EFFECT OF 2012 FEDERAL STUDENT FINANCIAL AID POLICY CHANGES ON COLORADO PUBLIC HIGHER EDUCATION STUDENT ENROLLMENT

by

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Effect of 2012 Federal Student Financial Aid Policy Changes on Colorado Public Higher Education Student Enrollment

Dissertation directed by Associate Professor Sylvia Mendez

ABSTRACT

Federal student financial aid policy changes in 2012 altered the eligibility of postsecondary students for federal Pell Grant and other funding. This dissertation applies Social Equity Theory and Rational Choice Theory to understand the influence of financial aid policy changes on enrollment rates at publicly funded Colorado colleges and universities. Quantitative analyses are utilized to measure the effects of the 2012 federal student financial aid provisions on student enrollment. This study used logistic regressions to explore the questions: (1) Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges? (2) Is there an impact on enrollment intensity based on the interaction of Pell Grant award and institutional type? Results found statistical significance with regard to predictors of EFC and Pell award in 2012-2013. Students with lower calculated EFC and students with lower Pell Grant awards had a greater likelihood of not enrolling in the 2012-2013 year. Students were 17% more likely to be enrolled in at least half-time with each EFC increase of $1000. Students were nearly 50% more likely to enroll at least half-time with every $1000 increase in Pell Grant amount. In regard to the second question, results of an interaction of Pell Grant and institution type was not found to achieve statistical significance, indicating that there was no significant moderation present with respect to these two measures.
DEDICATION

This dissertation is first and foremost dedicated to my parents, Danny Yoon Ho and Hye Sook Choi. Their devotion and support are incomparable in my life. They have and continue to invest their time, efforts, and resources to ensure my every ability to pursue and achieve my goals. My happiness is their greatest priority. Their example and encouragement have fueled my success throughout my life and this research.

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CHAPTER 1
INTRODUCTION

The federal student financial aid program exists to provide and manage financial aid to eligible students seeking higher education degrees or career development opportunities through approved training programs (Gillen, 2010). The U.S. Department of Education, specifically the federal student aid program, is responsible for regulating and managing the student financial assistance programs authorized under Title IV of the Higher Education Act of 1965. Federal Student Aid provides more than $150 billion— in order of greatest percentage administered — in federal loans, grants, and work-study funds each year to more than 13 million students attending college or career schools (Mahan, 2011). Federal student aid not only provides financial assistance to participants, but is also responsible for oversight and monitoring of all program participants — schools, financial entities, and students — to ensure compliance with the laws, regulations, and policies governing the federal student aid programs (Dynarski & Scott-Clayton, 2013). Included in the oversight and compliance for fund allocations is the responsibility to determine and reassess applicant eligibility (Seftor & Turner, 2002). Funding allocation is intended to help students pay for education related expenses including tuition, fees, room and board, books, and supplies for education at a college, university, or private school.

The purpose of the federal student financial aid policy is to systematically calculate, allocate, and manage federal student aid and to support those with the least number of resources and greatest determined need for postsecondary education.
opportunities. “Financial aid has three main objectives: to increase access (enroll more
students), to increase affordability (make higher education cheaper for students and their
families), and to promote equality of opportunity (make sure disadvantaged students can
go to college)” (Gillen, 2010, p. 17). Federal financial aid programs were created and
continue to exist under the premise that educating the individual contributes to public
good and is not limited to a private benefit to the specific student, understanding that “the
American economy relies on an educated workforce” (Lynch, Engle, & Cruz, 2011, p. 1).
Governments continue to provide some portion of support for higher education. The
original justification for such support was that postsecondary education, like primary and
secondary education, contributes substantial benefits to the public as a whole. This
justification was supported by philosophical reasoning and supported by qualitative and
anecdotal evidence. Increasing access to college and career training programs allows for
greater economic potential of a larger number of educated individuals. Benefits to
society, both social and economic, are not singularly enjoyed by the educated individual
and thus perpetuate governmental support for higher education (Bloom, Hartley, &
Rosovsky, 2007; Steinberg, Piraino, & Haveman, 2009).

**Federal Financial Aid Application Process**

Any person can apply for Title IV federal financial aid through the Free
Application for Federal Student Aid, more commonly referred to as the FAFSA
(Dynarski & Scott-Clayton, 2013). An online application is available, on which a
potential student awardee registers for a Financial Student Aid (FSA) ID (username and
password). The FAFSA requests identifying information, including student name, date of
birth, address, social security number, and financial situation. “Once the FAFSA is filed,
the information is processed under one of eight formulas, depending upon family income, whether a student is classified as dependent or independent, whether the student has children, whether anyone in the household received benefits from another federal means-tested program, and what type of federal income tax form the family is required to use” (Dynarski & Scott-Clayton, 2013, p. 14). Depending upon the student’s situation, the financial information of the parents, guardians, and dependents also is required. Financial information is generally evaluated through the student’s and/or parent’s federal tax information. Assets also are accounted for during the financial needs and eligibility assessment. Students are allowed to request up to 10 educational institutions to which they wish to have their FAFSA information sent.

Once the application is complete, some applications are randomly selected for further verification requiring additional documentation to verify information proved by applicants. Examples of required verification documents would be a copy of the applicant’s federal tax forms or proof of residency. Federal Student Aid maintains some general eligibility requirements for initial application for aid:

- Demonstrated financial need
- U.S. citizen or an eligible non-citizen
- Valid social security number
- Registered with selective service, if male (between the ages of 18 and 25)
- Enrolled or accepted for enrollment as a regular student in an eligible degree or certificate program
- Enrolled in at least half-time or for six credit hours
- Maintain satisfactory academic progress in college or career school
• Sign the FAFSA stating no default on previous federal student loans exists, no money is owed on any previous federal student grants, and the funds will be used for educational purposes

• Demonstrate qualification to obtain a college or career school education by having a high school diploma or recognized equivalent — such as a GED or approved homeschool completion credential — or enroll in an eligible career pathway program

In order to determine financial need, the FAFSA uses a formula of student financial information and resources to calculate an expected family contribution (EFC). The EFC is the number used to determine eligibility for financial need. Subsequently, awarded aid is calculated as the difference between the cost of attendance (COA) at a school and the applicant’s EFC. Pell eligibility is widely utilized as a proxy for many variables that culminate to measure financial or fiscal need.

When a student fills out the FAFSA, an automatic application also may be generated for certain state financial aid. In some cases, the state requires an additional application in order to determine eligibility for state aid. Some programs other than government or school aid require that applicants file the FAFSA (e.g., certain private scholarships require eligibility for a Federal Pell Grant, determined only when FAFSA has been completed). Continued eligibility is determined by the basic eligibility and additional criteria. Financial supports in all of its many forms — grants, loans, work-study, and scholarships — are accessed (when eligible) by part-time students and other categorically non-traditional students. Aid is available not only to low-income students,
but also to middle- and even high-income families, in the form of grants, subsidized loans, and tax credits.

**2012 Financial Aid Policy Eligibility Amendments**

Changes to the federal student financial aid policy for 2012 include provisions that amended eligibility of students to participate in Federal Financial Aid as follows:

- **Provisions affecting Pell Grants** reduced the duration of eligibility from an equivalent of 18 full-time semesters to the equivalent of 12 full-time semesters. This change was effective beginning with the 2012-2013 financial aid award year (July 1, 2012) and eliminated a previous text that grandfathered in students who had received Pell Grants prior to July 1, 2008.

- **As of July 1, 2012**, the ability-to-benefit (ATB) option for establishing general student eligibility for Title IV funds was eliminated. Neither ATB testing nor earning six credits applicable to a degree or certificate satisfy the academic qualifications for receiving Title IV funds. A student was required to have a high school diploma or its recognized equivalent, or have been homeschooled, to meet the eligibility criterion.

- **Qualifications based on income and resources** also were limited. Qualifying income for the automatic zero Expected Family Contribution (EFC) determination was reduced to $23,000 from the previous $31,000.

Provisions regarding direct loans were changed as well. Interest subsidy during the six-month grace period was eliminated for new Stafford Loans made on or after July 1, 2012. The repayment period remained the same, six months after the student is no longer
enrolled at least half-time, but interest that accrued during those six months is payable by the student rather than subsidized by the federal government.

These 2012 financial aid policy changes not only created increased limits on award eligibility for new students, but also students who previously met financial aid eligibility criteria suddenly became ineligible for aid on July 1, 2012. Students reported having received a financial aid award letter prior to the start of the summer 2012 semester, but were then re-issued a new award letter mid-summer 2012 informing them that they no longer met the eligibility requirements or had exceeded the eligibility duration for Pell Grants. Of the now-ineligible students, those with alternative or personal resources to compensate for the new financial aid eligibility could continue to enroll, while those who did not meet the new criteria and lacked resources were unable to enroll for the following semester and academic year.

**Research Questions**

This study serves an exploratory investigation on whether the 2012 federal financial aid policy amendments that increasingly restrict eligibility caused an adverse impact on student enrollment, in contrast to the intended purpose for federal financial aid programs, which were designed to increase postsecondary access and affordability to low- and middle-income individuals. Additionally, this study examines whether there is an impact on enrollment intensity based on the interaction of Pell Grant award and type of institutions — community college and four-year universities — which tend to serve slightly different populations of students.

This study falls in the category of a trend study and specifically examines student enrollment at public Colorado higher education institutions. The research questions are:
1. Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges?

2. Is there an impact on enrollment intensity based on the interaction of Pell Grant award and institutional type?

Research questions are addressed in this study using descriptive statistics and a logistic regression. Student award status is recorded in two separate years (2011-2012 and 2012-2013) and all individuals are used as their own time invariant control in the regression model.

Enrollment intensity in this study designates the amount of credits for which a student is enrolled. Enrollment intensity is relevant because it is factored in when student eligibility is related to the level in which a student’s enrollment is defined for federal financial aid eligibility and allocation. The enrollment intensity and level definitions are those associated with undergraduate financial aid recipients. This study concentrates on a quantitative analysis of full-time, half-time, less than half-time, or non-enrolled students from pre-policy to post-policy change. Full-time students are those enrolled in 12 or more credits per academic semester. Enrollment between 6 to 11 credits is considered half-time. Any number of credits below six is considered less than half-time. Enrollment in zero or no credits is defined as non-enrollment. Noting enrollment of at least 6 credit hours per semester is required for Pell Grant eligibility.

The latest federal financial aid policy adaptations have created a need to assess the impact and quite possibly the efficacy of the policy changes in relation to student enrollment and persistence. Brinkman and Leslie (1988) previewed three potential ways to study the impact of student aid: opinion surveys that ask students whether student aid
influenced their choices; trend studies that examine the relationship between funding levels for federal programs and college enrollments; and econometric studies that examine the influence of aid on actual choices made by students, controlling for other non-financial program related factors that influence their choices.

This study differs from some other financial aid policy research, as it does not examine whether a student initially chooses to access or enroll in a postsecondary school. This study specifically investigates the data relative to students enrolled in the year prior to the 2012 federal financial aid policy change and the year of the policy change. The question of whether the student chooses to pursue a college or career program already has been answered. The consideration of student abilities to be matched to colleges based on qualification and selection criteria are not in contention. The student has already applied, been accepted, and is enrolled for at least an academic semester prior to the policy change. This study also removes the question of whether a student decides to attend a more or less selective institution. Acknowledging, that four-year universities have more selective criteria than two-year community colleges (Coley, 2000), this study focuses away from the characteristics of which students choose to enroll in specific institutions and why, but concentrates on the likelihood of re-enrollment of a student from one year to another based on Pell Grant eligibility. The data considers the enrollment of a student from one year to the next at the institution of enrollment in 2011-2012 and 2012-2013.

**Problem Statement**

Acknowledging the increasing influence governmental policy has on higher education, a large volume of literature and research continues to be contributed around the interactions of higher education financial policy and student outcomes (McLendon,
This influence of governance and control of educational support financing is germane to student enrollment, persistence and success. Supporters of financial aid policy changes – restricting eligibility – have indicated that these changes will better control the increasing financial aid deficit and will allow for more specific funding to be distributed to those with the greatest determined need and demonstrated ability to complete their postsecondary education goals in a reasonable timeframe. Those opposed to the policy amendment revisions have inferred that the revisions create increasing and more expansive restrictions of eligibility, duration of funding, and qualification criteria, which limit accessibility to funding for higher education for those who most require financial assistance to have the opportunity to obtain a college degree (Long, 2010).

This research contributes insight into the impact of financial aid policy changes on higher education access. This specific study examines information from a recent change in the 2012 federal financial aid policy and adds to the growing body of research in the area of policy research. This study focuses specifically on the impact in Colorado, but the research and implications can be expanded to the national level. Considering national trends in the number of Pell Grants awarded nationally, Figure 1 presents the number of Pell Grants awarded from the 2007 award year through the 2015 award year. An increase from 2007-2008 through 2011-2012 can be noted, after which there is a visible decline occurred in the number of Pell Grants awarded nationally.
Figure 1. Number of Pell Grants awarded nationally by award year. Source: Federal Student Aid Title IV Program Volume Reports.

Figure 1 presents a change from growth trend to a declining change during the period of the policy implementation and prompts investigation on potential causes for the shift in trend. In an environment where higher education funding and budgeting relies more heavily on increasing enrollment, potential declines in enrollment are of concern. The insight gained from this study could provide specific data to institutional leadership and policymakers to utilize for decision making through an awareness of the specific impact of federal financial aid amendments on enrollment intensity.

