EDUCATIONAL CONTRIBUTIONS, ACADEMIC QUALITY, AND ATHLETIC SUCCESS

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This article examines the role of successful Division I football and basketball programs in motivating alumni and other donors to make charitable educational contributions to U.S. universities. Results from fixed effects analysis of panel data on 87 universities for the period 1986–87 to 1995–96 indicate that year-to-year changes in athletic success have a positive impact on levels of alumni giving, but that other types of donors are not as responsive. Also, long-standing athletic traditions established prior to the sample period appear to generate academic benefits in the form of increased charitable donations from all sources. However, the estimated impact of a successful athletic tradition is relatively weak when compared to the effect of student and faculty quality on educational contributions. (*JEL* I22, H49)

I. INTRODUCTION

To meet rising expenses, college and university presidents actively seek private contributions to support the educational mission of their institutions. An important strategic issue in this regard concerns the relative roles of successful athletic traditions and high-quality academic programs in encouraging charitable donations. To what extent is donor generosity influenced by the "warm glow" of victories in recent athletic contests or in strong athletic traditions maintained over many years? Does building top-rated academic programs pay off possibly because graduates earn larger incomes over their careers and acquire greater wealth to share with their mentors? If athletic success is indeed positively associated with educational contributions, which sport produces donations most efficiently? Of course, athletic and academic quality may both lead to greater education-related contributions. Nevertheless, both areas are costly to maintain, so it is of interest to know the amount by which contributions might rise in response to improvements in each.

This article presents an empirical examination of links between athletics, academics, and educational contributions from two perspectives. First, a fixed effects model is applied to panel data on 87 universities from the 1986–87 academic year to the 1995–96 academic year. This analysis has similarities to previous studies of athletic success and educational contributions (e.g., Marts, 1934; Sigelman and Carter, 1979; Brooker and Klastorin, 1981; Sigelman and Bookheimer, 1983; Coughlin and Erekson, 1984; Grimes and Chressanthis, 1994; Baade and Sundberg, 1996), but has the advantage of offering better controls for heterogeneity between universities and over time. The main results of the analysis, which stand in contrast to those presented in some of the earlier work cited, is that year-to-year changes in athletic success have no effect on total educational contributions, but do appear to affect the component of total contributions

*The authors thank Ben Blalock and Esther McGann, University of Wyoming Foundation, for their help in providing the educational contributions data and the University of Wyoming, College of Business, for partial financial support. Gerking also acknowledges, the hospitality of CentER at Tilburg University, where portions of this article were completed, as well as Visiting Grant B46-386 from the Netherlands Organization for Scientific Research (NWO).

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ABBREVIATIONS

ACT: American College Test
OLS: Ordinary Least Squares

Contemporary Economic Policy
(ISSN 1074-3529)
Vol. 18, No. 2, April 2000, 248–258

coming from alumni. Second, a related empirical model is developed to explain the large variation in average contributions received by each of the 87 universities over the 10-year period analyzed. This analysis extends work by McCormick and Tinsley (1987, 1990) and links mean educational contributions to both historical athletic success and institutional quality as measured by prominence of research programs and test scores of incoming freshman.

The remainder of this article is divided into four sections. Section II describes the data measuring voluntary contributions. Section III presents fixed effects estimates of the role of year-to-year changes in athletic success on contributions. Section IV analyzes university-specific variables, such as athletic tradition and academic quality, in determining mean contributions over the sample period. Section V concludes.

II. DATA ON VOLUNTARY CONTRIBUTIONS

Data for this study were collected from 87 universities that fielded both NCAA Division I football and basketball teams over the period 1986–87 to 1995–96. These universities include most members of the Southeastern, Big Ten, Atlantic Coast, Pacific 10, Big 12, and Western Athletic conferences as well as representatives from other conferences and some major independents. Many have made long-term commitments to high-profile athletic programs with teams regularly appearing in major football bowls, the NCAA basketball tournament, and other games broadcast on national television. Thus, the sample includes a large selection of universities at which current and past administrations apparently believe that their institutions can gain from investing in athletics. This article asks whether these gains come in the form of voluntary educational contributions and, if so, whether gains differ between success in football versus success in basketball.

