suburban | 1.287 | .181 | |
| Grants | 1.795 | .339 | |
| Loans | 3.042 | .204 | *** |
| Work-study | 3.416 | .279 | *** |
| Other Financial Aid | 1.097 | .439 | |
| No Financial Aid | 1.435 | .381 | |
| Aid Amount/100 | 1.013 | .004 | *** |
| Mathematics Credits | 1.388 | .099 | *** |

| | | | |
|------------------------|-------|------|-----|
| Science Credits | 1.686 | .092 | *** |
| Social Science Credits | .869 | .091 | |

Note. Significance: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 8 demonstrates that parental education level is significantly related to four-year college enrollment for students whose annual family income was below \$25,000. Specifically, for low-income students whose parents have a graduate degree, the odds of going to four-year colleges is statistically significantly lower than the odds of those whose parents without a college degree. Race and gender variables are not statistically significant associated with four-year college enrollment for low-income group.

Parental involvement is another significant variable related to 4-year college enrollment for low-income college-qualified students. To be specific, A low-income student have discussions with their parents regarding SAT/ACT test preparation and going to college is significantly ($p < .05$ and $p < .05$ respectively) and positively related to the odds of going to four-year institutions. Among low-income group, for student who often discussed school courses with parents, the odds of attending a four year institution is 48.3% of the odds for those who did not discuss the topic with their parents.

As demonstrated in Table 8, high school teachers' influence is significantly related to college enrollment. To be specific, for students whose teacher suggested going to college after high school, the odds of attending a four-year institution are 82.9% higher than the odds for those whose teacher didn't suggest attending higher education institutions. Table 8 also indicated that there is a significant relationship between peers' influence and college going patterns for low-income group. In particular, for low-income

student who had friends went to two-year colleges, the odds of go to four-year institutions was 30.4% of those who had no friends went to two-year institutions.

Of the financial aid variables, three were considered significant. For low-income students who received loans and work-study, the odds of attending a four year institution is about three times (odds ratio = 3.042, 3.416 respectively) than the odds for those who didn't receive these kinds of financial aid. Among students from families with an annual income below \$25,000, a hundred- dollar increase in the amount of financial aid is related to a 1.3% increase in the odds of going to a 4-year institution.

The results also demonstrate that high school math credits and science credits are statistically significantly ($p < .001$, and $p < .001$ respectively) and positively related to 4-year college enrollment for low-income group. Among low-income group, a one-credit increase in math or science in high school is related to a 38.8%, 68.6% increase respectively in the odds of going to four-year colleges or universities.

Interaction Effects

The interaction tests were conducted to examine the hypotheses that the effects of financial aid and four-year college enrollment vary by family income.

The logistic regression analyses (Table 9) reveal one statistically significant interaction between family income and financial aid variables. The odds-ratio for the interaction between high-income and loans is 0.050 for four-year enrollment. The likelihood ratio test was conducted to determine the significant improvement of the model with the set of interaction effect (between income and loan) over the model without them. The likelihood ratio test statistic is 12.134, with two degrees of freedom.

The associated p-value ($p < .01$) indicates that the model with this group of interaction terms (the “unrestricted” model) provides for a better fit than the model that excludes them (the “restricted” model). Thus, it is necessary to incorporate the interaction effects and fit the full model. Combined with the results on the loan variable in the subgroup analyses, this suggests that, compare with students from high-income background, students from low-income family seemed to be more responsive to receiving loans when they made decisions to go to four-year institutions vs. two-year institutions. Receiving loans was not related to choosing to attend 4-year institutions for high-income background students, but it was positively related to attending four-year institutions for low-income background students. However, it is worth noting that this conclusion should be interpreted with caution since only small shares of high-income received loans comparable to middle and low income.

Table 9

Final Model with Interaction Effects

| Variable | Odds ratio | Standard Error | Significance |
|------------------------|-------------------|-----------------------|---------------------|
| Race: Asian | 1.365 | .203 | |
| Race: African American | .862 | .143 | |
| Race: Hispanic | .920 | .160 | |
| Race: Native American | .328 | .420 | ** |
| Gender: Male | .940 | .080 | |