**Theoretical Framework**

This study applies Social Equity Theory and Rational Choice Theory to understand the influence of financial aid policy changes on enrollment rates in publicly funded Colorado colleges and universities. These theories intersect to create a condition in which students arrive at the decision to continue to pursue an education and, if so, at
which level of time commitment and course workload they are willing to continue their education when considering the financial burden that has potentially been altered for them. Publicly funded higher education institutions are purposed with providing increased access for more individuals to gain skills and degrees from accredited institutions. This theoretical framework convergence works with the assumption that education is associated with some value to a reasonable individual.

**Social Equity Theory**

A central part of the advancement of an ideal government is the consideration of social equity and the application of effective administration by public service entities. H. George Frederickson (1990) introduced "a theory of social equity and put it forward as the 'third pillar' of public administration" (p. 228). Frederickson was concerned that those in public administration were making the mistake of assuming that person A is similar to person B, ignoring social and economic conditions. The National Academy of Public Administration defined the term as the fair, just, and equitable management of all institutions serving the public directly or by contract; the fair, just, and equitable distribution of public services and implementation of public policy; and the commitment to promote fairness, justice, and equity in the formation of public policy. “Social equity emphasizes responsiveness to the needs of citizens rather than the needs of public organizations” (Frederickson, 1990, p. 228). As a public administration program, the federal financial aid program assumes a responsibility for applying Social Equity Theory to best serve the public. College attendance incurs costs (e.g., tuition, fees, books, foregone earnings) and generates benefits for both individual students and overall society (Perna, 2006). Social Equity Theory supports the need to develop and to improve
programs such as federal financial aid to best create access to postsecondary education, modeling the commitment to fairness, justice, and equity via public policy.

Social equity emphasizes the importance of freedom, equality, fairness, and justice, understanding that the American system of values functions around the concept that social equity is a central pillar of serving public good with increasing an individual’s access to education. As such, “it is important to measure the extent and impact of social equity in the work of public organizations” (Johnson & Svara, 2011, p. 20). Public administration must do more than simply value the construct of social equity. Systems have been developed to ensure social equity is practiced and administered. The government and policy makers are responsible for being good stewards for the equity of the higher education system (Carnevale & Fry, 2001; Cunningham, 2006). There is an assumption of a moderate guarantee and equitable opportunity for access to higher education (Hearn, 2001). This assumption is based on the ideals of Social Equity Theory as postsecondary education increasingly becomes the threshold for eligibility and qualifications to jobs and careers for individuals to sustain themselves, their families, and contribute to a thriving society. This envelopment of social equity on the value of education, particularly higher education, establishes acknowledgment and application of Social Equity Theory on this study.

**Rational Choice Theory**

Rational Choice Theory, also referred to as Choice Theory or Rational Action Theory, is a framework for understanding social and economic behaviors of individuals based on reasonable choices available to them. “A pioneering figure in establishing rational choice theory in sociology was George Homans (1961), who set out a basic
framework of exchange theory, which he grounded in assumptions drawn from behaviorist psychology” (Scott, 2000, p. 126). Economic theories are commonly utilized in policy research based upon the fiscal systems these theories must understand. Rational Choice Theory in this study is applied as a general theory of public policy in specific application to 2012 federal financial aid policy revisions. “Rational choice theory borrows heavily from economic assumptions of individual preferences, and believes that a sufficient behavioral model could be drawn from deductions of an individual’s self-interested utility maximization” (Jones, Boushey, & Workman, 2006, p. 40). Rational choice models assume that individuals (1) have ordered, stable preferences; (2) are self-interested utility maximizers; (3) have the correct information to assess outcomes relative to objectives; and (4) make strategic decisions based on their preferences, calculations of costs, risks, and rewards (Jones et al., 2006). Rational Choice Theory holds that individuals anticipate outcomes of alternative courses of action and calculate that which will be best for them. Rational individuals choose an alternative that is likely to give them the greatest satisfaction or result in an overall benefit (Hindess, 1988). Figure 2 is a model for the Rational Choice Framework depicting the process of decisions made by individuals considering preferences, constraints, and beliefs. Preferences accounts for the individual’s subjective predispositions and inclinations. Constraints are the alternatives available to the individual. Beliefs are the conceptual values and biases that influence an individual.
Figure 2. The Rational Choice Framework. The convergence of the preferences, constraints, and beliefs on an individual’s decision-making process.

Related forms of rational choice, such as institutional economics, bounded rationality, and opportunism, generally have replaced the strict traditional form of rational choice as an explanatory theory of individual motivation, choice, and behavior. “[R]ational choice theorists appeal to deductive accounts of incentives, constraints, and calculations that confront individuals” (Green, Shapiro, & Shapiro, 1994, p. 3). Federal student aid is awarded for individual eligible students to apply toward their educational expenses at any eligible institution of higher education. Assuming an application of Rational Choice Theory, students have a choice on the eligible institution for which they will utilize their financial aid awards for tuition and other educational expenses. The variables of which the institution chosen are dependent upon those options the student
values most in an educational institution, can subsequently impact the enrollment intensity choice that is feasible for students.

Figure 3 depicts the convergence of Social Equity Theory and Rational Choice Theory and their impact on financial aid-based decisions for students to enroll and at which subsequent level of enrollment intensity.

![Figure 3](image)

**Figure 3.** Theoretical framework convergence of access via Social Equity Theory and decision to enroll via Rational Choice Theory. The overlapping area between the two theories captures students who are enrolled in college or university at varying intensities (part time, half-time, full-time) and those who have made the decision to withdraw after initial enrollment.

**Significance of the Study**

In the time since the implementation of the Higher Education Act of 1965, financial aid programs have grown in scale, expanded in scope, and multiplied in form to increase access and affordability of postsecondary education to low- and middle-income individuals. But despite federal financial aids intended purpose, the U.S. Department of Education (Spellings, 2006) found that access to American higher education is unduly
limited by persistent financial barriers, as well as the complex interplay of inadequate preparation and lack of information about college opportunities. Evaluations and review of governmental programs, especially for those that impact the economically disadvantaged are necessary to ensure good stewardship and administration of these entities (Friedlander & Robins, 1995; Friedlander, Greenberg, & Robins, 1997; Tebbs & Turner, 2005a, 2005b; Greenberg, Michalopoulou, & Robin, 2006). And while financial aid continues to be the contemporary standard means of access among a great diversity of college enrollees the 2012 financial aid amendments restricted eligibility. The increasing scope and complexity of the student aid system has generated questions about effectiveness, heightened confusion among students and parents, and raised concerns about how program rules may interact with student enrollment, retention, and graduation.
CHAPTER 2
REVIEW OF LITERATURE

Financial aid programs are touted as a means of investment, most commonly reinforced by human capital theory. “Human capital theory suggests that individuals and society derive economic benefits from investments in people” (Sweetland, 1996, p. 341). Principally, if one invests in improving oneself, that individual is more likely to become a positive contributor to his or her community. An educated citizenry provides numerous public benefits such as an increased tax base and greater civic engagement, in addition to helping individuals attain economic and social success. Students who attend institutions of higher education obtain a wide range of personal, financial, and other lifelong benefits; likewise, taxpayers and society as a whole derive a multitude of direct and indirect benefits when citizens have access to postsecondary education (Baum, Payea, & Steele, 2005; Checchi, 2006). The relevance of financial aid to student access, enrollment, persistence, and success continues to be reviewed and revealed (Baum, Little, & Payea, 2011; Baum & McPherson, 2008; Baum & Payea, 2005, 2011; Baum, Payea, & Steele, 2011; Baum & Scott-Clayton, 2013; McPherson & Schapiro, 1991a, 1991b, 1998, 2006).

“The added value of a bachelor’s degree over a high school diploma or GED has increased to $1.2 million in 2005 from $910,000 in 1997-1999. Compared with the average out-of-pocket costs of a college education, this represents a return on investment in excess of 27%” (Kantrowitz, 2007, p. 19). Experiences and skills acquired from completing a postsecondary education resonate throughout life in terms of higher earnings, a lower likelihood of unemployment, and better decisions about maintaining positive individual health. Table 1, summarizes the national numbers of full-time, first-
time, degree/certificate-seeking undergraduate students enrolled in degree-granting postsecondary institutions.
### Table 1

**Full-time, First-time, Degree/Certificate-seeking Undergraduate Students Enrolled in Degree-granting Postsecondary Institutions in Award Years 2000 Through 2013**

<table>
<thead>
<tr>
<th>Level of institution and year</th>
<th>Students enrolled</th>
<th>Number receiving financial aid</th>
<th>Percent receiving aid</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Public</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000-01</td>
<td>1,333,236</td>
<td>872,109</td>
<td>65.4</td>
</tr>
<tr>
<td>2005-06</td>
<td>1,510,268</td>
<td>1,066,041</td>
<td>70.6</td>
</tr>
<tr>
<td>2006-07</td>
<td>1,568,395</td>
<td>1,096,808</td>
<td>69.9</td>
</tr>
<tr>
<td>2007-08</td>
<td>1,648,583</td>
<td>1,173,222</td>
<td>71.2</td>
</tr>
<tr>
<td>2008-09</td>
<td>1,701,017</td>
<td>1,245,890</td>
<td>73.2</td>
</tr>
<tr>
<td>2009-10</td>
<td>1,804,745</td>
<td>1,383,660</td>
<td>76.7</td>
</tr>
<tr>
<td>2010-11</td>
<td>1,802,335</td>
<td>1,421,369</td>
<td>78.9</td>
</tr>
<tr>
<td>2011-12</td>
<td>1,766,428</td>
<td>1,418,651</td>
<td>80.3</td>
</tr>
<tr>
<td>2012-13</td>
<td>1,736,952</td>
<td>1,390,827</td>
<td>80.1</td>
</tr>
</tbody>
</table>

| Four-year                    |                   |                                |                       |
| 2000-01                      | 804,793           | 573,430                        | 71.3                  |
| 2005-06                      | 906,948           | 695,017                        | 76.6                  |
| 2006-07                      | 949,162           | 716,323                        | 75.5                  |
| 2007-08                      | 976,830           | 753,643                        | 77.2                  |
| 2008-09                      | 1,007,672         | 791,177                        | 78.5                  |
| 2009-10                      | 1,021,273         | 833,194                        | 81.6                  |
| 2010-11                      | 1,039,126         | 858,424                        | 82.6                  |
| 2011-12                      | 1,059,837         | 878,933                        | 82.9                  |
| 2012-13                      | 1,056,185         | 872,769                        | 82.6                  |

| Two-year                     |                   |                                |                       |
| 2000-01                      | 528,443           | 298,679                        | 56.5                  |
| 2005-06                      | 603,320           | 371,024                        | 61.5                  |
| 2006-07                      | 619,233           | 380,485                        | 61.4                  |
| 2007-08                      | 671,753           | 419,579                        | 62.5                  |
| 2008-09                      | 693,345           | 454,713                        | 65.6                  |
| 2009-10                      | 783,472           | 550,466                        | 70.3                  |
| 2010-11                      | 763,209           | 562,945                        | 73.8                  |
| 2011-12                      | 706,591           | 539,718                        | 76.4                  |
| 2012-13                      | 680,767           | 518,058                        | 76.1                  |

The data distinguish total enrollment and number of students receiving financial aid. Note that the numbers show a steady rise in enrollment, number of students receiving financial aid, and subsequently the percentage receiving financial aid that steadily increases. The percentage of students who are receiving aid shows a steady incline as well. However, there appears to be a slight shift in trend to decline in each of these areas from 2011-2012 to 2012-2013.

The U.S. Census Bureau data presented in the Education Pays, Trends in Higher Education Series report stated that “[i]n 2011, median earnings of bachelor’s degree recipients with no advanced degree working full time were $21,000 higher than those of high school graduates. The difference includes $5,000 in tax payment and $16,100 in after tax income” (U.S. Census Bureau, 2012, Table PINC-03). The data on earnings and taxes paid support the conclusion that educated members of society make more individually (increasing benefit to self) and pay more in taxes (increasing benefit to society), supporting the concept that increased educational opportunity and access for a greater population is favorable. Figure 4 presents the median earnings and median taxes paid by education level.
Opposition to the existence of federal financial aid programs arises from the lack of confidence in the efficacy and sustainability of continuing federal financial aid programs. The Commission on the Future of Higher Education, appointed by Secretary of Education Margaret Spellings (2006), concluded, “There is no issue that worries the American public more about higher education than the soaring cost of attending college” (p. 10). The federal government has greatly increased its investment in college student aid. In addition to higher Pell Grant awards and low-interest student loans, the American Recovery and Reinvestment Act of 2009 created the new American Opportunity Tax Credit (AOTC), which provided an estimated $7.1 billion in tax relief in fiscal year 2012.

The U.S. Department of Education estimated that the combination of federal postsecondary student aid and selected tax benefits grew to $181 billion in fiscal year 2012, up from $140 billion in 2009, an increase of $41 billion, or nearly 30%. Such a substantial portion of the national debt must be accountable to scrutiny of its success and
benefits to funding entities. Increased financial aid should ideally increase student access and enrollment. Figure 5 presents enrollment data from the National Center for Education Statistics (NCES), indicating a notable decline in undergraduate student enrollment after years of steady increase. This figure provides enrollment data specific to Colorado, which is the focal environment for the impact scope of this study.

