INCREASING COLLEGE COMPLETION RATES IN CALIFORNIA:

A STUDY OF THE FACTORS INVOLVED AND RECOMMENDATIONS TO FACILITATE STUDENT SUCCESS

A Thesis

Presented to the faculty of the Department of Public Policy and Administration

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by

Natalie Rose Wagner

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Department of Public Policy and Administration

Abstract

of

INCREASING COLLEGE COMPLETION RATES IN CALIFORNIA:
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The purpose of this study has been to identify how financial aid and other factors influence college graduation rates, and to make recommendations on policies that could be used to increase graduation rates at public colleges in California. I obtained data on all four-year public degree-granting colleges in the United States and used regression analysis to identify the factors that impact college graduation rates and measure the magnitude of the impact to determine which factors in my data set are the largest contributors to graduation rates. My regression analysis included financial aid factors (the percentage of students at a college receiving different forms of aid, average amounts received, and the percentage of financial aid dollars distributed to different income groups), college factors (selectivity, tuition and fees, total enrollment, remedial services, etc), student factors (percentage of students at the college in different age, race/ethnicity, and gender groups); and social factors, which are characteristics of the state in which the student resides (percentage in different age and race ethnicity categories, the percentage of individuals who own their home, percentage single parents, etc). While my initial intent was to focus primarily on financial aid factors, I found these variables to have a smaller impact on graduation rates than many of the other explanatory variables included in my model.

After identifying the impact that these factors have on college graduation rates, I used my regression model to identify colleges that are doing much better than predicted (and those doing worse) at graduating students in six years, all factors held constant. I studied the top and bottom performing schools in the UC and CSU systems and identified things that the top colleges are doing to increase graduation rates that were not controlled for in my regression model. As I was studying the colleges, I looked at various types of support provided to students including financial support (financial aid) and also social and academic support services. I also looked at the mission and culture of the colleges doing well compared to those doing poorly.

My study did not lead to specific recommendations on additional policy changes that should be made to California's state financial aid programs and services to increase graduation rates. However, I found some differences in the information and resources provided to students regarding financial aid between the best and worst performing colleges. In my concluding chapter, I make recommendations on things that California's public colleges could do to increase graduation rates, both related and unrelated to financial aid. I also provide some general policy recommendations for the state that could be implemented to increase the percentage of students at public colleges in California that earn a bachelor's degree in six years.

_____, Committee Chair
Robert W. Wassmer, Ph.D.

_____
Date

DEDICATION

This thesis is dedicated to the most intelligent woman I know. Mom, thank you for teaching me to always keep an open mind, continuously seek new opportunities to learn, and for instilling in me the value of education. This degree would not have been possible without you.

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Completing this thesis and the MPPA program would not have been possible without the guidance, support, and encouragement I received from many individuals along the way. I want to express my sincerest gratitude to my family, thank you for your constant encouragement throughout my academic career. To my husband who proposed and married me while I was attending this program, thank you for your unending patience and understanding. To my sister in law, Meghan Facciuto, thank you for always being available to answer my questions and calm my endless concerns. Your support and encouragement were helpful beyond words.

To all of the PPA professors, your commitment to students and higher education is inspiring, thank you for all that you do, every day. A special thanks to my thesis advisors Dr. Robert Wassmer and Dr. Su Jin Jez for your advice and assistance, the two of you were instrumental in seeing this thesis through to completion. Finally, to Suzy Byrd, thank you for all that you do to keep us organized and moving forward.

Lastly, to my PPA cohort, I am tremendously grateful to have met so many amazing people in this program; I am proud of our accomplishments and excited to see what the future holds.

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Chapter 1

INTRODUCTION

Higher Education in the United States

The United States higher education system has been labeled the best in the world for over 50 years (Callan, 2008; Hunt, 2000). Higher education is a vital component in enabling Americans to compete in the expanding knowledge-based global economy, for that reason, it is important to look at higher education in the global context and assess how the United States fares in comparison to other countries. Over the last decade, the United States' ranking in comparison to other developed countries throughout the world has been steadily declining in terms of college completion and educational attainment (Callan, 2008). In the past, the National Center for Public Policy and Higher Education produced a report every few years titled *Measuring Up: The National Report Card on Higher Education.* In these reports, they looked at the United States' higher education system focusing on four categories: college preparation, enrollment, completion, and affordability. They compared the performance of our higher education system to past performance, and to higher education systems around the world.

For decades, the United States has focused on providing access to higher education for all Americans. The United States rates of college participation have remained fairly steady, with small improvements. However, compared to other countries, the United States which was once number one in terms of college participation, has lost their lead and has seen their rank steadily decrease over the last 5 years (National Center, 2008). Even worse than the college participation rates in the United States are the rates of completion. In 2008, the United States ranked 15th among 29 countries in terms of college completion rates, which puts them in the bottom half (National Center, 2008). The reasons for this drop in completion rates are heavily debated. Some researchers claim that the percentage of students completing a degree is decreasing because of the

United States policy that everyone should have access to a college education. Encouraging college attendance by all individuals, even those who less academically and financially prepared, results in a smaller percentage of individuals actually completing a degree (Kantrowitz, 2012; Bound et al, 2010). Others argue that the United States policy of open access to college is serving its intended purpose and is actually the primary reason for small improvements in completions in the United States over the last few years (Doyle, 2010).

Research Question and Data

My research question is twofold: What are the various factors that impact bachelor's degree completion rates, and, how can financial aid and other forms of student support be used to improve college completion rates in California? The data I use to conduct my regression analysis comes from the Integrated Postsecondary Education Data System (IPEDS), which is a part of the National Center for Education Statistics (NCES). They collect data on all post-secondary institutions in the United States. Data is collected by surveying institutions regarding: enrollment, tuition costs, financial aid, completion rates, faculty, and other student and institution characteristics. I am using a subset of their data by only including four-year degree granting public institutions. This subset includes 543 institutions. I use regression analysis to assess whether degree completion rates (at public institutions) are impacted by various explanatory variables, with a focus on how they are impacted by financial aid.

In the next section, I discuss recent trends in the United States higher education system and president Obama's goals for the future. Next, I provide information on the different sources and types of financial aid available to public college students in the United States. Because my goal is to use my findings from this study to inform policy recommendations for California specifically, I provide an overview of financial aid policies in California later in this chapter. The Chapter concludes with my thesis agenda which will detail how I plan to use multivariate

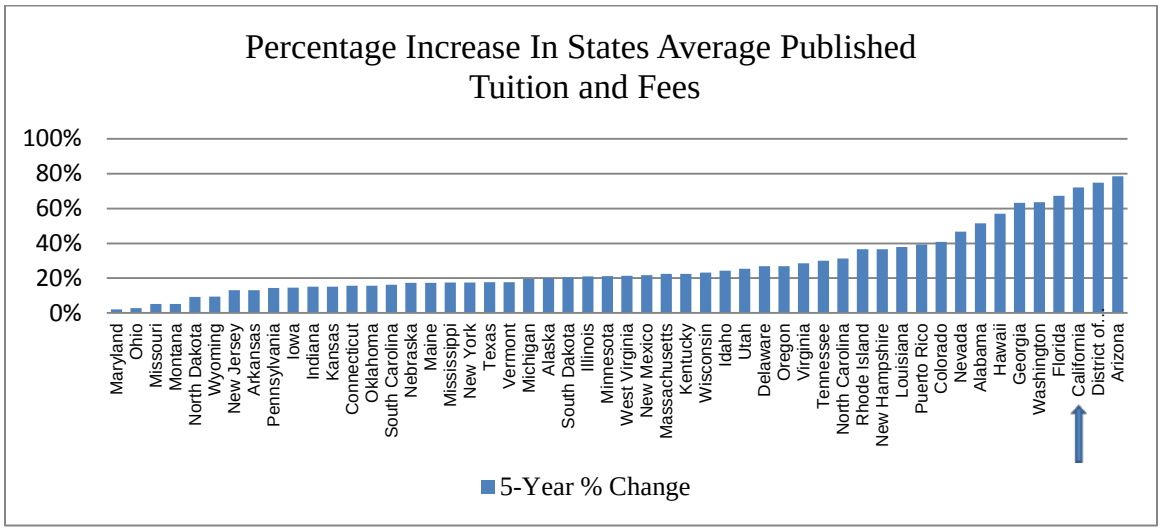
regression, as well as case studies, to assess the impact financial aid on bachelor's degree completion rates and inform financial aid policy recommendations for California.

Higher Education Affordability

One factor that is contributing to the low college graduation rates in the United States is that college is becoming less and less affordable. Over the last 10 years, college tuition costs in the United States have increased by 44% percent, a rate much higher than the increase in the nation's median family incomes, which was approximately 6% over the last 10 years (Tierney, 2006; and US Census Bureau, 2012). Students across the United States are turning to financial aid to bridge the gap between tuition costs and what their families can afford.

In California, the price of tuition and fees at California's public universities has increased significantly (compared to where prices started) over the last few years. In comparison to other states, California's tuition is increasing at a more rapid rate than most. When looking at these numbers, however, it is important to note that California started out with tuition and fees that were much lower than most other states, some would say that they had some catching up to do, and that the fact that they stated with much lower rates the primary reason for their rapid increase.

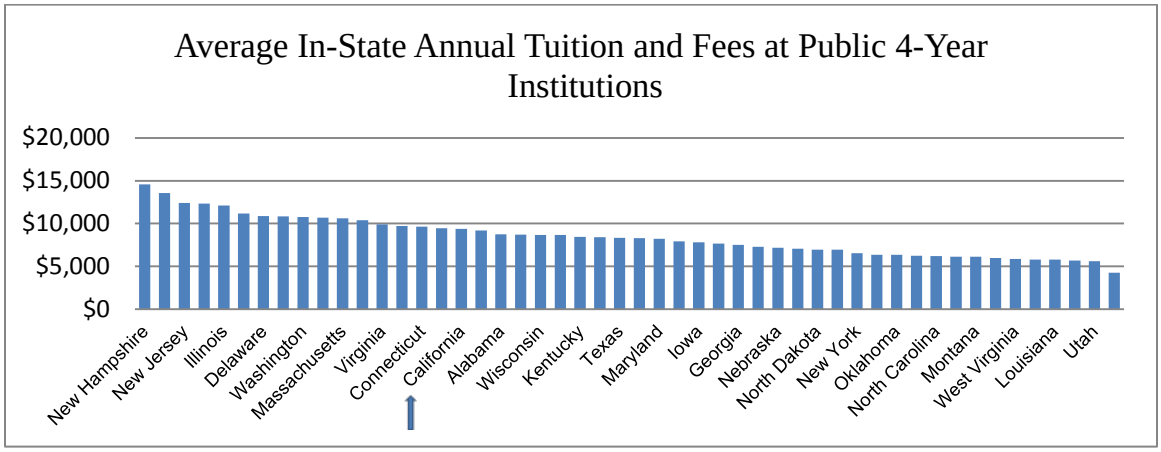
Figure 1



Source: College Board, Annual Survey of Colleges, includes only Public 4-year Colleges

In looking at the actual cost (as opposed to the change in cost) of tuition and fees in California compared to that of other states, California is not still not among the very highest in terms of the cost of tuition and fees at public institutions. California has the 17th highest (out of 50 states) average public institution tuition and fees (College Board, 2012). Tuition and fees for CSU's and UC's are averaged to come up with this figure. The published annual tuition and fees for UC's and CSU's in 2012 were $13,200 and $6,602, respectively (Admission.universityofcalifornia.edu, 2012; CSU.edu, 2012). This ranking is not a major cause for concern; however, it is something that should be watched due to the fact that California's tuition rates are increasing so rapidly.

Figure 2



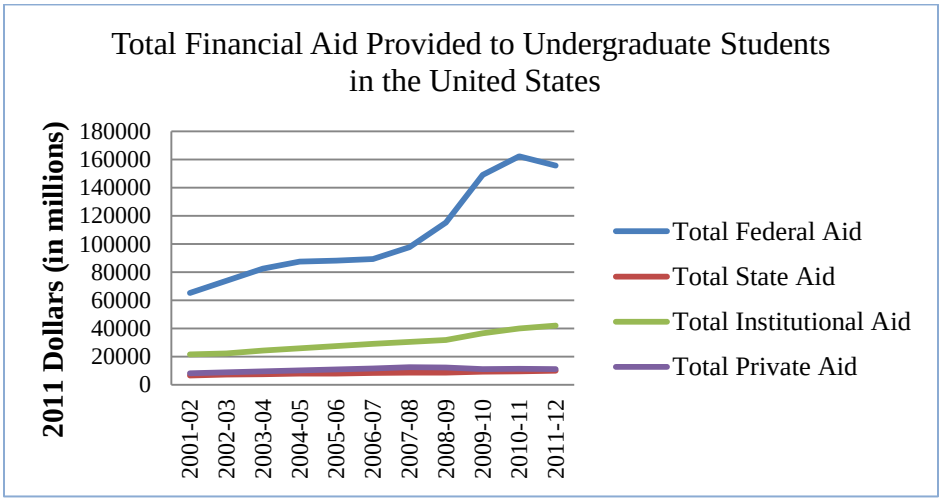
Source: College Board, Annual Survey of Colleges for 2012-13

Sixty-six percent of undergraduates in the United States received some form of financial aid to pay for education related expenses in the 2007-08 academic year (US Dept of Education, 2009). The percentage of students receiving financial aid has been steadily increasing for over a decade (NCES, 2011). Support to students through financial aid has evolved over many years starting with the Higher Education Act of 1965, which established the federal government's first student assistance programs. In the years since the Higher Education Act, several financial aid

programs have been established by the federal and state governments, institutions, as well as private entities. These programs are all different in terms of their eligibility criteria and practices for awarding aid.

The federal government spends billions of dollars per year to provide financial aid to students in the form of grants, scholarships, loans, and work study programs (Kefling, 2012). In the last 10 years, the total amount of federally funded financial aid has increased by 140 percent, a greater increase than other financial aid programs such as those operated by the state, institutions, or privately (College Board, 2012). Financial aid issues have emerged in public policy in recent years as governments and institutions struggle to determine the best way to allocate limited resources across a wide range of financial aid programs. Financial aid policies should work to maximize both equity (in terms of how aid is allocated) and efficiency (in the outcomes achieved), the overall goal is to grant aid that enables students to persist in college and graduate (Heller, 2008).

Figure 3



Source: College Board Trends in Student Aid 2012, Data covers 2001-02 through 2011-12

The goal of financial aid is to make college more affordable for students and families, thus increasing the number of students who are able to attend college, and ultimately graduate with a degree.

California's Master Plan for Education

In 1960, California implemented the Master Plan for Higher Education, which was created to increase the efficiency of California's public higher education system as the baby boomers approached college age. The goal was to make quality higher education available to all people in the state of California regardless of economic means. The Master Plan designated UC's as the states state's primary academic research institution, and the UC's were to provide undergraduate, graduate and professional education. The UC system was given exclusive rights to doctoral degrees in California's public higher education system (with a few exceptions granted later which allowed them to be offered in the CSU system). The Master Plan identified CSU's primary mission as undergraduate education and graduate education through the master's degree including professional and teacher education (Taylor, 2011).

President Obama's Goals for Higher Education

President Obama has identified lagging graduation rates and decreased affordability of higher education in the United States as issues of concern in recent years. In 2010, he specified a goal of increasing the percentage of Americans, ages 25 to 34 that hold an associate degree or a bachelor's degree from 40 percent to 60 percent. This would produce an additional 10 million Americans ages 25 to 34 with an associate or bachelor's degree (White House, 2012). Obama talked about ways to make college more affordable using federal aid distributed to those schools that keep tuition from rising (Kefling, 2012). This method may, however, have unintended consequences as schools have to raise tuition due to funding cuts and then face additional cuts in federal aid forcing them to raise tuition even more. Obama also expressed the need to invest more

federal dollars in financial aid programs that benefit students in need such as Pell Grants. He expressed confidence that using federal aid to make college more affordable would assist the United States in increasing the number of college educated individuals, as fewer students would be forced to drop out for financial reasons.

Obama is focusing on the rates of degree attainment by individuals ages 25 to 34 rather than looking at college graduation rates. The degree attainment rate refers to the percentage of individuals in the population (in this case, ages 25 to 34) who have attained a associate or bachelor's degree. This differs from the graduation rate (that I am using), which measures the percentage of individuals within a cohort who earn a bachelor's degree within a certain amount of time. Another difference between my study and Obama's goals for higher education is that I am looking at bachelor's degree completion rates while Obama is including both associates degrees and bachelor's degrees. While differences exist between my study and President Obama's goals for higher education, the two are closely related, finding ways to use financial aid to effectively improve graduation rates would help to accomplish the President's goal of increasing the number of educated Americans.

What is Financial Aid?

Students attending public universities rely on many different types of financial aid, in this section I provide a brief overview of the different types of financial aid available to public college students in the United States. I am providing an overview of the different types and sources of financial aid because I believe that the impact that each form of aid will have on 6-year graduation rates will be different. Different forms of aid are used for varying purposes, and are awarded based on different eligibility criteria. Some forms of aid are awarded based on financial need, while others are awarded based on academic merit, or other special talents or skills. It is important to understand the differences that exist between the forms of financial aid in order to

understand how each form impacts graduation rates and inform financial aid policy decisions. The next section will describe additional financial aid programs available only in California. This information is important to include since I plan to use my findings from this study to inform policy recommendations for California specifically.

Need-Based Aid vs. Merit-Based Aid

Financial aid in the form of grants is often reserved for students that have demonstrated a "financial need". Grants are moneys provided to students, which do not have to be repaid. Eligibility for need-based grant aid is calculated by subtracting the amount the student and their family can afford to pay (often referred to as their estimated family contribution or EFC) from the annual cost of attendance at the institution they are attending. The difference between these two figures represents the student's financial need. Pell Grants, funded by the federal government, are provided primarily to low income undergraduate students. Under the Pell Grant program students attending participating institutions may receive up to $5,550 per year to pay for qualifying education expenses. Amounts received through the Pell Grant program are not required to be repaid. To qualify for a Pell Grant, a student must first complete the Free Application for Federal Student Aid (FAFSA). The FAFSA is a long form of questions, which must be completed by the student and their parents. The financial information collected on this form is used to determine how much a student (and their family) can afford to pay annually for college. That figure is compared to the cost of tuition and fees at the school the student is attending to determine a student's eligibility for financial aid programs including various grants, work-study, and loan programs.

In addition to the federal government, states also provide financial aid to students. The majority of todays need-based aid programs at the state level began with the establishment of the State Student Incentive Grant (SSIG) program which started in the 1960s. Prior to the creation of

the SSIG, only 16 states had need-based financial aid programs in place. Within the next 20 years, all states in the nation had some form of need-based aid (Heller, 2002).

Merit-Based Scholarships are often provided to students as a reward for high levels of academic performance on the basis of academic merit. Scholarships may also be awarded for athletic, musical, or other special talents, specific areas of study, or as recognition for performing community service. Scholarships can range from low amounts such as fifty dollars to thousands of dollars, which cover the entire costs of attendance. These moneys must be spent on educational expenses and are not required to be repaid.

Student Loans

Students may qualify to take out loans from either the government, or private lending institutions, to pay for the costs of education. Students are required to repay any amounts borrowed, plus interest. Loan repayments are often deferred until after the student graduates or stops attending college for a specified period of time, interest may also be deferred during the time when a student is attending college.

Federal Work-Study Programs

Work study programs are provided by the federal government, these programs provide part time jobs for undergraduate and graduate students, with demonstrated financial need. This allows students to earn money that can be used to pay education expenses. Schools must be a participating institution in the Federal Work-Study Program for their students to qualify.

Tuition Tax Credits

Many students and their parents receive tax credits at the end of the year if they have paid qualifying education expenses. The amount of the tax credit is based on a percentage of the total dollars spent on qualified higher education expenses in a given year. Currently, there are two

tuition tax credit programs offered by the federal government, the American Opportunity Credit, and the Lifetime Learning Tax Credit.

Financial Aid Policies in California

After looking at the impact that financial aid has on graduation rates, my aim is to focus specifically on public colleges in California, identify ways that aid may be used to improve college completion rates, and make policy recommendations on changes that could improve California's financial aid policy.

California has three public higher education systems operating simultaneously: the University of California (UC) System, California State University (CSU) System, and California Community Colleges system. The University of California system and the California State University system both operate four-year public institutions and are, for the most part, independent of one another. The California Community Colleges system is made up of public 2-year colleges that offer associates degrees and certificates, and also allow students to complete their lower division education requirements before transferring to a four-year institution to complete their bachelor's degree.

In their desire to provide access to higher education to all Californians regardless of financial means, California has instituted a multitude of need-based financial aid programs, many of which, also require students to meet minimum levels of academic performance. In the following sections, I provide a brief overview of California's state financial aid programs and policies that impact four-year public institutions.

Cal Grants

The Cal Grant Program is California's largest student financial aid program. Administered by the California Student Aid Commission (CSAC), this program provides financial aid to undergraduates, vocational training students, and participants in teacher

certification programs, in California. In order to receive a Cal Grant, students must meet minimum GPA requirements and demonstrate financial need (CSAC, 2012). Financial need is calculated based financial information submitted on the FAFSA. Cal Grants do not have to be repaid. There are five different categories of Cal Grants for which students may qualify: Cal Grant A, Cal Grant B, Cal Grant C, Cal Grant A Competitive Award, and Cal Grant B Competitive Award. The requirements and allowable uses for each of these awards are slightly different and are displayed in the following table. Students may receive only one Cal Grant at a time (CSAC, 2012).

Table 1. Summary of Cal Grant Requirements

Type of Cal Grant	Description and Allowable Uses
Cal Grant A	Cal Grant A Entitlement awards can be used for tuition and fees at public and private colleges as well as some private career colleges. At CSU and UC schools, this Cal Grant covers system wide fees up to $5,970 and $12,192 respectively. If you are attending a private college, it pays up to $9,223 toward tuition and fees. To get this Cal Grant, you need to be working toward a two-year or four-year degree.
Cal Grant B	Cal Grant B Entitlement awards provide low-income students with a living allowance and assistance with tuition and fees. Most first-year students receive an allowance of up to $1,473 for books and living expenses. After the freshman year, Cal Grant B also helps pay tuition and fees in the same amount as a Cal Grant A. For a Cal Grant B, your coursework must be for at least one academic year.
Cal Grant C	Cal Grant C awards help pay for tuition and training costs at occupational or career technical schools. This $547 award is for books, tools and equipment. You may also receive up to an additional $2,462 for tuition at a school other than a California Community College. To qualify, you must enroll in a vocational program that is at least four months long at a California Community College, private college, or a career technical school. Funding is available for up to two years, depending on the length of your program.
Cal Grant A and B Competitive Awards	Cal Grant A and B Competitive Awards are for students who aren't eligible for the Entitlement awards. The main difference is that these awards are not guaranteed.
Cal Grant A Competitive Awards	Cal Grant A Competitive Awards are for students with a minimum 3.0 GPA who are from low-and middle-income families. These awards help pay tuition and fees at qualifying schools with academic programs that are at least two years in length.

Cal Grant B Competitive Awards	Cal Grant B Competitive Awards are for students with a minimum 2.0 GPA who are from disadvantaged and low-income families. These awards can be used for tuition, fees and access costs at qualifying schools whose programs are at least one year in length. If you get a Cal Grant B Competitive Award it can only be used for access costs in the first year. These costs include living expenses, transportation, supplies and books. Beginning with the second year, you can use your Cal Grant B Competitive Award to help pay tuition and fees at public or private four-year colleges or other qualifying schools.

Source: http://www.calgrants.org

The Dream Act

The California DREAM (Development, Relief, and Education for Alien Minors) Act, passed in 2011, allows children who were brought into the United States under the age of 16 without proper immigration documentation to apply for financial aid in California as long as they meet certain requirements. including the following: (1) high school attendance in California for three or more years; (2) graduation from a California high school or attainment of the equivalent thereof.; (3) registration as an entering student at, or current enrollment at, an accredited institution of higher education in California not earlier than the fall semester or quarter of the 2001-02 academic year; and (4) in the case of a person without lawful immigration status, the filing of an affidavit with the institution of higher education stating that the student has filed an application to legalize his or her immigration status, or will file an application as soon as he or she is eligible to do so (CSAC, 2012). In addition to these requirements, students must show financial need (as determined by the FAFSA) and meet any academic performance standards required by a program as a condition of receiving aid.

Governors Scholarships

California Governors Scholarships are awarded to public high school students who demonstrate high academic achievement on the Statewide Standardized Testing and Reporting (STAR) tests. Students in 9th 10th, and 11th grades who score in the top percentage of test takers receive a $1000 scholarship. The number of scholarships issued each year depends on the state

budget. Once the budget is determined, the state calculates how many $1000 scholarships may be funded, and awards these to the top scoring students. These scholarships are not being offered currently due to budget cuts, however, it is anticipated, that the program may be reinstated in the future.

Assumption Program of Loans for Education (APLE)

California's Assumption Program of Loans for Education (APLE) provides student loan forgiveness for teachers who teach in California for up to four years. Teachers may receive up to $11,000 for teaching in areas of California where there is a critical shortage of teachers (CSAC, 2008). Certain fields have been identified as having a critical shortage of teachers in California, these fields include Mathematics, Science, Foreign Language, Special Education, Agriculture, and Business. Additionally, the following types of schools are also classified as having a critical shortage of teachers: Schools serving a large population of students from low-income families, Schools having a high percentage of teachers holding emergency permits, Schools serving rural areas, and State Special Schools (APLE, 2012). Teaching Math, Science, or Special Education; or teaching at a designated low-performing school (identified as being in the lowest 20 percent on the Academic Performance Index) qualifies individuals for greater loan assumption benefits of up to $19,000. The Federal government also offers a loan forgiveness program for teachers (APLE, 2012).

Thesis Agenda

In the remaining chapters of this thesis I attempt to do two things, I will first conduct a quantitative study of the 500-plus public four-year universities in the United States to investigate how six-year bachelor's degree completion rates at these institutions are impacted by various student, school, and social factors; with a special emphasis on the impact of financial aid factors. Using multivariate regression analysis, I will identify colleges in California that are doing the best

and those that are doing the worst (in comparison to their predicted graduation rates) at graduating students within six years. After identifying the top and bottom performing colleges in the UC and CSU systems, I will conduct case studies of these schools to identify things they are doing (factors not included in my regression model) that could be working to increase or decrease their six-year graduation rates. Through my case studies, I hope to identify some lessons and best practices from the schools doing well that can be replicated by other four-year public colleges in California to use limited resources to graduate students more efficiently. My aim is to make recommendations on things that public colleges could do to increase their six-year college graduation rates.

Chapter Two will provide an overview of the relevant literature related to college completion rates in the United States, and the relationship to financial aid, as well as other school, social, and student factors. This chapter will also summarize some of the research looking at the impact of financial aid on other dimensions of education such as enrollment, persistence, and dropout rates. Chapter Three will include my regression methodology, regression model, and the results of my regression analysis. Chapter Four will provide an overview of my case studies, conducted on the two UC colleges and two CSU colleges identified in my regression model as outliers that are doing much better than expected. I will describe how the case studies were completed and summarize my findings and conclusions. In chapter Five, I will provide an overall summary of my findings from both the regression model and the case studies, I will provide recommendations, identify the limitations of my study and opportunities for further research.

Chapter 2

LITERATURE REVIEW

Scholars all over the world have completed studies regarding college graduation rates and the factors that influence them. Theories are developed, tested, and revised as new studies are published and new ideas come to light. I reviewed several published studies, in an effort to get an idea of the completed research and areas that are lacking. In my research, I identified numerous factors that have been found to impact bachelor's degree completion rates. I categorized these into broad causal factors to better examine their impacts. These broad factors include: social factors, student factors, school factors, and financial aid factors. In this section, I will summarize some of the literature on each of these factors, and the impact each has been found to have on college graduation rates.

The graduation rate refers to the percentage of students in one entering class that completed a bachelor's degree within a certain number of years. Many of the studies I reviewed use 6-year graduation rates, which is the same measure I will use to complete my study. I did, however, review some studies that used 4-year college graduation rates; these studies are identified in the discussion and also in the literature review table included in Appendix A. Graduation rates are calculated each year, the 6-year graduation rate for 2009-10 is based on the cohort of full time students that entered in 2003. The rate is calculated as the total number of completers (in the cohort) divided by the total number of students in the cohort. Most of the studies

The success of post-secondary education systems can be measured or tracked using various outcomes, such as enrollment, time to degree completion, student persistence, dropout rates, or a number of other techniques used to assess or measure the system. For the purposes of this thesis, I focused on studies that look specifically at graduation rates, as it made it easier to

compare the results of the studies with one another. I did however, summarize some of the findings on the impact that financial aid has on other educational measures.

In reviewing the literature, I identified the key explanatory variable(s) being examined in each study, and organized the studies into the four broad causal factors that influence a university's graduation rate: social factors, student factors, school factors, and financial aid factors. This allowed me to review similar studies together and look for trends, differences, and gaps in the research. Appendix A includes a table that summarizes the research methods, specific findings, and main conclusions of the regression articles I reviewed.

Social Factors' Impact on Graduation Rates

Social factors can be described as characteristics of the environment in which the student grew up. Included in these are: parent's occupational status and income, parent's educational attainment, whether the student was raised in a single parent household, the average income in the neighborhood they grew up in, etc. Social factors and student factors can overlap, and are often studied together. I classified each study into one of the two categories; however, some could fit into both as they look at characteristics of the student and their environment which both likely impact a student's likelihood of graduating from college.

In my own study, I will look at these factors and also at characteristics of the state in which the student grew up. These characteristics will include the median income in the state, the percentage of individuals living in poverty, the average household size, the percentage of homeowners, and the percentage of individuals in the state who fall into different age and race categories.

Looking outside the United States

Carpenter, Hayden, and Long (1998) looked at social factors, and the impact they pose on college completion rates in Australia. The authors conducted a multiple regression analysis,

looking at the impact of gender, parent's occupational status, parent's educational attainment and family wealth, on 4-year college completion rates. While this study found three of the explanatory variables (parent's occupational status, parent's educational attainment, and family wealth) are associated with higher rates of college completion, these variables are likely all interrelated, and not independent of one another. Parent's educational attainment could likely lead to higher occupational status, and higher family wealth. Using this study to inform research done in the United States has limitations, as education policy in Australia is different from that of the United States. However, it is important to look at higher education in other countries, and assess how they compare to the United States. Another difference between this study and the study I plan to undertake is that Carpenter et al. (1998) used 4-year graduation rates as their dependent variable. I plan to use 6-year graduation rates; most researchers claim that earning a bachelor's degree in the United States now takes longer than the traditionally recognized four-year degree (Knight, 2004; and Long, 2008).

