# ANALYZING FACTORS THAT PREDICT ALUMNI GIVING

# AT A PUBLIC UNIVERSITY IN CALIFORNIA

A Thesis

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Ginger Tierney Hashimoto

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Department of Public Policy and Administration

Abstract

of

ANALYZING FACTORS THAT PREDICT ALUMNI GIVING

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As California's financial commitment to higher education continues to waver amidst fiscal crises and competing policy priorities, it is important that public institutions explore other strategies to cope with budget shortfalls (Public Policy Institute of California (PPIC), 2012). Such strategies have generally consisted of tuition and fee increases, expenditure reductions, and enrollment management (PPIC, 2012). There are numerous consequences related to each. Tuition and fee increases heighten worries about affordability. Expenditure reductions raise concerns about quality. Enrollment management practices threaten to limit access.

One less explored strategy in the California State University (CSU) system is the solicitation of philanthropic support. Unlike private colleges and universities who have relied on philanthropic support for generations, most CSU schools lack a culture and tradition of giving back. Indeed, it has only been since the state legislature began cutting back support in the 1990s and 2010s that CSU schools started becoming interested in philanthropy and expressing the need for more money than the state provides. Given this, many higher education administrators view philanthropic support as a promising way for

public institutions to continue funding university initiatives no longer supported by the state.

Focusing specifically on the CSU system, this study used a mixed-methods approach of both quantitative and comparative research to further examine philanthropic support through the lens of alumni giving. For the quantitative research, I utilized data from a CSU Advancement Office to conduct a two-part regression analysis and examine alumni giving patterns over a five-year period. The quantitative research also included a forecast prediction model. For the comparative research, the study compared its predictions on donor likelihood and target gift amount to that of a third party analytics company which conducted similar research with the same dataset.

Corroborating past literature, the study overwhelmingly found that the type of degree earned and the number of degrees earned impacted alumni giving. Master, doctoral, and second-degree earners were significantly more likely to be donors. Similarly, student athletes and students who participated in at least one university-sponsored activity were more likely to be donors. In terms of total amount given, the results again substantiated that higher educational attainment and student involvement corresponded with larger gifts. The variables of age, median household income, and proximity to campus also had an effect on total amount given.

When comparing the study's predictions to a third party company's predictions, the analysis revealed that the study's model may lack a robust indicator for high-end

donors. Yet for low-end donors, the study may provide a more nuanced prediction that could prove to be helpful for annual funds.

Based on these findings, there is evidence to suggest that regression analysis can assist CSU University Advancement Offices to understand the factors that predict alumni giving. Learning more about the influences that cause an alumnus/na to make a financial contribution in support of the CSU can help inform policy decisions about state general fund allocation. The study can also help CSU Advancement Offices engage in more fruitful, meaningful, and strategic fundraising.

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# Chapter 1

## INTRODUCTION

Are public universities in California effectively and efficiently engaging alumni in fundraising efforts? Researchers have studied alumni philanthropy for decades. From involvement as a student to professional success, empirical studies have identified numerous factors that influence alumni donations. Yet, despite knowing what factors may contribute to an individual's willingness to give back to his or her alma mater, the question remains, how do public institutions leverage this information to engage in more effective and efficient fundraising? Perhaps more significantly, how do public, non-research based institutions generate the largest return on alumni outreach efforts to fund university initiatives no longer supported by the state? This study aims to offer some insight toward answering these questions within the context of the California State University system. This study also addresses the profound public policy implications of such insight, particularly as state support for higher education has fluctuated considerably within the last few decades. The volatility in funding coupled with a strong economic demand for college graduates further underscores the importance of exploring this topic.

### An Overview of Public Higher Education in California

California's public higher education consists of four systems: (1) the California Community Colleges (CCC) system, (2) the University of California (UC) system, (3) the Hastings College of Law system, and (4) the California State University (CSU) system. The Master Plan for Higher Education in California sets forth different missions for each system based on the tenet that every student deserves the opportunity to earn a postsecondary degree

from a public institution (Legislative Analyst's Office (LAO), 2015). The following paragraphs provide a brief overview of each system's mission, with a specific emphasis on the CSU.

***1. California Community Colleges (CCC)***

The CCC's primary mission is to provide technical career education that leads to credentials and provide lower division coursework that leads to an associate degree or transfer to a baccalaureate institution. Unlike its counterparts, the CCC is open access, which means that any individual is eligible for enrollment. The transfer process between the open-access CCC to a more selective public institution is a key component of the Master Plan (LAO, 2015).

***2. University of California (UC)***

The UC's mission is to provide undergraduate education for the top one-eighth or 12.5% of California's public high school students as well as to provide graduate and doctoral education (LAO, 2015). The Master Plan also designates the UC as the state's primary source of academic research (CA Master Plan, 2016).

***3. Hastings College of the Law***

The Hastings College of the Law's mission is to prepare students for the practice of law within California (LAO, 2015). While affiliated with the UC, a separate Board of Directors governs Hastings (LAO, 2015).

***4. California State University (CSU)***

The CSU's mission is to provide undergraduate education for the top one-third or 33.3% of California's public high school students as well as to provide graduate education (LAO, 2015). The CSU also offers three doctoral degrees (CA Master Plan, 2016).

Comprised of 23 campuses, the CSU represents the nation's largest four-year public university. The system enrolls approximately 460,000 students and confers over 100,000 degrees

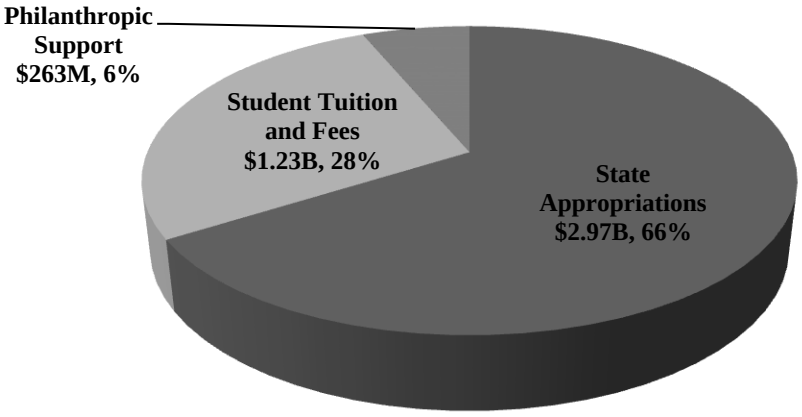
each year (LAO, 2015). When broken down, CSU-conferred degrees constitute nearly half or 46% of the state's undergraduate degrees, nearly one-third or 32% of the state's graduate degrees, and nearly 2% of the state's doctoral degrees (CSU, 2015). Given the CSU's distinct mission and large impact on California, the remainder of this study will focus specifically on the CSU.

## How the CSU is Funded

### *Core Funding Sources*

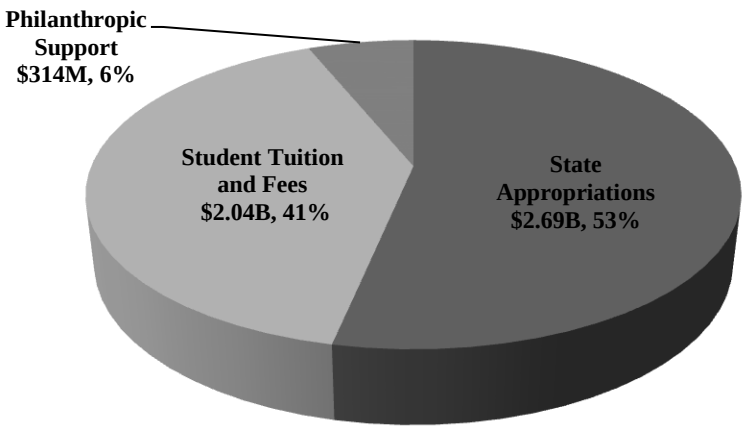
Funding for the CSU comes from three primary sources: (1) state appropriations, (2) student tuition and fees, as well as (3) philanthropic support (CSU, 2015). Figures 1 and 2 depict the proportion of each source for the 2007-08 and 2014-15 fiscal years.

**Figure 1: CSU 2007-08 Revenues**




*Source: California State University, 2007 Facts*

**Figure 2: CSU 2014-15 Revenues**



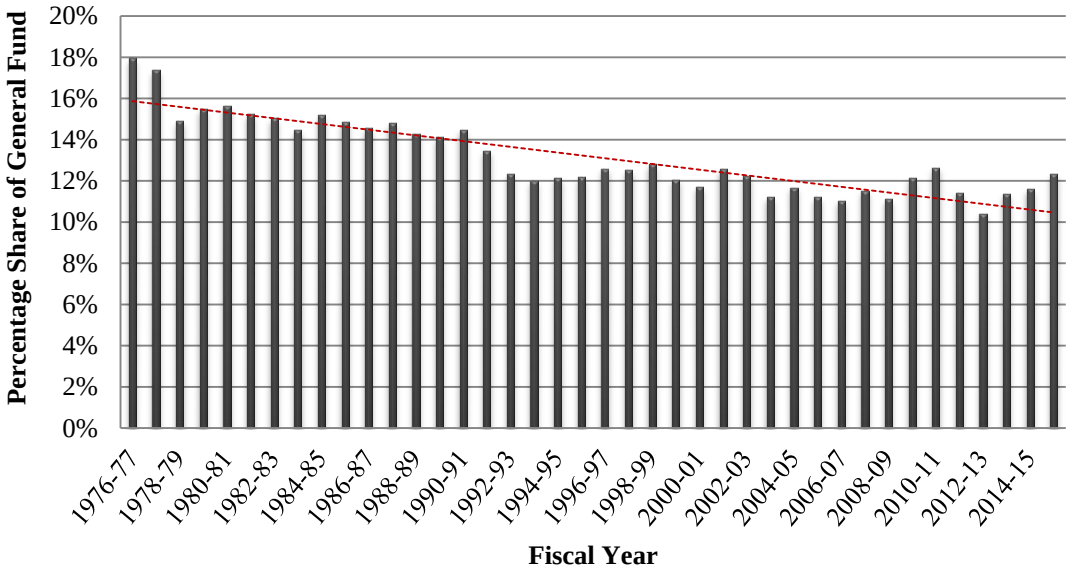

*Source: California State University, 2015 Facts*

As demonstrated by the charts, over a seven-year period state appropriations declined by 13%, whereas student tuition and fees increased by 13% and philanthropic support remained stagnant at 6% (CSU, 2007 & 2015). The reduction in funds occurred even though evidence documents a rise in the cost of providing education. According to trend data, the average cost incurred by CSU institutions per full-time student increased 12.26% from 2007 to 2012 (College Measures, 2016).

While the change in revenues partly reflects California's natural boom and bust cycles, the fluctuation also reflects the state's changing policy priorities (Public Policy Institute of California (PPIC), 2012). Compared to other policy issues such as corrections, state appropriations for public higher education have not kept pace (PPIC, 2012). During the 1976-77 fiscal year, for example, California apportioned nearly four times more to higher education than to corrections, with the total general fund allocation for higher education constituting about 18% of all expenditures (PPIC, 2012). As of 2014-15, the percentage

fell to approximately 12% (California Department of Finance, 2015). Figure 3 denotes the decline in percentage share of state general fund expenditures since the mid-1970s. As stated previously, the impetus for this decline was largely due to changing policy priorities that stemmed from federal and state requirements, court mandates, and voter-approved initiatives (PPIC, 2012). This is particularly true for the CSU and UC because there are no state funding requirements.

**Figure 3: Higher Education Share of General Fund Expenditures**




*Source: Department of Finance*

The CCC is much less vulnerable because its system is part of the Proposition 98 guarantee for K-14 education. Perhaps unintentionally, Proposition 98 is placing a much larger emphasis on community college funding. For example, in the 1960s, the CCC received 18% of general fund higher education expenditures, whereas in the 2010s the CCC now receives over 40% (PPIC, 2012). In addition to increasing community college funding, Proposition 98 is

shifting California's commitment to its Master Plan for Higher Education. Previously achieved through the CSU and UC systems, the state now largely achieves its Master Plan commitment through community colleges (PPIC, 2012).

Another factor to consider about higher education funding is that unlike most other state programs, policymakers largely believe that higher education is a budget area that can compensate for cuts by raising student tuition and fees (PPIC, 2012). This belief makes public higher education particularly vulnerable to cuts during recessions or other fiscal crises. Ultimately, even though the budget outlook for the coming years is not as dire as it was previously, the situation remains precarious. Should California's budget suffer another downturn, the CSU is likely to incur disproportionate cuts compared to other programs supported by state appropriations.

## Responses to Budgetary Volatility and Uncertainty

In the face of such budgetary volatility and uncertainty, the CSU has generally relied on some combination of the following four strategies to cope with budget shortfalls: (1) tuition and fee increases, (2) expenditure reductions, (3) enrollment management, and (4) philanthropic support (PPIC, 2012).

### *Tuition and Fee Increases*

Historically, tuition and fee increases have been the most relied upon way to overcome budget gaps (CSU, 2016). The CSU did not start significantly increasing tuition and fees until the early 1990s due to an economic recession. During that time, tuition and fees more than doubled as the CSU struggled to offset reductions in state general fund support (CSU, 2016). In the early 2010s, the CSU again relied on tuition and fee increases to maintain a balanced budget during another economic downturn. This time, tuition and fees more than tripled with the typical

undergraduate rate jumping from $1,428 in 2001-02 to $5,472 in 2011-12 (CSU, 2015). The rates soared even higher for students earning teaching credentials, graduate, and post baccalaureate degrees (CSU, 2015). It is important to note that even with such increases, the CSU remains generally more affordable than comparable institutions in other states (College Board, 2015).

As one can assume, there are numerous consequences related to tuition and fee increases. While this strategy helps the systems cope with budget shortfalls, it also heightens concerns about the affordability of a college education, especially for lower and middle-income families (PPIC, 2014). Even though research indicates that students from higher-income families have borne most of the burden of recent increases because of financial aid and scholarship opportunities, there remains the challenge of reaching low and middle-income students who are eligible for but do not apply for financial aid (PPIC, 2014). National data shows that 94% of students from families with a household income under $30,000 submit a Free Application for Federal Student Aid (FASFA) form (U.S. Department of Education, 2016). Yet, more than 10% of students from families with a household income of $30,000 to $48,000 and 20% of students from families with a household income of $48,000 to $75,000 failed to complete a FASFA form (U.S. Department of Education, 2016).