Student enrollment for Colorado public institutions of higher educations reported steady increases from 2006 until 2011. Then in 2012, there was a slight decline in student enrollment. A shift in enrollment growth trend inspires investigation of potential causes.

Figure 5. Number of students enrolled in postsecondary institutions annually by state (Colorado) and student level (undergraduate). This figure includes the unduplicated 12-month enrollment at institutions from July 1 of one year through June 30 of the next, collected from Title IV institutions in Colorado. Sources: U.S. Department of Education, National Center for Education Statistics (NCES), Integrated Postsecondary Education Data System (IPEDS), 12-month Enrollment component.

The visibility of the current landscape of higher education and the emphasis on directing costs to the student and his/her family continue to rise. The argument of the
value of education versus the increasing costs of education is addressed in this study. This study focuses more on the context of effect on federal financial aid policy of overarching and far reaching policy changes — especially financial ones — in a society very much influenced by financial economic systems. The context of education and its value — monetarily and otherwise — is the system by which the federal financial aid program and its ever changing policies operate.

Higher education is regarded as an increasingly important role in helping individuals to attain social and economic success. Financial aid policies’ impact on enrollment and retention varies as policies continue to be created and amended. Checci (2006) stated that “educational choice [is an] investment decisions where income opportunities are renounced in exchange for better income prospects in the future” (p. 19). Proportionally, researchers also have focused on the way in which non-financial factors can improve retention, e.g., student engagement (Tinto, 2006); the gender composition of the faculty (Robst, Keil, & Russo, 1998); effectiveness of instruction (Langbein & Snider, 1999); and student demographic characteristics (Murtaugh, Burns, & Schuster, 1999). Justifiably, these non-financial factors also influence student enrollment, persistence, and success. Additionally, of those who become students at colleges and universities, the likelihood of persisting and completing a degree differs greatly by income. Berkner, He, and Cataldi (2002) found that, while approximately 68% of students with family incomes of $70,000 or more received the degree within six years, this rate was only 47% for those with family incomes of $25,000 or less.

An impediment to higher education for many students, particularly those from low-income and middle-income families, is the complexity of the college admissions
process and financial aid systems, as well as a lack of accurate information about higher education costs (Long & Riley, 2007). The ultimate goal of U.S. financial aid policy is to ensure that academically capable students are able to earn a college degree independent of financial considerations (Brinkman & Leslie, 1988). Thus, financial aid policy is germane to the access of higher education for many students.

The relationship between financial aid — at the federal, state, and institutional levels — and impact on student college choice, enrollment, and retention is not a new concept. The cost of an education for prospective students and their families has long been a focus of public and private concern. With increasing policies on appropriations and financial aid, many concerns have been directed toward the impact of enrollment rates and other student outcomes of low-income, middle-income, minority, and other individuals with limited college-going opportunities (Perna & Titus, 2004; Mundel, 2008). Prior studies and numerous researchers have addressed a potential influence or correlation between these concepts in specific relation to financial aid. To best frame the premise of this study, a brief progression of financial aid policy history and research is presented, along with a summary of the current landscape of the financial aid needs, including reasonable considerations for students. The perspective and research on the impact — negative or positive — of financial aid on student enrollment, persistence, and success appear to shift on both sides of the argument.

**Background**

The highlights of the federal financial aid policy developments and amendments pertinent to this study are presented. Noteworthy legislation that initiated the modern financial policy movement began as far back as the Morrill Act and land grant funding.
“Any comprehensive history of American higher education must pay homage to the 1862 Morrill Act for having fostered the land grant college” (Thelin, 2005, p. 27). Prior to modern federal government fiscal support of expanding access to colleges and universities, postsecondary education consisted primarily of private religious institutions inaccessible to individuals who had no means to directly pay for tuition and board.

Imperial policies of the British Empire were initial influencers for practices of colonial governments and institutions of higher education (Thelin, 2005). “The management and the curricula of these first schools were characterized by two basic commitments: a commitment to a religious, or more accurately a sectarian orientation, and a commitment to a classical, essentially a linguistic course of study as the only road to the advancement of the denominational outlook” (Lee, 1963, p. 19). The colonial governments initially based in North America established their governing boards and educational systems from familiar systems of British values. An example comes from the statutes set by Harvard University founders that “were taken directly from the Elizabethan statutes of the University of Cambridge; that the phrase pro modo Academiarum in Anglia (‘according to the manner of universities in England’) …that early Harvard, like Elizabethan Cambridge, welcomed ‘fellow commoners’ as well as serious degree students” (Brubacher & Rudy, 1997, p. 3). Not only was establishing education of importance, but this example shows the means by which the missions of institutions, British and colonial, were to serve all who pursued education, adding value to access.

As the United States began to expand and to industrialize beyond the east coast region, a need developed to establish institutions of training and education in the newly expanded lands. Passed on July 2, 1862, the Morrill Act and land grant funding made it
possible for colleges to increase access for thousands of farmers and working people previously excluded from higher education. This funding, which was awarded to institutions, more formally opened access of higher education for a greater population of students. Subsequently, financial aid has grown from allocations directly to institutions of higher education to a more portable component for students, which allowed them to attend a college or university of their choice. Expanding beyond farmers and working people, the 1944 GI Bill and 1952 Veterans Readjustment Assistance Act (which extended GI Bill benefits to Korean War Veterans) expanded the support of educational access to military personnel. In 1947, the “Truman Commission represented the federal government’s increasing interest in educational equity and access” (St. John & Parsons, 2004, p. 32). Beyond promoting the readjustment of military personnel and veterans, the G.I. Bill was implemented to serve in replenishing the nation's human capital, which had been exhausted both by the steep decline in college enrollments throughout the war and by combat deaths and disabilities (Serow, 2004). The Truman Commission created a precedent in which government openly expressed the need for postsecondary educational opportunity and access to better serve the public good of the nation.

Thereafter, President Lyndon B. Johnson signed the Higher Education Act of 1965, which authorized most federal student financial aid programs, including the Educational Opportunity Grant Program and the Guaranteed Student Loan Program. “From a policy perspective, the passage of the Higher Education Act of 1965 was arguably the most important change, as it extended need-based financial assistance to the general population for the first time” (Brock, 2010, p. 111). The Educational Opportunity Grant Program was the precursor to the current Pell Grant, and the Guaranteed Student
Loan (GSL) Program the precursor to the Stafford Loan Program (renamed in 1987). In 1972, the Educational Opportunity Grant was renamed the Supplemental Educational Opportunity Grant (SEOG) (Dynarski & Scott-Clayton, 2013). The Educational Opportunity Grant Program allocated funds directly to colleges that committed to identifying and recruiting students with “exceptional financial need.” In the same year, the Basic Educational Opportunity Grant (BEOG), the origin of the Pell Grant, utilized the first federal need analysis formula and generated a maximum grant initially of $452. The BEOG delivered funds directly to students.

In 1978, the Middle Income Student Assistance Act expanded federal student assistance programs to include middle-income students in addition to low-income students by expanding eligibility for the BEOG grant and eliminating income restrictions for GSL loans. The BEOG program was renamed the Pell Grant in 1980 in honor of Senator Claiborne Pell of Rhode Island. Senator Pell was a driving force in expanding financial aid eligibility to students attending part-time, as well as to those in vocational education or community colleges (Dynarski & Scott-Clayton, 2013). The transitions and increasing reach of federal support in funding the individual student established an assumption of value and investment in creating access to higher education, feeding the culture of promoting a public good. Between 1980 and 1990, there was increasing federal movement to increase access to college for minority and poor students (Orfield, 1992). Not only were federal funds being made more accessible to more students (eligible low- and middle-income applicants), but the Higher Education Amendments of 1992 added the Free Application Federal Student Aid (FAFSA) to ensure application for federal student aid was free.
Federal policies in the early 2000s focused on recalculating percentages on interest rates of direct and indirect loans, increasing maximum Pell Grant amounts, revising the eligible EFC threshold, and creating Teach Grants. These changes increased federal funding support for eligible students, but in part decreased eligibility for some due to the increase in the EFC threshold. The EFC is based on a formula set by law, which takes into account income, assets, employment benefits, family size, and number of family members in college. The financial aid policy amendments addressed in this study were mitigated by the American Recovery and Reinvestment Act of 2009 (ARRA), which included increases in Pell Grant discretionary funding for 2009-10, increases in scholarship tax credits, increases in federal work-study, and Americorps funding. The ARRA is referred to as a stimulus package, as it was created as an influx of temporary support for programs impacted by the recession, including education after an economic downturn in 2008. The current financial aid amendments that took effect on July 1, 2012, attempted to compensate for the budgetary backfill created from decades of federal financial aid adaptations and amendments. The national debt continues to be an issue of concern; redirecting the financial responsibility of education from the government to the individual is becoming a more acceptable option for some policymakers.

As is intended for public policies, the federal financial aid policy continues to be rewritten and amended with the objective to more accurately represent the needs of the public, budgetary constraints, and political climate. Whether to provide incentives to military veterans or to expand the effects of the civil rights movement, financial aid policy continues to be developed and amended to magnify its reach and benefits (Dynarski & Scott-Clayton, 2013). These amendments shift with intent depending upon
the political and public acceptance of whether postsecondary educational access is a private or public good. Recognizing that political shifts do influence policy. Politics of scarcity vary from politics of prosperity, thus impacting financial support of higher education and students in different ways (Callan, 2002; Nicholson-Crotty & Meier, 2003; Gladieux, & Swail, 2008; Napolitano, Pacholok, & Furstenberg, 2014). The present decline in higher education's support from state and federal expenditures may not represent some deliberate policy decision to minimize higher education’s accessibility and sustainability for students; it may simply be an outcome of economic currents and political shifts.

**Financial Aid and Enrollment**

A reasonable assumption exists that having a means to pay for college creates opportunity and a choice for a student to enroll at a college or university. Early studies that control for various background factors consistently have found that students having financial aid has a positive influence on student decisions to attend college. The area of financial aid in regards to impact on student access and enrollment is substantial and consistently revisited (Cellini, 2009; Coomes, 2000; Cornwell, 2006; Curs, Waddell, & Singell, 2004, 2007; Davis, Green-Derry, & Jones, 2013; Fife & Leslie, 1976; Hardy, & Roessler, 2009; Hearn, 1988, 1992; Heller, 1997, 1999, 2001, 2002, 2008; Hemelt & Marcotte, 2011; Hossler, Schmit, & Vesper, 1999; Jensen, 1982, 1983; John, 1990; John & Asker, 2003; Kennamer, Katsinas, Knapp, Kelly-Reid, & Ginder, 2009; Leslie & Brinkman, 1988; MacCallum, 2008; Mullin & Phillippe, 2011; Mumper, 2003; Nielsen, Sørensen, & Taber, 2008; Olivas, 1985; Paulsen, 1990; Perna, Rowan-Kenyon, Thomas, & Li, 2008; Rubin, 2011;). This is supported by the initial expansion of eligibility of the
BEOG to the Pell Grant in 1972. Between 1972 and 1992, college enrollments rose by 44%, but the number of Pell Grant recipients grew twentyfold as a result of more generous eligibility criteria (Baum & Payea, 2011). “If student financial aid is introduced, direct student aid based on family income can be expected to raise the enrollment rates among students who qualify for some amount of aid” (Hansen, 1983, p. 90). Hansen (1983) analyzed two comparisons in regard to enrollment and income level, using income level as a proxy to assume financial aid eligibility. The first was of enrollment rates for college-age youth from families of different income levels. The second comparison involved planned and realized enrollment rates for high school seniors (years 1972 and 1980) by socioeconomic status and ability levels. Although a few increases occurred across some of the groups, the overall conclusion was that “the greater availability of student financial aid, targeted largely toward students from below-median-income families, did little, if anything to increase access” (Hansen, 1983, p. 93). Hansen provided a potential reason for mere availability, although insufficient in amount, which may have deterred the anticipated increase in postsecondary access in the 1970s.

Conversely, Hansen (1983) later used Current Population Surveys (CPS) to examine college participation rates by different subpopulations in the traditional college aged student cohort in 1972, the year before the Pell program was implemented, and in 1978, the year the Middle Income Student Assistant Act (MISAA) was implemented. He found that participation rates by middle- and upper-income students increased more during the six-year period than lower-income students. Hansen concluded that aid was not effective on increasing student enrollment rates. This redirects a focus to consider if socioeconomic status (SES), which impacts financial aid eligibility, impacts enrollment
of students. Black and Sufi (2002) found that although socioeconomic status has a significant impact on college enrollment behavior. Through their research, Black and Sufi (2002), were able to uncover different responses to tuition and labor markets by individuals from different ends of the SES distribution, an important consideration for policies targeted at improving college enrollment for low-SES individuals.

Student income has been shown to be relevant to ability to access postsecondary education (Epple, Romano, & Sieg, 2006; Singell & Stone, 2007). Income is a factor of eligibility for financial aid. However, the mere existence of financial aid programs and funds is not enough to ensure students have access to financial aid. Bettinger, Long, Oreopoulos, and Sanbonmatsu, (2012) found that combined assistance with navigating and being provided information about financial aid program processes substantially increased submissions of financial aid applications and the likelihood of college attendance, persistence, and aid receipt.

