CAN TUITION INCREASES IMPROVE STUDENT OUTCOMES IN CALIFORNIA COMMUNITY COLLEGES?

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CAN TUITION INCREASES IMPROVE STUDENT OUTCOMES
IN CALIFORNIA COMMUNITY COLLEGES?

A Thesis

by

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Abstract

of

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At California community colleges, books can cost more than tuition. At less than $80 a class, California charges the lowest community college tuition in the country, a testament to the state's commitment to providing its residents with an affordable college education. While the low tuition may help get students into the classroom, the tuition policy may not be helping students stay in the classroom. Studies have shown that California community college students are dropping one of every five courses midway through the semester. Policy analysts have suggested that higher tuition might motivate students to choose their courses more carefully and to stick out tougher courses. This study examines how price and other factors contribute to a community college's course-completion rate. Using data obtained from the California Community College Chancellor's Office, course completion is modeled using regression analysis with broad casual inputs (price, student demographics, school characteristics, and economic conditions). The statistical analysis is used to isolate how tuition changes in California community colleges from 2002-2008 can influence course-completion rates. The analysis confirmed a statistically significant, positive relationship between tuition and course completion. Though the predictive effect is small – and is likely moderated by the high percentage of students not paying any

tuition due to fee waivers – small changes can carry long-term impacts on a community college system on the scale of California. With students enrolled in 4 million courses, a 38 percent tuition hike approved by the state Legislature in 2011 could lead to students completing up to 10,000 more classes statewide and staying on track to transfer to a university, earn a degree, or complete other goals. Larger tuition increases that have been proposed would motivate students to complete even more courses. An even larger potential impact on course completion could occur if proposed changes to the state's fee waiver policy are made, such as requiring waiver recipients to make satisfactory academic progress or reducing the number of students not paying any tuition by replacing the fee waiver with a traditional need-based financial aid model.

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INTRODUCTION

Political attention on improving student achievement for community college students has reached new heights, perhaps best underscored by the first-ever White House Summit on Community Colleges held in October 2010. Addressing the conference of educators, President Barack Obama called community colleges the "unsung heroes of America's education system. They may not get the credit they deserve. They may not get the same resources as other schools. But they provide a gateway to millions of Americans to good jobs and a better life" (Obama, 2010). The President stressed the role of community colleges to improve America's global competitiveness by expanding educational and job training opportunities. He set a 10-year goal for the nation's higher education system to lead the world in college graduates, with an additional 5 million degrees and certificates coming from community colleges (Obama, 2010). As of 2008, only 41.6 percent of 25- to 34-year-old Americans had earned at least an associate degree, putting the United States in 12th place globally (Adams, 2010a).

The challenge for California's community colleges, however, is that only 31 percent of their students earn an associate's degree, vocational certificate, or transfer to a 4-year college after six years and most students start in remedial classes to catch up on basic skills (Moore and Shulock, 2010). Many education organizations and college

leaders share the emphasis of community colleges as a key economic lever, and are pursuing strategies to combat the low rate of completion and help students achieve their goals (Mullin, 2010). These efforts have been fueled by the Bill and Melinda Gates Foundation, the Lumina Foundation for Education, and other nonprofit organizations investing millions of dollars to identify and encourage improvement efforts on community college campuses across the country (Adams, 2010b).

Taking a Close Look at Tuition

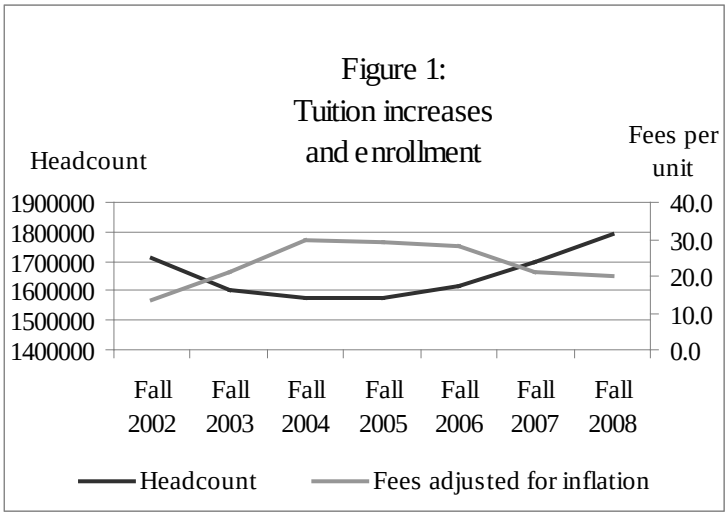
In community colleges across California, the textbooks can be more expensive than the tuition. Thanks to generous state subsidies, student fees comprise only 8% of the operating revenue of the state's community college system (Legislative Analyst's Office, 2010). At roughly $80 a class today, the least expensive community college system in the country attracts nearly 2 million students a year and stands as a testament to the state's commitment to providing access to higher education. Getting students in the door is easy. Getting them to stay in class, however, has proven much more challenging. In the spring 2010 semester, only 68% of courses were successfully completed by students with a letter grade of C or better (California Community College Chancellor's Office, 2011). Even among more committed, degree-seeking community college students, Moore and Shulock (2007), found a 78% course-completion rate, which means students are dropping or receiving a letter grade below C in every one of five courses each semester.

Conklin (1997) noted that withdrawals frustrate faculty, as well as students who are shut out of closed sections "who would have loved to have had the opportunity to enroll instead of the student who ultimately withdrew" (p.2). Because of the low tuition in California, Shulock and Moore (2007) suggested that "students are not deterred by financial consequences from dropping courses" (p. 32). The state's Little Hoover Commission (2000) also asserted that "low tuition encourages students to pick and choose courses knowing they can be dropped with little financial impact" (p. 59). According to the Legislative Analyst's Office (2004), if students paid a higher share of their college costs, the higher tuition would create incentives for students to take personal ownership of their educational experience and "formally recognize the private as well as public benefits of higher education." This common-sense assertion, however, has not been tested empirically. The theory also does not take into account the high percentage of financial-aid students at California community colleges who do not pay any tuition because they receive fee waivers. The impact of potential tuition increases on these students remains unclear. An opportunity to explore these issues more thoroughly has surfaced. Recent hikes in California community college tuition have provided data in a natural setting to understand how changes in price may have affected course completion behavior, a research question made more relevant by current proposals in the Legislature to increase tuition.

Tuition and Enrollment

California has a long history of keeping community college tuition affordable, if not free. State residents did not pay any tuition for community colleges until 1984. Community college tuition in California has fluctuated between roughly $40 and $90 a class since 2002, when adjusted for today's dollars (Legislative Analyst's Office, 2009). It is still the lowest in the country. A full-time student taking 30 units per academic year now pays $780 per year, one-fourth the average for all other public two-year colleges of $3,075 (Legislative Analyst's Office, 2011).

When tuition more than doubled from 2003 to 2005, the California Community College Chancellor's Office (2005) observed a drop in enrollment of 315,000 students, though researchers in the state Chancellor's Office did not control for other factors that may have contributed to the enrollment dip, such as reduced course offerings due to budget cuts. Taken in isolation, the inverse relationship between tuition increases and enrollment can appear striking (Figure 1). Without considering other factors that could affect enrollment, when fees increased in 2003 and 2004, enrollment dropped; when fees stayed flat and then dropped in 2007, enrollment began climbing back up.



However, a drop in enrollment without consideration for who stopped enrolling presents an incomplete picture. This is an important distinction, because the community college system pursues missions beyond a pathway to a four-year university and bachelor's degree. Students attend community college for a variety of other reasons, including personal enrichment. We also know that the State Chancellor cited reduced course offerings for the enrollment decline, after ordering colleges to cut 5% of classes except for basic education courses such as English and math, job-training classes, and classes needed to transfer to the state universities (Krupnick, 2010). As the state Chancellor told the Los Angeles Times, "The 'mission creep' that made room for flower arranging, yoga and other recreational studies is likely to be greatly reduced or eliminated" (Rivera, 2010). In addition to demonstrating how changes in price can

influence student success, the tuition increases also raise interesting policy questions about setting priorities for the college system.

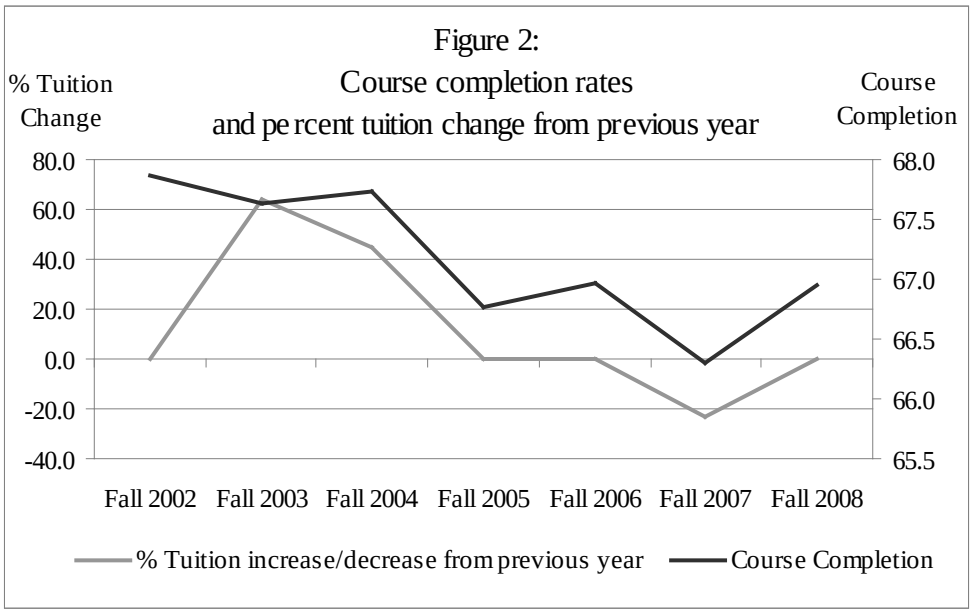
New Tuition Increases on the Table

Since the fee increases from 2003 to 2005, the story has grown more complicated, and volatile. With the state's budget still in crisis, higher education funding remains vulnerable. New fee increases to backfill potential cuts at community colleges are being discussed today that could increase the cost per class to as high as $180 (Legislative Analyst's Office, 2009). In his proposed 2011-12 budget, Governor Jerry Brown called for budget cuts to the colleges, as well as a 38% fee increase (Department of Finance, 2011). The State Chancellor has asserted that additional tuition hikes "would risk significant and lasting negative impacts on community college participation" (California Community College Chancellor's Office, 2009a).

The state Chancellor's Office, however, observed some positive impacts when tuition was increased in the past: Students dropped courses less frequently when tuition increased by 136% from 2003 to 2005. The overall course completion rate increased by 1 percentage point – indicating a "significant shift" in behavior, according to the Chancellor's Office – though the study did not control for other factors (California Community College Chancellor's Office, 2005, p. 27). Though one percentage point may not seem like much, in the context of 4 million course enrollments, a 1-point bump

means student successfully completing 40,000 more courses and staying on track to achieve their goals.

