THE EFFECT OF COLLEGIATE ATHLETICS ON ALUMNI GENEROSITY

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THE EFFECT OF COLLEGIATE ATHLETICS ON ALUMNI GENEROSITY

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A Thesis

Submitted to

the Graduate Faculty of

Auburn University

in Partial Fulfillment of the

Requirements for the

Degree of

Master of Science

Auburn, Alabama
December 15, 2006

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Christopher Andrew Whaley, son of Ronald Whaley and Virginia Whaley, was born September 13, 1982, in Cordova, Tennessee. He graduated from Germantown High School in 2000. Chris attended Auburn University in the fall of 2000 and graduated cum laude with a Bachelor of Science degree in Business Administration in August, 2004. He entered Graduate School, Auburn University, that same fall.

THESIS ABSTRACT

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Master of Science, December 15, 2006
(B.S.B.A., AU, 2004)

76 Typed Pages

Directed by Steven Caudill

This study tests the effect collegiate athletics plays within the parameters of a model for alumni giving. A sample of over 650 schools, both with and without athletic programs, indicates universities participating in NCAA football can see substantial increases in alumni revenues, while basketball programs have no significant bearing on contributions. Further investigation into the relative success of an athletic team proves inconsequential, concluding that it is not how well a university performs; only that it performs at all.

ACKNOWLEDGEMENTS

The author would like to thank Dr. Jim Long for the opportunity to pursue graduate studies in Economics, Dr. John Jackson for having the time to answer questions, and Dr. Richard Beil for listening to the ideas. Special thanks are also due to Dr. Steven Caudill for guidance, assistance and endless patience throughout the writing of this paper.

Style manual or journal used: American Journal of Economics

Computer software used: SAS, LIMDEP, Microsoft Excel, Microsoft Word

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CHAPTER I

INTRODUCTION

For over 130 years, academic institutions have participated in intercollegiate sports. Collegiate athletics have grown into multi-billion dollar industry. In the 2003-2004 season, total football revenue collected from universities in NCAA Division I eclipsed $1.5 billion dollars.[1] Clearly, intercollegiate athletics generates sizeable revenues, but many argue that these programs are indulgences draining valuable resources from academic programs. Critics say that athletics not only distract students from academic pursuits, but also divert finances away from the core of the institution. Empirical results support this claim. For example, as of 2003, spending on Division I athletic programs rose about 25 percent, while total university spending increased by only 10 percent. In addition, only 40 percent of institutions participating in collegiate athletics reported self-sufficient athletic programs.[2]

Are there benefits from athletic programs? A growing area of research examines the externalities associated with collegiate athletics. The effects of athletic programs on, for example, student quality (Mixon, 1995), graduation rates (Tucker, 2004) and applicant pool sizes (Toma and Cross, 1998) have been recently examined. This thesis examines the connection between athletic programs and alumni contributions.

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[1] Office of Post-Secondary Education Equity in Athletics Disclosure Website at http://ope.ed.gov/athletics/index.asp

[2] The findings are based off data released from the NCAA and the U.S. Department of Education. (Sylwester and Witosky, 2004)

In 2005, voluntary support to higher education exceeded $25 billion. Of that amount, 28 percent (roughly $7 billion) came from alumni.[3] As giving from alumni has become increasingly important to university finances, many have speculated about the effect athletic programs have on the generosity of donors. It is easy to see why most assume that college sports have a positive influence on donation levels. The degree to which the public is exposed to the Bowl Championship Series and March Madness via television, media, and the Internet, reinforces a common sense belief that college sports have the potential to generate enormous revenue for colleges and universities. Others dismiss this idea, arguing that college-level athletics, particularly basketball and football, are dominated by a small collection of successful teams who receive the majority of publicity and revenues. Even so, there are few systematic examinations of the relationship between athletics and alumni giving.

This thesis presents an empirical analysis of the relationship between collegiate athletics and alumni generosity. Unlike previous literature, a comprehensive data set of schools both with and without athletic programs is used. This allows, for the first time, a complete analysis of athletics and giving, using non-athletic institutions as a benchmark for comparison. The study further examines alumni contributions not only as a factor of athletics, but also other important student, institutional and economic characteristics.

This paper includes three sections of specific methodology. First, a contributions model is subjected to OLS regression analysis to determine the effect of athletic programs. Simple dummy variables are constructed to account for participation in NCAA football and basketball. Next, a decomposition technique is used to establish the

[3] Information is found at www.cae.org

relative differences in schools with and without athletic programs. Finally, the same contributions model will be used to verify any relationship athletic success measures might have on giving. The finds show a significant increase in alumni generosity is associated with schools having athletic programs. In particular, institutions participating in NCAA football could see on average $3.3 million more in alumni giving. However, for those institutions with athletics, there is no difference in giving between schools having "successful" programs and those having "unsuccessful" programs.

CHAPTER II

LITERATURE REVIEW

There are several theoretical frameworks for the economic modeling of charitable giving. The first discussed in this thesis views donations as part of consumer theory, setting contributions as a function of prices and income. Feldstein (1976) developed a demand model for charitable giving using itemized tax returns gathered from 1948-1968 by the Internal Revenue Service. Itemized charitable contributions were divided into five major categories, one being educational institutions. The amount of charitable contributions for education is used as the dependent variable in several regression models. Feldstein employed the average adjusted gross income per return as the measure of income and one minus the marginal federal tax rate as the price. Economic theory suggests that a person contributing one dollar towards charity, because of the deduction, could have one minus the marginal tax rate of additional consumption. Using a double log model, the author reported that gifts to educational institutions are extremely sensitive to price, i.e. marginal tax rates. He finds that eliminating federal deductions on charitable contributions would reduce those donations by 50 percent.

The second approach to charitable giving involves the individual's desire to provide public goods for society. Much of the previous literature focused on explaining the following: person A gives a donation to person B and both receive a positive level of utility; however, as B's income rises (due to the contribution from A), A gives a smaller amount than before.[4] Keating (1981) felt that contributions were not made based on the relative income of others, but based on a general need to contribute. Keating examined data collected from 1000 individuals contributing to the United Way in the autumn of 1979. Using a probit model, Keating modeled the probability of giving as a function of income level and a series of donor characteristics, including the age, education, and sex of the respective donor. The results indicated the existence of a positive and significant relationship between age and donations, while education and sex were insignificant.

These two theories explaining generosity provide insight into the development of a model for philanthropic contributions. The focus here is on a specific instance of giving, that is, charitable giving to academic institutions. Of particular interest is the correlation between alumni giving and the presence and success of athletic programs. Several authors have previously investigated this relationship.

Sigelman and Carter (1979) were among the first to conduct an empirical investigation in this area. While previous studies focused on how an institution's decision to drop football affected alumni giving, Sigelman and Carter recognized that universities most likely to drop football programs are those with weak football teams that may not inspire generosity among alumni. The authors also dismissed widely reported casual empirical evidence. For example, Virginia Tech won the National Invitational Tournament for men's basketball in 1973. Afterwards, their president reported increases in giving in the thousands of dollars and preferential treatment from the legislature. Sigelman and Carter conclude from an analysis of giving data for years preceding and succeeding the NIT victory that there was no increase in donations; "what we have is a

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[4] See Schwartz (1970)

wealth of speculation and a lack of conclusive evidence concerning the input of athletic success on alumni giving."(Sigelman and Carter, 287)

Sigelman and Carter also are among the first to attribute alumni generosity not only to number of alumni but also to social class characteristics of those alumni. Even so, this idea is not introduced in their empirical work. Using data gathered on 138 Division I "big time" institutions for the 1975-1976 academic year, Sigelman and Carter apply several simple correlation and regression techniques. In each analysis, they specify three measures of alumni generosity: 1) percent change in total alumni giving, 2) percent change in the dollar value of the average gift, and 3) percent change in the proportion of alumni who contributed. These three dependent variables were regressed on three independent variables related to athletic success: football basketball winning percentage, basketball winning percentage, and a dummy variable equal to one if the institution participated in a post-season football bowl game. In their simple correlation models, none of the athletic performance measures proved to have any significant relationship to alumni giving; in fact, three of the performance measures were negatively correlated with giving.[5] Sigelman and Carter's simple regression models gave similar results. None of the coefficients on the athletic success measures were significant. In fact, the overall explanatory power of the model (R^2) was zero. Sigelman and Carter concluded that no significant relationship between athletic performance and alumni generosity could be found. The authors did suggest other statistical tests as recommendations for future papers.

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[5] Zero of the nine independent variables were significant at a 0.05 level of probability.

Sigelman and Carter's work encouraged many similar efforts. However, their paper has one major problem not addressed in the literature for some time. Their analysis omits certain key independent variables that affect alumni generosity such as academic success. Universities, while excelling on the football field, may also be improving academically. If measures of academic success are omitted from the regressions, these effects may be captured by other variables in the regression model, yielding inaccurate results.

Brooker and Klastorin (1981) recognized some of the limitations of Sigelman and Carter's analysis and conducted a reexamination of their data. Brooker and Klastorin conclude that Sigelman and Carter implicitly assumed that all universities and colleges are homogeneous. The authors note that Division I schools differ along several dimensions: public/private, size of student body, alumni numbers, and religious/secular.