***Expenditure Reductions***

Since increases in tuition and fees do not always offset budgetary shortfalls, the CSU has also relied on reducing expenditures. For example, in 1998-99, the total revenue per student totaled $13,502 with 81% from state appropriations and 19% from student tuition and fees (PPIC, 2012). By 2011-12, total revenue decreased to $11,971 per student with 54% from state appropriations and 46% from student tuition and fees (PPIC, 2012). As mentioned above, these

reductions occurred even though data documents a 12.26% rise in the average cost per student of providing higher education (College Measures, 2016).

The reductions do not just affect student expenditures. In the late 2000s and into the early 2010, California's fiscal crisis forced the CSU to reduce its total workforce by nearly 10% or about 4,000 employees (PPIC, 2012). The CSU also implemented other cost-saving measures such as pay freezes and employee furloughs. While expenditures have been somewhat restored to pre-recession levels, the examples illustrate how the system resorts to expenditure reductions when state general fund allocations are not sufficient.

As with the strategy of tuition and fee increases, there are many consequences with instituting expenditure reductions. Most significantly, the practice raises concerns about the quality of public higher education in California. Typically, more spending per student equates to a higher caliber education.

***Enrollment Management***

A third strategy that the CSU has implemented to help stabilize budgetary volatility is enrollment management. As its name suggests, the strategy involves adopting practices to intentionally reduce enrollment.

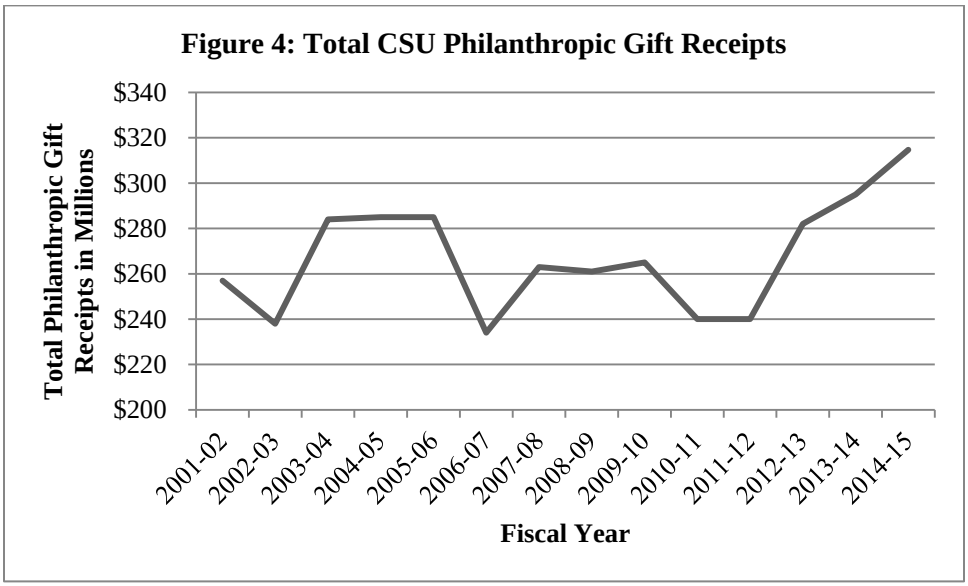
One such practice used by the CSU is to deem a major or a campus as impacted. This means that the CSU subjects certain subpopulations of students to additional eligibility criteria. Major impaction generally occurs when the number of qualified applicants far exceeds the number of available spaces in an academic discipline (CSU, 2016). At present, Fullerton, Long Beach, San Diego, San Jose, and San Luis Obispo campuses are impacted in all majors (CSU, 2016).

For campus impaction, the most common practice is for CSU institutions to place additional requirements for applicants outside a designed local admission area (PPIC, 2012). For instance, at Northridge, students who do not live in Los Angeles or Ventura Counties, have to possess either a higher GPA by 0.375 points or a higher SAT score by 300 points than the minimum requirements in order to gain admission (PPIC, 2012). As of the 2016-17 school year, 17 of the 23 CSU campuses are impacted compared to 2008-09 when only four schools were impacted. This means in the span of about eight years, 13 additional schools adopted some form of campus impaction (CSU, 2015).

This type of enrollment management strategy is concerning because it limits access to public higher education. In many ways, the strategy not only denies admission to qualified students, but it also violates the primary tenet of California's Master Plan for Higher Education, which is to provide accessible public higher education to any student who desires to attain it.

***Philanthropic Support***

The fourth way the CSU has coped with decreased state support is by soliciting philanthropic support. Since 2003, the CSU reports an increase of $57 million in philanthropic support with the 2014-15 total raising an all-time high of $314.7 million (CSU, 2015). Figure 4 illustrates the trend over time. Despite the upward trend, as demonstrated in Figures 1 and 2 above, there was no percentage change in philanthropic support when compared other revenue sources. This indicates philanthropic support offered minimal support in the face of decreased state appropriations.



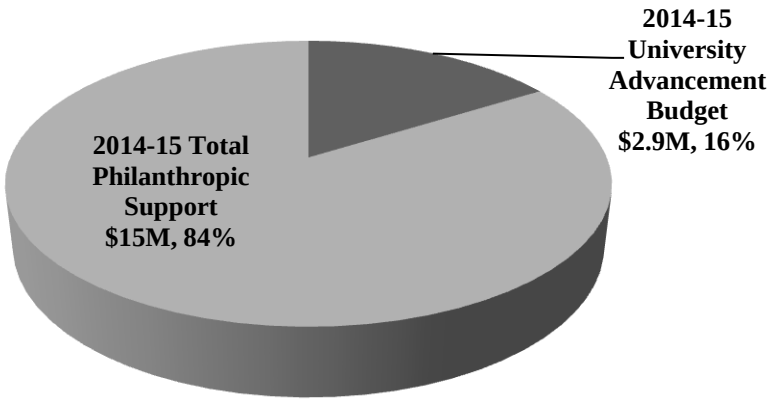

*Source: California State University Philanthropic Report*

In addition, of the record-high $314.7 million, alumni contributions constituted $88.8 million or 28% (CSU, 2015). According to the CSU, this equated to a 2.6% alumni participation rate when comparing the number of addressable alumni to the number of those solicited. This rather low participation rate coupled with the fact that philanthropic support played little role in easing the loss of state support suggests that the CSU needs to more effectively and efficiently engage alumni in fundraising efforts. Despite being a more promising option than the previous three budget coping strategies, seeking alumni donations poses several challenges.

Unlike private colleges and universities who have relied on alumni philanthropy for generations, the CSU lacks a culture and tradition of giving back. Indeed, it has only been since the state legislature began cutting back support in the 1990s and 2010s that the system started becoming interested in alumni philanthropy and expressing the need for more money than the state provides. Given this, it will be challenging for the CSU to instill an ethos of philanthropy and overcome the stigma that taxpayer money fully funds their institutions.

In addition, relying on donors requires an upfront investment because fundraising necessitates extensive staff and administrative time. Figure 5 compares the 2014-15 budget of one CSU Advancement Office to the total amount of philanthropic dollars raised. The total includes cash and in-kind gifts, pledges, grants from private foundations, and testamentary commitments through estate plans. According to the data below, for every University Advancement dollar spent, it yielded approximately $5.17 in philanthropic support. Thus, if a university can afford the upfront costs, there is typically a good return on investment.

**Figure 5: Comparison of Advancement Budget to Philanthropic Support**




*Source: California State University*

Nonetheless, fundraising is also unpredictable and likely to mimic the ebb and flow of the economy. As mentioned above, given that the CSU and UC systems are not part of the Proposition 98 mandate, public higher education outside the community colleges is likely to incur disproportionate cuts during a recession. Therefore, private philanthropic support is not as viable when the systems are most vulnerable.

Despite its many challenges, alumni philanthropy also presents several opportunities. Of the previous three strategies, alumni philanthropy has the least negative impact on students while simultaneously including the greatest chance for augmenting additional support.

**Policy Implications**

Further exacerbating the CSU's budgetary struggles is a potential shortage of college-educated workers. Economic projections suggest that California will need an increasing number of college graduates to meet the rising demand for highly educated workers (PPIC, 2012). One study analyzed the proportion of jobholders in California with a bachelor degree and used the historical data to project future trends. The researcher concluded that whereas 34% of California jobholders had a bachelor degree in 2006, by 2025 this proportion would need to increase to 41% (LAO, 2015). Other studies examining demand for professional jobs in California's workforce sectors have also identified shortages. For example, the federal government has designated several northern and inland counties in California as health professional shortage areas based on the ratio of health care professionals to residents (LAO, 2015). It is important to note that forecasting these trends is difficult to assess. Therefore, while many predictions anticipate shortages, it is impossible to predict workforce demand with great certainty.

Despite such uncertainties, it remains important to anticipate this occurrence and factor it into public policy decision-making. For state lawmakers, the potential shortage of college-educated workers coupled with budgetary volatility underscores the need for a more consistent and reliable source of revenue.

**Thesis Framework**

As explored above, the CSU needs to find a better way to cope with budgetary unpredictability. While there are positive and negative aspects of each budgetary strategy

currently used, alumni philanthropy represents a promising option. Thus, the impetus for this study is to understand the factors that predict alumni giving. Learning more about the influences that cause an alumnus/na to make a financial contribution in support of the CSU can help inform policy decisions about state general fund allocations. The study can also help CSU Advancement Offices engage in more fruitful, meaningful, and strategic fundraising. To that end, Chapter 2 offers a comprehensive literature review of existing research. The review not only provides context regarding the factors found to have a significant influence on alumni giving, but also identifies gaps in the literature. The review ultimately lays the foundation for my own study, which is specific to the CSU. Chapter 3 describes the study's methodology, which includes a mixed-methods approach of both quantitative and comparative research. For the quantitative research, I use data from one CSU Advancement Office to conduct a two-part regression analysis and examine alumni giving patterns over a five-year period. The quantitative research also includes a forecast prediction model. For the comparative research, I compare my predictions on donor likelihood and target gift amount to that of a third party analytics company which conducted similar research with the same dataset. This portion of the research hopes to offer further insight into the study's validity and usefulness. Chapter 4 summarizes the results of both approaches and highlights important findings. Finally, Chapter 5 identifies the study's implications for California policymakers as well as CSU administrators interested in better understanding alumni philanthropy and its viability as a source of additional financial support.

# Chapter 2

LITERATURE REVIEW

Understanding the factors that predict alumni giving has significant fiscal implications for public higher education systems. Over the past several decades, researchers have conducted copious studies to identify the determinants of alumni philanthropy. Using a sample of over a dozen articles, this literature review organizes the identified predictive influences into four categories. The first category explores the effect of academic factors such as field of study and type of degree earned. The second category analyzes personal factors including relevant demographic variables. The third category reviews findings on the impact of vintage factors such as age and class year. The last category delves into the influences of participation factors by examining involvement of graduates as both students and alumni. I conclude the chapter by identifying gaps in the literature and lay the foundation for a regression analysis specific to the CSU system.

## Academic Factors

### *College/Major*

Several studies determined that certain academic disciplines are associated with a higher incidence of alumni giving. In their covariance regression analysis studying alumni giving data from Memphis State University (MSU), Okunade et al. (1994) found that College of Business graduates were 18.24% more likely to give a higher amount, compared to College of Arts and Sciences graduates, who were 4.69% more likely to give a higher amount. Since business disciplines are generally associated with higher average incomes, the researchers surmised that fields of study related to lucrative occupations result in increased alumni philanthropy.

In a later study, Okunade and Berl (1997) focused specifically on the MSU College of Business. Incorporating only business majors into their logistic regression model, the researchers found that alumni who majored in finance, insurance, and real estate were 15.5% more likely to donate relative to other business majors (Okunade & Berl, 1997). Similar to Okunade's previous study, the researchers hypothesized that majoring in a discipline with higher average salaries increases the subsequent likelihood of being a donor.

Hueston (1992) analyzed 34,938 alumni records from New Mexico State University (NMSU). Using logistic regression analysis, Hueston determined that the College of Engineering had the highest concentration of alumni donors at 33% (Hueston, 1992). Since engineering graduates are likely to earn a higher income, Hueston's findings, like Okunade et al., are consistent with the assumption that academic disciplines play a role in alumni propensity to give. Despite such evidence in the existing literature, it is important to note that all three studies derived their data from public research universities. Since CSU schools are not research-based, the applicableness of the findings to this study is uncertain.

***Type of Degree***

In addition to academic discipline, several studies found the type of degree earned such as an undergraduate degree versus a graduate degree to be a predictive factor in alumni philanthropy. In their covariance regression model, Okunade et al. (1994) found that undergraduate alumni who later earned a graduate degree from the same university were 6.35% more likely to give higher amounts. The researchers postulated that students who receive more than one degree from the same university develop a greater sense of attachment and belonging. This is particularly true given the longer periods of association (Okunade et al., 1994). Moreover,

the researchers thought this finding corroborated the assumption that graduate level alumni are more likely to obtain lucrative occupations (Okunade et al., 1994).

Rooney et al. (2007) also found the level of educational attainment to be a predictive factor in alumni giving. Examining the giving patterns of married couples, Rooney et al. conducted a regression analysis on panel data. The results found that each year of education increased a husband's likelihood of donating to his alma mater by 19.42%, while each year of education increased a wife's likelihood of donating to her alma mater by 21.51%. This finding is consistent with literature about the impact of education on charitable giving. Research suggests that philanthropy correlates with higher educational attainment (Bekkers & Wiepking, 2011).

As demonstrated, academic factors play a role in predicting alumni giving. Most evidently, college/major and type of degree earned bear some indication of future occupation and earning potential.

## Personal Factors

In addition to academic factors, the literature identified several personal factors as predictive indicators of alumni giving. While most studies opted to include demographic variables such as gender, race, marital status, and number of children, the two variables most associated with statistically significant findings were income/occupation and proximity to campus.