Taken in isolation, the relationship between fees and course drop-out behavior follow similar trajectories. Figure 2 overlays the year-to-year percent change in tuition with the average course-completion rate for students, from 2002-2008. The actual dollar changes in tuition were not particularly large (ranging from $11 to $26 per credit unit), but the percentage increases and decreases – up 60% one year, down 20% a few years later – were substantial. When looking at the relationship to course completion in Figure 2, a potential, positive psychological effect comes through. When fees increased at a high percentage, course completion increased; when fees fell back down at a sharp rate, so did the course completion rate. However, without considering other variables, and without understanding who is dropping out, the effect of tuition increases remains inconclusive. We need to move beyond the question of enrollment, to understand tuition policy in the context of the multiple missions of the community college system, the impact on student education goals and the state's need for college educated individuals. If students in P.E. and ceramics classes stopped coming because of high tuition, it would mean something far different than if first-time, degree-seeking students dropped out.



Gaps in Research Invite New Approaches

While the relationship between tuition and enrollment has been studied frequently (Leslie and Brinkman, 1987; Heller, 1999; Cofer and Somers, 2001) the research often focused on how price affects a student's behavior outside of the classroom – whether to attend college or not. A question remains about the impact that tuition can play on aspects of student behavior inside the classroom, such as their commitment to complete the courses in which they enroll. This thesis provides a deeper analysis of the implications of tuition increases on one aspect of student achievement, course completion. I chose to examine the course-completion rate because it serves a gateway indicator about student performance and progress (Jenkins, et. al, 2009). Based on my

own experience, I also am interested in learning more about the phenomenon I witnessed while taking inexpensive community college courses in California: crammed classrooms at the beginning the semester and empty seats at the end of the term. Anecdotal evidence suggests that this is a widespread pattern. I believe significant changes in tuition would bring the most immediate impact on course completion, compared to on other common performance indicators, such as transfer rates and degree completion that measure longer term goals. Because course completion represents a critical link in the chain of student success, finding a tool in the form of prudent tuition increases could have major policy implications for the college completion agenda. As Adelman (2006) observed, frequent course dropping can lead to "crippling" consequences for students, reducing the likelihood of degree completion by half (p. 74).

Building a Research Agenda

To inform this discussion, I will conduct a quantitative study of the 100-plus community colleges across California. Using academic, demographic, and economic data specific to each college, I will use regression analysis to isolate and measure how strongly a tuition increase may improve course-completion rates. Alternatively, the data might show that tuition increases do not play a significant role in improving course-completion rates. The data also could raise more questions – by suggesting that intervening or overlapping factors that also are changing might be responsible for fluctuations in course-completion rates.

In the following sections, Chapter Two examines the relevant literature about course completion and the factors that can influence it. I will review how course completion has emerged as an important building block for researchers who study student success. A deeper discussion of how price, a student's background, institutional characteristics, and economic conditions can influence student success also will be included in my review of the literature. Chapter Three provides a description of the analytical methods I will use to explore how tuition increases have influenced course completion rates in California community colleges. This includes a discussion of the regression model, the variables included in the model and their predicted effects, and the data I assembled to conduct my research. Chapter Four provides the results of the regression analysis and will identify the statistically significant variables that influence course completion. Chapter Five concludes the report with a discussion about the findings and implications for the policy debate about increasing community college tuition.

Chapter 2

LITERATURE REVIEW

Introduction

Strategies to improve student outcomes often are rooted in scholarly research. In this section, I will discuss how course completion has emerged as a progress indicator for student success and examine what researchers have learned about this important building block. I then will examine the key levers identified in the academic literature that can influence the behavior of community college students. The variables that influence student success generally fall into four thematic categories: price, student background, institutional characteristics, and economic conditions. I will briefly highlight findings from each category. The conclusion of this section will discuss the limitations of the research and address opportunities to better understand the relationship between course completion and tuition increases in California community colleges.

Course Completion

Defining student success is complicated by the fact that students may attend community college for reasons other than earning a bachelor's degree, an associate degree, or a vocational certificate, such as taking a small number of classes for enjoyment or to improve job skills. Students' goals often are unclear and can be difficult to quantify.

Because of the lack of a uniform end-goal, the use of intermediate milestones and success indicators have emerged as an alternate way to monitor progress and behaviors as students pursue – or stop – their studies (Offenstein and Shulock, 2010). Commonly used milestone achievements include completing remedial coursework, earning one year of college-level credits, and transferring from community college to a university. Success indicators help researchers deconstruct the milestones, with a deeper level of analysis that can predict the completion of a milestone. Success indicators include a high course-completion ratio, enrolling continuously, and timely passage of "gateway" English and math courses. Researchers have found that students who meet these success indicators demonstrate a greater likelihood of degree completion or transfer (Moore and Shulock, 2009). Regardless of the individual goal, student progress at community college is made incrementally, by completing one class at a time. It seems inarguable that a student intends to complete a course in which he or she has enrolled. However, in the face of multiple missions of community colleges, a closer examination of course completion as an indicator can be helpful in understanding if students intend to earn a credential or degree. According to Adelman (2006 and 2005), dropping and re-taking more than 20 percent of courses can lead to "crippling" consequences for students, reducing the likelihood of degree completion by half and for community college students and decreasing the probability of transfer by 39 percent. Researchers have confirmed repeatedly that the likelihood of completion declines when students drop a high percentage of courses (Moore and Shulock, 2009). In a study of "degree-seeking"

California community college students who began taking classes in 2000-01, students who dropped fewer classes during their first year had a completion rate that was 24 percentage points higher than student who completed less than 80% of their courses. Only 14.6% of students who completed less than 80% of courses they enrolled in during their first year earned a certificate or degree or transferred within seven years (Moore, Shulock, and Offenstein, 2009).

Researchers also have explored why community college students drop courses. Work conflicts rose to the top of reasons cited by students. Using survey data from Santa Ana College, Hayward (2003) found that community college students cite conflicts with work, family and personal problems, and dissatisfaction with instruction or academic progress as reasons for dropping. He also notes that minority students tend to withdraw more frequently (41%) than the overall average (17.5%). In an earlier survey and follow-up interviews of students who dropped courses at San Jose City College, Kangas (1991), found that 64% of students cited personal reasons, such as sickness and job-related conflicts. Only 16% of respondents cited financial difficulties for withdrawing, and half of those students referred to the cost of books. Among the withdrawing students, 85% did not talk to their instructor about withdrawing; 84% worked 40 or more hours a week (compared to 45% of successful students); 89% studied alone (compared with 57% of successful students); and 87% of interviewed withdrawing students said they intended on attending college "next semester." Conklin (1997) surveyed students at a small, unnamed Midwestern community college and found that students dropped courses due to

schedule conflicts (24.9%), bad time/inconvenient (15.7%), personal problems (17.7%), too hard/bad grades (14.7%), disliked instructor (13.4 percent). Not discussed in the survey work was how the low cost of tuition may have influenced the students' decisions to drop courses. Even with family obligations and other conflicts, higher tuition may have encouraged students to remain in class because the cost of retaking it would the course would have been prohibitive. Were the cost higher, some of these students – those working full-time or for whom class was at an inconvenient time – might not have enrolled in the first place.

Researchers also have discussed adopting more interventions, such as mentoring and support services, to help students remain in class. Others have questioned if college policies simply make it too easy for students to drop courses. For example, Adelman (2006) questions college policies that do not penalize students for dropping courses. Course completion, in fact, has become ground zero in a policy debate about apportioning funds to California community colleges. California community colleges receive funding based almost entirely on how many students are enrolled in courses during the third week of the semester. This can create a perverse financial incentive for colleges to focus on filling classrooms at the beginning of the semester, as opposed to focusing on ensuring that students complete their courses (Shulock and Moore, 2007). Legislative efforts have been attempted to tie the funding formula to enrollment at the end of the semester, an idea resurrected in 2011 by Governor Jerry Brown in his first budget proposal (Office of Legislative Counsel, 2010; Department of Finance, 2011). As

college budgets continued to be tightened, the issue remains controversial – colleges with lower course completion rates could see even further cuts under a new funding method (York, 2010) – though it underscores the political importance and ongoing attention of the course-completion rate that I will be examining more closely throughout this study.

The Effect of Price

Because of the recent volatility in California community college tuition, understanding how students respond to changes in price in the classroom forms the basis of my research question. My search of the literature, however, revealed a gap in the research: studies I reviewed about tuition increases only considered the impact on student enrollment, not on course completion or other intermediate measures of success. For example, Leslie and Brinkman (1987) examined 25 studies of tuition effects on college campuses and found that every $100 increase in undergraduate tuition reduces enrollment by 0.7 percentage points. Heller (1999) found that every $1,000 increase in community college prices is associated with an overall drop in enrollment of 2.08 percentage points. Heller also notes that price sensitivity has been decreasing, which might indicate that students are recognizing the valuing – and increased earning potential – from a college education. "They are more likely to suffer tuition increases than their predecessors a generation or more earlier," he notes. Though the research is based on enrollment impacts, the information is still useful in a broad sense, in that researchers

demonstrated that students do respond to price; their hypothesis can be extended to see how price affects behavior in the classroom.

A large body of literature also reveals that student perception (and misperception) about college costs and availability of financial aid can influence college-going patterns (Tierney and Venegas, 2009; de la Rosa, 2006; Grodsky and Jones, 2006; Heller, 2006). This is particularly important in California, because the total dollar costs are not substantial, but the percentage increases – as high as 136% over two years – can appear alarming. The sticker shock potentially could lead to the type of self-selection and enrollment drops feared by the California Community College Chancellor's Office (2009). As mentioned in the previous chapter, the story of declining enrollment during a time of tuition increases is complicated by the multiple missions of the community college system. Tuition increases that potentially scare away students from enrolling in recreational classes may not be as much as a public policy concern if the remaining students are more academically inclined and committed to pursuing a degree, certificate or transferring.

We also know that financial aid can provide a powerful incentive for students to continue their studies, even in the face of tuition increases. In a national sample of 7,505 college students in 1993 and 1996, Cofer and Somers (2001) found that community college students who take on higher levels of debt (more than $7,000), increase the likelihood that they will continue to the next school year by 16.4 percentage points, compared to students who did not take out loans. They observed that as students near

degree completion and “the proverbial light at the end of the tunnel,” they appear more likely to incur debt (p. 70). Research shows that **s**tudents might take more ownership in their educational outcomes with a greater personal financial investment. Grants also provide incentives for lower income community college students to persist in their studies, presumably freeing up time for school that would otherwise be spent working to pay for education costs (Mendoza, 2009). An experiment in Ohio to provide performance-based scholarships to low-income parents enrolled in community colleges also underscores the power of money on student success patterns. Ohio offered student awards up to $1,800 per academic year for earning a “C” or better in 12 or more credits per term, or up to $900 for meeting that benchmark in 6 to 11 credits per term. Cha and Patel (2010) found that scholarship winners attempted and earned more credits and were more likely to be enrolled full time than a control group.