Brooker and Klastorin employed a smaller data set than Sigelman and Carter. Using data from years 1964-1965 through 1971-1972, they selected 58 schools representing most of the major Division I athletic conferences. The independent variables selected for use in their regression models are similar to those used by Sigelman and Carter, but with some additions. Brooker and Klastorin added winning percentage lagged one and two years, ranking in final UPI Top 20 national poll (football and basketball), and lagged values of those rankings.[6] GNP was included to incorporate fluctuations in economic conditions. Three dependent variables were chosen to measure alumni generosity: size of the average gift, per capita gift to alumni, and percentage of

[6] United Press International was the approved ranking system before the modern poll and BCS system.

alumni solicited contributing to annual fund.[7] To further control for institutional differences, Brooker and Klastorin grouped schools by size and public/private status. Their findings are summarized in the following quote:

> To question whether athletic performance influences alumni giving, contrary to the generalized conclusion of Sigelman and Carter, the answer seems to be, 'yes, but it depends on some institutional factors.' (Brooker and Klastorin, 746)

One of the major factors is the nature of the institution; whether public or private. In every regression for every group of schools, at least one or more of the measures of athletic success was associated with giving. However, no consistent effect (positive or negative) was found. For public institutions, only major state universities had significant relationships between athletic success and giving. There was a negative relationship between football success and the size of per capita gifts, indicating that the giver is inclined to give less if the football team is doing well (although the authors do assume that there is an overall increase in the number of alumni contributing).

Brooker and Klastorin also discuss a hidden benefit of collegiate athletic success, favorable attitudes from legislatures. This, alone, could lead to increases in funding. However, they dismiss the investigation citing the difficulty in any accurate determination. The authors admit the potential of favorable treatment, but warn careful consideration from individual institutions relying on such an outcome. Their results do indicate that future analysis should include some distinction between public and private institutions.

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[7] Per capita gifts were chosen to account for schools of differing size. Annual funds are mentioned throughout the paper. These funds are often general giving accounts that go specifically to the university, including a variety of earmarked and all-purpose gifts.

Sigelman and Bookheimer (1983) examined the alumni-athletics relationship, focusing on contributions specifically earmarked for athletic programs. The authors give an excellent discussion of the problems associated with collegiate athletic programs. Sigelman and Bookheimer address issues like poor ticket sales for losing institutions and ticket price ceilings for schools facing professional sports competition. Their analysis includes not only an examination of donations specifically to athletic departments, but also a study of voluntary giving to schools, in general, to determine the relationship between giving to athletic departments and giving to annual funds.

Sigelman and Bookheimer obtained financial data on various collegiate athletic programs from a survey conducted by the Omaha World-Herald and published in the Chronicle of Higher Education (Middleton, 1982). The measurement of athletic success, usually based on the won/loss record, was calculated and reported as a "success score." These "success scores" used a linear decay function to weight the four previous year's winning percentages, in order to incorporate the lagged effect of athletic performance into their analysis. This is based on the idea that wins four years ago do not matter as much as wins today.

Sigelman and Bookheimer are among the first to incorporate socioeconomic factors into the generosity analysis. The authors include the number of alumni, a public/private dummy, and an academic quality measure.[8] Also included are three novel independent variables. The "Hotbed" variable is an index of sports-craziness. This variable is measured three ways: percentage of state population engaged in agriculture,

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[8] The academic quality measure used in Sigelman and Bookheimer is a composite scale designed by Barron's Profiles of America Colleges. It is an index ranging from 1 (non-competitive) to 9 (most competitive) and based on admission selectivity.

median educational attainment of state adult population, and median family income of the state. The "Prevailing Ethos" recognizes that certain areas promote civic responsibility and hence a decreased value on non-noble pursuits (for example, donating to an athletic department). This is measured by the Sharkansky-Elazar political culture index assigning a score of 1 for the most moralistic areas and 9 for most traditionalistic (likely athletic contributors). Finally, they use the "Only Game in Town" factor. This measures the competition universities face from professional sports teams. It is denoted by a dummy variable having a "1" value if the institution is located within a two hour driving distance from professional football or basketball franchise and a "0" value if otherwise. In order to conduct the parallel analysis, total alumni giving is used as a second dependent variable.

Sigelman and Bookheimer conducted simple correlation analysis between the aforementioned independent variables and the two dependent variables. They report that there is no significant relationship between total alumni giving and athletic giving. This is important to note because it allows the authors to work with two different dimensions of voluntary support. Only two significant correlations were found. The first was between traditionalistic nature of a school and athletic contributions. This positive correlation implies that schools in more traditionalistic areas have less civic desire and more self-interested wants (i.e. they would rather spend for have a luxury box at a football game than spend for a scholarship to help an unknown student). The second correlation is between football success and athletic contributions. Here again, the positive correlation follows logic; a better team encourages more donations.

Sigelman and Bookheimer also estimated several multiple regression models in order to isolate the effects of performance on contributions. Due to the large number of independent variables and the small size of the available samples, the authors encountered problems with degrees of freedom. As a solution, Sigelman and Bookheimer used a stepwise regression procedure, allowing variables to enter the regression model only if they significantly increased the model's explanatory power. A regression model was developed regressing football success score on athletic contributions.[9] It was concluded that a one unit increase in the football success score brought about an increase of $1,251,600, or, more appropriately, for every ten percent increase in the football success translates into $125,160 more of voluntary support to the athletic department. Overall, Sigelman and Bookheimer examined a large amount of data and concluded the following:

> In sum, the increasingly precarious financial situation in which most athletic programs find themselves is apt to beget an emphasis on winning which has many unfortunate consequences, and also to set into opposition the economic interests of the largely independent athletic program and those of the rest of campus. (Sigelman and Bookheimer, 358)

Further, Sigelman and Bookheimer commented on the implications of these finding, citing that traditional athletic powerhouse wins are loses for doormat schools. Good and bad football programs still spend money on their teams. Much like certain societies income gaps, better schools get richer, worse schools get poorer.

Many of the previous studies face problems with model definition and capturing all the factors that go into alumni generosity. There was never any real discussion of case studies or institutional investigation. However, in 1994, Grimes and Chressanthis

[9] No other variables could meet the criteria once added.

published a study done specifically on one university. Through their article deals with time-series data, relevant information regarding their model is included in this paper.

Their subject was Mississippi State University. Arguing that it is a median representative of Division I-A schools, Grimes and Chressanthis examined data given by the Mississippi State Development foundation from 1962-1991.[10] This gave the authors a two-fold advantage. The previous studies used alumni giving data based off reported “annual” funds. These funds are reported by law; however, they often include a hodgepodge of assorted donations that range from general gifts to restricted funds. Also, there is no confusion between generosity towards the university and donations towards athletic departments.

The authors were also some of the first to incorporate more detailed sport related variables in the testing. They included not only television appearances, but also NCAA sanctions. This was of particularly new interest to see how a group like the NCAA could affect a school’s earning potential.

Grimes and Chressanthis outlined a need-based approach to alumni giving, including enrollment and appropriations variables. Larger student populations require that the university spend more money on the care and instruction of those students. Coupled with the effect of state appropriations, these variables help determine the need for alumni donations and hence, the degree to which the institution (i.e. Mississippi State Development Foundation) will procure those funds. Grimes and Chressanthis also

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[10] Mississippi State Development Foundation is the main source of alumni contributions and information concerning Mississippi State University. They distinguish between gifts of different types of private giving by source and function. MSU possesses a separate group know as the Bulldog club that receives and disperses money to athletics.

included the number of televised games per year (Television). This helps to determine the relevance of what many authors have called the "advertising effect of athletics".[11]

MSU participates in several NCAA sports, however, their revenue collecting programs included football, basketball, and baseball. Grimes and Chressanthis ran three regressions each using its own respective athletic measures (i.e. one for football, one for basketball, and one for baseball) and a fourth involving total athletic performance. While all the regressions reported similar findings on non-athletic variables, the results on athletics differ in each regression.[12] Under football it was determined that only NCAA sanctions were significant suggesting that these sanctions cause decreases in alumni giving. Winning percentage provided the only significant sports variable under the basketball information. A positive correlation shows that better basketball seasons induce higher giving. Television appearances proved highly significant in baseball data, showing a positive relation to alumni donations. Finally, the total regression showed that both winning percentage and television appears are positively and significantly correlated with generosity.[13]

Grimes and Chressanthis conclude that, overall, a successful athletic program does possess spillover benefits in the form of increased alumni generosity. However, the authors do mention some of the limitations of their study. The case study of MSU, though a median representative, cannot be generalized due to the specific nature of the

[11] Advertising effect of athletics, see Bremmer and Kesselring (1993)
[12] Appropriations and Income were significant in all four models. Alumni base proved significant in all three individual sports models, but failed to be substantial in the collective regression.
[13] Coefficients for football sanctions, basketball winning percentage, and overall television appearances are significant at a 95% level. Estimates on baseball television appearances are reported at 99% level, while overall winning percentage is at a 90% level.

school. Further, the study only examined the monetary effects of collegiate athletics and ignored moral views concerning athletics and higher education:

> While this analysis cannot possibly attempt to settle all the controversies surrounding intercollegiate athletics, it has provided some evidence that a major sports program is more than a series of social events, and can yield external monetary benefits for academics. (Grimes and Chressanthis, 38)

The message provided here seems to reinforce the principle issued by Brooker and Klastorin (1981) that the spillover benefits of athletics depend on the institution.

Discussion of the next paper diverges from the athletics and provides a comprehensive model for alumni donations. Baade and Sundberg (1995) presented a paper attempting to determine the factors affecting alumni-specific generosity. They chose to design several models off three sets of variables: institution characteristics, student characteristics, and efforts to solicit funds. The authors used a dataset of more than 250 differing institutions over the 1989 and 1990 fiscal years.[14] The data underwent longitudinal regression analysis producing three separate regressions: public universities, private universities, and liberal arts colleges. The defining characteristic of their study is their introduction of "family wealth". This idea was to capture the overall wealth of students entering a university as potential for them to donate. They used a proxy in place of a direct measurement.[15] Their conclusions on the regressions included much regard for student and institutional quality, citing highly significant t-values on variables measuring student ability and institutional efforts to solicit donations.