Student's Socioeconomic Status

A student's socioeconomic status or background has been found to impact, not only graduation rates, but also student persistence. Chen (2011) studies state level financial aid policies and also looked at whether differences in student persistence exist depending on students' socioeconomic background. The findings from the study were that even after controlling for all other factors at individual, institutional, and state levels, substantial gaps exist in persistence rates at first-institutions by socioeconomic status. Specifically, students from families with high socioeconomic status were found to have 55% higher chances of enrolling the following year, than their low socioeconomic status peers.

Income

One factor found to impact graduation rates is the income level of students and their families. This is expected, given the financial resources required to attend college. When students complete the Free Application for Federal Student Aid (FAFSA) they are asked for information on their own income and also that of their parents, unless they meet certain requirements to be considered financially independent. The total income (of the student and their parents) is used to determine the amount of aid for which they qualify. Data on students own income and that of their parents is not collected and reported separately, therefore, studies usually consider students income to be that of the student plus their parents.

One interesting finding is students in different income levels respond differently to the various forms of financial aid. Paulsen & St. John (2002) and St. John & Starkey (1995) looked at how students from different income groups respond to different types of financial aid in their within-year persistence decisions. They found low-income students to be more responsive to financial aid in the form of grants, whereas middle-income students are more influenced by loans and work-study aid programs. Students in the highest income groups are found to be significantly less responsive to all forms of financial aid in terms of student persistence and bachelor's degree completion rates (Paulsen & St. John, 2002).

Parents Educational Attainment

Parent's level of education has been found to impact individuals' probability of enrolling in college and graduating (Choy, 1999). Parents and peers have also been found to influence student enrollment decisions, as well as persistence (Perna and Titus, 2005). Researchers claim that students perform better and are more likely to succeed when their families affirm their students' choices and encourage them to stay the course; this is especially important for underserved populations (Perna, 2005,; Bound and Turner, 2010). Thus, one could make the point

that parental involvement and support can help offset negative impacts of a disadvantaged background to some degree (Chrispeels and Rivero 2001).

Approximately one in three college students come from families where neither parent had any postsecondary education (National Survey of Student Engagement (NSSE) 2009). These students are referred to as first-generation college students. First-generation students are more likely (than students who are not first generation) to be female, to be older, to have lower incomes, to be married, and to have dependents (Nuñez and Cuccaro-Alamin 1998). First-generation students are also more likely to be Latino than any other ethnicity. More than 40 percent of Latino students have parents whose highest level of education is less than high school, compared to only 18 percent of Whites (Swail et al. 2005).

First generation college students are found to have lower rates of college enrollment and graduation. Choy, (1999) looked at enrollment and completion rates of students who graduated high school in 1996. He found that enrollment rates in postsecondary education for students with parents who had less than a high school education were around 45 percent while students with parents with a bachelor's degree or higher had college enrollment rates of about 80 percent (Choy, 1999).

The Interactionalist Theory

A student's background characteristics and precollege experiences can have a large impact on his success in post-secondary education. Tinto's (1987) interactionalist theory is the dominant sociological theory related to a student's success in college. Tinto hypothesizes that students first must separate from their "home group" (family members and high school peers), go through a period of transition (when they learn to interact in new ways), and then adapt to the normal behaviors of the new group, or college. Students, who are not able to do this successfully, ultimately end up leaving college without completing a degree.

Summary of Social Factors Influence on Graduation Rates

Social factors can influence a person from a very young age, in order for a student to be successful in college, preparation must start early. Parental expectations and family support have a huge impact on college attendance and graduation (Buchman and DiPrete). Often times, students who come from similar socioeconomic backgrounds (in terms of parent's level of education, income, academic preparation, family support, and other characteristics) will exhibit similar patterns of college enrollment and graduation. The same is true when considering students and their parents' level of income. It is important to consider social factors as early as possible to help to lessen the possibility that these factors will impede a student's ability to be successful in college.

Student Factors' Impact on Graduation Rates

Student factors include characteristics of the student such as race, age, and gender. Factors such as income and parents educational attainment are sometimes considered to be student factors, however; I categorized those factors as social characteristics. The similarities between the two categories, student characteristics and social characteristics, make it slightly difficult to separate the two.

Impact of Race and Ethnicity

There have been found to be large differences between Whites and Blacks, and Whites and Latinos, in terms of being college ready (Braswell et al., 2001). Additionally, many studies have shown that a difference exists by race in college attendance and college completion (Tinto, 1987; Bowen & Bok, 1998). Light and Strayer (2002) completed a study using regression analysis to look at the impact of race/ethnicity on college attendance and completion rates. They found that when looking at only race, minorities are less likely than whites to attend college, and that they are even more unlikely to attend high quality colleges. However, after considering other

factors which impact college attendance and graduation (i.e. family income, test scores, per capita income, mothers' level of education, unemployment rate, tuition costs, and financial aid), minorities are about 5% more likely than whites to attend college. While minorities were found to be more likely to attend college when considering all factors, their likelihood of graduation was found to be less than whites. When assessing graduation rates, the authors found that graduation probabilities are higher for whites than they are for minorities (23% vs. 14% respectively for the lowest quartile, and 50.9% vs. 45.6% respectively for the highest quartile). They hypothesized that affirmative action in the admissions process leads to a greater number of blacks enrolling in college but that these efforts do not ensure that blacks graduate at the same rate as whites (Light and Strayer, 2002).

Graduation Rate of Males vs. Females

Buchmann and DiPrete (2006) completed a study which looked at the graduation rates of men and women separately across the United States. Their reasoning for looking at the graduation rates individually was that for many years, men had higher rates of college graduation rates than women, yet, in recent years, women have closed the gap, and actually passed men in terms of college graduation rates, calculated in terms of the percentage of bachelor's degrees awarded to women compared to the percentage awarded to men. The authors' regression analysis considers various social factors, which could have led to the change in proportion of females to males graduating from college. Buchmann and DiPrete (2006) found that the female lead in college completion is largest in families with low educated or absent fathers, but that this lead is present in all family types. They also found that women have experienced increasing incentives to attain a college degree, such as more equal employment and wage opportunities, which also contributes to their advantage in college completion rates as compared to men. One interesting finding was that females do not have higher rates of college enrollment overall (in 2-year and 4-year colleges

combined); however, they do have higher rates of enrollment in 2-year colleges than their male counterparts.

Mortensen (2003) investigated college attendance and completion rates and found similar results. His explanation for the shift was that women now outperform men on some major determinants college success which include high school grades and test scores. Additionally, Mortensen (2003) concluded that changing societal attitudes towards the role of women in the workplace also contributes to the larger number of women attending and completing college.

Academic Preparedness

Student's academic ability and level of academic preparedness upon entering college is a strong predictor of their likelihood to succeed in college courses. About 87 percent of students who complete four years of math, science, and English in high school stay on track to graduate from college compared with a 62 percent persistence rate among those who do not complete comparable coursework (Adelman 1999; Warburton, et al. 2001). While it is important for all students to complete these types of classes prior to enrollment in college, opportunities to do so are not equally distributed. For example, Hispanic students, and low-income students, are less likely to attend a school that even offers courses such as trigonometry and calculus. As a result, course-taking patterns for low income and Hispanic students are more likely to be in lower level math and English courses (Adelman, 1999). Hoffman, Llagas, and Snyder (2003) reported a similar pattern for black students; their study found that black students are more likely to attend public high schools with a high percentage of students from disadvantaged backgrounds. They are less likely than White students to take advanced mathematics and science courses, and are less likely than White or Hispanic students to participate in advanced placement exams. Graduating high school unprepared, these students already are at a huge disadvantage in comparison to their peers.

Importance of Considering all Variables

One of the earlier studies done by Thomas (1981), looked at the impact of student characteristics including: race, ability to pay, standardized test scores, high school rank, and grade performance, on 4-year college graduation rates. Thomas (1981) also considered two institution characteristics: college selectivity, and the sector of the institution. His findings indicate that some of his independent variables have a larger impact on student graduation rates than do others. However, the most interesting finding is that all the independent variables he considered only accounted for 32 percent of the variance in the dependent variable, signaling that there are independent variables not considered in the regression analysis that are responsible for a large percentage of the variance in the dependent variable college graduation rates. The outcome of this study shows the importance of including all variables that could influence a dependent variable, in order to get an accurate result from the regression analysis.

Summary of Student Factors Impact on Graduation Rates

Students come from many different backgrounds and have had varying life experiences by the time they reach college age. Research has found that certain background characteristics increase a student's chances of being successful in college. The impact of race has been studies extensively and has found certain races (primarily Whites and Asians) to have better chances of college success than students of other races; however, there are differing theories as to why this variation exists (Tinto, 1987; Bowen & Bok, 1998). Other student factors which have been found to impact college graduation rates include age, gender, academic preparedness, enrollment patterns, and many more. Researchers continue to analyze the ways that student factors influence college graduation rates.

College Factors Impact on Graduation Rates

College factors include characteristics of an institution such as: sector (public vs. private institutions), institutional selectivity, location (state and degree of urbanization), cost of tuition, enrollment, and faculty characteristics. Colleges and universities have a role in encouraging and increasing student success; however, these institutions are limited in what they can do. Bean's (1983) student attrition model, theorizes that experiences in an institution, impacts a student's beliefs and attitudes about the institution, which ultimately determine a student's sense of belonging or "fit" with the institution. In this section, I will look at studies on characteristics of a college that have been shown to impact graduation rates: sector and institutional selectivity.

Institutional Selectivity

Alon and Tienda (2005) completed a study looking at institutional selectivity, and the impact that selectivity has on 6-year college graduation rates, looking at the differences among races. The authors evaluated the "mismatch hypothesis": a theory, which says that affirmative action hurts everyone, because it lowers chances of admissions for "better white" students, and sets up minority students for failure when admitting them to selective universities. The mismatch hypothesis predicts lower graduation rates for minority students who attend selective post-secondary institutions, than for those who attend colleges and universities where their academic credentials are better matched to the institutional average. Alon and Tienda's findings do not support the mismatch hypothesis. The authors found that graduation rates are higher at selective institutions for all races (both white and minority students). They also found that graduation rates of black and Hispanic students have increased since 1988, at both selective and non-selective colleges. These findings indicate that, contrary to the theories that have been established arguing that affirmative action hurts all students, affirmative action, according to this study, is serving its intended purpose.

Student Faculty Interaction

Many studies (Kuh, 2003; Terenzini, 1980; Tinto 1993) have looked at the impact of student faculty interaction such as talking with instructors outside of class, and serving on committees with faculty, on student success. These studies found student faculty interaction to have a positive relationship with student success in terms of persistence and graduation. (Kuh, 2003; Terenzini, 1980). However, debate exists on whether the relationship is causal. Some say that students who have higher levels of persistence and a higher probability of graduating (because of other observed characteristics) are more likely than others to seek out faculty interaction, others say that it is the faculty interaction that leads to higher levels of student persistence. Kuh and Hu (2001) claim that the effects of student faculty interaction on student outcomes vary between different groups of students. According to their study, students who are better academically prepared for college and those who devote more effort to their studies interact more frequently with faculty. They offered two possible explanations for this; either the better prepared students were more assertive in seeking out faculty interaction, or, faculty offered cues to the better prepared students, such as comments on papers, that induced them to seek interaction (Kuh and Hu, 2001).

Support Programs for Entering Students

Some institutions offer support programs for first year students to help them in transitioning to college (Kuh et al. 2005b). There are many different types of support programs including: orientation, transition courses, first-year seminars, mentoring, and peer tutoring. Researchers have found that simply offering these programs does not guarantee that they will increase student persistence and graduation rates. Kuh (2005) claims that support programs must be carefully designed based on the needs of most at risk populations to maximize the program's success.

Forest (1985) looked at the impact of support programs on graduation rates, controlling for student factors such as academic ability, race and income. He found that institutions that provided the most extensive orientation and advising programs had higher graduation rates, holding other factors constant. Other studies looking at orientation programs for first year students show similar results (Dunphy, 1987; Fidler and Hunter 1989). Contrary to these findings, Pascarella and Terenzini, (2005) looked at the impact of orientation programs on student persistence and argue that after controlling for factors such as students' educational aspirations, academic preparation, and socioeconomic status; participation in orientation may only have a small, not statistically significant effect on student persistence.

Students who Attend Multiple Institutions

Jones, Radcliffe, Huesman, Kellogg (2009) did a study on degree attainment, but rather than using institutional graduation rates, they actually tracked the individual students who transferred, and graduated from a different institution than where they started. They stated that these transfer students are usually counted as an unsuccessful outcome, when in reality; they are just transferring and obtaining a degree at another institution. The authors found that the Binary Logit Model ignored all students who transferred out of their original institution and obtained a degree somewhere else, and therefore, produced results that could be misinterpreted. Using the Multinomial Logit Model, the authors found higher graduation rates among students who were admitted to their first choice colleges, and those who lived on campus during their first term, while these factors are not likely to be causal in influencing college graduation rates, the correlation between them should be considered in looking at college factors.

Summary of College Factors Impact on Graduation Rates

As graduation rates vary largely from college to college, attention has been to focus on what colleges can do to better their student's graduation rates. College conditions which have

been found to have a positive impact on student success include: assessment and timely feedback, peer support, integration of prior learning and experience, and active collaboration between students and faculty (Bailey and Alfonso 2005). Ultimately, institutions need to find a way to get students engaged, to minimize their chances of transferring to another college, or dropping out of college altogether. Students who are engaged are likely to feel as though they "fit in", which will maximize their chances of a timely graduation.

Financial Aid Factors Impact on Graduation Rates

In reviewing studies on the impact of financial aid on graduation rates, I found some studies that focused on the type of aid: grants, loans, work study, etc., while other researchers have looked at how aid is distributed: based on financial need or academic merit. In my own dataset, I included multiple financial aid factors in an attempt to differentiate the impacts of different forms of financial aid. I looked at the source, type of aid received, and the average amount of aid received by students. I also included data on the income level of students receiving aid and the percentage of financial aid recipients at a college that are in the different income levels.

Grant Aid Versus Student Loans

Leslie and Brinkman (1987) conducted one of the first comprehensive studies, which looked at the impact of financial aid and college attendance. They tried to determine what proportion of students would not attend college, if financial grant aid did not exist. The authors found that, without government provided grant aid, enrollment of low-income students would decrease by 20 to 40 percent. They found that the absence of financial aid would cause a much smaller decrease in the enrollment of middle-income students (7 to 20 percent) (Leslie and Brinkman, 1987). The one drawback of the Leslie and Brinkman study is that, it is based on cross sectional data across states, and does not distinguish between states, or control for other factors

that may exist in that particular state (Long, 2008). However, many studies were conducted following the release of Leslie and Brinkman's report, and similarly found that the absence of government provided grant aid would result in lower college enrollment and graduation rates, and that these decreases would be most apparent among low-income students (Heller, 1997; Rouse, 1994).

While the funding for federal and state grants has declined due to budget issues, student loans have grown, becoming the most widespread form of student funding for post-secondary education in the last 15 years (Long, 2008). Studies conducted on the impact of student loans of graduation rates have produced mixed findings (Long, 2008; Singell, 2006). However, Savoca (1991) completed a study on whether the shift from grants towards loans adversely affects college enrollments, and found that when loans replace grants, dollar-for-dollar as the form of available aid, a student's probability of attending college decreases. Savacova hypothesized that the reason for this decrease in the probability of attending college is that students perceive loans as a somewhat risky and inferior form of financial aid, since it must be repaid. She also stated that low income and minority students are even less likely to take out student loans than those from more affluent backgrounds because loans represent a claim on future earnings that are uncertain. If a student does not have a family with the resources to assist with repayment, loans can feel like a larger risk.

Need-Based Versus Merit-Based Financial Aid

Singell and Stater (2006) used regression analysis to evaluate the impact of need-based and merit-based financial aid on college graduation rates. Their findings indicate that both need-based and merit-based financial aid work to increase college graduation rates; however, they work in different ways. Need-based aid allows students to select a college that is the best match for them, as opposed to the college with the lowest cost, thus improving their chance of

graduating, by making them feel they “fit in”. Merit aid works by attracting good students to the college that will provide the highest amount of aid. These students already have a better chance of success than their lower performing peers, and the aid works to attract them. Singell and Stater’s (2006) sample included students from three institutions, which were all similar in that they were large public universities. This study would need to be conducted on a larger scale, using a more representative sample, for the results to be considered representative of college students in the US.

Doyle (2010) conducted a study to look at whether merit-based financial aid programs “crowd out” need-based programs. His reasoning in undertaking the study was that in recent years, states have been faced with massive shortages in resources, forcing them to cut funding to programs such as financial aid. As these cuts are made, states must choose where to use their limited resources. Doyle (2010) hypothesized that many states, wanting to use their funds efficiently, were putting dollars toward merit-based programs of financial aid, resulting in less money available for need-based financial aid, thus merit-based programs were essentially “crowding-out” need-based financial aid programs. Doyle used data from NCES which covered the period from 1984 through 2005. Contrary to his hypothesis, Doyle did not find a statistically significant relationship between changes in state need-based aid and changes in state merit-based aid, meaning that the two forms of aid were not impacting one another and were dependent on other factors. His conclusions were that states can offer both need-based aid and merit-based aid programs simultaneously and should focus on designing each program to maximize enrollment among those who could benefit from higher education.

While Doyle (2010) concluded that need-based and merit-based financial aid do not work to “crowd out” one another, he did identify trade-offs between the two forms of financial aid. Need-based programs promote equity. Despite the theoretical advantages in terms putting the

dollars where they are needed most, low-income individuals who receive the aid are still not graduating from college at comparable rates to their more affluent counterparts. Need-based programs have begun to suffer from a lack of political popularity as they have not shown to result in degrees (Doyle, 2010). Merit-based programs have become more popular in the political realm, but still face criticism for advancing inequity among students in terms of financial resources available to pay for college (Doyle, 2010). Additionally, many researchers claim that the students who benefit from merit-based aid programs would attend and graduate from college anyway and therefore these dollars are not being spent efficiently (Dolye, 2010 and Alon, 2011).

Summary of Financial Aid Factors Impact on Graduation Rates

The number of students attending college with unmet financial need has increased dramatically over the last 15 years; this is no surprise given the huge increases in the price of attending college (Doyle, 2010). Studies examining the ways different types of financial aid influence graduation rates have found that financial aid plays varying roles in promoting student success depending on the type of aid.

I found that a large amount of research has been done on financial aid, with mixed results. While it is generally agreed upon that financial aid can influence students' decisions to attend college, it is not as clear whether financial aid leads to actual degrees being earned. As a result, much debate remains on the most effective types of financial aid programs and policies. More specifically, there is discussion around which forms of aid are the most cost effective, equitable, and will lead to the most college degrees. Further research is needed to look specifically at the impact of various forms of financial aid on student graduation rates.

Impact of Financial Aid on other Education Measures

Financial Aid Impact on Enrollment

Studies focusing on the impact of financial aid on enrollment have found positive relationships between financial aid and enrollment (Dynarski, 2003; Neilsen, 2012). These studies are often completed using quasi-experiments such as changes in existing aid programs. Dynarski, (2002) reviewed previous studies done in the United States and found about a 4 percent increase in enrollment rates for a $1000 increase in student aid. Earlier estimates claimed that an increase in financial aid of $1000 would raise enrollment rates by 5-7 percent (Leslie and Brinkman, 1987). The shortcoming of these studies is that they focus on college enrollment only, and even state that many of these students will complete only a few years and will not graduate (Dynarski, 2003). Studies that look at college enrollment should also look at persistence or completion to get a more complete picture of the educational outcomes driven by financial aid.

Financial Aid Impact on Persistence

Many studies have looked at the ways in which financial aid impacts student persistence. Alon (2011) looked at the relationship between financial aid and student persistence in college. Student persistence is identified when a student enrolls for classes the following year after aid is received. (Alon, 2011; Chen, 2011) He found a statistically significant positive relationship between financial aid and student persistence, meaning that students who received financial aid had higher levels of persistence. Furthermore, Alon found that that financial aid had varying impacts on student persistence depending on their income or family income. Students in the lower income levels (bottom half) were highly sensitive to financial aid amounts; their chances of enrolling in college the following year increased greatly with an increase in financial aid. Students in the higher income levels were not as impacted by the amount of financial aid received, in terms of their level of persistence. The author's position was that higher income

students would continue to enroll, regardless of whether they received financial aid (Alon, 2011). Additionally, Alon theorized from his results that if some financial aid funds granted to affluent students were diverted to low- income students, the gap in first-year persistence could be decreased significantly or even closed.

Financial aid Impact on Drop-Out Rates

Looking at a student's risk of dropping out of college, or all students' drop-out rate, is other way to measure or track educational outcomes. Student drop-out rates measure the percentage of students within a cohort that drop-out or stop attending college within a certain period of time. Financial aid is a factor found to influence student drop-out rates. Arendt (2008) completed a study using data from the Local Institute of Government Studies in Denmark. He studied figures from before and after a grant reform, which increased government funded financial aid, and studied changes in the data to determine if student drop-out rates were affected by the reform. The overall findings from the study were that the financial aid grant reform decreased drop-out rates overall, but did not impact completion rates. Arendt (2008) hypothesized the change in drop-out rates but not completion rates occurred because students were able to reduce their number of work hours as a result of the increased amount of financial aid. This reduction in hours worked decreased students chances of dropping out, however the lower hours of work did not increase their chances of graduating.

Chen (2010) also looked at the impact of financial aid on student drop out risks, focusing on differences among ethnic and racial groups. One important finding from this study is that financial aid has varying effects on student dropout risks across racial groups. Among students not receiving need-based financial aid, minority students were found to have higher risks of dropping out than white students. However when need-based grant aid is received, larger amounts of aid equate to lower drop out risks in minority students (especially Asians), while the drop-out

rates of their white counterparts is not impacted much by the amount of aid received. One of the author's conclusions is that improved access to financial aid could narrow the gaps in college enrollment between whites and minorities. He stated that colleges should make it a priority to provide accurate information regarding student financial aid programs to minority students both before and after they enroll (Chen, 2010).

The Politics of Public Tuition and State Financial Aid

Doyle (2012) completed a two stage regression to measure the extent to which state policy makers preferences affect levels of tuition and financial aid in the state. Variation exists across states in terms of both the average tuition at public universities, and also in state funded financial aid programs. Doyle (2012) argued that that the process of setting tuition and financial aid at the state level is inherently a political process. He focused on three dependent variables: (1) state tax appropriations for higher education in the state, on a per student basis; (2) tuition and required fees at public four year colleges and universities for all states; and (3) total amount of state student financial aid on a per-student basis. In the end, Doyle found substantial evidence that the ideological positions of state policy makers do affect tuition levels at public state universities. He also found that private institutions play an important role in the political process for setting both tuition and financial aid. Additionally, Doyle (2012) concluded that tuition levels are not set according to traditional models of pricing. This study highlighted the differences that exist across state lines in terms of tuition and financial aid policies. To control for these differences, I will also include state dummy variables in my dataset. While I am using data from all states to perform my regression analysis, my aim is to focus my case studies on California institutions and use my findings make recommendations to improve California's financial aid policies.

Closing Thoughts

In studying previous empirical literature on college graduation rates, I was made aware of additional explanatory variables that I had not included in my data set beforehand. For instance the percentage of students living in a single parent household has been found to have a profound impact on college graduation rates. I was able to obtain data on this measure and add it to my data. Additionally, the percentage of students admitted to an institution is a good measure of institutional selectivity and should be considered when examining college graduation rates; this is another variable that I added into my data set as a result of the literature that already exists. I learned from the literature that there are numerous explanatory variables that influence college graduation rates. As a result, I will start with a very large number of explanatory variables and then eliminate those that I find to be redundant; I feel this is the best approach to minimize my chances of having omitted variables that could cause my results to be biased.

While there are numerous studies with a focus on college graduation rates, I did not find many studies that consider school, student, social, and financial aid factors simultaneously. These factors have all been found to impact graduation rates, yet, they are often considered independently of one other. While some of these variables may be correlated, a regression study including all these factors would potentially provide the most accurate outcome possible from my regression analysis.

One of the major difficulties with analyzing the impact that financial aid has on bachelor's degree completion rates is that financial aid, specifically need-based financial aid is an endogenous variable. Eligibility for need-based financial aid is correlated with the same observed and unobserved family and personal characteristics that influence enrollment in, and graduation from college. For example, students who qualify for need-based financial aid must demonstrate a financial need. These same students (low income) historically have lower rates of college

attendance and even lower rates of completion (Alon, 2009; Haveman and Wilson, 2007). To correct for this I have included measures of the percentage of students receiving various forms of financial aid, along with the percentage of these students that fall into different income groups, and the percentage of total financial aid dollars that are distributed to the different income groups. My hope is that by including all three variables, I will be able to isolate the true impact that financial aid has on bachelor's degree completion rates.

Chapter 3

REGRESSION METHODOLOGY AND RESULTS

In this chapter, I explain the statistical model and data set I used to evaluate the impact that financial aid, college, student, and social factors have on six-year college completion rates using nationally representative data from 2009, 2010, and 2011. I discuss the regression model, how I obtained and compiled the data, the rationale for including my chosen variables, and my hypothesis as to the effect that each will have on college completion rates. I also discuss the results of my regression, the magnitude and statistical significance of the variables that I find to influence six-year college completion rates. Lastly, I use my regression model to identify the top two CSU colleges and the top two UC colleges in California that are doing better than predicted at graduating students in six years, as well as the bottom two UC's and CSU's. In the next chapter, I conduct case studies on the colleges identified as doing better than predicted or worse than predicted, my reasoning for doing using both quantitative and qualitative methods is that there are many factors that could impact graduation rates that cannot be quantified or measured. The case studies are an opportunity to identify some of these factors that are likely impacting graduation rates that I could not include in my regression model. I am hoping that using both quantitative and qualitative methods in my study will enable me to have a more complete picture when making recommendations on things that could be done to increase graduation rates.

Research Approach in Analyzing Factors that Impact College Graduation Rates

Researchers have identified many factors that impact college graduation rates. Students who enter college better prepared with more resources (both financial and other forms of student support) have a better chance of success in college than students who are underprepared and lack the resources necessary to attend and ultimately graduate from college. Social factors, student factors, college factors, and financial aid factors have all been identified as impacting college

graduation rates. Using institution-level data reported for the years 2009-10, 2010-11, and 2011-12, my regression model seeks to isolate the impact of various explanatory variables on 6-year college graduation rates, holding other factors constant. The majority of the explanatory variables are measured in terms of the percentage of students at that particular college who demonstrate that variable or fall into that category. For example, in looking at the financial aid factors, I included explanatory variables that measured the percentage of students at a college receiving federal grant aid and the percentage of students receiving student loan aid. Student factors measure the percentage of students at the college who are in certain age or race/ethnicity categories. I also included some dummy variables, which can only assume a value of zero or one. The value is one if the institution falls into that category and zero if it does not. I also used dummy variables to identify which schools were located in certain states, the college location's degree of urbanization, and whether the school offered certain student services such as tutoring, counseling, and distance learning opportunities. My regression model includes only whether these student services are offered or not. In the next chapter, when I do the case studies of schools doing well, I look further into these services and how they are being offered to students. The dependent variable, six year college graduation rates, is calculated as the percentage of students at a college in a particular entering cohort (my data refers to cohorts that entered during 2003, 2004, and 2005) who earned a bachelor's degree within six years of enrolling at the college.

Statistical Method

Regression analysis is a statistical method used to identify relationships that exist between an independent variable and a dependent variable holding other factors constant. Specifically, regression analysis attempts to identify the unit change that will occur in a dependent variable as a result of a one unit change in an independent variable, holding other variables constant. Regression analysis is not used to prove causality, but rather whether a

correlation exists between the two variables and the magnitude of the correlation (Studenmund, 2011). I am using regression analysis to identify the change that will be observed in a colleges graduation rates after a change in an explanatory variable, holding other variables constant. I also identify the direction and magnitude of the change in a college's six-year graduation rate, and also the level of significance.

Description of the Data

The sample used to perform this analysis includes 543 observations and includes all public, four-year, bachelor's degree-granting colleges in United States for the 2009-10, 2010-11 and 2011-12 academic years totaling 1434 total observations. I limited my sample to public colleges only, as they are more limited in their resources, and also must work within certain constraints imposed by the state and federal government as a condition of funding. Additionally, because I am using this data to identify colleges that are doing better or worse at graduating students than expected, I did not think it would be appropriate to compare public and private colleges in the same dataset. It is important to consider the sample and number of observations as it can impact the strength and reliability of your results. The data used in this sample was obtained from the Integrated Post-Secondary Education Data System (IPEDS) Data Center, which is administered by the National Center for Education Statistics (NCES). All institutions that receive any form of federal financial assistance authorized by Title IV of the Higher Education Act of 1965 are required to complete IPEDS surveys annually. This sample includes only public colleges in the United States that grant bachelor's degrees. I used the most recent three years of data containing all of my variables, which included data from the 2009-10, 2010-11 and 2011-12 academic years. In addition to the data obtained from IPEDS, I also used data from the American Community Survey administered annually by the United States Census Bureau to identify social characteristics of a state in which a college is located. The American Community Survey is an

ongoing survey that provides collects data and provides a report each year that is used to help determine how to allocate state and federal funds. Information is collected on a variety of topics including age, sex, race, family and relationships, income, health insurance, education, disabilities, employment and more (census.gov/about_ACS, 2012).

Overview of the Statistical Model

In this section, I provide an explanation of the model used to complete this analysis. I review the dependent variable, broad explanatory categories, and show the model equation used for my regression. The next section will go into detail on each of the explanatory variables and the expected relationship between the explanatory variables and the dependent variable (six-year college completion rates).

Dependent Variable and Broad Explanatory Factors

The dependent variable is six-year bachelor's degree completion rates at public, degree-granting institutions in the United States. Graduation rates measure the percentage of students at each institution who completed a bachelor's degree within six years of their first semester of enrollment. My data set covers academic years 2009-10, 2010-11, and 2011-12 which measures the graduation rates of student cohorts that enrolled in 2003, 2004, and 2005 respectively. The four categories of explanatory variables included in my model are: financial aid factors, college factors, student factors, and social factors. The variables included in each of these categories will be described in detail in the next section. Table 2 provides a description and source for each of the variables in my dataset. My goal in considering variables in each of these categories was to include all the variables that previous research and theory indicate could impact student graduation rates without including variables that would be duplicative, measuring the same outcome in a different way. In order to draw conclusions on how effective a college is at

graduating students, it is necessary to consider the types of students that enroll and the environment surrounding those students (support, resources, background).