Educational contributions data were obtained from annual publications of the Council for Aid to Education (1987–1996) entitled *Voluntary Support of Education*, which measure dollars of voluntary support received. In this study two alternative measures are analyzed: (1) total real voluntary support of education (in \$1987) from all sources per enrolled student and (2) real voluntary support from alumni (in \$1987) per enrolled student. Total voluntary support includes contributions received from individuals, charitable foundations, businesses, and religious organizations. Research grants and contracts received from sources such as the National Science Foundation, National Institutes of Health, and federal mission agencies are not included. Support received from alumni is one component of total support. Scaling both measures of support by enrollment controls for university size.[1] Real contributions were computed from the raw data using the GDP deflator.

The data set analyzed forms an unbalanced panel because information about contributions is missing for a few years for some universities.[2] The Council for Aid to Education obtains contribution data by survey, and there are instances where university development offices apparently failed to respond. In any case, the data set contains 821 observations, rather than the expected 870. Table 1 lists the 87 universities included in the sample, together with means and growth rates of measures of voluntary support for the period 1986–87 to 1995–96. Table 1 also shows ratios of alumni to total support received for each university and indicates instances of missing contribution data.

Means of both real total and alumni support exhibit considerable variation across universities. Whereas Stanford, for example, received an annual average of nearly \$210 million in total voluntary support from all sources over the period 1986–87 to 1995–96, New Mexico State received less than \$4 million per year. Ten-year growth rates in raw total and alumni support (unadjusted for enrollment) also vary greatly across universi-

1. Contributions are scaled by the number of enrolled students to control for university size. Number of alumni represents another possible choice of a scaling variable. The Council for Aid to Education reports annual alumni counts for each university in each year of the sample; however, these data appear to be measured with substantial error. For many universities, data provided appear to be little more than guesswork and frequently jump around implausibly between years.

2. If contributions data were missing for 6 years or more over the 10-year sample period, the school was excluded from the sample altogether. Also, University of Illinois was excluded because in some years data were reported for the Urbana campus while in other years data were reported for the entire university system. Also, there were a few instances where single-season basketball records were unavailable and, therefore, observations were lost for this reason as well.

TABLE 1
Descriptive Statistics

School	Average Annual Total Support (millions)	Growth of Total Support	Average Annual Alumni Giving (millions)	Growth of Alumni Giving	Alumni Giving as a Share of Total Support	Years of Missing Data due to Unreported Contribution Data
Akron	9.63	79%	2.26	384%	24%	1993, 1996
Alabama	20.17	143%	10.32	358%	51%	
Arizona	41.36	28%	4.59	970%	11%	
Arizona State	26.59	103%	0.96	−31%	4%	
Arkansas	17.69	552%	2.71	375%	15%	1987
Auburn	20.66	40%	7.34	60%	36%	
Ball State	9.36	92%	2.16	65%	23%	
Baylor	23.23	−12%	7.96	−1%	34%	
Boston College	18.89	105%	9.89	2%	52%	
Bowling Green	4.74	9%	1.40	63%	30%	
UC Berkeley	99.18	122%	25.61	116%	26%	
UCLA	85.95	139%	10.15	130%	12%	
Cincinnati	31.32	41%	7.51	149%	24%	
Clemson	21.40	229%	4.64	122%	22%	
Colorado	43.60	68%	9.70	252%	22%	1988
Colorado State	11.20	4%	1.70	252%	15%	1988−90
Delaware	17.66	128%	2.62	196%	15%	1990
Duke	123.98	146%	19.68	152%	16%	
Florida	64.82	58%	12.90	45%	20%	
Florida State	21.31	110%	5.62	196%	26%	
Georgia	27.19	57%	10.50	40%	39%	
Georgia Tech	38.67	−28%	16.45	−69%	43%	1987
Hawaii	11.83	47%	1.07	151%	9%	1993−94
Houston	40.49	120%	7.17	319%	18%	1988−89
Indiana	84.42	201%	15.35	81%	18%	
Iowa	46.96	105%	14.74	37%	31%	
Iowa State	31.23	134%	9.76	374%	31%	
Kansas	30.26	244%	13.80	368%	46%	
Kansas State	17.03	112%	8.38	112%	49%	
Kent State	6.10	13%	0.94	−2%	15%	
Kentucky	26.09	125%	5.83	89%	22%	1991, 1993
Louisville	14.36	274%	3.66	211%	25%	
Maryland	25.64	41%	6.08	80%	24%	
Massachusetts	11.16	109%	2.23	170%	20%	
Memphis	4.29	87%	0.75	309%	17%	
Miami	60.51	21%	5.31	79%	9%	
Miami (Ohio)	11.84	126%	5.51	121%	47%	
Michigan	94.95	99%	34.52	132%	36%	
Michigan State	49.69	58%	7.20	95%	14%	
Minnesota	117.81	21%	12.61	58%	11%	
Mississippi	15.05	104%	5.99	127%	40%	
Mississippi State	13.85	347%	8.64	1045%	62%	
Missouri	30.81	−20%	6.58	34%	21%	
Nebraska	39.97	145%	11.40	127%	29%	
Nevada-Reno	12.76	408%	1.16	9%	9%	1989−1992
New Mexico	12.47	53%	2.16	119%	17%	
New Mexico State	3.76	22%	0.71	25%	19%	1987−91, 1994

