

# A reexamination of the effect of big-time football and basketball success on graduation rates and alumni giving rates

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## Abstract

To determine the impact on the academic mission, the models in this study test whether there is statistical evidence that student graduation rates or alumni giving rates are influenced by pigskin or hoop success for major universities after adjustment for key academic variables. Using a sample of big-time sports universities and models comparable to other research, the evidence presented in this article indicates that having a highly successful football team has a positive impact on both the overall graduation rate and the alumni giving rate. In contrast, a successful basketball team has no significant effect on either of these key measures of academic success.

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## 1. Review of the literature

There are few papers in the literature that examine whether there are spillover effects on overall graduation rates from a school's successful football program. One theory is the "football fever" or substitute theory that began with Tucker (1992). This paper studied 1984–1989 graduation rates for 64 universities with high-quality sports programs and reported statistical evidence that major conference football success measured by the number of appearances in the final AP top 20 rankings is negatively related to the school's overall graduation rate. The explanation was that a significant portion of a school's student body wastes time in a frenzy over a successful football team and the graduation rate is diminished. This reasoning is synonymous with an earlier paper by Shughart, Tollison and Goff

(1986) that found that football success comes at the expense of academic success of the economics faculty. Using a sample of 126 US colleges and universities, these authors presented a regression model estimation that the winning percentage of a football team was negatively related to per capita publications of economics departments over the 1974–1978 period measured by the numbers of pages published in 24 major economics journals. The explanation given for this tradeoff between success in scholarly productivity and football success was that professors deferred work on research papers to attend games, take road trips, and go to bowl games.

Conversely, Mixon and Trevino (2002) argue instead for an alternate "football chicken soup" or complement theory. This study of major football conferences in 2000–2001 found a positive and significant relationship between a university's winning percentage in football and overall graduation rates. The explanation given is that being a football fan, along with other important extracurricular activities, helps

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students to adjust to college life and this “social development process” spills over to improve one’s academic performance and lowers student attrition. The same substitute versus complement theories also apply to the impact of big-time basketball success on academic variables. Although untested in the Mixon and Trevino study, the Tucker (1992) study presented evidence that a big-time basketball program is unrelated to the overall graduation rate. A study by Rishe (2003) also found no relationship between basketball success variables and the six-year graduation rates of freshman entering in 1988. Using a sample of 252 Division I schools, Rishe tested athletic success variables measured by the number of Sears’ Director’s Cup points, the Jeff Sagarin rankings, average total profit, and membership in a major conference. This paper also reported a lack of significant relationship between any of these athletic success variables for football and the overall graduation rate.

Another key measure of academic success is the average alumni giving rate. Success on the playing field can create publicity or an advertising effect that raises the profile of a university and increases the likelihood that alumni make donations. A higher percentage of alumni who contribute to their schools indicates more revenue schools have to spend on improving academics, including new buildings, smaller class sizes, more computer resources, higher quality instructors, and so on. If so, this would be additional support for the complement theory. The literature on this relationship for big-time collegiate competitors is also mixed, particularly in terms of which measures of football or basketball success affect the alumni giving rate.

A study by Sigelman and Carter (1979) used a 1975–1976 sample comprised of about 90 universities playing big-time Division I schedules and examined the relationship between alumni donations, bowl appearances, and winning records of football and basketball teams. The major conclusion of the authors was that the results did not support an association between successful athletic performance and alumni giving. Brooker and Klastorin (1981) studied 58 members of major athletic conferences from 1963 to 1971 and reported a positive relationship between the percentage of alumni donors and football winning percentage and bowl appearances. McCormick and Tinsley (1990) studied cross-sectional data on gifts per alumni over a 5-year period for Clemson University and concluded that athletic success increases both athletic booster donations and general contributions. In a more comprehensive study, Baade and Sundberg (1996) used data from over 300 institutions of various types from 1973–1974 to 1990–1991 and they found that general giving per alumni donations depends very little on the overall winning record. However, bowl appearances and NCAA basketball tournament appearances for

public universities were found to raise general giving. This finding is consistent with the study by Rhoads and Gerking (2000). Using data collected from 87 universities that fielded both NCAA Division I football and basketball teams over the period 1986–1987 to 1995–1996, the principal conclusion was that alumni-educational donations respond positively to football bowl wins and NCAA basketball tournament appearances. However, their study did not test for the impact of the winning percentages. Tucker (1995) used data for academic year 1989 to estimate the relationship between all sources of university contributions and AP rankings in football and basketball for 55 major athletic universities. The principal conclusion was that the AP rankings had no significant impact on contributions.