Table 2. Identification, Description, and Source for all Variables

Variable Name	Description and Source
Dependent Variable	
gradrate Six-year graduation rate	Graduation rate - Bachelor degree within 6 years, 2009-10, 2010-11 2011-12. This rate is calculated as the total number of students completing a bachelor degree or equivalent within 6-years (150% of normal time) divided by the revised bachelor subcohort minus any allowable exclusions. Source: IPEDS
Financial Aid Factors	
Pctgrantaid Percentage of students receiving grant aid	Percent of full-time first-time undergraduates receiving federal, state, local or institutional grant aid 2009-10, 2010-11, 2011-12 Source: IPEDS
Avggrantaid Average amount of grant aid received	Average amount of federal, state, local or institutional grant aid received, 2009-10, 2010-11, 2011-12 Average amount of grant aid received by full-time, first-time degree/certificate-seeking undergraduate students. Source: IPEDS
pctstudloan Percentage receiving student loan aid	Percentage of full-time, first-time degree/certificate-seeking undergraduate students who received student loans. 2009-10, 2010-11, 2011-12 Source: IPEDS
avgloanaid Average amount of student loan aid received	Average amount of student loan aid received by full-time first-time undergraduates 2009-10, 2010-11, 2011-12 Source: IPEDS
pctaidto0-30k *omitted percent financial aid that went to $0-30,000.	Calculated by dividing the total amount of financial aid provided to that income level ($0-30,000) by the total financial aid dollars to all income levels. Source: IPEDS
pctaidto$30.1k-48k Percent aid to$30,001-48,000	Calculated by dividing the total amount of financial aid provided to that income level ($30,001-45,000) by the total financial aid dollars to all income levels. Source: IPEDS
pctaidto$48.1k-75k Percent aid to$48,001-75,000	Calculated by dividing the total amount of financial aid provided to that income level ($48,001-75,000) by the total financial aid dollars to all income levels. Source: IPEDS
pctaidto$75.1k-110k Percent aid to$75,001-110,000	Calculated by dividing the total amount of financial aid provided to that income level ($75,001-110,000) by the total financial aid dollars to all income levels. Source: IPEDS

pctaidto$110k+ Percent aid to$110,000+	Calculated by dividing the total amount of financial aid provided to that income level $110,000+ by the total financial aid dollars to all income levels. Source: IPEDS
College Factors	
Degree Urban Dummy Variables	Degree of urbanization (Urban-centric locale), 2009-10, 2010-11, 2011-12 Source: IPEDS **City: Large:** Territory inside an urbanized area and inside a principal city with population of 250,000 or more. lgcitydum 0,1 **City: Midsize**: Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000. midcitydum 0,1 **City: Small**: Territory inside an urbanized area and inside a principal city with population less than 100,000. smcitydum 0,1 **Suburb: Large**: Territory outside a principal city and inside an urbanized area with population of 250,000 or more. lgsubdum 0,1 **Suburb: Midsize**: Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000. midsubdum 0,1 **Suburb: Small**: Territory outside a principal city and inside an urbanized area with population less than 100,000. smsubdum 0,1 **Town: Fringe**: Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area. frtwndum 0,1 **Town: Distant**: Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area. disttwndum 0,1 **Town: Remote**: Territory inside an urban cluster that is more than 35 miles of an urbanized area. remtwndum 0,1 **Rural: Fringe**: Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster. frrurdum 0,1 **Rural: Distant**: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural distrurdum 0,1 **Rural: Remote**: Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster. remrurdum 0,1
totalenroll Total enrollment	Total enrollment 2009-10, 2010-11, 2011-12 Total number of students enrolled in the college for credit on official fall reporting date. Source: IPEDS
Pctadmitted Percent of students admitted	Percent of total applicants admitted to the college (Institution selectivity) 2009-10, 2010-11, 2011-12 Source: IPEDS

tuitionfees Tuition and fees costs	Tuition and fees, 2009-10, 2010-11, 2011-12 Price of attendance for full-time, first-time undergraduate students for the FULL ACADEMIC YEAR. TUITION AND REQUIRED FEES - Tuition is the amount of money charged to students for instructional services. Tuition may be charged per term, per course, or per credit. Required fees are fixed sum charged to students for items not covered by tuition and required of such a large proportion of all students that the student who does NOT pay the charge is an exception. Source: IPEDS
Distance learning opportunities	1 Yes, 0 Implied no DISTANCE LEARNING - An option for earning course credit at off-campus locations via cable television, internet, satellite classes, videotapes, correspondence courses, or other means. Source: IPEDS
Study abroad	1 Yes, 0 Implied no STUDY ABROAD - Arrangement by which a student completes part of the college program studying in another country. Can be at a campus abroad or through a cooperative agreement with some other U.S. college or an institution of another country. Source: IPEDS
Weekend/evening college Weekend/evening courses	1 Yes, 0 Implied no WEEKEND/evening college - A program that allows students to take a complete course of study and attend classes only on weekends or only in evenings. Source: IPEDS
Remedial services Remedial courses	1 Yes, 0 Implied no REMEDIAL SERVICES - Instructional activities designed for students deficient in the general competencies necessary for a regular postsecondary curriculum and educational setting. Source: IPEDS
Academic/career counseling service	1 Yes, 0 Implied no COUNSELING SERVICE - Activities designed to assist students in making plans and decisions related to their education, career, or personal development. Source: IPEDS
Employment services for students	1 Yes, 0 Implied no EMPLOYMENT SERVICES FOR CURRENT STUDENTS - Activities intended to assist students in obtaining part-time employment as a means of defraying part of the cost of their education. Source: IPEDS
On-campus day care for students' children	1 Yes, 0 Implied no DAY CARE SERVICE - A student service designed to provide appropriate care and protection of infants, preschool, and school-age children so their parents can participate in postsecondary education programs. Source: IPEDS

Open admission policy	1 Yes, 0 Implied no OPEN ADMISSION - Admission policy whereby the school will accept any student who applies. Source: IPEDS
Dual credit	1 Yes, 0 Implied no DUAL CREDIT - A program through which high school students are enrolled in advanced placement (AP) courses, taught at their high school, that fulfill high school graduation requirements and may earn the student college credits. Source: IPEDS
Credit for life experiences	1 Yes, 0 Implied no CREDIT FOR LIFE EXPERIENCES - Credit earned by students for what they have learned through independent study, noncredit adult courses, work experience, portfolio demonstration, previous licensure or certification, or completion of other learning opportunities (military, government, or professional). Credit may also be awarded through a credit by examination program Source: IPEDS
Advanced placement (AP) credits	1 Yes, 0 Implied no ADVANCED PLACEMENT - Advanced placement courses are college-level courses taught in high school. Students may take an examination at the completion of the course; acceptable scores allow students to earn college credit.
Student Factors	
pct18-24 Percent of total enrollment 18-24	Percent of undergraduate enrollment that are between 18 and 24 years old 2009-10, 2010-11, 2011-12 reported is of the institution's official fall reporting date Source: IPEDS
pct25-64 Percent of total enrollment 25-64	Percentage of all undergraduate fall enrollment by students 25 through 64 years of age 2009-10, 2010-11, 2011-12 reported is of the institution's official fall reporting date Source: IPEDS
pctover65 Percent of ttl enrollment over 65	Percentage of all undergraduate fall enrollment by students age 65 years or more 2009-10, 2010-11, 2011-12 reported is of the institution's official fall reporting date Source: IPEDS
pctunder18 Percent of total enrollment 18 and under *omitted	Percent of undergraduate enrollment under 18 2009-10, 2010-11, 2011-12 NOTE: Enrollment reported is of the institution's official fall reporting date or October 15. Source: IPEDS
pctwhite Percent of total enrollment White	Percent of total enroll that are White, non-Hispanic 2009-10, 2010-11, 2011-12 White, non-Hispanic - A person having origins in any of the original peoples of Europe, North Africa, or the Middle East (except those of Hispanic origin). Source: IPEDS

pctblack Percent of total enrollment black	Percent of total enroll that are Black, non-Hispanic 2009-10, 2010-11, 2011-12 Black non-Hispanic - A person having origins in any of the black racial groups of Africa (except those of Hispanic origin). Source: IPEDS
pcthispanic Percent of total enrollment Hispanic	Percent of total enrollment that are Hispanic 2009-10, 2010-11, 2011-12Hispanic - A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race. Source: IPEDS
pctasian percent of total enrollment asian	Percent of total enrollment that are Asian or Pacific Islander 2009-10, 2010-11, 2011-12 Asian or Pacific Islander - A person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, and Pacific Islands. Source: IPEDS
pctamerind Percent of total enrollment American Indian	Percent of total enrollment that are American Indian or Alaska Native 2009-10, 2010-11, 2011-12 American Indian or Alaska Native - A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition. Source: IPEDS
pctwomen Percent of total enrollment female	Percent of total enrollment that are women 2009-10, 2010-11, 2011-12 Percent of student body that are women in the fall of the academic year. This variable is derived from the enrollment component that is collected in the winter and spring surveys. Source: IPEDS
Social Factors (Source: US Census Bureau American Community Survey)	
statettlpop State total Population	Resident total population, (Per State) 2009, 2010, 2011 From US Census Bureau American Community survey (ACS) is an ongoing statistical survey that samples a small percentage of the population every year -- giving communities the information they need to plan investments and services
stateundr18 Percent under 18 in the state	From ACS The age of the person was usually derived from their date of birth information. Age classification is based on the age of the person in complete years 2009, 2010, 2011
State1844 Percent 18-44 in the state	From US Census, ACS See above
State4564 Percent 45-64 in the state	From US Census, ACS See above
ovr65state Percent over 65 in the state	From US Census, ACS See above

stpctfemale Percent female in the state	From US Census, ACS The number of females is expressed as a percent of the total population. Resident population: total females, percent, (Per State) 2009, 2010, 2011
STpctwhite State percent white *omitted	From US Census, ACS Percentage of individuals who classify themselves as being white 2009, 2010, 2011
STpctblack State percent black	From US Census, ACS Percentage of individuals who classify themselves as being Black or African American 2009, 2010, 2011
STpctasian State percent Asian	From US Census, ACS Percentage of individuals who classify themselves as being Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. percent, 2009, 2010, 2011
Stpctnathaw State percent native Hawaiian	From US Census, ACS Native Hawaiian: Percentage of individuals who classify themselves as having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands 2009, 2010, 2011 (Per State)
STpcthispnc State percent Hispanic	From US Census, ACS Percentage of individuals who classify themselves as being one of the specific Spanish, Hispanic, or Latino categories listed on the ACS questionnaire 2009, 2010, 2011 (Per State)
Stpctownhome Percent own home	From US Census, ACS2009, 2010, 2011 Owner-occupied housing units - percent of total occupied housing units,
Stpctsglparent Percent of children living with single parent	Definitions: percentage of children under age 18 who live with their own single parent either in a family or subfamily. 2009, 2010, 2011
STpctpoverty Percentage of people in the state living below poverty line	From US Census, ACS 2009, 2010, 2011 The percentage of individuals in the state below the federal poverty threshold

The model for my regression analysis is:
Six-year Bachelor's Graduation Rate = f (Financial Aid Factors, College Factors, Student Factors, and Social Factors)

Regression Model Details and Expected Relationships

In this section I give details on each of the explanatory variables and their expected sign in the regression equation. I also provide a brief justification for my chosen expected signs. If I

expect the coefficient to be negative, this will be indicated with a (-) next to the variable, if I expect it to be positive there will be a (+) next to the variable, and if I am unsure of the expected sign, I use a (?) next to the variable. In the following sections, I list all variables included in the model, identify the relationship that I expect each to have with six-year college graduation rates (positive (+), negative (-), or not sure (?)), and provide my reasoning for including each in the model.

Financial Aid Factors

Financial Aid Factors= f [percentage of students receiving grant aid (+), average amount of grant aid received (+), Percentage receiving student loan aid (+), Average amount of student loan aid received, percent aid to 0-30k income group (omitted), percent aid to$30.1k-48k income group (-), percent aid to$48.1k-75k income group (-), percent aid to$75.1k-110k income group (-), percent aid to$110k income group (-)]

Given that I am using financial aid factors as my key explanatory variable, I wanted to include as many variables as I could. Initially, I included information on the percentage of students at a given institution receiving various forms of financial aid and average amounts of aid received by students at each of the institutions (i.e. grant aid, student loan aid). I also included the percentage of students at a college receiving financial aid from various sources (i.e. federal aid, state aid, institutional aid etc). I found that when I included both of these measures together (both the type of aid and the source), it resulted a model that was too complex to interpret the results accurately. I was able to achieve a greater number of significant variables without including both measures, as it made it easier to really isolate the affect that each was having on the dependent variable. Additionally, I found multicollinearity to exist between the variables meaning that they were measuring very nearly the same thing. I found that the source of the aid (whether it came from the federal government or the state) was not significant in terms of the impact on graduation

rates. Therefore, I decided to include only the variables on the type of financial aid and the average amount of aid received, since these better represented what I was attempting to measure. I expect that grants and loans will have different impacts on student behavior and ultimately on graduation rates. I have also included the percentage of financial aid dollars that are distributed to different income groups as financial aid impacts students' behavior differently depending on their own available resources to pay for college. Initially I included the percentage of students at a college that fall into different income groups and the percentage of financial aid dollars that are distributed to different income groups. I found that none of the correlation coefficients for the percentage of students in different income groups were significant; however the coefficients for the percentage of aid distributed to the different income groups were significant. I decided to drop the variables that measure the percentage of students that fall into different income groups since colleges with a larger percentage of students in the lowest income groups will likely have a greater percentage of financial aid dollars going to that income group.

College Factors

College Factors= f [degree of urbanization [dummy for City: Large (omitted), City: Midsize, City: Small, Suburb: Large, Suburb: Midsize, suburb: Small, Town: Fringe, Town: Distant, Town: Remote, Rural: Fringe, Rural: Distant, Rural: Remote], total enrollment (+?), percent of students admitted (-), tuition and fees costs(+), distance learning opportunities (+), study abroad (+), weekend/evening college (+?), remedial services (-), employment services for students (+), on-campus day care for students' children (-?), Open admission policy (-?), dual credit (+), credit for life experiences (+), AP credit (+)]

College or Institution factors are specific to the college being assessed. I included many variables related to the college itself since I am using the results of my regression analysis to

identify schools doing better than expected to study further. In terms of the location of the college (aside from the state), I created dummy variables which measure the degree of urbanization. I am not sure what to expect from this variable, my expectation is that being located in a large city will have a positive impact on graduation rates, while being located in a remote or rural location could result in a negative impact on graduation rates. I am not sure what my reasoning is behind this assumption, I think that large cities tend to have a higher percentage of college educated people than rural areas, and thus must have more people graduating from college. However, this could be due to the greater availability of jobs in larger cities that attract college educated individuals. I included the percentage of applicants admitted to an institution, which measures institutional selectivity; I expect that institutions that admit a lower percentage of applicants (more selective) will have higher graduation rates. I included the tuition and fees charged by the institutions to look at the impact of the cost of attendance, my expectation is that the schools with higher tuition and fees will have higher graduation rates, but that the reasoning for this is actually that the higher fees deter certain students from attending those schools who likely have additional barriers to graduation. Lastly, I created dummy variables to identify whether colleges offer certain services to students such as remedial education, employment assistance, daycare, weekend and evening classes; non-traditional credits including: AP credits, credit for life experiences, or dual credits; and a dummy variable identifying colleges with an open admissions policy. Many of these services are offered to assist students in staying enrolled and ultimately graduation; therefore, my guess is that other things equal, institutions offering these services have higher graduation rates.

Student Factors

Student Factors = f [percent of total enrollment that are white (omitted), percent black (-), percent Hispanic (-), percent Asian (+), percent American Indian (?), percent 18 and

under (-), percent 18-24 (omitted), percent 25-64 (-), percent 65 and older (-), percent female (+)] these percentages are calculated out of the total students enrolled at the college.

Included in the student variables are race/ethnicity, age and gender percentages of students enrolled at each of the institutions. My reasoning for including these demographic characteristics of the students is that certain groups have been found to have lower probabilities of college attendance and graduation. Although it is likely that these differences are due to underlying factors such as college-going culture and socioeconomic status, research has shown significant differences in college graduation rates. I would expect institutions which have higher percentages of African American and Hispanic students, as well as those with higher percentages of older students to have a negative impact on graduation rates when controlling for other factors.

Social Factors

Social Factors= f [percent under 18 in the state (-?), percent 18-24 in the state (omitted), percent 25-64 in the state (+?), percent over 65 in the state (+), percent female in the state (+), percent white (omitted), percent black (-), percent Hispanic (-), percent Asian (+), percent native Hawaiian (?), percentage of individuals who own their home (+), average household size (?), and percent of children living with single parent (-),]. These are calculated for each college based on the state in which the college is located. The percentages are calculated as the number of individuals in the state who fall into that category, divided by to state total population.

The social variables in my dataset are characteristics of the state in which the college is located. So they are not meant to represent the students or schools themselves, but the environment that the student likely lived in before they came to college and when they go home. Included in these are age and race percentages of the state total population, which I feel will have

a similar impact as the age and race characteristics of the institution. I have included the percentage of students in the state raised in a single parent household and also the average household size in the state to determine whether a correlation exists between these variables and college graduation rates. I also included a variable which measures the percentage of individuals in the state who own their home. I expect home ownership to be positively correlated with college graduation rates. Table 3 provides the summary statistics including the variable name, mean standard deviation, minimum and maximum value for each of the variables.

Table 3. Summary Statistics

Variable	OBS	Mean	Std. Dev.	Min	Max
Six Year Graduation Rate (Dependent Variable)	1434	47.48241	16.93819	4	100
Percentage of students receiving grant aid	1434	69.30279	17.49772	0	100
Average amount of grant aid received	1434	6544.75	2075.026	1891	16631
Percentage receiving student loan aid	1434	63.79443	21.1857	0	100
Average amount of student loan aid received	1434	5845.417	1309.796	275	14423
Percent aid to$30,001-48,000	1434	23.80133	7.239578	0	100
Percent aid to$48,001-75,000	1434	14.73324	6.670629	0	38.76495
Percent aid to$75,001-110,000	1434	6.42802	5.026666	0	31.57627
Percent aid to$110,000+	1434	3.907909	4.496208	0	43.55902
City: Midsize dummy	1434	0.138122	0.345134	0	1
City: Small dummy	1434	0.16329	0.369744	0	1
Suburb: Large dummy	1434	0.108656	0.311302	0	1

Suburb: Midsize dummy	1434	0.034377	0.182251	0	1
Suburb: Small dummy	1434	0.029466	0.16916	0	1
Town: Fringe dummy	1434	0.01903	0.136673	0	1
Town: Distant dummy	1434	0.123389	0.328984	0	1
Town: Remote dummy	1434	0.123389	0.328984	0	1
Rural: Fringe dummy	1434	0.081031	0.272967	0	1
Rural: Distant dummy	1434	0.016575	0.12771	0	1
Rural: Remote dummy	1434	0.009208	0.095545	0	1
Total enrollment	1434	13600.86	11895.43	57	76438
Percent of students admitted	1434	67.2565	17.55157	16	100
Tuition and fees costs	1434	6726.776	2410.923	0	15250
Weekend/evening courses dummy	1431	0.37078	0.483162	0	1
Remedial courses dummy	1434	0.755678	0.429816	0	1
Employment services for students Dummy	1434	0.975445	0.154812	0	1
On-campus day care for students' children dummy	1434	0.597913	0.49047	0	1
Open admission policy dummy	1434	0.918969	0.272967	0	1
Dual credit dummy	1434	0.953346	0.210962	0	1
Credit for life experiences dummy	1434	0.35175	0.477663	0	1
AP credit dummy	1431	0.997545	0.049507	0	1
Percent black	1434	14.10433	21.11585	0	98

Percent Hispanic	1434	8.236433	12.43232	0	93
Percent Asian	1434	4.417916	6.71987	0	74
Percent American Indian	1434	1.119784	4.462862	0	86
Percent female	1434	55.78955	9.154342	8	90
Percent 18 and under	1434	2.944751	5.042268	0	56
Percent 25-64	1434	20.73542	13.67585	0	91
Percent over 65	1434	0.06814	0.281969	0	2
State total Population	1434	10300000	9404119	563626	37300000
Percent under 18 in the state	1431	23.8717	1.754539	16.8	31.5
Percent 45-64 in the state	1434	26.71835	1.516754	19.8	30.9
Percent over 65 in the state	1434	13.1593	1.642616	7.7	17.3
Percent female in the state	1434	50.85721	0.577702	48	52.8
State percent black	1434	12.70074	9.113464	0.4	50.7
State percent Asian	1434	3.891529	4.014727	0.6	38.6
State percent native Hawaiian	1431	0.164641	0.761659	0	10
State percent Hispanic	1434	12.58723	11.64303	1.2	46.3
Percent own home	1434	67.44125	5.037252	43.5	74.6
Average Household size	1432	2.561713	0.14188	2.12	3.04
Percent of children living with single parent	1433	34.49624	4.555267	19	60

Uncorrected Regression Results

Appendix B contains my uncorrected regression results using three different functional forms in STATA: Lin-lin, Log-lin, and Log-Semilog. I started with the Lin-Lin Ordinary Least Squares (OLS) equation; I ran it using my dataset which contains 51 explanatory variables. I omitted one variable in each race and age category, and, in the category, which measured the degree of urbanization, for comparison. Using the lin-lin functional form, I ended up with 35 explanatory variables that were significant.

The second functional form that I used is the log-linear functional form (also called log-lin). To use this functional form, I calculated the natural logarithm of my dependent variable (gradrate) and used this in my regression with the linear explanatory variables instead of the unlogged dependent variable. This form can only be used if your dependent variable contains no zeros or negative values. When using the log-lin functional form, you are measuring the impact of the independent variable on the dependent variable in percentage terms. Specifically, you are measuring the percentage increase or decrease in the dependent variable that is correlated with a 1 unit change in the independent variable, all other things constant (Studenmund, 2011, pg. 219). When I ran the regression using the log-lin functional form, it resulted in 19 significant variables. I found that many variables, which had been significant using the Lin-Lin equation, lost significance when the dependent variable was logged.

The third functional form I used is the log-semilog functional form. To run this regression, I use the logged dependent variable and also the logged form of all explanatory variables that are not dummy variables. Dummy variables cannot be logged because they contain zero values. When interpreting the results of the log-semilog functional form, the coefficients of the logged explanatory variable represent the percentage change in the dependent variable that is correlated with a one percent change in the explanatory variable, other factors constant

(Studenmund, 2011, p.218). To run the log-semilog functional form, I first calculated to natural log of each of my explanatory variables (with the exception of the dummy variables) and created new logged explanatory variables. I used the logged form of my dependent variable and the logged explanatory variables to run the regression. Using the log-semilog functional form resulted in only 11 significant variables.

Selecting a Functional Form

The regression results in Appendix B show how different one's results can be, depending on the functional form used; this also illustrates the importance of selecting the correct functional form. Comparing my results across all three functional forms, I found that I had the greatest number of significant variables (35).

Multicollinearity

When using multivariate regression analysis to estimate the impact of changes in various explanatory variables on a dependent variable, each of the explanatory variables must be uncorrelated with the error term or with other variables (Studenmund, 2011). One way to test whether any of the explanatory variables are highly correlated with the error term or another variable is to review the simple correlation coefficients between the variables. Pairs of variables, which have a simple correlation coefficient of .8 or higher should be examined, and further tested to determine if multicollinearity exists between the two. Appendix C contains simple correlation coefficients and significance for each of variables the included in my regression model.

Multicollinearity exists when two or more variables are highly correlated with one another; it is a violation of a necessary assumption of ordinary least squares regression analysis, which states: “no explanatory variable is a perfect linear function of any other explanatory variable(s)” (Studenmund, 2011, 99). If two variables are highly correlated with each other, it is hard to separate the effect of one from the effect of the other on the dependent variable, since they

move together. Some multicollinearity is expected, however, if variables are highly collinear, it can cause results to show as being not significant, when, in reality, a significant relationship does exist.

In addition to reviewing the correlation coefficients, another test, which can be done to look for the multicollinearity, is a variance inflation factor (VIF) Test. The rule of thumb is that, any variable that has a VIF over five, and is not statistically significant, likely has issues with multicollinearity (Studenmund, 2011, pg. 259). These variables should be examined closely, to determine how best to correct for the multicollinearity if the regression coefficient is found to not be statistically significant. Correcting for multicollinearity may involve dropping one of the highly correlated variables.

Using the VIF Test, I found 10 variables with a VIF over five. Of those variables with a VIF over five, two were not statistically significant in my regression results. I reviewed these variables to determine whether they should be left in my dataset or if there were other variables measuring something similar that would justify dropping one. After reviewing these, I decided to drop the state total population (VIF of 5.63 and not significant), from my dataset. Originally, I included the state population just to see if it had any correlation with college graduation rates, since I found that it was not significant and was highly correlated with other variables (probably some of the social characteristics) I decided to drop this variable from my final regression model. The other variable that has a VIF over 5 and was not significant is the percentage of individuals in the state who are Asian. I decided to leave this variable in my dataset since the other state race and ethnicity characteristics included in my model had a significant impact on college graduation rates.

I ran my regression after dropping the state total population variable; the results are shown in Appendix D along with my original regression results and the results from the VIF test.

Dropping these two variables resulted in the same number of significant variables and a slightly higher R-squared overall.

Heteroskedasticity

Heteroskedasticity exists when a variable has a variance that is not constant; this violates a classical assumption necessary to trust the results of regression analysis, which states: "the error term has a constant variance" (Studenmund, 98). If heteroskedasticity exists and is not corrected for, it can result in variables showing as significant when they are not actually significant: this impact is opposite of what is caused by multicollinearity. To check for the existence of heteroskedasticity in my model, I ran the Breusch- Pagan/Cook-Weisburg test. The general rule when interpreting the results of this test is that heteroskedasticity exists if: Prob > chi2 is less than .10. When I ran the test using my dataset, my results were: Prob > chi2 = 0.0000. Because 0 is less than .10, I know that heteroskedasticy exists in my dataset. To correct for heteroskedasticity, one would run the regressions in STATA using the robust standard error type selection. All of my regressions were already run using the robust standard error type; therefore, no further corrections are needed.

Final Regression Results

My final regression results are displayed in the last column (far right) Appendix D. The results of my linear regression containing 51 explanatory variables produced 35 significant variables. The next section will go into more detail on results of my regression analysis, identifying some of the explanatory variables I found to be significant and the relationships that exist between my explanatory variables and six-year college graduation rates. I describe the policy implications and recommendations informed by my regression results in the final chapter of this thesis.

Analysis of Significant Variables from Regression

In this section, I provide an overview of the variables in each category (financial aid, college, student, and social factors) that I found to have a significant impact on six-year bachelor's degree completion rates, holding other factors constant. I not describe every variable that I found to be not significant; however, all of my final regression results can be viewed in Appendix D. Appendix D displays results for all the explanatory variables included in my data set, the magnitude and direction of relationships found (positive or negative), and the level of significance for each.

Financial Aid Factors

Included in my financial aid factors are variables that measure: the percentage of students at an institution receiving various types of financial aid, and the average amounts of different types of financial aid received by students at an institution. In addition, I included variables that look at the percentage of aid being distributed to students in different income groups and the percentage of students at the school that fall into different income groups. Of the eight explanatory variables I included to measure the impact of financial aid factors on six-year college graduation rates, I found 17 to have a significant impact, holding other factors constant.

I found that when there are a greater percentage of students at a college receiving financial aid either in the form of grants or loans, the graduation rate is lower. Specifically, when the percentage of students at a college receiving grants increases by 10 percent, this is correlated with a decrease in graduation rate of .64 percent. When the percentage of student receiving loans increases by 10 percent, it is correlated with a decrease in graduation rates of .75 percent, all other factors constant. This result displays that just giving financial aid to a larger percentage of a university's students is not leading to increased graduation rates for students; in fact it is the opposite. But once this degree of coverage is accounted for, I found a positive relationship to

exist between the average amount of aid received and graduation rates. Specifically, I found that when the average amount of aid received by students at a college (in the form of grants or loans) increases by $1,000, graduation rates increase by .1 and .5 percent respectively.

In looking at the percentage of aid distributed to different income groups and how this relates to college completion rates, the income groups were divided as follows: $0-$30,000 per year, $30,001-$45,000 per year, $45,001-$75,000 per year, $75,001-$110,000 per year, and $110,000+ per year. I left out the lowest income group ($0-$30,000 per year) for comparison. I found that when the percentage of aid distributed to students in the $30,000-$45,000 or $45,001-$75,000 income groups increased by ten percent [which can be interpreted as taking the money away from the lowest income group and giving it instead to this group], the change in graduation rates was positive, 1.8 percent and 3.38 percent respectively, meaning that when a greater percentage of financial aid dollars are given to students in these middle income groups as opposed to the lowest income students, the result is graduation rates that are slightly higher. To me this result signifies two things, first, colleges that have a larger proportion of students that fall into this lowest income group (in comparison to other income groups), and thus have a greater percentage of financial aid dollars going to this income group, will have lower graduation rates than colleges that have a smaller proportion of students in the lowest income group, resulting in a smaller percentage of financial aid going to these students. Second, I think this finding demonstrates that students in the lowest income group ($0-$30,000) need more than just dollars to stay in school and graduate, they need other types of support services as well. I look at the impact of some of these services provided by colleges when I review my findings of the college factors impact on graduation rates. I also look at the impact of different student services in chapter four when I conduct case studies of the colleges that are succeeding and graduating students.

According to my model, one option to increase graduation rates would be in redistributing aid from the lowest income group to the higher income groups who may also have some level financial need and have better outcomes in terms of graduation rates. This approach goes to the equity vs. efficiency debate, while it may be more efficient to redistribute aid to these higher income groups (in terms of increasing graduation rates), it is not equitable as it would place economically disadvantaged students at an even greater disadvantage by further limiting their available resources to pay for college.

College Factors

My regression model includes 23 variables, which look at characteristics of the college. Of those, I found 12 to be significant in impacting six-year college graduation rates. I found that a college's level of selectivity has a positive impact on graduation rates; specifically a college that admits ten percent more of its applicants (less selective) will see a decrease in graduation rates of 0.51 percent. I found that total enrollment, and tuition and fees, have small but significant impacts on college graduation rates, holding other factors constant. When looking at total enrollment, I found that an increase in total enrollment at a college of 1000 students is correlated with an increase in graduation rates of .29 percent. An increase in the annual tuition at a college of $1000 was found to be correlated with an increase in graduation rates of .4 percent.

I used dummy variables to evaluate the impact of certain student services (or the types of colleges that offer these services) on graduation rates. Colleges were identified with a "1" if they offered the service and a "0" if they did not offer the service. One of the interesting relationships that I was able to identify was that between remedial programs and graduation rates. I found that colleges that offer remedial programs have graduation rates that are 2.03 percent lower than colleges that do not offer remedial programs. Remedial programs are used to increase the academic skills of students who are found to be unprepared academically for college level work.