TABLE 1 continued

School	Average Annual Total Support (millions)	Growth of Total Support	Average Annual Alumni Giving (millions)	Growth of Alumni Giving	Alumni Giving as a Share of Total Support	Years of Missing Data due to Unreported Contribution Data
North Carolina	62.47	132%	21.61	17%	35%	
North Carolina State	33.00	96%	5.89	77%	18%	
Northern Illinois	4.16	38%	0.62	193%	15%	
North Texas	4.62	75%	1.03	430%	22%	
Northwestern	83.20	88%	22.57	37%	27%	
Notre Dame	55.48	65%	22.04	62%	40%	
Ohio	11.64	118%	4.52	215%	39%	
Ohio State	80.73	92%	17.13	121%	21%	
Oklahoma	24.36	45%	8.39	−37%	34%	1994−96
Oklahoma State	14.83	46%	3.48	86%	23%	1990
Oregon	19.70	226%	8.54	609%	43%	1993
Oregon State	23.60	54%	6.75	126%	29%	
Penn State	66.05	70%	17.87	103%	27%	
Pittsburgh	32.48	138%	5.65	44%	17%	1992, 1994
Purdue	43.75	219%	17.25	294%	39%	
Rice	27.41	83%	6.99	2%	25%	1994−96
Rutgers	30.51	101%	5.40	73%	18%	
South Carolina	24.25	40%	3.40	237%	14%	1987
Southern California	120.16	41%	18.48	67%	15%	
Southern Methodist	22.96	−1%	7.42	−16%	32%	
Stanford	209.97	58%	77.60	115%	37%	
Syracuse	27.58	92%	10.70	212%	39%	1994
Temple	17.20	17%	3.45	339%	20%	
Tennessee	37.99	81%	11.00	187%	29%	
Texas	58.29	154%	10.74	93%	18%	
Texas A & M	66.38	137%	21.01	164%	32%	
Texas Christian	15.18	30%	4.04	125%	27%	
Texas Tech	16.94	64%	1.93	116%	11%	1987−88, 1995
Toledo	4.53	138%	1.69	29%	37%	
Tulane	29.47	23%	11.16	40%	38%	1987, 1995
Tulsa	6.62	256%	1.07	−54%	16%	1994
Utah	47.28	118%	7.18	134%	15%	1987, 1993, 1996
Utah State	6.69	26%	1.87	−37%	28%	
Vanderbilt	54.62	53%	13.37	51%	24%	
Virginia	60.61	174%	19.78	237%	33%	
Virginia Tech	31.43	29%	9.11	−11%	29%	1996
Washington	102.40	99%	13.76	60%	13%	
Washington State	30.57	242%	6.07	511%	20%	1989
Western Michigan	10.51	249%	2.13	136%	20%	
West Virginia	16.35	43%	4.03	−17%	25%	
Wisconsin	130.20	112%	20.14	146%	15%	1993
Wyoming	5.82	128%	2.09	283%	36%	
MEAN	37.80	104%	9.30	154%	26%	