### *Income/Occupation*

Using a logistic regression model, Lindahl and Winship (1994) analyzed wealth screening information for 140,000 alumni records from Northwestern University. Key explanatory variables included recency of gift; respondent to a planned giving mailer; high-ranking occupation; high gift potential based on wealth screening; self-reported salary over

$200,000; self-reported salary over $250,000; years since graduation; local resident; and participation in a student activity (Lindahl & Winship, 1994). Parsing the results into low, moderate, and high level donors, the researchers found that salary, affluence of neighborhood, and gift potential as determined by the wealth screening were statistically significant for moderate and low level donors (Lindahl & Winship, 1994). Interestingly, however, for high-level donors, recency of gift served as the most important single predictor of future giving. In fact, as past giving increased, the probabilities of making a gift over $10,000 were respectively: $1 to $24—0.05%; $25-$99—0.29%; $100-$249—2.33%; $250-$499—5.88%; $500-$749—13.33%; $750 and over—33.14% (Lindahl & Winship, 1994). This finding suggests that both the recency and history of past giving are important predictors of future giving for high-level donors; however, wealth and neighborhood affluence are important predictors for low and moderate donors.

In their study, Okunade and Berl (1997) found both income and occupation to be important factors when determining giving propensity among business alumni from MSU. The results indicated that compared with base annual family incomes of less than $30,000, tendency to give rose 16% for incomes between $30,000-$49,999; 21% for incomes between $50,000-$69,999; 28% for incomes between $70,000-$89,999; and 45% for incomes $90,000 or more (Okunade & Berl, 1997). In terms of occupation, the study found a link between likelihood of giving and type of spouse employment. Giving probability fell by 53% for alumni spouses employed in service related occupations, relative to non-service occupations.

Ultimately, income and occupation are significant predictors of alumni giving and often account for a large portion of the gap between donors and non-donors. Again, however, these findings are not necessarily directly applicable to the CSU system. For instance, Lindahl and Winship derived their data from Northwestern University, a private research institution in Illinois.

### *Proximity to Campus*

Another personal factor associated with statistically significant findings was proximity to campus. Ebersole (2011) conducted a class-specific study on 1973 graduates from Shippensburg University, specifically analyzing their life cycle of giving over a 36-year period. Shippensburg University is a small public university in Pennsylvania that is quite comparable to the smaller sized CSU schools. Ebersole defined the proximity variable by delineating any residence within a 50-mile radius as close proximity and any residence outside a 50-mile radius as far proximity. Ebersole found that graduates living in close proximity to campus were more likely to give and more likely to give higher amounts (Ebersole, 2011). The results are consistent with the notion that close geographical proximity to a campus can lead to more engagement in academic, athletic, and social activities offered by the university.

Similarly, Bruggink and Siddiqui (1995) conducted an Ordinary Least Squares (OLS) regression on 22,471 class reunion surveys to examine the philanthropic behavior of alumni from an independent liberal arts college. The study's dependent variable was the total amount donated in one fiscal year. The independent variables were income, marital status, children, age, distance from campus, gender, Greek affiliation, alumni participation, major, and type of degree earned. The study ultimately determined that distance from campus was a highly statistically significant factor with an increase of 90.5% in donations with every increase in the miles away bracket listed on the survey (Bruggink & Siddiqui, 1995). As mentioned above, the applicableness of this study is somewhat uncertain given how different liberal arts colleges are from CSU schools.

## Vintage Factors

Most articles identified the vintage factors of age and years since graduation as the most predictive influences for increased alumni giving.

### *Age*

Olsen et al. (1989) studied alumni giving life cycles in relationship to age and time from Middlebury College. Middlebury is a small liberal arts college in Vermont and thus not particularly applicable to the CSU system. Nonetheless, the researchers conducted an OLS regression analysis and found that that average alumni gift growth rate remains positive until 39.6 years after graduation (Olsen et al., 1989). Assuming that the average student is between 21 and 22 years old when he or she graduates, this would mean that he or she would be 60 to 61 years of age when the rate of giving levels off and eventually declines. The researchers asserted that since that age range corresponds with the average retirement age, such a finding suggests that alumni giving increases with age until the alumnus/na begins to focus on retirement (Olsen et al, 1989).

Another pivotal moment related to age and the life cycle of alumni was child-raising years. In their 1997 regression study, Okunade and Berl concluded that the financial burden of having children, particularly during the children's college-aged years, resulted in lower alumni donations. Interestingly, however, the researchers concluded that despite lower donations, such alumni were still likely to contribute during that life cycle phase.

Based on a study of alumni from the University of New Hampshire, a public research university, Bristol (1990) identified a positive correlation between the age of an alumnus/na and the average gift amount. Ultimately, Bristol found that the average gift per donor is small in the beginning years after graduation, but gradually increases over time. Even so, the growth was not always steady; rather the trend experienced several vicissitudes (Bristol, 1990).

### *Years since Graduation*

Whereas some studies focused on age, others focused on years since graduation. Okunade and Berl (1997) found alumni who graduated 30 or more years ago are significantly more likely

to give. Marginal probabilities for giving increased by 19.2% when comparing alumni who graduated 30 to 36 years ago versus alumni who graduated 10 to 19 years ago (Okunade & Berl, 1997). This corroborates the expectation that older alumni are generally wealthier and have more discretionary income (Okunade & Berl, 1997).

Class reunion giving is another significant predictor of alumni philanthropy as it relates to vintage factors. Analyzing data from Princeton University's annual giving program over a 50-year period, Willemain et al. (1994) observed a statistically significant relationship between alumni giving and the number of years since graduation with increased donations occurring at the 25th and 50th reunion markers. As mentioned previously, it is important to note the distinction in where each study derived its data. Since Princeton is a private, Ivy League, research institution, findings based on a study of Princeton alumni may not be applicable. Even so, the findings offer insight into the breadth of existing literature. Thus, using the key explanatory variables of number of years since graduation, number of reunions hosted by the University, and fiscal year, the researchers observed over the first 50 reunions that the average alumni donation increased by one unit on the log scale (Willemain et al., 1994). The study accounted for inflation, the health of the economy, as well as other factors associated with particular fiscal years by converting gift values from nominal to real terms.

Similarly, Bristol (1990) identified a spike in donations during years where alumni celebrated a 25, 40, and 50-year reunion. In the same study, Bristol found that the percentage of donors in an alumni class is minimal immediately following graduation. During the first 10 to 20 years after graduation, the percentage increases dramatically and continues to increase but at a slower rate 20 to 30 years after graduation (Bristol, 1990).

Overall, the vintage factors of age and years since graduation represent important predictors in determining alumni giving. Validating general expectations, most studies found that older alumni and older classes often result in more gifts. Despite such findings, the literature review revealed two problems. First, few studies recognized that the variables of age and years since graduation are not synonymous. While age and years since graduation generally move in tandem over time, the variables do not always share a positive correlation. Thus, it is important for regression models to include both variables and consider them separately. Second, few studies recognized that when conducting a regression analysis the continuous variables of age and years since graduation have the potential of producing a nonlinear effect. Therefore, it is imperative to include squared and non-squared components of the variables and ensure that both yield statistically significance results.

## Participation Factors

A fourth predictive factor that emerged was the involvement of graduates as both students and alumni.

### *Student Involvement*

Several studies stressed the importance of an individual's sense of fondness toward his or her alma mater based on student involvement. Indeed, most studies found a link between giving and the level of participation in university-sponsored student activities. Using two-stage least squares regression analysis, Harrison (1995) observed a 0.20% increase in alumni giving for those who joined a Greek fraternity or sorority. Such affiliation suggests a high degree of social integration while a student may contribute to fond memories and thus encourage alumni philanthropy.

Similarly, Bruggink & Siddiqui (1995) identified a statistically significant relationship among Greek participation and increased alumni giving. The results of their regression analysis found that Greek involvement resulted in a positive coefficient of 0.422 (Bruggink & Siddiqui, 1995). Interestingly, when Okunade et al. (1994) compared Greek versus non-Greek student participation, the regression found that non-Greek student leaders tended to donate a higher amount. The researchers surmised that is because Greek student leaders may continue to identify with and designate their charitable contributions to the current chapter or national foundation of their Greek organization, rather than directly to their alma mater (Okunade et al., 1994).

Other factors found to be statistically significant included student athlete participation and scholarship recipients. Wunnava and Lauze (2001) found in their study of private liberal arts colleges that alumni who played an intercollegiate sport were more likely to become consistent donors. While, Taylor and Martin (1995) found that alumni who received scholarships as students were more likely to give larger gifts. This finding suggests that receiving financial assistance may cause some alumni to give back out of a sense of moral obligation.

Weerts and Ronca (2007) concluded that alumni support depends, in part, on an individual's perception of his or her student experience. Indicators that shaped individual perception included the quality of education received, the extent to which the university provided career preparedness, and the degree to which faculty members exerted a positive influence (Weerts & Ronca, 2007).

### *Alumni Involvement*

Numerous studies also linked alumni involvement to financial donations. Many graduates contribute their time to alumni activities such as serving as a department advisory board member

or as an alumni association chapter leader. By virtue of their willingness to volunteer, such alumni are more likely to be regular donors.

Newman (2011) conducted a logistic regression analyzing 7,298 survey responses collected from alumni of a public doctoral-granting research university. The study found that current members of the alumni association were 4.8 times more likely to be a donor than non-members (Newman, 2011). The researcher expected the positive relationship as members typically harbor a greater loyalty to their alma mater as demonstrated by the action of joining the alumni association.

Keating (1981) contended that a desire to provide collective goods and services could sometimes drive charitable giving. The researchers also described charitable contributions as payments in exchange for intangible personal rewards such as self-esteem or group membership. In their study of athletic winning records and alumni giving, Baade and Sundberg (1996) found the perceived rewards of group membership as well as shared success to be important motivations. After conducting a covariance regression analysis on data from over 300 private, public, and liberal arts universities, they found that bowl game appearances resulted in a 40% increase in alumni gifts (Baade & Sundberg, 1996). Likewise, for public universities, NCAA tournament appearances resulted in a 35% increase in alumni gifts (Baade & Sundberg, 1996). Such results illustrate the power and allure of perceived rewards.

Ultimately, participation factors play an integral role in determining the propensity for alumni giving. Despite revealing valuable information about alumni intention and willingness to donate, such factors are difficult to quantitatively measure. Moreover, particularly for alumni involvement, there is a risk that including such variables in a regression model could cause endogeneity. This problem arises when one variable in the causal model determines the state of

another variable in the model. In the case of alumni philanthropy, it is plausible that alumni involvement causes one to make a gift or vice versa. For example, it is typical for alumni associations to require board members to make an annual contribution. Endogeneity is also the reason why most predictive alumni giving studies do not track development outreach efforts such as contacts or visits.

**Literature Review Conclusion**

This review of literature demonstrates the breadth of research on alumni philanthropy within the last several decades. Of significance to this study, however, is the limited amount of research applicable to the CSU. There are three major reasons for the lack of applicableness. First, as discussed in Chapter 1, the California public higher education system is uniquely complex. Specific policy implications, such as the impact of Proposition 98 on state general fund expenditures, very much sets CSU institutions apart from other colleges and universities. Second, the CSU has only recently begun embracing alumni philanthropy and employing it as a budget coping strategy. The recency of this change makes the CSU system distinct as compared to even its UC system counterpart. Third, most studies focused on research-based institutions, whereas the CSU system is predominately comprised of non-researched-based, teaching universities. The key difference here is that the student experience is generally different in that research-based institutions often expect faculty and students to conduct and publish research. For these reasons, there was a noticeable gap in the literature.

Using the information learned from past research, this study aims to bridge such a gap by conducting a regression analysis specific to the CSU system. In order to ensure a robust regression model, the study will incorporate variables associated with each of the major categories of factors identified in the literature. For academic factors, the study will use the

variables of college and type of degree earned to capture the influence of field of study and educational attainment. For personal factors, the study will include the variables of gender, median household income, and proximity to campus to capture the influence of discretionary income and potential level of university engagement. For vintage factors, the study will include the variables of age and years since graduation to capture the influence of the various stages of an alumnus/na's life cycle. For participation factors, the study will use student athlete participation and number of student activities to capture the influence of student involvement. As mentioned above, the study chose not to include any alumni involvement or development related variables including alumni association membership status, number of alumni activities, or number of direct mail solicitations received, as it would cause an endogeneity problem with the regression model.

# Chapter 3

## METHODOLOGY

The previous chapter identified that academic, personal, vintage, and participation factors can influence alumni giving. Though such findings are significant, there was a noticeable lack of studies investigating the role of alumni philanthropy at California, public, non-research based universities. Attempting to address such a void, this study uses a mixed-methods approach of both quantitative and comparative research to examine alumni giving within the context of the CSU system. For the quantitative research, I conduct a regression analysis to quantify the relationships among several variables that previous studies found to be influential. I then use the regression results to create a forecast prediction model. For the comparative research, I compare my predictions to the predictions of a third party research company. This portion of the study hopes to not only ascertain the validity of my own results, but also assess the usefulness of the third party company's research.

### Quantitative Research

The primary source of information for the quantitative analysis is the University Advancement database for a single CSU institution. Though a larger and more varied sample size usually increases the generalizability of findings, the university selected serves as a remarkably representative sample for the entire CSU system. When comparing student body compositions, for example, the study's university was comprised of 90.8% undergraduate students, 57% female, 30% White, 28% Hispanic/Latino, 20% Asian/Pacific Islander, and 6% African American. Comparatively, the CSU system as a whole was comprised of 87.8% undergraduate students, 56.1% female, 27.3% White, 34.8% Hispanic/Latino, 16.7% Asian/Pacific Islander, and 4.4% African American (CSU Facts, 2015). The total number of fall 2014 enrollment and 2014-15

budget also closely matched the median enrollments and budgets of the entire CSU system. With the study's university reporting an enrollment of nearly 30,000 students and a budget of approximately $240 million and the CSU reporting a median enrollment of 19,000 students and a median budget of $170 million (CSU Facts, 2015). Considering these similarities, the study is likely to yield findings that are applicable system-wide.