Other papers by the author of this article on the relationship between big-time athletic success and academics are worthy of note. Tucker (2005 forthcoming) found that high quality successful football teams had a positive impact on the SAT scores of incoming freshman in academic years 1996 through 2002. The conclusion is that a strong athletic success advertising effect or positive externality was created after the formation of the bowl alliance in 1995 and BCS series in 1998. In years between 1990 and 1995 this relationship was statistically insignificant. In another article, Tucker (2004a) tested the importance of membership in a super conference on the academic mission. Consistent with the McCormick and Tinsley (1987) study, the finding was a positive relationship existed between super conference membership and SAT scores. Tucker (2004b) examined the impact of Propositions 48, 38-E and 16 on the graduation rates of football players. The results of this paper support the argument that NCAA reforms over recent years have changed the impact of big-time football performance measures on the graduation rates of football players from negative prior to these propositions in 1984–1985 to positive after all these reforms were implemented in 2001–2002. The explanation is that higher academic standards have resulted in more highly successful teams with football players who now have the academic ability to overcome the in-service adverse effect of big-time competition on their graduation rates. Finally, Tucker (2004c) revisited the Shugart et al. findings described above. Using a similar empirical model applied to more recent data, Tucker found that the winning percentage for football had no statistically significant impact on the per capita number of pages published in top economic journals.

After controlling for academic variables, the objective of this study is to extend the sports economics literature by using 2001–2002 data and three measures of football and basketball success. For the first time in the literature, the winning percentage, bowl and NCAA

Table 1  
Variable descriptive statistics, 2001–2002

Variable	Description and range	Mean	S.D.
GR	Six year graduation rate (33–94 percent)	63.65	14.60
AAGR	Average alumni giving rate (4–48 percent)	18.82	8.42
SAL	Average salary of faculty ( $24.2\text{--}47.3 \times 10^3$ )	35.18	3.90
SFR	Student faculty ratio (7.5–21)	15.73	3.16
PRI	Private school dummy (1 = private; 0 = public)	0.18	0.39
ROLL	Enrollment ( $4.01\text{--}38.49 \times 10^3$ )	19.56	8.30
AGE	Age of university (23–232 years)	135.16	35.73
FWP	Football winning percentage (17–93 percent)	54.33	18.22
BWP	Basketball winning percentage (32–83 percent)	58.64	11.17
FBA	Football bowl appearances (0–6)	2.95	1.90
BTA	Basketball NCAA tournament appearances (0–28)	6.15	6.36
FAPA	Football final top 20 AP Poll appearances (0–6 points)	1.46	1.76
BAPA	Basketball final top 20 AP poll appearances (0–6 points)	1.28	1.60

tournament appearances, and final AP poll rankings for both football and basketball are tested as determinates of two key measures of academic success: overall graduation rates and the average alumni giving rate.

## 2. Model and data

When a student selects a university, he or she seeks a diploma that is a combination of human capital investment to yield future higher income and psychic benefit. Academics is primarily investment in nature and athletics is a psychic benefit. Following Tucker (1992) and others, a student academic output empirical equation is specified:

$$\text{GR, AAGR} = a_0 + b_1X + \varepsilon$$

where GR is the average graduation rate and AAGR is the average alumni giving rate,  $a_0$  is a constant term,  $X$  is the vector of academic and nonacademic variables describing human capital investment and consumption characteristics,  $b_1$  is the vector of coefficients on these variables, and  $\varepsilon$  is the error term. Investment characteristics include academic quality measures such as student/faculty ratios and the average salary of faculty. A key consumption quality characteristic is athletic success in football and basketball. For comparability, the data used to estimate the empirical equation presented above are drawn from the same big-time athletic universities used in the study by Mixon and Trevino (2002). The sample includes members of the following major conferences: Atlantic Coast, Big 10, Big 12, Big East, Mountain West, Pacific 10, Conference USA, Southeastern, and Notre Dame.<sup>1</sup>

<sup>1</sup> Air Force and Army were deleted because of their failure to report one or more of the variables used in the model.