This then leads to the consideration of enrollment being impacted not only by increased availability of financial aid through targeted programs and packages. Merely being eligible to apply for aid is less convincing in postsecondary enrollment decisions than being offered a package of financial aid. St. John and Noell (1989) compared the influence of different types of student financial aid packages on the enrollment decisions of students in the high school classes of 1972, 1980, and 1982. They found that: (1) all types of aid packages were positively associated with attendance decisions when all students were considered, and (2) packages with loans were less consistently significant for minority applicants than for White applicants in the 1980s. This study is limited and focused on the school choice and enrollment decisions for a specific population of high school level students. As colleges and universities continue to diversify their student
populations beyond students directly out of high school, it is relevant also to incorporate the influence of studies focused on more than only traditional-aged students. Dynarski (1999) found that college attendance among students who lost their financial aid grants fell by more than one third after the grants program ended. This supports the context that the availability of grant aid increases college enrollment rates above what they otherwise would be.

Seftor and Turner (2002) concentrated on the influence of the effect of changes in the federal Pell Grant program on enrollment decisions of potential students in their 20s and 30s. The population of students was identifiably very different, not only in age, from students enrolling in college directly after high school. Non-traditional students include a variety of more complex issues, per Rational Choice Theory, which would influence their decisions to enroll. Seftor and Turner utilized a model surmising that all students weigh the costs and benefits of investing in a college education in order to make an enrollment decision. An empirical examination was used based on the data from the 1973 October CPS and an OLS regression to estimate the probability of college enrollment between two periods prior to and after the implementation of the Pell Grant in 1973. An aspect of policy change addressed in this study is the Pell eligibility definition of an independent student in 1986. Applicants were required to be at least 24-years-old, married, or with children to qualify as an independent student. Ultimately, Seftor and Turner concluded that changes in the availability of federal financial aid had a significant effect on the enrollment behavior of older non-traditional students.

Using a sample of high aptitude high school seniors in 1999-2000, Avery and Hoxby (2004) found that college enrollment is influenced by financial aid labels,
including whether the aid is categorized as “grant” or “scholarship,” and whether the grant aid is offered before enrollment. Linsenmeier, Rosen, and Rouse (2006) supported this contention, finding that one university’s switch from loans to grants has a weak but positive impact on the enrollment of low-income students. They found no statistically significant impact on the aggregate of low-income youth, but found slightly significant results for low-income minority students. In an examination of more traditional age students, Turner (2010) conducted research to explore the effects of three tax-based aid programs: the Hope Tax Credit, the Lifetime Learning Tax Credit, and the Tuition and Fees Deduction. Using a policy-induced variation in the value of these programs, Tuner (2010) estimated their causal effect on college enrollment. The results indicated that tax-based aid programs have a positive enrollment effect for the first two years of college. He found that “tax-based aid increases full-time enrollment in the first two years of college for [18- to 19-year-olds] by 2.2 percentage points (6.7 percent)” (p. 23).

Transitioning from census and survey data comparisons, Van der Klaauw (1997) utilized a regression discontinuity (RD) approach to examine how discontinuities in an east coast college's aid assignment rule could be used to measure credible estimates of a financial aid effect. Asserting that simple OLS effect estimates were found to be biased and very sensitive to the number and types of additional covariates included in the regression to control for the endogeneity of actual aid offers, Van der Klaauw found that RD was a more effective design to examine the relationship between financial aid and enrollment choice. Resulting estimates affirmed the importance of financial aid as an effective instrument in competing with other colleges for students.
More recent studies have focused on exploring the relationship between financial aid and postsecondary enrollment choices. Recently, Kim (2012) utilized an event history model for a sample of the National Education Longitudinal Study (NELS:88/2000), in addition to state level policy variables, in order to explore the relationship between state financial aid policy and postsecondary enrollment. Kim focused on the relationship between state financial aid policy changes and enrollment choice across income and race groups. The findings suggested that low-income and underrepresented minority students (i.e., African Americans and Hispanics) experience far more transitioning difficulties than their upper-income and White peers after high school. The findings demonstrated that there was a clear and consistent gap in college enrollment for students who are from different income and race/ethnic groups, and that state financial aid significantly affects students’ enrollment probabilities. The results also indicate that the effects of state financial aid vary by income and racial/ethnic backgrounds. Also, revealing that low-income students had enrollment propensities that were more responsive to changes in state aid policy for every racial group, but high increases in the provision of state financial aid do not appear to benefit all race/ethnic groups equally in terms of college participation.

More germane to the focus of this study is Darolia’s (2013) research on the effect of federal financial aid availability on postsecondary enrollment. Implementing a dynamic RD design using a multi-year rule, Darolia found that financial aid loss discourages enrollment at for-profit institutions. “The decline in enrollment appears to be driven by fewer new enrollees, particularly at for-profit colleges” (p. 101). When access to financial aid continues to trend toward limiting eligibility and access, fewer students
are able to enroll in postsecondary programs. “Restrictions such as these are intended to protect students and the integrity of federal aid programs, but may also have implication for access to higher education” (p. 101). This implication for higher education access, ideally at the maximum enrollment intensity level based on financial aid eligibility and allocation, is even more important to consider during policy change periods.

**Enrollment Intensity and Degree Completion**

Enrollment level must be considered, as the 2012 federal financial aid provisions intentionally or unintentionally forced students to compress their financial aid supported eligible enrollment period and to further their motivation to increase enrollment intensity (credits per semester) in order to complete certificates and degrees in the reduced eligibility timeframe. Wei and Horn (2009) found that receiving a Pell Grant was indeed associated with a shorter time to degree completion. Previous research has accumulated evaluating the trends in degree completion and/or graduation rates. Graduation rates measuring the proportion of an entering class or group of students that have graduated or completed a certificate within a specific number of years are the most common (Scott, Bailey, & Kienzi, 2006; Singell & Stater, 2006). Substantial years of research provide evidence to support a relationship between enrollment intensity and likelihood of degree completion, which can also be referred to as success in terms of student outcome. In an analysis of the national "High School and Beyond" data for the high school class of 1980, Eagle and Carroll (1988) found that degree attainment six years after high school graduation was substantially lower for those who attended part time or delayed entry into postsecondary education. Full-time enrollment has been repeatedly supported as having a positive correlation with retention and persistence of students. Using IPEDS data, Clark,
Waller, Lumadue, and Hendricks (2012) found that full-time students had higher retention rates in all sectors (both public and private) of two-year institutions than part-time students.

Titus (2006) used national survey data, multilevel modeling techniques, and descriptive statistics to understand the influence of financial contexts on the chance of college completion for low socioeconomic status (SES) students at four-year postsecondary institutions. Students were measured on four student success characteristic components: academic performance in college (via grade point average), declaration of a major, living on campus, and freshman year student involvement. The results indicated that college completion is positively associated with enrollment as a full-time equivalent student.

Examining a financial support component, Richburg-Hayes, Sommo, and Welbeck (2011) presented early findings from an evaluation of a program in New York City targeted at low-income adults (ages 22 to 35) who needed remedial coursework in 2008 and 2009. The researchers compared outcomes of the combined program groups with control group outcomes to measure the impact of the scholarship program. Results indicated the program encouraged more full-time enrollment, even though the scholarship required only part-time attendance. Full-time enrollment increased 5.6 percentage points (7.9%) in the first semester and 7.4 percentage points (14%) in the second semester.

Financial aid is a means with which to access postsecondary education and to increase the ability to enroll in college; at higher intensity levels it best serves those who might not otherwise be able to pursue higher education. “A primary goal of federal student aid is to increase postsecondary school attendance. Many federal student aid
programs, such as Pell Grants and campus-based aid, work toward this goal by targeting lower-income youths and their families” (Turner, 2010, p. 756). However, is it enough to get students in the proverbial or literal door? Turner (2010) stated that “[e]mpirical results imply that tax-based aid increases full-time enrollment in the first two years of college by 2.2 percentage points (6.7 percent)” (p. 756). Thus, if the goal of financial aid is to increase enrollment, policies that decrease access to aid would have a negative influence on enrollment decisions by students.

**Financial Aid and Persistence**

Financial aid policy research has not only examined access and enrollment, but also has examined a relationship with postsecondary education persistence and student retention. A larger increase in college enrollment (and in Pell Grant awards) has not led to a greater increase in graduation among low-income students (Robinson & Cheston, 2012). Accepting that financial aid does relate to ability to pay, and through review of economic theory and exploring previous literature, Cabrera, Stampen, and Hansen (1990) found that ability to pay had a direct effect on college persistence. “Measures of persistence take into account those who have earned a certificate or degree as well as those who are still enrolled in college” (Brock, 2010, p. 114). Persistence refers to the student’s ability to be retained at a postsecondary institution and to progress from year to year in a program of study. “The study of the effects of student financial aid on persistence and graduation rates is particularly important given the increasing public policy focus on student financial aid programs” (Hossler, Ziskin, Gross, Kim, & Cekic, 2009, p. 390). Financial aid programs are not intended solely to attract students to
postsecondary institutions, but also are intended to provide a means of continuing and completing degree attainment.

Although not all forms of financial aid are considered helpful to student persistence, the argument for a link between persistence and financial aid has been touted for decades (Baker & Velez, 1996; Castleman & Long, 2013; Chen & DesJardins, 2008; Choy, 2001; Glocker, 2011; Hayes, 2008; Jackson, 1982; John, Andrieu, Oescher, & Starkey, 1994; Kane, 2003; Keane & Wolpin, 2001; King & Bannon, 2002; Paulsen & St. John, 2002; Mendoza, Mendez, & Malcolm, 2009; Moline, 1987; Murdock, 1990; Perna, 1998; Singell, 2004; Sydow, & Sandel, 1998). Blanchfield (1971) performed a study trying to identify those who were potentially successful or who dropped out. He found that successful students receive higher percentages of grants than unsuccessful students. He determined that loans did not necessarily contribute to incentivizing students to persist or remain enrolled in college. Supporting grants versus loans research, Astin (1975) found that financial aid in the form of grants has a small positive effect on persistence, and loans have a negative effect.

In contrast, Fields and LeMay (1973) found no difference in persistence rates for students who applied for financial aid, received aid, and did not apply for aid. They concluded that financial concern has a greater effect on decision to initially attend college rather than remain in college. They stated that the amount and/or type of aid awarded did impact student persistence. Supporting this argument that persistence is not correlated with financial aid, Peng and Fetters (1978) found that neither financial aid as scholarships or loans have a significant impact on persistence for both two-year and four-year institutions. Additionally, Braunstein, McGrath, and Pescatrice (2000) found financial aid
did not have a significant impact on freshmen persistence. They noted that students from families with greater incomes tended to persist more. Wetzel, O’Ttoole, and Peterson (1999) also found academic and social integration factors to be more significant factors in persistence. Financial considerations were less important in persistence. Agreeing that more than financial decisions were relevant to academic performance and student persistence from freshmen to sophomore year, as poor performing students tended to drop out in that transitional period.

Returning back to the research of persistence correlated with financial aid, Voorhees (1985) used a causal modeling methodology and found that financial aid awarded in the form of loans and grants has positive effects on persistence of college students. His research found that campus-based financial aid programs have a significant effect on new freshmen persistence. In that same year, Terkla (1985) also found that financial aid was linked to completion of degrees and was the third most important direct influence on persistence. Focusing on the National Longitudinal study of the High School Class of 1972, a causal model was used to illustrate the manner in which withdrawal was affected by interacting variables with a path analysis. The research question was: Does financial aid enhance persistence? As noted, the financial aid variable was the third strongest predictor to directly affect persistence and the fifth strongest on students’ decisions to either remain at higher education institutions or withdraw completely. Terkla concluded that the receipt of financial assistance is relevant to the decision whether to remain in college. However, Tinto (1990), in his review of sociological research based on year-to-year persistence, concluded that student aid has little influence on persistence.
St. John, Andrieu, Oescher, and Starkey (1994) used the 1987 National Postsecondary Student Aid Study to compare alternative approaches to assess the influence of student aid on within-year persistence by traditional college-age students enrolled in four-year colleges. Three conclusions were drawn from the research: (a) models that included tuition charges better predicted within-year persistence than models that do not, (b) the use of multiple approaches for measurement provides more insight into student aid policies and their influence on persistence than any one approach, and (c) tuition charges have a consistently negative influence on persistence.

Bettinger (2004) examined the realm of financial aid and persistence utilizing both cross-sectional variation and panel data. The results suggested that Pell Grant awards reduce dropout rates. However, while the estimates reinforced a negative relationship between the size of a Pell Grant award and stop-out behavior, they were not completely robust. Notably, the study found that a $1,000 increase in the Pell Grant award corresponded with a 4% reduction in the likelihood of student attrition.

Studies have found persistence to be negatively correlated with financial aid awards. Dowd and Coury (2006) used data on community college students extracted from the National Postsecondary Student Aid Study (1989-1990) and the Beginning Postsecondary Student Second Follow-Up Surveys (1994-1999) to measure persistence levels from Year 1 to Year 2. These results could possibly reveal an interesting correlation due to the uniqueness of community college students. However, according to Dowd and Coury, personal and/or family financial status and academic performance are strong predictors of persistence and certificate or degree attainment for community college students. Thus, although financial aid awards had a negative correlation, the
variable of personal and/or family financial status predicted persistence. Personal and/or family financial status, as a contributing variable to the federal financial aid award eligibility formula, serves as a proxy for financial aid eligibility. This less definitive result that muddied a financial aid award and financial status study by Dowd and Curry (2006) served to fuel the need to further investigate financial aid policies that impact eligibility.