These students are required to first complete remedial courses before enrolling in college level courses, the objective is that after completing the remedial courses, these students will have the skills necessary to be successful in college level coursework. I did not have data on students' level of academic preparedness at each of the colleges studied; however, this finding shows the importance of students being academically prepared before they enter college. It also shows that even with remedial programs available to bring students up to the level they need to be, graduation rates at these schools (that accept students needing remedial education) are lower, other factors equal. This does not signify that remedial programs are ineffective; however, these findings indicate that the way colleges offer remedial education is something that could be reevaluated to better student outcomes. I further explore remedial programs in my case studies, to look for similarities and differences in how remedial education is offered by different colleges, and possible aspects that could be improved to lead to an increase in graduation rates rather than a decrease. I also found that colleges with open admissions policies have graduation rates that are 2.38 percent lower that colleges that have some level of selectivity, this is to be expected, colleges that admit any student who applies will likely end up with a larger percentage of students (compared to other colleges) that don't have the skills or resources needed to attend college through the completion of a bachelor's degree, it is expected that having a greater percentage of underprepared students would lead to lower graduation rates.

I included 11 dummy variables that measured the degree of urbanization of a college's location. These variables differentiated between colleges located in a city, suburb, town, or rural location, these four classifications were even further broken down; for example, there were variables for large city, mid-size city, and small city. I left out the variable for large city when I ran my regressions, to use this as a point of comparison. I found five of the 11 variables to be significant in my model. I found that colleges located in a mid-size city will have graduation rates

that are 2.8 percent higher than those colleges located in a large city. Colleges located in a midsize suburb are found to have graduation rates that are 1.80 percent higher in comparison to colleges located in a large city *ceteris paribus*. I also found that colleges located in a fringe town (territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area), distant town (territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area), or remote town (territory inside an urban cluster that is more than 35 miles of an urbanized area) will have graduation rates that are higher than the graduation rates of a college in a large city by 2.06 percent, 2.04 percent, and 2.66 percent respectively *ceteris peribus.* These findings could also be related to students' level of academic preparedness when they enter college, perhaps colleges located in large cities tend to have a greater percentage of students that enter college unprepared and thus, have lower graduation rates. These findings on a college's degree of urbanization are interesting and show that the location of a college can impact the behavior of students in terms of whether they make in through to completion.

Student Factors

Included in my student characteristics are race and age characteristics of the students enrolled at a particular college. I included eight variables in my model and found seven of these to be significant. In the race and ethnicity categories, I found that when the percentage of students who are Black or Hispanic increases by 10 percent (compared to the percentage white); the graduation rate at a college can be expected to decrease by 1.88 percent and 1.68 percent, respectively. However, I did not find the percentage of students who are Asian (in comparison to the percentage white) at a college to have any significant impact on college graduation rates. Looking at the age categories, the schools with the best graduation rates are those with the largest percentage of students between the ages of 18 and 24. When the percentage of students under 18, or the percentage of students 25-64 increases by 10 percent (compared to the percentage between

18 and 24), the result is a decrease in graduation rates of 3.4 percent and 5.9 percent respectively. This is expected, younger students are less mature and might not be quite ready for college, and older students are likely to have greater responsibilities and time constraints (i.e. family or work) that would decrease their likelihood of completing a college degree. Lastly, it seems from the data, that women are graduating from college at a slightly better rate than men. I found that when the percentage of women at an institution increases by 10 percent, the graduation rate increases by .3 percent. Most of the findings relating to the impact of student characteristics were consistent with my predictions, and with past research, and as such, were not surprising.

Social Factors

The social variables in my dataset measure characteristics of the state in which the college is located. I found that when the percentage of individuals in the state who are female increases by 10 percent, graduation rates at colleges located in that state will increase by 1.42 percent *ceteris paribus.* I am not sure why a greater percentage of females in a state is correlated with higher graduation rates. Research has found that women do better in school and have higher college graduation rates than their male counterparts (Mortensen, 2003; Buchmann and DiPrete, 2006), however I am not sure if this explains the correlation between an increased percentage of females in the state and increased college graduation rates at schools in that state. Perhaps having more women in the state creates more role models (since women typically do better in school) and this is the reason for the increased graduation rates. I found that a 10 percent increase percentage of individuals in a state who own their home is correlated with an increase in graduation rates of 5.14 percent. One of my variables looked at the percentage of children in a state raised in a single parent home; my regression model found that an increase in the percentage of children raised in a single parent home of 10 percent is correlated with a decrease in college graduation rates of 9.08 percent *ceteris peribus.* My assumption is that this is because two parents

are able to provide more support (emotional, academic, financial, and time) than one parent alone. Students who are raised in a two parent household are also more likely to have more stability than those raised in a single parent home, which would likely lead to them doing better in school. I also found that states with larger average households will have lower college graduation rates; specifically, an increase in the average household size of one unit (one person) is correlated with college graduation rates that are 17.01 percent lower. This finding is tricky to evaluate because a state's average household size is usually a decimal, the number is calculated by averaging the number of people in each household as reported in the American Community Survey for each state. Since this number is an average for the state (for all states it falls between 2 and 3.2), a change in the average household size of one full unit (for example from 2.01 to 3.01) would be a large change not likely to occur. This finding is useful, however, in comparing different states that may have very different average household sizes such as North Dakota (2.29) and Utah (3.04).

Elasticity of the Dependent Variables

To measure the magnitude of the impact that each of the explanatory variables in my dataset has on the dependent variable, six-year college graduation rates, I calculated the elasticity of each of the significant continuous explanatory variables in my data set and presented the elasticities in table 4 organized from the most elastic to the least elastic. Since my dependent variable and many of my explanatory variables are measured in percentage terms, the elasticity is equal to the regression coefficient, since it already measures the percent change that would occur in the dependent variable as the result of a one percent change in the variable. For those explanatory variables that were not in percentage terms, the elasticity is calculated by multiplying the regression coefficient by the mean of the explanatory variable divided by the mean of the dependent variable. Table 5 contains the regression coefficients of all the significant dummy

variables in my data set arranged from those that have the largest impact on graduation rates to the smallest impact. The elasticity of an explanatory variable measures the percent change that will occur in the dependent variable (six-year college graduation rates) when there is a one percent change in the explanatory variable. Elasiticies can be used to compare the magnitude of impact on graduation rates posed by each of the explanatory variables.

Table 4. Elasticity of Significant Variables Ranked from Largest to Smallest Impact

Variable	Elasticity
Percent under 18 in the state	1.8600
Percent over 65 in the state	1.8490
Percent over 65	-1.5520
Percent female in the state	1.4420
Percent 45-64 in the state	1.2180
Average Household size	-0.9175
Percent of children living with single parent	-0.9080
Percent 25-64	-0.5914
Tuition and fees costs	0.5667
Percent own home	0.5140
State percent black	0.4710
Percent aid to$48,001-75,000	0.3380
Percent 18 and under	-0.3300
Percent aid to$110,000+	0.3220
Percent black	-0.1880
Percent aid to$30,001-48,000	0.1810
State percent Hispanic	0.1740
Percent Hispanic	-0.1680
Average amount of grant aid received	0.1378
Percent American Indian	-0.1280
Total enrollment	0.0831
Percentage receiving student loan aid	-0.0750
Percentage of students receiving grant aid	-0.0640
Average amount of student loan aid received	0.0591
Percent female	0.0390
Percent of students admitted	-0.0051

Table 5. Dummy Variables Impact on Graduation Rates

Variable	Switching from Zero to One Results in this Change in 6 Year Grad Rate
Rural: Distant dummy	6.2020
Suburb: Small dummy	4.6310
Rural: Remote dummy	4.1670
Rural: Fringe dummy	3.1860
City: Midsize dummy	2.8470
Town: Remote dummy	2.6690
Open admission policy	-2.3828
City: Small dummy	2.2810
Town: Fringe dummy	2.0640
Town: Distant dummy	2.0390
Remedial courses	-2.0330
Employment services for students	-2.0310
Suburb: Midsize dummy	1.8080
Suburb: Large dummy	1.6920
AP credit	1.3820
Credit for life experiences	-0.7520
Dual credit	-0.4780
On-campus day care for students' children dummy	-0.2410
Weekend/evening courses	-0.0350

Interpreting my Regression Findings

Findings Regarding Financial Aid

In comparing elasticities of the explanatory variables, one interesting finding is that social factors, and tuition and fees costs have a larger impact on graduation rates than do the percentage of students' at a college receiving grants or loans or the average amount of aid received. In fact, I found the percentage of students at a college receiving grant or loan aid and the average amount of loan aid received, to have a very small impact on college graduation rates, compared to other variables in my dataset. While the elasticities are small, one interesting finding that is worth highlighting is that when the percentage of students receiving aid increases it has a negative impact on graduation rates. However, when the average amount of aid increases it

has a positive impact on graduation rates. The lesson here is that aid should be more concentrated on selected groups of students, not spread thin to providing smaller amounts of aid to a greater percentage of students.

Interestingly, I found that the percentage of financial aid being distributed to different income groups has a larger impact on graduation rates than the percentage of students receiving aid or the average amounts of aid received. When a greater percentage of aid is distributed to students in middle-income groups (in comparison to those in the lowest income group) graduation rates at that college are higher. This demonstrates the impact that income has on college graduation rates. Thinking from an efficiency standpoint, colleges that want to use financial aid dollars to increase graduation rates could redistribute dollars from the lowest income group to students in middle income groups since this would have a positive impact on graduation rates, however, this approach is far from equitable as it would exacerbate the disproportion that exists between students in different income groups in terms of the resources they have available to pay for college.

In analyzing these results, I feel there are two different scenarios that could be impacting the percentage of aid distributed to different income groups. The first scenario is that a college has a greater percentage of students in the lowest income group resulting in a larger percentage of financial aid dollars going to these students, simply because there are more of them. The second scenario is a college that has students more evenly distributed in terms of income group (meaning they don't have a larger proportion of poor students in comparison to other colleges) but devotes a larger percentage of financial aid dollars to the lowest group (compared to other income groups). When I included variables for the percentage of students at a college that fall into different income groups (which would control for whether scenario one or scenario two is occurring), I found that these variables did not have any significant impact on graduation rates,

meaning that either of these two scenarios will result in lower graduation rates when a larger percentage of aid is going to students in the lowest income group.

The important take away is that for the lowest income group, financial aid dollars alone do not lead to increased graduation rates. In fact giving these dollars to students in higher income groups would be more effective in terms of increasing college graduation rates. Looking at my findings it seems that financial aid is not the answer. Many of the students in the lowest income category have all their tuition and fees paid by need-based financial aid and are still graduating at lower rates (other things equal). There is no doubt that students in the lowest income group need financial support, however, they also need other forms of support, and they need these additional support services more than their peers in higher income groups. Since financial aid alone is not effective in increasing graduation rates of students in the lowest income groups (in comparison to students in higher income groups) colleges need to look at how to effectively support these students to increase their chances of staying in college and earning a college degree.

College Location and Degree of Urbanization

Looking at the regression coefficients of my significant dummy variables, I found that the degree of urbanization in the area where a college is located has the largest impact on graduation rates (other things equal), compared to the other dummy variables in my dataset. Specifically, colleges located in rural areas have higher graduation rates (other things equal) than colleges located in large cities. While the rural locations had the largest impact on graduation rates, I found that colleges located in towns, suburbs, or small to midsize cities all had better graduation rates (other factors equal) than colleges located in large cities. This gap is likely due to the academic preparedness of students who attend college in large cities vs. other locations. Research has found that elementary and high schools located in large cities generally don’t do as good a job of preparing students for college, additionally, more students drop out of high school in large

cities than in other locations (Dillon, 2009; Wittle and Denaux, 2007). Given the disparity in K-12 education that exists between schools in large cities and those located elsewhere, it is not surprising that colleges located in large cities also experience lower graduation rates than colleges in other locations.

Remedial Education and Open-Admissions Policies

Aside from the location dummy variables, two other dummy variables that had a rather large impact on college graduation rates, compared to other dummy variables, were remedial education and open-admissions policies. I found that colleges that offer remedial education to students that are found to be unprepared for college level work, and colleges that have open-admissions policies, have lower graduation rates than other colleges (other factors equal). These findings demonstrate the importance of academic preparedness or academic ability of students entering college. Colleges that have a higher proportion of students who are academically unprepared have to offer more remedial services, but still have lower graduation rates (other things equal). To me, this finding demonstrates the importance of students being academically prepared when they enter college. Even with remedial education, these colleges have graduation rates that are over two percent lower than other colleges. This does not mean that remedial education programs are ineffective; however, these findings indicate that the way colleges are going about offering remedial education may be something that should be reevaluated to determine if it could be done differently to better student outcomes.

I also found that colleges that have open admissions policies have graduation rates that are over two percent lower than colleges that do not have open admissions policies. This finding is less surprising than the impact of remedial education. Colleges that have open admissions policies, allow anyone who applies to be admitted to the college. Since most colleges base admissions decisions mostly on academic performance (GPA, SAT Scores, AP courses, etc.)

colleges that have open admissions policies will end up with a larger percentage of students who are not academically prepared for college, therefore, it is expected that these colleges will have lower graduation rates than their more selective counterparts.

Summing Up and Revisiting my Research Question

This chapter contains the regression results from three regressions that I ran using my dataset. I compared the results of these three to find one with the best fit. Ultimately, I found that the Lin-Lin model was the best fit, since it had the most significant variables and the highest R-Squared value. I tested for multicollinearity using the correlation coefficients, and the VIF test. After examining my VIF results, dropping one variable and then comparing the regression results to my original regression results, I decided to leave out the variable measuring state total population as this resulted in the highest number of significant variables and the highest value for R-squared. I also tested for and corrected for heteroskedasticity, which I found to be present in my model. Lastly, I described the results of my regression analysis and the significant relationships found to exist between my explanatory variables and six-year college graduation rates.

As a reminder, my research question is: what are the various factors that impact bachelor's degree completion rates, and, how can financial aid and other forms of student support be used to improve college completion rates in California? Using regression analysis, I have been able to identify many factors that impact graduation rates, as well as the magnitude and direction of the impact. Regarding the impact of financial aid, I found that when the percentage of students on financial aid (either in the form of grants or loans) at a college increases, the graduation rates decrease. I also found that an increase in the average amounts of aid received by students at a college is correlated with an increase in graduation rates. In looking at the percentage of aid distributed to different income groups, I found that when a greater percentage of aid goes to

students who are not in the lowest income group ($0-$30,000 per year); the result is higher graduation rates. This finding demonstrates that, in order to increase graduation rates of the most economically disadvantaged students, colleges need to focus on offering other forms of support than just financial support. It also shows that colleges that have a larger proportion of disadvantaged students and thus a larger percentage of aid dollars going to this group need to invest extra resources in supporting these students and helping them to succeed. In my next chapter, I look more closely at other forms of support that successful colleges are using to aid students in reaching graduation.

My regression analysis also looked at how graduation rates are impacted by other college, student, and social factors. I found that while financial aid does impact college graduation rates, it is not the most important variable in driving a student's likelihood of completing a college degree. In my last chapter, using the findings from this regression analysis and from case studies on the colleges doing the best at graduating students, I identify the factors that I have found to have the largest impact on college graduation rates. I use these findings to make recommendations on things that public colleges in California could do to increase college graduation rates.

Identifying Colleges in California that are Doing Better than Expected

After analyzing my regression results, I used Stata to identify California public colleges that have better graduation rates than my model would predict. To do this I first predicted the fitted y values based on my model. The fitted y value is the six-year graduation rate that a college is predicted to have based on all the explanatory variables for that college. After calculating the fitted y, I calculated the percentage difference that exists between my actual y value (gradrates) and my fitted y value based on my model. I looked at the results for all public colleges in California and found a large range, varying from schools that are doing almost 20 percent better

than expected to colleges that are doing almost 20 percent worse than expected. Using my model, the two UC colleges that are doing the best at graduating students within six years, *ceteris peribus*, are UC San Diego and UCLA. The two CSU colleges that are doing the best are San Diego State University and California Maritime Academy. The two UC colleges that are doing the worst are UC Riverside and UC Merced, and the two CSU colleges that are doing the worst are San Jose State and CSU Monterey Bay. In the next chapter, I will complete case studies on these schools to look for things they are doing that were not considered in my model and could be working to increase or decrease graduation rates. In my final chapter, my goal is to use my findings from the regression analysis and the case studies to make policy recommendations for California on things that could be done to increase college graduation rates.

Chapter 4

QUALITATIVE STUDY ON THE BEST AND WORST COLLEGES

Using regression analysis, I was able to quantify the impact that various explanatory factors have on six-year college graduation rates. However, the statistical analysis conducted can only find the correlates of graduation rates and can be misleading if key variables are excluded. As such, I conducted case studies to ensure that I have the most complete information possible to inform my policy recommendations. Table 6 and Table 7 list the predicted graduation rates (based on my regression model), actual graduation rates, and percentage difference between the two, for all UC and CSU colleges. The colleges are ranked in order from those colleges doing the best (as predicted by my regression model) at graduating students, to those doing most poorly.

Table 6. Actual vs. Predicted Graduation Rate for All UC Colleges

University of California Colleges			
Institution Name	**Predicted Graduation Rate**	**Actual Graduation Rate**	**Percent Difference**
University of California-San Diego	76	85	11.60
University of California-Los Angeles	82	90	9.14
University of California-Irvine	82	85	3.62
University of California-Berkeley	87	90	3.06
University of California-Santa Barbara	80	80	0.11
University of California-Santa Cruz	74	73	-1.82
University of California-Davis	84	82	-2.76
University of California-Riverside	73	67	-7.66
University of California-Merced	67	58	-12.99

Table 7. Actual vs. Predicted Graduation Rate for all CSU Colleges

California State University Colleges			
Institution Name	**Predicted Graduation Rate**	**Actual Graduation Rate**	**Percent Difference**
San Diego State University	57	66	16.76
California Maritime Academy	53	62	16.32
California State University-Channel Islands	48	54	11.71
California State University-Bakersfield	37	41	11.32

California State University-Stanislaus	45	49	8.70
California State University-Chico	55	59	7.17
Sonoma State University	54	57	4.93
California State University-San Luis Obispo	72	75	4.62
California State University-San Bernardino	44	45	1.74
California State University-San Marcos	48	49	1.53
California State University-Fresno	49	49	-0.69
California State University-Long Beach	57	54	-5.64
California State University-Northridge	49	46	-6.78
California State University-Los Angeles	39	36	-7.89
California State University-East Bay	47	43	-9.06
California State University-Pomona	56	50	-10.65
California State University-Fullerton	59	50	-15.38
San Francisco State University	54	46	-15.42
California State University-Dominguez Hills	28	24	-15.65
California State University-Sacramento	50	42	-16.16
Humboldt State University	50	40	-19.55
San Jose State University	58	46	-20.01
California State University-Monterey Bay	48	38	-21.00

In doing these qualitative studies, I looked for things that the colleges are doing (i.e. services, programs, faculty activities, mission and culture) that could be leading to increased graduation rates (that were not controlled for in my regression model). I studied the two best performing and two worst performing colleges in both the UC and CSU systems that I identified as having much better or much worse six-year college graduation rates than my regression model would predict. In the UC system, I studied UC San Diego and UCLA (best performing); as well as UC Riverside and UC Merced (worst performing). In the CSU system I studied San Diego State and CSU Maritime (best performing), and San Jose State and CSU Monterey Bay (worst performing).

As I gathered the information, I took notes on my findings from each of the colleges on different factors that could be leading to higher or lower graduation rates than expected, and were not included in my regression model. I then compared my notes for the colleges doing well and

those doing poorly, and found that four themes emerged regarding the different things that colleges are doing that could be leading to increased graduation rates. These themes include: programs and services that provide academic support, social support, or financial support to students, and also the mission and culture of the college. I used these themes to organize and present the information obtained, as these types of support have been identified as being very important in helping students to be successful in college (Herndon and Hirt, 2004; Kuh, 2005).

One thing that was very surprising as I reviewed the predicted graduation rates for UC's and CSU's, is the difference between the predicted graduation rates of the UC colleges, which range from 67 to 76 percent, compared to the rates predicted for the CSU colleges, which range from 48-57 percent. There is no overlap between the two systems and even the highest predicted rate in the CSU system (57 percent for San Diego State) is 10 percent lower than the lowest predicted rate for a UC college (67 percent for UC Merced). California's Master Plan calls for UC's to admit the top 12.5 percent of high school graduates based on academic and test scores. CSU's are expected to admit the top third of high school graduates based on the same measures (Johnson, 2010). While it is to be expected that since UC's typically admit better prepared students than their CSU counterparts, they would have higher graduation rates, however, the difference in the expected graduation rates of colleges within the two systems is more drastic than I anticipated. I would expect there to be some level of overlap between the two and would hope that the CSU's expected to have the best rates are somewhere near the middle rates expected at the UC's.

In this chapter, I summarize my findings around each of these four themes. I describe the programs, services, or characteristics of the college that fall into these categories, which I believe may be leading to increased graduation rates for the colleges doing well and decreased graduation rates for the colleges doing poorly. At the end of the chapter I summarize the things that I

identified as being key take-aways in each of the four themes, in terms of factors that could be leading to increased (or decreased) graduations rates at these colleges. In the final chapter, I relate my case study findings to the final results from the regression analysis, and also use information gathered in reviewing the literature, to inform policy recommendations for California on things that could be done to increase public college graduation rates.

Methods Used to Obtain Information

I used a variety of methods to obtain as much information as I could on the four colleges studied. First, I looked at available data. I gathered information from the college's websites, journal articles, news articles, and any publications published by the college. Next, I contacted individuals at each of the colleges to answer remaining questions and garner insight into the college that I could not obtain using available data. I contacted the Academic Dean at Cal Maritime, Assistant Dean at both UDSD and UCLA, and the Dean of Student Affairs at SDSU. I was able to interview individuals at Cal Maritime and UCLA. I also interviewed the Vice President of Student Affairs at Sacramento State. Although Sac State is not one of the schools doing the best or worst (their predicted graduation rates is 50 percent and their actual graduation rate is 42 percent) I thought it would be useful to get input from Sac State since I have more direct knowledge of their programs, services, and students. Even though I was not able to interview individuals at all of the colleges, I feel that the information I obtained using available data and the interviews I did, is sufficient in allowing me to identify things that these colleges are doing to improve graduation rates that I did not control for in my regression model. My findings from these studies are exploratory, preliminary findings that I am using combined with my regression findings to draw conclusions make policy recommendations for California. To fully understand all the factors that are impacting graduation rates at a college, much more in-depth

studies would need to be conducted, looking at individual student outcomes over a longer period of time.

Overview of the Four Themes

In this section, I will provide an overview of each of the four themes, and the information on the programs, services or characteristics of the college, that would be included in each of the categories. The first three themes refer to certain types of support offered by colleges through various programs and services: academic support, social support, and financial support. Studies have identified each of these types of support as being essential in assisting students to succeed. (Herndon, 2004; Kuh et al., 2006). The fourth theme centers around the mission and culture of a college, these elements have also been identified as being a determinant of successful student outcomes (Birnbaum 1988; Ewell 1989).

Academic Support Programs and Services

One type of support that students need while attending college is academic support, which is used to provide students with the academic skills and tools needed to be successful in college level courses. Colleges provide academic support to students through a variety of programs and services including: tutoring, contact with faculty, academic guidance and advising, learning communities, and remedial courses. Academic support is also provided through campus facilities that provide resources to facilitate student learning such as libraries, computer labs, math labs, and writing labs.

Social Support Programs and Services

In addition to academic support, social support is vital so that students feel that they have a support system around them offering encouragement and advice when needed. Social support is especially important for students who do not have a strong network of support already in place; this could include students from disadvantaged backgrounds or those that move a great distance

from home to attend college (Tinto, 1987; 1993). Students can obtain social support from student clubs or organizations on campus, interaction with faculty, peer mentoring and tutoring, new student orientation and welcome programs, student government, participation in collegiate sports and any other social activities that bring student together to share common experiences.

Financial Support Programs and Services

A third form of support that students need when attending college is financial support. College is expensive and requires students to have resources to cover the cost of attendance. Students may receive financial support from a variety of sources such as federal or state grants, scholarships, student loans, or grants provided by the college. Students may also receive financial support from parents or family resources, or from working while attending school to cover the costs.

Mission and Culture of the College

A college's mission and culture are hard to quantify or measure, however these can have profound impacts on student behavior (Kuh, 2005; Strange and Banning, 2001). Strange and Banning (2001) claim that "campus cultures and environments set conditions that affect student learning and, in turn, students influence the shape of campus environments" (p. 200). A colleges mission should also be considered, researchers claim that a when a colleges mission is well aligned with their educational policies and programs, it usually results in better student outcomes (Birnbaum 1988; Ewell 1989).

In California, the UC system and the CSU system have distinctly different missions, the primary mission of the UC system is research, while the primary mission of the CSU system is to increase access to college and produce graduates with bachelor's degrees. Even given these two different system missions, the UC and CSU colleges vary in what they perceive to be the mission of their college. The culture of a college could be described as the mission, beliefs, values,

traditions, goals, symbols, and behavior of students, faculty, staff and the institution itself. Some colleges have strong cultures, while other college's cultures may not be as well defined. Colleges with strong cultures often work to immerse new students in these beliefs, traditions, and way of life as soon as they step on campus through welcome programs and new student orientations.

Findings on Academic Support Programs and Services

As I was looking at the various forms of academic support provided by the colleges doing better than predicted and the colleges doing worse than predicted, I found that the colleges doing better than predicted offer more forms of academic support to students, and also, work to maximize access to these programs and awareness that they exist. I found that while the poorly performing colleges do offer these programs, information on the programs and services, and how to obtain them is relatively difficult to find. At some of the poorly performing colleges, the only way I could find any information on services such as tutoring, study labs, or academic advising was to specifically search for that term on their website. On the websites for the better performing colleges, links to these services were much more accessible and did not require many clicks to find. Links to these services need to be easily accessible, many students may not be aware that tutoring or study labs exist, and therefore, would not think to enter "tutoring" in the webpage search field. The remainder of this section summarizes my findings on academic support and how colleges may be using it (or not using it) to impact graduation rates.

Combining Academic and Social Support

I found that many of the colleges doing better than expected offer academic support services in addition to many services that combine academic and social support. Research has been done on the benefits of combining academic and social support to enable students to meet more rigorous academic standards while increasing the confidence they have in their own academic abilities (Stavitz Romer et al., 2009, Adelman, 1999). When provided together, these

services are successful in increasing students' academic skills and allowing them to find support in others and achieve a sense of belonging or fitting in. This sense of belonging is critical to students in helping them to succeed in college, it is especially important for disadvantaged students who likely don't have these support networks in place at home (Stavitz-Romer et al., 2009). These combined services should not replace traditional academic support such as academic guidance and advising, study labs, or other contact with faculty, but rather, combined academic and social support services (usually peer delivered) should complement traditional academic support provided by faculty and staff of a college.

The UCSD Office of Academic Support & Instructional Services (OASIS) is a learning center on campus that provides free tutoring in math, science, writing, language (including ESL), and study skills. Additionally, OASIS provides peer counseling and peer support to students. OASIS operates under the principle belief that *learning is a social process and students grow and develop the most when they are challenged, supported, and when learning is shared collaboratively* (Students.UCSD.edu, 2012). Shared learning in a social and supportive setting is believed to be the most effective. In addition to the tutoring services offered through OASIS, students can use the UCSD website to look up tutoring and study groups by department.

The SDSU Center for Academic Assistance and Training is a tutoring center designed to help students persist through their academic tenure at SDSU. The center provides one-on-one tutoring in almost every subject. Additionally, the center has walk-in labs for math and writing, and provides computers and private rooms for studying. The SDSU Service Learning and Community Engagement Programs support student learning through course based study that connects components of the course to responsive civic action by students in their local community.

SDSU offers programs and services to encourage students to engage with and learn from other students, as well as faculty. Common Experience is one program offered to SDSU students, which has high rates of participation. The Common Experience Program promotes a common conversation, encourages participation in campus life, and fosters a sense of community among students, staff, faculty and the broader San Diego community (SDSU, 2013). SDSU's Peer Mentoring Program, initiated in 2010, provides information, campus visits, and workshops to help students make a smooth transition to life at SDSU.

Maximizing Access to Academic Support Services

One of the most important components of all programs and services offered to students is that these services be easily accessible to students. As I was studying the colleges doing well and those needing improvement, I found that the colleges doing well have much more comprehensive websites where students can receive a lot of academic support services virtually, without even having to go to campus. The most common example of this was with academic advising.

UCSD maximizes access to their many academic tools and services by offering them online. They offer a virtual advising center and online degree audit and class planner. Both of these are resources to help students decide what classes to take and plan ahead so that they can reach graduation in a timely manner.

UCLA works to ensure that students have as much access as possible to academic advising. In addition to meeting with academic advisors on campus, students have the option of participating in virtual counseling, which is done using a chat room format, where students can get information on required courses, majors, available services like tutoring, or other questions they may have related to academics. ASK Email is a similar service, however it is offered by peer counselors rather than staff counselors, using ASK Email, students can submit questions about academics or available programs and services on campus and get a response within a few days.

When looking at the lower performing colleges I found that most did not offer these services online, this could be due to a variety of reasons, including not having needed staff or resources to maintain the offering of online services. However, if they could work toward making these services more accessible, it would likely result in a greater number of students being able to benefit from the programs and services offered.

Providing Information Early

I found that both of the high performing CSU's have successful programs in place where they partner with high schools in the area provide information to students to get them to start thinking about college and help to ensure that these students are academically prepared for college level work when they graduate from high school.

In 2000, San Diego State University and the Sweetwater Union High School District created a program called Compact for Success (CFS). The program involves faculty from SDSU working with teachers in the Sweetwater District to design a curriculum (starting at the 7th grade level) that meets college admissions standards. The program also created benchmarks that students need to meet to be considered college ready; those students from the Sweetwater District that met all five benchmarks were guaranteed admission to SDSU. The CFS is a nationally recognized program that has won numerous awards such as the Campaign for College Opportunity Recognition, however, more significant than the awards; the CFS program increased the number of students attending college after Sweetwater District by 120 percent (sdsu.cfs.edu, 2012).

To engage high school students and prepare them to start thinking about college, the California Maritime Academy offers the Summer Academic Enrichment Program (SAEP). The SAEP is a six-week program for high school sophomores and juniors. Students live on campus, to get the experience of a college student life. Students attend college level courses in algebra,

physics, English literature and psychology; they also participate in various activities which facilitate learning of concepts such as team work, problem solving, and critical thinking (Cal Maritime, 2013).

This important finding would not have been recognized, had I not completed the qualitative portion of my study. Using the findings from my regression analysis, I hypothesized that students in the lowest income group need, not only financial support, but also other forms of support to be successful in college. Even more important than various forms of support is the fact that students, especially those from disadvantaged backgrounds, need information in order for them to make the decision to apply for college in the first place. Working with high schools to provide information to students early, would allow colleges to reach a completely new population of students who would likely not have applied to college otherwise because of their low expectations in terms of the resources available.

