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An Examination of Contributions to Support Intercollegiate Athletics*

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I. Introduction

Contributions have become an increasingly important source of revenue for college athletic departments. For example, Raiborn [21; 22; 23] found that in 1968-69 athletic departments participating in Division I football received 5 percent of their total revenues via contributions. Over time this figure has increased so that by 1981-82 contributions were the source of 11 percent of the average athletic department's revenues. When the contributions are expressed in dollars, the rapid increase in contributions is highlighted. Raiborn calculated average contributions per athletic department of $116,000 for 1968-69, while the figure had risen to $437,000 by 1981-82.

Research by Feldstein [5] and Reece [24] on charitable contributions by individuals has highlighted the importance of developing specific models for groups of recipients such as religious organizations, political parties, and higher education. To date, however, there has been no systematic analysis of the economic determinants of athletic contributions. This paper addresses this void by providing a model of athletic contributions and by subjecting the model to empirical scrutiny.

This paper will be presented in three parts. First, a model of athletic contributions will be developed. The next section will consist of a brief discussion of the data and an examination of the empirical results. The final section will highlight the results and suggest future research.

II. A Model of Athletic Contributions

The goal of this section is to provide a framework for identifying the determinants of athletic contributions. To determine the amount raised by a particular athletic department

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one needs to understand the motivations and consequent behaviors of the donors and the recipients. Prior to discussing the donors and the recipients separately, it might be helpful to differentiate this paper's approach from previous research on contributions.

An examination of frequently cited empirical articles dealing with charitable contributions reveals an almost exclusive attention to donor behavior [2; 4; 5; 6; 12; 24; 27]. These articles focus upon the price elasticity, due to tax deductibility, and the income elasticity of charitable contributions. Generally, the price elasticity is estimated to be elastic and the income elasticity is estimated to be normal.[1] Another frequent theme concerns the impact of recipient income upon donor behavior. The limited evidence on this relationship is mixed. For example, Schwartz [27] found a significant negative relationship between contributions in general and recipient income, but Reece [24] was unable to find a significant relationship. At the other extreme, Keating [12] found a significant positive relationship between United Way contributions and recipient income.

Research by Long [15] contained a noteworthy extension of the preceding research. Long attempted to gauge the importance of social pressure as a determinant of contributions to health charities. Social pressure can take various forms such as solicitation by friends and publication of a list of contributors. The inclusion of a social pressure variable was a recognition that some donations are not completely voluntary and that fund-raising techniques can be a major determinant of contributions.[2] In fact, Long found social pressure (along with income and wealth) to be a significant determinant in many cases. The potential importance of social pressure has been reinforced by recent research by Keating, Pitts, and Appel [13]. In a study of United Way contributions, social pressure was a significant determinant of whether or not an individual contributed and also of the size of the contribution.

Price and income elasticities of charitable contributions are not emphasized in the present study. While the microeconomic behavior of individual donors is examined, the donors are aggregated on the basis of contributions to individual schools. Consequently, this study focuses upon a particular group of recipients, athletic departments. This approach allows insight into the incentives for donors to make contributions and the motivations for the recipients to seek contributions.

Donors

Consider the behavior of donors in a utility-maximization framework where donors derive utility from giving as a part of a process producing some other argument in their utility functions. In other words, the donor is pursuing end utility as opposed to act utility.[3] This perspective appears reasonable for examining contributions to intercollegiate athletics. The earmarking of contributions for athletics rather than for general university use suggests that the donor receives utility from the specialized use of the funds. In addition, a large percentage of contributions are a payment for preferential seating at games and other benefits. This type of giving may be viewed with a utility function as follows:

1. Contrary to findings with respect to the United States, a study by Hood, Martin, and Osberg [9] of the determinants of charitable contributions in Canada estimated a price elasticity of less than one.

2. Athletic administrators are quite aware of the importance of fund-raising techniques. A recent article by Barnes, Rice, and Sturrock [1] discussed alternative methods of fund-raising.