How financial aid affects California community college student success will play a key role in my analysis. At California community colleges, a generous fee waiver is available for low and moderate-income students. Zumeta and Frankle (2007) found that students receiving the Board of Governors fee waiver represent 42% of all credits taken in California community colleges. Based on the research about price sensitivity to tuition and the positive influence of financial aid on achievement, the message is clear: students can be motivated by money. That message, however, is murkier in California, where a high percentage of community college students not pay any tuition.

Student Characteristics: Age, Race and Gender

Community colleges attract a diverse population of students from varying backgrounds, often unprepared for a college curriculum. Though the literature does not specifically address how student characteristics influence course completion in community college, it provides extensive examples that link student background characteristics to other performance indicators in college. Variables repeatedly studied include age, race, gender, family income, career goals, and previous academic performance and preparation in high school. This body of research is still applicable and included in this section, because the completion of courses is the inherent, first component of frequently examined success indicators related to persistence, transfer, and degree or certificate completion. That is, a student cannot earn a degree without completing coursework and accruing sufficient units. If a student's race factors into the probability of degree completion, then one could reasonably assume that race also would influence the intervening course-completion rate.

In a landmark study, Bean and Metzner (1985) created a theoretical framework that suggested factors beyond a college's control – the student's personal background and home environment – play a pivotal role in predicting his or her success in college. Researchers (Adelman, 2006; Kuh, 2006; Chen, 2007) confirmed that the demographic characteristics such as race and socioeconomic status that a student brings into the classroom influence the student's trajectory through college. Moore and Shulock (2007) found many of the expected relationships between student backgrounds and success at

California community colleges: college completion declined with increases in students' age, if students were black or Latino, and if they came from families with lower income.

Academic preparation and readiness also is predicted to propel students forward toward degree completion. Hoachlander (2003) examined a cohort of 1992 high school graduates and found that students who entered college already proficient in math and reading were more likely to earn a degree within six years. Older, part-time students face additional burdens – such as work and family obligations – than younger students in reaching college goals. Adelman (2005) declared: "One demographic variable makes an enormous difference in the distribution of virtually any postsecondary outcome or process – age at the time of first entry to postsecondary education." Chen (2007) examined a cohort of students entering college in 1995 and found that part-time students were less likely to persist and earn a bachelor's degree or certificate after five years. Calgano (2006) also confirmed the gap in graduation and transfer rates between older and younger students. He observed, however, that older students make progress at their own pace. He found that reaching milestones, such as obtaining 20 credits, is a more positive factor affecting the likelihood of graduation for younger students than older students.

Institutional Factors

Various studies have analyzed how the campus environment shapes student experiences and performance. Tinto (1975) established a conceptual framework to understand college drop-out behavior that became a seminal article and is still dominant

in the field. In addition to well-established variables of individual student characteristics (such as race or family income) and student academic performance (such as high school GPA), Tinto argued that a student's integration into a college's academic and social systems – contacts with faculty and involvement in school activities, for example – can play a pivotal role in the student's commitment to complete a degree. Tinto found that the higher the degree of integration, the greater the commitment to the specific institution and goal of college completion. As an oft-cited study, Tinto's attention to institutional factors has been tested frequently with more quantitative methods. For example, in a national sample that followed 12,000 students from 1988-2000, Bailey and colleagues (2005) found that students do not integrate as well in large colleges and colleges with more part-time faculty – impersonal environments that lead to lower rates of academic success. Halpin (1990) also confirmed that increased student conversations with faculty, for example, can improve student success.

Despite criticism that Tinto's framework does not apply well to community college students who are typically older and attend classes part-time (Braxton, et. al, 2004), others contend that academic and social integration does occur at community colleges, though it may look different than on a four-year residential campus. Based on interviews at two urban Northeast community colleges, Karp (2008) cites orientation or success courses, which are becoming more common at community colleges to help nontraditional navigate the college system, as helping motivate students to continue with their students. However, Moore, Shulock, and Offenstein (2009) determined that

relationship between success courses and goal-completion was more complicated, likely because the classes target at-risk students who face additional challenges. In a study of California community college students, Moore, Shulock, and Offenstein found that completing a success course did not make a difference for full-time, traditional-age students or Asian students, and that black students who took a success course were less likely to earn a certificate or degree or transfer.

In line with the integration theory, there is a large body of work about the influence of counseling, tutoring and student support programs on college campuses. Hayward (2003) suggested that more intensive intervention strategies, such as mentoring programs, would deter students from dropping courses midway through the semester. Purnell (2004) observed that California community college students who participated in the Extended Opportunity Programs and Services (EOPS) network of intervention services completed their courses at higher rates than non-EOPS students, though the study did not isolate other variables that may have influenced the course-completion rate. In a more rigorous regression analysis, Chaney (1998) looked at the Federal Student Support Services, which provides counseling and peer tutoring services to low-income students, and found that participating students were 7 percentage points more likely to persist to a third year of college than on participating students.

Attention to unique and innovative institutional programs is certainly growing, as is the frustration at not being able to quantify why some institutional practices work at community colleges, in order to design successful programs for other colleges (Tinto,

2006; Bailey and Alfonso, 2005). Bailey and Alfonso (2005) note that much work in this area is based on case studies, with limited applicability to other campuses. Jenkins (2007) took a unique approach to estimate institutional effectiveness on graduate, transfer, and persistence rates among minority Florida community college students. Jenkins and his colleagues conducted field work to assess how the state's 28 community colleges coordinate programs and services for low-income students, describing the colleges as high-, medium- or low-impact based on their management strategies. They found, when controlling for other factors, that high-impact colleges, with more coordinated and targeted services to students, showed stronger success indicators than low-impact colleges.

The Economy

The fourth theme that emerged from the literature focuses on societal factors that influence student achievement in college; that is, the external forces beyond a student's home life or the campus environment, such as unemployment rates. Surprisingly, I found few studies that examined how the labor market affects student choices about pursuing a college degree and completing courses. The studies revealed that economic conditions, such as a tight labor market, can entice students to seek refuge in the classroom. For example, Betts and McFarland (1995) examined 818 colleges and found through a regression analysis that a 1 percentage point increase in unemployment rates leads to a 0.5 percentage point increase in enrollment for younger college students and a 4

percentage point increase in attendance of older students. More to the point, Kienzl (2007) reviewed a national longitudinal sample of 12,000 students and observed that community college students, who stand at the margin between work and school, are more sensitive to changes in the labor market. According to Kienzl, when the labor market is tight, students will stay in school despite increases in tuition. That dynamic is playing out across California right now. Despite double-digit unemployment and tuition increases at all public higher education institutions in California, campuses are experiencing an increased enrollment demand. The impact on student performance in the classroom, however, remains unclear.

Conclusion

For decades, researchers built and tested conceptual models, using dozens of variables, to predict student outcomes. They developed a foundational understanding of the pressure points that can bolster – or hinder – achievement. We learned through the literature that background characteristics still play a major role in predicting student success in community college – poor, minority students lag behind their peers. Financial aid programs, however, can help students stay in school and on track, as can campus-based support services. However, I found little research that directly tied a major issue confronting students today – rising tuition – with student course completion and persistence. Often, the studies that separately examined tuition increases and labor markets tested those variables against the overall enrollment of colleges, not how those

factors influence behavior inside the classroom, such as the dropping of courses midway through the semester. This research gap provides an opening to contribute to the literature on student success. In today's economic downturn, it becomes glaringly obvious that high unemployment is driving more students to college, even in the face of higher tuition. And with an ever-tightening state budget, more tuition hikes to offset budget cuts seem inevitable. Further research into how tuition increases, when controlling for other student, school and economic factors, have influenced student course completion would do well to inform the ongoing policy discussion about potential tuition hikes at the State Capitol and conversations about improving student success.

Chapter 3

METHODOLOGY

This section details the methodology I will use to understand how tuition levels affect course completion in community college classrooms. I chose to test how tuition might influence course completion by conducting a regression analysis. To separate the effect of tuition from other factors that might push course completion rates in the same or a different direction, I assembled a database that includes seven years of academic, demographic, institutional, and economic data (from 2002-2008) about each of California's community colleges. A regression computer software package reviews how all the variables interact with each other to determine which factors have a statistically significant effect on the outcome of course completion. In this section, I will describe the dependent variable – course completion – and outline the broad factors that are expected to cause variation in it. The factors, based on the review of literature, fall into the following categories: price, student background characteristics, institutional measures, and regional economic conditions. Testing the strength of those connections and relationships will require a model that incorporates these specific explanatory variables. I will identify those variables and predict their directional pull. I also will discuss the preferred model and testing procedure for the regression analysis. A table at the end of this section specifies the sources of data used in this study.

Dependent Variable

The dependent variable is student course-completion, as measured by the course-completion rate at each of the California community colleges, during the fall semester from 2002-2008. The statewide community college system refers to this measure as the "success rate." Specifically, the success rate for each college in my data set represents the total number of course enrollments that were completed with the letter grade of C or higher at the end of the semester, as a portion of the total number of course enrollments attempted by students at the beginning of the semester (at the third week, the official cut-off date for enrollment counts). I chose this measure because the California community college system experiences an alarming number of course-drops in the middle of the semester. Completing courses is the first step on the pathway toward earning a vocational certificate, transferring to a four-year college or completing a bachelor's degree. Adelman (2006) and others have shown that withdrawing from or repeating courses reduces the probability of degree completion. As described earlier, I would like to examine more closely whether recent tuition increases have encouraged students to work harder in class, to avoid paying a higher price to retake a course. The data set I developed covers 2002 to 2008 because of the dramatic swings in tuition that students experienced during that time. In light of current proposals to increase community college fees, it would be timely and controversial to find a "silver lining," if it can be predicted

that fee increases might improve course-completion behavior when controlling for other factors, ultimately boosting student achievement and degree completion.

Model

The research indicates that student success is shaped by several factors: price, student background, institutional characteristics, and the economy. The general form of the regression model, therefore, includes proxies for each of these broad causal factors so as to control for these factors while isolating the impact of tuition on the variable of interest – course completion. The unit of analysis is the college. A longitudinal study following individual college students over a period of time would more accurately capture the impact of tuition changes on student course-completion behavior; I used college-level data that was more immediately available to pursue this research question. Though I am fundamentally interested in the impact of tuition on student behavior, I will be inferring student behavior by examining a high order unit of analysis, the college. The general form, with expected effects in parentheses, is:

> Course-completion behavior = f (cost inputs, student inputs, school inputs, economic inputs), where:

- Course-completion behavior = f[Fall semester college success rate, 2002-2008]
- Cost inputs = F[fees per unit, adjusted to 2010 dollars (+), % fee increase from previous year (+), % BOG waiver (?)]
- Student inputs = f[%female (?), % African American (-), % Hispanic (-), % Asian (+), % age 25 and older (?), % part-time (-)]

- School inputs = f[, % participated in EOPS (+), campus enrollment (-), % change in campus enrollment from previous year (-), % full-time faculty (+), dummy variable for individual community college (?)]
- Economic inputs = f[county poverty rate (-), county unemployment rate (+)]

Rationale for Anticipated Effects

Before conducting the regression analysis, I developed hypotheses regarding the factors that research has shown influence student course-completion behavior. The expected direction of the independent variables is indicated by a "+" sign that signifies a positive effect, a "-" sign that indicates a negative effect, and a "?" sign that indicates an unclear predictive effect.