ties. Both measures of growth were positive for most universities; in some cases growth rates were substantial. For example, 40 of the 87 universities more than doubled their total support between 1986−87 and 1995−96. These schools were led by Arkansas, which increased its total support by a factor of about 5.5. For 52 schools, percentage increases in alumni giving exceeded those for total support, indicating a tendency toward greater reliance on the generosity of alumni in comparison with other sources of support. Finally, Table 1 presents calculations of alumni giving as a percentage of total contributions from all sources. Although these figures range from 4% for Arizona State to 62% at Mississippi State, levels of alumni and total support are closely related for most universities in the sample; the Pearson correlation between these two measures is 0.845.

III. FIXED EFFECTS ANALYSIS

The first part of the empirical analysis looks at effects of year-to-year changes in athletic success on voluntary educational contributions. Relationships are estimated by applying fixed effects models to the panel data just described. The model to be estimated is

$$(1)\qquad Y_{jt} = \alpha_j + \lambda_t + \sum_i \beta_i Z_{ijt} + \sum_i \gamma_i X_{ij} + u_{jt},$$

where Y_{jt} measures the natural logarithm of real contributions (either total or alumni) per student to university j in academic year t, Z_{ijt} are explanatory variables that vary over both universities and time (such as those measuring athletic success), X_{ij} are observable (or, at least, potentially observable) variables that vary across universities, but do not change over time (such as geographic location, athletic tradition or historical athletic performance, and whether the university is a land grant or a private institution). α_j and λ_t are unobserved university- and time-specific effects, β_i and γ_i are coefficients, and u_{jt} is an error term. The dependent variables are transformed into natural logarithms in light of the large variation in levels of contributions across universities (see Table 1) partly to reduce heteroskedasticity in u_{jt}. Also, changes in explanatory variables are more likely to exert a constant percentage increase on contributions across universities than a constant absolute increase.

The fixed effects approach was selected for three interrelated reasons. First, it is a simple way to control for unique aspects of universities as well as heterogeneity over time (arising, e.g., from tax law changes and the general increase in stock prices that occurred over the sample period). Second, random effects specifications of equation (1), in which sources of university- and time-specific heterogeneity are treated as error components, are decisively rejected by Hausman (1978) tests.[3] Third, conditional estimates of effects of athletic success measures on voluntary support are thought to be of greater interest than the corresponding unconditional estimates that would be obtained from a random effects model. Coefficients of explanatory variables in equation (1) are broadly interpreted as changes in voluntary support received in year t, holding constant net effects of university- and time-specific factors.

Results from ordinary least squares (OLS) and two-way fixed effects estimates of equation (1) are presented in Table 2. Estimates are presented for both dependent variables, denoted as TOTAL$ and ALUM$. Explanatory variables are limited to those measuring athletic success. BBPOST and FBPOST measure the number of postseason wins in a given year in the NCAA basketball tournament and football bowl games, respectively, whereas the dummy variables BBPROB and FBPROB indicate that a team was on NCAA probation for rules infractions, such as impermissible recruiting or granting improper financial aid.[4] Sample means for these variables also are presented in Table 2.

Variables measuring student quality and quality of academic programs exhibit variation over time within universities and, therefore, also could be included as explanatory variables in the Table 2 regression. This approach is not taken for two reasons. First, for a given school, they are likely to change slowly over time and accurately measuring

3. Hausman test statistics on the two-way random effects estimates of the equations reported in Table 2 are 23.82 for the ln(TOTAL$) equation and 26.44 for the ln(ALUM$) equation. P-values for the two test statistics are less than 0.0001.

4. Four other athletic success variables also were tried in regressions not reported here. These variables measured NCAA basketball tournament appearances, football bowl appearances, and regular season wins in the two sports. Results presented in Table 2 are broadly representative of outcomes using these other variables and avoid possible multicollinearity problems arising when both regular season wins and postseason appearances or performance are included.