The data set contains 195,495 alumni records spanning the calendar years 2010, 2011, 2012, 2013, and 2014. The study removed all non-alumni records including students, faculty, emeritus faculty, staff, emeritus staff, other individuals, foundations, corporations, and organizations that made a gift. In addition, the study removed all physical therapy alumni because the Physical Therapy Department transitioned from offering a Master degree to a Doctoral degree partway through the five-year period of the study. The university maintained donor privacy by removing all personal identifiers including name, unique identification number, and street address prior to releasing the data to me. Per the request of the university of focus, I maintained its anonymity throughout this study by refraining from using its formal name.

### *Theoretical Model*

Since the literature indicates that most factors that predict alumni giving fall within the four broad categories of academic factors, personal factors, vintage factors, and participation factors, I created the following model for quantitative analysis based upon the available data.

**Donor Dummy and Total Amount Given = Academic Factors, Personal Factors, Vintage Factors, Participation Factors;**

where

**Academic Factors** = f (Vocational Education BA Degree Dummy, MA Degree Dummy, MBA Degree Dummy, MM Degree Dummy, MPPA Degree Dummy, MS Degree Dummy, MSW

Degree Dummy, EDD Degree Dummy, Second BA Degree Dummy, BS Degree Dummy, Second BS Degree Dummy, Credential Dummy, College of Business Administration Dummy, College of Education Dummy, College of Engineering and Computer Science Dummy, College of Health and Human Services Dummy, College of Natural Sciences and Mathematics Dummy, College of Social Sciences and Interdisciplinary Studies Dummy)

**Personal Factors** = f (Male Dummy, Miles from Campus, Median Household Income)

**Vintage Factors** = f (Age, Years since Graduation)

**Participation Factors** = f (Student Athlete Dummy, Number of Student Activities)

***Regression Analysis***

Since an alumnus/na's decision to make a gift to his or her alma mater involves two choices, it is appropriate to use a two-part model (TPM). The first choice involves deciding whether to give; the second choice involves deciding how much to give. As its name suggests, the TPM considers both choices by dividing the regression analysis into two stages. The first stage replaces a positive value of whether an alumnus/na donated with a one. Using logistic regression, the model yields coefficients that once transformed into odds ratios, show the change in probability of an alumnus/na donating following a one-unit change in a respective variable, holding all other explanatory variables constant. The second stage uses ordinary least squares (OLS) regression to analyze only the alumni that donated. From the data, the model produces coefficients that indicate the expected change in amount given from a one-unit change in a respective explanatory variable, holding all other explanatory variables constant.

***Dependent Variable***

As described above, the logistic regression uses the donor dummy variable indicating whether an alumnus/na made a gift at any time within the five-year period of 2010 through 2014

as the study's dependent variable. Meant to provide an initial assessment, the dependent dummy variable establishes a foundation by identifying key differences between donors and non-donors. The OLS regression analyzes only those who gave and uses the total amount given as the dependent variable. This demonstrates of those who gave, who donated the most.

***Independent Variables***

The following four sections explain each category of predictive influences in more detail and offer a justification for the inclusion of each independent variable within the study's theoretical model. As shown in Table 1, the sections also discuss the expected effect of each independent variable on the dependent variable.

| Table 1: Independent Variable Description and Expected Effect on Likelihood of Giving | | |
|---|---|---|
| **Variable** | **Description** | **Expected Effect** |
| ***ACADEMIC FACTORS*** | | |
| (BA Degree)* | Received a Bachelor of Arts degree | Reference |
| BVE Degree Dummy | Dummy variable = 1 if received a Bachelor of Vocational Education degree | ? |
| MA Degree Dummy | Dummy variable = 1 if received a Master of Arts degree | + |
| MBA Degree Dummy | Dummy variable = 1 if received a Master of Business Administration degree | + |
| MM Degree Dummy | Dummy variable = 1 if received a Master of Music Degree | + |
| MPPA Degree Dummy | Dummy variable = 1 if received a Master of Public Policy and Administration degree | + |
| MS Degree Dummy | Dummy variable = 1 if received a Master of Science degree | + |
| MSW Degree Dummy | Dummy variable = 1 if received a Master of Social Work degree | + |
| EDD Degree Dummy | Dummy variable = 1 if received a Doctorate in Education degree | + |
| Second BA Degree Dummy | Dummy variable = 1 if received a second Bachelor of Arts degree | + |
| BS Degree Dummy | Dummy variable = 1 if received a Bachelor of Sciences degree | ? |
| Second BS Degree Dummy | Dummy variable = 1 if received a second Bachelor of Sciences degree | + |
| Credential Degree Dummy | Dummy variable = 1 if received a Credential degree | ? |
| (College of Arts and Letters)* | Graduated from the College of Arts and Letters | Reference |
| College of Business Administration Dummy | Dummy variable = 1 if graduated from the College of Business Administration | + |
| College of Education Dummy | Dummy variable = 1 if graduated from the College of Education | ? |
| College of Engineering and Computer Science Dummy | Dummy variable = 1 if graduated from the College of Engineering and Computer Science | + |
| College of Health and Human Services Dummy | Dummy variable = 1 if graduated from the College of Health and Human Services | ? |
| College of Natural Sciences and Mathematics Dummy | Dummy variable = 1 if graduated from the College of Natural Sciences and Mathematics | ? |
| College of Social Sciences and Interdisciplinary Studies Dummy | Dummy variable = 1 if graduated from the College of Social Sciences and Interdisciplinary Studies | ? |
| ***PERSONAL FACTORS*** | | |
| (Female)* | Dummy variable = 0 if identified in database as a female | Reference |
| Male Dummy | Dummy variable = 1 if identified in database as a male | ? |
| Miles from Campus | Number of miles that the center point of the preferred address zip code is from the university's Alumni Center | - |
| Median Household Income | Median household income of the preferred address zip code as estimated by the 2010 U.S. Census | + |
| ***VINTAGE FACTORS*** | | |
| Age | Number of years since birth | + |
| Years since Graduation | Number of years since graduation | + |
| ***PARTICIPATOPN FACTORS*** | | |
| (Non-Student Athlete)* | Dummy variable = 0 if not identified in database as a student athlete | Reference |
| Student Athlete Dummy | Dummy variable = 1 if identified in database as a student athlete | + |
| Number of Student Activities | Number of activities participated in while a student | + |

**Independent variables in parentheses indicate the reference from which all findings will be relative.*

### *Academic Factors*

The literature indicates that academic factors play an integral role in predicting alumni giving. To control for such influences, the study uses the dummy variables of type of degree and academic college. Type of degree is important as it differentiates undergraduate alumni from graduate and doctoral alumni. In some cases, like for the Master of Public Policy and Administration, the type of degree is also associated with a particular discipline. Using the Bachelor of Arts degree as its base, the study expects that alumni who earned a Graduate degree, a Doctoral degree, a second Bachelor of Arts degree, and a second Bachelor of Sciences degree to have a positive effect on the dependent variables. This is because, according to previous research, higher educational attainment leads to higher wealth potential and therefore increased propensity to give.

To further capture the influence of discipline, the study includes the dummy variable of academic college. Based on past research, the study expects the College of Business Administration as well as the College of Engineering and Computer Science to be associated with lucrative professions and thus a positive effect on the dependent variables. Given that the College of Arts and Letters serves as the base, the study is uncertain about the effect of the remaining four colleges.

### *Personal Factors*

The literature indicates that gender, miles from campus, and median household income can influence alumni willingness to give. While the literature suggests including other demographic variables like marital status and number of children, the data did not consistently include that level of specificity. Accordingly, my model uses a dummy variable for gender, with female as the base, and continuous variables for both miles from campus and median household

income. I calculated the miles from campus variable by using a geocoded shape file to locate the center point of every zip code within the dataset. Using the center points, I determined the distance in miles away from the university's Alumni Center. To obtain a measure of potential wealth, I used United States Census data from 2010 based on zip code to collect an estimate of median household income.

As depicted in Table 1, the effect of gender is uncertain; however, the model expects that alumni who live closer to campus and alumni who earn a higher income to have a positive effect on the dependent variables.

***Vintage Factors***

A third set of factors that research finds important is age and years since graduation. The model includes both as continuous variables. In general, I expect that older alumni and alumni who have been out of school longer will contribute more. The results, however, may produce a nonlinear effect. Hence, the study includes both age and aged squared as well as years since graduation and years since graduation squared. The study will keep the variables in the model only if both the non-squared and squared components of the variables are statistically significant.

***Participation Factors***

Finally, the literature identifies several student participation factors as predictive indicators of alumni giving. To capture these effects, the model uses one dummy variable and one continuous variable. The dummy variable indicates whether the alumnus/na was a student athlete. The study uses a non-student athlete as the base. While the continuous variable denotes the number of activities the alumnus/na participated in while a student. The model predicts that both variables will have a positive effect on the dependent variables.

Table 2 features descriptive statistics for each independent variable including the mean, standard deviation, minimum, and maximum values. Due to the high number of categorical or dummy variables used, most minimum entries show a value of zero and most maximum entries show a value of one.

I also calculated pairwise correlation coefficients to identify possible strong correlative relationships between each of the independent variables. Appendix A contains the results. Variables with a strong association have a partial correlation coefficient that is closer to one in absolute value. According to the table, there is no value greater than 0.8. Therefore, multicollinearity is likely not a concern. This means that if the regression finds a variable to exert a non-statistically significant influence on either of the two dependent variables, it is not likely due to correlation with other explanatory variables, which would bias the regression coefficient's standard error upward and the t-statistic downward.

| Table 2: Descriptive Statistics | | | | |
|---|---|---|---|---|
| **Variable** | **Mean** | **Standard Deviation** | **Minimum** | **Maximum** |
| ***ACADEMIC FACTORS*** | | | | |
| (BA Degree)* | - | - | - | - |
| BVE Degree Dummy | 0.002 | 0.040 | 0 | 1 |
| MA Degree Dummy | 0.035 | 0.184 | 0 | 1 |
| MBA Degree Dummy | 0.010 | 0.100 | 0 | 1 |
| MM Degree Dummy | 0.001 | 0.023 | 0 | 1 |
| MPPA Degree Dummy | 0.001 | 0.036 | 0 | 1 |
| MS Degree Dummy | 0.031 | 0.173 | 0 | 1 |
| MSW Degree Dummy | 0.014 | 0.116 | 0 | 1 |
| EDD Degree Dummy | 0.000 | 0.013 | 0 | 1 |
| Second BA Degree Dummy | 0.003 | 0.052 | 0 | 1 |
| BS Degree Dummy | 0.429 | 0.495 | 0 | 1 |
| Second BS Degree Dummy | 0.002 | 0.043 | 0 | 1 |
| Credential Degree Dummy | 0.037 | 0.189 | 0 | 1 |
| (College of Arts and Letters)* | - | - | - | - |
| College of Business Administration Dummy | 0.212 | 0.409 | 0 | 1 |
| College of Education Dummy | 0.098 | 0.298 | 0 | 1 |
| College of Engineering and Computer Science Dummy | 0.078 | 0.268 | 0 | 1 |
| College of Health and Human Services Dummy | 0.186 | 0.389 | 0 | 1 |
| College of Natural Sciences and Mathematics Dummy | 0.050 | 0.219 | 0 | 1 |
| College of Social Sciences and Interdisciplinary Studies Dummy | 0.205 | 0.404 | 0 | 1 |
| ***PERSONAL FACTORS*** | | | | |
| (Female)* | - | - | - | - |
| Male Dummy | 0.443 | 0.497 | 0 | 1 |
| Miles from Campus | 204.583 | 497.594 | 1.457 | 6,651.245 |
| Median Household Income | $67,601.53 | $22,302.31 | $4,633 | $228,487 |
| ***VINTAGE FACTORS*** | | | | |
| Age | 48.635 | 15.165 | 21 | 103 |
| Years since Graduation | 20.652 | 13.779 | 1 | 66 |
| ***PARTICIPATOPN FACTORS*** | | | | |
| (Non-Student Athlete)* | - | - | - | - |
| Student Athlete Dummy | 0.016 | 0.124 | 0 | 1 |
| Number of Student Activities | 0.051 | 0.240 | 0 | 6 |

**Independent variables in parentheses indicate the reference from which all findings will be relative.*

### *Predictive Modeling*

To further the usefulness of the two-part regression analysis, I created a predictive forecast model. Using the results from the logistic regression, I estimated the probability of donor likelihood by converting the logistic regression model's log odds scale into a probability scale out of 100. Similarly, using the results from the OLS regression, I estimated a target gift amount by converting the OLS regression model's odds scale into a probability scale.

I then extrapolated the predictions with the donor dummy variable and total amount given variable. To evaluate the data, I first sorted by my donor likelihood prediction. I identified alumni who received a high likelihood score, but did not donate as prime prospects. I then sorted by my target gift amount and compared the study's estimated target gift amount to the actual amount given. Similar to donor likelihood, I identified alumni whose predicted values exceeded the actual values as prime prospects.

## Comparative Research

The quantitative research alone does not provide context for how helpful the regression results will be for CSU institutions. This is particularly true as it is now commonplace for CSU Advancement Offices to hire third party research companies to assist with donor analysis. Thus, with the hope of ascertaining the validity and usefulness of my own model as well as assessing the validity and usefulness of research provided by contracted companies, I conducted a comparative analysis.

Using an arbitrary identification number assigned to each unique donor by the university who provided the data, I directly compared the study's predicted values to the third party company's predicted values for both donor likelihood and target gift amount. In order to make the predictions comparable, I completed two additional calculations. First, since the third party

company used a scoring system based out of 1,000, but I used a scoring system based out of 100, I divided the company's likelihood scores by 10. Second, since the third party company provided a target gift range rather than a single threshold, I computed the median of the company's range.