Providing Students with a Road Map of Necessary Courses for their Major

Cal Martime and SDSU both provide a road map to students that shows each course they need to complete and provides a sample list for each semester. For many students, registering for courses can be very confusing, students must consider the courses required for their major, as well as general education courses, and remedial courses (if required). Additionally, many curses are prerequisites for other courses and therefore, must be taken in the correct sequence. Providing a road map is very helpful in keeping students on track and enabling them to complete a degree within six years. SDSU makes these plans available to students online; referring to them as Major Academic Plans (MAPS), using these MAPS takes the guessing out of enrolling in classes. Students are able to see their progress and look forward to see the remaining courses they need to take.

Offering Remedial Education at UC's

In reviewing the way that the best performing and worst performing colleges offer remedial education to students who need it, I made a few observations. First, I found that the colleges performing better than expected require students to begin remedial education during the summer before their first semester and combine these remedial courses with other academic support such as tutoring, counseling and workshops, to maximize student's chances of success. Most of these "summer programs" or "Early Start programs" at the colleges doing well strongly encourage or require students to live on campus so that they have a network of support and are able to establish relationships with other first time students. I found that UCLA takes a different approach to remedial education, which is offered through their Academic Advancement Program. Rather than requiring students to take remedial courses before they begin college level work, participants in the Academic Advancement Program take college level courses combined with weekly workshops that are used to supplement the course work and provide additional one-on-one assistance to these students to enable them to complete the course successfully. In reviewing the colleges doing worse than expected, I found that they tend to have more lax remedial education policies, allowing students to start slow with one-unit courses, which do not supplant the remedial education courses they must complete during the regular academic year. These policies make it so that remedial students start college already behind in the fall, and allowing them to take low unit courses slows them down even more as these students have to take more courses before they reach the level necessary to do college level work.

UCLA's Academic Advancement Program (AAP) is the nation's largest university-based student diversity program (aap.ucla.edu, 2013). The AAP provides academic advising, collaborative learning workshops, mentoring, and summer bridge programs for entering freshmen and transfer students. Rather than offering traditional remedial education, the AAP at UCLA

offers peer learning workshops that students can attend weekly to receive extra help with their coursework. These workshops are held in small groups and are designed to enhance the concepts learned in class. The goal is that by attending collegiate level courses and AAP workshops concurrently, students will be able to succeed in college level courses without having to take extra remedial courses (UCLA Interview, 2013). The AAP does not identify their services as remediation, but rather, describe their goals as "academic success and retention" and "fostering excellence in students" (UCLA Interview, 2013). Peer learning workshops are also offered by the AAP, in these workshops, students learn to work collaboratively, think critically, and articulate new perspectives (aap.ucla.edu, 2013). Many of the participants in the AAP come from disadvantaged backgrounds or are first generation college students; however, this is not a requirement for admittance to the program.

Offering Remedial Education at CSU's

In the CSU system, where a greater proportion of students enter with remedial education needs (in comparison to the UC system), changes have been made in the last few years in hopes of improving remedial education services available to students. In 2006, the CSU system implemented the Early Assessment Program (EAP). The EAP is a voluntary program that assesses students in their junior year of high school and informs students if it is determined that they will need remedial courses before beginning college level courses. By informing students earlier, the hope is that they will use their senior year of high school to improve their skills and be college ready by the time they graduate.

In addition to the EAP, in 2012, the CSU Board of Trustees instituted a mandate requiring all CSU's to offer Early Start courses over the summer and require all students found through the assessment process to need remedial math and/or English to participate in the Early Start program (interview, 2013). The mandate was unfunded and did not give CSU's a lot of time

to create their Early Start programs. Additionally, these programs were not required to supplant traditional remedial courses offered during the school year. As a result, many CSU's (in efforts to comply with the mandate given their limited funds) have implemented Early Start courses that are in addition to traditional remedial courses, which begin in the fall (Interview, 2013). These Early Start courses are often only one or two units, and do not make much progress in giving students the skills necessary to do college level work.

I found that as I looked at the best performing CSU's (SDSU and CSU Maritime), they had implemented more robust Early Start programs. Offering multiple three unit courses that replace traditional remedial courses offered during the regular school year, giving students the opportunity to complete all remedial courses over the summer so that they are able enroll in college level courses in the fall. Additionally, these campuses require students to participate in support services (such as tutoring and advising) while enrolled in the Early Start program, to maximize their chances of success.

Remedial Education at the Low Performing Colleges

When I looked at the low preforming colleges, I found a number of differences between their remedial education programs and those of the better performing colleges. First, in looking at the low performing UC's, I found that both UC Merced and UC Riverside require new incoming freshmen to take placement exams in math and Chemistry regardless of past accomplishments in these discipline areas (ucr.edu/placement test, 2013; ucmerced.edu/orientation, 2013). This policy of not considering past accomplishments could put students at a disadvantage and require them to take remedial courses they may not need adding to the time it takes them to obtain a degree. Students who have achieved certain scores on other exams such as the SAT, ACT, or AP exams should be exempt from taking UC placement tests since they have already demonstrated their skill level. In addition, UC Merced offers a variety of summer session courses to students who

want to earn extra units to graduate earlier, prepare for college, or just simply to satisfy university requirements. They do not reserve these courses for remedial education or new students, but rather offer the courses with the highest demand. Additionally, students at UC Merced make the decision on whether or not they want to participate in summer session; this includes students needing remedial courses, by making these courses optional, UC Merced is giving students the opportunity to fall even further behind their peers who are starting college level courses in the fall.

I found that CSUMB has a very laidback remedial education policy, which could actually be slowing students down, in terms of moving through the system. Incoming CSUMB students who are identified as needing remedial education are encouraged (not required like other CSU campuses) to begin these course over the summer. Students who do choose to take remedial education over the summer are only required to take a one unit math or English course. These courses act as refresher courses and are in addition to the remedial courses that the student must complete after starting in the fall. (earlystart.csumb.edu, 2012). Allowing students to take one unit remedial courses is doing them a disservice, and will only extend the time it takes them to achieve the ability to do college level work. Students who opt for the one unit course over the summer are required to take additional remedial courses in the fall. While there are some students that will require more remediation than others, this decision is not one that should be left solely up to the student, colleges need to set clear expectations and encourage students to move through the system quickly and obtain a degree.

SJSU recently implemented a summer bridge program, however, currently, the program is offered only to Educational Opportunity Program (EOP) students. While these students are likely to have more remedial education needs than other students, SJSU should work to expand the summer bridge program so that any student with remedial needs can participate. SJSU

implemented a Remediation Policy, which requires first time regularly admitted freshmen one year to complete required remedial courses. Students who fail to remediate in the allotted time (one year) will be subject to Administrative Academic Disqualification and will be placed on a one-year leave of absence (SJSU.edu/policies/remediation, 2013). This policy is relatively new, time will tell whether it works to students' advantage or just institutes another barrier that they must overcome.

Facilitating Academic Support through Contact with Faculty

I found that all of the top performing colleges promote student faculty contact and mentor programs as a form of academic support. Research has also found that even when students are not able to participate in formal faculty mentor programs, engaging in conversations with faculty outside of class or receiving personal feedback on assignments can make a big difference in increasing student persistence and success (Kuh, 2005).

Cal Maritime provides the bulk of their academic support through students' continuous contact with faculty. The student-faculty ratio at Cal Maritime is 14-1; class sizes average about 20 students to a class. This ensures that students have access to faculty to provide academic support as they are completing their courses. In addition to having access to faculty, the California Maritime Academy tutoring lab offers free academic support to students as well. In addition to completing courses, the California Maritime Academy requires that students complete an internship as part of their education. These internships are with shore-side companies, government agencies, or on commercial ships, Cal Maritime believes that gaining real world experience through on-the-job experiences is a vital part of the programs they offer (Interview, February 25, 2013).

UCSD and San Diego State both offer Faculty Mentor Programs that aim to help students to grow academically. At UCSD students work as research assistants for a UC San Diego faculty

member, completing a research project that they present at the end of the year. Students acquire research skills and experience while working one-on-one with faculty that they would not get from a regular college course. The San Diego State Faculty Student Mentoring Program serves primarily students from disadvantaged backgrounds and has a mission of supporting student engagement and development through undergraduate research, scholarship and creative initiatives (SDSU, 2013).

Findings on Social Support Programs and Services

Welcoming New Students and Setting Expectations

Welcoming new students is a great opportunity for colleges to provide as much information as possible to new students on the programs and services available to help them to be successful in college. I found that the best performing colleges really maximize this opportunity, while the poorly performing colleges could benefit a lot from improving their system for welcoming new students.

UCLA puts forth an extra effort in welcoming new students and helping them adjust to college like. The welcome starts with Bruin to Bruin, which is a phone call made to each incoming student by staff of the New Student and Transition Programs office. During this phone call, students receive information on upcoming deadlines and available services such as orientation, placement exams, financial aid, CSI, housing, parking and more (newstudents.ucla.edu, 2012). UCLA provides three different orientations to new students throughout their first year. They start with new student orientation is offered to all incoming freshmen and transfer students. At orientation, students receive information on choosing a major, course planning and graduation requirements. They also participate in workshops on available student services such as housing, financial aid, and counseling (ucla.edu, 2012). In addition to new student orientation, UCLA offers family orientation for parents and family members of new

students, and children's orientation for younger siblings of new students attending family orientation. Orientation Part 2 is offered during the fall quarter and is a one night event when new student advisors are available for drop in counseling to assist students with any questions they have in preparing for the winter quarter. Bruin Next Steps is an evening program that provides resources to students to enable them to successfully transition into their second year at UCLA. Bruin Next Steps includes various workshops that cover topics such as stress and time management, course counseling, choosing a major, and options after graduation (newstudents.ucla.edu, 2012).

I found that San Diego State also puts a lot of resources and energy into maximizing the information they can provide as they are welcoming new students. In addition to their new student orientation, which new students are required to attend, incoming freshmen and transfer students are strongly encouraged to attend the Annual New Student and Family Convocation, which is a welcoming ceremony similar to commencement for students who are graduating. Convocation is a ritual that brings new students and their families together with faculty and staff, and is used to portray core institutional values of scholarship, citizenship and leadership (SDSU, 2012).

Welcoming activities are an opportunity to introduce students to the culture of the college and set expectations early. Research has shown that when students know what is expected from them and what they can expect from the college experience, their chances of success increase substantially (Kuh and Williams, 2005; Tinto, 1993). The difference between what students expect from college and their actual college experiences is referred to as the student expectations-experience gap; colleges need to make every effort to close this gap so that students are well informed from the beginning on what to expect (Tinto, 1993). Students who have a more realistic understanding of what college life is like are more likely to make wise enrollment decisions,

devote more effort to their education, and ultimately earn a degree (Kuh, 2005; tinto, 1993; pascarella and Terenzini, 1991).

SDSU does a great job of setting expectations for students, in terms of what they can expect from college and their expected level of performance to succeed. Students learn that completion of a degree is to be their primary goal, and that they should work to achieve this goal in the shortest time possible. New students are strongly encouraged to enroll in 15 units in their first semester, rather than starting off with a light course load to get adjusted as some other CSU's advise (Nelson, 2011).

New students enrolling in Cal Maritime for the first time participate in a four-day orientation just before classes begin. The incoming cohorts are relatively small (about 300 students per year), these small cohorts allow students to create strong bonds with each other and provide support to each other as they begin college life. The maritime industry is a safety oriented industry, it is important for students to create bonds with one another and know that they need to be there to help and support each other when needed (Interview, February 25, 2013).

Cal Maritime makes their expectations very clear, by requiring all new students to declare a major before they begin taking courses. Upon selecting their major, students are presented with a four-year "roadmap" of courses; this roadmap lists all the courses that must be completed and the appropriate sequence to earn a bachelor's degree in that major within four years. From their very first semester, students are put on the road to completion (Interview, February 25, 2013).

As I was reviewing the way that the low performing colleges welcome new students, I found some differences. First, many of them encourage, but do not require students to attend orientation, as many of the higher performing colleges do. At UC Merced, students are required to pay a fee of $85 per student and an additional $75 per guest to attend orientation. While they do identify the first week of the fall semester as welcome week, UC Merced's welcome week

pamphlet is over 40 pages long, very overwhelming, and contains a lot of conflicting activities with limited information on where students can obtain information on available services.

Providing Emotional Support

Many colleges provide emotional support to students through services such as mentoring, psychological counseling, group and peer support, and other programs and services. Researchers have identified emotional support as being critical in fostering self-esteem and motivation in students (Stavitz-Romer, 2009). I found that the high performing colleges, especially UCSD, do a great job of ensuring that students have access to services that provide emotional support.

UCSD considers programs and services that offer social support to students to be extremely valuable, and effective at assisting students to stay enrolled and reach graduation. The Counseling and Psychological Services (CAPS) office offers a variety of support services to ensure students mental well-being while they are attending UCSD. Students can receive counseling services where they are free to discuss a variety of academic, personal or relationship issues (caps.ucsd.edu, 2012). The Peer Education program involves UCSD students providing education and outreach to other students. Students may also choose to participate in other support groups at CAPS, such as psychotherapy groups, growth and support groups, and psycho-education workshop, these groups meet regularly throughout the semester and focus on the acquisition of skills and strategies to meet personal goals, as well as encouragement from other students.

SDSU and UCLA both offer peer-mentoring programs that help students to make a smooth transition to college life. These programs pair up new students with graduate students who have been specially trained to help with program planning, course selection and provide advice on things such as choosing a major, and time management. At UCLA, students are paired

with a mentor for an entire semester and are encouraged to meet with or make contact with their mentor regularly.

Living on Campus

Researchers have found living on campus to be correlated with a variety of positive student outcomes, including: an easier transition for freshman, increased critical thinking skills and academic performance (Thompson et al., 1993; Pascarella, 1993; and Kuh, 2005). As I was studying the colleges doing the best, and those doing the worst (as identified by my regression model), I found differences in the percentage of first time students that live on campus and the colleges policies regarding living on campus.

At UCLA, nearly 95 percent of all new UCLA students live on campus. New students are strongly encouraged to live on campus so that they have access to all the support services available during the critical transition period. The college believes that living on campus is a vital component of college life for new students, especially for those from disadvantaged backgrounds (UCLA Interview, 2013).

One difference between California Maritime Academy and other CSU colleges is that Cal Maritime requires that all undergraduate students live on campus; students who wish to live off campus must file a petition and meet specific criteria for exemption (Cal Maritime, 2011). Their reasoning for requiring students to live on campus is first to enable them to have the support of other students around them going through a common experience, and also, to immerse them in the culture of the college (Interview, February 25, 2013).

At UC Merced, one of the low performing colleges, the exorbitantly high costs of living on campus compared to the low cost of living in the area immediately surrounding the college dissuade many students from campus living. In 2011, the New York Times estimated the cost of on-campus room and board to be around $13,720 a year, while the cost of living off campus is

around $7,000 per year. A lot of this difference is attributable to the real estate market. The UC Merced dorms were built at the height of the market, using bond funds and now must charge a high cost to pay down these debts (Brown, 2011).

Findings on Financial Support Programs and Services

Availability of Information on Types of Aid and Requirements

One of the first things I noticed as I was reviewing the financial support programs and services offered by the best and worst performing colleges was the difference in the availability of information on available aid programs, and how to apply. I found that the best performing colleges are doing a great job of providing information to students on financial aid, which can be a very daunting process, especially for new students to navigate. However, I found the low performing colleges to be lacking in the availability of information and the type of information provided to students regarding financial aid.

Most of the high performing colleges offer financial aid calculators or estimators that are good tools in planning for college expenses. These calculators allow students to enter information on their own income and assets as well as that of their parents to estimate the amount of aid for which they may qualify. UCSD and UCLA also offer a loan repayment calculator and loan counseling so that students fully understand what they are committing to if they chose to finance a portion of their education using student loans.

Financial aid timelines are also very helpful in assisting students with keeping track of all the deadlines in the process of applying for financial aid. These timelines are displayed month by month and provide deadlines, important details and possible scenarios for each step in the financial aid process.

The best performing colleges also provide answers to frequently asked questions on their Financial Aid Office websites to enable students to get their questions without having to contact

the financial aid office directly. UCSD has a document on their website titled Myths of Financial Aid, which dispels commonly believed myths about financial aid that may be preventing students from applying for or seeking out information about financial aid. Ensuring that all students have accurate information about the types of financial aid available is imperative, especially for students who lack the financial means to pay for college.

The front page of SDSU's webpage shows that the entire month of February is financial aid awareness month at SDSU. Throughout the month, the SDSU Office of Financial Aid and Scholarships staffs financial aid information tables all over the campus where students can obtain information on financial aid and ask any questions they may have on the process or types of aid available.

As I was looking at the information provided by the low performing colleges, I found that all of them, especially CSUMB, are lacking in terms of the financial aid information available to students. The CSUMB Financial Aid Office website includes very little information on the types of aid available, and how to apply. There is not a timeline or list of due dates, informing students when various steps need to be completed. The link titled *Financial Aid Process* only states three steps and does not include how to apply or when to file the FAFSA. Three steps listed are: (1) Financial Aid Estimated Award Letter; (2) Missing Information Letter; and (3) Financial Aid Email. They do provide a list of financial aid deadlines that gives information on deadlines that exist such as the add/drop deadline, Extension of Payment Deadline, and Document Deadline. However, this list does not state when the deadline is, only that it exists. UC Merced and UC Riverside are also lacking in the information provided to students around financial aid. Their webpages give information on the types of aid available, such as grants, loans, scholarships, federal work-study. However, aside from defining each type of aid they do not give information on potential sources of aid (i.e. what grants are available?).

Ease of Contacting Financial Aid Advisors

Applying for financial aid is a very long and complicated process. Being able to contact advisors in the financial aid office is critical for students to ensure they are completing all requirements and get their questions answered. I found that most of the high performing colleges provide ways for students to contact individuals in the financial aid office via email to get quick information and responses to their questions. UCLA allows students to access all of their financial aid information online through My Financial Aid Office (MyFAO). One of the most used resources on the UCLA financial aid webpage is the AskFAO mailbox (fao.ucla.edu, 2013). Students can submit questions and get general information or information about their own personal record from financial aid office staff through the AskFAO mailbox.

SDSU provides AidLink, which assists students in obtaining information and applying for financial aid. Using the AidLink system, students and parents are able to log in securely and view their financial aid record online. Contact information for the SDSU Office of Financial Aid and Scholarships is available online to contact someone by phone, mail or, walk into the office. Students at Cal Maritime may obtain contact information for financial aid advisors online, and are encouraged contact these individuals directly through email or by phone to obtain information about financial support services available to students.

In addition to working to ensure that students are informed on financial aid options, UCLA offers numerous services for students in financial, or any other form of crisis. Any student that finds him or herself in economic distress (or experiencing any type of crisis) is encouraged to contact the UCLA Consultation and Response (CR) Team directly. The CR team operates as an early warning system and works with other units on campus including the associated students, AAP, Financial Aid Office, student Financial Services Office, UCLA Police, and others. They take a comprehensive approach to determine as many options as possible for the student

experiencing difficulties, with an ultimate goal of keeping them in school (UCLA Interview, 2013).

Most of the low performing colleges were lacking in the amount of information provided to students. The lack of information provided, combined with the difficulty in contacting individuals in the financial aid office for assistance, puts students attending theses colleges at a disadvantage in terms of their chances of meeting all financial aid requirements and receiving all the aid may qualify for.

Assistance in Completing Forms and Applications

Applying for financial aid is a very long and complicated process. The process starts with students filing the Federal Application for Student Aid (FAFSA). The form consists of over 100 questions, which cover information on assets and income of both the student and their parents. The FAFSA also asks questions on dependency, household size, the number of college students in the family, and many other topics. After filing out and submitting the FAFSA, there are a multitude of other deadlines and requirements that students must meet to qualify for different financial aid programs. Students, especially those from disadvantaged backgrounds need support in filing the necessary forms and meeting deadlines so that they can receive any financial aid for which they qualify.

Cal Maritime works to provide this information to students early, before they even apply to college. In addition to the information available to enrolled and prospective students, Cal Maritime hosts a FAFSA workshop annually at Vallejo High school for students and families to provide information on applying for financial aid.

The SDSU Office of Financial Aid and Scholarships hosts FAFSA workshops to assist current students at SDSU in completing their FAFSA. The SDSU financial aid office website provides a comprehensive list of documents that students should bring to these workshops. The

SDSU Office of Financial Aid and Scholarships offers a vast amount of information on their webpage on the various types of aid available, how to apply, and eligibility requirements.

In looking at the information and services provided by the financial aid offices of the low performing colleges, I found that the area where they are most lacking information is in providing assistance with the FAFSA. The CSUMB financial aid office provides very little useful information to students completing the FAFSA. Under the Link *FAFSA Filing Tips,* the financial aid office provides tips such as: "*There are approx. 100 questions that need to be answered to complete the application.*" This sentence would be daunting to any student especially students who have little help or support, first generation students, those with language barriers, etc. Further down on the page it states "*Making mistakes on your FAFSA could delay your application and possibly make you lose out on some financial aid*" Given the little information and resources available to answer students questions on the FAFSA, it is likely that anyone could make a mistake on this very complex form. These tips are not very helpful to students, especially those filing the FAFSA for the first time. Even more disappointing is that instead of encouraging students to contact the financial aid office at CSUMB or come in for assistance in filing the FAFSA or other financial aid questions, the financial aid office directs them to contact the Federal Student Aid Information Center using an 800 number.

When it comes to financial aid, providing information and assistance in completing forms and requirements should be of highest importance to college financial aid offices. Especially in these tough economic times, when tuition is quickly increasing while incomes are staying the same or even decreasing, access to financial aid could mean the difference between a student attending college and not.

Findings on Mission and Culture of the College

Academic and social support programs and services that consider the characteristics of the students at a college and work toward achieving the mission of the college can help to increase student success in college (Kramer, 2003; Kuh et al. 2005). However, Kuh (2005) argues that simply offering these programs and services does not guarantee that they will increase student success. Instead, student support programs and services must be well thought out and designed to for the students they are intended to reach. Lastly, these programs and services must be firmly rooted in a student success-oriented campus culture (Kuh et al., 2005).

Comparing Mission Statements of High and Low Performing Colleges

Generally, I would say that a college's mission describes their desired outcomes and objectives. Some colleges also include goals or a vision statement, which are used to highlight specific targets or performance objectives, and define a colleges plan for the future. The mission statements of each of the high performing and low performing colleges that I studied are contained in Appendix E. I found a lot of variation between the mission statements of the eight colleges I studied. I also found some major differences between the missions of the higher performing colleges and the missions of the lower performing colleges.

In reviewing the mission statements of the top four performing colleges, I found that all four contain the word "education" in the first sentence of their mission statement. I did not really think this was very significant, until I reviewed the mission statements of the bottom four performing colleges. I found that only one of the bottom four colleges, CSU Monterey Bay, has the word education in the first line of their mission statement. San Jose State does not contain the word education at all in their mission statement. UC Merced and UC Riverside both have the word education in their mission statements; however, it is toward the end (in the last paragraph) for both. Instead, both of these colleges highlight their focus on research.

The differences in the mission statements between the high performing colleges who list education in their first sentence and the low performing colleges that do not place the emphasis on education is important to consider. If UC Riverside and UC Merced identify their mission as being research driven, not to provide education, then perhaps this is why they have lower than expected graduation rates. I believe that this topic could be studied further. As state policies are made and changed; colleges are, to some degree, told what their mission should be (i.e. to provide access, or to graduate students). Since I am using 6-year college completion rates as my dependent variable and comparing colleges on this measure, it is not surprising that the colleges that have a primary mission of providing education do much better than colleges for whom, education is not their primary focus.

Facilitating a Culture of Inclusion

Assessing the culture of a college is difficult, as it is not something that you can really see or measure. However, I did find as I was reviewing the best performing and worst performing colleges, that those that are performing well, really work to facilitate a culture of inclusion by requesting input from students and individuals in the community as decisions are being made. I did not see these efforts being made by the lower performing colleges. By seeking input before making changes, these colleges make the decision-making process more transparent and give students satisfaction knowing their opinions are heard.

UCSD strives to maintain a culture of inclusiveness and collaboration. Students are involved in decision-making and planning for the future of UCSD, this gives them a sense of ownership and responsibility. One way that UCSD involves students is in updating their strategic plan. UCSD is continuously updating their strategic plan, they post all updates to the strategic plan web page, titled, *Defining our Future.* On this page, they also ask for input into the planning process from students, faculty, alumni, and the community. There is an electronic submission

form that individuals can complete and submit online to provide their opinion, this form poses the question: "*How can UC San Diego better serve the San Diego and California community and economy?"*.

UC San Diego seeks input from students in response to other changes as well. Currently, UCSD is proposing some changes to their transportation program that are planned to take place in July 2013. All of the proposed changes, which were developed using input obtained through campus surveys, are posted to the UCSD webpage. In addition to offering information on the proposed changes, the webpage includes information on scheduled town hall meetings and an email address that can be used to provide feedback, opinions, and ask questions.

UCLA values open access to information and mutual respect for individuals. UCLA makes every effort to enable a culture of openness, support, and inclusion (about.ucla.edu, 2011). Beginning with the Bruin-to-Bruin phone call, UCLA works to make students feel included from the time they make the decision to attend UCLA. Through their multiple orientation programs, and numerous programs and services that combine academic and social support, UCLA works to ensure that student have access to the resources they need to be successful.

I also found that the successful colleges introduce students to the campus culture early, through the welcoming activities, offered to get students involved. These welcome activities are vital in immersing students in the campus culture and setting expectations so that they are prepared to do what is expected of them.

College Leadership

As I was looking at the mission and culture of the colleges, I found that another factor that could be hindering the success of UC Merced is that, not only are they a new campus (opened in 2005) but they have had a few leadership changes during that short period. Dealing with change is challenging in any organization, especially when the organization is relatively new

(Liu, 2010). The quick turnover of college leaders has likely made it hard for UC Merced to develop a strong culture or create traditions.

UC Merced is the newest of the UC campuses. Since opening in 2005, UC Merced has seen a few different leaders: founding Chancellor Carol Tomlinson-Keasey was in charge from 2005 to 2007; Sung-Mo "Steve" Kang led the campus from 2007 to 2001, and Dorothy Leland, the current chancellor, started in 2011. This constant change in leadership has likely made it difficult for UC Merced to establish a culture and traditions and to figure out how they fit within the overall UC system. UC Merced is the smallest campus in terms of enrollment, with much smaller incoming cohorts than other UC campuses. Given that they are so different from other campuses in the UC system (much newer and smaller); perhaps UC Merced needs to look at implementing policies better tailored to their students, not the traditional UC campuses which have a very different student body.

A Brief Review of My Main Findings in Each of the Four Themes

Academic Support

In looking at the academic support programs and services provided by the best performing and worst performing colleges, I found that the best performing colleges offer a lot of programs and services the combine elements of academic and social support, in addition to their traditional programs that focus primarily on providing academic support. I also found that maximizing access to academic support services and working to provide information early, and to as many students, or prospective students, as possible is imperative to student success. I fund that the top performing colleges work to provide detailed roadmaps to students that display the courses required to graduate in their major; these maps are very helpful in setting expectations and keeping students on track.

Regarding remedial education, I found some key differences between the best performing colleges and the worst performing colleges. Specifically, I found that the best performing colleges set expectations early and establish a sense of urgency in students needing remedial education, to minimize the amount of time it takes these students to reach the level necessary to succeed in college level courses. I found that the worst performing colleges allowed students to stretch out their remedial education over multiple semesters, which only works to put these students further and further behind their peers.

Social Support

I found that the best performing colleges put extra effort into providing social support to students as soon as they declare their intent to register. These colleges use the opportunity of welcoming new students to provide mandatory orientations during which, they provide information about many programs and services available to help students to be successful in college, by making these orientations mandatory, they maximize the number of students that receive this vital information. The top performing colleges also use orientation and welcome week as an opportunity to set expectations, so that students know what they are expected to achieve. The low performing colleges could improve in the way they welcome students, starting by instituting free mandatory orientations, and using these orientations to provide as much information as possible to incoming students so that they are aware of the services and programs available. I also found emotional support, provided through services such as mentoring and psychological counseling, to be very important in fostering self-esteem and motivation in students. Lastly, I found that the best performing colleges strongly encourage students, especially new students to live on campus, and consider living on campus to be imperative to student success, especially for students from disadvantaged backgrounds. Overall, I found that the low

performing colleges have a smaller percentage of students living on campus in comparison to the best performing colleges.

Financial Support

Regarding financial support, I found that the availability of information is of paramount importance, especially at colleges with a greater proportion of low income students. I also found the best performing colleges to have much better systems in place for students to contact advisors in the financial aid office to get their questions answered quickly. Finally, I found the best performing colleges to be doing a superior job in comparison to the worst performing colleges at providing assistance in completing and submitting all required financial aid forms.

Mission and Culture

I found major differences between the mission statements of the best performing colleges and those of the worst performing colleges. Specifically, I found that the mission statements of the best performing colleges state a primary objective of providing education, while the mission statements of three of the four worst performing colleges have other areas that they identify as being their primary focus. This difference in the missions of the colleges could partially explain why certain colleges ranked lower given that my dependent variable of college completion rates, assumes that the focus of a college is to provide graduates. I also found that the best performing colleges facilitate a culture of inclusion, which varies from the cultures of the worst performing colleges, that do not appear to solicit feedback from students on changes they would like to see happen.

In Closing

While reviewing the top four and bottom four performing colleges (as identified by my regression model), I found a number of factors that could be impacting their graduation rates that were not controlled for in my model. In the next chapter, I offer policy recommendations for

California on things that could be done to increase college graduation rates at California's public universities. I also describe the limitations of my study and identify opportunities for future research.

Chapter 5

CONCLUSION

The purpose of this study has been to identify how financial aid and other factors influence college graduation rates and to make recommendations on policies that could be used to increase graduation rates at public colleges in California. I obtained data on all four-year public degree-granting colleges in the United States. I used regression analysis to identify the factors that impact college graduations and measure the magnitude of the impact to determine which factors in my data set are the largest contributors to graduation rates. I also used my data set to predict the expected six- year graduation rate for each of the colleges, based on characteristics of the college, students, financial aid, and social characteristics of the state in which the college is located. I compared the predicted graduation rates to the actual graduation rates for all colleges in California and identified colleges that are doing much better than predicted at graduating students in six years. I compared the practices of the highest and lowest performing UCs and CSUs to look for any differences (not controlled for in my model) that could explain the disparities in their outcomes.

In this chapter, I present my recommendations in three categories: first, I present my financial aid recommendations, followed by recommendations for public colleges in California on factors outside of financial aid that were found to have a positive impact on college graduation rates. Lastly, I provide some general state policy recommendations that would assist in increasing the percentage of California college students at public

schools that earn a bachelor's degree in six years. This chapter concludes by explaining the limitations of my study and identifying opportunities for further research.

Federal Financial Aid Policy

In recent years, federal financial aid policies have become a popular subject of political debate. President Obama has identified lagging graduation rates, and decreased affordability of higher education as issues of concern and has committed to a goal of increasing the percentage of Americans, ages 25 to 34 that hold a college degree. Obama has expressed the intent to invest more federal dollars in financial aid to increase affordability, which has drawn attention to federal financial aid policies as researchers question whether current policies are achieving what is intended.