Table 1 contains the variable descriptive statistics. Brief explanations and expected signs for the variables tested in the model are as follows.

### 2.1. The dependent variables

*Six-year graduation rate.* GR is one of the dependent variables used for the model. More specifically, GR is the six-year actual graduation rate for the class that entered in 1996–1997 and graduated in 2001–2002. The average for GR in the sample is 64 percent.

*Average alumni giving rate.* AAGR is the other dependent variable used in the model. It is the percentage of undergraduate alumni who gave money to their school during the 1999–2000 and 2000–2001 academic years. This measure does not include donations to athletic funds. The average for AAGR in the sample is 19 percent.<sup>2</sup>

The sources of GR, AAGR, and all the academic variables except faculty salary used in the model are *America's Best Colleges 2003 and 1998*. In order to estimate the average cross-sectional values of academic variables that influence the dependent variables during the six-year period prior to 2001, each academic variable is an average of academic years between 1996 and 2001. The average value for academic variables therefore corresponds to the timeline of matriculation (GR) and just prior to the years of donations (AAGR).

### 2.2. The academic variables

*Salary of the faculty.* This variable (SAL) is the average salary of full-time faculty. The average salary in this sample is \$35,184. A higher average salary

<sup>2</sup> A detailed explanation for this variable is available on the US New America's Best Colleges web site.

indicates higher quality instruction that improves the graduation rate and success of alumni who reward the school with contributions. The expected sign here is positive.<sup>3</sup>

*SFR ratio.* This variable (SFR) is the academic year student enrollment divided by the number of faculty at each school. The average SFR for this sample is 16. If lower student-faculty ratios improve the quality of instruction and attention provided to students who graduate and make financial donations, the expected sign for the coefficient on SFR is negative.

*Private school dummy.* A zero-one dummy variable (PRI) equals 0 for a publicly-supported university. As shown in Table 1, a greater proportion (82 percent) of the universities sampled were public. PRI controls for the theory that private-supported institutions have a greater incentive to graduate higher-quality students who later become highly successful and reward these schools with donations. The expected sign on this variable is positive.

*Student enrollment.* The total number of students enrolled variable (ROLL) measures the size of the university. The average enrollment for universities in the sample is 19,562. A smaller university may hire faculty devoted to teaching, and the impact on the graduation rate and alumni giving is positive. On the other hand, large universities may offer more courses and degree options that facilitate graduation and the chances of having successful alumni who make contributions to their universities. Therefore, no a priori prediction is made about the sign of this variable.

*Age of the university.* The age variable (AGE) is the number of years since the university's establishment. This quantitative regressor measures the maturity of the campus. The average age for universities in the sample is 135 years. Since an older university may be steeped in academic heritage, it can offer prestige as a nonpecuniary compensation to professors and access to more funding sources that contribute to the education of students and alumni giving. Older universities have more alumni who are more likely to have a tradition of alumni giving. The expected relationship between the graduation rate, alumni giving rate and age of the university is therefore positive.

### 2.3. Athletic success variables

*FWP.* The studies by McCormick and Tinsley (1987); Sigelman and Carter (1979); Tucker (1992); Baade and Sundberg (1996), and Mixon and Trevino (2002) tested the relationship between academic success variables and football success variables measured by

the winning percentage over various time periods.<sup>4</sup> In this study, FWP equals the winning percentage for football for six years prior to academic year 2001–2002. This period of time corresponds to the six-year graduation rate period since the students graduating in this time period are affected by either the costs or benefits of football success. The average winning percentage for FWP is 54 percent. If the negative externality “fever” theory is correct, a significant negative sign for an athletic success variable would be expected. A significant positive sign would be consistent with the positive externality “chicken soup” theory.