In 1996, Baade and Sundberg used a similar version of their model to answer the question between alumni generosity and athletic success. *Fourth Down and Gold to Go?*

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[14] 143 public institutions, 112 private universities, and 550 liberal arts schools

[15] The proxy was the percentage of student's receiving student loan aid and will be discussed later.

Assessing the Link between Athletics and Alumni Giving (1996) proves to compensate for problems associated with much of the earlier work. Their analysis includes many of the variables left out of the previous literature, focuses specifically on giving to respective universities, and incorporates schools outside of NCAA Division I athletics.

Data was gathered on 48 private doctorate-granting universities, 94 public doctorate-granting universities, and 167 liberal arts colleges for the academic years spanning 1973-1990. This panel study was the most comprehensive than any before it. However, much of the data gathered was not based on pure theory, but rather on what was available. They included three athletic measures: (1) a dummy corresponding to football bowl game appearance, (2) a dummy corresponding to an NCAA tournament appearance, and (3) respective sports winning percentages.

Their results concluded that most all of the non-athletic variables were significant. Post-season bowl game appearances were positive and significant at a level greater than 99% in both private and public universities. Using a semi-elasticity method of conversion, Baade and Sundberg estimated that a bowl game appearance increased alumni donations at an average public institution by 54% or over $2 million. NCAA tournament appearance was correlated with increases in contributions only in public institutions, increasing alumni donations by 35%

In closing their analysis, Baade and Sundberg put focus on athletic programs advancing to post season play. Winning percentages were never significant in any of their regressions. Their final suggestion is as follows, “money spent building the sports program may in fact reduce alumni giving, if it is at the expense of academic quality.” (Baade and Sundberg, 802).

In summary, the literature discussed above is relatively neutral on the effect of athletics on alumni support. While more recent studies prove positive relationships between athletic success and alumni generosity, the majority of articles reveal only insignificance. The next chapters present several models in which to examine the relationship between athletics and alumni donations.

CHAPTER III

THE DATA

This study utilizes a constructed database of financial, institutional, and athletic data from schools of higher education during the fiscal year, 2004.[16] Empirical analysis of the relationship between athletics and giving is constrained by data availability. While information on the sports success of colleges and universities is widely available, other institutional factors are often proprietary, unreported, or riddled with measurement error. These problems present challenges for empirical work in the area.

The majority of the data for this study comes from the Integrated Postsecondary Education Data System (IPEDS) collected by the Department of Education. IPEDS is a single, comprehensive system designed to encompass all educational organizations whose primary purpose is providing postsecondary instruction. IPEDS is developed from a series of interrelated surveys containing institution-level data on enrollments, graduation rates, staffing and finances. In several cases universities did not report a complete set of data to the IPEDS system. These missing data points were collected from another source, the *Peterson's Guide to Four-Year Colleges*. The guide is published annually by the

[16] FY2004 reporting dates run from August 2003 to July 2004 for institutions included in this study.

Thomson Company and contains information designed to aid high school graduates in evaluating different colleges and universities.[17]

Data on alumni generosity is obtained from the Council for Aid to Education (CAE). The CAE is a non-profit group whose initial purpose was improving corporate support of higher education. More recently, the CAE develops and maintains the most comprehensive database on alumni information.[18] This information is contained in their *Voluntary Support of Education* survey sent out annually to various colleges and universities. Information in this paper is limited by access restrictions to CAE data. The CAE requires fees in order to view the entire database; however, selected years and variables are available on a trial basis.[19] Finally, all information regarding football and basketball performance is gathered from the NCAA official results book.[20] The resulting dataset is a cross-section of 658 colleges and universities from across the country.

Previous literature measures alumni giving in several ways. Some of the earliest work like Admur (1971) and Culip (1965) discussed the effect of athletic success on total alumni donations. A problem is that the use of total alumni giving does not account for differences in the number of alumni. An institution with a larger group of alumni, due to factors like institutional age and enrollment size, will have, perhaps, more alumni donations. Brooker and Klastoria (1981) were among the first to offer an alternative measure of alumni giving. As mentioned earlier, these authors measured alumni giving

[17] A random sample of schools was selected to compare the data from the two sources. In all cases, the IPEDS and *Peterson's Guide* yielded the same results.
[18] The CAE has information regarding the voluntary support of education for over 60 years. Electronic information is available through their VSE Data Minor System. Subscribers gain access to 10 years worth of data on over 300 variables for thousands of institutions. Costs associated with the VSE system can be found at www.cae.org.
[19] Total alumni contributions is the trial variable used in this study.
[20] NCAA official rule book and results is available online at www.ncaa.org.

by average contributions from solicited alumni and the per capita gifts to annual funds. The use of average and per capita measures eliminates the size-of-the-alumni-pool problem, but other problems remain. Solicited alumni may only account for a small fraction of the alumni who can and do donate. The problem with using per capita gifts to annual fund accounts is that most universities have several "funds" to which alumni can contribute.

As an alternative measure, Baade and Sundberg (1996) developed a "contributions per alumni" variable, dividing total giving by the number of alumni of record. Baade and Sundberg obtained their information from the same CAE database as used in this thesis. This measure solves the problems with the other measures of giving previously discussed. However, determining the "number of alumni" is problematic. The reported value is subject to the interpretation of the individual school doing the reporting. In a personal correspondence, Sundberg made the following comment on the reliability of alumni data:

> When we talked to our contact at the Council, he said that the data integrity was pretty high except in the case of "alumni of record". He said that different institutions have wildly different attitudes toward that. In some cases, alumni of record include virtually all non-deceased alums, while in others it consists of only those alumni for whom the institution has current addresses. (Sundberg)

This quote suggests the possibility of measurement error. Rhoads and Gerking (2000) also note the high degree of measurement error in the CAE data. Their attempt to scale total alumni contributions involved dividing through by the respective school's enrollment. Their "average gift per student" variable solved the institutional size problem. Rhoads and Gerking also included an age of the institution variable in their regressions as to control for the effects of age.

The dependent variable chosen for use in this thesis is determined by a comparison of four different measures based on previous research. Table I displays the four variables, a definition of each, and their respective descriptive statistics. In the following paragraphs each of these four variables is discussed in turn.

AlumTotal is the total alumni contributions made to an institution by alumni in the 2004 fiscal year. This measure includes a variety of giving categories and is presented in total dollars.[21] Due to problems with this measure previously discussed, *AlumTotal* is included for purposes of comparison.

AlumPS is total contributions divided by the enrollment of the institution and so controls for differences in the university size.[22] *AlumPS* is calculated using total contributions (*AlumTotal*) divided by total enrollment in the fall of 2003.

Two other measures, *AlumPA* and *AlumPA2* involve approximations for the actual number of alumni at an institution. The goal is to eliminate or minimize the error in reported alumni numbers discussed previously. *AlumPA* is defined to be

(1) $$AlumPA_i = \frac{AlumTotal_i}{(0.25Enroll_i)(\lim_{0 \to 100} Age_i)}$$

where total alumni contributions is divided by a proxy for the number of alumni. The quarter enrollment is meant to represent the size of the graduating class (future alumni) and, multiplying by the school's age, yields an estimate of the number of alumni. The school's age, *Age*, is restricted to be less than or equal to 100 years. This is done because alumni graduating 100 years ago would no longer be living to contribute. This

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[21] Giving categories include, but are not limited to: annual fund, capital campaign, and earmarked gifts (towards academics or athletics). However, only donations from alumni are counted.

[22] See Rhoads & Gerking (2000)

constructed variable, *AlumPA*, is not without problems. For example, the 0.25 times enrollment is an overestimate of actual graduation rates; it would require a university having constant enrollments over time and a 100 percent retention and graduation rate.

AlumPA2 uses another measure of total alumni. This variable is similar to *AlumPA* except the upper limit on institutional age of 100 years is removed and actual age is used. Essentially this is a measure of the number of alumni in the history of the school.

The independent variables used to estimate differences in levels of alumni generosity are based upon economic theory and previous literature. Consumer demand theory suggests that income, tax incentives, and tastes should explain differences in giving behavior. The explanatory variables chosen in this thesis control for these three factors.[23] Institutional characteristics are also included due to the specific nature of alumni contributions. Data on all explanatory variables is based on the 2004 fiscal year, or the corresponding 2003-2004 academic year.

Most universities keep few, if any, records of alumni income. Even if this data were collected it is not likely to be publicly available. To estimate income effects, current student information is used. Previous research uses this information for two reasons: to examine the future donation potential of a student and to control for differences in the family wealth. The next six variables adopt this approach with a variety of improvements.

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[23] *AvgSAT, Tuition, %Min, %Fem, %RecLoan,* and *AvgLoan* describe potential income, *Tax* measures tax liability, *StudExp* explain the differences in taste, while *Age, Enroll,* and *Private* determine institutional characteristics.

The first two variables are based off student demographics. Information on the minorities and females as a percentage of total enrollments for the 2003-2004 school year are included in the regressions. Data on minority enrollments is determined by dividing Caucasian enrollment by total enrollment then subtracting from 1 (*%Min*). This measure includes African American, Asian American, Native American, Hispanic, Middle Eastern and those not reporting their ethnic status. Female enrollments (*%Fem*) are similarly determined; dividing female enrollment by total enrollment.

These characteristics aid in determining the giving ability of respective alumni. Previous research has shown that minorities and women begin employment at lower starting salaries than their majority (male) counterparts.[24] For that reason, it is likely to assume that these individuals will leave their alma mater with, initially, a smaller capacity to donate. The consequence is that higher percentages of minority and female enrollments (i.e. alumni) are associated with less giving.