McKinney and Novak (2012) used data from the Beginning Postsecondary Student Study and examined the relationship between FAFSA filing status and persistence from the fall to spring semesters among first-year community college students. Results indicated that, when controlling for other relevant predictors of persistence, filing a FAFSA was associated with higher likelihoods of persistence among all students and was particularly strong for the restricted sample of students enrolled part time. The literature supports that some aspects tangential to federal financial aid, such as filing, even impact the persistence of students. Advancing the research on the concept of persistence and its enhancing factors continues to grow and to promote the obvious need to examine the relationship of financial aid and student success.

**Financial Aid and Student Success**

The reasonable assumption can be made that access and the ability to persist in college ultimately contributes to the successful completion and degree attainment of students. The cost of pursuing a postsecondary education, financial aid award, and ability to pay do have a relationship with educational attainment, particularly with low-income populations of students (Deming & Dynarski, 2009). Financial aid effects on access and persistence have been synopsized, but the lateral issue of success also must be reviewed.
In a recent Pell Institute report, Engle and Tinto (2008) stated, “[w]ith adequate resources, more low-income, first-generation students could afford to enroll in four-year institutions or attend full-time, both of which would increase their chances of earning four year degrees” (p. 4). Among a multitude of barriers for success, the ability to afford tuition is a repeated challenge for students. As financial aid provides a means to meet this financial obligation and other education related expenses, it stands to reason that success relies in some part on financial aid eligibility and access. Stater (2009) used data from three public universities to examine the effects of financial aid on college grade point average (GPA). The results indicated that both need-based aid and merit-based aid have positive effects throughout college, and colleges may be able to use financial policy mechanisms to increase academic achievement.

Policymakers must balance the question of fiscal responsibility in determining those who will actually benefit by receiving financial aid. Hauptman (2007) advises that state policymakers should take into greater account the intended and unintended consequences of policies in addressing the issues related to improving student success. Dynarski (1999) addressed this concern with financial aid and success: Does student aid increase college attendance or simply subsidize costs for infra-marginal students? The results revealed that offering grant aid increases educational attainment by approximately 0.16 years and the probability of attending college by four percentage points. The researcher concluded that a student who is able to overcome the challenge of college entry and enrollment with the assistance of aid is more likely to continue schooling later in life than one who has never attempted college. This result was consistent with a model in which fixed costs of college entry existed. Therefore, financial aid as a means to
overcome the obstacle of entering college contributes to the likelihood of a student continuing in college. Previous conclusions indicated that persistence is a logical necessity to success, which is reliant on many factors of the student, institution, and policy. Financial aid continues to exist due to the ideal that increasing access and persistence will contribute to graduation of students (Horn & Carroll, 2006). However, if success cannot robustly and definitively be attributed to financial aid, some insight from the contrasting outcome of attrition and/or stop-out can be reviewed as well.

DesJardins, Ahlburg, and McCall (2002) utilized simulated alterations of financial aid data to calculate changes in student stop-out. They began with a baseline of results from “survival rates of students who, conditional on receipt of a scholarship or loan offer, receive average scholarship and loan offers for the first five years and no aid thereafter” (p. 672). They proceeded with changing, within a simulation, the type and in what years the students would receive aid. “The results of our analyses suggest that existing financial aid packages at the study institution, a large public land grant university, do reduce first stop-out probabilities relative to a policy in which no financial aid was provided” (p. 673). This perspective from the other side of success, correlated with financial aid award status, in some way adds to connecting financial aid and success. The design of interpreting effects of different types of aid provides depth beyond the question of whether financial aid (in general) supports a student’s success.

Zhang (2006) utilized panel data to examine a direct link between state funding and graduation rates at four-year public institutions. When other factors were held constant, a $1,000 increase in state appropriations per FTE student at four-year public institutions was associated with about a one percentage point increase in graduation rates.
Additionally, there was evidence to support that changes to reduce funding were associated with a negative impact on graduation rates. Generally, the evidence throughout financial aid policy research indicates that lowering costs can improve higher education access and completion.

Additionally, Glock (2009) evaluated the effect of student aid on academic studies success, specifically the duration of study and the probability of graduation with a degree. She found that the duration of study is responsive to the type of financial support a student receives. Focusing on three main results, Glock found that student financial aid recipients finish faster than comparable students who are supported by the same amount from parents or private funding, higher financial aid does on average affect the duration of study, and the effect of financial aid is dominated by the increased probability of finishing a degree. However, this general theme of financial aid supporting student success has exceptions.

Chen and DesJardins (2010) utilized a heterogeneous model and event history method to run a longitudinal investigation into how financial aid affects college dropout behavior by racial and ethnic groups. They concluded from their investigation that American society still faces a serious challenge in equalizing educational opportunity for lower-income and minority students. Their results confirmed a positive effect on student retention with subsidized loans and a non-significant effect with unsubsidized loans. They also found significant and positive effects with merit and need-based aid. This study also identified distinct impacts of financial aid on college student dropout risks across different student sub-groups, specifically differential effects on student dropout risks across racial groups.
Dynarski and Scott-Clayton (2013) presented lessons from the research on financial aid effectiveness. According to their first lesson, 30 years of research supports that “money matters for college access” (p. 79). In 1988, Leslie and Brinkman reviewed several dozen nonexperimental studies and concluded that a $1,000 decrease in net price of tuition was associated with a 3 to 5 percentage point increase in college attendance. The second lesson was that program complexity undermines aid effectiveness. Certainly, money matters in many situations. However, if access to the money is confounded by a burdensome and difficult to navigate process, then lack of access to money can cause issues with enrollment and persistence. The third lesson was that achievement incentives appear to increase effectiveness, particularly when the focus is on improving college performance and completion. Merely widening the accessibility does not ensure successful academic performance or completion by a student. In fact, the contrary seemed to be the case. A study by Manpower Demonstration Research Corporation (a social policy research organization) examined a sample of low-income, primarily minority, female enrollees at two community colleges in Louisiana and found that performance based-scholarships increased GPAs and persistence.

**Financial Aid Research Opportunity**

As summarized, the area of financial aid research is quite extensive, as financial aid policy and programs continue to impose a consuming presence in postsecondary education, particularly public colleges and universities. Financial aid policy research spans decades and continues to adapt as financial aid programs and the needs of students evolve. The scope of financial aid policy continues to expand and to influence many aspects of student and institutional decision-making. One of those most recent
amendments, more specifically the 2012 Federal Financial Aid Amendments, went into
effect on July 1, 2012, and was applicable to all students applying for federal financial
aid. Due to the recentness of these amendments and the clear activation of the policy
nationally, an opportunity exists to capture more insight into the impact of financial aid
policy on higher education access, student persistence, and student success.
CHAPTER 3

METHODOLOGY

The research approach for this dissertation is a quantitative analysis, including a descriptive statistical analysis and logistic regression. The research questions that guide this study are: (1) Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges? and (2) Is there an impact on enrollment intensity based on the interaction of Pell Grant award and institutional type? The focus of this analysis is on the impact of the 2012 financial aid policy amendments on enrollment of students (who were all eligible to receive Pell Grant assistance in 2011-2012) and exploring whether an enrollment impact occurred on those same students in the following award (2012-2013) year.

The latest federal financial aid policy adaptations create a timely opportunity and inspire a need to assess the impact and quite possibly the efficacy of the policy changes in relation to student enrollment and persistence. This quantitative analysis falls in the category of a trend study and specifically examines whether there was an effect of the 2012 Federal Student Financial Aid Provisions on student enrollment in public Colorado higher education institutions considering federal Pell Grant status. This research focuses on the impact of a treatment (Pell Grant eligibility due to policy amendments) estimated by examining the difference between the changes experienced by both groups (comparison and treatment). In this investigation, the 2012 policy amendments and the potential change in Pell eligibility are considered the treatment. In this situation a natural experiment is possible because the 2012 policy change serves as a feature (often unintended) that produces exogenous variation in what would otherwise be an
endogenous variable allowing for an estimate of the impact of the treatment. This study utilizes a “natural-experiment” approach because depending upon the individual; the treatment separates one from the initial group to another group.

This analysis starts with a sample of the students enrolled in a Colorado public higher education institution in the 2011-2012 academic year who were eligible and awarded Pell Grants. There are two groups that result in the following year, based on new Pell Grant eligibility. The comparison group is comprised of all students eligible in the 2011-2012 year and still eligible and awarded Pell Grants in the 2012-2013 year. The treated group is comprised of students who were Pell Grant eligible and awarded in the 2011-2012 year, but who were ineligible and not awarded Pell Grants in the 2012-2013 year. The application of this design is appropriate per Meyer (1995), understanding that one needs strong evidence that the two groups would have been comparable over time in the absence of the treatment. Since the two groups start from a sample of individuals in one year and then reevaluates the same group of individuals in a second year, this analysis focuses on addressing the research questions of this study.

This analysis begins with the descriptive statistics of the sample (the entire 2011 group of students who were eligible and awarded Pell Grants, submitted a FAFSA for both 2011-2012 and 2012-2013 academic years, and enrolled in Colorado public institutions of higher education for the 2011-2012 academic year). The descriptive analysis indicates the dependent variable of enrollment status (full-time, half-time, less than half-time, and non-enrollment) for each individual before and after the application of the policy change (treatment) in 2012. However, the dependent variable is set on a binary analysis (enrolled in 6 or more credits= 1 and non-enrollment for those enrolled in five or
less credits = 0). The policy change was applied to all individuals at the same time on July 1, 2012, as a federal policy amendment to Pell Grant eligibility. As supported by Allison (2009), it is applicable to use each individual as his or her own control to make it possible to control for omitted variable bias by having individuals serve as their own controls.

**Colorado Public Higher Education**

In all states and public higher education institutions, tuition charges are influenced, in some context, by federal and state policies and by the level and procedures for direct state support for public institutions (Lenth, 1993). Colorado’s state support in funding to institutions of higher education has been on a continuous decline for the last 40 years. Burnett (2012) captured how the reduction in state support for public higher education forced institutions to increase prices for students to attend, leading to greater dependence on students and families to pay a larger share of the cost of higher education. This lack of state support and increased burden to fund access to a college or university compels students to seek alternatives such as grants, loans, and scholarships to supplement out-of-pocket expenses. Those families with the least amount of financial means most likely are eligible for Federal Pell Grant financial aid.

The current landscape of higher education funding in Colorado continues to hold with the model that increases direct costs to students, even though the cost of educating a student has not increased at the same rate. Amendments such as the Gallagher Amendment of 1982 and the Tax Payers Bill of Rights (TABOR) in 1992 were not directly involved with higher education funding but they shifted the funding structures and requirements of the state (Burnett, 2012). Increased provisions and constraints to
calculate what an average student actually pays at a college or university, total tuition added to fees then subtract subsidized grants and financial aid awards. The result is reported as net tuition and/or fees. This net tuition/fee is the average of a student’s cost for the year’s education. In Colorado, less of this amount is subsidized by the state and more is left as the responsibility for the student or student’s family to pay.

Reviewing the retention trend in Colorado, there is an opportunity to address if a shift or measurable difference in the retention rate trend occurred during the 2012 financial aid policy amendment year. Table 2 shows the retention rates of Colorado public higher education institutions by financial aid year to year, differentiated by type of institution. The trend from 2008 until 2011 was on a small but steady incline and then a noticeable decline in 2011-2012. Colorado is comprised of 26 institutions of public higher education. Twelve are four-year universities and 14 are categorized as two-year institutions of higher education. Table 3 lists the Colorado public institutions of higher education, indicating two- or four-year, and enrollment headcount for undergraduate students in 2011. Noting that thirteen of the two-year institutions are connected and governed by the Colorado Community College System (CCCS).