In terms of the average alumni giving rate, a higher winning percentage would be expected to create a positive externality by “charming” alumni and a greater percentage of them make contributions. In this case, the expected sign is positive. Conversely, a negative sign for FWP would suggest that the winning percentage causes alumni to resent inappropriate priorities on football success and this regressor is therefore a negative externality. The same analysis of expected signs applies to the other football and basketball success variables described below.

*BWP.* This variable measures the percentage of basketball games won for six years prior to 2001–2002. The average winning percentage for BWP is 59 percent.

*FBA.* As employed in the models of Baade and Sundberg (1996) and Rhoads and Gerking (2000), the FBA variable is the number of postseason bowl appearances by each university over the six-year period beginning in 1996. The average number of bowl trips for FBA is 3.

*BTA.* This variable is the number of rounds a team appeared in the NCAA men's basketball post-season tournament. Mixon (1995) found a positive impact between this variable and SAT scores of incoming freshman using 1994 data. However, the Mixon study did not test for the relationship between the number of NCAA tournament round appearances and graduation rates or alumni contributions. The average for BTA in this sample is 6 rounds in the NCAA tournament over the six-year period.

*FAPA.* As used in Tucker (1992), big-time gridiron success is also measured by the final Associated Press (AP) top 20 ranking for the year. The rationale is that the AP poll is a tabulation of votes based on the assessment of selected sports writers across the nation. These rankings of sports writers take both the quality of the

<sup>3</sup> The source for SAL is from *The Chronicle of Higher Education* web site at <http://www.chronicle.com/stats/aau/2003>.

<sup>4</sup> The McCormick and Tinsley (1987) paper did not study the relationship between football winning percentages and graduation rates. Instead, this study found a positive impact between a thirteen-year trend in winning percentage and SAT scores of entering freshman. Mixon and Trevino (2002) use an eleven-year football winning percentage from 1990–2000.

opposition and the win-loss record into consideration. Being highly ranked in the AP poll over the years signals a high-quality sports university. FAPA counts the number of times a school was ranked in the final AP top 20 for the football team. The average number of final top 20 football appearances is 1.5 times over six years.

*BAPA.* This variable counts the number of times a basketball team appeared in the final AP poll. The average number of NCAA tournament appearances is 1.3 times over the same period.<sup>5</sup>

### 3. Empirical results

A data set was collected for 78 members of the major conferences listed above. Table 2 presents three different specifications using the six-year overall graduation rate dependent variable (GR). The variation in graduation rates accounted for by the variables is between 62 and 64 percent in the models. As shown in equations (1)–(3), SAL, PRI, and AGE have the expected sign and are significant where SFR and ROLL are insignificant. Not surprisingly, an older private school with a higher paid faculty results in higher graduation rates.

The important finding in Table 2 is that each of the football success variables is statistically significant and positive. Consistent with the *Mixon and Trevino (2002)* study, the evidence from recent data is robust that big-time football success can indeed produce net positive externalities that offset the opportunity cost effect in terms of higher overall graduation rates. For example, an opportunity cost of tailgating at a football game could be studying, but it is also a social event that encourages a student to remain in college and graduate. The interpretation of these results is: First, the estimated coefficient for FWP indicates that a 10 percent increase in the winning percentage over a six-year period increases the overall graduation rate by 2.1 percent. Second, the coefficient for FBA estimates that an additional bowl appearance each six years boosts the graduation rate by 1.7 percent. Third, the final AP poll variable, FAPA, estimates that each appearance in this poll yields a 1.7 percent higher overall graduation rate.