3. This distinction is commonly made in the contributions literature. Ireland and Johnson [11] provide a discussion of this distinction. In addition, Hochman and Rodgers [8] and Rodgers [26] use a version of this distinction in this discussions of redistribution and utility interdependence.

$$U_d = U_d(X_1, X_2, \ldots, X_m, S). \tag{1}$$

Here the donor derives utility from the m private goods consumed, one of which might be the enjoyment from attending an athletic contest, and from the value he attaches to the success of the athletic programs, S. As a result, the marginal utility of a contribution, C, by the donor, $MU_d = (\partial U_d/\partial S)(\partial S/\partial C)$, is derived indirectly from the success of the athletic program, rather than directly from the act of giving.[4]

Success may be defined in many ways. A thorough, but not exhaustive, list is as follows: 1) developing the academic and athletic talents of the student-athlete; 2) maximizing student participation in intercollegiate athletics; 3) promoting morale within the athletic department and the unity of all University constituencies; 4) winning conference and national championships; 5) providing superior athletic facilities; 6) selecting and training quality employees for athletic department positions; 7) encouraging quality young men and women to pursue a career in athletics; and 8) assisting the development of interscholastic and intercollegiate sports.[5] Undoubtedly, one of the most important measures of success is the performance of various athletic teams. A number of arguments follow directly.

An obvious manifestation of increased utility through athletic success is reflected by attendance at a school's games. In fact, close examination of attendance and price-setting behavior reveals a key source for athletic contributions. Consider a demand curve for attendance as shown in Figure 1. For present purposes the demand curve can be viewed as capturing the demand for a school's entire schedule of home games. Assume an average ticket price, $\bar{P}$, which would attract attendance of $\bar{Q}$.[6] The area $\bar{P}BA$ is consumer surplus and represents a source of potential contributions to the athletic department. These potential contributions can be realized if the athletic department practices price discrimination.[7] In fact this is precisely what big-time athletic programs do. Athletic departments frequently utilize a two-part tariff for the sale of football tickets. There is a price for a season ticket and a mandatory lump sum contribution. This contribution determines seat location and other benefits.[8]

A question might be raised as to why the schools do not explicitly incorporate seat location into their ticket prices. Two reasons can be offered. First, many conferences have gate-sharing arrangements. A given school, and especially one with high attendance, has an incentive to convert gate receipts into contributions because gate receipts must be shared, while contributions are not.[9] Second, and likely more important, contributions by

4. Sigelman and Bookheimer [28] found a significant simple correlation between success in college football and contributions to athletic programs.

5. The list is a shortened version of a statement of goals of the University of North Carolina athletic department which was supplied the authors a few years ago by William Cobey, Jr., then Director of Athletics at UNC.

6. The actual pricing of college football games is more complicated than the assumption indicates. Colleges typically offer a schedule of ticket prices differentiating among faculty, staff, students, and the general public and differentiating reserved seating from general admission seating.

7. A similar argument can be found in Hansmann [7]. The economic viability of a nonprofit enterprise might necessitate voluntary price discrimination. The combination of high fixed costs and low marginal costs results in prices which cover marginal costs, but the revenue generated fails to cover fixed costs. To remain in operation, the nonprofit enterprise needs voluntary contributions.

8. In a survey of the fifty-six schools to be used later in the regression analysis, we found that only three schools indicated athletic contributions were not used in either the determination of seat location or the eligibility to purchase tickets for football games.

9. There are ways to remove this incentive. For example, visiting schools can negotiate a guarantee based on attendance, rather than just a minimum guarantee.