| | | | |
|--|-------|------|-----|
| Family Income: High | 5.257 | .201 | *** |
| Family Income: Middle | 1.097 | .118 | |
| Parental Education: Less than High School | .187 | .229 | *** |
| Parental Education: High School/GED | .420 | .147 | *** |
| Parental Education: Some College | .458 | .119 | *** |
| Parental Education: Bachelor Degree | .873 | .132 | |
| Parental Involvement: Often discussed school courses | .758 | .124 | * |
| Parental Involvement: Often discussed school activities | 1.007 | .106 | |
| Parental Involvement: Often discussed things studied in class | 1.147 | .119 | |
| Parental Involvement: Often discussed grades | .701 | .096 | *** |
| Parental Involvement: Often discussed prepare for the ACT/SAT test | 1.233 | .117 | |
| Parental Involvement: Often discussed going to college | 2.211 | .094 | *** |
| High School Counselor | 1.200 | .122 | |
| High School Teacher | 1.702 | .117 | *** |
| Friends: Attended 4-year college | 4.321 | .289 | *** |
| Friends: Attended 2-year college | .212 | .123 | *** |

| | | | |
|-----------------------------------|-------|------|-----|
| High School Urbanity: Urban | .845 | .152 | |
| High School Urbanity: Suburban | 1.039 | .115 | |
| High School Type: Public | .839 | .091 | |
| Grants | 1.500 | .161 | * |
| Loans | 2.731 | .180 | *** |
| Work-study | 2.754 | .188 | *** |
| Other Financial Aid | .856 | .265 | |
| No Financial Aid | 1.030 | .178 | |
| Aid Amount/100 | 1.016 | .002 | *** |
| Mathematics Credits | 1.492 | .052 | *** |
| Science Credits | 1.694 | .046 | *** |
| Social Science Credits | .989 | .045 | |
| Loans*High Income | .149 | .519 | *** |
| Loans*Middle Income | 1.076 | .216 | |

Note. Significance: * $p < .05$; ** $p < .01$; *** $p < .001$

Chapter 5

Conclusions and Implications

A largely body of literature has examined the relationships between financial aid and college choice. However, this line of research focused on the effects of financial aid in general, paying limited attention to the college-qualified students and the differences in college choice behavior across socioeconomic groups. This study attempted to remedy the limitations in the literature by examining how financial aid is differentially related to the four-year college enrollment of four-year college-qualified students from different income groups. The main goal of this study was to propose a research model of four-year college enrollment, apply it to a national sample, and examine the income differences in college choice behaviors.

The primary research questions that guided the analyses include:

1. How is financial aid related to four-year college enrollment among college-qualified students by controlling students' academic preparation and student social background?
2. Is the relationship different across college-qualified students with different income backgrounds?

The conceptual framework for this study is the three-stage model developed by Hossler and Gallagher (1987). The new model I proposed contains factors of student academic preparation, student social background, and financial aid, as well as the interaction effects.

The data source for this study came from the National Education Longitudinal Study (NELS), a nationally-representative longitudinal study that tracked first-time

eighth grade in 1988 through college and as they enter the workforce in 2000. The final sample used in the study was made up of 4904 high school students.

Binary logistic regression was used for data analysis in this study. The first analytic stage was to fit a baseline model that uses the whole sample and incorporates all of the independent variables. The second step was to conduct sub-group analyses, which was to run separate analysis on each income group. The third stage of analysis involved a series of tests for interaction effects using the whole sample and examining the variation of income in four-year college enrollment as a function of financial aid.

This chapter first concludes the findings of chapter 4. Then discussions about the implications for policy and practice, and for future research are followed.

Conclusions

The descriptive analyses provided information about the patterns in aid distribution and dropout risk by income. In general, high-income students were less likely to receive financial aid. Also, low-income students were found to be less likely to enroll in a four-year college. My results indicate a consistent gap in four-year college enrollment for low-income college-qualified students compared with their upper income peers, with the former being less likely to enroll than the latter.

Binary logistic regression of the baseline model reveals that college-qualified student college choice decisions were influenced by many factors, including family income, parental education, parental involvement, high school teachers' influence, peers' influence, high school course-taken, grants, loans, work-study, and the amount of

financial aid. The results of the logistic regression were generally consistent with previous research results.

The cross-income comparisons of financial aid effects facilitate our understanding of the differential effects of aid on 4-year college enrollment for college-qualified students from different income backgrounds. Findings demonstrate that low-income and middle-income students tend to respond more to loans and work-study.

In the logistic regression of the full model with interaction effects, the likelihood ratio test indicate that only one sets of interaction term is significant. The interaction between high-income and loans is statistically significant. Compared with their high-income peers, low-income background students tended to respond more to loans.