To seek further validity, for donor likelihood, I assigned a value of one for any prediction that was greater than 50 (percent likely to give) and correlated with an alumnus/na who was a donor. Likewise, I assigned a value of one for any prediction that was less than 50 (percent likely to give) and correlated with an alumnus/na who was a non-donor. I assigned all other predictions a value of zero, as they did not correctly predict donor status. To obtain an overall accuracy, I calculated the mean and standard deviation for both my study's accuracy and the third party company's accuracy. For target gift amount, I subtracted the predicted value from the actual value. After taking the absolute value, I again calculated the mean and standard deviation to determine my study's accuracy as compared to the third party company's accuracy.

**Study Limitations**

My study suffers from several limitations. First, even though the study's university shares numerous similarities with the CSU system as a whole, the study's generalizability is not as strong as if it collected samples from more than one university.

Second, the data may be subject to some inaccuracies including human error in keying gifts into the database and human error in extracting the information from the database. In addition, the data does not consistently track some integral information that would have been helpful to include in the regression model such as student GPA, student Greek affiliation, scholarship recipients, marital status, number of children, and employment information.

Third, the zip codes used to determine the explanatory variables of both potential wealth and distance from campus did not always correspond with an alumnus/na's home address.

Depending on the preferred mailing address as indicated by the alumnus/na, the zip code may have denoted a business or PO Box address. This may slightly skew the results by overestimating or underestimating an individual's distance from campus as well as median household income.

Lastly, due to lack of sufficient time and resources, I did not conduct face-to-face interviews with staff from University Advancement or staff from the third party research company, even though that would have been my preference. This is because the qualitative component of face-to-face interviews would have provided further contextual information about the usefulness of this study.

# Chapter 4

RESULTS

This chapter presents the results from the study's quantitative and comparative research. The first section features the statistically significant results from the study's two-part regression analysis. The first section also explains how I used the regression results to create a predictive forecast model. The second section presents the study's comparative analysis results, identifying key differences between my own predictive modeling and the predictive modeling of a third party research company.

## Quantitative Analysis Results

As described in Chapter 3, I used a two-part regression analysis to represent the two-part decision of making a gift. The first decision involves choosing whether to donate. This initial decision of yes or no corresponds with the logistic regression model and the dependent dummy variable of donor versus non-donor. If the alumnus/na decides to make a gift, the second decision involves determining the amount to donate. This secondary decision of how much corresponds with the OLS regression model and the dependent continuous variable of total amount given.

### *Logistics Regression Results*

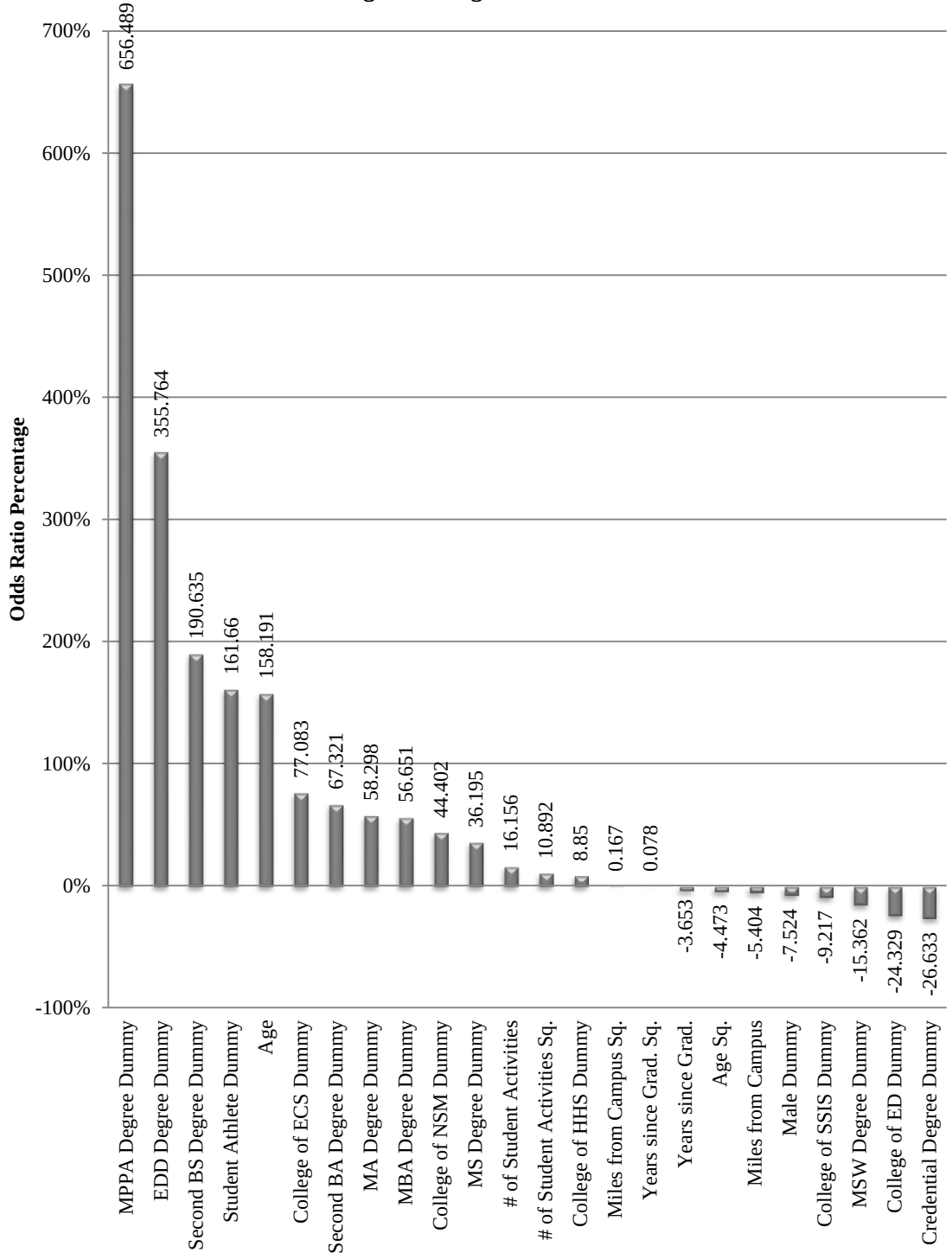
Table 3 features the logistic regression results. As depicted, the model identified 24 statistically significant results at the 90% confidence level or better in a two-tailed test. For the continuous variables of miles from campus, age, years since graduation, and number of student activities, I determined both the original variable and the squared variable were statistically significant. Thus, I detected a nonlinear effect and kept the variables in my findings. While I also included the original and squared variables for median household income, I identified neither as statistically significant.

In addition to the statistical significance, Table 3 provides the odds ratio calculation to determine the percent increase in likelihood that the dependent variable of donors versus non-donor moves from zero to one after a one-unit increase in any one of the given independent variables. Figure 6 depicts the results graphically, by organizing the statistically significant variables in order of magnitude.

Overall, most of the logistic results confirm the findings of previous research. Likewise, most of the findings are consistent with the study's expected effects. In terms of magnitude, the results indicate that holding all other explanatory variables constant, Master in Public Policy and Administration alumni are 656.489% more likely to be a donor compared to Bachelor of Arts alumni. The next greatest positive influences on donor likelihood were as follows—Doctorate in Education degree 355.764%; second Bachelor of Sciences degree 190.635%; student athlete 16.156%; age (for every 10-year increase) 158.191%;  College of Engineering and Computer Science 77.083%; Second Bachelor of Arts degree 67.321%; Master of Arts degree 58.298%; Master of Business Administration degree 56.651%; College of Natural Sciences and Mathematics 44.402%; Master of Sciences degree 36.195%; number of student activities 16.156%; and College of Health and Human Services 8.85%. While the negative influences on donor likelihood were as follows—miles from campus (for every 100-mile increase away from campus) -5.404%; male -7.524%; College of Social Sciences and Interdisciplinary Studies -9.217%; Master of Social Work degree -15.362%; College of Education Degree -24.329%; and Credential degree -26.633%. When analyzing these percentages, it is important to remember the study's baseline constant for its dummy variables from which to compare the findings. The baseline constant consisted of the following: Bachelor of Arts degree, College of Arts and Letters, female, and non-student athlete.

| Table 3: Logistic Results | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Odds Ratio** | **Natural Exponent** | **(Natural Exponent -1) * 100** | **Robust Std. Error** | **Significance** | **90% Confidence Level Lower Bound** | **90% Confidence Level Upper Bound** |
| BVE Degree Dummy | 0.344 | 1.411 | 41.167 | 0.225 | 0.126 | -0.025 | 0.715 |
| MA Degree Dummy | 0.459 | 1.582 | 58.298 | 0.048 | 0.000*** | 0.379 | 0.538 |
| MBA Degree Dummy | 0.448 | 1.566 | 56.651 | 0.091 | 0.000*** | 0.297 | 0.600 |
| MM Degree Dummy | -0.369 | 0.691 | -30.895 | 0.596 | 0.535 | -1.35 | 0.611 |
| MPPA Degree Dummy | 2.023 | 7.564 | 656.489 | 0.162 | 0.000*** | 1.756 | 2.290 |
| MS Degree Dummy | 0.308 | 1.361 | 36.195 | 0.057 | 0.000*** | 0.214 | 0.403 |
| MSW Degree Dummy | -0.166 | 0.846 | -15.362 | 0.092 | 0.070* | -0.318 | -0.015 |
| EDD Degree Dummy | 1.516 | 4.557 | 355.764 | 0.504 | 0.003*** | 0.686 | 2.346 |
| Second BA Degree Dummy | 0.514 | 1.673 | 67.321 | 0.156 | 0.001*** | 0.257 | 0.771 |
| BS Degree Dummy | 0.000 | 0.999 | -0.033 | 0.037 | 0.993 | -0.061 | 0.061 |
| Second BS Degree Dummy | 1.066 | 2.906 | 190.635 | 0.175 | 0.000*** | 0.778 | 1.355 |
| Credential Degree Dummy | -0.309 | 0.733 | -26.633 | 0.077 | 0.000*** | -0.437 | -0.182 |
| College of Business Administration Dummy | 0.023 | 1.024 | 2.403 | 0.048 | 0.625 | -0.056 | 0.103 |
| College of Education Dummy | -0.278 | 0.756 | -24.329 | 0.046 | 0.000*** | -0.354 | -0.202 |
| College of Engineering and Computer Science Dummy | 0.571 | 1.77 | 77.083 | 0.052 | 0.000*** | 0.485 | 0.657 |
| College of Health and Human Services Dummy | 0.084 | 1.088 | 8.85 | 0.042 | 0.044** | 0.015 | 0.154 |
| College of Natural Sciences and Mathematics Dummy | 0.367 | 1.444 | 44.402 | 0.047 | 0.000*** | 0.289 | 0.445 |
| College of Social Sciences and Interdisciplinary Studies Dummy | -0.096 | 0.907 | -9.217 | 0.033 | 0.004*** | -0.151 | -0.042 |
| Male Dummy | -0.078 | 0.924 | -7.524 | 0.021 | 0.000*** | -0.113 | -0.042 |
| Miles from Campus in 100 Mile Increments | -0.055 | 0.945 | -5.404 | 0.004 | 0.000*** | -0.062 | -0.048 |
| Miles from Campus Squared in 100 Mile Increments | 0.001 | 1.001 | 0.167 | 0.000 | 0.000*** | 0.001 | 0.001 |
| Median Household Income in $10,000 Increments | 0.003 | 1.003 | 0.371 | 0.018 | 0.845 | -0.027 | 0.034 |
| Median Household Income in $10,000 Increments Squared | 0.000 | 0.999 | -0.052 | 0.001 | 0.654 | -0.002 | 0.001 |
| Age in 10 Year Increments | 0.948 | 2.581 | 158.191 | 0.057 | 0.000*** | 0.854 | 1.043 |
| Age Squared in 10 Year Increments | -0.045 | 0.955 | -4.473 | 0.004 | 0.000*** | -0.053 | -0.037 |
| Years since Graduation | -0.037 | 0.963 | -3.653 | 0.003 | 0.000*** | -0.043 | -0.031 |
| Years since Graduation Squared | 0.000 | 1.000 | 0.078 | 0.000 | 0.000*** | 0.000 | 0.000 |
| Student Athlete Dummy | 0.961 | 2.616 | 161.660 | 0.058 | 0.000*** | 0.866 | 1.057 |
| Number of Student Activities | 0.149 | 1.161 | 16.156 | 0.057 | 0.009*** | 0.054 | 0.244 |
| Number of Student Activities Squared | 0.103 | 1.108 | 10.892 | 0.026 | 0.000*** | 0.059 | 0.147 |
| **# of Observations** | **195,495** | **Correlation is significant with 90% confidence*<br>***Correlation is significant with 95% confidence*<br>****Correlation is significant with 99% confidence* | | | | | |
| **Pseudo R-Squared** | **0.080** | | | | | | |
| **# of Significant Results** | **24** | | | | | | |