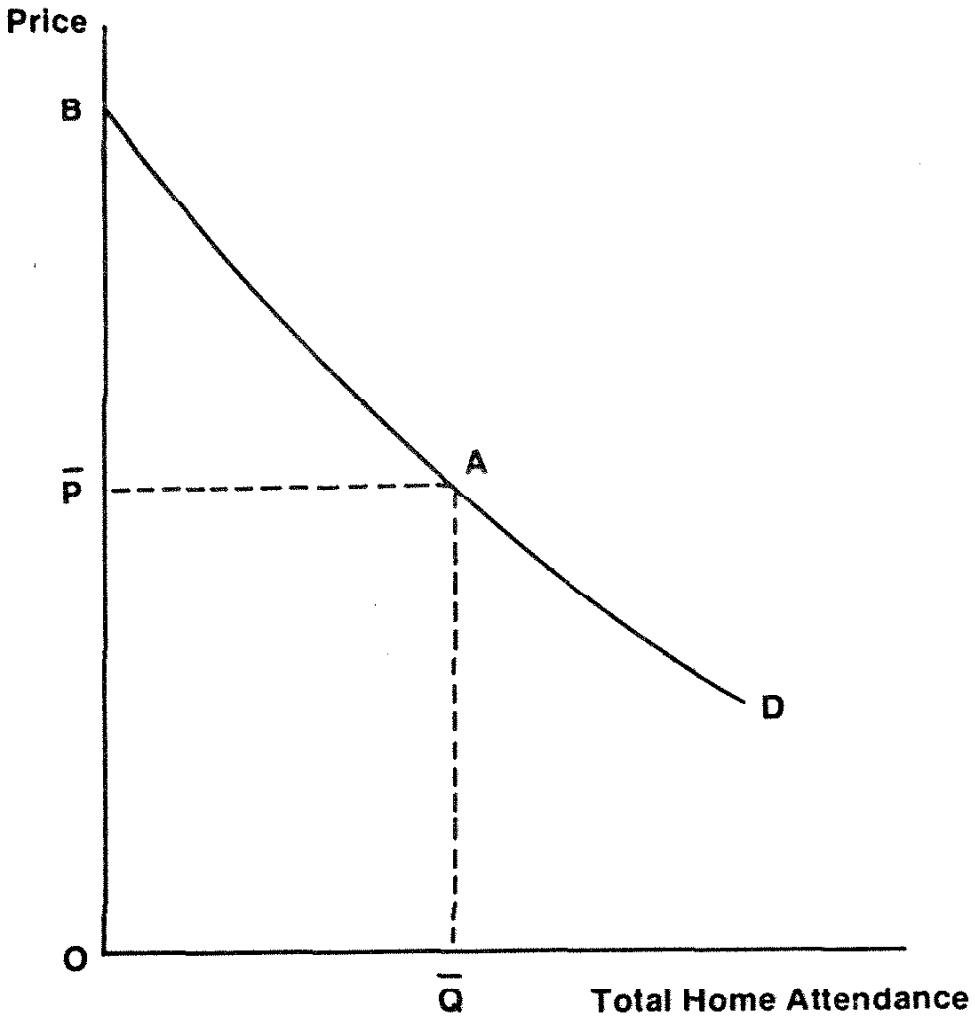

Figure 1.

individuals are tax deductible, while the purchase of tickets is not. The use of price discrimination through mandatory contributions allows the school to reduce the real cost of a contribution and, therefore, possibly increases the school's receipts.

For empirical purposes the relationship between the amount of potential contributions and attendance is straightforward. For a fixed ticket price, there is a positive relationship between potential contributions and attendance. If there is an increase in demand for tickets, there will be an increase in the amount of consumer surplus and thus in the amount of potential contributions. This increased demand may come from a team's past success or from the promotional efforts of the athletic department.

A second feature of this relationship is noteworthy also. The increase in potential contributions increases at a decreasing rate as attendance increases to $\bar{Q}$. The economic interpretation of this result is straightforward. The consumer surplus of the $\bar{Q}$th fan will

be less than the $\bar{Q}$th minus one fan and, therefore, is a relatively poorer candidate for a contribution. This results both from differences in tastes by different fans and due to the scarcity of premium seats in a stadium.

The preceding calculation does not determine potential contributions completely. There are individuals who do not attend the games, but derive utility from following the team via various media outlets. While these individuals are potential free riders, not all choose to do so. Various reasons can be posited to explain contributions by these individuals. For example, individuals might derive utility from feeling that their contributions have aided the team and, therefore, can feel justified in sharing in the fortunes of their favorite team. These contributions will be larger as the number of these fans increases. A population measure will be used to capture this effect.[10] This support will be reduced by the existence of alternative products. For example, professional sports compete for the attention and, therefore, the dollars of non-attenders (as well as limiting the potential contributions from attenders).