Baade and Sundberg (1996) introduced the "family wealth" idea of alumni generosity. This is the notion that wealth passing from generation to generation is available for future alumni giving. Simply put, wealthier families have greater capacity to contribute. Baade and Sundberg developed two proxy measures for "family wealth." The first is the percentage of students at an institution receiving financial aid. Students who accept financial aid likely do not have the wealth available to finance college. A higher percentage of students on financial aid implies poorer families. Therefore, one expects an inverse relationship between the percentage of students on financial aid and alumni generosity. This thesis includes a similar but improved measure of family wealth.

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[24] See Oaxaca (1978)

General financial aid includes measures like loans, grants, and scholarships. The former two components, grants and scholarships, are often performance-based stipends and do not necessarily reflect financial need. Students excelling academically receive this assistance, but that does not imply that these students lack the capacity to pay for college. In this thesis the percentage of students receiving loans (*%RecLoan*) will be used as a measure of family wealth. This is expected to be inversely related to alumni contributions.

The second gauge of family wealth given by Baade and Sundberg (1996) is the average amount of financial aid per student. Like before, higher values denote lower overall wealth. Using the argument above, this thesis employs the average amount of student loan aid (*AvgLoan*). *AvgLoan* is expected to vary inversely with alumni contributions. All values for *%RecLoan* and *AvgLoan* represent the 2003-2004 academic year.

Another proxy for family wealth is tuition costs. *Tuition* is the total of tuition and fees required for the 2003-2004 academic year.[25] Tuition costs indicate the level of wealth needed to avoid use of financial aid. Again, wealthier families have enough money to cover the cost of tuition and should have a higher capacity to donate. Accordingly, tuition should be positively related to alumni giving. In fact, there may be a second avenue for the effect of tuition on giving. Tuition costs are often positively related to quality of education. Better education (higher cost) leads to higher-paying jobs and, perhaps, an increased capacity to donate.

[25] For public universities, *Tuition* is the instate value for all cost and fees.

Most of the previous literature includes some measure of student quality as another proxy for alumni income.[26] Brighter students often get higher paying jobs and enjoy an increased capacity for giving. Standardized test scores (average SAT or ACT equivalent) found in admission reports are used here (*AvgSAT*). *AvgSAT* is expected to be positively related to alumni giving. In cases where schools reported only ACT scores, the values were transformed into an SAT equivalent using a conversion guide produced by the College Board.[27] All values for *AvgSAT* refer to the incoming class for fall 2003.

Previous articles include tax-related variables to account for deductions on charitable contributions. Differences in tax incentives are incorporated by including an effective marginal tax rate using methodology developed in Long (2000). The measure is a summation of federal tax liability on the average adjusted gross income of the state in which the institution is located and the highest marginal state tax, if applicable. Itemized and federal tax deductions on state returns are included as well. The tax rate is defined as:

$$Tax = \frac{(f + sd_s - fst_s - fsd_s)}{(1 - fst_s)} \qquad (2)$$

where f is the federal marginal tax rate faced by the average adjusted gross income, s is the highest marginal state tax rate, t_s is a value equal to "1" if federal taxes can be deducted from state returns and "0" if otherwise, and d_s equals "1" if the state allows itemized deductions on state returns and "0" otherwise

[26] See Baade & Sundberg (1995,1996) or Rhoads & Gerking (2000)
[27] College Board is a non-profit group providing information to students entering post-secondary education. Their equivalency charts can be found at www.collegeboard.com

Many times an individual's experience at a particular university provides the foundation or "tastes" for giving behavior. An alumnus who enjoyed his or her collegiate years will be more inclined to make donations to that institution. However, the quality of one's college experience is a difficult variable to measure. Students pay a price for college, mainly tuition. In return, students receive an education and an experience. This experience includes things like extracurricular activities and academic support. University expenditures on students are used as a proxy for "experience." The more a university spends towards students, the richer the student's time will be. To construct this proxy, data was gathered on institutional budgets. For each university, three main categories of spending for the FY2004 (instruction, academic support, and student services) were summed and divided by total enrollment to yield the expenditure per student variable (*StudExp*). Baade & Sundberg (1995, 1996) use two similar variations on this measure: instructional expenditure per student and scholarship expenditure per student. *StudExp* is chosen for use in this thesis because it represents a direct measure of spending on students. There is assumed to be a positive association between *StudExp* and alumni generosity.

Three institutional characteristics are included as explanatory variables. The first two, *Enroll* and *Age*, attempt to measure the relative size of the alumni pool. *Enroll* is the total full-time enrollment for the 2003-2004 academic year. More students at a university represent a larger potential alumni body. *Enroll* is expected to be positively associated with giving. *Age* is defined as the current year (2003) minus the founding date of the institution. Older schools may not only have more alumni, but also a history of giving. *Age* is also assumed to be positively related to donations. Lastly, a dummy variable is included to allow for differences between public and private institutions. Private schools rely on support primarily from tuition dollars and alumni giving. Public schools have assistance from state appropriations to aid them in funding. In order to account for this difference, *Private* is defined to equal to "1" for private institutions and "0" for public.

Information on school efforts to solicit alumni may also have bearing in the model. However, relevant data on university campaigns is not consolidated and often inconsistently reported. Most colleges have alumni associations or branches of the university administration that deal with alumni.

Table II presents summary definitions for each of the explanatory variables and the expected effect on alumni generosity. Table III shows the descriptive statistics.

CHAPTER IV:

DETERMINING THE EFFECT ATHLETIC PROGRAMS

The objective of this thesis is to determine the relationship between collegiate athletics and alumni generosity. Past research includes only athletic "success" measures. These articles explored the relationship between athletic success and alumni giving. This thesis begins with an investigation into the relationship between alumni giving and the presence of an athletic program, successful or not.

To examine this correlation, one could simply calculate the mean difference in giving between schools with and without athletic programs. For example, Table IV presents the average values of several measures of giving. Means are calculated both for schools with and without NCAA football programs. As the table shows, an average university participating in football will receive over $10 million in alumni contributions. This is over $8 million more than a school without a football program. However, this difference does not account for variation in other factors that might influence giving in football and non-football schools.

In order to control for these other differences, regression analysis will be used. The variables discussed in the previous chapter provide the basis for the regression model of alumni generosity. Two variables are introduced to account for any effect of intercollegiate athletics. The first is *Football*. A dummy variable is constructed to equal "0" for schools not participating in NCAA football and "1" for those participating schools.[28] Similarly, *Basketball* is a dummy variable equal to "0" for those schools not involved in NCAA Basketball and equal to "1" for schools that are. Football and basketball are the only two sports considered in this analysis because they are traditionally revenue-generating sports and receive the majority of the media exposure.

Much of the previous literature in this area employs a double log model. This model allows the authors to control for large degree of variability in giving and potential heteroskedasticity. Estimated values in log-linear models are easily interpreted as elasticities. However, variables like *Private, Football* and *Basketball* are dummy values and cannot undergo the transformation. Expressed in linear form, the percent change interpretation no longer applies. Many authors use a semi-elasticity transformation, but this approach produces biased estimates.[29] In addition, the interpretation of the Blinder decomposition results in the next chapter is much easier in a linear model. For these reasons the linear functional form is chosen for use in the empirical work.[30]

The OLS regression results from the estimation of four linear specifications for alumni generosity model are presented in Table V. The dependent variable is different in each model as discussed in the previous section: *AumTotal, AlumPS, AlumPA* and

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[28] It is worth noting that schools participating in NCAA football and basketball constitute all competitive divisions. Further, schools with a "0" value (i.e. schools not participating in NCAA) do not necessarily lack athletic teams; these institutions simply do not participate in the NCAA.

[29] The semi-elasticity calculation uses an exponential function to convert a logarithmic value. The exponential transformation is a non-linear function and computes an biased estimate. See Wooldridge (2003).

[30] Several other reasons for dismissing log transformation are cited. Data points with a zero or negative value cannot undergo the natural log transformation. Later analysis incorporates winning percentages, of which several cite 0 values. Also, *%RecLoan, %Min*, and *%Fem* are measured in percentages. Their log estimates would be interpreted as point percentages (i.e. a 1 percent change in a percent) and may prove difficult to translate.

AlumPA2, respectively. Any explanatory variable involved in the calculation of a dependent variable is omitted from the regression model to eliminate spurious correlation or enhanced explanatory power.

Models I uses *AlumTotal* as the dependent variable. Regressed against a set of 13 independent variables, the model reports the highest R^2 value of 0.49. Model I has seven significant coefficients at a 95 percent level or better (*Enroll, Age, AvgSAT, Tuition, %Min, StudExp,* and *Private*). *Tuition* and *%Fem*, reporting parameter values of -360.92 and 3.45×10^6 respectively, are the only variables inconsistent with expectations. Both sports related dummy variables (*Football* and *Basketball*) have t-ratios below critical levels and are insignificant.

Model II utilizes *AlumPS* as the dependent variable while dropping *Enroll* from the right hand side. The model has eight significant coefficients with an R^2 value of 0.37. While *Tuition* and *Private* drop from statistical importance, measures of financial aid (*%RecLoan* and *AvgLoan*) and female enrollments report significant impact. *Football* becomes significant (only at a 90 percent level), showing a positive coefficient of 351.57. *Basketball* remains inconclusive.

Using *AlumPA* as the dependent variable, the Model III explains over a third of the variation in alumni giving (reporting an R^2 value of 0.35) with seven significant coefficients.[31] Both *Enroll* and *Age* are dropped from the equation. Generally all variables follow their expected signs with exception to *%Fem*. *Football* increases its significance to a 95 percent level, while the t-ratio on *Basketball* continues drop.

[31] *AvgSAT, %RecLoan, AvgLoan, %Min, %Fem, StudExp,* and *Football* are all significant at a 90% level or better (the intercept is not included as an independent variable, though it is significant).