TABLE 2
Voluntary Contributions and Year-to-Year Athletic Success

Explanatory Variable	Mean	ln (TOTAL $) OLS	ln (TOTAL $) Two-Way Fixed Effects	ln (ALUMNI $) OLS	ln (ALUMNI $) Two-Way Fixed Effects
Constant	—	−7.014	−6.901	−8.530	−8.386
		(−182.861)	(−624.927)	(−184.428)	(−485.381)
BBPOST	0.543	0.108	0.008	0.118	−0.001
		(3.966)	(0.902)	(3.623)	(0.086)
FBPOST	0.174	0.301	0.017	0.449	0.073
		(3.63)	(0.632)	(4.487)	(1.764)
BBPROB	0.039	−0.142	−0.018	−0.141	−0.136
		(−0.850)	(−0.363)	(−0.700)	(−1.748)
l04FBPROB	0.043	0.361	0.026	0.354	0.030
		(2.259)	(0.545)	(1.837)	(0.408)
Summary Statistics					
N Observations		821	821	821	821
R^2		0.042	0.942	0.045	0.903

Numbers in parentheses are *t*-statistics.

year-to-year changes is difficult.[5] In consequence, they are treated as if they can be swept out when α_j is included in equation (1) but are explicitly considered in the analysis of university mean levels of giving presented in the next section. Second, prior studies sometimes find a positive and significant relationship between certain athletic success variables and alumni contributions. Because these studies do not adequately control for heterogeneity, it is of interest to see whether the same result emerges in a setting where heterogeneity is better controlled and athletic success variables are given the best chance possible to show up as significant determinants of contributions.

OLS results, presented only for comparison purposes, suggest that football bowl wins, NCAA basketball tournament wins, and NCAA probation status for the football team have positive effects on both total contributions and contributions made by university alumni. These results are similar to those of Baade and Sundberg (1996), who also applied OLS to their panel data set. The OLS results, however, easily can be challenged because some schools simply receive more contributions and participate more frequently in postseason football and basketball games. Because of this possible source of heterogeneity bias, these results may not show what happens to a particular school's contributions when its athletic teams perform well. Further, the NCAA may have been more vigilant in imposing sanctions for rule violations on universities with top athletic programs than on lesser known schools receiving lower levels of contributions. In fact, selective rules enforcement by the NCAA may explain why the coefficient of the football probation variable has a positive sign, contrary to what might be expected (for amplification of this point, see Fleischer et al., 1988).

Fixed effects estimates, on the other hand, suggest that after removing heterogeneity among universities and over time, success of a school's athletic programs has smaller effects on educational contributions received. In Table 2, only two-way fixed effects estimates are presented to save space and because one-way fixed effects estimates tell a similar story. As expected from the large variation in average contribution levels between universities reported in Table 1, university-specific variation in both total

5. Possible measures of student quality are good examples in this regard. While annual data on admission test scores are available, they do not appear to be comparable on a year-to-year basis. Score ranges collected for the American College Test (ACT) changed over the sample period (especially in 1990–91) with the inception of the Enhanced ACT. Also, the Scholastic Aptitude Test (SAT) underwent several changes over the sample period involving (1) recentering of the test scale, (2) elimination of antonyms and more and longer reading passages on the verbal portion, and (3) use of calculators and fill-in-the-blank questions on the math portion.

and alumni contributions is significantly different from zero under an F-test at less than the 1% level.[6] Time-specific variation in both contribution variables also differs significantly from zero at the 1% level under a corresponding test, after removing university-specific effects.[7] The much larger coefficients of determination in the fixed effects estimates, compared with those for OLS, indicate the importance of controlling both university- and time-specific heterogeneity.

In the two-way fixed effects estimates of the equation for total contributions, none of the four athletic success variables have coefficients with t-statistics that exceed unity in absolute value. On the other hand, in the alumni contributions regression, coefficients of FBPOST and BBPROB were significantly different from zero, but only if the test is conducted at the rather generous 10% level under a two-tail test. Quite similar coefficient estimates and t-statistics also emerge when the regression is rerun with the dependent variable measured as the natural log of real alumni contributions (not deflated by enrollment). In any case, the coefficient of FBPOST (0.073) indicates that for a given university, alumni contributions per student rise by 7.3% when the football team wins a bowl game. Correspondingly, when a university's basketball team is placed on NCAA probation, alumni penalize the institution by reducing contributions per student by 13.6%. Evaluated at the mean of alumni contributions per student for all universities in the sample ($487), these results imply that a football bowl win is worth an additional $35.55 per student and NCAA basketball probation is associated with a decline in contributions of $66.23 per student. Mean enrollment for sample universities is 24,132 students. So, on average, a football bowl win results in increased alumni contributions of about $858,000 and NCAA basketball probation results in a decline in alumni contributions of about $1.6 million.