Cost Inputs

Among the factors that can shape a student's academic experience is the cost of attendance. In this category, I am including two tuition variables, as measured by the base fees per unit in real dollars (adjusted for inflation), as well as the percent of the per-unit fee increase from the previous year. Though student fees account for only a portion of the total cost of attending college, tuition still represents the most visible, well publicized and debated of college costs (Leslie and Brinkman, 1987, p. 196). Using a tuition-increase measure also is appropriate because fee increases are high-profile and symbolic on campuses, particularly when fees more than doubled over a two-year period

ending in 2005. I assigned the fee variables a positive effect, to test the assumptions by Moore and Shulock (2007) and the Little Hoover Commission (2000) that increases in tuition might incentivize students to remain in class.

The California community college system also provides financial aid to low-income students through a Board of Governors (BOG) fee waiver. Students qualify for a BOG fee waiver – exempting them from paying any tuition – by demonstrating financial need based on income, welfare or public assistance participation, or eligibility for other federal or state financial aid services (California Community Colleges, 2009b). Because of the lower-income profile of community college students, it is common for a substantial portion of the student to receive BOG waivers. The data set, therefore, includes a variable representing the percent of students at each college who are receiving BOG waivers. The importance of including this variable is not to capture the percentage of low-income students at each college. Rather, it is to build into the analysis an important aspect of California community colleges: Many students do not pay any tuition. It is reasonable to assume that a tuition hike will have no bearing on financial-aid students who already do not pay for tuition.

Student Inputs

The literature has long established that a student's demographic background can influence his or her classroom achievement. In the regression, I will control for gender, ethnicity, age and the student's part-time status, based on data from the California Community College Chancellor's Office. Literature on the gender effect has been mixed

and the variable carries a question-mark to indicate the uncertainty of campuses with higher percentages of female students. The academic performance of underrepresented minorities (African-American and Hispanic students) has typically lagged that of their classmates and is predicted to bring a negative effect. Asian students, however, are expected to bring a positive effect. Part-time students (those attempting fewer than 12 credit hours) have other obligations and are predicted to produce weaker outcomes than full-time students. Research, meanwhile, has been divided about the performance of older students – if they are more focused on their career goals and exhibit greater academic success, or if they are distracted by family and job obligations and demonstrate weaker performance. I assigned a question mark to the older-student variable.

School Inputs

A strong academic outreach effort through counseling and support services would be expected to improve student achievement in a positive direction. Unfortunately, I was unable to compile accurate and comprehensive data to capture student participation in and availability of counseling services at each community college. As a substitute measure, I have included data that was available for each college about student participation in the Extended Opportunity Programs and Services (EOPS) network. Created in 1969, the EOPS program targets low-income, academically underprepared and at-risk students for a variety of services including "individual and group counseling, tutoring, academic and needs assessment, peer support, required textbooks, transportation, basic skills instruction, orientation, personal growth and development activities, summer programs, and registration

assistance" (California Community Colleges Chancellor's Office, 2007). I predict that higher EOPS participation will pull completion rates in a positive direction.

Furthermore, I am including two variables for enrollment. I predict that larger, more impersonal campuses carry negative implications on student drop-out behavior. I also have included a measure for the percent change in campus enrollment from the previous year. Because the college system experienced an enrollment dip at the same time as a tuition increase in 2003-2005, I want to consider how student self-selection might affect the course-completion rates. Under the self-selection theory, less committed students were wary of higher tuition and decided to abandon or postpone college plans, leaving a more academically inclined cohort, which could push the course-completion rate upward. Therefore, the enrollment-change variable carries a negative sign to indicate an inverse relationship with course-completion rates.

A student's ability to integrate into the school also is captured by the percent of academic faculty on each campus that works full-time. A college with more full-time professors, who remain on campus to interact with students, is expected to have a positive influence on student success. I also added a dummy variable for each community college to identify institutional factors that may have "fallen through the cracks" of the data, such as institutional leadership and culture, and any policies that would affect student behaviors that can vary from campus to campus. The outcome for each college is uncertain and likely to carry mixed results, and is therefore labeled with a question mark in the model.

Societal Inputs

The financial backdrop surrounding each college also must be accounted for in the analysis. To control for the labor market, I used county-level data in which the community college is located. County-level economic data is appropriate because community colleges typically draw student-commuters from outside the city or zip code in which the college is located. In this category, a high unemployment rate would be expected to drive more students into the classroom and away from a shaky job market. The unemployment variable, therefore, carries a positive sign. It is assumed that students from poorer areas lag in academic performance compared to their richer classmates. Accordingly, the poverty-rate variable carries a negative effect.

Data and Sources

This section includes detailed descriptions and a table of the 16 variables included in the regression analysis. Table 3 describes the variables and the sources I used to obtain the data. I examined data for individual community colleges in California from 2002 to 2008. I obtained much of the college-level data, including success rates, enrollment, and demographic information (age, gender, and race), from the "Data Mart" Web site of the California Community College Chancellor's Office. I obtained economic data from the U.S. Census, U.S. Department of Labor, and the California Employment Development Department Web sites.

I only included college campuses with data available for all variables from 2002-2008, resulting in an analysis of 108 campuses. The following colleges were excluded because they are newer and opened during the period of observation: Folsom Lake College, West Hills College-Lemoore, and Woodland College. Data to compute the full-time faculty ratio also was missing for the following colleges: in Fall 2002, for Compton College, Evergreen College, Lassen College, Merced College, San Jose College, and Shasta College; in Fall 2003, for Fresno College, Reedley College, and Shasta College; in Fall 2007, for Santa Barbara College; and, in Fall 2008, for Solano College. As a substitute for the missing data, I used the average full-time faculty ratio of all colleges for that semester.

Data also was missing for the percent of Asian students enrolled in classes at Imperial College in Fall 2008. As a substitute measure, I used the average Asian enrollment of Imperial College for the fall 2002-2007 semesters. Financial-aid data also was missing for Canada and Ohlone colleges for the Fall 2003 semester. I used the average percent of students receiving fee waivers at those colleges during the other semesters observed.

Model Testing Procedures

Ordinary Least Squares (OLS) was used to analyze the impact of all independent variables on the dependent variable. The OLS method minimizes the sum of squared vertical distances of all entries in the data set. It is a commonly accepted econometric tool used to measure the variation of the data against the predicted linear relationship.

The approach allowed me to determine the strength of the relationship between the variables. I chose to continue the analysis using a Log-Linear functional form, which would provide the best interpretation of the model and conform to my underlying theory (Studenmund, 2006, Chapter 7). This form, in which the log of the dependent variable is taken, depicts the rate at which the dependent variable changes due to percentage variations in an independent variable. The form is useful in predicting – and explaining to policy-makers – how incremental changes in an independent variable, such as the size of a tuition increase, will result in the percentage change in the course-completion rate.

Table 1: Data and Sources			
Variable name	Description	Source	Calculation
Course Completion Rate	Number of course enrollments completed with a letter grade of C or higher, as a percent of all course enrollments attempted	California Community College Chancellor's Office (CCCCO) Data Mart; Program Retention/Success Rates; http://cccco.edu/ChancellorsOffice/Divisions/ TechResearchInfo/MIS/DataMartandReports/ tabid/282/Default.aspx	Success rate, as provided for all course enrollments (enrollment status not specified)
Base tuition	Base fees per unit, adjusted for inflation to 2010 dollars	Legislative Analyst's Office; U.S. Department of Labor, Bureau of Labor Statistics, online CPI calculator, http://www.bls.gov/ data/ inflation_calculator. Htm	Fees, as provided; adjusted for inflation using online calculator
Tuition change	Rate of fee increase/decrease from previous year	Legislative Analyst's Office	(Year 2 Fees – Year 1 Fees)/ Year 1 Fees
BOG waiver	Percent of students receiving Board of Governors (BOG) fee waivers	CCCCO Data Mart; Student Financial Aid Awards, Board of Governors (BOG) Fee Waiver; Student Demographics, Unit Load	BOG headcount/ Total headcount

Table 1 (continued)

Variable name	Description	Source	Calculation
Headcount	Size of college campus by headcount	CCCCO Data Mart; Student Demographics, Unit Load	Total headcount, as provided
Headcount change	Percent change of campus headcount from previous year	CCCCO Data Mart; Student Demographics, Unit Load	(Year 2 headcount – Year 1 headcount)/ Year 1 headcount
African American	Percent of course enrollments comprised of African American students	CCCCO Data Mart; Program Retention/Success Rates, Demographics, Ethnicity	Number of African-American enrollments/ Total course enrollments
Hispanic	Percent of course enrollments comprised of Hispanic students	CCCCO Data Mart; Program Retention/Success Rates, Demographics, Ethnicity	Number of Hispanic enrollments/ Total course enrollments
Asian	Percent of course enrollments comprised of Asian students	CCCCO Data Mart; Program Retention/Success Rates, Demographics, Ethnicity	Number of Asian enrollments/ Total course enrollments

Table 1 (continued)			
Variable name	Description	Source	Calculation
Age 25+	Percent of course enrollments comprised of students aged 25 and older	CCCCO Data Mart; Program Retention/Success Rates, Demographics, Age Group	Sum of course enrollments for all students age 25 and older/ Total course enrollments
Part-time students	Percent of students attempting less than 12 credit hours	CCCCO Data Mart; Student Demographics, Unit Load	Sum of unit load for all students attempting less than 12 credit hours / Total headcount
EOPS	Percent of students eligible for Extended Opportunity Program Services (EOPS) during semester	CCCCO Data Mart; Student Services Programs, Extended Opportunity Program Services (EOPS), Student Demographics, Unit Load	EOPS headcount/ Total headcount
Full-time faculty	Percent of academic faculty that is full-time	CCCCO Data Mart, Staffing Reports; Employee Category Full-time Equivalency Distribution by District/College	Tenured-Tenure / Tenured-Tenure + Academic Temporary

Table 1 (continued)			
Variable name	Description	Source	Calculation
Poverty	Estimated county poverty rate	U.S. Census Bureau, Small Area Income and Poverty Estimates; http://www.census.gov//did/www/saipe/county.html	As provided
Unemployment	County unemployment rate, average annual	California Employment Development Department, Labor Market Information Division, http://www.labormarketinfo.edd.ca.gov	As provided
College dummy	Dummy variable for individual colleges, 2002-08	CCCCO Data Mart	1 for dummy, 0 for all others

Chapter 4

FINDINGS

To move the research question beyond the hypothesis – if tuition goes up, students will value their education more and drop courses less frequently – I conducted a regression analysis. The approach allowed me to attach specific numbers to potential influences on student behavior in order to measure and predict what, if any, effect that tuition fluctuations can mean for course-completion behavior. In this section, I will describe the preferred functional form for the analysis, discuss issues with multicollinearity, and describe how I checked the analysis for heteroskedasticity. This chapter also includes three separate tables. Table 2 provides the descriptive statistics of the variables used in the analysis. Table 3 contains the results of the OLS regression. Table 4 highlights the statistically significant independent variables. After explaining how I conducted the regression analysis – selecting a preferred functional form and correcting for errors – I will detail the results. This approach should allow me to isolate the effect that community college fee increases in California have had on student course-completion behavior by controlling for student background factors, school characteristics, and economic conditions, as identified by the literature.