The contrast between the results for the football success and basketball success variables is quite interesting. Each of the basketball success measures (BWP,

Table 2

Regression coefficients for the overall six-year graduation rate (GR) of incoming freshman in 1996 by athletic success variables equations

Variable	(1)	(2)	(3)
Intercept	−31.69* (−1.82)	−17.76 (−1.05)	−18.66 (−1.10)
SAL	1.86** (5.47)	1.69** (4.94)	1.73** (5.04)
SFR	−0.09 (−0.21)	−0.14 (−0.31)	0.02 (0.04)
PRI	14.57** (4.12)	15.34** (4.23)	14.76** (4.02)
ROLL	0.08 (0.52)	0.12 (0.75)	0.07 (0.49)
AGE	0.11** (3.54)	0.105** (3.30)	0.11** (3.30)
FWP	0.21** (3.45)		
BWP	0.02 (0.18)		
FBA		1.69** (2.90)	
BTA		0.01 (0.03)	
FAPA			1.69** (2.59)
BAPA			0.05 (0.07)
R <sup>2</sup>	0.64	0.63	0.62
N	78	78	78

Note: t-statistics are shown in parenthesis. A single asterisk denotes significance at the 10 percent level, a double asterisk denotes significance at the 5 percent level.

BTA, BAPA) in the model is insignificant. Hence, as found in *Tucker (1992)*, the evidence presented here does not support success in big-time basketball as providing either a positive or negative externality to the overall graduation rate.

One could argue that the best students are not influenced by athletic success, and the complement theory applies primarily to those students who finish beyond the four-year standard and are most subject to attrition. To test this hypothesis, each specification in Table 2 was also estimated using a four-year graduation rate. The results were that the coefficients for the football success variables were significantly positive and the basketball success variables were statistically insignificant. Also, *Rishe (2003, p. 409)* argues that using an overall student graduation rate that does not omit student-athlete graduation rates leads to a “muddled picture concerning whose academic performance is impacted by athletic success.” To test this proposition, the regressions in Table 2 were estimated using NCAA six-year graduation rate data that excluded student-

<sup>5</sup> The source for the FWP and FBA variables was Historical Football Scores, <http://www.jhowell.net/cf/score/byName.htm>. The final AP poll football rankings for FAP was taken from <http://www.cae.wisc.edu/~dwilson/rsfc/history/Appolls.txt>. The source for the BWP was *The World Almanac* various years; BTA is from Postseason Tournament Records Index <http://www.hometown.aol.com/cebarat/tournstats/index/htm>. The final AP poll appearances (BAP) are from Tournamentfacts.com, <http://www.tournamentfacts.com/id34.htm>.

Table 3  
Regression coefficients for the average alumni giving rate (AAGR) for 1999 and 2000 by athletic success variables equations

Variable	(1)	(2)	(3)
Intercept	–21.19** (–1.88)	–15.65 (–1.46)	–16.17 (–1.48)
SAL	0.88** (4.03)	0.77** (3.53)	0.79** (3.57)
SFR	0.33 (1.14)	0.28 (0.94)	0.39 (1.29)
PRI	6.75** (2.96)	7.32** (3.17)	7.11** (3.02)
ROLL	–0.39** (–3.71)	–0.37** (–3.47)	–0.39** (3.59)
AGE	0.05** (2.37)	0.04** (2.18)	0.04** (2.17)
FWP	0.11** (2.87)		
BWP	–0.04 (–0.67)		
FBA		1.01** (2.72)	
BTA		–0.01 (–0.10)	
FAPA			0.96** (2.30)
BAPA			0.14 (0.31)
R <sup>2</sup>	0.56	0.55	0.53
N	78	78	78

Note: t-statistics are shown in parenthesis. A single asterisk denotes significance at the 10 percent level, a double asterisk denotes significance at the 5 percent level.

athletes.<sup>6</sup> The conclusions remained unchanged by this analysis because each football success variable remained positive and significant and each basketball success variable was insignificant. This finding is not unexpected since student-athletes are a small percentage of the total number of students who graduate.

Table 3 reports the regression coefficients for models using the same three athletic success independent variables and average alumni giving rate (AAGR) as the dependent variable. The variation in the alumni giving rate accounted by the variables ranges from 53 to 56 percent. The academic variables SAL, PRI, ROLL, and AGE are statistically significant and have the expected signs in each regression. It is interesting to note that ROLL had a negative effect on the alumni giving rate. An explanation might be that a smaller school creates a more personal bond with alumni who feel that their donations are more important to smaller schools. To summarize, the findings here suggest that older private

schools with a higher paid faculty and small enrollments positively influence their average alumni giving rates.