Implications for Policy and Practices

Persistent Gaps in Four-year College Enrollment

Descriptive results demonstrate that low-income college-qualified students were less likely to enroll in a four-year college compared to their high income peers. Although the public has paid special attention to college opportunities for low-income students, this study found that 4-year college enrollment gap by income has still persisted in recent years in American higher education. The results confirm the prior research demonstrating that American society still faces a challenge in equalizing educational opportunity for lower income students. In terms of a policy perspective, it is thus recommended that higher education policy makers and institutional practitioners should provide better social, academic and financial assistance to students from lower income backgrounds so that the four-year college-qualified students may choose to attend a 4-year institution.

Effects of Aid in General

Results indicate that after controlling for other factors, change in the amounts of financial aid is significantly associated with 4-year college enrollment among these college-qualified students. Consistent with prior literature on financial aid, this study confirmed that grants are, in general, positively affected the odds of enrollment in 4-year institutions when considering the sample of college-qualified students. In terms of loans, this study indicates that loans were significantly associated with 4-year college enrollment for college-qualified students. The positive relationship between work-study and 4-year college enrollment was especially pronounced among lower income students.

The results as to the general aid effects have implications for financial aid programs in higher education. According to this study, grants, loans, and work-study, as well as the amount of financial aid are significantly positively associated with 4-year college enrollment for college-qualified students. The findings on the impact of grants, loans, and work-study indicate that increased availability of financial aid may remove financial barriers to access to four-year colleges for college-qualified students. Given this finding, institutional administrators and financial aid policy makers should ensure sufficient aid are maintained for these student aid programs, if improving the four-year college enrollment is the priority.

Differential Aid Effects

This study provides an exploration of whether, and if so how, financial aids are related to the college choice of college-qualified students from different income backgrounds. In my sub-group analysis of whether financial aid effects vary by income, I

found significant relationship between financial aid and four-year college enrollment for low-income and middle-income academically qualified students, but not for their high-income peers. To be more specific, the odds of four-year college enrollment for students from high-income families are generally greater than those for their lower income peers. However, the benefits of financial aid on college choice were not equally distributed across income groups. When they received loans, middle-income and low-income college-qualified students seemed to benefit more than their high-income peers. In addition, this differential effect was significant according to the interaction effect test. I conducted the sub-group analysis as well as the interaction tests to examine the differential effects of financial aid, and find that low-income college-qualified students were significantly more responsive to receiving loans when they made decisions to go to four-year institutions vs. two-year institutions. This result demonstrates that increases in loans tend to increase the income gap in four-year college enrollment. Thus, this study provides evidence that loans help reduce college choice gap between high-income and low-income college-qualified students. This finding suggests that institutional practitioners should not overlook the importance of loans in minimizing the four-year college enrollment gap between low-income students and their high-income counterparts.

Implications for Future Research

The research finding suggests that educational researchers need to investigate financial aid effects on college choice for college-qualified students. First, this study answers one of my research questions that whether the impact of financial aid varies by student social backgrounds. The sub-group analyses indicate that loans, work-study, and aid amounts are significantly related to four-year college enrollment for middle and low

income groups. Thus, the present research suggests that college-qualified students from different income backgrounds may respond differently to the types and amounts of financial aid received. In addition, the current study finds significant interaction effects between income and loans. In the future studies on the effects of financial aid on college choice, in order to avoid main effects bias, researchers need to compare the effects of financial aid across different income groups and include the interactions effects into their research models.

Second, although this study provides an exploration of whether financial aids are related to the college choice of college-qualified students, future research should also examine whether some particular kinds of financial aid make a difference in the type of institution that college-qualified students attend. Also, research is needed to measure the four-year postsecondary entry gap between the minority students and the white students.

Third, in order to include as many students as possible who were potentially qualified for 4-year college, this study utilized Berkner, and Chavez's (1997) formula to select sample. However, results may vary by different definition of college-qualified students. Future research should investigate whether the results were consistent with this study by utilizing different index of college-qualified students.

This study also hopes to provide suggestions of future NCES data collection. A more recent and detailed survey is needed for analysis. In the current available national datasets, such as ELS (2002), the financial aid information is not complete as needed. Also, although NELS data is the best available database for this study, more detailed financial aid information is needed for further analysis.

In summary, the study's modeling of 4-year college enrollment among college-qualified students expands our understanding of how individual students' choice to college differs across income and how financial aid policies affect enrollment choices for college-qualified students from different income groups. In the presence of persistent socio-economic disparities in higher education opportunity, the reality that not all the academically college-qualified students enjoy equal access to four-year postsecondary institutions justifies further investigations of college choice issues varied by student income. I hope the findings from this study could help policy makers and institutional practitioners implement targeted financial aid policies toward the economically disadvantaged college-qualified student population who may not get enough financial aid support in order to boost their enrollment in four-year institutions.

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