Descriptive Statistics

The analysis incorporated data about California community colleges from 2002 to 2008. In Table 2, the descriptive statistics show the variations among the explanatory factors that will be used to understand the influences on course-completion rates. The average course-completion rate of colleges in the data set is 67.7%, with a range from 47% to 89.9%. The descriptive statistics also indicate a potential error in the data collected by the community college system that I used for this thesis. For example, my data set includes a community college – Santa Ana – that may have double-counted some students. According to the data set, part-time students at Santa Ana represented up to 107% of the total headcount at the college. Because of the large amount of information captured in my data set, I continued the analysis with the Santa Ana part-time student data unaltered.

Table 2: Descriptive Statistics (N=756)				
	Minimum	Maximum	Mean	Std. Deviation
Course-completion rate	47.00	89.90	67.70	4.79
Base fees per unit, adjusted to 2010 dollars	13.31	29.95	23.26	5.58
% fee change from previous year	-23.08	63.63	12.14	28.11
% of students on BOG waiver	4.71	98.92	34.81	15.32
Total headcount	1424.00	38245.00	14319.65	8013.64
% headcount change from previous year	-49.25	55.46	1.31	8.67
% African American enrollment	0.53	77.89	9.31	11.08
% Hispanic enrollment	4.32	88.20	27.63	16.08
% Asian enrollment	0.61	41.75	10.43	9.39
% Female enrollment	26.17	75.06	55.32	6.20
% of students age 25+	17.96	74.58	36.46	10.55
% Percent of students attending part-time	38.07	107.73	65.75	9.86
% of students eligible for EOPS	1.14	24.28	5.68	3.36
% Percent of faculty full-time	13.25	88.77	57.30	9.25
County unemployment rate, average annual	3.40	22.90	6.32	2.11
Estimated county poverty rate	5.50	23.20	12.99	3.95

Functional Form

Using the model described in the previous chapter, I first forecasted how the data would be shaped using different functional forms of the equation for all explanatory variables. By comparing the results, I could proceed with a functional form that best explained the relationship between the dependent and independent variables, and conformed to my underlying theory (Studenmund, 2006, Chapter 7). The linear form is the most basic, and indicates that the relationship between the dependent and independent variables follows a straight-line path. If the plotted data resembles curved trajectories, however, alternative functional forms may be more appropriate. The log-log form, for example, uses the natural log of the dependent and independent variables to capture the elastic relationship between variables. The log-linear form, in which the log form of the dependent variable is taken, is another method to depict the rate at which the dependent variable changes due to variations in an independent variable. Quadratic functional forms, in which a one or more of the variables are squared, resembles U or inverted U-shape that indicate a rising-and- falling trend.

I considered the linear-linear, log-linear, and linear-quadratic form to assess the best equation to continue with the analysis. The log-log functional form was inappropriate because the key variable – the rate of change of tuition from the previous year – included negative values and zero values that would not compute into log form. Additionally, the tuition rate variable already represented a percentage change.

The linear-linear and the log-linear forms produced the same nine statistically significant explanatory variables. The linear-quadratic form also produced nine statistically significant variables. Though the results did not vary much across the different functional forms, I chose to continue the analysis using the log-linear functional form, because I believe it provides the best interpretation of the model. The log-linear form allows me to predict the percentage change in a college's course completion rate for every percentage point increase or decrease in tuition, when controlling for other variables. The regression results for the log-linear form are listed in Table 3. The regression results for the linear-linear and linear-quadratic forms are included in Appendix A.

Table 3: Log-Linear Regression

Dependent variable: Course completion (log form)

	Regression Coeffiecient	VIF
(Constant)	4.0189 *** (.0921)	
Base tuition	.0008 *** (.0003)	2.898
Tuition change	.0001 * (.0001)	2.692
BOG waiver	-.0012 *** (.0002)	13.389
Headcount	.0000 (.0000)	103.270
Headcount change	-.0002 (.0002)	1.652
African American	-.0027 ** (.0011)	153.949
Hispanic	.0024 *** (.0008)	142.265
Asian	-.0015 (.0012)	114.352
Female	-.0022 *** (.0008)	25.633
Age 25+	.0033 *** (.0006)	34.274
Part-time Student	.0020 *** (.0004)	17.760
EOPS	.0010 (.0013)	17.708
Full-time faculty	.0002 (.0002)	3.860
Poverty	.0032 *** (.0012)	22.345
Unemploy-ment	.0012 (.0017)	11.985
R^2	.8586	
Adjusted R^2	.8313	

Standard error in parenthesis

*Significant at 90% confidence level
**Significant at 95% confidence level
***Significant at 99% confidence level

Correcting for Errors

Identifying, incorporating and fine-tuning the appropriate data elements in the model provided the foundation to conduct the regression analysis. The model ultimately will help explain the percentage variation in the dependent variable (the course-completion rate); the closer the model and variables reflect real world relationships, the more credible the results. To ensure that the variables "fit," or represent good operationalization of the theoretical concepts, I tested the correlation coefficients, which assessed how strongly the variables relate to each other to see if multicollinearity is a potential problem.

Bi-Variate Correlations

The first step involves checking for multicollinearity, which indicates that an independent variable can be explained by another independent variable. Such overlap from highly correlated variables violates a classical assumption of econometrics and creates biased results (Studenmund, 2006, Chapter 8). Studenmund (2006, Chapter 8) called for a simple test to detect multicollinearity by checking the simple correlation coefficients that exceed a Pearson's coefficient of 0.80, which would cause "unacceptably large variances" (p. 258). None of my variables carry such a high coefficient. It is important to note, however, that several variables are closely related,

such as county unemployment and poverty rates (.60), and the percent of students eligible for EOPS services and receiving BOG waivers (.62). Appendix B provides the simple correlation coefficients of the variables.

Variance Inflation Factors

Another multicollinearity test involves an examination of high variance inflation factors (VIFs). The rule of thumb is that VIFs greater than five (5) indicate severe effects of multicollinearity (Studenmund, 2006, Chapter 8). Several of my non-significant, but key, variables produced high VIFs above the detection threshold, including the total headcount (103.27), percent of Asian students (114.35), EOPS eligibility (17.71), and the county unemployment rate (11.99). A possible explanation for the overlap may be that low-income minority students who would qualify for EOPS services are more likely to attend urban (and often larger) community colleges. These areas also are likely to be marked with higher levels of poverty and unemployment. Based on the descriptive statistics, California community colleges can have enrollments as high as 78 percent African American and 88 percent Hispanic. Overlap also is likely to occur because I used aggregate college data, not individual student data. For example, I could break out and analyze the percentage of students who were Hispanic, and the percentage of students who were female, but not the percentage of female, Hispanic students. One could assume that females would make up roughly half of any racial category.

The remedies for multicollinearity include dropping a redundant variable. Subsequently, I re-ran the regression after eliminating the unemployment rate. Removing

this variable did not produce substantial improvement. I continued the regression using the county unemployment rate variable.

Multicollinearity also might be present between the individual college dummy variables and other independent variables, such as minority enrollment and poverty rates, because many colleges serve high-minority, high-poverty areas. Inclusion of all the variables is important and captures the diverse demographic and socioeconomic makeup of the California community college system. Based on these circumstances, I will follow Studenmund's advice (2006, Chapter 8) to "do nothing" and leave the rest of the equation unaltered.

Park Test

Another econometric error can occur when the variance of an error term is not constant, known as heteroskedasticity. According to Studenmund (2006, Chapter 10), heteroskedasticity often emerges in cross-sectional equations when the scale of observations in a sample is not uniform, such as observations in large and small schools. The problem also arises due to an omitted variable, when a portion of the omitted effect is absorbed by the error term. Heteroskedasticity can bias the standard errors of regression coefficient and increase the variance of the regression coefficient estimates. To check for heteroskedasticity, Studenmund (2006, Chapter 10) suggested conducting a "Park test" to determine if a heteroskedastic condition is present. To conduct the Park test, I re-ran the linear regression and obtained the unstandardized residuals. After

squaring and logging the residuals, I then regressed the residuals against the log of a proportionality factor Z. I chose the total headcount of the campus as the Z factor. The new regression did not produce a statistically significant coefficient of the proportionality factor (.338 significant). No further corrections were needed. The adjusted R squared indicates that 83.1% of future outcomes could be predicted by this model. The results are included in Table 5.

Other Modifications

Understanding the relationship between the BOG waiver and course-completion rates during periods of tuition increases and decreases also required further analysis. My data set indicated that, on average, 35% of community college students at each campus do not pay tuition. If someone else is paying the cost, why would tuition increases influence their course-completion behavior at all? The initial model, which included a variable for the percent of students at each college receiving the waiver, found that colleges with higher percentages of students on the BOG waiver are predicted to produce lower course-completion rates. The regression also found that course-completion rates will improve when tuition increases. The model, however, may not have captured the interplay between the BOG waiver effect during periods of tuition changes. As an alternative way to understand the relationship, I conducted a series of analyses using dummy variables for each of the seven years included in my data set. I removed the price variables, because they are the same for each college for that year. Running the

regression analysis through individual years could produce a point-in-time measurement of the strength of the BOG waiver on course-completion for that year. It can also serve as an additional test of the hypothesis that price affects course completion rate. While there was very little variation in the BOG coefficients across the individual years, or when compared to the original model, the coefficient of the BOG waiver variable is in the direction expected: the more students receiving the waiver in a college, the lower the course completion rate. The results are included in Appendix C.

Summary of Findings

In the original model, nine of the 15 key independent variables were found to be significant at the 90% confidence level or stronger. Table 4 provides a breakdown of the statistically significant variables, the directional pull of the variable, and the coefficient's magnitude. Though these relationships demonstrate statistical significance, examining the magnitude and direction of the relationships can help put these findings in context. The next chapter covers the full discussion of findings.

Table 4: Statistically Significant Variables

Explanatory Variable	Directional Pull	Coefficient Magnitude
Base Tuition	+	.0008
Tuition Change	+	.0001
BOG Waiver	-	.0012
African American	-	.0027
Hispanic	+	.0024
Female	_	.0022
Age 25+	+	.0033
Part-time students	+	.0020
County poverty rate	+	.0032

Chapter 5

CONCLUSION

As community college transfer rates and degree attainment have been elevated on the research agenda, attention has turned to understanding the key ingredients that can improve not only student success, but lead to a more educated workforce. I focused my research on the first step of this pathway – the completion of individual courses. Students in California community colleges have been found to drop as many as one in five courses each semester, a red flag for completing their educational goals. I sought to understand how the relatively low tuition to attend community college in California might influence student academic behaviors, and the recent swings in college tuition provided natural data to test my assumption that higher tuition could incentivize students to remain in classes they would otherwise drop. To test this theory, I conducted a regression analysis that considered how multiple factors – tuition, student demographics, campus characteristics, and economic conditions – might influence student behavior and course-completion rates. This chapter includes an expanded discussion of the findings, discloses limitations with my analysis, and offers suggestions for further research.