The important finding is that the coefficient on the football success variable in each equation is positive and significant. The interpretation of the estimate from equation (1) in Table 3 is that a 10 percent increase in the football winning percentage (FWP) over a six-year period increases the average alumni giving rate by about 1 percent. As shown in equations (2) and (3), one extra bowl appearance (FBA) or additional AP poll appearance (FAPA) over a six-year period is estimated to boost the average alumni giving rate by about 1 percent. These results are inconsistent with Sigelman and Carter (1979) and Baade and Sundberg (1996). Conversely, the results of this paper for football winning percentages are consistent with McCormick and Tinsley (1990) and Rhoads and Gerking (2000). The research of Baade and Sundberg (1996) found similar results for the positive impact of bowl appearances to those reported in Table 3.

As in the models for the graduation rates presented in Table 2, each basketball success regressor (BWP, BTA, BAPA) is statistically insignificant. Therefore, the findings in this paper are inconsistent with the finding of Rhoads and Gerking (2000) that a successful basketball program influences alumni donations.

#### 4. Concluding analysis

While the NCAA does not allow wage competition for athletes, it does allow competition in coaches' salaries, facilities, and other spending for athletic competition. The role of big-time athletics in American colleges and universities is an important and interesting question. We need to understand why universities offer expensive big-time athletics as part of the educational process. The literature offers mixed findings on whether big-time athletic success has a significant impact on the academic mission of universities. Using a data set from major conferences and models comparable to those studied by Tucker, Mixon and Trevino, and others, this paper begins by reexamining the issue of whether there is evidence that a big-time successful football or basketball program yields positive or negative externalities that affect the overall graduation rates of students. One theory is that students are faced with the decision to study or engage in entertainment, including being a fan. If the team is highly successful, there is greater incentive to talk sports, attend games, cut classes, and the opportunity cost is studying and graduating. The opposing theory is that a winning football or basketball program provides a benefit by making students more likely to enjoy the college lifestyle. As a result of satisfying extracurricular activities, such as being a sports fan, more students are unlikely to leave school,

<sup>6</sup> The NCAA source for graduation rates is [www.ncaa.org/](http://www.ncaa.org/).

devote more time to studying and, therefore, the graduation rate rises.

The evidence presented in this article clearly supports the conclusion that there is indeed a significant positive statistical relationship between big-time football success and overall graduation rates. However, the evidence rejected the argument that success in basketball influences the overall graduation rate. These conclusions are more robust than previous studies because this article tests more measures of football success from the literature than previous studies. Instead of using only the winning percentage, bowl appearances, or final AP appearances, this study examines all three measures in order to formulate its conclusions.

In addition to the aforementioned research on the relationship between graduation rates and athletic success, the literature provides estimates of the relationship between measures of athletic success and charitable contributions. To the critics of big-time athletics, the finding that winning football or basketball teams increase alumni giving earmarked for athletics represents perverted priorities. Supporters of big-time athletic competition boast that these higher winning-induced contributions of alumni provide a tangible benefit to the university and therefore justify the importance placed on financing a high-quality sports program. A key measure of donor support for the university (not athletics) is the average alumni giving rate. In support of the complement theory that a successful major football team supports the academic mission, the finding in this paper is that each of the football success variables positively influenced contributions to the university. In contrast, success in basketball had no significant effect on the average alumni giving rate.

In conclusion, using updated data, the results of this research confirm a positive aspect of big-time athletic competition. In short, a successful big-time football team is indeed consistent with the argument that “athletics contributes to academics.” How can the findings of this paper that all three measures of football success positively affect both graduation rates and alumni giving be explained in contrast to earlier research that did not find such a robust relationship? The explanation might be the impact in recent years from increased television coverage of major-conference football schools by ESPN, ESPN2, Time Warner, and the addition of Thursday night games, extra season games, new bowl games, conference playoff games, and the BCS series.

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