Table 2

<table>
<thead>
<tr>
<th>Type</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
<th>2013-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community College</td>
<td>57.7%</td>
<td>55.0%</td>
<td>53.8%</td>
<td>53.4%</td>
<td>54.0%</td>
<td>53.0%</td>
</tr>
<tr>
<td>University</td>
<td>75.0%</td>
<td>75.7%</td>
<td>75.8%</td>
<td>68.7%</td>
<td>70.0%</td>
<td>70.0%</td>
</tr>
</tbody>
</table>

*Note. Rates compiled from Colorado Department of Higher Education (CDHE) Retention Reports from multiple years.*
Table 3

*Public Institutions of Higher Education in Colorado by Type and 2011 Enrollment*

<table>
<thead>
<tr>
<th>Institution</th>
<th>Type</th>
<th>Enrollment Headcount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adams State College</td>
<td>four-year</td>
<td>2,225</td>
</tr>
<tr>
<td>Aims Community College</td>
<td>two-year</td>
<td>5,290</td>
</tr>
<tr>
<td>Arapahoe Community College</td>
<td>two-year</td>
<td>11,097</td>
</tr>
<tr>
<td>Colorado Mesa University</td>
<td>four-year</td>
<td>8,922</td>
</tr>
<tr>
<td>Colorado Mountain College</td>
<td>two-year</td>
<td>5,823</td>
</tr>
<tr>
<td>Colorado Northwestern Community College</td>
<td>two-year</td>
<td>1,301</td>
</tr>
<tr>
<td>Colorado School of Mines</td>
<td>four-year</td>
<td>3,947</td>
</tr>
<tr>
<td>Colorado State University</td>
<td>four-year</td>
<td>22,259</td>
</tr>
<tr>
<td>Colorado State University-Pueblo</td>
<td>four-year</td>
<td>4,941</td>
</tr>
<tr>
<td>Community College of Aurora</td>
<td>two-year</td>
<td>7,824</td>
</tr>
<tr>
<td>Community College of Denver</td>
<td>two-year</td>
<td>13,053</td>
</tr>
<tr>
<td>Fort Lewis College</td>
<td>four-year</td>
<td>3,841</td>
</tr>
<tr>
<td>Front Range Community College</td>
<td>two-year</td>
<td>20,568</td>
</tr>
<tr>
<td>Lamar Community College</td>
<td>two-year</td>
<td>935</td>
</tr>
<tr>
<td>Metropolitan State University-Denver</td>
<td>four-year</td>
<td>23,304</td>
</tr>
<tr>
<td>Morgan Community College</td>
<td>two-year</td>
<td>1,885</td>
</tr>
<tr>
<td>Otero Junior College</td>
<td>two-year</td>
<td>1,546</td>
</tr>
<tr>
<td>Pikes Peak Community College</td>
<td>two-year</td>
<td>14,725</td>
</tr>
<tr>
<td>Pueblo Community College</td>
<td>two-year</td>
<td>8,055</td>
</tr>
<tr>
<td>Red Rocks Community College</td>
<td>two-year</td>
<td>9,544</td>
</tr>
<tr>
<td>Trinidad State Junior College</td>
<td>two-year</td>
<td>1,839</td>
</tr>
<tr>
<td>University of Colorado Boulder</td>
<td>four-year</td>
<td>25,440</td>
</tr>
<tr>
<td>University of Colorado Colorado Springs</td>
<td>four-year</td>
<td>7,692</td>
</tr>
<tr>
<td>University of Colorado Denver</td>
<td>four-year</td>
<td>10,233</td>
</tr>
<tr>
<td>University of Northern Colorado</td>
<td>four-year</td>
<td>9,876</td>
</tr>
<tr>
<td>Western State College</td>
<td>four-year</td>
<td>1,981</td>
</tr>
</tbody>
</table>

*Note: Enrollment data from Colorado Department of Higher Education.*
Data Source

This study utilizes data provided by the Colorado Department of Higher Education (CDHE) with a formal Data Use Agreement. The study focuses on all Colorado public two-year and four-year institutions for the time periods of the 2011-2012 and 2012-2013 financial aid years. The individuals included in the data are all who were eligible for and received the Pell Grant in the 2011-2012 financial aid year, who also applied for financial aid in the 2012-2013 year. The qualifier of applying for financial aid in the 2012-2013 year indicates intent to attend a higher education institution in the following year, decreasing the likelihood that the 2011-2012 students include in the data had graduated in the following year. The data were stripped of any identifiable information prior to being provided by CDHE and eliminated risks of compromising the privacy of any students whose financial aid award status information was included.

Graduate students were omitted in order to focus the analysis on those most impacted by federal financial aid Pell Grant eligibility. Graduate students were omitted from the sample because they are not Pell Grant eligible when enrolled in graduate degree programs. Another reason for removal of the graduate student data was to maintain comparability from the two-year and four-year data, as the two-year colleges do not have graduate degree-seeking students. Excluding graduate students allowed for more consistency and uniformity of this sample.

Sample

The sample utilized in this study is limited to undergraduate students enrolled at public Colorado institutions of higher education who were awarded Pell Grants in the 2011-2012 academic year and those same students in the 2012-2013 academic year.
Table 4 provides a visual snapshot of the sample in the two financial aid years of interest with descriptive characteristics by frequency and percent for the Colorado Federal Financial Aid Pell Grant recipients from 2011-2012 year (all eligible and awarded a Pell Grant) and 2012-2013 (same group of individuals after policy change). Full-time students are those enrolled in 12 or more credits per academic semester, 6 to 11 credits are considered half time, any number of credits between 1 and 5 is considered less than half-time, enrolled in no credits is defined as non-enrollment.

Table 4

*Financial Aid Years Sample Characteristics by Frequency and Percent*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>2011-12 Frequency</th>
<th>2011-12 Percent</th>
<th>2012-13 Frequency</th>
<th>2012-13 Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institution Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Enrolled</td>
<td>0</td>
<td>0</td>
<td>46,954</td>
<td>45.8</td>
</tr>
<tr>
<td>Community College</td>
<td>53,257</td>
<td>51.9</td>
<td>25,838</td>
<td>25.2</td>
</tr>
<tr>
<td>University</td>
<td>49,286</td>
<td>48.1</td>
<td>29,751</td>
<td>29</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Specified</td>
<td>67</td>
<td>0.1</td>
<td>67</td>
<td>0.1</td>
</tr>
<tr>
<td>Male</td>
<td>42,271</td>
<td>41.2</td>
<td>42,271</td>
<td>41.2</td>
</tr>
<tr>
<td>Female</td>
<td>60,205</td>
<td>58.7</td>
<td>60,205</td>
<td>58.7</td>
</tr>
<tr>
<td>Enrollment Intensity Level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Time</td>
<td>69,278</td>
<td>67.6</td>
<td>36,885</td>
<td>36.0</td>
</tr>
<tr>
<td>Half Time</td>
<td>29,288</td>
<td>28.6</td>
<td>17,024</td>
<td>16.6</td>
</tr>
<tr>
<td>Less than Half Time</td>
<td>3,415</td>
<td>3.3</td>
<td>1395</td>
<td>1.4</td>
</tr>
<tr>
<td>Not Enrolled</td>
<td>5</td>
<td>0</td>
<td>46,958</td>
<td>45.8</td>
</tr>
<tr>
<td>Withdrew After FA Disbursement</td>
<td>557</td>
<td>0.5</td>
<td>281</td>
<td>0.3</td>
</tr>
<tr>
<td>Federal Financial Aid Received</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
<td>46,954</td>
<td>45.8</td>
</tr>
<tr>
<td>Yes</td>
<td>102,543</td>
<td>100</td>
<td>55,589</td>
<td>54.2</td>
</tr>
</tbody>
</table>

*Note: 2012-2013 group is comprised of the same individuals from the 2011-2012 group.*
Procedure: Descriptive Statistics and Logistic Regressions

This study applied a descriptive statistics and logistic regression models to a sample of all Colorado students enrolled in public two- and four-year postsecondary institutions who received Pell Grants in the 2011-2012 financial aid year. Based on the outcome variable of enrollment in the 2012-2013 academic/financial aid year, the procedures of this study addressed the research questions regarding impact on enrollment of these students in the year following Pell Grant eligibility change. Within this analysis, enrollment, coded dichotomously, is included as the dependent variable of interest, with the independent variables consisting of student gender, institution type, EFC, and Pell Grant amounts from 2012. Diagnostics were not conducted with regard to these regressions as logistic regression is non-parametric, not incorporating the assumptions relevant to linear regression analysis.

Descriptive statistics were conducted on these data. Both detailed descriptive statistics (see Table 4) and a focused version of descriptive statistics (see Table 5) limited to those variables that were coded and analyzed in the logistic regression model. The descriptive statistics consisted of a frequency table being constructed reporting the sample sizes and percentages of response associated with all response categories associated with the categorical measures included within this study, with measures of central tendency and variability calculated and reported for the continuous items of interest. The measure of central tendency calculated and reported consisted of the mean, with the measures of variability consisting of the standard deviation, minimum and maximum scores, and range.
In addition to the descriptive statistics, regression analyses were conducted in which enrollment in the 2012-2013 academic year, coded as enrolled (six credit hours and above) or unenrolled (zero to five credit hours of enrollment), was predicted on the basis of student gender, the type of institution attended, as well as the EFC and Pell Grant amounts from the 2012-2013 academic/financial aid year.

\[ y = \beta_0 + \beta_1(\text{gender}) + \beta_2(\text{school type}) + \beta_3(\text{EFC}) + \beta_4(\text{Pell})+ \epsilon \]

With respect to these variables, regarding enrollment, half-time or above was coded as “1,” with not enrolled coded as “0.” In this regression, \( \beta_0 \) is the intercept or constant. \( \beta_1 \) is the gender (the only time invariant variable provided in the dataset from CDHE) variable coefficient. A dummy measure was created for student gender, with males coded as “1,” and females coded as “0.” Regarding the type of institution attended, \( \beta_2 \) was also coded a dummy variable, with universities coded as “1,” and community colleges coded as “0.” Measured in thousands of dollars, the Expected Family Contribution (EFC) amounts (\( \beta_3 \)) and Pell Grant award amounts (\( \beta_4 \)), are included in the logistic regression. Finally, the \( \epsilon \) serves as the error term.

The second logistic regression includes all of the variables from the first logistic regression (with the dependent variable of enrollment in at least half-time as “1” and less than half-time as non-enrollment set as “0”) but also applies an interaction between receiving a Pell Grant award (in the 2012-2013 year, with yes awarded as “1” and not awarded as “0”) and institution type (with university coded as “1” and community college coded as “0”).

\[ y = \beta_0 + \beta_1(\text{gender}) + \beta_2(\text{EFC}) + \beta_3(\text{Pell}) + \beta_4(\text{University}) + \beta_5(\text{Pell} \times \text{University})+ \epsilon \]
Logistic regressions are applicable and used since the dependent variable was dichotomous, with student gender and type of institution included in this analysis as controls. The logistic regression analysis conducted included the reporting of the odds ratios, standard errors, calculated probability levels, and 95% confidence intervals of the odds ratios. Additionally, the sample size associated with the analysis was also reported, along with the logistic regression chi-square value and its associated degrees of freedom and significance, and the pseudo $R$-squared associated with this model.

**Reliability, Validity, and Generalizability**

The results from the methods applied in this study are meaningful in addressing the research questions because the sample utilized in the regression is comprised of all of the public Colorado higher education students enrolled in the 2011-2012 financial aid year who were eligible, and awarded Pell Grants in the 2011-2012 financial aid/academic year prior to the implementation of the federal financial aid policy changes in July of 2012 and then delineates between the same students by enrollment status in the following 2012-2013 year. In addition to the change in “treatment” (implementation of 2012 federal financial aid policy amendments), the two groups (students awarded Pell Grants in both years and students who were awarded only in 2011 and not 2012) likely differed in important economic measures. It would be expected that individuals who lost their Pell Grant differed in meaningful ways from those who did not, these differences are unobserved, but potentially significantly related to enrollment intensity in the following year.

Therefore, the estimates provided by the analysis conducted are likely to be somewhat conservative in their estimation. Unobserved student characteristics including:
gender, ethnicity, first generation, are incorporated and accounted for with the use of this sample. These time-invariant variables are the same for an individual in both 2011 and 2012 time periods of data. This regression looks at the outcome of interest being student enrollment from the period of time before the policy was applied to everyone and after the application of policy amendments impacting that same group of individual students at the same time.

The data were provided directly from the organization that collects and maintains Colorado postsecondary education data — Colorado Department of Higher Education Institutional Research Department — and were stripped of any identifiable information, eliminating risks of compromising the privacy of any students whose financial aid award status information was included. The source of the data increases its reliability and validity as authentic measurements.

Limitations to generalizability exists in this study as only Colorado postsecondary undergraduate students enrolled in public institutions of higher education are included. Colorado higher education, like in any other state adheres to unique funding structures for higher education, a variety in the characteristics of the population, and specific state legislation, which should be considered prior to applying any generalizability to the results of this study. In addition, adaptation and amendments to the financial aid policy are to be anticipated and expected with each political shift at the state and federal government levels.

**Ethical Issues and IRB Approval**

This study involves minimal issues in ethical risks, as the data have previously been stripped of identifiable information and the covariates provided by CDHE were
general; i.e., gender, aid awarded, enrollment intensity level, and type of postsecondary institution. Thus, identification of the individual student would be difficult. This study was submitted to the University of Colorado Colorado Springs (UCCS) and approved for expedited exemption (see Appendix A). The risk level to participants (Colorado public higher education institution students awarded Pell Grants in 2011 and 2012) was deemed minimal, and no vulnerable populations were accessed.

**Bias**

The author of this research study acknowledges potential bias as a Student Affairs professional serving as an Interim Director in a public Colorado university. In order to mitigate bias with this research, the data were not collected by the author, but were provided by CDHE. The data were stripped of any identifiable indicators (prior to being provided for analysis) and pulled from all public institutions of higher education in Colorado by CDHE. The literature review attempts to minimize bias by incorporating both perspectives of research with contradictory research findings for each theme addressed regarding within the overall area of financial aid policy.

**Research Limitations**

This study is limited to the public community colleges and universities in Colorado. The external validity and generalizability is limited to Colorado higher education, and is uniquely funded at lower levels than comparable states in the United States and utilizes the Colorado Opportunity Fund (COF), which allocates a determined amount of funds to eligible students and is applied directly to the institution to reduce the amount of student tuition. The timeframe of this study also is a limiting factor, as this policy is quite recent compared to the lifespan of federal financial aid. The lack of more
variables to consider, such as GPA at the end of the 2011-2012 year may be interesting information to consider with a rerun of this analysis. This study also uses data that are readily available from CDHE but could be better served with more extensive covariates and more years of data. The limitation of the information provided by CDHE allows for a before and after design to easily be applied, but such a design is described by Meyer (1995) as employed often as a method of preliminary analysis.
CHAPTER 4

RESULTS

In this chapter, the results of the analyses conducted for this study are presented and detailed. Initially, a series of descriptive statistics were conducted on these data. This consisted of the sample sizes and percentages of response associated with each response category being reported for the categorical measures of interest, with measures of central tendency and variability calculated and reported for the continuous items of interest included within this study. Next, a logistic regression analysis was conducted in order to test this study’s hypotheses, focusing upon enrollment intensity as the outcome measure of interest.