Predicted Versus Actual Findings

After conducting the OLS regression, nine of the 15 independent variables in my model were found to be statistically significant factors in pulling course-completion rates up or down. The magnitude, or strength, of the significant variables might appear weak – none of the variables was predicted to move a college's course-completion rates more than a one-third of one percentage point. Small changes, however, can carry large, long-term impacts. I will now review the independent variables.

Tuition Volatility

Base Tuition: I predicted that course-completion rates would increase as the level of tuition increases. Using the per-unit fee adjusted to 2010 dollars, a college's course-completion rate is predicted to increase by 0.08 percent for every dollar increase in the per-unit fee. This finding confirms my hypothesis that tuition hikes could encourage students to "stick out" courses to avoid the penalty of re-taking courses at a higher price and/or choose courses more carefully before enrolling in them.

Tuition Increases/Decreases: The regression analysis also demonstrated that students respond to price in other ways. I predicted that course-completion rates will increase with year-over-year percentage increases in tuition. I found that every percentage-point change in tuition from the previous year is expected to increase a college's course-completion rates by 0.01 percent in a positive direction. The coefficient was the smallest among the statistically significant variables. One-hundredth of 1 percent might seem unimpressive, but consider that the California community colleges classes are

filled with roughly 2 million students taking 4 million courses, and it is conceivable that tuition could double (a 100% increase) because of perennial budget cuts and very low base rates that make small dollar changes equal large percentage increases. That scenario could lead to a 1 percent increase in the state's overall course-completion rate, meaning that students would complete an additional 27,000 courses and stay on track to earn a certificate, associate's degree or transfer to a four-year university.

BOG Waivers: I predicted an unclear effect of how students receiving a BOG tuition waiver would affect course-completion rates at the college during periods of tuition increases or decreases. Through the regression analysis, it seems that the strength of the tuition variables are likely moderated by the large portion of students on community college campuses who do not pay any tuition because of the state's BOG waiver program. The analysis found that a college's course-completion rate is expected to decrease by 0.12 percent for every one-percentage point increase in the number of students at each campus receiving BOG waivers. When I conducted additional analyses using dummy years, the BOG coefficient was similar across the seven separate years of data, even as tuition rose and fell. The modified models also produced a negative relationship, ranging from 0.10 to 0.13 percent decrease in the course-completion rate for every percentage point increase in the percent of students receiving BOG waivers.

Enrollment Increases/Decreases

Year-over-year enrollment change: I also included a variable to measure the self-selection that might occur during a period of tuition hikes, which could result in less

motivated or cash-strapped students dropping out of college or postponing their education plans. Under this theory, the remaining students might value their education more, which could positively influence a college's course-completion rate and moderate the predictive effect of the tuition variables. To address this issue, I included the percentage change from the previous year of the number of students at each community college campus. I predicted a negative relationship, in that decreases in enrollment would lead to increases in course-completion rates. In the original model, the regression analysis found that the year-to-year change in enrollment fell slightly outside the bounds of being significant at the 90% confidence level. At 0.133 significance, a college's course-completion rate is predicted to decrease by 0.02 percent for every percentage point increase in enrollment. This finding could be interpreted as a confounding variable. It would validate that enrollment changes could skew the role that tuition increases can play on improving course completion rates.

Headcount: I also included a measure to control for the size of the student body on each campus. I predicted a negative relationship, in which colleges with larger enrollment would lead to lower course-completion rates. The regression, however, did not find a statistically significant relationship between the enrollment size and course-completion rates.

Race and Gender

Several of the demographic variables included in the model produced the strongest influences on course-completion rates.

African-American students: For every percentage-point increase in the percent of courses occupied by African-American students, the college's course completion-rate is predicted to drop by 0.27 percent, which corresponds with research on minority achievement and my expectations.

Hispanic students: Meanwhile, for every percentage-point increase in the percent of courses occupied by Hispanic students, the course-completion rate is expected to increase by 0.24 percent, when controlling for other factors. I predicted the opposite effect. Such a finding seems inconsistent with research on minority achievement and could be controlled more accurately with student-level data, as opposed to using the college as the unit of analysis. Another interpretation is that Latino students complete courses at reasonable rates but don't persist in their education to ultimately transfer or receive a degree. For example, Moore and Shulock (2010) found that Latino community college students showed early success equal to whites but did not stay on the same trajectory.

Asian students: I predicted that courses with more Asian students would lead to higher course-completion rates. Such a relationship did not prove to be statistically significant in the original regression model. Such a finding also seems inconsistent with research on minority achievement and could be controlled more accurately with student-level data. The literature about racial gaps in college success may not be based as much on course-completion rates of racial groups; it is possible that Asian students complete

courses at lower rates but ultimately put their courses together to reach higher degree-completion rates.

Female students: I predicted an unclear effect on how the percentage of female students in enrolled in classes would influence course-completion rates. The regression found a negative relationship. For every percentage-point increase in female enrollment, a college's course-completion rate is expected to decrease by 0.22 percent. The magnitude of the coefficient seems unusually strong and could be controlled more accurately with student-level data.

Older- and Part-Time Students

Non-traditional students demonstrated a positive influence on course-completion rates when controlling for other factors.

Age 25 and older: I predicted an unclear relationship between older students and course-completion rates. For every percentage-point increase in students above age 25 at each campus, a college's course-completion rate is predicted to increase by 0.33 percent. This finding might indicate that older students are returning to school more focused and committed to accomplishing their education goals.

Part-time students: Based on the literature, I predicted that a college's course-completion rate would decrease as the percentage of part-time student on campus increases, because part-time students have obligations and priorities beyond school. The regression, however, found the opposite effect. For every percentage-point increase in students attending college part-time, a college's course-completion rate is expected to

increase by 0.20 percent. Such a finding also seems inconsistent with research and could be controlled more accurately with student-level data. Another interpretation could be that while part-time students have lower graduation or transfer rates because they have difficulty maintaining their college enrollment over a prolonged period of time, it does not necessarily mean that they do not complete their classes at reasonable levels. In fact, if part-time students only have one or two courses at a time to worry about, perhaps they should demonstrate higher course-completion rates.

Other School Factors

EOPS: As a proxy for counseling and tutoring services available to students, I incorporated into the model the percentage of students eligible at each campus for the Extended Opportunity Programs and Services (EOPS) program. I predicted a positive relationship between EOPS participation and course-completion rates. The relationship was not statistically significant.

Full-time faculty: I also tested whether colleges with higher percentages of full-time faculty would increase course-completion rates – I predicted it would. The relationship also was not statistically significant.

Economic Conditions

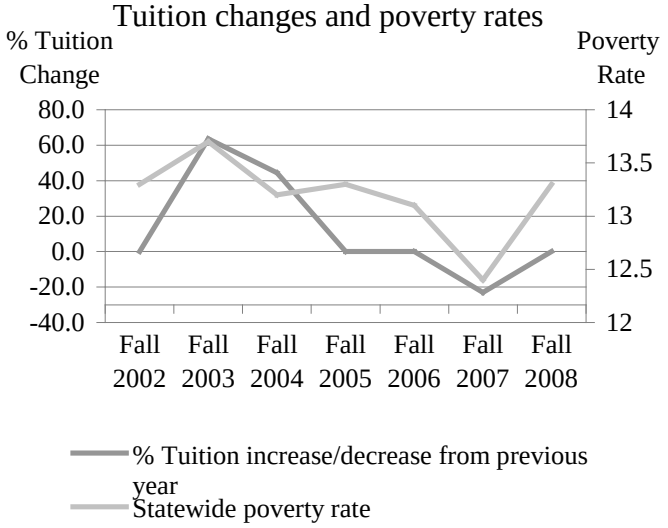
The poverty rate appeared to carry the strongest weight in the model, an area that demands further discussion and might explain movement in other variables. We know that high-poverty areas generally produce lower education outcomes. We also know

from the literature that changing economic conditions, when jobs are harder to find, can drive students into the classroom. A corollary to that finding is that changing economic conditions might encourage students to take their classes more seriously and remain in school to gain new skills and opportunities (improving course-completion rates), as the outside economy and job market remains weak. As predicted, I found a positive relationship between higher poverty and course-completion. This might seem counter-intuitive, but I would contend that the slumping economy captured in the data has produced poverty rates (or unemployment rates) that are higher than normal. In other words, the economy is worse, so more students are heading to or staying in college. According to the regression analysis, for every percentage-point increase in a county's poverty rate, the course-completion rate for colleges in that county is predicted to increase by 0.33 percent. However, it may still be difficult to truly isolate the economic conditions in the model, leading to potential misinterpretation of other results. The unemployment variable, predicted to carry a positive effect, did not prove to be statistically significant.

As seen in Figure 3, decisions of state leaders to modify community college tuition generally followed economic trends. When the economy was weak (higher poverty rates), tuition increased; when the economy stabilized or improved (lower poverty rates), generating additional government revenue, tuition decreased. This might explain why the regression analysis showed that colleges with more non-traditional students (older and attending part-time) could be predicted to improve a college's course-

completion rates. Limited workforce opportunities may have sent those people back to school. Because of the historic tie between a weak economy and tuition increases, the results should be viewed cautiously as to the predictive effects of the tuition variables.

Figure 3:
Tuition changes and poverty rates



Limitations

Because I used the college as the unit of analysis, the model measured how a college's overall course-completion rate might vary depending on unique circumstances at each college. The model would have been stronger if I was able to include richer, more comprehensive data about student participation in counseling or outreach services at each campus. The model also lacked a measure about course offerings – we know that some courses have been eliminated due to budget cuts, which might influence enrollment and the behavior of students who continue to pursue their education. The data also set lacked additional student background characteristics at each college that have been known to predict success, such as high-school preparation, high school grades, and parental education.

This research approach also was not able to capture the behavioral changes of individual students in response to changes in tuition, the economy, and other dynamic factors. A longitudinal analysis that follows a cohort of individual students (with detailed background data) over time would be able to more accurately determine and quantify how changes in tuition can influence drop-out behavior and course completion. Such a granular look also could capture more accurately how individual students receiving a BOG waiver have reacted to tuition increases.