These results provide at least limited evidence that year-to-year athletic success has an influence on voluntary contributions to universities in support of education. Additionally, as might be expected, they indicate that alumni appear to care more about the performance of the football and basketball teams than do other types of donors. These outcomes, however, should be interpreted cautiously for at least three reasons. First, in addition to the marginal significance of the coefficients of BBPROB and FBPOST, it remains puzzling as to why BBPOST and FBPROB would perform poorly.[8] In particular, the relationship between probation and giving may be worth more attention in future research. In any case, the overall pattern of coefficient estimates for these four variables does not appear to have an easy explanation. Second, contributions may either lead or lag athletic success. Participation in a bowl game in one year, for example, may affect contributions in the next year. Alternatively, contributions may come from donors who anticipate future athletic success. Experimentation with leading and lagging relationships in estimating equation (1), however, did not yield any clear-cut results to report on this matter. Third, contributions may be at least partly tied to a school's athletic tradition than to its team's performances in a particular year. Because athletic tradition would largely have been determined prior to the sample period, this factor may have been one of many university-specific effects controlled, but removed from explicit consideration, by the fixed effects analysis. The next section examines the role of athletic tradition in determining contributions in the context of other potentially relevant university-specific variables.

6. In the ln(TOTAL$) regression, controlling for university-specific variation in addition to athletic success raised R^2 from 0.042 to 0.927. The F-statistic for significance of the university-specific effects is $F(86, 731) = 108.00$. The corresponding increase in R^2 in the ln(ALUM$) regression was from 0.045 to 0.882, yielding an F-statistic for significance of university-specific effects of $F(86, 731) = 63.12$. These results indicate that unmeasured, unique aspects of universities explain a large fraction of the variation in the natural logarithm of voluntary contributions per enrolled student.

7. In the ln(TOTAL$) regression, adding time controls when university controls and athletic success variables already are present, yields $F(9, 721) = 20.868$. The corresponding F-statistic in the ln(ALUM$) regression is $F(9, 721) = 17.295$.

8. Additionally, supplementary regressions specified with the dependent variables measured in levels (rather than logs) of contributions per student or in levels of contributions show an even smaller role for year-to-year athletic success in determining voluntary contributions. Coefficients of the four variables shown in Table 2 never are significantly different from zero at conventional levels.

IV. ANALYSIS OF UNIVERSITY-SPECIFIC EFFECTS

The role of university-specific effects, such as athletic tradition, student quality, and academic program quality, in determining voluntary contributions can be recovered by manipulating equation (1) to obtain equation

$$(2) \qquad W_j = c + \sum_i \gamma_i X_{ij} + \nu_j,$$

where $W_j = \bar{Y}_{j.} - \sum_i \hat{\beta}_i \bar{Z}_{ij}$, $\bar{Y}_{j.}$ denotes the time mean of Y_{jt} (i.e., the time mean of the natural logarithms of real contributions per student), c is a constant equal to the average of the λ_t, $\nu_j = \alpha_j + \bar{u}_j$, and the u_{jt} are residuals from the fixed effects estimates of equation (1). The term ν_j is interpreted as a composite error term. The dependent variable, W_j, then, simply nets out the observed effects of year-to-year athletic success from Y_{jt}. To estimate the coefficients of the university-specific effects, W_j is regressed on X_{ij} using OLS. Errors, however, are expected to be heterogeneous because (1) the panel is unbalanced, (2) the variances of the W_j are likely to be unequal, and (3) α_j is a component of ν_j. Therefore, standard errors of estimated γ_i coefficients are corrected for heteroskedasticity using the method proposed by White (1980).[9]

Table 3 presents results from estimating equation (2). Explanatory variables are listed in the first column and are discussed more fully below. Definitions and means of these variables are presented in the second and third columns. Regression results presented in the fourth and fifth columns pertain to the two dependent variables (W_j) of interest and use 87 observations. Coefficients of explanatory variables in both regressions are jointly different from zero at conventional significance levels. The R^2 in the total support regression was 0.715, and the R^2 in the alumni support regression was 0.708.