A final argument based on the promise that donors receive utility from winning is suggested by the expectations of Clemson University, following their national championship in football. Prior to its national championship football season, Clemson expected to raise $3.5 million in 1981-82 [14]. After its very successful season, Clemson increased the estimate to $4 million. A team's special successes likely generate increased contributions. Attendance will likely capture some of the effect of success, but there may remain certain special contributions. A proxy to test for this effect is whether participation in a bowl game has an effect on contributions.

Recipients

So far attention has been focused upon the willingness of donors to contribute. Obviously, the potential contributions might go untapped. Efforts may be required by the athletic department (or the body in charge of athletic fund-raising) to secure maximum contributions. What determines the need for contributions and the effort to solicit them?

In order to address this question it is useful to consider more carefully the economic choices facing an athletic department. It is reasonable to hypothesize that athletic departments attempt to maximize utility subject to a breakeven constraint. This approach will allow an analysis of how the need for contributions enters the athletic department's decision process.

An athletic department's utility function is dependent upon what it, in conjunction with numerous constituencies, views as success. Recall the previous discussion which suggested that success is likely to be a multidimensional concept. Consequently, the utility function can be represented as follows:

$$U = U(S), \tag{2}$$

where U represents the utility of the athletic department and S represents success.

The production of success requires the use of resources. In general terms, the success function can be expressed as follows:

10. There are a number of other measures that might capture this effect. For example, student body size or an alumni measure might be reasonable proxies for these fans. Empirically, these measures were found to be statistically insignificant.

$$S = S(Z_1, Z_2, \ldots, Z_n; \alpha) \tag{3}$$

where success is derived from the use of inputs Z_1 through Z_n given a vector, α, of technological parameters. The Zs may include such things as the quality of coaching staffs, student-athletes, athletic facilities, and academic advising. The productivity of these inputs depends upon technological parameters as exemplified by the quality of one's opponents.

The use of inputs in the success function suggests that the athletic department is incurring costs, costs which must be covered by the athletic department's revenues. The breakeven constraint can be represented as follows:

$$R = CONT + NCONT \geq C = \sum_{i=1}^{n} W_i Z_i + VP. \tag{4}$$

Total revenue is represented by R, while total cost is represented by C. On the revenue side $CONT$ is the level of contributions, while $NCONT$ is the non-contribution revenue from ticket sales, television and radio revenue, and all other sources. On the cost side, each of the Z_i inputs used in the production of success causes the athletic department to incur a cost of W_i per unit. Finally, there are fund-raising expenses, where each unit of fund-raising, P, entails a cost of V. Consequently, the firm must generate revenues sufficient to cover all costs.[11]

In order to simplify the exposition, assume success can be summarized by a variable which we will term winning percentage, WIN. In reality, an athletic department will have a winning percentage associated with each team that it fields, but that does not affect the following analysis.[12] It is also reasonable to expect that WIN is functionally related to the athletic department's revenues and costs. Consequently, the athletic department's optimization problem can be represented as follows:

$$\max_{WIN} U(WIN) \text{ subject to } R(WIN) \geq C(WIN) \text{ and } WIN \geq 0. \tag{5}$$

Using Lagrangean methods the following function results:

$$L(WIN, \lambda) = U(WIN) + \lambda(R(WIN) - C(WIN)), \tag{6}$$

where λ is the Lagrangean multiplier.