Descriptive Statistics

Initially, a series of descriptive statistics were conducted on the data in order to present a focused illustration of the data and the students included within the sample. Measures of central tendency and variability were calculated on the continuous data measures included within this dataset, with the mean used as the measure of central tendency, and the standard deviation, minimum and maximum scores, and range calculated and reported as measures of variability. Additionally, a frequency table was constructed reporting the sample sizes and percentages of response relating to the categorical measures of interest.

In the 2011-2012 academic/financial aid year, 102,543 students received Pell Grant awards who enrolled at public institutions of higher education in Colorado. Descriptive statistics was applied to these same students in the 2012-2013 academic/financial aid year, and 46,953 students were not eligible or awarded Pell
 Grants. In regards to EFC amount in 2012, this measure had a mean of $814.54 (SD = $1382.21), with a minimum of zero and a maximum of $17,893. Next, with regard to the Pell amount awarded, this was found to have a mean of $3268.45 (SD = $1727.39), with a minimum of three and a maximum of $5551, producing a range of $5548.

Table 5 presents descriptive statistics associated with the categorical variable measures of interest. With regard to enrollment, close to 54% of the sample was found to be enrolled at half-time or above, with slightly over 46% being unenrolled. Next, with regard to whether students received a Pell Grant, this was found to be the case in slightly over 54% of the student cases, while this was not found to be the case in close to 46% of cases. Noting, the national average of students enrolled at public two- and four-year institutions was 61% for the 2011-2012 year and 54% in the 2012-2013 year. With regard to student gender, close to 59% of students were female, with slightly over 41% of students being male. Finally, with regard to institution type, close to 52% of students were found to be enrolled in community colleges, with slightly over 48% being enrolled in universities.
Table 5

Descriptive Statistics of 2012-2013 Coded Variables Used in Logistic Regression

<table>
<thead>
<tr>
<th>Measure</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unenrolled</td>
<td>47,238</td>
<td>46.07%</td>
</tr>
<tr>
<td>Half-Time or Above</td>
<td>55,305</td>
<td>53.93%</td>
</tr>
<tr>
<td>Received a Pell Grant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>46,954</td>
<td>45.79%</td>
</tr>
<tr>
<td>Yes</td>
<td>55,589</td>
<td>54.21%</td>
</tr>
<tr>
<td>Gender Dummy Male</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>60,272</td>
<td>58.78%</td>
</tr>
<tr>
<td>Male</td>
<td>42,271</td>
<td>41.22%</td>
</tr>
<tr>
<td>Institution Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community College</td>
<td>53,257</td>
<td>51.94%</td>
</tr>
<tr>
<td>University</td>
<td>49,286</td>
<td>48.06%</td>
</tr>
</tbody>
</table>

Note: Only 2012-2013 data was used for the logistic regression, as the 2011-2012 sample consisted of all students who were eligible and awarded a Pell Grant.

Research Findings

A logistic regression analysis was conducted in order to test this study’s hypotheses. Within this analysis, enrollment, coded dichotomously, was included as the dependent variable of interest, with the independent variables consisting of student gender, institution type, and EFC and Pell Grant amounts from 2012. As presented in Table 6, all predictors were found to achieve statistical significance within this analysis. With regard to addressing the question: Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges? In regard to the
amounts received, a $1000 increase in the Expected Family Contribution in 2012 increased the odds of being enrolled half-time or above by a factor of 1.175, while a $1000 increase in the Pell Grant amount in 2012 increased the likelihood of being enrolled half-time or above by a factor of 1.493. Results found statistical significance with regard to predictors of EFC and Pell amounts award in 2012-2013. Students with lower calculated EFC and students with lower Pell Grant awards had a greater likelihood of not enrolling in the 2012-2013 year. Students were 17% more likely to be enrolled in at least half-time with each EFC increase of $1000. Students were nearly 50% more likely to enroll at least half-time with every $1000 increase in Pell Grant amount. This logistic regression model was found to achieve statistical significance, with a pseudo $R^2$-squared approaching .06.

Table 6

*Logistic Regression Analysis Results*

<table>
<thead>
<tr>
<th>Measure</th>
<th>OR</th>
<th>SE</th>
<th>p-value</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Male</td>
<td>.864***</td>
<td>.011</td>
<td>&lt;.001</td>
<td>.842</td>
</tr>
<tr>
<td>University</td>
<td>.842***</td>
<td>.012</td>
<td>&lt;.001</td>
<td>.820</td>
</tr>
<tr>
<td>EFC 2012 (1000s)</td>
<td>1.175***</td>
<td>.007</td>
<td>&lt;.001</td>
<td>1.162</td>
</tr>
<tr>
<td>Pell 2012 (1000s)</td>
<td>1.493***</td>
<td>.007</td>
<td>&lt;.001</td>
<td>1.479</td>
</tr>
<tr>
<td>Constant</td>
<td>.323***</td>
<td>.006</td>
<td>&lt;.001</td>
<td>.312</td>
</tr>
</tbody>
</table>

*Note.* ***$p<.001$; $N = 102,488$; LR $\chi^2(4) = 8409.20, p < .001$; Pseudo $R^2 = .0595$.

An additional logistic regression analysis was conducted which included an interaction between Pell amount and institution type. As shown in Table 7, this
interaction was not found to achieve statistical significance, indicating that there was no significant moderation present with respect to these two measures. Diagnostics were not conducted with regard to these regressions as logistic regression is non-parametric, not incorporating the assumptions relevant to linear regression analysis.

Table 7

Logistic Regression Analysis with Interaction between Pell and Institution Type

<table>
<thead>
<tr>
<th>Measure</th>
<th>OR</th>
<th>SE</th>
<th>p-value</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Male</td>
<td>.864***</td>
<td>.011</td>
<td>&lt;.001</td>
<td>.842</td>
</tr>
<tr>
<td>University</td>
<td>.842***</td>
<td>.012</td>
<td>&lt;.001</td>
<td>.820</td>
</tr>
<tr>
<td>EFC 2012 (1000s)</td>
<td>1.174***</td>
<td>.007</td>
<td>&lt;.001</td>
<td>1.161</td>
</tr>
<tr>
<td>Pell 2012 (1000s)</td>
<td>1.493***</td>
<td>.007</td>
<td>&lt;.001</td>
<td>1.479</td>
</tr>
<tr>
<td>Pell * University</td>
<td>.994</td>
<td>.007</td>
<td>.371</td>
<td>.980</td>
</tr>
<tr>
<td>Constant</td>
<td>.324***</td>
<td>.006</td>
<td>&lt;.001</td>
<td>.312</td>
</tr>
</tbody>
</table>

Note. ***p<.001; N = 102,488; LR $\chi^2$(5) = 8410.01, $p < .001$; Pseudo $R^2 = .0595$.

In this chapter, the results of the analyses conducted for this study were presented and reported. Following the descriptive statistics, the results of the logistic regression analysis found statistical significance with regard to the predictors of student gender, type of institution attended, as well as the EFC and Pell amounts from 2012.
CHAPTER 5
DISCUSSION AND CONCLUSION

The increasing scope and complexity of the federal financial aid program and its policies, and particularly Pell Grants, has generated questions about effectiveness, heightened confusion among students and parents, and raised concerns about how program rules may interact with student enrollment, retention, success, and graduation. The 2012 financial aid policy changes not only created increased limits on financial aid award eligibility for new students, but was also applicable to students who previously met financial aid eligibility criteria. These changes included: a reduction in the duration of eligibility from an equivalent of 18 full-time semesters to the equivalent of 12 full-time semesters, eliminated the ability-to-benefit (ATB) option for establishing general student eligibility for Title IV funds, and adjusted the qualifying income for the automatic zero Expected Family Contribution (EFC) determination from $31,000 to $23,000.

Provisions regarding direct loans were changed as well. Interest subsidy during the six-month grace period was eliminated for new Stafford Loans made on or after July 1, 2012. The repayment period remained the same, and activated six months after the student is no longer enrolled at least half-time, but interest that accrued during those six months was payable by the student rather than subsidized by the federal government. These changes went into effect for all federal financial aid applicants at the same time. This national change provided an opportunity to analyze the impact of such a policy change for a large group of students. This chapter will review and summarize financial aid research, identify the main methods used in this study, discuss the implications of results, and consider future implications on financial aid policy research.
Summary of Results

Access and retention in higher education continues to be an area of direct interest for students, educators, researchers, and policymakers. When policy changes occur at the federal level, there is an opportunity to research phenomena and impact. This study adds to the area of financial aid policy and enrollment research by exploring a recent policy change and enrollment data. The research approach for this study was a quantitative logistic regression analysis. The research questions addressed by the methodology in this study were: (1) Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges? and (2) Is there an impact on enrollment intensity based on the interaction of Pell Grant award and institutional type? The research completed in this study applied a convergence of Social Equity Theory and Rational Choice Theory as a framework to aptly develop a lens in which to view student enrollment as a model of individual human behavior in relation to financial aid policy amendments.

Initially, a series of descriptive statistics were conducted on the research data in order to present an initial illustration of these data and the students included within the sample of interest. Starting with a sample of 102,543 students enrolled at public institutions of higher education in Colorado who received Pell Grant Awards in the 2011-12 academic/financial aid year. Descriptive statistics was applied to these same students in the 2012-2013 academic/financial aid year, and 46,953 students were not awarded Pell Grants due to ineligibility. Additionally, a frequency table was constructed reporting the sample sizes and percentages of response relating to the categorical measures of interest. The measure of interest was whether or not students were enrolled in the following 2012-
2013 year when the policy took effect. A logistic regression analysis coded enrollment dichotomously, and was set as the dependent variable of interest, with the independent variables consisting of student gender, institution type, calculated EFC, and Pell Grant award amounts in the 2012-2013 academic/financial aid year.

The results of the logistic regression analysis found statistical significance with regard to the predictors of student gender, type of institution attended, as well as the EFC and Pell amounts from 2012-2013. To answer the first research question in this study, a higher calculated EFC in 2012-2013 increased the odds of being enrolled half-time or above by a factor of 1.175, while a $1000 increase in the Pell Grant awarded amount in 2012-2013 increased the odds of being enrolled half-time or above by a factor of 1.493. Students were 17 percent more likely to be enrolled in at least half-time with each EFC increase of $1000. And for every $1000 increase in Pell Grant awarded amount, students were nearly 50% more likely to be enrolled in at least half-time. This means that if a student was calculated to have a higher EFC or available documented resources (based on family income, assets, and allowable expenses) there was an increased likelihood of enrollment in six or more credits. An increase in Pell Grant amounts (awarded based on greater demonstrated need and lack of resources) increased the likelihood of enrollment in six or more credits. These results produced a paradigm of duality regarding Pell Grant eligible and enrolling students, which will be discussed further under implications. In regard to the second question results of the interaction of Pell Grant and institution type was not found to achieve statistical significance, indicating that there was no significant moderation present with respect to these two measures.
The scope of this study is specific to the sample of public college and university students in Colorado who were eligible and awarded Pell Grants. The specific group of students in the sample had unique situations that allowed them to meet the eligibility requirements to receive federal financial aid. Accepting that Colorado has a specific higher education funding stipend per eligible student, and legislative funding for public higher education is limited by multiple constitutional amendments, generalizability is limited to a conservative estimation. However, the results of this study inspire a greater investigation on the impact of financial aid eligibility requirements on a national level, since the policy amendments are overarching across the nation and initiated at the federal level.

**Discussion and Implications**

The study findings have important implications for financial aid policy as well as future research on the role of federal financial aid policies on the enrollment of students at higher education institutions. Remembering the applied of the convergence between Social Equity Theory and Rational Choice Theory (Frederickson, 1990; Jones et al., 2006), this study finds that financial aid—specifically the Pell Grant—has significance in influencing the decision of enrollment in a postsecondary institution. Financial aid policy and its impact on student access, enrollment, retention, persistence, and success continue to be relevant in research (Baum & Payea, 2011; Dynarski & Scott-Clayton, 2013). In an environment where an increased need for education exists for individuals to be eligible for professional employment opportunities, the rising cost of higher education, and where political climate influences policy there is an expectation for policymakers and practitioners to investigate and understand the impact of financial aid policy on current
and potential students (Doyle, 2012). An increasing range of indirect and direct benefits to the individual and society should inspire a collective desire to support access and success of students in postsecondary education. Many institutions of higher education continue to trend towards budgeting systems and formulas that require increased enrollment numbers to fund operations and continue their mission (Burnett, 2012). Social Equity Theory applies that with the societal and individually shared value in education and belief that postsecondary education is simultaneously a private and public good, the ideal exists to maximize access for all potential students. Public administration must do more than simply value the construct of social equity. Policymakers, administrators, and educational leadership are responsible for being good stewards for the equity and access of the higher education system (Carnevale & Fry, 2001; Cunningham, 2006). Rational Choice Theory reveals that individuals anticipate and consider courses of action to calculate that which will be best for them. Rational individuals choose options that are likely to give them the greatest satisfaction or result in an overall benefit (Hindess, 1988). The results of this study indicated that students operating within the constructs of Rational Choice Theory made decisions to discontinue enrollment and not pursue an education students had previously made the decision to start. The convergence of these conditions influence the process of re-enrollment of a student who has been impacted by financial aid policy changes shifting their Pell Grant award amount or changing their eligibility status.