**Figure 6: Logistic Results**



### *Count R-Squared*

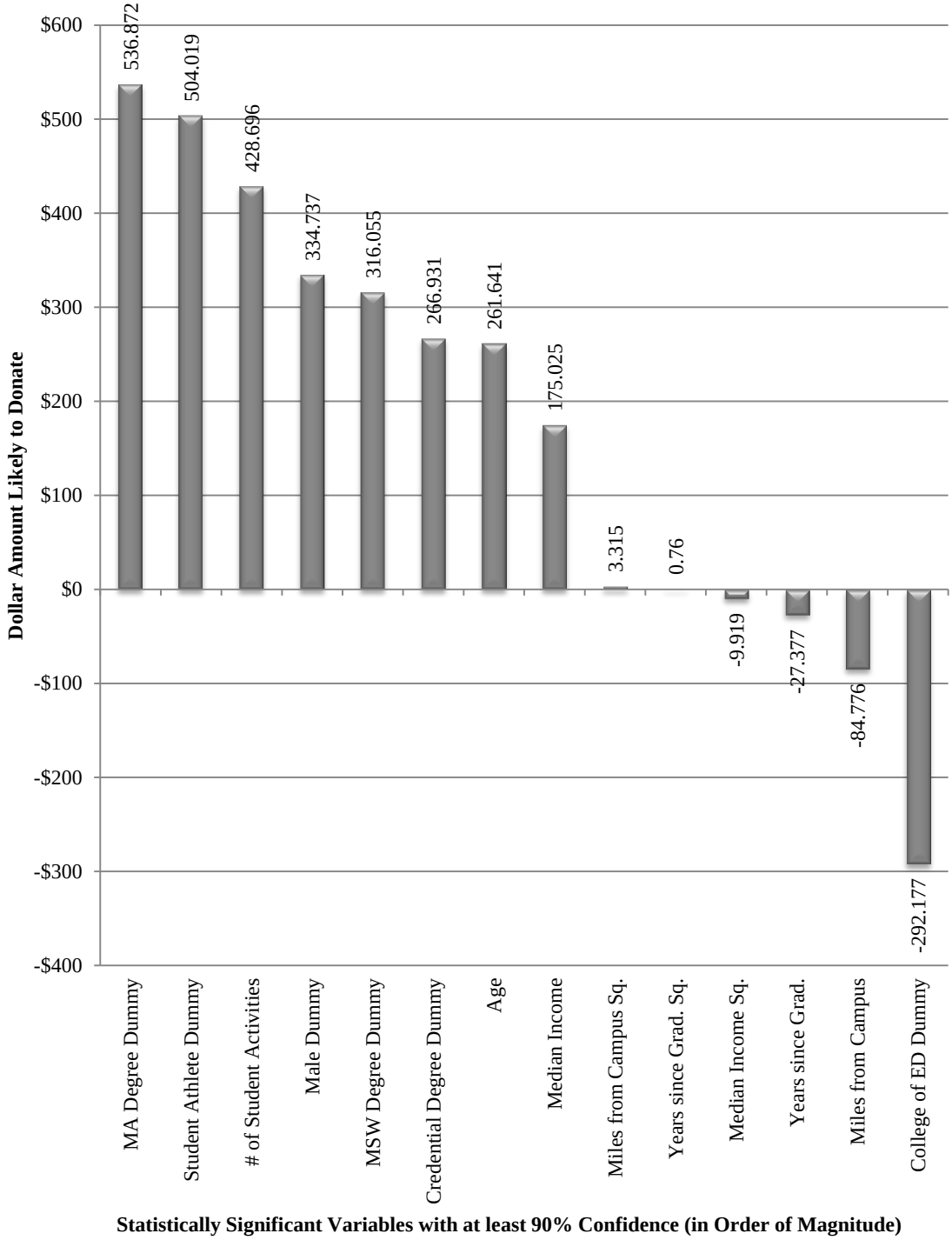
In order to understand how accurately the logistic regression model predicted whether an alumnus/na is a donor versus non-donor, I conducted a count R-squared calculation. The count R-squared value is equal to the number of correct predictions divided by the total number of observations. The results indicated that the logistic regression analysis correctly predicted the donor dummy variable 45.07% of the time. While this percentage is somewhat low, of the 195,495 observations, the logistic regression analysis correctly predicted the non-donor dummy variable 82.74% of the time. Ultimately, the model's overall accuracy was respectable, correctly predicting donor status 80.23% of the time.

### *Ordinary Least Squares (OLS) Regression Results*

Once an alumnus/na makes a gift, the OLS regression seeks to predict those who are likely to give higher amounts. Table 4 presents the results using data from only those who donated. As shown, the model identified 14 statistically significant variables at the 90% confidence level or better for a two-tailed test. Since the logistic model already detected a nonlinear effect for the continuous variables of miles from campus, age, years since graduation, and number of student activities, the study kept them in the model. Conversely, while the logistic model did not detect a nonlinear effect for median household income, the OLS model did by finding both the original and squared values to be statistically significant. Thus, the study kept that variable in the model as well.

| Table 4: OLS Results | | | | | |
|---|---|---|---|---|---|
| | **Coefficient** | **Robust Std. Error** | **Significance** | **90% Confidence Level Lower Bound** | **90% Confidence Level Lower Bound** |
| BVE Degree Dummy | 148.960 | 105.608 | 0.158 | -24.749 | 322.67 |
| MA Degree Dummy | 536.872 | 96.212 | 0.000*** | 378.617 | 695.128 |
| MBA Degree Dummy | -171.616 | 216.188 | 0.427 | -527.214 | 183.981 |
| MM Degree Dummy | -119.564 | 195.734 | 0.541 | -441.518 | 202.389 |
| MPPA Degree Dummy | -75.705 | 77.865 | 0.331 | -203.782 | 52.372 |
| MS Degree Dummy | 181.825 | 146.327 | 0.214 | -58.86 | 422.512 |
| MSW Degree Dummy | 316.055 | 152.629 | 0.038** | 65.002 | 567.108 |
| EDD Degree Dummy | -130.605 | 123.982 | 0.292 | -334.539 | 73.327 |
| Second BA Degree Dummy | 64.223 | 120.974 | 0.595 | -134.761 | 263.208 |
| BS Degree Dummy | 162.853 | 181.089 | 0.368 | -135.011 | 460.718 |
| Second BS Degree Dummy | 203.878 | 149.921 | 0.174 | -42.720 | 450.478 |
| Credential Degree Dummy | 266.931 | 108.9 | 0.014** | 87.806 | 446.057 |
| College of Business Administration Dummy | 147.626 | 221.992 | 0.506 | -217.518 | 512.771 |
| College of Education Dummy | -292.177 | 101.518 | 0.004*** | -459.16 | -125.194 |
| College of Engineering and Computer Science Dummy | 6.658 | 182.343 | 0.971 | -293.269 | 306.585 |
| College of Health and Human Services Dummy | -181.176 | 140.105 | 0.196 | -411.629 | 49.277 |
| College of Natural Sciences and Mathematics Dummy | 237.214 | 174.903 | 0.175 | -50.475 | 524.905 |
| College of Social Sciences and Interdisciplinary Studies Dummy | 29.389 | 80.988 | 0.717 | -103.824 | 162.602 |
| Male Dummy | 334.737 | 50.182 | 0.000*** | 252.194 | 417.28 |
| Miles from Campus in 100 Mile Increments | -84.776 | 24.572 | 0.001*** | -125.193 | -44.358 |
| Miles from Campus in 100 Mile Increments Squared | 3.315 | 1.252 | 0.008*** | 1.254 | 5.376 |
| Median Household Income in $10,000 Increments | 175.025 | 37.281 | 0.000*** | 113.702 | 236.347 |
| Median Household Income in $10,000 Increments Squared | -9.919 | 2.119 | 0.000*** | -13.405 | -6.433 |
| Age in 10 Year Increments | 261.641 | 128.922 | 0.042** | 49.583 | 473.699 |
| Age in 10 Year Increments Squared | -18.111 | 12.174 | 0.137 | -38.137 | 1.913 |
| Years since Graduation | -27.377 | 10.832 | 0.011** | -45.195 | -9.559 |
| Years since Graduation Squared | 0.760 | 0.212 | 0.000*** | 0.410 | 1.110 |
| Student Athlete Dummy | 504.019 | 192.569 | 0.009*** | 187.269 | 820.768 |
| Number of Student Activities | 428.696 | 164.449 | 0.009*** | 158.201 | 699.191 |
| Number of Student Activities Squared | 8.241 | 33.200 | 0.804 | -46.369 | 62.852 |
| **# of Observations** | **11,848** | **Correlation is significant with 90% confidence*<br>***Correlation is significant with 95% confidence*<br>****Correlation is significant with 99% confidence* | | | |
| **R-Squared** | **0.029** | | | | |
| **Adjusted R-Squared** | **0.027** | | | | |
| **# of Significant Results** | **14** | | | | |

**Figure 7: OLS Results**



To depict the magnitude of the OLS findings, Figure 7 displays the results in a bar graph. In most instances, the results corroborate previous research and assumptions of expected effects. The model identified Master of Arts alumni as the most likely to make the largest gift, predicting that, holding all other explanatory variables constant, their average gift is $536.87 higher than the based used of Bachelor of Arts alumni. To provide further context, Table 5 lists all of the Master of Arts and Master of Sciences majors offered by the study's university of focus. Similar to previous studies, I decided that including major as a separate variable was too granular and that the variables of college as well as type of degree were sufficient in order to capture the effect of academic discipline.

**Table 5: Master of Arts and Master of Sciences Majors**

| **Master of Arts Majors** | **Master of Sciences Majors** |
|---|---|
| Anthropology | Biological Sciences (MS, MA) |
| Art Studio | Business Administration |
| Biological Sciences (MS, MA) | Chemistry |
| Child Development | Civil Engineering |
| Communication Studies | Computer Engineering |
| Economics | Computer Science |
| Education - Special Education, Rehabilitation, School Psychology (MA, MS) | Counseling |
| Education - Teacher Education | Criminal Justice |
| Education (Bilingual/Multicultural) | Education - Special Education, Rehabilitation, School Psychology (MA, MS) |
| Education Leadership and Policy Studies | Electrical & Electronic Engineering |
| English | Kinesiology |
| Government | Marine Sciences |
| History | Mechanical Engineering |
| Humanities | Nursing |
| Mathematics | Recreation, Parks and Tourism Administration |
| Psychology | Special Major (MA, MS) |
| Sociology | Speech Pathology |
| Spanish | Urban Land Development |
| Special Major (MA, MS) | |
| Teaching English to Speakers of Other Languages (TESOL) | |

The next greatest gift amounts had to do with student involvement. The model found that student athletes and students who participated in at least one on campus activity were more likely to give $504.02 and $428.70, respectively.

Per previous research, the study found that for every 10-year increase in age, alumni were likely to give $261.64 more. Likewise, the results predicted that for every $10,000 increase in median household income, the average alumnus/na donated $175.03 more. Lastly, for every 100-mile increase in distance from campus, the average donor gave -84.78 less.

***Predictive Modeling***

As explained in Chapter 3, I used the regression results to create a forecast model to predict both donor likelihood and target gift amount. Table 6 features two sets of 10-samples illustrating how the predicted donor likelihood and target gift amount forecasts can help inform solicitation decisions. The first two columns demonstrate that of the 10 non-donors, the model predicts that all 10 are more than 50% likely to give. The accompanying three columns show that of the 10 donors, the predictive model estimates a far greater target gift amount than the donor actually gave. These examples highlight the many opportunities offered by using such predictive modeling.

| Table 6: Sample of Predictive Modeling Forecasts | | | | | |
|---|---|---|---|---|---|
| **Predicted Donor Likelihood** | **Donor Status** | **Predicted Target Gift** | **Donor Status** | **Actual Gift** | **Predicted Target Gift – Actual Gift** |
| 79% | Non-Donor | $2,561.14 | Donor | $100 | $2,461.14 |
| 70.5% | Non-Donor | $2,527.18 | Donor | $100 | $2,427.18 |
| 69.8% | Non-Donor | $2,589.66 | Donor | $258 | $2,331.66 |
| 67.1% | Non-Donor | $2,315.28 | Donor | $30 | $2,285.28 |
| 67.1% | Non-Donor | $2,305.18 | Donor | $25 | $2,280.18 |
| 67.1% | Non-Donor | $2,299.2 | Donor | $20 | $2,279.2 |
| 65.6% | Non-Donor | $2,364.72 | Donor | $100 | $2,264.72 |
| 65.2% | Non-Donor | $2,274.29 | Donor | $20 | $2,254.29 |
| 64.1% | Non-Donor | $2,411.81 | Donor | $200 | $2,211.81 |
| 64.1% | Non-Donor | $2,182.2 | Donor | $30 | $2,152.2 |

### *Quantitative Research Conclusion*

In analyzing the results of both the logistic and OLS regressions, there is evidence to suggest that after controlling for other variables, there are certain predictive characteristics that make an alumnus/na more likely to be a donor and more likely to donate higher amounts. Nonetheless, the quantitative analysis does not provide any context for how useful or valid these models will be if implemented by universities to guide their fundraising strategies. Thus, a comparative analysis is necessary.

## Comparative Analysis Results

Given the need for public universities to fundraise, it is now commonplace for CSU institutions to hire third party research companies to assist with donor analysis. Much of the analysis entails conducting regressions and creating predictive models similar to the methods described above.

The primary difference is that such companies include a much more thorough examination of external wealth indicators that are difficult to collect and synthesize into one

dataset. Some examples include publically held assets, political donations, credit history, available credit balance, credit card transactions, subscriptions to business/finance magazines, and whether the donor's children attend private K-12 school.

In addition, the third party companies typically include information from other research databases. For instance, the company evaluated for this study incorporated NOZASearch predictors in its model. NOZASearch collates charitable giving information from publicly available internet sources into one searchable database. For the purposes of this study, what was unclear, however, was how the third party company determined the effect of charitable giving on alumni giving. Charitable giving does not necessarily equate to an increased likelihood of alumni giving. Indeed, it may have the opposite effect, as many individuals donate a set amount to charity each year that they are not likely to exceed.