Model IV employs *AlumPA2* as the dependent variable. It reports the lowest R^2 value of 0.31 and the smallest number of significant coefficients, four. *%RecLoan*, *%Min* and *Football* drop below statistically significant levels and *Basketball* continues to remain insignificant.

Model III is the best model fit for this analysis. While Model II reports a higher R^2 (0.37), Model III is chosen on the basis of stronger t-ratios. The majority of significant coefficients in Model III report higher t-ratios than Model II, with exception to *%RecLoan*, *AvgLoan*, and *StudExp* (though the difference is minute). Of particular importance is the increased explanatory power of the football dummy variable. The t-ratio increases from 1.80 to 2.35 when moving from Model II to III. The additional statistical strength of *Football* and other variables outweighs the 0.02 loss in R^2 value. The chosen regression equation is presented below,

$$\begin{aligned} AlumPA_i &= \beta_0 + \beta_1 AvgSAT_i + \beta_2 Tuition_i + \beta_3 \%RecLoan_i + \beta_4 AvgLoan_i \\ &+ \beta_5 \%Min_i + \beta_6 \%Fem_i + \beta_7 StudExp_i + \beta_8 Tax_i + \beta_9 Private_i + \beta_{10} Football_i \\ &+ \beta_{11} Basketball_i + \varepsilon_i \end{aligned} \tag{3}$$

where *i* represents the individual cross-section and *ε* is a disturbance term. Implications of the coefficient values will be discussed later.

Several diagnostic tests are performed prior to any detailed discussion of the results. While its presence does not lead to a violation of OLS assumptions, multicollinearity may produce imprecise estimates and wider confidence intervals. Two methods are used to detect the presence of collinear relationships among the independent variables. The first is the calculation of the matrix of Pearson correlation coefficients presented in Table VI. This table shows a very high correlation between *Tuition* and *Private* (0.87). The correlation makes sense given that the mean tuition at a private school is over \$15,000 more than the mean tuition at a public institution. Further investigation into the presence of multicollinearity is achieved by computing the Variance Inflation Factors (VIF) for each explanatory variable (see Table VII). These measures are scaled versions of the multiple correlation coefficients between each independent variable and the remainder of the independent variables. All VIF values are below 10, ruling out multicollinearity.[32]

Further diagnostic testing was conducted to investigate the presence of heteroscedasticity, which is likely to be present given that dependent variable is related to expenditures. Heteroscedasticity leads to inefficient estimates, underestimated standard errors, and overestimated t-ratios. White's test is used to investigate the presence of heteroscedasticity. Residual and predicted values are obtained from the original OLS regression equation. Residuals values are squared and used as the dependent variable in two regression models including, in turn, the predicted values and the square of the predicted values as independent variables. From these two regressions, a statistic of 22.15 is obtained which is less than the critical $\chi 2$ value, indicating that the null hypothesis of a homoskedastic error term cannot be rejected.[33] In addition, a Breusch-Pagan test is also administered. Here, the squared residuals from the linear equation are regressed on the original explanatory variables. The calculated LM statistic of 672.05 is significantly above the critical $\chi 2$ value; denoting the presence of heteroscedasticity.

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[32] It is generally accepted that a value greater than 10 is an indication of potential multicollinearity. For reference, see Neter, Wasserman, and Kunter (1990).
[33] Critical 2 value is 68.67 at 95% significance

The tests for heteroscedasticity give conflicting results. In order to be cautious, White's correction is used to produce heteroscedasticity-robust standard errors and consistent t-ratios. Table VIII reports the corrected regression output.

As mentioned before, the model contains seven significant coefficients at the 95% level or better. Most have the expected sign suggested in the conceptual model. The directions of the effects of several of the included student characteristics are consistent with their hypothesized effects. Higher SAT scores are associated with higher alumni giving, while higher minority enrollments and higher average student loans reduce giving. All significant institutional factors (*StudExp* and *Private*) have positive associations with contributions. Universities spending more on their students experience higher donations, possibly due to the enhanced experience felt by alumni. Private schools also experience more giving. The results indicate that the average private school enjoys $4.6 million more in alumni giving than its public counterpart. *Tuition* and *%RecLoan* both have the expected sign, but fall just short of statistical significance. The coefficients of *Tax* and *Basketball* have very small t-ratios.

One surprising result is the positive effect of higher female enrollment. Past research suggests that female enrollments are typically negatively related to alumni giving. The positive coefficient value of 91.30 on *%Fem* suggests otherwise. A one percent increase in female enrollments would increase alumni generosity per alum by roughly $0.91 which, in a university of average size, would lead to an increase in giving of $152,541.[34]

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[34] An average institution is based off the mean values of the sample. It would be 122 years old, enroll 7501 students and have 167,957 potential alumni.

Schools investing in intercollegiate football see substantially larger alumni contributions than those that do not. The average university competing in NCAA football could enjoy over $3.3 million more per year in alumni generosity than schools not participating in football. The argument becomes more convincing when considering the remaining significant coefficients. To match the $3.3 million increase in giving, an average university would have to increase its female enrollment by 22 percent, increase student expenditures by over $45 million or raise the average SAT score of an entering freshman 143 points, roughly 13 percent.

Questions arose to the relationship of football and the explanatory variables in the giving model. Several of the independent variables may factor into whether or not a school might have a football program. To determine any level of endogeneity in *Football*, a Hausman test was constructed. An equation for football participation was developed using *Football* as the dependent variable and the remaining independent variables from the original regression equation (3). Also included on the explanatory side are a total revenue per student variable and a dummy variable indicating participation in the NCAA.[35] After undergoing OLS estimation, the residual values were saved and placed inside the alumni giving equation (3). The results of the second regression showed a t-ratio on the residual values of 1.51. Insignificant at a 90 percent level, this demonstrates no endogeneity associated between alumni generosity and football participation.

Clearly collegiate football programs have a strong bearing on alumni giving. Football games provide a level of exposure to respective alumni not otherwise given by a

[35] *RevPS* was constructed using total revenue divided by total enrollment. *NCAA*, the dummy variable, indicates membership in the NCAA no matter what athletic sport.

university. Television and print media coverage act as school advertisements, while game attendance entices alumni to return to their alma mater. Past research often refers to this phenomenon as a "warm glow" effect, whereby alumni feel connected to their old school through football competition.[36] Whatever the reasoning, college football programs do provide some spill over benefit relating to increased alumni giving.

The next section will present separate regressions for football and nonfootball models and a decomposition of the difference between the two. For several reasons, the dummy variable on basketball will be dropped and focus centered on football. *Basketball* demonstrates low t-ratios in all the regression results presented above and is continually deemed statistically insignificant. Further, the effect of basketball is captured by a portion of the football dummy. All schools within the data set that participate in NCAA football also participate in NCAA basketball. Future relationships involving basketball will be presented in a later chapter.

[36] See Turner, Meserve, and Bowen (2001)

CHAPTER V

BLINDER DECOMPOSITION

As indicated in the previous section, the presence of a college football program is associated with a sizeable increase in alumni revenues. However, the significance of the dummy variable, *Football,* means only that the intercept for football schools can change. The coefficients of all other independent variables are forced to be the same for football and non-football schools. This may not be true. Previous literature fails to address the issue of whether the alumni giving equation differs between schools with and without football programs. In testing this hypothesis, two new regressions models are compared: the original model minus the football dummy variable (essentially equation (3)), and a fully interacted model using *Football* as the integrating factor. An F-test indicated the null hypothesis that all regression coefficients are equal between football and non-football schools can be rejected.[37]

This finding verifies separate regressions for football and nonfootball schools are appropriate. The OLS results of these two models are reported in columns 2 and 3 of Table IX. The non-football model explains a greater portion of the variation in alumni giving (R^2 of 0.45 as opposed to 0.32 for the football model). Each model contains five significant coefficients. Coefficients on *AvgSAT*, *AvgLoan*, and *StudExp* are significant in both models. Obvious differences in explanatory significance are found in the

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[37] The calculated F-statistic was 2.73 with a critical value of 1.86 and 2.38 for =0.05 and =0.01 respectively.

coefficients of *%Min, %Fem*, *Tax* and *Private*. In the football regression, the remaining significant variables are minority enrollments and the private/public status of an institution. In the non-football regression, the two other significant variables are percent female enrollment and the tax price. *Tax* has a coefficient value of -316.87 at a significance greater than 95 percent in the non-football sample.

Given the two regressions, it is possible to decompose the average difference in giving into two distinct components. The first is the difference resulting from the school characteristics such as average SAT, tuition costs, and various student demographics. The second is the coefficient effect or the differing marginal effect of changes in the independent variables on the alumni generosity equation. This paper employs an Oaxaca-Blinder decomposition, often found in labor economics as a means for determining discrimination.[38]

The mean alumni generosity per alumni value for football ($\overline{G}_f$) and non-football ($\overline{G}_n$) schools can be written as:

(5) $$\overline{G}_F = \beta_F(\overline{X}_F)$$

and

(6) $$\overline{G}_N = \beta_N(\overline{X}_N)$$

respectively, where β denotes the vector of regression coefficients and $\overline{X}$ is the vector of the mean values of the explanatory variables. Using the equations above, the difference in alumni generosity between football and non-football schools can be expressed as,

[38] For an example, see Oaxaca (1973) or Blinder (1973). For specific methodology used here, see Long & Caudill (1992).