The familiar Kuhn-Tucker conditions for a maximum are as follows:

$$\begin{aligned} (\partial L/\partial WIN) \leq 0 \qquad & (\partial L/\partial \lambda) \geq 0 \\ (\partial L/\partial WIN)(WIN) = 0 \qquad & (\partial L/\partial \lambda)(\lambda) = 0 \\ WIN \geq 0 \qquad & \lambda \geq 0 \end{aligned} \tag{7}$$

Generally, one can anticipate that the maximum would be characterized by $\partial L/\partial WIN = 0$ and $WIN > 0$. On the other hand, the value of $\partial L/\partial \lambda$ and λ depend on whether or not the breakeven constraint is binding. If the constraint is binding, then $\partial L/\partial \lambda = 0$ and $\lambda > 0$. Since λ is the marginal utility of an increase in net revenue, this

11. In order to simplify the analysis, we have omitted reference to the time dimension. In a given year the breakeven constraint need not hold. As long as the athletic department has accumulated financial reserves over time, it may incur costs in excess of revenues for a particular year.

12. For an examination of the relationship between costs and winning in intercollegiate athletics, see Coughlin and Erekson [3].

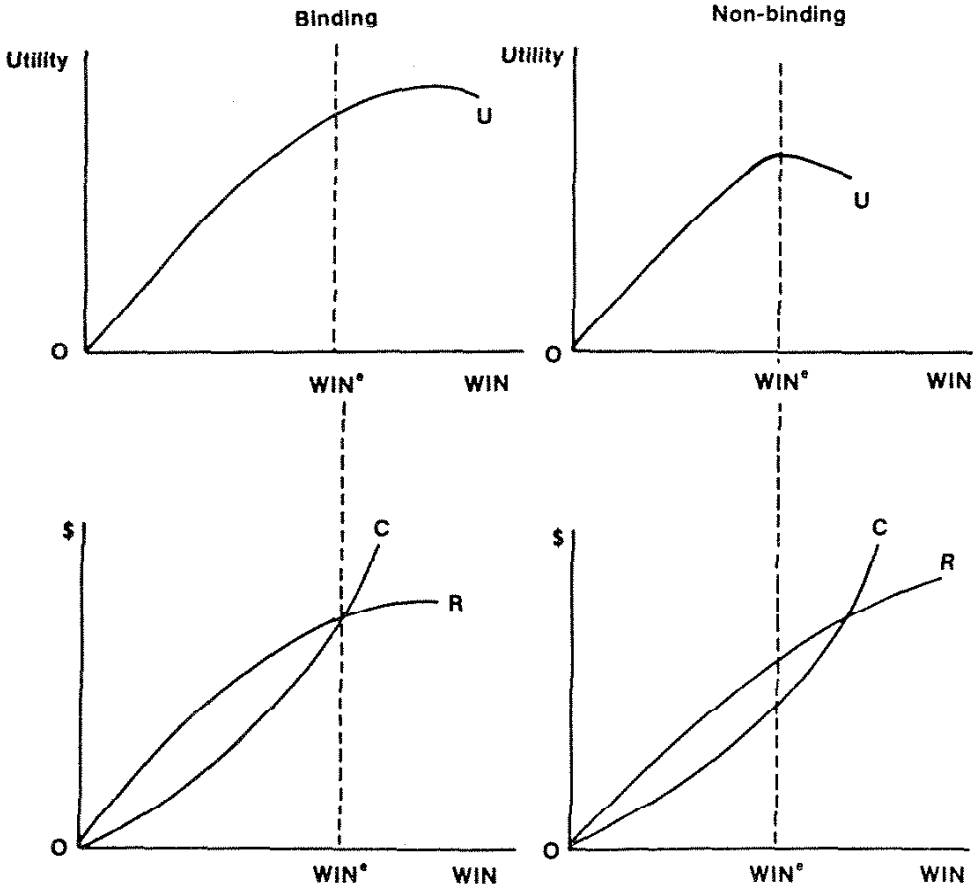

Figure 2.

suggests the athletic department can increase its welfare with an increase in net revenue. On the other hand, if the constraint is not binding, then $\partial L/\partial\lambda > 0$ and $\lambda = 0$. With $\lambda = 0$, this means an increase in net revenue will not allow an improvement in the athletic department's welfare.