A possible qualification regarding this specification, however, is that institutional size and quality may be endogenous. For example, schools that receive more contributions may have resources to expand facilities as well as to hire better trained faculty and to recruit better students. In fact, McCormick and Tinsley (1987) present cross-sectional, single-equation evidence suggesting that SAT scores are higher at universities with larger endowments. Therefore, data on enrollment levels, Carnegie Research 1 status, and SAT scores are taken from 1984, the year preceding the sample period, to reduce the potential for results to exhibit simultaneous equation bias.

Results suggest that older universities receive more total voluntary contributions per student as well as more alumni support per student. This outcome supports the notion that better known schools with more living alumni receive more voluntary contributions than do others. Additionally, public universities receive less voluntary support than do private universities, a result that would be expected with the inclusion of several very high-quality private schools in the sample (see Table 1). Land grant status, on the other hand, appears to have little to do with the amount of voluntary support received after other factors are controlled. Performance of region dummies is uneven; coefficients of these variables are significantly different from zero at conventional levels in three out of six cases.

Student quality is measured by the variable TEST. Among universities in the sample, 65% report average SAT scores of entering freshmen, while the others report average scores from the ACT examination. The variable TEST is defined as the average combined mathematics and verbal score from the SAT examination for those schools that report it. For the other schools, TEST is the SAT equivalent of the combined mathematics and verbal score from the ACT examination. Conversion of ACT scores to SAT equivalent scores was carried out using the approach developed by Pugh and Sassenrath (1968). Table 3 indicates that coefficients of TEST are positive and highly significant. A school with incoming freshmen that average 100 points higher on the SAT exam appears to receive 34% more in mean total support per student and 51% more in mean alumni support per student.

RESEARCH 1 measures faculty quality. Schools that have attained Carnegie Research 1 status enjoy greater mean total support per student by nearly 41% in comparison with others, whereas Research 1 status appears to be unrelated to mean alumni

9. Standard errors tend to fall and, thus, t-statistics tend to rise when this adjustment is made.

TABLE 3
Determinants of Adjusted Mean Voluntary Contributions

Explanatory Variable	Definition	Mean	ln (TOTAL $)	ln (ALUMNI $)
CONSTANT	—	—	−3.523 (−5.844)	−5.811 (−7.530)
PUBLIC	= 1 if a public institution, 0 otherwise	0.827	−1.058 (−7.418)	−1.002 (−5.643)
AGE	Age of school in years in 1984	120.2	0.003 (2.0321)	0.007 (4.038)
RESEARCH 1	= 1 if classified as Research 1 institution in Carnegie's 1987 *Classification of Institutions of Higher Education*, 0 otherwise[a]	0.575	0.407 (3.468)	−0.003 (−0.063)
LAND GRANT	= 1 if institution has land grant status, 0 otherwise	0.402	0.089 (0.755)	0.209 (1.418)
TEST	= average combined verbal and math score on SAT exam in hundreds or estimated value based on ACT exam (see text)	10.540	0.335 (6.541)	0.509 (7.501)
WEST	= 1 if institution is in WA, OR, CA, MT, ID, WY, UT, CO, AZ, NM, NV, AK, HI; 0 otherwise	0.218	0.149 (0.887)	0.044 (0.217)
NORTHEAST	= 1 if institution is in ME, VT, NH, NY, PA, NJ, MA, CT, RI; 0 otherwise	0.287	0.084 (0.695)	0.293 (2.075)
MIDWEST	= 1 if institution is in ND, SD, NE, KS, MN, IA, MO, WI, IL, MI, IN, OH; 0 otherwise	0.287	0.081 (0.695)	0.293 (2.075)
TOTAL BOWL	Total number of major bowl appearances prior to 1985	10.080	0.017 (2.906)	0.024 (3.084)
TOTAL NCAA	Total number of NCAA tournament appearances prior to 1985	3.759	0.007 (2.669)	0.010 (2.774)
Summary Statistics				
N			87	87
R^2			0.715	0.708