In the last few months, several papers have been published on the federal financial aid system and policies as part of the Bill and Melinda Gates Foundation's Reimagining Aid Design and Delivery (RADD) Project. As part of the RADD Project, the foundation provided $3.3 million in grants to 15 higher education policy organizations to be used to fund studies, which focus on identifying ways to use federal financial aid dollars to increase the number of college graduates in the United States (Nelson, 2013). The Bill and Melinda Gates Foundation funded these projects in hopes that the reports would influence policy conversation around federal financial aid as congress is preparing to renew the Higher Education Act. The reports describe the current federal financial aid system as broken. One report refers to the system as "inefficient, inequitable, and inadequate" (Dannenberg and Voight, 2013); while another report claims that the current system is "based on a set of assumptions that no longer hold" (Doyle, 2013). Nearly all of

the papers call for an overhaul of at least part of the nation's financial aid system. While many of the 15 papers present recommendations that conflict with one another, these studies represent a step in the direction of rethinking federal financial aid policy. Time will tell whether the United States is ready to make changes in the programs and services offered to help students to pay for college.

California's Recent Financial Aid Policy Changes

California has made some recent changes to their state financial aid programs that are likely to have some effects on student outcomes in the coming years, yet given the recent implementation of these changes, I am not able to accurately discern what the impacts will be to California going forward. In this section, I provide an overview of the recent policy changes regarding California's financial aid programs.

In 2012, California made some big changes to their Cal Grant Program, which is their largest state financial aid program. The 2012 budget act imposed across the board, 5 percent cuts on maximum Cal Grant awards at private institutions, and put in place additional cuts that will are being phased in over time (Fain, 2012). In addition to the cuts, the budget act instituted eligibility requirements that colleges must meet in order for their students to be eligible to receive Cal Grants. Starting in 2012, colleges are required to have a six-year graduation rate of at least 30 percent for their students to be eligible for participation in the Cal Grant program. Additionally, colleges cannot have a three-year cohort default rate above 15.5 percent on federal student loans. The California Student Aid Commission posts a list of eligible Cal Grant schools on their website. These changes reflect the shift from the goal of access to focusing more on college completions.

Supporters of the changes to the Cal Grant Program argue that these changes are long overdue, referring to the changes as a sensible way to hold colleges accountable for student outcomes (Fain, 2012). The modifications to the Cal Grant program are recent; as such, the effects of these changes and their impact on college completion rates will take some time to be fully realized. Over time, we will be able to see whether these changes achieved the outcomes that policymakers were looking for.

Financial Aid Recommendations

In starting this thesis, the intent was to make recommendations relating to state financial aid policy (i.e. identify programs that are most effective, how aid should be distributed, best ways to provide information to students, etc). However, analyzing the findings of my regression, looking at the colleges doing the best and worst at graduating students, and reviewing available literature on financial aid and other forms of student support, I have found other factors to be more influential in increasing college graduation rates than financial aid factors alone. Surprisingly, I found that financial aid factors were among the least influential factors in my model in terms of their impact on college graduation rates.

While my study did not lead to specific recommendations on additional policy changes that should be made to California's state financial aid programs and services to increase graduation rates, I did find some things that colleges can do to ensure that students are getting the most out of the aid programs and services available. These recommendations are presented below. In the next section, I offer a number of

recommendations with respect to programs, services, and practices that public colleges and California can use to increase graduation rates that are not related to financial aid.

Maximize the Availability of Financial Aid Information

One of the first things I noticed as I was reviewing the financial support programs and services offered by the best and worst performing colleges was the difference in the availability of information on financial aid programs, and how to apply. I found that the best performing colleges are doing a great job of providing information to students on financial aid available, and how to apply. The financial aid application process can be very intimidating, especially for new students to navigate, making information and resources available to students (especially those from disadvantaged backgrounds) is vital to keeping them enrolled and increasing their chances of graduation.

Colleges need to work to ensure that financial aid information is available and that students can access this information easily. Colleges can do this in a number of ways. I found that the best performing colleges provide a large amount of information to students on their website and allow students to log in electronically to manage their financial aid account and view awards. The best performing colleges also staff financial aid information tables all over the campus where students can obtain information on financial aid and ask any questions they may have on the process or types of aid available.

Financial aid calculators or estimators are also good tools that make it easier for students and their families to plan for college expenses. These calculators allow students to enter information on their own income and assets as well as that of their parents to

estimate the amount of aid they may qualify for. Colleges should offer these calculators that are preset with the costs of attendance at that college specifically.

Colleges should also provide updated financial aid timelines to assist students with keeping track of all the deadlines in the process of applying for financial aid. These timelines should be laid out month by month and provide deadlines, important details and possible scenarios for each step in the financial aid process.

Partner With High Schools to Provide Financial Aid Information Early

I found that the partnerships that SDSU and Cal Maritime have established with high schools in their area to provide information to students and promote a college going culture have been very successful in reducing the number of barriers facing students in regards to information availability and resources. Colleges across the state should work to implement programs such as these in their community to increase awareness about the programs and services available to assist students in applying for and attending college. Organizations such as the National College Access Network (NCAN) could help in working with communities to create programs and provide this information at high schools. The NCAN supports a network of state and local college access programs and that provide counseling, and advice on topics such as applying for college and financial aid to students and families (NCAN.collegeaccess.org, 2012). California Cash for College Workshops are also offered to guide students and families through the financial aid application process and provide assistance in filling out financial aid forms. Similar formats could be used to offer these workshops in high schools. As stated earlier, working with high schools to provide information early, especially those schools with a

larger percentage of disadvantaged students, would allow colleges to reach a whole new population of students who would likely not have applied to college otherwise.

Make it Easy for Students to Contact Financial Aid Administrators for Assistance

Applying for financial aid is a very long and complicated process. Being able to contact advisors in the financial aid office is critical for students to ensure they are completing all requirements and get their questions answered. I found the best performing colleges to have much better systems in place for students to contact advisors in the financial aid office to get information and answers to their questions.

The lack of financial aid information provided by the low performing colleges, combined with the difficulty in contacting individuals in the financial aid office for assistance, puts students attending theses colleges at a disadvantage in terms of their chances of meeting all financial aid requirements and receiving all the aid for which they may qualify. Colleges should post a list of commonly asked questions and answers on their website, and should also have an email box dedicated to questions on financial aid that students can use to submit questions and expect a quick response.

Other Recommendations for California's Public Colleges

This study finds factors outside of financial aid to have a more significant impact on increasing graduation rates than changes in financial aid factors alone. More importantly, I found that a more holistic approach focused on how we can provide all types of needed support to get students through college is essential. Financial aid is only one type of support that helps students to get through college, and if we really want to improve California college students' likelihood of success we need to look at all types of

support and ways that a college environment (mission, culture, faculty, activities, academic and social support) encourage success. The following are recommendations identified through my research that would work to increase graduation rates at public colleges in California.

Set Expectations Early, Remind Students Often of What is Expected of Them

If California public colleges want to increase graduation rates, they need to make it clear that completion is the expectation and that they expect students to achieve this expectation as quickly as possible. I found that most of the top performing schools in terms of their actual graduation rates vs. those predicted by my model, make expectations of completion very clear to students before they even enroll in courses. San Diego State, UCLA, and CSU Maritime spend a good portion of their welcome orientations setting the expectation of graduation for students, along with creating a sense of urgency in reaching this goal, they work to ensure that when students leave orientation, they know what is expected of them going forward (Interviews, 2013). As new students attending college for the first time, many students do not know what to expect, and more importantly, they do not know what is expected of them. Below, I provide some examples of practices identified through my research that colleges could use to make expectations clear for students and keep them on the path to graduation.

- Encourage students to enroll in a full course load (preferably 15 units but no less than 12) right away, similar to San Diego State. Ethan Singer, SDSUs associate vice president for academic affairs, credits this practice for getting students through school to graduation faster (Nelson, 2011).

- Require that students select a major before enrolling in their first semester courses; (like CSU Maritime) this will eliminate the problem that occurs when students are just taking courses for the sake of taking courses and not working toward a specific goal or degree. Research finds that undeclared students have lower graduation rates than students who select a major right away. Interestingly, undeclared students are also found to have lower graduation rates than those who select a major right away, and later switch majors. (Tepper, 2012; Antoine et al., 2011)
- Provide a detailed course road map specific to students majors to keep them on track. A useful way to do this is through a "virtual degree estimator" which is an electronic tool that students can access online, that analyzes students' transcripts and tracks their progress against program requirements to determine how close they are to completion. It displays their progress in a visual, easy to understand format (like a map) so that students can literally see their progress, and where they need to go (Gee, 2013).
- Check in with students often, to assess their progress and remind them of the ultimate goal they are working toward (graduation). Colleges can check in via email, sent toward the end of the semester, or send reminders to students that pop up when they sign in to enroll in courses for the following semester. Students need to be held accountable for their performance, continuous contact is necessary to establish a sense of urgency in students (Kuh et al., 2005).

Require Students to participate in Mandatory Advising

Colleges should require new students, first time transfer students and those from disadvantaged backgrounds to participate in mandatory advising sessions throughout their first year. Continuous required advising keeps students on track and accountable and enables colleges to identify problems before they lead to drop outs. Sacramento State requires incoming freshmen to participate in advising throughout their first year, and has found this program to have great success in keeping students enrolled and on track to graduate (Interview, 2013). Providing this type of advising to such a large percentage of students would be very difficult given current fiscal constraints on California's public colleges, state leaders would likely need to provide additional funding to make this possible.

Reform Remedial Education and Require Concurrent Participation in Support Services

The topic of remedial education is one that has received much attention and while there are multiple theories as to the best way to provide remedial education, additional research should be done to look at California's education system (both K-12 and higher education) and how to best provide remedial education to students who need it. Since the focus of my thesis was not on remedial education, I am not offering a solution as to what remedial education should look like in California. However, given my findings, I propose some changes that would improve the system in place now.

One change that successful colleges made in their remedial programs is to require students who place into remedial level courses to participate in academic advising sessions, academic support services such as tutoring, and create individualized academic

plans so that they have a plan in place and are aware of the courses they need to complete (Gee, 2013). This format of combining remedial education with student support services seems to be successful in getting students to complete remedial courses faster and continue enrolment into collegiate level courses (Gee, 2013). At UCLA, students that need extra academic assistance participate in the Academic Advancement Program, instead of taking remedial courses before enrolling in college level courses. While in this program, students participate in weekly peer learning workshops that are aligned with the course they need assistance with. These workshops offer more one on one support and allow students to ask additional questions in a supportive environment. UCLA has found this format of students taking collegiate level courses and weekly workshops concurrently (rather than remedial courses first followed by collegiate level courses) to be successful in bringing students to the level they need to be academically. This format is one that could be mirrored in other colleges by devoting more resources to supportive academic services and less to providing remedial courses. Students would enroll in collegiate level courses combined with an academic support component (weekly workshops attended like courses) so that they receive additional assistance but are not required to take additional courses before starting collegiate level work.

Another recommendation regarding remedial education that has been proposed by researchers and was confirmed in this study is to shorten the length and number of remedial courses that students are required to complete. Instead of requiring students to take long remedial course sequences, Gee (2013) recommends that instruction take the form of short modules, refresher courses, or supplemental instruction that accompanies

collegiate-level classes. I found that the colleges that are more successful in graduating students are offering remedial courses that are completed quickly (over the summer) and are providing support services to students taking these courses. When I studied the colleges needing improvement, I found that they give students the option of starting remedial courses over the summer or waiting until the fall and also allow students to take 1 unit remedial courses which would extend the time it takes to reach collegiate level courses. Studies state that over one-fourth of 4-year college students who have to take three or more remedial classes leave college after the first year (Adelman, 2005; CCSSE, 2005). Furthermore, as the number of required remedial courses increases, the odds that the student will drop out will also increase (Burley, et al., 2001).

The way in which students are assessed to determine the need for remedial courses is another area that should be explored. Through the Early Assessment Program, CSUs are working to asses students earlier to determine the need for remedial education so that students have time to improve their skills while they are still in high school. I think this is a positive change for California's college system; however, it still relies on scores on standardized tests in placing students in remedial education. Many researchers posit that students (especially those from disadvantaged backgrounds) have hidden talents and abilities that are often not reflected in standardized test scores that are used to determine a student's level of academic ability (Sternberg, 2005; St. John et al., 1999). While assessing students earlier is a good start in improving remedial education, we also need to look at the way in which students are assessed and determine if other methods of assessment would be better determinants of student's ability.

Create Early Warning Systems to Keep Students in School

Colleges should work to create early warning systems to increase their chances of identifying students on the verge of dropping out. UCLA operates an effective early warning system that could be used as an example for other colleges looking to implement something similar. If a student experiencing difficulties is flagged early enough, colleges can provide support services to the student to increase their chances of staying enrolled and reaching graduation. Early warning systems are especially important for students who start college with risk factors already in place (i.e. low income, first generation students, academically unprepared, attending part time, working more than 30 hours per week, commuter students) or those students who appear to be struggling academically. (Kuh, 2005; Tagg, 2003). These early warning systems can be a vital resource for new students who may have a hard time becoming adjusted to college life.

Offer Services on a Small Scale and Implement a One-Stop Approach

At large, organizationally complex campuses, such as many of the UCs and CSUs in California, it would be difficult to immediately adopt and implement new programs and services campus-wide. Rather, colleges should start by providing new programs and support services to a targeted group of students, then scale up. This would allow them to address any issues that may arise, so that when the programs and services are expanded to more students, they operate as effectively as possible.

Institutional research shows that students in high-risk courses (courses with high dropout rates, due to academic rigor) are almost twice as likely to seek tutoring when it is available in their own residence hall, as when the same service is provided in other

campus locations (Kuh, 2005). Student use of academic skills centers increases when the centers are moved closer to where students live, thereby increasing access. Additionally, students who use these centers are more likely to persist into their second year of college (Kuh, 2005). Colleges need to implement these support services on a small scale, close to students, and work to offer multiple services in the same location. By offering multiple services in one location (a One-Stop Approach), colleges are able streamline information so that students are not forced to go to multiple offices and locations to obtain services. Offering these services close to students may be especially difficult for CSU colleges, which often have a small proportion of students who live on campus. In these cases, CSUs should work to maximize the percentage of at risk and underprepared students who live on campus, as these are the students most in need of additional support.

If it is not possible to offer services at multiple locations that are close to students, or to implement a one-stop approach where services are offered, colleges should work to make these services accessible electronically. Colleges can make services such as advising more accessible by offering virtual advising, email Q&A, and involving peer and faculty advisors (who may be more available) to make the information easy to obtain and understand so that students with simple questions are able to find the answer themselves without having to visit the academic advising office.

Implement Unit Limits for Most Majors to Get Students Through Faster

In January, 2013, the CSU Board of Trustees voted to approve unit limits on most major programs to enable students to graduate faster. By fall 2014, CSUs are tasked with amending their program degree requirements to enable students in most majors to meet

all requirements and graduate with 120 units. Currently, many CSUs have general education and graduation requirements in place, which are in addition to major requirements and require students to complete more units to earn a degree. By changing degree programs to include only 120 units (with no exceptions), students will be able to graduate faster making room for more students to enter the system.

State Policy Recommendations

Renew Commitment to Higher Education

Since 2007, state support for higher education has decreased year after year (SHEEO Report, 2013). As California has struggled to cope with a budget deficit, and overall slowing of the economy, UCs and CSUs have been forced to deal with devastating cuts in their state apportionments year after year. With few options to bring in needed revenues, California's public colleges have passed the bulk of these budget cuts on to students and families in the form of tuition increases (Armario, 2012). These frequent and sizable tuition increases combined with the shift in focus from a goal of access to one of completion, has worked to create a negative perception of California's public colleges systems (Quay, 2010). In order to make positive changes for California's public higher education systems, state policy leaders must first renew their commitment to higher education in the state. Governor Jerry Brown has started to do this with Proposition 30, dedicating most of the revenue to restore funding to education. By passing it, California voters showed that they do not want to see any more cuts to education. State policy leaders need to work together with UC and CSU leaders if they want to make effective changes to increase college graduation rates in California.

Fund the Mandated Early Start Program for CSUs

The Early Start Program has the potential to be very helpful in providing remedial services to students and enabling them to enter college level courses faster. However, in order for colleges to create robust Early Start programs that supplant the remedial courses they are offering to students currently, CSUs need time to come up with a plan to make this transition, and they need appropriate funding to make these changes. I found that the colleges doing the best operate robust Early Start programs with 3-4 unit courses that replace traditional remedial courses, giving students the opportunity to be college ready by the fall semester. The successful also offer support services, such as tutoring and math and writing labs, to students participating in the Early Start programs. The lower performing CSUs offered the necessary summer courses to comply with the mandate, but did not replace their traditional remedial courses, this only adds to the list of courses that students must complete before reaching college level courses. These colleges may not have had the time or available funding to create strong programs with multiple 3-4 unit courses and the necessary support services to enable students to be successful in these courses.

Adding new courses, especially during the summer and also offering support services such as tutoring and advising to these students is costly, by not funding the mandate, the state but an additional burden on colleges and set them up to fail. Offering the Early Start program in addition to traditional remedial courses is only adding to the burden on students by increasing the number of curses they must complete prior to enrolling in college level courses.

Create Feedback Loops to Enable Colleges to Report Back to High Schools on Graduates Performance

As I was reviewing the assessment process for remedial education and interviewing individuals at the colleges, I asked how their assessments compare with high school exit exams or other exams that high school students take before graduating. None of the individuals I interviewed knew exactly how they compare, but all assumed that they are not well aligned.

If we want to streamline the transition from high school to college and help students to be better academically prepared when they reach college, California needs to develop an efficient way for colleges to report back to high schools on their graduates' college performance and use the information to improve. In order for high schools to prepare their students to do college level work, they need to receive information from colleges on areas where their students are doing well and areas that need to be improved. With this information, high schools can make changes in curriculum as needed to better align their education with what is expected of students when they get to college. Conversely, perhaps colleges need to modify their assessments to be more aligned with the things students learn in high school. Regardless of where the changes are made, colleges and high schools should be sharing this information, for the benefit of their students.

These feedback loops are essential for strengthening the high school curriculum (Conley, 2003). The obstacle in creating a system such as this is the collection and availability of data. In order for a feedback loop to work efficiently, colleges would need

to track students based on the high school they attended and communicate information on these students' academic performance and outcomes back to the high school. Eventually, this could lead to a decrease in the percentage of college students requiring remedial education, as students would be better academically prepared for college level work.

Limitations of My Study

Graduation Rate as the Dependent Variable

Focusing on college graduation rates as a dependent variable can be problematic for a few reasons. First, this measure does not include students who transfer from their original college and go on to earn a degree somewhere else. There is no system in place to keep track of students who withdraw from their original college, so it is impossible to know whether these students dropped out or simply transferred to a different college.

Non-Traditional Students Not Considered

Additionally, the graduation rates that I obtained from the IPEDS data system are calculated as the percentage of first time, full time degree seeking students who obtain a bachelor's degree within six years, meaning that students who attend part-time or return to college after taking a break from school are not included. A growing proportion of students at many colleges do not fit into this category, these students are commonly referred to as non-traditional students, and include part time students (who may be working full time and have families), older students who delay entry to college after graduation (these are included in my model if they are entering college for the first time), and others. Further studies would need to be done to look at non-traditional students

specifically and what programs, policies, services are effective in getting these students through to graduation.

College vs. Individual Level Data

I carried out the quantitative portion of this study using aggregate data rather than looking at outcomes for individual students. Aggregate data is useful in enabling the user to identify overall trends and the relationships that exist between various explanatory variables and the dependent variable. However, each student's individual situation is different, if I had the time and resources to track individual students, perhaps I would be able to identify barriers that are stopping students from finishing college within six years that are not apparent when analyzing aggregate data.

Opportunities for Further Research

Look for Effective Ways to Assess Students Ability to do College Level Work

In my opinion, one of the biggest opportunities for future research is in relation to remedial education. I have made the assertion that remedial education could be improved to be more effective in helping underprepared students to reach graduation, however, because the focus of my research was not centered around remedial education, I am not presenting recommendations as to how it should be structured to improve student outcomes. One area that I believe could be improved is the way that colleges assess students ability to do college level work. Sternberg (2005) contends that students from disadvantaged backgrounds often have hidden talents and abilities that are not reflected in traditional exams that are used as screening tools, in admitting students and placing them in the appropriate level of courses (i.e. remedial vs. collegiate). He argues other measures

can be used in addition to traditional measures to better assess analytical, creative and practical skills (Sternberg, 2005). These and other measures may offer more useful assessments of an individual's talent, ability, and motivation to do college-level work. (St. John et al, 1999).

Look at Disbursement of Power and Politics in Public Colleges

As I was conducting my interviews and writing these recommendations, it came to my attention that the power and politics present on college campuses could easily block the implementation of any of these proposed changes. Further studies could be conducted to look at the power and politics in play and ways that changes could be made within the current system. Studies could also look at whether the current power structure is effective in working to achieve the best possible outcomes for students.

Further Studies needed to Explore the Impact of Institutional College Culture and Structure

Multiple studies conducted on high performing organizations, including colleges, conclude that culture is a factor in their success (Kuh et al., 2005; Kuh and Whitt 1988; Tierney 1999). To build on the work of these studies more research should be done to look at the particular cultural characteristics of a college that are associated with student success. Specifically what differentiates the culture and mission of a successful college from one that is performing below the level expected? The culture of a college is particularity complex because and is impossible to measure; however, qualitative studies could be done to look for cultural characteristics present at successful colleges that do not exist at poorly performing schools. Another area that could be further explored is looking

at organizational structures at colleges and how the structure impacts student outcomes such as graduation. Information obtained from studies in both of these areas, institutional culture and organizational structure of a college, could be useful in making recommendations for improvement.

Using Financial Aid to Achieve Success rather than (or in Addition to) Access

In recent years, the types of financial aid programs and the types of individuals who are recipients of financial aid continue to expand. New programs are being created and increased demand is coming from "non-traditional students". Additional research will need to look into financial aid program design and delivery, as well as unanticipated interactions between programs or unanticipated consequences of aspects of various programs. If policy changes are made at the federal level, state and local programs that operate within or parallel to the federal system will likely need to make changes as well in order to maximize efficiency. Policy leaders also need to consider what the overall goal of financial aid should be. Many programs have been established to provide access to college for individuals who otherwise would not have the resources to attend. However, recently, the focus has shifted from providing access, to graduation rates and degree attainment; critics complain that the current financial aid programs and policies are not effective enough in achieving these outcomes; they argue that changes should be made so that financial aid policies are leading to more degrees. In order to determine whether our financial aid system is achieving the outcomes intended, we need to determine as a state, and as a nation, what it is that we are aiming to achieve.

Appendix A
Key Findings from the Literature on College Graduation Rates

Author, Publication Date	Data and Functional Form(s)	Dependent Variable Measured And General Explanatory Variables	Main findings, conclusions of study, and significance
Alon and Tienda, 2005	Linear regression model using two estimation techniques: propensity score and matching estimator. The data was obtained from the College and Beyond (C&B) database. The authors limited the analysis to U.S. residents or citizens with valid racial and ethnic identities and graduation status, the final sample was 29,018 students, including 23,086 white, 2,260 black, 1,235 Hispanic, and 2,437 Asian-origin students.	6-year college graduation rates of students from 1988-1998. Institutional selectivity (for this study, institutions were ranked based on the average SAT score of freshman classes, and the percentage of applicants who were admitted, classified as nonselective, selective, or highly-selective). and racial-ethnic groups (black, white, Asian and Hispanic)	At a 5% confidence level, the authors found that white students who attend selective universities are 3.9 times more likely to graduate than white students at non selective universities. Hispanic students who attend selective universities are 2.7 times more likely to graduate than Hispanic students at non selective universities. Black students who attend selective universities are 2.9 times more likely to graduate than black students at non selective universities. Graduation rates are higher at selective institutions for all races (not just whites and Asians). Grad rates of black and Hispanic students have increased (since 1988) at both selective and non-selective schools. Mismatch hypothesis says that affirmative action hurts everyone because it lowers chances of admissions for "better white" students and sets up minority students for failure when admitting them to selective universities, this hypothesis predicts lower graduation rates for minority students who attend selective post-secondary institutions than for those who attend colleges and universities where their academic credentials are better matched to the institutional average. Findings of this article do not support the mismatch hypothesis. Authors found that Graduation rates are higher at selective institutions for both white and minority students.
Alon, Segal 2011 Who Benefits Most from	Question: Can a redistribution of funds narrow the persistence gap between students from the top and bottom of the income	Persistence in college (first- and second-year persistence, as well as graduation within six years) Student financial aid amounts received in the first	Pell grants are focused on lowest income students, however, state and institutional grants go to all, Yet, it is only the persistence of students from the bottom half of the income distribution that is sensitive to aid amounts. If the need-based funds granted to affluent students had been diverted to these students, the gap in first-year persistence would have been closed.

Financial Aid? The Heterogeneous Effect of Need-Based Grants on Students' College Persistence	distribution? Data: National Postsecondary Student Aid Study (NPSAS) and the Beginning Postsecondary Students Longitudinal Study (BPS),	year from all need-based grants and school, social, and student characteristics, family income, used a dummy variable to indicate if siblings are attending college	From the perspective of persistence in college (as opposed to that of college enrollment/choice), these findings suggest that the aid granted to affluent students is a waste of resources. This broaches the issue of a redistribution of funds. For a redistribution of funds to boost degree attainment and achieve equality of educational opportunity it must be based on stricter means-tested allocations of nonfederal funds as they are the main source of need-based aid. An effective strategy must do 3 things: (1) improve prior academic preparation, (2) improve access to higher education (enrollment), and (3) focus on persistence in college.
Arendt, Jacob Nielsen, 2008 The impact of public student grants on drop-out and completion of higher education – evidence from a student grant reform	Data: administrative register data constructed by the Local Institute of Government Studies (AKF), obtained from Statistics Denmark The Author used duration models for both time-to-completion and time-to-drop-out.	6- year degree completion rates and student dropout rates (student being enrolled in one year and not the next without completion) Used data from before and after a large scale government grant reform.	Arendt estimated the impact of the reform overall reduce the drop out rate by about 20% per year. Additionally, he estimated that raising the grant level by $1000 decreases a student's chance of dropping out by 5.7 percent. Arendt found that the grant reform had no significant impact on student completion rates. The evidence overall supports (although with some uncertainty) the view that a better financial situation for students decrease drop-out rates, but also suggest that it has no impact on completion after four-to eight years of study. The results indicate that the lower drop-out rate partially may be explained by a reduction of work hours while studying, as intended by the reform, although lower hours of work is not accompanied by higher completion rates.
Buchmann and DiPrete, 2006	Using data from the General Social Survey and the National Educational Longitudinal Study, the authors restricted the analysis of college completion to	College completion rate for men and women, Percentage of completed college degrees earned by women compared to the percentage earned by men. In recent years, women have taken over, earning a greater	The authors found no strong evidence that the female-lead in college completion is being driven by changes in the family situation (i.e. parents' level of education) that would give women a specific advantage over men in the degree attainment process. They did find that in families with absent or less educated fathers, there has been a shift from a male advantage in grad rates during the earlier period (born between 1940 and 1945) to a female

	white respondents between the ages of 25 and 34 years who were born between 1938 and 1977 , total respondents n=7024 (the black GSS sample is too small to perform this analysis.	percentage of the total college degrees than men. And the gap is continuing to widen. Social origins: parents education, single parent households, hs dropout rate, incentives (i.e.labor market), resources (financial, social and cultural); academic resources: academic performance, intermediate educational transitions	advantage in the later period (born between 1970 and 1975). When they compared the completion rates for the two periods the authors found that the graduation rates of sons who had no father present at the age of 16 dropped by 4.98%. Males maintain an advantage over females (5.2%) in terms of college graduation rates in families in which fathers have some college and mothers have a high school education or less. However, in families where mothers had some college and fathers had a high school education or less, daughters had a 14.6 percent advantage over sons in terms of college completion rates. They also found that the rates of college completion are significantly higher for males and females who attended only 4-year college (68 and 77 percent, respectively) than for those who attend 2- year and then 4-year college (39 and 47 percent, respectively), and that for both types of school attendance, higher percentages of females than males complete college.
Carpenter, Hayden, and Long; 1998	Multiple classification analysis- involves using multiple regression with categorical variables by employing multi category dummy variables to represent each predictor variable. Data is from the national survey data from the Australian Council for Educational Research (ACER) and included a total of 1259 respondents.	4-year college graduation rates Gender, parent's occupational status, parent's educational attainment and family wealth	Parent's occupational status, parent's educational attainment, and family wealth are associated with higher rates of college graduation At a 4% level of significance, the grad rate for females who entered higher education by age 19 (79%) was well above that for males (74%), and yet the graduation rate for males from degree programs (71%) was higher than that for females (68%). The graduation rate at age 23 for respondents from a "professional" background (83%) was well above that for respondents from either a "managerial, white-collar" (76%) or a "blue-collar" (72%) back ground The graduation rate from higher education for the "wealthiest"' group was 84%, which was well above that for both the "middle" (75%) and the "poorest" (71%) groups.
Chen, Rong, 2011 State	Questions: 1. After controlling for student and institutional level factors, how are state-level financial policies	students' cumulative persistence outcome at their first institution. Student background, academic	Both ratio variables (the level of state public tuition covered by state funding for non-need-based aid and for need-based aid) had positive associations with student persistence for a bachelor's degree relative to dropout. Coordination of state grant aid, merit- or needbased, with tuition provides means of improving student

Financial policies and Student Persistence: A National Study SES= socioeconomic status	associated with persistence overall at students' first institutions? 2. Do the relationships between state financial policies and first-institution persistence differ by student SES and racial/ethnic background? Data: The BPS longitudinal study (from 96 and 01) and the national higher education data bases Form: hierarchical generalized linear modeling	preparation, college grades, aspirations, integration in college academic and social life (using composite measures), and unmet financial need, school variables: selectivity, pub/private, tuition,	persistence toward degree attainment. Limitation: study did not consider students who transferred In our research, even after controlling for all other factors at individual, institutional, and state levels, we found substantial gaps in persistence rates at first-institutions by SES, with high-SES students having 55% higher odds of persisting than their low-SES peers. We suggest that institutional practitioners pay more attention to students with lower grades as well as those with poor social or academic integration on campus in the first year to avoid dropout. In particular, compared to students whose first-institutions were least selective, those who started higher education in more selective institutions tended to be more likely to persist than dropout, consistent with prior research. These findings suggest that campus leaders in non-selective institutions need to focus more attention and effort on the issue of reducing dropout.
Doyle, William, 2010 Does Merit-Based aid "crowd out" Need-Based aid?	Question: Could it be that as states implement a merit-based program, they will simultaneously defund or even discontinue their need-based programs? Data: The data in this analysis come from a panel dataset constructed from a variety of sources. All data cover the period of time from 1984 (when state-by-state data on student financial aid first became available) to 2005 (the last year that data are	The amount of need-based aid awarded in each state per full time equivalent (FTE) students. Total amount of merit-based aid awarded in the state per FTE. Controls: tax collections per capita, indicator of policy liberalism, percent of Full Time Equivalent Students, level of public college tuition (averaged across institutions) in the state	I did not find a statistically significant relationship between changes in state need-based aid and changes in state merit-based aid. As far as the question of what did happen to need-based aid in these states after merit-aid programs were adopted, the answer is: very little. Given the results of this study, there is little evidence so far that merit-based aid programs have been displacing need-based aid programs At least at this point, there appears to be little reason to argue that the two types of programs are crowding one another out. Rather, each type of program ought to be designed to maximize enrollment among those who could benefit from higher education. The long-term financial viability of such programs is another issue that has so far received little study.