(7) $$\overline{G}_F - \overline{G}_N = \beta_F(\overline{X}_F) - \beta_N(\overline{X}_N)$$

After some simple manipulations, the ride hand side of (7) now becomes,

(8) $$[\beta_F(\overline{X}_F) - \beta_F(\overline{X}_N)] + [\beta_F(\overline{X}_N) - \beta_N(\overline{X}_N)]$$

The first difference shows the disparity in the mean values evaluated using the coefficients for football schools. This can be viewed as the difference attributed to differing values of school characteristics. If found to be positive (negative), then the disparities in school characteristics favor football (non-football) institutions. The second portion of the equation shows the differences in coefficient values of football and non-football universities evaluated at the non-football means. This accounts for any discrepancy in the way the characteristics of football and nonfootball schools affect generosity.[39] These parameter differences are the unexplained variation between the schools and could be attributed to football participation, omitted variables, or possible misspecification in the alumni generosity equation.[40]

Table X shows that the proportion of the difference in alumni generosity between football and non-football institutions attributed to disparities in school characteristics is only 19.92 percent, leaving 80.08 percent of the variation unexplained. To appreciate the results, the following example is presented.

An average NCAA football-participating university has a mean *AlumPA* value of \$71.56, while schools without football have a mean value of \$44.03. Multiplying each

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[39] If there was no difference in the model treatment of football and non-football schools, the value of $[\beta_F(\overline{X}_N) - \beta_N(\overline{X}_N)]$ would be zero.

[40] The equation can be equally evaluated as $[\beta_N(\overline{X}_F) - \beta_N(\overline{X}_N)] + [\beta_F(\overline{X}_F) - \beta_N(\overline{X}_F)]$. The results are consistent with the above mentioned analysis and can be found in Table XI.

by their average number of alumni, the total alumni contribution becomes $15,328,096 for football schools and $4,440,449 for non-football schools. Differences in mean values explain only $877,554 of the $10,887,647 variation in generosity, leaving over $10 million depending on the perceptions of football at these schools.

Table X presents a partition of the individual influences of the explanatory variables in the decomposition. Individual effects are reported as percentages with a weighted t-ratio presented below.[41] Five variables are associated with statistically significant effects on the giving levels between the two groups of universities. Average SAT scores, student expenditures, and marginal tax rates all show positive percent values, indicating a disproportional preference for football schools. These factors account for 71 percent of the positive variation in the observed generosity difference. While the average loan amount is positive and significant, the variable controls for only 3 percent of the difference and hence relatively inconsequential. *%Fem* reports a significant negative percentage. This indicates that higher female enrollments are less favorable for football schools and contribute more towards universities without football.

Table X also demonstrates that female enrollments, tax rates, and private status all have significant weight in the unexplained variation between football and non-football institutions. As mentioned earlier, this unexplained difference can be attributed to the university participating in NCAA football. Again, *%Fem* is associated with a negative percentage and can be interpreted as increasing alumni generosity at universities without football programs. *Tax* and *Private* both show positive percent values and hence a

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[41] Weighted t-values are constructed using the respective standard error of the football (non-football) schools and the relative percentage make-up of the sample. For complete methodology, see Long and Caudill (1992).

favorable treatment towards increasing alumni contributions at football schools. These findings lead to the following conclusions. Women seem to be less inclined to donate to an alma mater that invests in football. Female students (potential alumni) may be more concerned with the academic nature of higher education and may find football a needless distraction. However, tax rates and private status account for increases in alumni giving at football schools. Football school preference of the tax rate (i.e. the incentive to donate for income deductions) could indicate higher incomes within those schools. The positive effect of *Private* is consistent with the earlier argument that private schools are better schools leading to better jobs

A tale of two schools: Auburn University and Emory. In 2003, Auburn University had an enrollment of 21,236, an estimated alumni base of 531,775, and received $18,529,853 in alumni contributions. During that time, Auburn participated in NCAA Division I-A football. However, what would the contributions have been if Auburn had not participated in football? Using the coefficients from the non-football model in Table IX, along with the Auburn characteristics for 2003, a prediction can be made. Without football, the school could expect to receive $9,287,267, or about half of the original amount. On the other hand, consider Emory University, a school without a football team. With an enrollment of 11,113 and alumni contributions of $7,425,514, the same calculation can be made by inserting Emory's characteristics into the football regression. With football, Emory might expect to see as much as $50 million more in alumni contributions.

CHAPTER VI

ESTIMATION OF ATHLETIC SUCCESS

As was evident from the literature review, most of the research involving giving and athletics has focused on the effect of athletic success. Every study uses athletic performance measures to incorporate the effect of athletics. These include winning percentages, postseason appearances, and national rankings. The issue is examined in this thesis as well.

The sample used here is a subset of the sample from the previous chapters. Because athletic success measures are introduced, schools without athletic programs must be omitted from the sample. The resulting dataset is a cross-section of 357 institutions participating in both NCAA football and basketball. Again, all variables are taken from the 2004 fiscal year and corresponding 2003-2004 academic year. Athletic success values are collected from the previous three sports seasons, beginning fall 2002 and ending spring 2004.

Athletic success is measured using two types of variables.[42] The first are the winning percentages of a university's football and basketball programs. These values are calculated by dividing the total number of wins by the total number of games played in a season.[43] $WPFB_{-2}$, $WPFB_{-1}$, and $WPFB$ correspond to the winning percentages from the

[42] Descriptive statistics of the athletic success variables can be found in Table XIII.
[43] Total number of wins and games played includes any postseason play.

2001, 2002, and 2003 football seasons.[44] $WPBB_{-2}$, $WPBB_{-1}$, and *WPBB* are the respective winning percentages for the 2001, 2002, and 2003 basketball season. The second set of performance measures is a series of dummy variables indicating appearances in the postseason. All NCAA divisions offer some postseason opportunities for teams meeting high performance criteria; most notably the Bowl Championship Series and NCAA Basketball Tournament in Division I athletics. $FBPS_{-2}$, $FBPS_{-1}$, and *FBPS* take on a "1" value for appearances in the 2001, 2002, and 2003 postseasons. $BBPS_{-2}$, $BBPS_{-1}$, and *BBPS* are the basketball counterparts.

The lagged values of the success measures are included to control for time sensitive donations towards universities. Donors who are motivated by athletic performance may not have time to contribute prior to the start of the next fiscal year. For example, consider the NCAA Basketball tournament, which starts in March and finishes around mid-April. Consideration was also given to include differenced values for the athletic success variables. It was felt that some giving from athletic performance is based on relative success, i.e. how well a team did from the previous year. Ultimately, the difference variables were not retained. The coefficient on a differenced variable would essentially represent the difference between the current and lagged values (already included in the regression). Also, there is no definitive way to construct difference values on the postseason dummy variables.

Previous research recognizes the competitive differences between division levels in college athletics. Sigelman and Bookheimer (1983) focused their entire study on a collection of "big time" athletic programs, that is, those in Division I-A. Rhoads and

[44] Athletic seasons (postseasons) run from July to June, i.e. the 2001 season ran from July 2001 to June 2002

Gerking (2000) note that Division I schools make long-term, higher cost commitments to high-profile athletic programs. In fact, the sheer volume of media exposure of the Bowl Championship Series and March Madness is reason enough to separate the sample into divisions.

Table XIV presents the mean values of the variables used in this study, sorted by athletic division. The mean values are surprising. For example, an average Division III university receives almost $30 more per alumnus than an average Division I school. However, when looking at total alumni giving, the average DI institution receives $20 million more in generosity than an average DIII school. Again, this analysis is without any control for other factors affecting donations. For this reason, OLS regression is used to determine the specific effects of athletic success on giving.

The model used here is nearly identical to the model used in the preceding analysis with athletic success variables included in place of participation measures. The model is:

$$\begin{aligned}(9)\qquad & AlumPA_i = \beta_0 + \beta_1 AvgSAT_i + \beta_2 Tuition_i + \beta_3 \%RecLoan_i \\ & + \beta_4 AvgLoan_i + \beta_5 \%Min_i + \beta_6 \%Fem_i + \beta_7 StudExp_i + \beta_8 Tax_i \\ & + \beta_9 Private_i + \beta_{10} WPFB_{-2i} + \beta_{11} WPFB_{-1i} + \beta_{12} WPFB_i + \beta_{13} FBPS_{-2i} \\ & + \beta_{14} FBPS_{-1i} + \beta_{15} FBPS_i + \beta_{16} WPBB_{-2i} + \beta_{17} WPBB_{-1i} + \beta_{18} WPBB_i \\ & + \beta_{19} BBPS_{-2i} + \beta_{20} BBPS_{-1i} + \beta_{21} BBPS_i + \varepsilon_i\end{aligned}$$

Table XIV presents the results of four regressions using the model above. Each column in the table corresponds to a different competitive division with column 1 being the total sample. Diagnostic testing revealed no major problem with multicollinearity and the t-vales reported have undergone White's correction.

When analyzing all divisions together, the estimated model has four significant coefficients (*AvgSAT, AvgLoan, StudExp*, and *Private*) and an R^2 of 0.34. However, there are no significant coefficients associated with any of the athletic success measures. In column 2, looking only at Division I schools, the coefficient of *Private* is no longer significant and the R^2 remains at 0.34. The current winning percentage and a bowl game appearance last season both negatively affect giving at a 90 percent level of significance. The results for Division II schools are given in column 3. The model R^2 is 0.65 and the statistically significant non-athletic variables include *Tuition, %Min, %Fem, Tax*, and *Private*. Winning percentages in both basketball and football from the 2001 season are statistically significant; football success has a negative effect and basketball success has a positive effect. The results for Division III are given in column 4 of the table. The model has an R^2 of 0.43 and contains three statistically significant variables (*AvgLoan, %Fem,* and *StudExp*); however none of the athletic performance variables are statistically significant.

Because each of these regressions contains a group of athletic performance variables, F-tests are conducted to determine whether "athletic performance" helps explain differences in alumni giving. Table XV reports F-values associated with testing the joint significance of all athletic success variables in each model. The computed F-values are 0.72, 0.93, 0.78 and 0.39 for the total, DI, DII, and DIII regression models, respectively. All of the values fall below their critical levels and the null hypothesis that all of the coefficients of the athletic success are zero cannot be rejected. Athletic performance does not seem to matter when explaining differences in alumni giving.