The preceding discussion is represented graphically in Figure 2. The shapes of the curves are only suggestive of reasonable relationships. In the binding case, it is clear that the athletic department could reach a higher level of utility if the constraint were relaxed. In the other case, the constraint is not binding and the athletic department is able to attain an unconstrained maximum. In the non-binding case there is a question as to the exact amount of revenues generated and costs incurred. The athletic department might elect not to fully exploit the revenue potential associated with WIN^* and simply generate enough revenues to cover the costs associated with technical efficiency. There are other possibilities as well. The athletic department might waste some of the potential surplus by being technically inefficient. The athletic department might also elect to accumulate some financial reserves. Obviously, the athletic department might choose some combination of the above possibilities.

It should be noted that the illustration of the non-binding case as one of satiation resulted from a mathematical simplification. The athletic department, as an individual unit, need not be satiated for the breakeven constraint to be non-binding. For example, an authority external to the athletic department might have the final say as to the expenditures of the athletic department. This case can be handled by adding another constraint to the mathematical analysis. This constraint would be $C(WIN) \leq C^*$, where C^* would be the amount of allowable expenditures. Given the allowed level of expenditures, which may be less than potential revenues, the athletic department maximizes utility. This equilibrium can occur at a point where marginal utility is positive. Similar to the case of satiation, there is a question as to the exact amount of revenues which would be generated.

The preceding discussion provides the background for a closer examination of the contributions function. So far, we have expressed revenues, both contributions and all other revenue, as a function of winning percentage. There are likely a number of other variables which can affect revenues.

Recall that contributions (both mandatory and voluntary) result from an interaction of individuals willing to contribute and an athletic department's efforts to generate contributions. In the donor portion of this section of the paper, we identified a number of variables, in addition to winning percentage, which affect potential contributions. Since football and basketball are the primary revenue generating sports, it is reasonable to expect the winning percentages in both of these sports to affect potential contributions. In the case of football, however, the usual pricing policies of athletic departments suggests the use of attendance and the square of attendance rather than winning percentage. In addition, it was suggested that bowl participation and state population would also affect potential contributions.

The discussion concerning the breakeven constraint provides insight into whether or not these potential contributions will be realized. When the breakeven constraint is binding, then the rational athletic department will pursue fund-raising until the marginal revenue from fund-raising is equal to its marginal cost. Obviously, any increases in net revenue will allow the constrained athletic department to attain a higher winning percentage, and, thus, a higher level of utility. In other words, those factors which affect potential contributions will affect actual contributions in a similar fashion.

If the breakeven constraint is not binding, then definite theoretical implications are missing. The behavior of the athletic department concerning the disposition of the potential budgetary surplus is crucial to determining the impact on actual contributions to a change in potential contributions. An example will illustrate this point. Assume an autonomous increase in attendance. This will cause an upward shift in the revenue curve. If the athletic department chooses to increase its budgetary surplus, then it can tap this increase in potential contributions. Empirically, there would be a positive relationship between attendance and contributions. On the other hand, the athletic department might choose to maintain revenues at their previous level because existing revenues cover the financial needs of the program. Expenditures by the athletic department may be limited by university authorities or by NCAA regulations governing the size of the coaching staffs, the number of scholarships, or the level of financial aid. Alternatively, satiation may occur because a program reaches some target level of success vis-à-vis its competitors. No matter what the reason, any increase in ticket revenues from an increase in attendance will induce a reduction in fund-raising. Empirically, there would be a negative relationship between attendance and contributions.

The preceding conclusion can be demonstrated mathematically. Ignoring all other factors, the revenue function can be expressed as follows:

$$R = CONT(ATT) + NCONT(ATT), \tag{8}$$

where ATT represents attendance, while the other variables have been defined previously. The total differential of the expression above is:

$$dR = (\partial CONT/\partial ATT)\, dATT + (\partial NCONT/\partial ATT)\, dATT. \tag{9}$$

If the breakeven constraint is non-binding, then an athletic department might elect to maintain its revenue level after an autonomous increase in attendance. Setting dR equal to zero yields:

$$(\partial CONT/\partial ATT + \partial NCONT/\partial ATT)\, dATT = 0. \tag{10}$$

It is reasonable to anticipate $\partial NCONT/\partial ATT > 0$, so the way that revenues are maintained would be through a diminution of fund-raising. This would cause $\partial CONT/\partial ATT < 0$. The result in this case is that a larger percentage of the athletic department's revenues would come from revenues other than contributions. It should be stressed that the negative relationship between attendance and contributions is only a possibility and not a necessity. It should be stressed also that the preceding example holds for any variable that affects both revenue from contributions and revenue from all other sources. Nonetheless, the breakeven constraint is likely to be binding for all schools unless they were to have very large football attendance.