**Implications for Students**

Acknowledging, the work of researchers who have focused and found relevant the ways in which non-financial factors can improve retention, e.g., student engagement
(Tinto, 2006); the gender composition of the faculty (Robst, Keil, & Russo, 1998); effectiveness of instruction (Langbein & Snider, 1999); and student demographic characteristics (Murtaugh, Burns, & Schuster, 1999), this study focuses directly with financial aid Pell Grant eligibility. However, non-financial factors also influence student enrollment, persistence, and success. Quite possibly, there could be a link where the investment by federal and state programs inspires a sense of mattering by students. By providing a means of financial assistance and opportunity, students may accept value in their educational opportunities.

This study confirms the conclusions of relevance to student persistence of other recent financial aid research (Castleman & Long, 2013; Chen & DesJardins, 2008; Choy, 2001; Glock, 2011; Hayes, 2008; Kane, 2003; Keane & Wolpin, 2001; King & Bannon, 2002; Paulsen & St. John, 2002; Mendoza, Mendez, & Malcolm, 2009; Perna, 1998; Singell, 2004; Sydow, & Sandel, 1998), the results of this study find significance and correlations with enrollment to variables of concern to many groups, including gender, family income, and level of support available by federal financial aid. Realizing the direct impact eligibility criteria has on student access and potentially on retention or success, insists upon more thoughtful considerations before overarching policy changes are enacted (Baum, Payea, & Steele, 2005).

The intent of policy creation and amendments must have is a duty to be motivated to make for more efficient and positively impactful financial aid programs, but may be compelled by a need of policymakers to lower federal funding costs or be swayed by economic and political climates. Although, a proposed solution from this study is not necessarily to implement unlimited amounts of aid with no limitations on time for
students, as such a solution is non-sustainable and not necessarily ideal for student access and success. A need for well-developed policies is apparent as regulations and eligibility criteria impact people in important ways. As discussed by Hauptman (2007), state policymakers, administrators, and educational leadership should take into greater account the intended and unintended consequences of policies in addressing the issues related to improving student access, enrollment, persistence, and success. This research supports the need to be more intentional in determining exactly what variables should be considered when creating restrictions on financial aid eligibility.

The implications of this study support the research proposed by Doyle (2012), where he applied a model of state policy positing that political systems work by converting demands into policies. Federal financial aid programs, including the Pell Grant, were created to increase access and improve likelihood of success for students actively participating in higher education certificate and degree programs. The ultimate goal of U.S. financial aid programs and policies is to ensure that academically capable students are able to earn a college certificates and degrees independent of financial considerations (Brinkman & Leslie, 2007). And yet, amendments specifically designed to limit eligibility to Pell Grants, such as the changes in 2012, are contrary to the inspired purpose of increased access and continued financial support of these intended beneficiaries.

Higher education and financial aid policy, though complex and ever-changing, can be comprehended through appropriately developed models of behavior and continuous research. Accepting that through the lens of Social Equity Theory and Rational Choice Theory, individuals desire and take action to access and succeed in the
postsecondary education process. Focusing on the goals improving student access and retention, the results of this study further support an impetus for policymakers, education administrators, and students to pay attention to changes in federal financial aid amendments. This research and its results argue for an increased need to educate students and their families about financial aid policy and direct impacts to a student’s specific situation. An informed student and their family can integrate this additional knowledge about the financial aid process to plan and adapt to best support their own persistence and success.

Applying the framework of this study with the intent and continued purpose of the financial aid program, Social Equity Theory and Rational Choice Theory are contextualized and unified to understand the influence of financial aid policy changes on enrollment rates in publicly funded Colorado colleges and universities. These theories intersect to create a circumstance in which students conclude at a decision to continue to pursue postsecondary certificates or degrees. Increased access with the support of financial aid creates an opportunity and situation where a student can expect to enroll in postsecondary education institutions (Hansen, 1983). Potential and current students also consider in this decision-making process at what level of time commitment and course workload they are committed to considering the financial burden that has potentially been altered for them.

Recalling from the review of research, degree completion is reduced when there is a delay in enrollment to higher education after high school (Eagle & Carroll, 1988), inability to enroll full-time (Eagle & Tinto, 2008), and lack of financial resources (DesJardins et al., 2002). Publicly funded higher education institutions are purposed with
providing increased access for more individuals to gain skills and degrees from accredited institutions. The convergence of both Social Equity Theory and Rational Choice Theory works with the assumption that education is associated with some value to a reasonable individual. Thus, this value in postsecondary education motivates students to seek certificates and degrees.

**Implications for Policymakers and Practitioners**

Policymakers and practitioners should understand that demands from citizens, interest groups, and individuals are transformed into policies affecting these groups. This process is not merely directed by the intended purpose of federal financial aid programs for increased access and retention of student but is mediated by political systems and federal budgetary concerns. As individuals are influenced by this framework creating this convergence of Social Equity Theory and Rational Choice Theory, policymakers and practitioners must make decisions and implement regulations and requirements based on understanding that condition is relevant to outcomes of student decision-making regarding enrollment and the student’s continued success. There is a considerable need to evaluate overarching policy changes and compare these adaptations to the purpose of federal financial aid.

This research is timely in addressing a relatively recent policy change during a potential shift in political power in an election year. This and other research in this area provides opportunities for recommendations and advice to policymakers, education administrators, and potential students. Since policy changes are not controlled at the institutional level, information such as the results of this study can inform administrators and practitioners of possible countermeasures and opportunities to better address the
vacuum of financial need that is created for students when financial aid policy amendments occur. Expanding and increasing financial funding for programs such as the Colorado Opportunity Fund (COF) and other state supports could provide a means for students to fill the financial need that has resulted from federal aid ineligibility. The results of this study, encourage an opportunity for further research in this area of financial aid policy and impact on potential and current students in higher education.

**Implications for Higher Education**

There are many implications for higher education institutions in regards to maximizing access for potential students and supporting continued success or degree completion for students through institutions being more watchful of federal financial aid policy changes. By being more proactive in planning for shifts in financial aid eligibility, administrators and postsecondary institutional leadership may perhaps be able to backfill institutional aid awards or work with state leadership to create more state aid opportunities to support students with the greatest need and risk of denied access. When the topic of community college certificates/degrees or all postsecondary education being free to students repeatedly cycles through political platforms, discussions should include more information than merely the appeal of free education. Education, when free to the students, still comes at a cost to higher education institutions and state governments.

The paradigm of duality where the students with the greatest amount of documented resources (making them less eligible for the maximum Pell Grant award amount) and conversely the students with the least amount of documented resources (making them eligible for greater Pell Grant award amounts) each had a greater likelihood for enrollment in the 2012-2013 year of the Pell Grant eligibility change. This
creates a group of students in a financial ‘in-between’ category with the greatest likelihood of non-enrollment. The implications for these students and their families impose a need for improved awareness and knowledge of policies and regulations that directly impact the responsibility of higher education costs to students and families. This lack of knowledge and awareness is often a barrier for certain groups of students, such as first-generation students and their families who tend to have less information about higher education (Spellings, 2006). Thus, when federal financial aid amendments occur students and families who rely on Pell Grants and other financial aid resources are burdened with the need to be better prepared to not depend solely on the financial aid programs to access postsecondary education.

**Recommendations for Future Research**

Future research opportunities exist in several capacities. The first research opportunity would be to repeat this study with additional years of data following the 2012 federal financial aid policy amendments. There is also a prospect to include more variables of interest related to student enrollment, persistence, and success to better conceptualize which students (and why) are most impacted by federal aid policy changes. Also examining if there is a quantifiable level of financial aid that stops being beneficial to student enrollment. Considering changing costs (for governments, institutions, and students), is there a minimum amount of aid that would support student access and efficiently allocate limited federal funds? Research and data, such as those used in this study, prompts and provides an opportunity to offer feedback or recommendations to policymakers, education administrators, and potential students. Also, exploring beyond the scope of the Pell Grant, and focusing on if and how student loan applications and
usage were impacted would be informative as student loan debt is currently a topic concern.

There an opportunity to review the impact of financial support policy changes outside of Pell Grants and loans. There are opportunities to investigate other forms of financial assistance, such as VA benefits, merit and need based scholarships, institutional grants, and vouchers.

Creating and including more in-depth investigations through qualitative inquiry of policymakers, higher education administrators, and students would provide insight into the decision-making of individuals. There is an opportunity to collect themes of desires, decisions, concerns, and understanding of the financial aid process and policies (of all relevant constituents) through qualitative investigation methods. Applying both qualitative and quantitative research applications can provide richer data for creating more practical countermeasures and influence impact toward desired outcomes.

Recognizing that financial aid policy research looks at real-world issues impacting real life people, incorporating a way to shift some results tables into charts and graphs may increase an opportunity for wider consumption.

The adaptation of this research on a national scale would provide insight on national trends, and note if the enrollment intensity repercussions in Colorado are unique or in line with national trends. Expanding the reach and application of this research in various states and nationally can add to generalizability. Incorporating more years of data after the 2012 Financial Aid Policy amendments can investigate further if the year of change was the beginning of a trend in enrollment and persistence, or a singular event. Another quantitative model that could be applied would be a differences-in-differences
fixed effects to focus more specifically on the impact of policy by utilizing each individual as their own control for time invariant variables, and minimizing endogeneity (when an explanatory variable is correlated with the error term). There are now four years of enrollment data since these specific eligibility and other financial aid changes have been implemented since 2012 which allow for continued opportunities to research and explore federal financial aid eligibility revisions and enrollment trends.

**Conclusion**

The purpose of this study was to conduct an exploratory investigation on whether the 2012 federal financial aid policy amendments that increasingly restrict Pell Grant eligibility caused an adverse impact on the enrollment intensity of students. Applying a theoretical framework with the convergence of Social Equity Theory and Rational Choice Theory, this study focused on two research questions: (1) Does receiving federal Pell Grant financial aid predict enrollment intensity at public Colorado universities and colleges? (2) Is there an impact on enrollment intensity based on the interaction of Pell Grant award and institutional type?

This study applied quantitative analyses via descriptive statistics and logistic regressions with the focus on enrollment as a dependent variable of undergraduate Colorado public postsecondary students, pre- and post-policy change. Noting enrollment and non-enrollment were delineated by the rule of at least 6 credit hours per semester which is required for Pell Grant eligibility. This study utilized data only from Colorado public institutions of higher education from the 2011-2012 (pre-policy change) and 2012-2013 (year of policy change), concentrating on students who were eligible and awarded Pell Grants in the first year but may or may not have been in the second year.
To answer the first research question, this study found that there was significance in relation to Pell Grant eligibility criteria and enrollment status. Students with lower calculated EFC and students with lower Pell Grant awards had a greater likelihood of not enrolling in the 2012-2013 year. In regard to the second question results of the interaction of Pell Grant and institution type was not found to achieve statistical significance, indicating that there was no significant moderation present with respect to these two measures.

These policy eligibility criteria were recently implemented and went into effect on July 1, 2012. The relative newness of the policy amendments with the shift in enrollment trend around the same time created a need for exploration. This study specifically investigated the data relative to students enrolled in the year prior to the 2012 federal financial aid policy amendments and the year of the policy change. This study adds to the body of financial aid policy and enrollment research by analyzing new policy eligibility criteria and its impact on undergraduate student enrollment within the framework of Social Equity Theory and Rational Choice Theory.
REFERENCES


APPENDIX A

Institutional Review Board (IRB) Exemption

University of Colorado
Colorado Springs

Institutional Review Board (IRB) for the Protection of Human Subjects

Date: 2/9/2015

IRB Review

IRB PROTOCOL NO.: #15-128
Principal Investigator: Sandy Ho
Faculty Advisor if Applicable: Sylvia Martinez, PhD
Application: New Application
Type of Review: Exempt Category 4
Risk Level: No more than Minimal Risk
Renewal Review Level (If changed from original approval) if Applicable: N/A No Change
This Protocol involves a Vulnerable Population: N/A (No Vulnerable Population)
Expires: *
*Note, if exempt: If there are no major changes in the research, protocol does not require review on a continuing basis by the IRB. In addition, the protocol may match more than one review category not listed.
Externally funded: ☒ No ☐ Yes
OSP #: Sponsor:

Thank you for submitting your Request for IRB Review. The protocol identified above has been reviewed according to the policies of this institution and the provisions of applicable federal regulations. The review category is noted above, along with the expiration date, if applicable.

Once human participant research has been approved, it is the Principal Investigator’s (PI) responsibility to report any changes in research activity related to the project:
- The PI must provide the IRB with all protocol and consent form amendments and revisions.
- The IRB must approve these changes prior to implementation.
- All advertisements recruiting study subjects must also receive prior approval by the IRB.
- The PI must promptly inform the IRB of all unanticipated serious adverse (within 24 hours). All unanticipated adverse events must be reported to the IRB within 1 week (see 45CFR46.108(b)(3)). Failure to comply with these federally mandated responsibilities may result in suspension or termination of the project.
- Renew study with the IRB prior to expiration.
- Notify the IRB when the study is complete.

If you have any questions, please contact Research Compliance Specialist in the Office of Sponsored Programs at 719-255-3903 or irb@uccs.edu

Thank you for your concern about human subject protection issues, and good luck with your research.

Sincerely yours,

Melissa J. Benton
Melissa Benton, PhD
IRB Committee Member