Thus, with the hope of ascertaining both the validity the third party company's research as well as my own, I conducted a comparative analysis. Tables 7 and 8 feature 10 random samples to provide further illustration.

| Table 7: Sample of Donor Likelihood Comparative Analysis | | | | |
|---|---|---|---|---|
| **Study's Donor Likelihood Prediction** | **Third Party's Donor Likelihood Prediction** | **Donor Status (1=Yes; 0=No)** | **Did my study get it right? (1 if prediction > 50 and gave or prediction < 50 and did not give; else=0)** | **Did the other study get it right?** |
| 50.3 | 50.6 | 1 | 1 | 1 |
| 12.1 | 53.7 | 1 | 0 | 1 |
| 7.4 | 93.2 | 1 | 0 | 1 |
| 19.2 | 84.3 | 1 | 0 | 1 |
| 16.2 | 50.6 | 0 | 1 | 0 |
| 14.4 | 44.2 | 0 | 1 | 1 |
| 56.3 | 49.2 | 0 | 0 | 1 |
| 13.5 | 100 | 1 | 0 | 1 |
| 67.1 | 100 | 1 | 1 | 1 |
| 2.7 | 50.6 | 0 | 1 | 0 |
| | | **10-Sample Mean** | **0.5** | **0.8** |
| | | **10-Sample Standard Deviation** | **0.527** | **0.422** |
| | | **Overall Mean** | **0.965** | **0.708** |
| | | **Overall Standard Deviation** | **0.184** | **0.455** |

| Table 8: Sample of Target Gift Amount Comparative Analysis | | | | |
|---|---|---|---|---|
| **Study's Target Gift Prediction** | **Third Party's Target Gift Prediction** | **Actual Amount Given** | **Absolute Value of Study's Target Gift Prediction – Actual Amount Given** | **Absolute Value of Third Party's Target Gift Prediction – Actual Amount Given** |
| $2,336.25 | $751.00 | $200.00 | $2,136.25 | $550.50 |
| $(30.09) | $76.00 | $35.00 | $65.09 | $40.50 |
| $57.96 | $376.00 | $100.00 | $42.04 | $275.50 |
| $56.19 | $26.00 | $15.00 | $41.19 | $10.50 |
| $954.58 | $76.00 | $45.00 | $909.58 | $30.50 |
| $215.92 | $76.00 | $25.00 | $190.92 | $50.50 |
| $820.47 | $376.00 | $25.00 | $795.47 | $350.50 |
| $20.81 | $26.00 | $110.00 | $89.19 | $84.50 |
| $108.50 | $76.00 | $45.00 | $63.50 | $30.50 |
| $723.99 | $17,501.00 | $2,620.00 | $1,896.01 | $14,880.50 |
| | | **10-Sample Mean** | **$622.92** | **$1,630.40** |
| | | **10-Sample Standard Deviation** | **$802.38** | **$4,659.07** |
| | | **Overall Mean** | **$9.92** | **$129.20** |
| | | **Overall Standard Deviation** | **$131.28** | **$483.98** |

The overall results found that the mean accuracy of my study's donor likelihood was 0.965 and the standard deviation was 0.184. The third party company's mean accuracy for donor likelihood was 0.708 and the standard deviation was 0.455. While the mean accuracy for my study's target gift amount was $9.92 and the standard deviation was $131.28. The third party company's mean accuracy for target gift amount was $129.20 and the standard deviation was $483.98. For donor likelihood, the higher mean accuracy and lower standard deviation suggest that my study's predictive forecast model is more precise. Likewise, the lower mean accuracy and the lower standard deviation for target gift amount are also indicative that my predictive forecast model is more precise. The problem is that being more precise does not necessarily offer universities a way to grow their donor pipeline.

In this way, it is difficult to draw many concrete conclusions. Such findings do indicate, however, that the results are reasonably consistent with each other. One inconsistency was that the third party company's prediction for donor likelihood was typically higher than that of the study. Most of the differences revolved around non-donors. Another inconsistency was that for higher-end donors, the third party company's predictions were usually several thousand dollars higher. Yet for low-end donors, the study's predictions were usually several hundred dollars higher. The differences likely lie in the multitude of external wealth variables that the third party company used. As mentioned above, however, I question the validity of some of those predictors such as charitable giving history because it is unclear whether that has a positive or negative impact on alumni giving.

# Chapter 5

KEY FINDINGS AND RECOMMENDATIONS

In order to implement the most effective and efficient fundraising strategies, the CSU system needs to gain a comprehensive understanding of the factors that influence alumni giving. As noted in Chapter 1, the CSU system has endured major cutbacks over the past several decades due to declining state general fund support. Even though California's current budget situation is not as dire as years previously, it is important that the CSU find alternative sources of funding.

Contributing to an already extensive body of research, this study hopes to offer some insight relevant to California, public, non-research based institutions. By conducting a two-part regression analysis, creating a predictive forecast model, and engaging in comparative research, the study identified several findings relevant to the CSU system. In this final chapter, I review key findings and offer possible explanations. Applying the findings, I then make several recommendations for how CSU institutions can improve their fundraising strategies. Lastly, I examine the study's limitations and identify areas for future research.

## Key Findings

### *Educational Attainment*

Both regression models equated higher educational attainment with an increased propensity for alumni giving. Indeed, for the logistic regression, 7 out of the 13 positive statistically significant variables represented advanced degrees. The two degrees the study found to have a particularly large impact on donor likelihood were the Master of Public Policy and Administration as well as the Doctorate in Education. Alumni who graduated with those degrees increased donor likelihood by 656.489% and 355.764%, respectively. This is a profound magnitude compared to the other variables. While it is difficult to determine to the exact cause,

both programs inherently appeal to students interested in public service. Moreover, much of the curriculum involves teaching students how to contribute to the public good. In this way, the altruism learned as students may translate into generosity as alumni.

Another similarity is that both programs structure their classes using a cohort model with relatively small class sizes. The intimate settings may foster a sense of comradery among classmates, which may generate a sense of overall fondness toward the university. Interestingly, the structure of both programs is to accommodate working professionals. Thus, most of the instruction occurs on nights or weekends when campus is empty and most buildings are closed. One would assume this could negatively affect the students' perception of the university. Since the study found the contrary, this suggests the power of cohort modeling, and the notion that rather than the quality of physical time spent on campus, the quality of the time spent in class may serve as a stronger indicator of affinity towards one's alma mater.

As for the OLS results, the study found that, holding all other explanatory variables constant, Master of Arts alumni donors were likely to give $536.87 more than Bachelor of Arts alumni. This result represented the highest dollar amount for the total amount given dependent variable. It is not surprising given the findings of previous research. Most studies corroborate the notion that graduate alumni are more likely to obtain higher earning occupations and thus are more likely to be generous alumni donors.

It was interesting, however, that I did not find the Master of Sciences degree variable to be statistically significant. Compared to the Master of Arts degree, the Master of Sciences degree includes several majors that are associated with lucrative occupations such as computer science and accounting.

### *Academic Disciplines*

In addition to public policy and education, the study identified two other academic disciplines as statistically significant predictors of alumni philanthropy. The first was holding a degree from a program in the College of Engineering and Computer Science. The logistic regression found that, holding all other explanatory variables constant, alumni from that college were 182.343% more likely to be donors. This finding is consistent with past research that has specifically noted that engineering alumni are more likely to give because they typically earn good salaries and have more discretionary income.

The second significant finding related to academic discipline is for Master of Social Work alumni. The OLS regression found that of the social work alumni who were donors, they were likely to give $316.06 more than Bachelor of Arts alumni, holding other variables constant. This is a substantial amount, particularly for annual fund donors. Here as well, the disciplinary emphasis on altruism may have encouraged alumni giving.

The OLS regression also identified two academic disciplines associated with less alumni giving, which included the College of Education and the College of Health and Human Services. The study estimated that, holding all other explanatory variables constant, College of Education alumni donors were likely to give $292.18 less. Although the overarching finding for the College of Education may have been negative, it is important to note that in specific instances such as with the Doctorate of Education I identified pockets of increased giving. Another example of this occurred with Credential alumni. The OLS regression found that such alumni were likely give $266.93 more than Bachelor of Arts alumni. I found this surprising, however, primarily because most of the credential programs at the study's university are two to three semesters long. Two to three semesters is a brief period to foster a sense of connection and belonging, compared to the

eight to twelve semesters that an average Bachelor of Arts undergraduate student spends on campus.

For the College of Health and Human Services, the study estimated that, holding all other explanatory variables constant, the college's donors were likely to give $181.18 less. An important caveat to emphasize is that I decided not to include Master of Physical Therapy alumni and Doctorate of Physical Therapy alumni in my dataset as the programs underwent a transition during the five-year period of the study. This could have played a role in the negative finding.

***Student Involvement***

Another set of key findings relate to student involvement. My results confirm past literature correlating a positive student experience with an increased likelihood of alumni giving. Of particular note was that unlike any other variables, both the logistic and OLS models found the student athlete dummy variable and the number of student activities variable to be statistically significant.

The logistic regression found that, holding all other explanatory variables constant, student athletes were 161.660% more likely to give. Likewise, the study found that students involved in at least one on campus activity were 16.156% more likely to give. The OLS regression yielded similar results finding that student athlete donors were likely to give $504.02 more and actively involved students were likely to give $428.70 more.

Given the magnitude of these findings, I can assume that a student's experience positively influences his or her perception of the university. While not a new notion, it is significant that the study validated these findings for a non-research based institution.

### *External Wealth Indicators*

The final key finding involves the external wealth indicators included in the third party company's predictive modeling. After conducting the comparative analysis, I quickly realized that the study's model focused much more on capacity to give rather than the propensity to give. This is a noteworthy distinction, particularly when analyzing alumni from the CSU system.

Unlike private, research-based institutions that have an established tradition of alumni philanthropy, CSU schools may not be as successful focusing solely on wealthy alumni. Unfortunately, most CSU schools have to overcome the additional challenge of convincing their alumni of the need and value in donating. This is primarily due the stigma of being a public university that receives state funding. Such challenges add a layer of complexity that the third party company's model of external wealth indicators does not necessarily address. In this way, my study's inclusion of more internal and nuanced variables may provide some helpful insight.

## Recommendations

### *Create a more robust database*

At the core of any effective fundraising effort is a robust database. Given the lack of reliable data tracked by the university of focus for certain variables, I recommend that CSU Advancement Offices make their alumni databases a priority.

To make their databases a priority, leadership must carefully evaluate their Advancement Services Offices to ensure that they are not only sufficiently staffed, but also that they possess the necessary resources to bolster data collection and ensure data integrity. This may include a thorough analysis of University Advancement's organizational structure and a possible reorganization. At present, it is becoming more commonplace for Advancement Services Offices to become their own division as opposed to being a subset of the Development Office. Such a

change also means that the Advancement Services Director becomes an Associate Vice President (AVP) and that the Advancement Services AVP reports directly to the Vice President for University Advancement. Institutions, which have implemented this kind of reorganization, report many benefits to having someone who possesses a technical expertise participate in managerial discussions. Often it can save time and effort by providing realistic expectations about the technological capacity of an idea or project.

The new role as an AVP also comes with a myriad of new responsibilities much of which revolve around teaching colleagues about the importance of maintaining a robust alumni database and interfacing more with campus departments. For example, the Advancement Services AVP should play a more active role in collaborating with the Student Affairs Office to ensure a successful transfer of important data elements from the student database into the alumni database. As my results indicated, tracking student involvement is an important predicator for alumni giving. If the research had a more detailed account of student involvement, the study could have provided better recommendations.

For some Advancement Offices a shift in organizational culture is also necessary. Within the Advancement Services Offices, this means reassessing how to improve current processes and procedures. Advancement Services employees must determine the extent to which they are performing unnecessary and sometimes counterproductive functions. Examples include maintaining manual check/gift logs and limiting biographical updates to only a small group of users. Field experts consider these practices obsolete. One recommendation would be to ensure that Advancement Services staff members receive professional development opportunities to help them learn and embrace modern and cost saving technologies.

Outside of the Advancement Services Office, it is important that all campus staff learn about the alumni database and care about data integrity. Data sharing should also be encouraged and departments should not feel the need to maintain their own lists of alumni contact information. While this culture shift may represent a new way of thinking, it is an essential step toward ensuring a robust database.

***Implement individualized strategies to target key subpopulations***

Another recommendation includes revising segmentation strategies for annual fund calling and direct mail solicitations. Whenever possible, I encourage smaller, more individualized scripting and messaging. Based on the study's findings, I suggest starting with the key subpopulations identified by the regression analysis. For example, the Annual Fund Analyst should work with the Department of Public Policy and Administration to create a specific calling script and direct mail appeal that speaks to the unique experience of those alumni. While difficult, a key element would be to acknowledge past giving, if applicable, and elaborate how the donations helped the Department achieve its intended objective or mission.

In addition to the various academic disciplines and types of degrees, the Annual Fund Analyst should experiment with segmentation variations related to age, years since graduation, and proximity to campus. Since the study also found these variables to be statistically significant factors, it would be worthwhile to tailor some appeals based on those subpopulations. For age, perhaps the Annual Fund Analyst could further subdivide the appeals by the four main generations of Matures, Baby Boomers, Generation X, and Generation Y or Millennials. For proximity to campus, the appeals could acknowledge their closeness to campus by inviting them to upcoming events or acknowledge their remoteness by suggesting ways to reconnect via the online alumni community or social media.

I also recommend adopting the predictive modeling strategy created by the study. Thus, in addition to working with each key subpopulation, the Annual Fund Analyst should focus on calling and mailing to the non-donors who received a high donor likelihood score and the donors whose predicted target gift amount is significantly higher than the actual amount given.

### *Develop strategies to track the validity and usefulness of predictive modeling*

A final recommendation is to develop internal strategies to track the validity and usefulness of the predictive modeling provided by third party companies. With the advent of these research companies, it is imperative that the CSU devise a way to analyze its value. Does their predictive modeling increase revenue each year? Does their predictive modeling grow a loyal and active donor base? These questions are significant, but they are not easy to answer. Indeed, it will require careful consideration particularly by the Annual Giving Office to monitor how it uses the company's information and whether it generates the results that it promises.

On a more macro level, I question whether the third party research company truly understands or captures the uniqueness of the CSU system. As stated previously, CSU institutions face a distinctive challenge as public, non-research based institutions. Rather than focusing so heavily on alumni capacity to give, the CSU system may benefit by first focusing on alumni propensity to give.

## Study Limitations

As mentioned at the end of Chapter 3, this study suffered from several limitations.

### *Quantitative Analysis Limitations*

Most notably, even though the study's university shared numerous similarities with the CSU system as a whole, the study's generalizability is not as strong as if it collected samples from more than one university. While most studies identified in the literature only focused on one

institution, some studies collated data from multiple institutions, which offered important generalizable findings.

In addition, the dataset was not as robust as desired. The data did not consistently track some integral information that would have been helpful. Thus, omitted variable bias is likely present within the study's regression. Furthering underscoring this, the count R-squared results indicate that the logistic regression model accurately predicted donors 45.07% of the time and predicated non-donors 82.74% of the time. Such a low accuracy for donors reveals that there are vital pieces of information missing. Conversely, the model is helpful in determining which alumni are not likely to give, which is also valuable information.