The college-level data, however, remains a useful tool to address this policy concern. The initial findings confirm the common-sense argument that students behave

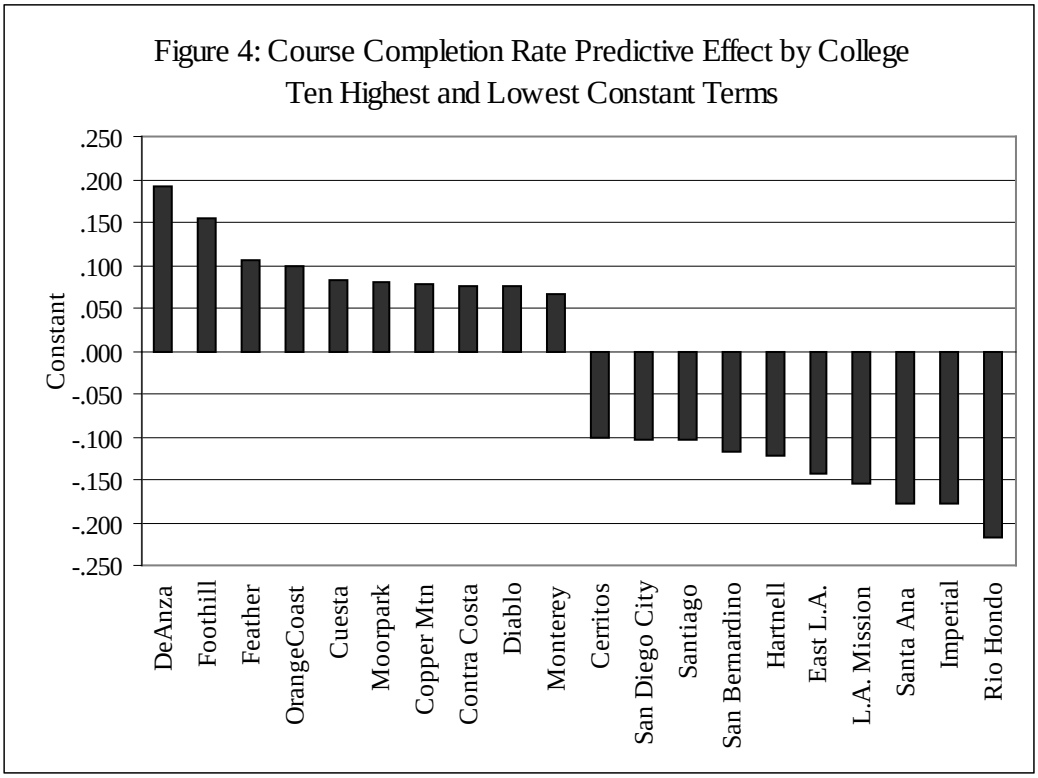
rationally to price. The relationship between tuition and course-completion behavior carries with it important implications for the policy debate about tuition increases at California community colleges. I will address this issue in my concluding remarks.

Opportunities for Further Research

The model also provides a good starting point to ask more questions about the variations that exist between colleges. I was able to demonstrate using dummy variables that each college produced a constant term at a different point on the course-completion spectrum. This disparity is likely related to unknown institutional strategies, distinct programs, and campus cultures that are unique to each campus. Understanding why some institutional practices work can help college administrators replicate those strategies on other campuses to speed the success of their students, yet little research has been conducted in this area (Tinto, 2006; Bailey and Alfonso, 2005; Jenkins, 2007).

When using Sacramento City College (a large, diverse, urban campus) as a control, I was able to rank the other 107 community college campuses in my data set to determine their predictive effect on course-completion rates. This means that De Anza College, for example, is expected to produce a course-completion rate that is 0.192 of a percentage point higher than Sacramento City College, when controlling for other changes in price, student characteristics, institutional factors, and economic conditions. De Anza's sister school, Foothill College, has the second-highest constant term of 0.154. Researchers should consider a case study of the Foothill-De Anza District to understand

how the college is managing and targeting its student services – or to identify other factors – that might give the district's colleges a leg up in course completion. Figure 4 displays the colleges with the 10 highest and 10 lowest constant terms from the original regression model, in a bar-graph format.



To evaluate and visualize the data another way, I ranked the colleges in Appendix D by the percentage of students on BOG waivers for the fall 2008 semester. Alongside that column, I ran the ranked the colleges by the course-completion rates for the fall 2008 semester, and included the results of the regression analysis using the fall 2008 dummy variable. The table shows that schools with the highest percentage of students on BOG waivers generally produce the lowest course-completion rates in the state, and vice versa, when not controlling for other demographic, school, or economic factors. When controlling for these factors, the predictive effect for those colleges follows the same pattern. Mismatched colleges – those that stand out with a high BOG waiver percentage but a positive predictive effect deserve more research in future studies to understand what those schools might be doing differently.

Policy Lessons

Despite some wild swings in community college tuition since 2002, drop-out behavior at California community colleges, as measured by the course-completion rate, has varied only about five percentage points from the mean during that time. I initially thought the lack of variance complicated my ability to draw conclusions about the strength of the independent variables. Even if the regression coefficients showed a powerful influence, the impact would be relatively minor. The weak pull of my key variable – the percent increase or decrease in tuition from the previous year – seemed even more negligible. The regression analysis for the tuition-change variable produced a

statistically significant coefficient of 0.00014 at the 95% confidence interval; that is, for every 1 percentage-point increase in tuition, the course-completion rate would increase by a mere one-hundredth of 1 percent. Tuition increases at community college, however, do not arrive in 1% chunks. Because the overall price tag is still relatively cheap ($78 for a typical class in 2010), tuition hikes of only a few dollars per credit-unit can produce substantial percentage increases. For example, during a two-year period from 2003-2005, community college tuition increased by roughly $45 a course, representing a 136% increase. At the same time, the state Chancellor's Office (2005) noticed a 1 percentage-point increase in course-completion rates (without controlling for other factors). Even when controlling for other factors, the course-completion rates increase conforms to my analysis: Doubling tuition (a 100% increase) will increase course-completion rates by 1 percent.

Today, tuition increases again are on the table. An LAO proposal in 2009, for example, called for more than doubling community college tuition (Legislative Analyst's Office, 2009). In 2011, Governor Jerry Brown proposed a 38% increase in tuition (Department of Finance, 2011). My research can aid in policy discussions by drawing attention to the potentially powerful incentive of tuition to change student behaviors and raising new questions about the role that BOG waivers play that limit the effectiveness of this tool. A 100% increase in tuition, when controlling for other factors, could lead to a 1 percent boost to course-completion rates. Though the change seems marginal, consider the scale of the California community college system. A 1% change in a system with

students enrolled in 4 million courses translates into students completing 27,000 more classes and staying on track for degree completion or transfer, though the effect is moderated by the high percentage of students not paying any tuition through the BOG waiver. A 38% tuition increase, as proposed by Governor Brown, could increase the average 68% course-completion rate by 0.38 percent, encouraging students to complete an additional 10,000 courses. If California community college tuition jumped to the national average of $284 a course (The College Board, 2009), the 350% tuition increase would motivate students to complete up to 95,000 additional courses, to work harder in class and dissuade them from dropping a course (though the sticker shock would likely cause other problems). Large tuition hikes are likely to produce a noticeable psychological effect among students. My model validates the assertion that dramatic increases in tuition could help curb drop-out behavior at California community colleges.

Further research is needed to better understand how the high percentage of students on BOG waivers could moderate the impact of tuition increases (or decreases) on student behavior. This is yet another reason to take a hard look at the BOG waiver policy that has been questioned for other reasons. The Legislative Analyst's Office (2009), for example, has observed that the community college system's low-fee policy and generous BOG waiver eligibility standards subsidize students who are not financially needy. The LAO has argued that increasing tuition for all students – and targeting financial aid to those most in need – could raise revenue for community colleges and help students tap into federal financial aid programs. The Community College League of

California (2010) has proposed establishing satisfactory academic progress requirements for students seeking the BOG waiver. Shulock and Moore (2007) also note that the state loses a tool to reward successful academic behaviors – through tuition rebates, for example – when so many students are attending for free. Modifications to the BOG waiver policy are likely to improve course-completion rates even more. In the context of diminished state funding, tuition increases, and heightened public expectations for stronger academic outcomes, California's budget situation demands new ways to examine tuition and financial aid policies in the community college system.

Final Comments

I designed this model to test the theory that community college students might respond rationally to prices inside the classroom and will take their studies more seriously as the cost of their education increases. Though I proved that substantial tuition increases can curb dropout behavior, such a finding should not be interpreted to mean that policy-makers should raise tuition *in order* to improve student outcomes. Rather, an understanding of the relationship can help inform policymakers about the nuances of tuition increases. No one wants to see the cost of education go up for students, but a potential – and probably inevitable – tuition hike could carry a silver lining. As Fensterwald (2010) noted, proposals to boost community college tuition in California would still keep the state's community colleges the cheapest in the country. The political decision to increase tuition, however, is not expected to come any easier for policy makers.

Appendix A: Other Functional Forms

Dependent Variable: Course Completion				
	Linear-Linear		Linear-Quadratic	
	Regression Coefficients	VIF	Regression Coefficients	VIF
(Constant)	56.6126 *** (6.0478)		58.7124 *** (6.1197)	
Base tuition	.0544 *** (.0204)	2.898	.0321 (.0231)	3.736
Tuition change	.0080 ** (.0039)	2.692	.0223 *** (.0080)	11.512
Tuition change^2	Not included		-.0003 ** .0001	7.112
BOG waiver	-.0824 *** (.0159)	13.389	-.0791 *** (.0159)	13.531
Headcount	.0000 (.0001)	103.270	.0000 (.0001)	103.270
Headcount change	-.0120 (.0099)	1.652	-.0134 (.0099)	1.659
African American	-.2017 *** (.0747)	153.949	-.1896 ** (.0748)	154.909
Hispanic	.1500 *** (.0495)	142.265	.1641 *** (.0499)	145.043
Asian	-.0844 (.0761)	114.352	-.0777 (.0759)	114.562
Female	-.1639 *** (.0545)	25.633	-.1751 *** (.0547)	25.894
Age 25+	.2347 *** (.0371)	34.274	.2224 *** (.0375)	35.182

Appendix A (continued)

	Linear-Linear		Linear-Quadratic	
	Regression Coefficients	VIF	Regression Coefficients	VIF
Part-time student	.1251 *** (.0285)	17.760	.1209 *** (.0285)	17.855
EOPS	.0336 (.0835)	17.708	.0263 (.0834)	17.741
Full-time faculty	.0114 (.0138)	3.860	.0113 (.0138)	3.861
Poverty	.1924 ** (.0799)	22.345	.1673 ** (.0807)	22.876
Unemployment	.0593 (.1098)	11.985	-.0261 (.1172)	13.733
R^2	0.8727		0.8736	
Adjusted R^2	0.8482		0.8490	

Standard error in parenthesis
*Significant at 90% confidence level
**Significant at 95% confidence level
***Significant at 99% confidence level

Appendix B: Bi-Variate Correlations (N=756)