	available for every indicator). Models: Ordinary Least Squares, Fixed Effects model, First-Differenced Dynamic Models		
Doyle, W, 2012 The Politics of Public College Tuition and State Financial Aid. State politics-use in social factors	Question: To what extent do state policy makers' preferences affect levels of tuition and financial aid in the states? To what extent does legislators' ideology affect public college tuition and state financial aid? Data: database of state-level characteristics that was compiled from multiple sources. Model: two-stage least squares, regression	3 dep variables: 1. state tax appropriations for higher education in the state, on a per student Basis, 2. tuition and required fees at public four year colleges and universities for all states 3. total amt of state student financial aid on a per-student basis. 1. The level of government liberalism in the state. 2. The size of private enrollment in the state. 3. gross state product per capita and 4. median family income in the state.	This study provides substantial evidence that the ideological positions of state policy makers affect tuition levels, and that private institutions play an important role in the political process for setting both tuition and financial aid. Also finds that tuition levels are not set according to traditional models of pricing. There is great variation across states in terms of the average tuition at public universities. Variation also exists in state funded financial aid programs. This paper argues that the process of setting tuition and financial aid in the 50 states is at its heart a political process. Two of the findings from the results present intriguing questions for future work. First, the results from the models for tuition suggest that tuition is negatively related to the proportion of 18–24 year olds in the state. Meaning more 18-24 yr olds leads to lower tuition. Second, the results for financial aid suggest that a more professionalized legislature are related to higher levels of financial aid. This initial finding does suggest that the structures of governmental decision- making may affect the kinds of policy outputs produced within the states. This subject seems promising for further development and elaboration
Glocker, Daniela, 2011 The effect of student aid on the duration of study	Question: How does need based financial aid impact time to degree completions and actual graduation rates? Data: individual level panel data from the German Socio-Economic Panel (SOEP) for the	Time-to-degree completion and actual graduation rates (6-year) Student aid provided by the German Student Aid System (BAfoeG)	The main findings are that BAfoeG eligible students have a lower hazard to graduate and a higher conditional probability to drop out. The amount of BAfoeG received reduces the dropout hazard on average by 2.6 percentage points per 1000 EUR BAfoeG per semester. An increase in BAfoeG by 200 EUR per month would further reduce the probability to drop out by up to one third. First, student aid recipients finish faster than comparable students who are supported by the same amount of parental/private transfers only. Second, although higher financial aid does on

	years 1984–2007. Model: discrete-time duration model allowing for competing risks to account for different exit states (graduation and dropout)		average not affect the duration of study, this effect is (third) dominated by the increased probability of actually finishing university successfully. The results show that an increase in student aid has no significant effect on the time-to-degree. With a higher amount of financial aid, students are less likely to drop out. But the type of aid matters.
Jones, Radcliffe, Huesman, Kellogg, 2009	Authors used both the Binary Logit Model and Multinomial Logit Model of regression analysis and compared the results N= 15,496 students who entered as first time full time degree seeking students in 1999-2001.	Degree attainment: 3 possible scenarios, bachelor's degree from home institution, bachelor's degree from another institution, associated degree from another institution academic performance, academic background, demographics, geography, social integration, and financial background	The authors found that using the binary logit model regression analysis produced results that could be misinterpreted because it ignored all students who transferred out of their original institution and obtained a degree somewhere else. At a 1% level of significance, students admitted to their first choice school were 2.8% more likely to obtain a degree, those who lived on campus were 5.01% more likely to earn a degree at that institution. They also found students who are eligible to receive Pell grants to have lower graduation rates than those who are not eligible. The authors found that 61% of their sample earned a degree at their home institution, another 8% earned a bachelor's degree at another institution and 2% earned an AA or certificate.
Knight, 2004	The authors included the entire student population at Bowling Green State University earning bachelor's degrees in 2002-2003, this included 2457 students. They used a linear regression model to complete this study.	Time to complete a bachelor's degree (measured in total terms elapsed and total terms enrolled) Student background characteristics, remedial class and summer freshman program participation, pre-enrollment	The variables that showed a correlation with decreased time to degree attainment were: participation in the Summer Success Challenge program, average student credit hours earned per semester, participation in the President's Leadership Academy. The variables that the authors found to be related to increased time to degree attainment were: student credit hours earned at the time of graduation, and students being defined as dependent for financial aid purposes. At a 1% level of significance, participation in the summer success

		perceptions, enrollment behaviors, student experiences and perceptions, financial aid data, and academic outcomes	challenge program resulted in a .566 unit decrease in the time to degree attainment (measured in semesters). A one unit increase in avg student credit hours earned per semester resulted in a decrease of .323 units in the time to degree attainment. Participation in the President's Leadership Academy resulted in a decrease of .357 units in the time to degree attainment. A one unit increase in the number of student credit hours earned at the time of graduation resulted in an increase of .311 units in the time to degree attainment. Students defined as dependent for financial aid purposes had an increase of .575 units.
Light and Strayer, 2002	Using data from the National Longitudinal Survey of Youth, Integrated Postsecondary Data System, and the National Center for Education Statistics of the U.S. Department of Education. They included 2754 college goers and 4323 no-college goers. They created a linear regression model to estimate the results.	College attendance rates and college graduation rates. Race, family income, test scores, per capita income, mothers level of education, unemployment rate, tuition costs, financial aid,	The authors state that minorities are less likely than whites to attend and complete college, and they are even more unlikely to attend high-quality colleges. However they found that when they control for other determinants of college attendance and graduation, minorities are more likely than are whites to attend colleges but less likely to graduate. They also found that whites are substantially more likely than minorities to opt out of college regardless of which observed characteristics they possess. Using their model, they found that, once family income, test scores, and other determinants of college attendance are held constant, minorities are more likely than are whites to attend colleges in all four quality categories (around 5%). The positive relationship between the minority variable and college attendance indicates that factors not controlled for in the model raise the expected value of college attendance for minorities relative to whites. This could be due to affirmative action in college admissions or in the allocation of financial aid. When assessing graduation rates, the authors found that graduation probabilities are generally higher for whites than they are for minorities. For students in the lowest quartile of academic ability, the rates were 23% for whites vs 14% for minorities. Students in the highest quartile hade graduation rates of 50.9% for whites and 45.6% for minorities.

Scott, Bailey, And, Kienzl, 2006	Logistic Regression was performed using data from the American survey of colleges and the integrated post-secondary education data system. The authors used information from 1676 four-year institutions.	6-year college graduation rates Key: Sector (public vs private) Others: institutional expenditures, student to faculty ratio, selectivity, percent non-traditional students (part time, commuter, age) student demographics, urban/suburban location	The author's main finding was that while private institutions have higher graduation rates than public institutions; this gap is due to the differences the characteristics of their students. These findings suggest that valuation of public colleges based on graduation rates in not appropriate. At a 5% level of significance, they found that with equivalent resources and student populations, public schools would graduate a slightly larger percentage (3.42%) of students than privates. A private college that is 90% full-time will have a 4% higher graduation rate than one that is 50% full-time. A public college that is 90% full-time will have a 13% higher graduation rate than one that is 50% full time students.
Singell and Stater, 2006	The authors used demographic and economic data from the US census and student level data from respondents to a data inquiry at Indiana university, University of Colorado and university of Oregon. The final sample included 28,712 individuals. Regression analysis was used to create a linear probability model for both enrollment and graduation rates.	6-year college graduation rates Various forms of financial aid including need-based and merit based aid	Both need based aid and merit based aid increase graduation rates. Need based and merit based aid impact graduation rates in different ways. Need based aid allows students to select a school that is the best match (i.e. social and cultural network) for them, as opposed to the school with the lowest cost, thus improving their chance if graduating by making them feel they "fit in". Merit aid often attracts good students to the school that will provide the highest amount of aid. They found that at a 1% level of significance, an additional $1000 in need based aid per year will result in a 4 percent increase in the probability of graduating. In regards to merit based financial aid the authors found that an additional $1000 in aid would increase a student's probability of graduating by 1.1 percent.
Skyt, H; Sørensen, T. and Taber, C. 2012 Estimating the Effect of	Purpose of study: To investigate the responsiveness of the demand for college to changes in student aid by exploiting some useful	College enrollment (the percentage of high school graduates who enroll in college the year following high school graduation) Financial aid, parental income,	To conduct this study, the authors exploit a reform of the Danish Govt Grant Policy that took place in 1988 that doubled the amount of study grants awarded. To make the educational attainment less dependent on parental background, educational subsidies that are means-tested against parental income have been introduced all over the world.

Student Aid on College Enrollment: Evidence from a Government Grant Policy Reform	exogenous variation in Danish data. Data: Danish register-based data for the cohorts graduating from high school in the period 1985 to 1990.	other socioeconomic factors	From a reduced form analysis taking potential borrowing constraints into account, we find that college enrollment increases with increasing subsidy. A $1,000 increase in the stipend increases college enrollment by 1.35 percentage points, which is a somewhat lower response than found in the earlier literature
Thomas, 1981	The original base year (1972) survey involved a representative Sample of some 21,600 white and minority (Mexican-American, Oriental, Puerto Rican, Native American, Black) twelfth grade men and women.	4 year college graduation rates Family status, background, ability to pay, standardized test scores, high school rank, college selectivity, and sector of the institution,	Results showed that backs were less successful than whites in 4 year college completion; additionally the author found that males were less successful than females in 4 year college completion. They also found that attending a selective institution had an effect on prompt graduation for all the groups examined. The independent variables included in this study only accounted for 32% of the variance in the major dependent variables. This could mean that additional variables need to be considered to understand the variation in graduation rates. However it would be necessary to look at other studies to see if 32% is average. For all the groups, college grade performance was among the strongest predictors of prompt college graduation. The authors found that students who ranked 1 unit higher in college grade performance had a 2.2%-3.5% higher chance of graduating. The range is because the separated the students into groups by gender and race. The group most impacted by college grade performance (3.5%) was black males. These results are not surprising as the same factors that influence grade performance are likely to influence graduation.

Appendix B
Regression Results across Functional Forms

Variable Name	Lin-Lin (Chosen Functional Form)	Log-Lin	Log Semi-log
Six Year Graduation Rate (Dependent)		(Log)	(Log)
Percentage of students receiving grant aid	-0.065* (0.017)	0.00046* (0.000125)	(Log) -0.012 (0.080)
Average amount of grant aid received	0.001*** (0.0014)	0.000291** (0.000005)	(Log) 0.158 (0.434)
Percentage receiving student loan aid	-0.074** (-0.074)	-0.001 (0.000407)	(Log) -0.174 (0.089)
Average amount of student loan aid received	0.00046* (0.00019)	0.00016** (0.000003)	(Log) 0.107 (0.114)
Percent aid to$30,001-48,000	0.171** (0.03808)	-0.003* (0.000832)	(Log) 0.162 (0.262)
Percent aid to$48,001-75,000	0.332*** (0.024)	0.008*** (0.001)	(Log) 0.219 (0.190)
Percent aid to$75,001-110,000	-0.196 (0.0874)	-0.005* (0.001)	(Log) 0.029 (0.017)
Percent aid to$110,000+	0.312** (0.0623)	0.005** (0.001)	(Log) 0.003 (0.051)
City: Midsize dummy	2.847** (0.508)	0.049** (0.012)	(Log) -0.178 (0.085)
City: Small dummy	2.281 (1.686)	0.025 (0.044)	-0.088 (0.060)
Suburb: Large dummy	1.692 (1.4219)	0.030 (0.039)	-0.204*** (0.022)
Suburb: Midsize dummy	1.884* (0.572)	0.017 (0.031)	-0.547 (0.397)
Suburb: Small dummy	4.631 (2.580)	0.061 (0.058)	-0.178 (0.142)
Town: Fringe dummy	1.842** (0.402)	0.019 (0.016)	-0.242*** (0.008)

Variable Name	Lin-Lin (Chosen Functional Form)	Log-Lin	Log Semi-log
Town: Distant dummy	2.265* (0.833)	0.028 (0.023)	-0.130 (0.100)
Town: Remote dummy	2.921* (1.049)	0.046 (0.025)	-0.094 (0.081)
Rural: Fringe dummy	3.186 (0.4023)	0.036 (0.023)	-0.067 (0.032)
Rural: Distant dummy	6.202 (0.833)	0.129 (0.121)	(omitted)
Rural: Remote dummy	4.167 (1.0486)	0.108 (0.080)	-0.980 (0.479)
Total enrollment	0.00026*** (0.000033)	0.00046** (0.0000008)	(Log) -0.195** (0.040)
Percent of students admitted	-0.046* (0.015)	-0.001* (0.00015)	(Log) -0.337*** (0.038)
Tuition and fees costs	0.001* (0.00019)	0.00049 (0.000004)	(Log) -0.591*** (0.057)
Weekend/evening courses dummy	-0.035 (0.1082)	0.004 (0.008)	-0.096 (0.110)
Remedial courses dummy	-2.041* (0.5847)	-0.041** (0.008)	0.152* (0.059)
Employment services for students Dummy	-1.004 (3.7596)	0.023 (0.107)	-0.668*** (0.019)
On-campus day care for students' children dummy	-0.241 (0.553)	-0.020 (0.012)	0.116 (0.093)
Open admission policy dummy	-2.3828* (0.798)	-0.045 (0.026)	0.027 (0.151)
Dual credit dummy	-0.477 (0.228)	0.023 (0.013)	-0.075 (0.199)
Credit for life experiences dummy	-0.752* (0.223)	-0.015* (0.005)	-0.112 (0.085)
AP credit dummy	1.381 (2.003)	-0.001 (0.067)	(omitted)
Percent black	-0.183*** (0.0139)	-0.005*** (0.001)	(Log) -0.027 (0.021)
Percent Hispanic	-0.162** (0.022)	-0.003** (0.001)	(Log) -0.130*** (0.010)

Variable Name	Lin-Lin (Chosen Functional Form)	Log-Lin	Log Semi-log
Percent Asian	0.136 (0.084)	0.001 (0.002)	(Log) 0.096 (0.063)
Percent American Indian	-0.133*** (0.015)	-0.007 (0.003)	(Log) 0.058 (0.043)
Percent female	0.021* (0.012)	0.00033 (0.001)	(Log) 0.071 (0.669)
Percent 18 and under	-0.330*** (0.039)	-0.009*** (0.001)	(Log) 0.007 (0.012)
Percent 25-64	-0.649*** (0.0185)	-0.016*** (0.001)	(Log) -0.553*** (0.024)
Percent over 65	1.552** (0.354)	0.048* (0.015)	(Log) -0.039 (0.173)
State total Population	-0.000000024 (0.00000003)	0.000000000109 (0.0000000009)	(Log) 0.424* (0.182)
Percent under 18 in the state	1.450** (0.223)	0.034*** (0.002)	(Log) -.4357*** (0.0857)
Percent 45-64 in the state	0.944** (0.1907)	0.013* (0.005)	(Log) -.2253* (.0577)
Percent over 65 in the state	1.748*** (0.109)	0.044*** (0.005)	(Log) -0.123 (0.071)
Percent female in the state	1.207* (0.4997)	0.037** (0.008)	(Log) -.47* (.0847)
State percent black	0.439** (0.060)	0.010** (0.002)	(Log) 0.017 (0.250)
State percent Asian	0.036 (0.0325)	0.003* (0.001)	-0.393 (0.310)
State percent native Hawaiian	-0.612 (0.668)	-0.011 (0.012)	(Log) -0.125 (0.317)
State percent Hispanic	0.164* (0.041)	0.002 (0.001)	-0.006 (0.135)

Variable Name	Lin-Lin (Chosen Functional Form)	Log-Lin	Log Semi-log
Percent own home	0.514*** (0.0450)	0.012*** (0.00015)	(Log) 1.157 (1.339)
Average Household size	-13.848** (2.615)	-0.277** (0.047)	(Log) 3.574 (4.744)
Percent of children living with single parent	-0.855** (0.126)	-0.021** (0.005)	(Log) -0.861 (1.236)
Constant	9.103	2.513	146.510
Number of Observations	1434	1434	1434
Number of Significant Variables	35	19	11

Statistical significance: * is 90%; ** is 95%; and *** is 99% or greater

Appendix C
Simple Correlation Coefficients

	gradrate	pctgrantaid	avggrantaid	pctstudln	avgloanaid	pctaid30-48k	pctaid48-75k
gradrate	1						
pctgrantaid	-0.3609	1					
avggrantaid	0.346	-0.0492	1				
pctstudloan	-0.1305	0.2481	0.0008	1			
avgloanaid	0.2412	-0.1354	0.0448	0.27	1		
pctaidto30-48k	0.0861	-0.2865	-0.0895	-0.0741	-0.0429	1	
pctaidto48-75k	0.4642	-0.2295	0.0192	0.1269	0.1486	0.3921	1
pctaidt75-110k	0.4017	0.1091	0.0365	0.0477	0.1767	-0.0717	0.5914
pctaidovr1101k	0.3899	0.1189	0.0797	-0.0313	0.1353	-0.1805	0.3446
midcitydum	0.003	0.0327	0.0377	-0.0455	-0.0417	-0.0289	-0.0099
smcitydum	0.007	-0.0315	-0.0056	-0.0083	0.0517	-0.0236	-0.0163
lgsubdum	0.06	-0.0421	-0.0029	-0.0161	0.0665	0.0184	0.0039
midsubdum	-0.0067	-0.0678	-0.0348	0.0333	0.0054	0.0133	0.0205
smsubdum	0.067	-0.0782	0.0545	-0.0278	0.0545	0.0119	0.0187
frtwndum	0.0564	-0.0686	0.0233	0.0127	0.0217	0.0067	0.0469
disttwndum	0.0218	0.0002	-0.0425	0.0459	0.0122	0.0579	0.0571
remtwndum	-0.0398	0.1433	-0.0761	0.0999	-0.0474	0.0307	0.088
frrurdum	-0.0813	0.0278	-0.0316	0.0328	0.0161	-0.0147	-0.048
distrurdum	0.0055	0.0011	-0.043	0.001	-0.038	-0.0653	-0.0063
remrurdum	-0.048	0.0499	-0.015	0.0528	-0.0297	-0.0094	-0.0187
totalenroll	0.4083	-0.145	0.2723	-0.2733	0.0306	-0.0048	0.0426
pctadmitted	-0.1506	-0.0055	-0.2124	0.0803	-0.0266	0.0776	0.1283
tuitionfees	0.3777	-0.1278	0.2539	0.2297	0.4206	0.024	0.3249
statettlpop	0.1638	-0.1876	0.4007	-0.2027	-0.2014	0.0339	-0.125
weekendevecs	-0.1321	0.1096	-0.0503	0.029	-0.0074	-0.0587	-0.1307
remedial	-0.1996	0.0194	-0.0969	0.0937	0.0379	0.0504	-0.0757
employsvcs	0.042	-0.0308	0.0262	-0.0383	-0.0149	0.0346	0.038
daycare	0.0857	-0.0951	0.0637	-0.0817	-0.0361	0.0415	-0.0437

openadmiss	0.0378	-0.0557	0.0591	0.0086	-0.0096	0.0508	0.0757
dualcredit	0.0036	0.0326	-0.0985	-0.0111	-0.0203	0.0023	0.0093
credlifeexp	-0.1549	0.0742	-0.0913	0.0956	-0.0004	-0.0013	-0.0483
apcredit	0.0477	-0.0131	-0.0056	-0.0285	-0.0419	0.0302	0.0699
pctblack	-0.3629	0.3008	0.0803	0.1712	0.0825	-0.2288	-0.42
pcthispanic	-0.0936	0.0034	0.2346	-0.2163	-0.2982	0.003	-0.231
pctasian	0.3074	-0.2137	0.4284	-0.2972	-0.1214	0.0442	-0.0226
pctamerind	-0.1757	0.0826	-0.0972	-0.082	-0.161	0.016	-0.0717
pctwomen	-0.3581	0.1524	-0.1327	0.0428	-0.1516	-0.0109	-0.3044
pctunder18	-0.2227	0.154	-0.054	0.0102	-0.1367	-0.0552	-0.0406
pct2564	-0.6989	0.2212	-0.2195	-0.0176	-0.2497	-0.0945	-0.424
pctover65	-0.0766	0.0344	-0.0429	0.0209	-0.0379	-0.0207	-0.0339
stateundr18	-0.1755	0.0186	0.1338	-0.1752	-0.2674	-0.094	-0.1669
state4564	0.0859	-0.028	-0.1853	0.2414	0.3529	0.096	0.1965
ovr65state	0.0789	0.1385	-0.2203	0.2072	0.2417	0.0499	0.1477
stpctfemale	0.1203	0.1236	0.0419	0.131	0.1762	-0.1239	-0.0747
stpctblack	-0.0347	0.2252	0.1147	-0.0072	0.0102	-0.2155	-0.2449
stpctasian	0.2069	-0.2881	0.2672	-0.2195	-0.0987	0.0678	-0.0131
stpctnathaw	-0.0126	-0.0561	-0.0043	-0.0914	-0.052	0.03	0.0128
stpcthispnc	0.0456	-0.121	0.3085	-0.2605	-0.2682	0.0301	-0.1519
stpctownhome	-0.1224	0.1639	-0.1797	0.2402	0.2767	0.0021	0.2094
stavghhsize	0.0292	-0.1181	0.3839	-0.2769	-0.2392	-0.0977	-0.2308
stpctsglparent	-0.1749	0.3562	0.1191	-0.0113	-0.1084	-0.2219	-0.331

	pcta75-10k	pctaidover110	midcitydum	smcitydum	lgsubdum	midsubdum	smsubdum
pctaidtto75-110k	1						
pctaidovr1101k	0.7635	1					
midcitydum	0.0351	0.064	1				
smcitydum	0.0006	0.0017	-0.1803	1			

lgsubdum	0.0326	0.0632	-0.1418	-0.1541	1		
midsubdum	0.0059	-0.0124	-0.0798	-0.0867	-0.0682	1	
smsubdum	-0.0154	-0.0289	-0.069	-0.075	-0.059	-0.0332	1
frtwndum	-0.0162	-0.0321	-0.0575	-0.0625	-0.0491	-0.0276	-0.0239
disttwndum	0.0411	0.0199	-0.1577	-0.1714	-0.1348	-0.0759	-0.0656
remtwndum	0.071	0.0074	-0.1508	-0.164	-0.1289	-0.0726	-0.0627
frrurdum	-0.054	-0.0614	-0.1162	-0.1263	-0.0994	-0.0559	-0.0483
distrurdum	0.024	-0.0084	-0.0508	-0.0553	-0.0435	-0.0245	-0.0211
remrurdum	-0.0451	-0.042	-0.0374	-0.0407	-0.032	-0.018	-0.0156
totalenroll	0.0406	0.1344	0.0645	0.0495	0.0134	-0.0548	0.0081
entclasspct	0.1621	0.0677	-0.0671	0.0129	-0.0252	0.0302	-0.0006
pctadmitted	0.0825	-0.0116	-0.0115	0.0903	-0.0807	0.0641	-0.0105
tuitionfees	0.2832	0.1929	-0.085	-0.0117	0.1501	0.0428	0.0302
statettlpop	-0.214	-0.1101	0.0304	-0.0566	-0.0048	-0.0278	0.062
weekendevecls	-0.0336	-0.0247	0.0651	0.052	-0.0474	-0.0195	-0.0681
remedial	-0.1221	-0.1101	-0.0188	-0.058	0.0347	-0.0151	-0.0393
employsvcs	0.025	0.0345	0.0443	0.0502	0.0021	0.0019	-0.0358
daycare	-0.1235	-0.0743	-0.0271	0.0331	0.0049	0.0218	-0.0021
openadmiss	0.0328	0.0115	-0.0019	0.0195	0.0024	-0.0046	-0.0156
dualcredit	0.0187	0.0375	-0.0366	-0.0031	0.0444	0.0384	-0.0117
credlifeexp	-0.0788	-0.1008	-0.0573	0.0134	-0.0352	0.0261	0.0172
apcredit	0.0427	0.0323	-0.1124	0.0203	0.0159	0.009	0.0078
pctblack	-0.2506	-0.1683	0.0878	-0.0099	-0.0204	-0.0258	-0.046
pcthispanic	-0.2548	-0.1254	0.0491	-0.0157	0.0103	-0.0215	0.0009
pctasian	-0.0835	-0.0175	0.0011	-0.0503	0.0414	-0.0263	0.0415
pctamerind	-0.0739	-0.0728	-0.0373	0.0124	-0.064	-0.0188	0.0269
pctwomen	-0.315	-0.2817	0.0437	0.022	-0.0052	-0.0376	-0.0007
pctunder18	-0.0647	-0.0966	-0.0257	-0.0037	-0.0218	-0.0211	-0.0452
pct2564	-0.3933	-0.3354	0.0167	-0.0094	-0.0226	-0.0017	-0.0056
pctover65	-0.0233	-0.0168	0.0045	-0.0232	-0.0013	-0.0197	0.0211
stateundr18	-0.1499	-0.026	0.0743	0.0524	-0.1413	-0.0501	-0.0064
state4564	0.1665	0.0281	-0.0752	-0.03	0.1106	0.0536	0.0166
ovr65state	0.1589	0.0408	-0.0667	-0.0187	0.1112	0.0383	-0.0558

stpctfemale	0.0902	0.1202	-0.0084	-0.0343	0.1611	0.0124	-0.0313
stpctblack	0.0319	0.1629	0.0814	0.0224	0.0304	-0.0684	-0.0142
stpctasian	-0.1252	-0.0712	-0.0217	-0.0488	0.0415	0.0044	0.0701
stpctnathaw	-0.0373	-0.046	-0.015	-0.006	-0.0173	-0.0115	0.0194
stpcthispnc	-0.2399	-0.1131	0.0597	-0.0139	-0.0406	-0.0217	0.041
stpctownhome	0.2034	0.1043	0.0057	0.0702	0.0011	0.0121	-0.057
stavghhsize	-0.2099	-0.0464	0.0647	-0.0138	-0.0215	-0.046	0.0628
stpctsglparent	-0.0584	0.0542	0.0834	0.0137	-0.0199	-0.0616	-0.0126

	frtwndum	disttwndum	remtwndum	frrurdum	distrudum	remrurdum	totalenrollment
frtwndum	1						
disttwndum	-0.0546	1					
remtwndum	-0.0523	-0.1434	1				
frrurdum	-0.0403	-0.1105	-0.1057	1			
distrurdum	-0.0176	-0.0483	-0.0462	-0.0356	1		
remrurdum	-0.013	-0.0356	-0.034	-0.0262	-0.0115	1	
totalenroll	-0.0075	-0.0773	-0.1398	-0.0926	-0.0611	-0.0423	1
pctadmitted	-0.0391	-0.0106	0.121	-0.0313	-0.0102	0.0536	-0.1227
tuitionfees	0.0343	-0.0159	-0.0293	-0.0373	0.0454	0.0015	0.0434
statettlpop	0.01	-0.0143	-0.1129	-0.0203	-0.0582	-0.0468	0.2225
weekendevecls	-0.0348	-0.0514	0.0141	0.0118	-0.0249	-0.0226	0.0522
remedial	-0.035	0.0176	0.0554	0.0425	-0.0067	0.0353	-0.0937
employsvcs	0.0203	-0.0179	0.0076	-0.0153	-0.1433	-0.0956	0.0714
daycare	0.0003	-0.0861	-0.0343	-0.0241	-0.12	0.0427	0.1738
openadmissions	-0.0018	-0.0085	0.0451	0.009	-0.0399	-0.0255	0.0327
dualcredit	-0.0258	-0.0119	0.0499	-0.0281	-0.0056	0.018	0.0467
credlifeexp	0.0228	0.0749	-0.0036	-0.0108	0.0507	0.0286	-0.0481
apcredit	0.0065	0.0177	0.017	0.0131	0.0057	0.0042	0.0328
pctblack	0.0055	-0.0106	-0.0776	0.045	0.0054	0.0035	-0.1633
pcthispanic	-0.0277	-0.0749	-0.0852	-0.01	-0.032	-0.0351	0.1813

pctasian	0.0329	-0.0864	-0.1057	-0.054	-0.0454	-0.0511	0.3517
pctamerind	-0.021	0.0458	0.1172	-0.0319	0.0053	-0.0064	-0.0974
pctwomen	0.0043	-0.0055	-0.0332	0.023	-0.0717	0.0679	-0.0827
pctunder18	-0.0187	-0.0367	0.0146	0.0907	-0.0224	0.0126	-0.1021
pct2564	-0.0623	-0.0795	-0.0151	0.0406	0.0067	0.0519	-0.1545
pctover65	-0.0152	0.028	0.0283	-0.0008	-0.0296	0.0336	-0.1236
stateundr18	-0.0497	-0.0038	0.018	0.0149	-0.0323	-0.0765	0.1573
state4564	0.0205	0.0078	0.0105	-0.0016	0.0383	0.0978	-0.2058
ovr65state	0.0426	0.0157	0.0542	-0.0069	0.028	0.087	-0.1174
stpctfemale	0.0371	0.0264	-0.0983	-0.0215	0.0408	0.0205	-0.108
stpctblack	-0.0269	0.015	-0.0875	0.0255	0.0248	-0.0361	-0.0257
stpctasian	0.0243	-0.0504	-0.0758	-0.0429	-0.0295	-0.0576	0.1215
stpctnathaw	-0.002	-0.0388	0.0346	-0.0236	0.0104	0.0312	0.0263
stpcthispnc	-0.0057	-0.0497	-0.0776	-0.0233	-0.048	-0.052	0.2368
stpctownhome	-0.029	0.0166	0.0748	0.0405	0.0271	0.0736	-0.0924
stavghhsize	0.0022	-0.0476	-0.1083	0.0007	-0.0226	-0.0672	0.206
stpctsglparent	-0.0302	-0.0062	-0.0567	0.061	0.0174	0.0144	0.0124