### *Comparative Analysis Limitations*

Due to limited time and resources, I did not conduct qualitative research to gain a better understanding of the third party company's research methods. I would have liked to conduct face-to-face interviews with Advancement Services staff or representatives from the contracted analytics company. This would have provided important contextual information from which to draw better comparisons. I am particularly interested in learning more about the company's methodology and how the company collated the various information that they included in their predictive models.

## Future Research

Based on my study and the limitations identified, my first recommendation for future research is to further explore third party analytics companies and their current prevalence as the primary source of alumni donor analysis. While my study attempted to examine this phenomenon, there is value in delving deeper. Perhaps for fear of losing a competitive edge, the third party companies do not seem to be very forthcoming with publicly sharing their

methodology. Most content posted online is generic and includes no substantive information relevant to statisticians. Thus, I recommend that future researchers work closely with contracted universities to conduct a more thorough analysis on what variables the various companies use in their predictive modeling. It would be interesting to compare the methodologies of several companies and identify major similarities as well as differences.

It would also be worthwhile to conduct a multi-year study, investigating the accuracy of such predictive modeling over time. As discussed in the recommendations section, it is imperative that universities do not blindly accept the predictions of these third party companies as fact. While difficult to measure, particularly given the impact of externalities like economic recessions, further research needs to validate whether contracting a third party research company is a worthwhile investment of a university's time and resources.

**Key Findings and Recommendations Conclusion**

As California's financial commitment to public higher education continues to fluctuate given economic recessions and competing policy priorities, the CSU system faces crucial questions about how best to offer quality higher education that is both affordable and accessible. In hopes of helping the CSU begin to answer such questions, this study aimed to learn more about the influences that cause an alumnus/na to make a financial contribution in the support of the CSU. While this research may not be profound for private, research-based universities, it is significant for CSU institutions in that the results confirm several findings from past literature and validate their applicableness to California, public, non-research based institutions.

In analyzing the results of the study's quantitative and comparative research, there is evidence to suggest that researchers can predict alumni philanthropy. Corroborating past literature, the study overwhelmingly found that the type of degree earned and the number of degrees earned impacted alumni giving. Master, doctoral, and second-degree earners were significantly more likely to be donors. Similarly, student athletes and students who participated in at least one university-sponsored activity were more likely to be donors. In terms of total amount given, the results again substantiated that higher educational attainment and student involvement corresponded with larger gifts. The variables of age, median household income, and proximity to campus also had an effect on total amount given.

When comparing the study's predictions to a third party company's predictions, the analysis revealed that the study's model may lack a robust indicator for high-end donors. Yet for low-end donors, the study may provide a more nuanced prediction that could prove to be helpful for annual funds.

While these findings alone cannot solve the financial challenges faced by the CSU, it does help inform internal decisions about the viability of philanthropic support as a budget coping strategy. Particularly as research predicts a growing economic demand for college-educated workers in California, the CSU needs to consider how it will grapple with the many fiscal obstacles that lie ahead.

# APPENDIX A

| Pairwise Correlation Coefficients | | | | | | | |
|---|---|---|---|---|---|---|---|
| | BVE | MA | MBA | MM | MPPA | MS | MSW |
| BVE Degree Dummy (BVE) | 1 | | | | | | |
| MA Degree Dummy (MA) | -0.0076* | 1 | | | | | |
| MBA Degree Dummy (MBA) | -0.0040* | -0.0194* | 1 | | | | |
| MM Degree Dummy (MM) | - | -0.0045* | - | 1 | | | |
| MPPA Degree Dummy (MPPA) | - | -0.0069* | - | - | 1 | | |
| MS Degree Dummy (MS) | -0.0071* | -0.0341* | -0.0181* | -0.0042* | -0.0065* | 1 | |
| MSW Degree Dummy (MSW) | -0.0047* | -0.0225* | -0.0119* | - | -0.0043* | -0.0210* | 1 |
| EDD Degree Dummy (EDD) | - | - | - | - | - | - | - |
| Second BA Degree Dummy (2BA) | - | -0.0100* | -0.0053* | - | - | -0.0093* | -0.0061* |
| BS Degree Dummy (BS) | -0.0346* | -0.1654* | -0.0879* | -0.0204* | -0.0314* | -0.1549* | -0.1020* |
| Second BS Degree Dummy (2BS) | - | -0.0082* | -0.0044* | - | - | -0.0077* | -0.0051* |
| Credential Degree Dummy (CRED) | -0.0078* | -0.0375* | -0.0199* | -0.0046* | -0.0071* | -0.0351* | -0.0231* |
| CBA Dummy (CBA) | -0.0207* | -0.0981* | 0.1825* | -0.0122* | -0.0188* | -0.0471* | -0.0610* |
| ED Dummy (ED) | 0.1209* | 0.2520* | -0.0335* | -0.0078* | -0.0120* | 0.1009* | -0.0387* |
| ECS Dummy (ECS) | -0.0116* | -0.0551* | -0.0295* | -0.0068* | -0.0106* | 0.2012* | -0.0342* |
| HHS Dummy (HHS) | -0.0191* | -0.0818* | -0.0485* | -0.0113* | -0.0174* | | 0.2451* |
| NMS Dummy (NSM) | -0.0092* | -0.0297* | -0.0233* | -0.0054* | -0.0083* | 0.0040* | -0.0271* |
| SSIS Dummy (SSIS) | -0.0203* | -0.0199* | -0.0383* | -0.0120* | 0.0713* | -0.0898* | -0.0593* |
| Male Dummy (MALE) | -0.0064* | -0.0462* | 0.0373* | - | - | 0.0132* | -0.0604* |
| Miles from Campus (MILES) | - | 0.0242* | 0.0046* | 0.0046* | - | 0.0248* | - |
| Miles from Campus Squared (MILESSQ) | - | 0.0224* | 0.0053* | 0.0041* | - | 0.0201* | - |
| Median Household Income (INC) | -0.0068* | -0.0124* | 0.0328* | - | - | 0.0380* | -0.0246* |
| Median Household Incomes Squared (INCSQ) | -0.0073* | -0.0117* | 0.0343* | - | - | 0.0399* | -0.0222* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Age (AGE)** | 0.0215* | 0.0954* | 0.0109* | -0.0089* | -0.0131* | 0.0048* | 0.0364* |
| **Age Squared (AGESQ)** | 0.0179* | 0.0994* | 0.0076* | -0.0095* | -0.0133* | - | 0.0327* |
| **Years Since Graduation (YEARS)** | -0.0278* | - | -0.0255* | -0.0195* | -0.0253* | -0.0578* | -0.0154* |
| **Years Since Graduation Squared (YEARSSQ)** | -0.0279* | - | -0.0235* | -0.0170* | -0.0208* | -0.0573* | -0.0237* |
| **Student Athlete Dummy (ATH)** | -0.0050* | -0.0187* | -0.0124* | - | -0.0046* | -0.0211* | -0.0148* |
| **Student Activities (SA)** | -0.0080* | -0.0255* | - | - | - | -0.0327* | -0.0217* |
| **Student Activities Squared (SASQ)** | -0.0053* | -0.0181* | - | - | - | -0.0216* | -0.0145* |

**Correlation is statistically significant with 90% confidence*

| Pairwise Correlation Coefficients (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | EDD | 2BA | BS | 2BS | CRED | CBA | ED |
| EDD Degree Dummy (EDD) | 1 | | | | | | |
| Second BA Degree Dummy (2BA) | - | 1 | | | | | |
| BS Degree Dummy (BS) | -0.0113* | -0.0453* | 1 | | | | |
| Second BS Degree Dummy (2BS) | - | - | -0.0373* | 1 | | | |
| Credential Degree Dummy (CRED) | - | -0.0103* | -0.1704* | -0.0085* | 1 | | |
| CBA Dummy (CBA) | -0.0067* | -0.0134* | 0.5304* | -0.0104* | -0.1019* | 1 | |
| ED Dummy (ED) | 0.0394* | -0.0163* | -0.2805* | -0.0138* | 0.5600* | -0.1712* | 1 |
| ECS Dummy (ECS) | -0.0038* | 0.0075* | 0.2426* | - | -0.0572* | -0.1508* | -0.0960* |
| HHS Dummy (HHS) | -0.0062* | 0.0221* | 0.2547* | 0.0597* | -0.0671* | -0.2482* | -0.1580* |
| NMS Dummy (NSM) | - | 0.0109* | 0.0041* | - | -0.0451* | -0.1193* | -0.0760* |
| SSIS Dummy (SSIS) | -0.0066* | -0.0117* | -0.3968* | -0.0219* | -0.1000* | -0.2637* | -0.1679* |
| Male Dummy (MALE) | - | -0.0065* | 0.2147* | -0.0157* | -0.0857* | 0.1292* | -0.1660* |
| Miles from Campus (MILES) | - | - | -0.0152* | -0.0076* | -0.0124* | -0.0109* | -0.0230* |
| Miles from Campus Squared (MILESSQ) | - | - | -0.0147* | -0.0060* | -0.0109* | -0.0071* | -0.0164* |
| Median Household Income (INC) | - | - | 0.0592* | 0.0048* | - | 0.0627* | -0.0191* |
| Median Household Incomes Squared (INCSQ) | - | - | 0.0550* | 0.0038* | -0.0059* | 0.0607* | -0.0211* |
| Age (AGE) | - | - | -0.0804* | -0.0273* | 0.0476* | -0.0179* | 0.0844* |
| Age Squared (AGESQ) | -0.0044* | -0.0067* | -0.0888* | -0.0268* | 0.0346* | -0.0283* | 0.0869* |
| Years Since Graduation (YEARS) | -0.0166* | -0.0336* | -0.0054* | -0.0476* | -0.0533* | 0.0246* | -0.0228* |
| Years Since Graduation Squared (YEARSSQ) | -0.0113* | -0.0346* | -0.0199* | -0.0347* | -0.0832* | 0.0071* | -0.0199* |
| Student Athlete Dummy (ATH) | - | -0.0066* | 0.0076* | -0.0054* | -0.0241* | -0.0089* | -0.0268* |
| Student Activities (SA) | - | -0.0058* | - | -0.0092* | -0.0386* | - | -0.0492* |
| Student Activities Squared (SASQ) | - | -0.0044* | - | -0.0061* | -0.0258* | -0.0054* | -0.0337* |

**Correlation is statistically significant with 90% confidence*

| Pairwise Correlation Coefficients (Continued) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **ECS** | **HHS** | **NSM** | **SSIS** | **MALE** | **MILES** | **MILESQ** |
| **ECS Dummy (ECS)** | 1 | | | | | | |
| **HHS Dummy (HHS)** | -0.1392* | 1 | | | | | |
| **NMS Dummy (NSM)** | -0.0669* | -0.1101* | 1 | | | | |
| **SSIS Dummy (SSIS)** | -0.1479* | -0.2434* | -0.1170* | 1 | | | |
| **Male Dummy (MALE)** | 0.2383* | -0.0623* | 0.0510* | -0.0969* | 1 | | |
| **Miles from Campus (MILES)** | 0.0156* | -0.0128* | 0.0258* | - | 0.0287* | 1 | |
| **Miles from Campus Squared (MILESSQ)** | 0.0106* | -0.0124* | 0.0194* | - | 0.0190* | 0.9388* | 1 |
| **Median Household Income (INC)** | 0.0669* | -0.0225* | -0.0100* | -0.0420* | 0.0212* | 0.0128* | 0.0114* |
| **Median Household Incomes Squared (INCSQ)** | 0.0680* | -0.0237* | -0.0092* | -0.0404* | 0.0219* | 0.0268* | 0.0233* |
| **Age (AGE)** | -0.0147* | -0.0312* | 0.0128* | 0.0051* | 0.1011* | 0.1166* | 0.0849* |
| **Age Squared (AGESQ)** | -0.0245* | -0.0278* | 0.0132* | 0.0118* | 0.1005* | 0.1081* | 0.0782* |
| **Years Since Graduation (YEARS)** | -0.0107* | -0.0369* | 0.0306* | 0.0278* | 0.1449* | 0.1334* | 0.0953* |
| **Years Since Graduation Squared (YEARSSQ)** | -0.0253* | -0.0290* | 0.0396* | 0.0357* | 0.1561* | 0.1134* | 0.0800* |
| **Student Athlete Dummy (ATH)** | -0.0222* | 0.0459* | -0.0097* | -0.0078* | 0.0517* | 0.0048* | - |
| **Student Activities (SA)** | 0.0064* | -0.0345* | 0.0266* | 0.0364* | 0.0248* | 0.0086* | 0.0074* |
| **Student Activities Squared (SASQ)** | 0.0117* | -0.0251* | 0.0204* | 0.0266* | 0.0240* | 0.0061* | 0.0049* |

**Correlation is statistically significant with 90% confidence*

**Pairwise Correlation Coefficients (Continued)**

| | INC | INCSQ | AGE | AGESQ | ATH | SA | SASQ |
|---|---|---|---|---|---|---|---|
| **Median Household Income (INC)** | 1 | | | | | | |
| **Median Household Incomes Squared (INCSQ)** | 0.9737* | 1 | | | | | |
| **Age (AGE)** | -0.0084* | - | 1 | | | | |
| **Age Squared (AGESQ)** | -0.0241* | -0.0167* | 0.9869* | 1 | | | |
| **Years Since Graduation (YEARS)** | 0.0288* | 0.0352* | 0.8759* | 0.8592* | 1 | | |
| **Years Since Graduation Squared (YEARSSQ)** | - | 0.0095* | 0.8226* | 0.8406* | 0.9566* | 1 | |
| **Student Athlete Dummy (ATH)** | 0.0120* | 0.0103* | -0.0065* | - | 0.0309* | 0.0473* | 1 |
| **Student Activities (SA)** | 0.0149* | 0.0162* | 0.0208* | 0.0113* | 0.0601* | 0.0446* | 0.0258* |
| **Student Activities Squared (SASQ)** | 0.0080* | 0.0089* | 0.0121* | 0.0059* | 0.0382* | 0.0283* | 0.0188* |

| | SA | SASQ |
|---|---|---|
| **Student Activities (SA)** | 1 | |
| **Student Activities Squared (SASQ)** | 0.8240* | 1 |

**Correlation is statistically significant with 90% confidence*

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