CHAPTER VII

CONCLUSION

The case for college athletics is, and will continue to be, scrutinized by most everyone in and around academia. Though recording overall revenues in the billions of dollars, roughly 60 percent of university athletic programs operate with net losses. Such financial results have spurred researchers to investigate other effects of college sports.

This thesis has examined the role intercollegiate athletics plays in encouraging contributions from alumni. A cross-section of 657 schools for the FY2004 provides the basis for this study. The inclusion of schools without athletic programs in this dataset allows for a more thorough investigation than previous literature has offered.

The initial analysis explored the effect of athletic participation by a university; a question also never considered in previous literature. A constructed model of alumni generosity yielded several significant student, alumni and institutional characteristics. SAT scores and female enrollments are both directly related to giving, while the average student loan amount and minority percentages affect inversely. University characteristics like student expenditures and private/public status have positive connections with educational contributions.

It can be said that participation in NCAA football has a positive effect on alumni donations. School having such a program can expect roughly $3.3 million more in educational contributions than a university choosing not to participate. However, results offer no significant relationship between basketball programs and levels of giving.

Decomposition reveals over 80 percent of the differences between alumni contributions at football and non-football schools are determined by the sheer presence of a football team. Alumni treat schools with football programs more favorably by awarding them with higher donations. Reasons for this effect could stem from media exposure, feelings of connection from alumni, and a variety of other factors. It was also shown that women have a negative preference for football while tax rates and private status encourages donations towards football-participating institutions.

Further analysis was conducted to determine if the relative performance of athletic programs have any affect on giving. Winning percentages and post-season play variables were included into the alumni generosity model. The results were inconclusive. While regressions by competitive division yielded a few significance performance measures, overall model testing canceled these minute effects. Participation is what matters, success is inconsequential.

Although the results of this thesis offer insights into the relationship between athletics and alumni giving, the scope of their interpretation is limited. Data availability and quality are two issues that this paper, like many others before, find problematic. Most of the data problems are with the alumni giving information. Alumni data is inconsistently reported and filled with measurement error. Future studies may try more direct measures of alumni characteristics, if available. Also, the cross-sectional data used in this thesis limits any investigation of time-sensitive variation in alumni generosity. Panel data over several years may better describe schools with traditions of giving or help account for yearly differences in institutional characteristics. Finally, this author recommends that continued investigations into the relation of alumni giving and athletics focus on a case-by-case basis. Universities and other institutions of higher education differ on many levels. Controlling for these differences leads to models that may misrepresent the characteristics of an individual school. Case studies incorporate these school-specific variations and could reveal common results among differing institutions.

All in all, university officials wanting to increase educational contributions may find the results of this thesis beneficial. However, specific policy applications are imprudent. While there are elevated levels of giving associated with football programs, a complete cost-benefit analysis should be conducted before any investments in athletics are undertaken. These findings relate only to alumni contributions and are proof of spillover benefits in intercollegiate athletics.

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APPENDIX

TABLE I

Dependent Variable Information

Variable	Description	Mean	Minimum	Maximum
AlumTotal	Total alumni contributions	7535183	2668	1.88 x10^8
AlumPS	Total alumni contributions divided by total enrollment	1356.6	0.47	36979.83
AlumPA	Total alumni contributions divided by one-quarter total enrollment times upper bound age	44.03	0.06	691.54
AlumPA2	Total alumni contributions divided by one-quarter total enrollment times age	10.57	0.02	230.99

TABLE II

Explanatory Variables

Variable Name	**Label**	**Expected Direction**	**Description**
Percent Minority	***%Min***	-	The ratio of minority (non-Caucasian) students to total enrollment.
Percent Female	***%Fem***	-	The ratio of female students to total enrollment.
Percent Receiving Student Loan Aid	***%RecLoan***	-	The percentage of student receiving any type of student loan for fall 2003 to spring 2004.
Average Amount Student Loan Aid	***AvgLoan***	-	The average amount of a student loan at a respective university for the 2003-2004 year.
Average SAT	***AvgSAT***	+	The average SAT score (or ACT equivalent) of the fall 2003 incoming freshmen class
Tuition	***Tuition***	+	Total tuition and fees for fall 2003.
Expenditure per Student	***StudExp***	+	The ratio of total student expenditure (instruction, student services, and academic support) to total enrollment..
Enrollment	***Enroll***	+	Full-time enrollment for the 2003-204 academic year
Age of the Institution	***Age***	+	Current year (2003) minus the founding date of the school.
Private School Dummy Variable	***Private***	+	A dummy variable indicating private school status: "O" if public institution, "1" if private.
Tax Rate	***Tax***	?	Average adjusted gross income tax rate by state with applicable highest marginal state tax

TABLE III

Explanatory Variable: Descriptive Statistics[45]

Variable	Mean	Std Dev	Minimum	Maximum
%Min	0.29	0.18	0.03	0.99
%Fem	0.58	0.12	0.03	1
%RecLoan	0.57	0.19	0.04	1
AvgLoan	4133	1390	1002	11794
AvgSAT	1110	126.14	774	1520
Tuition	15558	7318	2554	30120
StudExp	12918	10323	3338	98628
Tax	0.19	0.03	0.15	0.32
Enroll	7501.24	8662.90	377	48397
Age	122.34	46.94	10	368

[45] *Private* is not included because it is a dummy variable.

TABLE IV

Mean Values of Dependent Variables

Dependent Variable	Mean Values	
	Football	Nonfootball
AlumTotal	1.09×10^7	2.68×10^6
AlumPS	1642.66	946.03
AlumPA	71.56	44.03
AlumPA2	47.19	35.27

TABLE V

Linear Regression Results with Differing Dependent Variables

Explanatory Variable	AlumTotal (I)	AlumPS (II)	AlumPA (III)	AlumPA2 (IV)
Intercept	-4.34×10^{7}*** (-4.27)	-3263.47** (-2.10)	-161.76** (-2.37)	-28.78*** (-2.47)
Enroll	911.74*** (10.34)			
Age	5.43×10^{4}*** (4.05)	5.32** (2.57)		
AvgSAT	2.05×10^{4}** (2.62)	2.59** (2.23)	0.14*** (2.82)	0.03*** (2.91)
Tuition	-360.92** (-2.08)	0.04 (1.48)	1.57×10^{-3} (1.34)	2.75×10^{-4} (1.37)
%RecLoan	6.42×10^{5} (0.02)	-1229.93** (-2.09)	-46.81* (-1.81)	-5.89 (-1.34)
AvgLoan	106.80 (0.25)	-0.23*** (-3.56)	-0.01*** (-3.48)	-1.56×10^{-3}*** (-3.20)
%Min	7.01×10^{6}* (2.02)	-878.18* (-1.69)	-41.24* (-1.82)	-5.64 (-1.47)
%Fem	3.45×10^{6} (0.72)	1894.18** (2.56)	91.57*** (2.81)	19.37*** (3.49)
StudExp	724.27*** (8.89)	0.08*** (6.21)	3.35×10^{-3}*** (6.12)	5.03×10^{-4}*** (5.39)
Tax	9.64×10^{5} (0.06)	-1729.51 (-0.70)	-48.24 (-0.44)	-12.02 (-0.65)
Private	8.05×10^{6}** (2.80)	533.66 (1.24)	27.75 (1.47)	4.38 (1.36)
Football	1.98×10^{6}** (1.55)	351.57* (1.80)	19.61** (2.35)	2.29* (1.61)
Basketball	-4.94×10^{5} (-0.19)	128.26 (0.32)	5.17 (0.29)	-0.48 (-0.16)
R^2	0.49	0.37	0.35	0.31
N	657	657	657	657

* Statistically significant at greater than 90% in a two-tailed test
** Statistically significant at greater than 95% in a two-tailed test
*** Statistically significant at greater than 99% in a two-tailed test

TABLE VI

Correlation Matrix

Explanatory Variable	AvgSAT	Tuition	%RecLoan	AvgLoan
AvgSAT	1	0.57	-0.27	0.19
Tuition	0.57	1	0.24	0.36
%RecLoan	-0.27	0.24	1	0.30
AvgLoan	0.19	0.36	0.30	1
%Min	-0.06	-0.03	-0.31	-0.13
%Fem	-0.27	-0.01	0.13	-0.05
StudExp	0.72	0.59	-0.2	0.13
Tax	0.07	0.06	-0.16	-0.04
Private	0.29	0.87	0.46	0.38
Football	0.15	-0.03	0.01	-0.03
Basketball	0.08	0.03	0.07	0.08

TABLE VI (continued)

Correlation Matrix

Explanatory Variable	%Min	%Fem	StudExp	Tax
AvgSAT	-0.06	-0.27	0.72	0.07
Tuition	-0.03	-0.01	0.59	0.06
%RecLoan	-0.31	0.13	-0.20	-0.16
AvgLoan	-0.13	-0.05	0.13	-0.04
%Min	1	0.02	0.11	0.26
%Fem	0.02	1	-0.20	0.03
StudExp	0.11	-0.2	1	0.09
Tax	0.26	0.03	0.09	1
Private	-0.13	0.11	0.36	-0.04
Football	-0.21	-0.35	0.13	-0.15
Basketball	-0.06	-0.08	0.02	-0.01

TABLE VI (continued)