	ttlenrollment	pctadmitted	tuitionfees	statettlpop	weekenevecls	remedial	employsvcs
pctadmitted	0.1149	1					
tuitionfees	0.2613	0.0455	1				
statettlpop	-0.0551	-0.3028	-0.0642	1			
weekendevecls	-0.1344	0.0416	-0.0607	-0.1237	1		
remedial	0.0108	0.0626	0.0094	-0.0071	0.0002	1	
employsvcs	-0.0351	-0.0337	-0.0139	0.0368	0.0482	0.0774	1
daycare	-0.1524	-0.0869	-0.0443	0.1514	0.0013	0.046	0.0768
openadmissions	0.0495	0.0045	0.0007	0.004	-0.0184	-0.0715	0.0834
dualcredit	-0.0511	0.0186	0.0102	-0.0592	0.0119	-0.0618	-0.0019
credlifeexp	-0.0543	0.0411	-0.0054	-0.1019	0.0366	0.0399	0.002
apcredit	-0.0344	0.0472	0.0382	0.0266	-0.0599	-0.0264	-0.0066

pctblack	0.0131	-0.2466	-0.1859	-0.0596	0.1255	0.0722	-0.0218
pcthispanic	-0.1815	-0.1644	-0.1448	0.5566	-0.0439	-0.0238	0.0439
pctasian	-0.176	-0.268	0.0917	0.512	-0.0963	-0.112	0.0278
pctamerind	-0.0412	0.1071	-0.1251	-0.134	0.0295	0.0461	-0.0043
pctwomen	-0.2869	-0.0665	-0.247	-0.0243	0.085	0.0457	0.0245
pctunder18	-0.1536	0.0297	-0.034	-0.0995	0.057	0.026	0.0397
pct2564	-0.509	0.0877	-0.2891	-0.0704	0.1531	0.0977	-0.0853
pctover65	0.0124	0.0448	0.0147	-0.1121	0.0226	0.0435	-0.0734
stateundr18	-0.1971	0.0441	-0.2559	0.2279	0.0014	0.0551	0.0575
state4564	0.1837	0.1127	0.3142	-0.4883	0.0419	-0.0093	-0.0785
ovr65state	0.1877	0.1066	0.2328	-0.3433	0.0426	-0.0137	-0.0424
stpctfemale	0.0933	-0.2703	0.1673	-0.0603	0.0829	-0.0035	-0.0421
stpctblack	-0.0154	-0.2825	-0.1452	-0.0347	0.068	-0.0449	0.0173
stpctasian	-0.1165	-0.2799	0.0033	0.5877	-0.1581	-0.0589	0.007
stpctnathaw	-0.0592	-0.0109	-0.0491	0.0042	-0.0716	-0.0559	0.0053
stpcthispnc	-0.165	-0.2293	-0.1716	0.7809	-0.0917	-0.0208	0.0579
stpctownhome	0.1667	0.3653	0.2241	-0.6719	0.1327	0.0488	-0.0154
stavghhsize	-0.1795	-0.299	-0.1468	0.7134	-0.0833	0.0099	0.05
stpctsglparent	-0.0155	-0.1815	-0.2526	0.0467	0.0617	0.0036	0.0223

	daycare	openadmissions	dualcredt	credlifeexp	apcredit	pctblack	pcthispanic
daycare	1						
openadmissions	-0.0072	1					
dualcredit	0.016	-0.0365	1				
credlifeexp	-0.0102	-0.0092	0.0745	1			
apcredit	-0.0369	-0.0085	-0.009	0.0337	1		
pctblack	-0.0672	0.0193	-0.0441	0.0231	-0.1765	1	
pcthispanic	0.1358	0.0037	-0.004	-0.0655	0.0308	-0.1459	1
pctasian	0.1728	0.0639	-0.0932	-0.1349	0.0301	-0.1487	0.2771
pctamerind	-0.0845	-0.0193	0.0084	0.044	0.0129	-0.1055	-0.0391

pctwomen	0.0317	-0.0191	0.0215	0.0945	0.0036	0.2885	0.0505
pctunder18	0.0487	-0.0702	0.0146	-0.0042	0.0206	-0.0438	0.1021
pct2564	-0.0653	-0.0361	-0.0078	0.177	0.0231	0.1238	0.1484
pctover65	-0.072	-0.096	-0.0204	0.0104	0.0108	-0.018	-0.0557
stateundr18	0.0533	-0.0134	-0.0082	-0.0506	0.0033	0.0755	0.3032
state4564	-0.0746	0.0014	0.0019	0.0721	-0.0017	-0.0857	-0.4001
ovr65state	-0.0592	0.0283	0.0183	0.0437	-0.0165	-0.0739	-0.3277
stpctfemale	-0.1277	0.0117	0.0008	-0.0049	-0.0516	0.303	-0.213
stpctblack	-0.1418	-0.0161	0.0274	-0.0749	-0.0677	0.5248	-0.1522
stpctasian	0.1626	0.0154	-0.032	-0.0796	0.0328	-0.1235	0.3442
stpctnathaw	0.0284	0.0078	0.011	-0.0266	0.0033	-0.065	0.0391
stpcthispnc	0.1536	0.0291	-0.0317	-0.11	0.0339	-0.1175	0.7171
stpctownhome	-0.1485	0.0257	0.0254	0.0592	-0.0328	0.0818	-0.4241
stavghhsize	0.1164	-0.0068	-0.0404	-0.0896	0.0099	0.0626	0.5233
stpctsglparent	-0.1394	-0.0098	0.0061	-0.1018	-0.061	0.4182	0.0056

	pctasian	pctamed	pctwomen	pctundr18	pct2564	pctover65	stateundr18
pctasian	1						
pctamerind	-0.0882	1					
pctwomen	-0.1185	0.0171	1				
pctunder18	-0.0099	0.0295	0.0928	1			
pct2564	-0.0773	0.1621	0.3561	0.1009	1		
pctover65	-0.0628	0.0712	0.0582	0.0193	0.1058	1	
stateundr18	0.0574	0.0991	0.0601	0.0875	0.1644	-0.0048	1
state4564	-0.2199	-0.0292	-0.0544	-0.0502	-0.0935	0.0584	-0.8496
ovr65state	-0.2102	-0.0375	-0.0568	-0.0404	-0.1069	0.0156	-0.8054
stpctfemale	-0.1497	-0.2302	0.0668	-0.0827	-0.1573	0.0227	-0.4601
stpctblack	-0.126	-0.1587	0.1756	-0.0629	-0.0594	0.0335	0.0967
stpctasian	0.7109	-0.083	-0.0258	-0.0673	-0.0674	-0.088	0.0225
stpctnathaw	0.3968	0.015	0.0126	0.0124	0.033	-0.0093	0.0092

stpcthispnc	0.4461	0.0367	-0.0125	-0.0459	0.0458	-0.082	0.441
stpctownhome	-0.5166	0.0386	0.0012	0.0618	-0.0013	0.0818	-0.0902
stavghhsize	0.5116	-0.0574	0.0545	-0.0389	0.0583	-0.041	0.627
stpctsglparent	-0.1324	-0.0214	0.1964	-0.011	0.0297	0.078	0.0454

	state4564	ovr65ste	stpctfemale	stpctblack	stpctasian	stpctnathaww	stpcthspnc
state4564	1						
ovr65state	0.6928	1					
stpctfemale	0.3102	0.3983	1				
stpctblack	-0.1475	-0.1474	0.6076	1			
stpctasian	-0.2317	-0.2796	-0.1408	-0.1445	1		
stpctnathaw	-0.058	-0.042	-0.2124	-0.1379	0.6387	1	
stpcthispnc	-0.5992	-0.4977	-0.3067	-0.1957	0.5133	0.0636	1
stpctownhome	0.4059	0.3687	0.0352	0.0445	-0.6877	-0.1731	-0.6285
stavghhsize	-0.74	-0.6771	-0.1848	0.1524	0.6372	0.2617	0.7512
stpctsglparent	-0.1155	0.0314	0.4874	0.7567	-0.2221	-0.1053	-0.0054

	stpctownhme	stavghhsize	stpctsparent
stpctownhome	1		
stavghhsize	-0.5577	1	
stpctsglparent	0.0197	0.093	1

Appendix D
Regression Results Corrected for Multicollinearity and Heterskedasticity

Variable Name	Lin-Lin Results (Chosen functional form)	VIF	Lin-Lin Results Corrected for Heterskedasticity and Multicollinearity
Six Year Graduation Rate (Dependent)			
Percentage of students receiving grant aid	-0.065* (0.017)	1.93	-0.064* (0.017)
Average amount of grant aid received	0.001*** (0.0014)	1.88	0.001*** (0.0014)
Percentage receiving student loan aid	-0.074** (-0.074)	1.69	-0.075** (-0.074)
Average amount of student loan aid received	0.00046* (0.00019)	1.59	0.00048* (0.00019)
Percent aid to$30,001-48,000	0.171** (0.03808)	1.61	0.181** (0.03808)
Percent aid to$48,001-75,000	0.332*** (0.024)	3.39	0.338*** (0.024)
Percent aid to$75,001-110,000	-0.196 (0.0874)	4.15	-0.174 (0.0874)
Percent aid to$110,000+	0.312** (0.0623)	2.88	0.322** (0.0623)
City: Midsize dummy	2.847** (0.508)	1.81	2.847** (0.508)
City: Small dummy	2.281 (1.686)	1.93	2.281 (1.686)
Suburb: Large dummy	1.692 (1.4219)	1.67	1.692 (1.4219)
Suburb: Midsize dummy	1.884* (0.572)	1.28	1.808** (0.572)
Suburb: Small dummy	4.631 (2.580)	1.22	4.631 (2.580)
Town: Fringe dummy	1.842** (0.402)	1.53	2.064** (0.402)
Town: Distant dummy	2.265* (0.833)	1.86	2.039* (0.833)
Town: Remote dummy	2.921* (1.049)	1.9	2.669* (1.049)
Rural: Fringe dummy	3.186 (0.4023)	1.16	3.186 (0.4023)
Rural: Distant dummy	6.202 (0.833)	1.21	6.202 (0.833)
Rural: Remote dummy	4.167 (1.0486)	1.13	4.167 (1.0486)

Variable Name	Lin-Lin Results (Chosen functional form)	VIF	Lin-Lin Results Corrected for Heterskedasticity and Multicollinearity
Total enrollment	0.00026*** (0.000033)	1.89	0.00029*** (0.000033)
Percent of students admitted	-0.046* (0.015)	1.59	-0.0051** (0.0541)
Tuition and fees costs	0.001* (0.00019)	2.02	0.004* (0.00019)
Weekend/evening courses dummy	-0.035 (0.1082)	1.13	-0.035 (0.1082)
Remedial courses dummy	-2.041* (0.5847)	1.15	-2.033* (0.5847)
Employment services for students Dummy	-1.004 (3.7596)	1.1	-2.031* (0.5912)
On-campus day care for students' children dummy	-0.241 (0.553)	1.21	-0.241 (0.553)
Open admission policy dummy	-2.3828* (0.798)	1.08	-2.3828* (0.798)
Dual credit dummy	-0.477 (0.228)	1.07	-0.478 (0.228)
Credit for life experiences dummy	-0.752* (0.223)	1.13	-0.752* (0.223)
AP credit dummy	1.381 (2.003)	1.06	1.382 (2.003)
Percent black	-0.183*** (0.0139)	2.38	-0.188*** (0.0139)
Percent Hispanic	-0.162** (0.022)	2.64	-0.168** (0.022)
Percent Asian	0.136 (0.084)	3.13	0.151 (0.077)
Percent American Indian	-0.133*** (0.015)	1.27	-0.128*** (0.016)
Percent female	0.021* (0.012)	1.46	0.039* (0.022)
Percent 18 and under	-0.330*** (0.039)	1.25	-0.330*** (0.038)
Percent 25-64	-0.649*** (0.0185)	2.52	-0.5914*** (0.0155)
Percent over 65	-1.552** (0.354)	1.09	-1.552** (0.345)
State total Population	-0.000000024 (0.00000003)	5.63	Omitted
Percent under 18 in the state	1.450** (0.223)	18.67	1.860** (0.223)

Variable Name	Lin-Lin Results (Chosen functional form)	VIF	Lin-Lin Results Corrected for Heterskedasticity and Multicollinearity
Percent 45-64 in the state	0.944** (0.1907)	10.47	1.218** (0.1907)
Percent over 65 in the state	1.748*** (0.109)	7.74	1.849*** (0.109)
Percent female in the state	1.207* (0.4997)	3.98	1.442* (0.4997)
State percent black	0.439** (0.060)	9.27	0.471** (0.060)
State percent Asian	0.036 (0.0325)	15.75	0.081 (0.0325)
State percent native Hawaiian	-0.612 (0.668)	4.85	-0.612 (0.668)
State percent Hispanic	0.164* (0.041)	7.97	0.174* (0.041)
Percent own home	0.514*** (0.0450)	6.31	.514*** (0.0450)
Average Household size	-13.848** (2.615)	12.71	-17.007** (2.585)
Percent of children living with single parent	-0.855** (0.126)	5.67	-0.908** (0.122)
Constant	9.103		16.06
Number of Observations	1434		1434
Number of Significant Variables	35		35

Statistical significance: * is 90%; ** is 95%; and *** is 99% or greater

Appendix E
Mission Statements for All Colleges Studied

University of California, San Diego Mission and Principles of Community

The University of California, San Diego is dedicated to learning, teaching, and serving society through education, research, and public service. Our international reputation for excellence is due in large part to the cooperative and entrepreneurial nature of the UCSD community. UCSD faculty, staff, and students are encouraged to be creative and are rewarded for individual as well as collaborative achievements.

To foster the best possible working and learning environment, UCSD strives to maintain a climate of fairness, cooperation, and professionalism. These principles of community are vital to the success of the University and the wellbeing of its constituents. UCSD faculty, staff, and students are expected to practice these basic principles as individuals and in groups.

- We value each member of the UCSD community for his or her individual and unique talents, and applaud all efforts to enhance the quality of campus life. We recognize that each individual's effort is vital to achieving the goals of the University.
- We affirm each individual's right to dignity and strive to maintain a climate of justice marked by mutual respect for each other.
- We value the cultural diversity of UCSD because it enriches our lives and the University. We celebrate this diversity and support respect for all cultures, by both individuals and the University as a whole.
- We are a university that adapts responsibly to cultural differences among the faculty, staff, students, and community.
- We acknowledge that our society carries historical and divisive biases based on race, ethnicity, sex, gender identity, age, disability, sexual orientation, religion, and political beliefs. Therefore, we seek to foster understanding and tolerance among individuals and groups, and we promote awareness through education and constructive strategies for resolving conflict.
- We reject acts of discrimination based on race, ethnicity, sex, gender identity, age, disability, sexual orientation, religion, and political beliefs, and, we will confront and appropriately respond to such acts.
- We affirm the right to freedom of expression at UCSD. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity, confidentiality, and respect.
- We are committed to the highest standards of civility and decency toward all. We are committed to promoting and supporting a community where all people can work and learn together in an atmosphere free of abusive or demeaning treatment.

- We are committed to the enforcement of policies that promote the fulfillment of these principles.

We represent diverse races, creeds, cultures, and social affiliations coming together for the good of the University and those communities we serve. By working together as members of the UCSD community, we can enhance the excellence of our institution.

University of California, Los Angeles Mission and Values

UCLA's core mission can be expressed in just three words: Education, Research, Service

Our Mission

UCLA's primary purpose as a public research university is the creation, dissemination, preservation and application of knowledge for the betterment of our global society. To fulfill this mission, UCLA is committed to academic freedom in its fullest terms: We value open access to information, free and lively debate conducted with mutual respect for individuals, and freedom from intolerance. In all of our pursuits, we strive at once for excellence and diversity, recognizing that openness and inclusion produce true quality. These values underlie our three institutional responsibilities.

Learning and teaching at UCLA are guided by the belief that undergraduate, graduate and professional school students and their teachers belong to a community of scholars. This community is dedicated to providing students with a foundational understanding of a broad range of disciplines followed by the opportunity for in-depth study in a chosen discipline. All members of the community are engaged together in discovering and advancing knowledge and practice. Learning occurs not only in the classroom but also through engagement in campus life and in communities and organizations beyond the university.

Discovery, creativity and innovation are hallmarks of UCLA. As one of the world's great research universities, we are committed to ensuring excellence across a wide range of disciplines, professions and arts while also encouraging investigation across disciplinary boundaries. In so doing, UCLA advances knowledge, addresses pressing societal needs and creates a university enriched by diverse perspectives where all individuals can flourish.
Civic engagement is fundamental to our mission as a public university. Located on the Pacific Rim in one of the world's most diverse and vibrant cities, UCLA reaches beyond campus boundaries to establish partnerships locally and globally. We seek to serve society through both teaching and scholarship, to educate successive generations of leaders, and to pass on to students a renewable set of skills and commitment to social engagement.

UCLA endeavors to integrate education, research and service so that each enriches and extends the others. This integration promotes academic excellence and nurtures innovation and scholarly development.

Principles of the Community

The University of California, Los Angeles (UCLA) is an institution that is firmly rooted in its land-grant mission of teaching, research and public service. The campus community is committed to discovery and innovation, creative and collaborative achievements, debate and critical inquiry, in an open and inclusive environment that nurtures the growth and development of all faculty, students, administration and staff.

These Principles of Community are vital for ensuring a welcoming and inclusive environment for all members of the campus community and for serving as a guide for our personal and collective behavior.
We believe that diversity is critical to maintaining excellence in all of our endeavors. We seek to foster open-mindedness, understanding, compassion and inclusiveness among individuals and groups.

- We are committed to ensuring freedom of expression and dialogue, in a respectful and civil manner, on the spectrum of views held by our varied and diverse campus communities.
- We value differences as well as commonalities and promote respect in personal interactions.
- We affirm our responsibility for creating and fostering a respectful, cooperative, equitable and civil campus environment for our diverse campus communities.
- We strive to build a community of learning and fairness marked by mutual respect.
- We do not tolerate acts of discrimination, harassment, profiling or other conduct causing harm to individuals on the basis of expression of race, color, ethnicity, gender, age, disability, religious beliefs, political preference, sexual orientation, gender identity, citizenship or national origin among, other personal characteristics. Such conduct violates UCLA's Principles of Community and may result in imposition of sanctions according to campus policies governing the conduct of students, staff and faculty.
- We acknowledge that modern societies carry historical and divisive biases based on race, ethnicity, gender, age, disability, sexual orientation and religion, and we seek to promote awareness and understanding through education and research and to mediate and resolve conflicts that arise from these biases in our communities. http://www.ucla.edu/about/mission-and-values

California State University, San Diego Mission and Goals

1.0 Mission

The mission of San Diego State University shall be to provide well-balanced, high quality education for undergraduate and graduate students and to contribute to knowledge and the solution of problems through excellence and distinction in teaching, research, and service. The university shall impart an appreciation and broad understanding of human experience throughout the world and the ages. This education shall extend to

1. Diverse cultural legacies,
2. Accomplishments in many areas, such as the arts and technology,
3. The advancement of human thought, including philosophy and science,
4. The development of economic, political, and social institutions, and the physical and biological evolution of humans and their environment.

The university shall accomplish this through its many and diverse departments and interdisciplinary programs in the creative and performing arts, the humanities, the natural and mathematical sciences, and the social and behavioral sciences.

2.0 Academic goals

Responding to these and other challenges, the university shall pursue the following academic goals to sustain and strengthen our position as a leading university:

2.1 To encourage the intellectual and creative development of a diverse group of students by helping them learn about themselves and others, their own and other cultural and social heritages, and their environment;

2.2 To foster development of critical thinking, writing, reading, oral communication, and quantitative and qualitative analysis as well as a commitment to lifelong learning and international perspectives needed to contribute to communities and fields of endeavor;

2.3 To provide the basis for informed citizenship in a democracy;

2.4 To offer advanced undergraduate and graduate students professional training and preparation for further study in a broad range of disciplines, with special emphasis on the preparation of teachers;

2.5 To support faculty in developing specialized contributions to knowledge, including innovative curriculum and pedagogy responsive to intellectual and professional needs of undergraduate, master's, and doctoral students;

2.6 To support faculty in their professionally-related community activities and informed exchanges with diverse professional and lay communities that strengthen the university's courses and scholarship;

2.7 To encourage scholarship, including the creative and performing arts, by students, faculty, and administrators from all areas of the university; and

2.8 To continue our commitment to research, including the expansion of externally funded projects and doctoral programs where appropriate.

3.0 The faculty

Given these challenges and academic goals, we hope to create

3.1 A Faculty of Teacher-Scholars: Every faculty member shall demonstrate excellence as a teacher-scholar. The faculty shall adopt and evaluate innovative teaching methods and shall incorporate active scholarship into teaching. The university's research orientation, distinctive within the California State University, shall afford graduate and undergraduate students the opportunity to become involved in research as well as interact with active research faculty.
3.2 A Faculty That Meets the Needs of Departments, School, and Programs to Provide Quality Degree Programs: Proud of our accomplishments in many areas, we shall continue to build upon the excellence of our academic offerings.
3.3 A Faculty That Is Diverse: Because academic discourse is informed and enriched by diverse ideas, the university shall diversify its faculty to meet the academic need for various perspectives and experiences, to address our student demographics, and to prepare students for the world in which they will live and work.
3.4 A Faculty That Provides International Perspectives: In our increasingly global society, we shall recruit faculty who can bring international perspectives to their work, who are committed to internationalization in their teaching and scholarship and in advising students, and some of whom are bilingual or multicultural.
3.5 A Faculty with Community-Based Interests. To strengthen the university's courses and scholarship and to bring university expertise the community, the faculty shall address the needs of the region through teaching, research, and service, which may include community-based activities such as applied research, training grants, and service learning.
3.6 A Faculty That Provides Interdisciplinary Perspectives. Because societal issues are multidimensional and transcend traditional academic disciplines, the faculty shall be expert in its disciplines and shall collaborate across disciplines to encourage students to work in groups and to provide an integrated educational perspective.

4.0 Diversity
Diversity shall be an essential consideration in all university policies and decisions, and shall be guided by the following statements that shall be published in staff and faculty handbooks, in the university Policy File, in the university General Catalog, the Bulletin of the Graduate Division, the IVC Bulletin, and linked from the Mission and Goals section on the main university Web home page.
4.1 San Diego State University is a community diverse in race, ethnicity, language, culture, social class, national origin, religious and political belief, age, ability, gender, gender identity, and sexual orientation. As a university committed to learning in all its forms, San Diego State University recognizes the need to attract and retain a critical mass of diverse persons who will advance its goals and ideals. This fundamental commitment to diversity 1) enriches the institution and provides an atmosphere in which all human potential is valued, 2) promotes learning through interactions among people of different backgrounds and many perspectives, and 3) better enables the university to prepare all members of its community to promote social responsibility, equity, freedom, and productive citizenship in a global society.

4.2 Diversity means not only the opportunity for all groups to be represented among faculty, student, staff, and administration but also the support for these persons as they seek the highest achievements. Attitudes, actions, programs, and policies that foster diversity engender the vigorous exchange of ideas, enhance respect and consideration for individuals and groups, strengthen the understanding of our mutual dependence, and form the core of the university. Diversity promotes enriched learning and produces positive educational outcomes for all.
4.3 Vigorous efforts to increase the diversity of the faculty, staff, administration, and students shall continue as a high priority, and as access increases, the university will create changes in its environment that enhance the opportunities for the success of all members of the campus community.
4.4 The university shall cultivate a campus climate that promotes human dignity, civility, and mutual appreciation for the uniqueness of each member of our community. Because the university's educational goals are founded on the values of intellectual honesty, appreciation for diversity, and mutual respect, it is critical that our academic and co-curricular programs, scholarships, courses, workshops, lectures, and other aspects of campus life reflect diverse perspectives. Freedom from discrimination, harassment, and violence against persons or property is a basic right and is requisite for learning. Freedom of speech shall be protected. By the same token, the campus community shall denounce and confront acts of intolerance, abusive behaviors, and the beliefs and past events that have separated us as a people.

California State University, Maritime Vision and Mission

The California Maritime Academy will be a leading educational institution, recognized for excellence in the business, engineering, operations, and policy of the transportation and related industries of the Pacific Rim and beyond.

We will maintain our commitment to quality instruction, research, and service in maritime education. From this foundation we will develop further to become a leader in engineering, science, and technology for the transportation industry. We believe our strength as an institution lies in maintaining focused areas of excellence, as distinguished from engaging in programmatic proliferation which our resource base cannot support.

Mission
The mission for Cal Maritime defines our purposes as an organization. Our educational community subscribes to the following statement of what we will do. Our mission is to:

- Provide each student with a college education combining intellectual learning, applied technology, leadership development, and global awareness.
- Provide the highest quality licensed officers and other personnel for the merchant marine and national maritime industries.

- Provide continuing education opportunities for those in the transportation and related industries.
- Be an information and technology resource center for the transportation and related industries.

Beliefs

The California Maritime Academy is defined, in part, by the system of beliefs that make us unique as an institution of higher education. They are:

- Experiential Learning
- Ethics Development, both Personal and Professional
- Small Residential Campus Environment
- Student Centered Learning
- Professional Orientation
- Having a Niche to Focus on in Higher Education
- Campus Civility and Collegiality
- Diverse Living/Learning Community

Values

Values influence how we make and carry out decisions, and how we interact with our internal and external constituencies.
At Cal Maritime they are:

- Dedication
- Honor
- Integrity
- Respect
- Responsibility
- Trust

<u>UC Merced Mission Statement</u>

The mission of the University of California, Merced is embodied in its proud claim of being the first American research university of the twenty-first century. Opening in 2005 as the tenth campus of the University of California, UC Merced continually strives for excellence in carrying out the University's mission of teaching, research and service, benefiting society through discovering and transmitting new knowledge and functioning as an active repository of organized knowledge. As a key tenet in carrying out this mission, UC Merced promotes and celebrates the diversity of all members of its community.

A research university is a community bound by learning, discovery and engagement. As the first American student-centered research university of the 21st century, UC Merced's strong graduate and research programs mesh with high-quality undergraduate programs. New knowledge increasingly depends on links among the disciplines, working together

on questions that transcend the traditional disciplines. UC Merced fosters and encourages cross-disciplinary inquiry and discovery.

Interdisciplinary practice in research nourishes undergraduate learning, building a foundation in connecting the ways that academic disciplines understand and grapple with society's problems. UC Merced undergraduates experience education inside and outside the classroom, applying what they learn through undergraduate research, service learning and leadership development. As apprentice scholars, graduate students build their understanding of and ability to do independent research in their chosen field, as the groundwork for entering professional life. Lifelong learners continue to hone their knowledge and workplace skills.

The twenty-first century ushered in the promise of new ways of connecting people to new knowledge and to one another. UC Merced capitalizes on this promise by functioning as a network, not simply a single place, linking its students, faculty and staff to the educational resources of the state, nation and world. The idea of network extends to UC Merced's relationships with neighboring institutions: educational, cultural and social. Born as a member of the distinguished network known as the University of California, UC Merced seeks strong and mutually supportive relationships with a variety of collaborators in its region: public and private colleges and universities; federal and state organizations that share UC Merced's educational and research goals; and cultural and social institutions.

This networking principle is also realized through the physical and intellectual integration between UC Merced and its surrounding community. The campus has been established as a model of physical sustainability for the twenty-first century, inviting all members of the campus and surrounding community to think and act as good stewards of the environment that they will convey to future generations. UC Merced celebrates its location in the San Joaquin Valley, reflecting the poetry of its landscape, history, resources and diverse cultures, while capitalizing on and expanding the Valley's connections to the emerging global society. UC Merced recognizes that research that begins with the natural laboratory at home can extend what is known in the state, nation and world.

UC Riverside Mission

The University of California, Riverside serves the needs and enhances the quality of life of the diverse people of California, the nation and the world through knowledge – its communication, discovery, translation, application, and preservation. The undergraduate, graduate and professional degree programs; research programs; and outreach activities develop leaders who inspire, create, and enrich California's economic, social, cultural, and environmental future.

With its roots as a Citrus Experiment Station, UC Riverside is guided by its land grant tradition of giving back by addressing some of the most vexing problems facing society. Whether it is assuring a safe, nutritious, and affordable food supply; stimulating the human mind and soul through the humanities and arts; or finding solutions to the profound challenges in education, engineering, business, healthcare, and the environment, UC Riverside is living the promise.

San Jose State Mission

In collaboration with nearby industries and communities, SJSU faculty and staff are dedicated to achieving the university's mission as a responsive institution of the state of California: To enrich the lives of its students, to transmit knowledge to its students along with the necessary skills for applying it in the service of our society, and to expand the base of knowledge through research and scholarship.

Goals

For both undergraduate and graduate students, the university emphasizes the following goals:

- In-depth knowledge of a major field of study.
- Broad understanding of the sciences, social sciences, humanities, and the arts.
- Skills in communication and in critical inquiry.
- Multi-cultural and global perspectives gained through intellectual and social exchange with people of diverse economic and ethnic backgrounds.
- Active participation in professional, artistic, and ethnic communities.
- Responsible citizenship and an understanding of ethical choices inherent in human development.

CSU Monterey Bay Vision and Mission

Vision

California State University, Monterey Bay (CSUMB) is envisioned as a comprehensive state university which values service through high quality education. The campus will be distinctive in serving the diverse people of California, especially the working class and historically undereducated and low-income populations. It will feature an enriched living and learning environment and year-round operation. The identity of the university will be framed by substantive commitment to multilingual, multicultural, gender-equitable learning. The university will be a collaborative, intellectual community distinguished by partnerships with existing institutions both public and private, cooperative agreements which enable students, faculty, and staff to cross institutional boundaries for innovative instruction, broadly defined scholarly and creative activity, and coordinated community service.

The university will invest in preparation for the future through integrated and experimental use of technologies as resources to people, catalysts for learning, and providers of increased access and enriched quality learning. The curriculum of CSUMB will be student and society centered and of sufficient breadth and depth to meet statewide and regional needs, specifically those involving both inner-city and isolated rural populations, and needs relevant to communities in the immediate Tri-County region (Monterey, Santa Cruz, and San Benito). The programs of instruction will strive for distinction, building on regional assets in developing specialty clusters in such areas as: the sciences (marine, atmospheric, and environmental); visual and performing arts and related humanities; languages, cultures, and international studies; education; business; studies of human behavior, information, and communication, within broad curricular areas; and professional study.

The university will develop a culture of innovation in its overall conceptual design and organization, and will utilize new and varied pedagogical and instructional approaches including distance learning. Institutional programs will value and cultivate creative and productive talents of students, faculty, and staff, and seek ways to contribute to the economy of the state, the wellbeing of our communities, and the quality of life and development of its students, faculty, and service areas.

Mission Statement

While the Vision sets the target, the university mission guides day-to-day operations. Every day, every faculty member, staff employee, and administrator works...

To build a multicultural learning community founded on academic excellence from which all partners in the educational process emerge prepared to contribute productively, responsibly, and ethically to California and the global community.

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