Some suggestive evidence relevant to the preceding discussion concerns Ohio State. Ohio State, along with Michigan, dominated Big 10 football throughout the 1970s. Ohio State was a leader in football attendance throughout this period. The revenues from football were sufficient to fund their athletic program. Since the program was a conference leader, as well as a national leader, one may argue there was little incentive to exploit the tremendous contributions potential suggested by their football attendance. In fact, citing evidence from the literature on professional athletics, a league balance effect may be important. Attendance, and thus revenues, might fall if one team became vastly superior to its opponents [10; 18].

On the other hand, in the last five years, pressures from a number of sources such as increased funding for women's athletics, inflation, and competitive pressures from other Big 10 schools have combined to force Ohio State to begin exploiting other sources of revenue. For example, Ohio State reported negligible contributions for 1976-77, but $1.25 million for 1980-81 [14]. The Ohio State situation reflects an important change that is generally recognized. No school is immune from the increasing cost pressures being experienced by college athletics. Even the schools with the largest attendance can no longer count on football ticket revenues being sufficient to support their athletic programs. Contributions, as well as television revenue, appear to be the best sources for the infusion of new revenue.

While Ohio State is a relative newcomer, the schools of the Atlantic Coast Conference are viewed as the leaders in athletic fund-raising [14]. These schools were the first to feel the pressure to generate additional revenues to support their non-revenue producing sports. For example, Clemson formed a fund-raising organization for athletics in 1934, while the

University of North Carolina began in 1938. The ACC schools had relatively lower football crowds and less television revenue, so they were leaders in soliciting athletic contributions. It appears that their experience and tradition have continued to aid contributions in the 1980s.

Contributions Model

The key aspects of the model can be summarized. Actual contributions are determined by potential contributions and the efforts by the athletic department to tap the potential contributions. The discussion suggested that potential contributions were a function of the winning percentages in football and basketball, bowl participation, population, and professional competition. Whether or not these potential contributions are tapped depends upon the financial position of the school. If the breakeven constraint is binding, then the athletic department will pursue fund-raising as long as the marginal revenue from fund-raising exceeds marginal cost. In this case, actual contributions will be directly related to the variables which affect potential contributions. If the constraint is not binding, the relationships may not be signed theoretically. In addition, it has been suggested that those schools belonging to the Atlantic Coast Conference are more adept at fund-raising. A combination of need and experience account for this advantage. This advantage should generate a positive relationship between contributions and Atlantic Coast Conference affiliation.

While winning percentage in football is a reasonable measure of potential contributions, the common practice of the use of a two-part tariff for the sale of football tickets suggests that football attendance would bear a closer relationship than winning percentage to actual contributions. In addition, the use of this variable allows for the derivation of additional implications. If the breakeven constraint is binding, then increased attendance will cause increased contributions at a decreasing rate. On the other hand, if the constraint is not binding, then the hypothesized relationship might not exist. While increased attendance suggests increased potential contributions, it also might reduce the need to tap the contributions. In other words, ticket revenue might be a substitute for revenue from contributions. The impact of these opposing forces is an empirical question.

A similar situation exists for basketball. However, for basketball the use of two-part tariffs to garner contributions is not as important. To test the revenue-substitution hypothesis for basketball, we include an interactive term combining population and winning percentage. As population increases, potential contributions may be larger. At the same time, noncontribution revenues from ticket sales and media revenue are expected to be larger. This would tend to depress actual contributions. A similar argument may be made with respect to increases in basketball winning percentage. The next section will provide evidence on the revenue-substitution hypothesis, as well as on the empirical importance of the other variables in the model.