Correlation Matrix

Explanatory Variable	Private	Football	Basketball
AvgSAT	0.29	0.15	0.08
Tuition	0.87	-0.03	0.03
%RecLoan	0.46	0.01	0.07
AvgLoan	0.38	-0.03	0.08
%Min	-0.13	-0.21	-0.06
%Fem	0.11	-0.35	-0.08
StudExp	0.36	0.13	0.02
Tax	-0.04	-0.15	-0.01
Private	1	-0.11	-0.04
Football	-0.11	1	0.23
Basketball	-0.04	0.23	1

TABLE VII

Variance Inflation Factors

Explanatory Variable	VIF
Intercept	0
AvgSAT	3.23
Tuition	8.23
%RecLoan	2.01
AvgLoan	1.26
%Min	1.36
%Fem	1.26
StudExp	2.53
Tax	1.12
Private	6.57
Football	1.33
Basketball	1.11

TABLE VIII

Heteroscedasticity Consistent Estimates

Explanatory Variable	All Schools
Intercept	-161.76** (-2.02)
AvgSAT	0.14*** (2.60)
Tuition	1.57×10^{-3} (1.57)
%RecLoan	-46.81 (-1.65)
AvgLoan	-0.01*** (-3.86)
%Min	-41.24** (-2.09)
%Fem	91.57** (2.19)
StudExp	3.35×10^{-3}*** (3.73)
Tax	-48.24 (-0.46)
Private	27.75** (2.00)
Football	19.61** (2.39)
Basketball	5.17 (0.38)
R^2	0.35
N	657

* Statistically significant at greater than 90% in a two-tailed test
** Statistically significant at greater than 95% in a two-tailed test
*** Statistically significant at greater than 99% in a two-tailed test

TABLE IX

Regression Results Seperated by *Football*

Explanatory Variable	Total Sample (I)	Football (II)	Non-Football (III)
Intercept	-128.33** (-1.78)	-75.115 (-0.62)	-167.99** (-1.88)
AvgSAT	0.15*** (2.71)	0.16* (1.94)	0.14*** (2.66)
Tuition	$1.74 \times 10^{-3*}$ (1.80)	1.2×10^{-4} (0.10)	2.48×10^{-3} (1.38)
%RecLoan	-38.73 (-1.43)	-39.75 (-1.21)	-48.28 (-1.22)
AvgLoan	-1.05×10^{-2}*** (-4.29)	-9.51×10^{-3}*** (-2.56)	-8.38×10^{-3}*** (-3.34)
%Min	-51.97** (-2.47)	-54.03* (-1.79)	-18.95 (-0.76)
%Fem	68.51** (1.79)	-90.45 (-1.08)	189.04*** (4.57)
StudExp	3.50×10^{-3}*** (4.24)	2.90×10^{-3}*** (2.93)	4.05×10^{-3}*** (3.13)
Tax	-79.38 (-0.85)	91.13 (0.68)	-316.87** (-2.27)
Private	20.56 (1.63)	58.45** (2.57)	-13.49 (-0.92)
R^2	0.34	0.32	0.45
N	657	389	268

* Statistically significant at greater than 90% in a two-tailed test
** Statistically significant at greater than 95% in a two-tailed test
*** Statistically significant at greater than 99% in a two-tailed test

TABLE X

Decomposition

Explanatory Variable	Percentage of Alumni Contributions Differential Due to Football Programs	
	Alumni Characteristics	Residual Component
AvgSAT	19.56 (2.66)	74.26 (0.17)
Tuition	-5.08 (1.38)	-121.23 (1.00)
%RecLoan	-0.77 (1.22)	17.86 (0.16)
AvgLoan	3.01 (3.34)	-16.78 (0.20)
%Min	5.46 (0.75)	-32.42 (0.77)
%Fem	-59.45 (4.57)	-549.20 (3.90)
StudExp	39.65 (3.13)	-58.86 (0.99)
Tax	12.45 (2.27)	274.03 (2.29)
Private	5.09 (0.92)	155.18 (1.94)
Total (including intercept)	19.92	80.08

TABLE XI

Decomposition II

Explanatory Variable	Percentage of Alumni Contributions Differential Due to Non-Football Programs	
	Alumni Characteristics	Residual Component
AvgSAT	22.11	71.71
Tuition	-0.26	-126.06
%RecLoan	-0.64	17.72
AvgLoan	3.42	-17.18
%Min	15.57	-42.53
%Fem	28.44	-637.09
StudExp	28.35	-47.56
Tax	-3.58	290.06
Private	-22.07	182.34
Total (including intercept)	71.36	28.64

TABLE XII

Descriptive Statistics of Athletic Success Variables [46]

Variable	Mean	Std Dev	Minimum	Maximum
$WPFB_{-2}$	0.53	0.25	0	1
$WPFB_{-1}$	0.51	0.24	0	1
WPFB	0.51	0.25	0	1
$WPBB_{-2}$	0.55	0.19	0.09	0.93
$WPBB_{-1}$	0.54	0.18	0.04	0.97
WPBB	0.53	0.19	0.04	0.94

[46] $FBPS_{-2}$, $FBPS_{-1}$, *FBPS*, $BBPS_{-2}$, $BBPS_{-1}$ and *BBPS* are not included because they are dummy variables.

TABLE XIII

Mean Values of Variables by Division

Explanatory Variable	All Divisions	Division I	Division II	Division III
AlumPA	72.17	67.67	18.42	100.85
AvgSAT	1132.19	1152.41	1024.31	1158.4
Tuition	14204.04	10596.09	8062.73	20790.73
%RecLoan	0.57	0.45	0.64	0.66
AvgLoan	4136.55	3990.34	3764.73	4458.03
%Min	0.26	0.29	0.28	0.21
%Fem	0.54	0.53	0.57	0.54
StudExp	14355.06	14892.64	8028.16	16586.62
Tax	0.18	0.19	0.18	0.18
$WPFB_{-2}$	0.53	0.52	0.53	0.54
$WPFB_{-1}$	0.51	0.52	0.50	0.51
WPFB	0.51	0.51	0.51	0.50
$WPBB_{-2}$	0.54	0.54	0.55	0.54
$WPBB_{-1}$	0.54	0.54	0.55	0.54
WPBB	0.53	0.52	0.53	0.55

TABLE XIV

Regression Results with Differing Success Variables

Explanatory Variable	All Divisions	Division I	Division II	Division III
Intercept	-81.60 (-0.66)	-423.94 (-0.73)	-24.63 (-0.61)	-141.28 (-0.84)
AvgSAT	0.18** (2.30)	0.29** (2.21)	0.04 (1.38)	0.07 (0.57)
Tuition	-4.74×10^{-4} (-0.34)	-4.39×10^{-5} (-0.02)	-3.06×10^{-3}** (-2.53)	-1.74×10^{-3} (-0.60)
%RecLoan	-51.95 (-1.27)	-1147.88* (-1.78)	21.76 (1.35)	-36.87 (-0.52)
AvgLoan	-0.01*** (-2.77)	-0.01 (-1.08)	-0.01 (-1.51)	-0.01** (-2.08)
%Min	-40.48 (-1.47)	-39.61 (-0.80)	-33.06** (-2.14)	-80.17 (-1.25)
%Fem	-86.01 (-0.97)	264.92 (0.58)	-53.47* (-1.84)	-162.24** (-2.30)
StudExp	2.76×10^{-3}*** (2.88)	1.93×10^{-3}** (2.14)	1.10×10^{-3} (1.01)	4.50×10^{-3}** (2.24)
Tax	57.71 (0.42)	118.62 (0.59)	218.40** (2.47)	-131.10 (-0.71)
Private	66.61** (2.34)	77.35 (1.08)	60.36*** (3.82)	80.02 (1.56)

TABLE XIV (continued)

Regression Results with Differing Success Variables

Explanatory Variable	All Divisions	Division I	Division II	Division III
$WPFB_{-2}$	-2.97 (-0.14)	8.63 (0.25)	-18.27* (-1.76)	15.98 (0.33)
$WPFB_{-1}$	30.09 (1.11)	80.64 (1.33)	8.05 (0.62)	-1.37 (-0.03)
WPFB	-18.47 (-0.79)	-80.30* (-1.69)	-5.91 (-0.47)	-11.78 (-0.28)
$FBPS_{-2}$	29.87 (0.91)	68.63 (1.14)	10.80 (1.17)	-27.46 (-1.31)
$FBPS_{-1}$	-2.97 (-0.14)	-63.52* (-1.84)	-1.98 (-0.17)	13.71 (0.71)
FBPS	30.09 (1.11)	-7.35 (-0.28)	-7.51 (-1.11)	2.34 (0.11)
$WPBB_{-2}$	-3.30 (-0.11)	-6.71 (-0.11)	-4.23 (-0.44)	-12.96 (-0.29)
$WPBB_{-1}$	-41.09 (-0.80)	-91.14 (-0.73)	38.79 (1.53)	-37.45 (-0.69)
WPBB	49.42 (1.05)	165.89 (1.17)	-28.21 (-1.55)	-1.00 (-0.03)
$BBPS_{-2}$	1.29 (0.11)	10.35 (0.56)	10.77* (1.79)	-3.68 (-0.12)
$BBPS_{-1}$	-3.16 (-0.31)	13.07 (0.48)	-8.80 (-1.16)	-18.52 (-0.72)
BBPS	-14.95 (-0.85)	-70.56 (-1.53)	11.23 (1.63)	27.15 (0.73)
R^2	0.34	0.34	0.65	0.43
N	357	152	63	142

* Statistically significant at greater than 90% in a two-tailed test
** Statistically significant at greater than 95% in a two-tailed test
*** Statistically significant at greater than 99% in a two-tailed test

TABLE XV

F-Statistics on Division Regressions

	All Divisions	Division I	Division II	Division III
F-Statistic	0.72	0.93	0.78	0.39
$\alpha = 0.01$	1.81	1.83	2.00	1.83
$\alpha = 0.05$	2.30	2.34	2.65	2.34