[a] No Carnegie *Classification* was published in 1984. The edition immediately preceding the 1987 edition was published in 1976.

support per student. These results suggest that corporations, foundations, and other nonalumni donor groups place a higher value on faculty quality and research than do alumni when considering their level of support. Moreover, this outcome might be to some extent expected because donations from nonalumni organizations could, in principle, go to any university and may be more motivated by benefits from future services or research. Effects of student quality and research quality appear to operate independently. In regressions not reported here, the coefficient of an interaction variable defined as the product of TEST and RESEARCH 1 was not significantly different from zero at conventional levels.

Athletic tradition also has a positive impact on both total and alumni contributions, although the effect of participation in football bowl games is larger than that for NCAA basketball tournament appearances.[10] For example, an additional bowl game appearance prior to 1985 increases mean total support per student by about 1.7% and an additional NCAA basketball tournament appearance prior to 1985 increases total support by

10. Interaction variables for RESEARCH 1 and TOTAL BOWL and RESEARCH 1 and TOTAL NCAA also were tried in both equations to test whether athletic traditions had a different effect on contributions at top research schools as compared with other schools. Coefficients of these two interaction variables, however, had *t*-statistics less than unity in absolute value.

about 0.7%. Interestingly, corresponding percentage increases associated with bowl and NCAA tournament appearances were slightly larger in the alumni support regression, as compared to the total support regression. In the alumni support per student regression, TOTAL BOWL entered with a coefficient of 0.024 and TOTAL NCAA entered with a coefficient of 0.010. Thus, 2.4 NCAA basketball tournament appearances have about the same effect on both total and alumni support as one football bowl appearance.

Table 3 results suggest, however, that strong athletic traditions are needed to make up for the lack of Carnegie Research 1 status or admission of weaker students. To illustrate, holding mean total contributions per student constant, it takes more than 24 additional bowl appearances or about 58 more NCAA basketball tournament appearances (note that this figure is only slightly smaller than the number of such tournaments played since its inception in 1939!) to compensate for the absence of Research 1 status. No trade-off between past athletic success and Research 1 status can be calculated for alumni because, as previously indicated, Research 1 status does not appear to be a factor motivating contributions from this group. Somewhat different results are obtained for the trade-off between TEST and postseason appearances. Holding total contributions per student constant, it takes about 10 additional football bowl appearances or 24 additional NCAA tournament appearances to compensate for each 50-point reduction in average SAT scores of entering freshmen. To hold alumni contributions constant, on the other hand, similar levels of prior athletic success—about 11 more football bowl appearances or about 25 more NCAA basketball tournament appearances—are needed to compensate for each 50-point reduction in SAT scores of entering freshmen. Thus, when alumni respond to incentives to invest in their university to protect its "brand name," they appear to place about the same value on student quality as do other types of donors.

V. CONCLUSION

This article has analyzed the role of success in intercollegiate football and basketball in motivating alumni and other donors to make educational contributions to U.S. universities. Results from fixed effects analyses of panel data for the period 1986–87 to 1995–96 indicate that year-to-year changes in athletic success have no impact on levels of giving by nonalumni. However, evidence is presented that alumni respond positively to football bowl wins and negatively when their school's basketball team is placed on NCAA probation. In contrast, long-standing athletic traditions, measured by the extent of participation in football bowl games and NCAA basketball tournaments prior to the sample period, does appear to have a positive impact on voluntary support from both groups. This estimated impact, however, is relatively weak when compared to the effect of student and faculty quality. Carnegie Research 1 schools that are more selective in admitting freshmen tend to receive the greatest volume of contributions. Despite this outcome, university presidents seeking to expand educational contributions still may find it advantageous to support athletic programs at their institutions. For example, building or maintaining quality athletic programs may be less costly when compared to the resource requirements to build up academic programs. Additionally, the payoff from establishing an athletic tradition may come more quickly, particularly if prospective donors have difficulty judging academic improvements and if changes in academic reputation lag behind actual improvements.

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