	Course completion rate	Base Tuition	Tuition Change	Percent on BOG	Headcount	Percent headcount change	African American
Course completion rate	1	-.032	.093	-.519	-.061	.017	-.344
Base Tuition	-.032	1	.205	.156	-.064	-.231	.011
Tuition Change	.093	.205	1	-.051	-.036	-.429	-.011
Percent on BOG	-.519	.156	-.051	1	-.109	-.072	.448
Headcount	-.061	-.064	-.036	-.109	1	.079	-.157
Percent headcount change	.017	-.231	-.429	-.072	.079	1	-.029
African American	-.344	.011	-.011	.448	-.157	-.029	1
Hispanic	-.235	.020	-.035	.352	.088	.049	-.050
Asian	-.010	-.005	.012	-.157	.315	-.031	-.013
Female enrollment	-.521	.007	.073	.454	-.158	-.135	.361
Age 25+	.281	-.086	.047	.089	-.342	-.003	.383
Part-time Students	.169	-.076	.011	.046	-.096	.046	.252
Percent EOPS	-.245	.035	.000	.621	-.401	-.145	.359
Full-time Faculty	.072	.019	.148	-.004	.011	-.179	-.017
County unemployment rate	-.019	-.215	.173	.256	-.179	-.011	-.062
County poverty rate	-.197	.003	.039	.506	-.006	-.037	.107

Pearson Correlation: Shaded area indicates significant at 90th% or stronger confidence level

Appendix B continued: Bi-Variate Correlations

	Hisp-anic	Asian	Fem.	Age 25+	Part-time student	EOPS	Full-time Faculty	Uemploy-ment	Pov-erty
Course completion rate	-.235	-.010	-.521	.281	.169	-.245	.072	-.019	-.197
Base Tuition	.020	-.005	.007	-.086	-.076	.035	.019	-.215	.003
Tuition Change	-.035	.012	.073	.047	.011	.000	.148	.173	.039
Percent on BOG	.352	-.157	.454	.089	.046	.621	-.004	.256	.506
Headcount	.088	.315	-.158	-.342	-.096	-.401	.011	-.179	-.006
Percent headcount change	.049	-.031	-.135	-.003	.046	-.145	-.179	-.011	-.037
African American	-.050	-.013	.361	.383	.252	.359	-.017	-.062	.107
Hispanic	1	-.229	.116	-.133	.016	.257	.035	.308	.385
Asian	-.229	1	-.148	.014	.200	-.201	.150	-.236	-.327
Female	.116	-.148	1	-.026	-.120	.274	-.134	.144	.201
Age 25+	-.133	.014	-.026	1	.490	.249	-.051	-.014	-.045
Part-time Students	.016	.200	-.120	.490	1	-.063	.051	-.201	-.222
Percent EOPS	.257	-.201	.274	.249	-.063	1	.074	.311	.398
Full-time Faculty	.035	.150	-.134	-.051	.051	.074	1	.171	.105
Unemploy-ment	.308	-.236	.144	-.014	-.201	.311	.171	1	.604
Poverty	.385	-.327	.201	-.045	-.222	.398	.105	.604	1

Pearson Correlation: Shaded area indicates significant at 90th% or stronger confidence level

Appendix C: Predictive effect of BOG Waiver by Semester

Dependent Variable: Course Completion (log form)		
Semester	Tuition compared to previous year?	BOG waiver coefficient
Fall 2002	Stayed same	-.0012 *** (.0002)
Fall 2003	Increased 64%	-.0011 *** (.0002)
Fall 2004	Increased 44%	-.0012 *** (.0002)
Fall 2005	Stayed Same	-.0010 *** (.0002)
Fall 2006	Stayed Same	-.0011 *** (.0002)
Fall 2007	Decreased 23%	-.0011 *** (.0002)
Fall 2008	Stayed same	-.0010 *** (.0002)
Standard error in parenthesis ***Significant at 99% confidence level		

Appendix D: Colleges Ranked by BOG Waiver, Course Completion and Constant						
	Percent of Students on BOG Waivers, Fall 2008		College Course-Completion Rate, Fall 2008		Controlling for Other Variables: Predictive Effect of Institution	
	Ranked Highest to Lowest		Ranked Lowest to Highest		Ranked Lowest to Highest	
College	Rank	%	Rank	%	Rank	Constant
LA. Southwest	1	87.0	1	53.3	88	.033
L.A. City	2	77.3	7	61.0	24	-.083
Yuba	3	76.4	39	65.6	44	-.038
L.A. Trade-Tech	4	68.0	6	61.0	22	-.084
West L.A.	5	62.4	3	58.6	49	-.035
Fresno City	6	60.6	28	64.1	17	-.092
L.A. Valley	7	60.0	10	62.3	25	-.080
Reedley	8	59.0	32	64.5	10	-.102
Lassen	9	58.6	102	72.8	58	-.015
East L.A.	10	58.0	45	66.0	5	-.123
Cosumnes River	11	56.6	5	60.3	103	.075
Imperial Valley	12	56.6	40	65.7	2	-.176
Bakersfield	13	56.5	26	63.9	32	-.058
Sacramento	14	56.2	13	62.7		CONTROL
Oxnard	15	55.4	47	66.2	16	-.093
Redwoods	16	55.2	59	67.1	75	.005
Barstow	17	55.0	96	71.4	42	-.042
Antelope Valley	18	54.0	34	64.7	61	-.010
Southwestern	19	53.9	33	64.6	20	-.088
San Bernardino	20	53.1	24	63.8	7	-.120
L.A. Mission	21	52.5	4	59.3	3	-.156
Compton	22	51.9	2	55.5	37	-.051
Victor Valley	23	51.1	14	62.7	14	-.097
Alameda	24	51.0	20	63.4	100	.059
American River	25	50.6	60	67.2	72	.001

Appendix D: continued						
	Percent of Students on BOG Waivers, Fall 2008		College Course-Completion Rate, Fall 2008		Controlling for Other Variables: Predictive Effect of Institution	
	Ranked Highest to Lowest		Ranked Lowest to Highest		Ranked Lowest to Highest	
College	Rank	%	Rank	%	Rank	Constant
San Joaquin Delta	26	50.2	35	64.8	54	-.021
Coastline	27	50.2	88	69.6	26	-.069
Sequoias	28	49.1	52	66.6	31	-.060
Shasta	29	48.5	82	69.1	81	.019
L.A. Pierce	30	48.4	30	64.2	69	-.005
L.A. Harbor	31	48.3	25	63.8	27	-.063
Long Beach City	32	47.8	19	63.4	33	-.056
Butte	33	47.5	86	69.5	29	-.062
Modesto	34	45.9	15	62.7	30	-.060
San Diego City	35	44.9	29	64.1	12	-.102
Siskiyous	36	44.9	71	68.5	63	-.007
San Jose	37	44.1	37	65.2	28	-.063
Mt. San Jacinto	38	43.6	27	64.0	39	-.049
Cerritors	39	42.3	17	63.2	15	-.096
Merced	40	41.8	16	63.1	19	-.091
Laney	41	40.9	18	63.3	92	.044
West Hills Coalinga	42	40.7	51	66.6	8	-.111
Porterville	43	40.7	23	63.7	11	-.102
Riverside	44	40.4	54	66.8	65	-.007
Columbia	45	39.1	53	66.7	74	.004
Evergreen Valley	46	38.4	66	68.1	57	-.017
Cypress	47	38.3	55	66.8	62	-.010
Mendocino	48	38.1	83	69.1	51	-.028
Merritt	49	38.0	9	62.2	80	.019
Canada	50	37.7	67	68.2	21	-.086

Appendix D: continued						
	Percent of Students on BOG Waivers, Fall 2008		College Course-Completion Rate, Fall 2008		Controlling for Other Variables: Predictive Effect of Institution	
	Ranked Highest to Lowest		Ranked Lowest to Highest		Ranked Lowest to Highest	
College	Rank	%	Rank	%	Rank	Constant
Contra Costa	51	37.2	78	69.1	95	.046
Hartnell	52	36.4	65	68.0	6	-.122
Berkeley	53	36.4	8	61.1	43	-.040
Golden West	54	36.3	68	68.3	76	.009
Ventura	55	36.3	38	65.2	50	-.028
Solano	56	36.1	48	66.4	91	.040
Los Medanos	57	36.0	70	68.3	77	.010
Chabor	58	35.8	46	66.0	68	-.006
Citrus	59	35.5	61	67.5	47	-.037
San Diego Mesa	60	34.8	58	67.0	55	-.020
Chaffey	61	34.7	31	64.4	18	-.092
Pasadena City	62	34.4	72	68.6	84	.025
Fullerton	63	34.1	22	63.7	34	-.056
Desert	64	34.0	85	69.3	53	-.027
Cerro Coso	65	33.1	12	62.4	13	-.102
San Diego Miramar	66	32.9	99	71.7	60	-.010
El Camino	67	32.8	21	63.4	46	-.037
Mt. San Antonio	68	32.7	49	66.5	52	-.027
Grossmont	69	32.2	43	65.8	67	-.006
Santa Ana	70	32.0	100	71.9	4	-.154
Sierra	71	31.8	69	68.3	86	.031
Palo Verde	72	31.7	97	71.7	40	-.048
San Francisco	73	31.4	93	70.5	93	.044
Orange Coast	74	31.2	98	71.7	105	.095
Santa Barbara	75	30.6	101	72.3	82	.020

Appendix D: continued						
	Percent of Students on BOG Waivers, Fall 2008		College Course-Completion Rate, Fall 2008		Controlling for Other Variables: Predictive Effect of Institution	
	Ranked Highest to Lowest		Ranked Lowest to Highest		Ranked Lowest to Highest	
College	Rank	%	Rank	%	Rank	Constant
Glendale	76	30.3	74	68.7	79	.018
Skyline	77	29.9	57	67.0	70	-.003
Cabrillo	78	29.7	90	70.0	48	-.037
Crafton Hills	79	29.3	73	68.6	41	-.048
Santa Monica	80	29.3	36	65.1	73	.002
Copper Mountain	81	28.2	63	67.8	59	-.014
Cuesta	82	27.7	76	68.8	99	.054
Gavilan	83	27.6	44	65.9	23	-.083
Allan Hancock	84	26.5	92	70.5	66	-.007
Mission	85	26.2	50	66.5	38	-.050
San Mateo	86	24.9	77	69.0	71	.000
Feather River	87	24.3	95	71.3	104	.079
Santa Rosa	88	21.9	89	69.9	96	.047
Rio Hondo	89	21.4	11	62.3	1	-.209
Diablo Valley	90	21.3	79	69.1	102	.070
De Anza	91	21.2	104	77.1	107	.201
Napa Valley	92	21.2	91	70.4	90	.037
Cuyamaca	93	20.9	41	65.7	36	-.052
Las Positas	94	20.6	87	69.6	85	.025
Santiago Canyon	95	19.5	75	68.7	9	-.107
Moorpark	96	19.4	84	69.2	101	.061
Palomar	97	18.8	56	66.9	64	-.007
West Valley	98	17.0	42	65.8	45	-.038
Mira Costa	99	16.2	62	67.5	35	-.055
Marin	100	15.6	107	82.6	89	.034
Irvine Valley	101	14.1	64	67.9	94	.044
Ohlone	102	13.7	80	69.1	87	.031
Canyons	103	13.3	105	79.6	78	.017
Monterey	104	13.1	94	71.0	97	.051
Foothill	105	10.7	106	80.0	106	.161
Saddleback	106	10.6	81	69.1	98	.054
Taft	107	10.4	108	86.4	56	-.019
Lake Tahoe	108	5.4	103	76.3	83	.022

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