III. Estimation of the Model

The following is estimated using ordinary least squares:

$$CONT_i = \beta_0 + \beta_1 FBAT_i + \beta_2 FBAT_i^2 + \beta_3 ACC_i + \beta_4 BOWL_i + \beta_5 POP_i$$

$$+ \beta_6 BB_i + \beta_7 POP_i BB_i + \beta_8 COMP_i + \epsilon_i .^{13} \quad (11)$$

The variables are summarized in Table I. Prior to discussing the empirical results, important aspects of the data will be highlighted.

The dependent variable in this study is athletic department contributions for 1980-81 (*CONT*). The *Omaha World-Herald* conducted a survey of all schools in the Big Eight, Pacific-10, Southwest, Big Ten, Atlantic Coast, and Southeastern Conferences [14]. In addition, information was requested from the following independents: South Carolina, Florida State, Penn State, West Virginia, Pittsburgh, Tulane, and Notre Dame.[14] All schools provided the total value of donations for 1980-81 with the exception of Nebraska, Texas, Wisconsin, Tennessee, Auburn, and Notre Dame.[15] Consequently, 56 schools, nearly all of the schools playing big-time college football, are represented. These athletic departments received an average of $1.38 million in contributions for 1980-81.

The data is not ideal, so a few caveats are in order. The figures do not include any estimates of gifts-in-kind. These gifts come in various forms. Volunteers frequently donate their time for fund-raising campaigns. For example, a fund-raising organization associated with the University of Iowa, the I-Club Scholarship Fund, has never paid any staff employees [29].[16] This fact is reflected in the organization's financial statements. During the period from 1970 to 1976, the organization contributed nearly $1.5 million to the University's athletic department, while it incurred expenses of $10,150. In addition to time, donations of transportation services and food for training tables are common. For example, Michener [17] has described a typical university with $320,000 worth of contributions in the form of transportation services.

The contributions data suffers from another weakness. Certain schools were conducting special fund raising projects (in addition to their regular fund-raising), while others were not. For example, the University of Oklahoma was conducting a capital improvement drive in 1980-81. As a result, the University reported a figure more than double any other Big Eight school. Duke University provides another example. In the late 1970s, the University began a special fund-raising project to endow athletic scholarships [16]. A goal of $13.5 million was established. By late 1979, 71 scholarships, each backed by a $100,000 endowment, had been funded. During this same period $4 million was raised to renovate the football stadium. Considering all fund-raising, the University was averaging contributions of $110,000 per week or $5.72 million per year. Consequently, it is reasonable to infer that Duke's reported contributions of $1 million for 1980-81 did not include any special projects [14]. All in all, it is simply not possible to be certain exactly what contributions a particular university included in their reported figure. It appears, however, that only a few schools, particularly Oklahoma and Stanford, reported their fund-raising for special projects.

13. One might argue that success, as proxied by football attendance and basketball winning percentage, and contributions are simultaneously determined. However, success in a given year is a function of contributions in previous years. Consequently, in this cross section analysis ordinary least squares is the appropriate estimating technique.

14. The survey included information on seven other schools. These schools are ignored in the present study for various reasons, but the primary reason is to restrict the analysis to the major football conferences and the major independents.

15. Nebraska provided a figure for 1979-80, while the other schools did not provide any information.

16. The information for the statement is now four years old, so it is possible changes have been made in the intervening years.

Table I. Variables in the Model

Symbol	Definition
i	This subscript refers to individual athletic departments.
$CONT$	This variable is athletic department revenues classified as contributions for 1980–81. Contributions are measured in thousands of dollars.
$FBAT$	This variable is total home football attendance for the 1980 season. Attendance is measured in thousands.
$FBAT^2$	This variable is the square of $FBAT$.
ACC	This is a dummy variable concerning an athletic department's affiliation with the Atlantic Coast Conference. A value of one indicates an Atlantic Coast Conference member; otherwise, the value is zero.
$BOWL$	This is a dummy variable reflecting a school's participation in a bowl game after the 1980 football season. A value of one indicates participation, otherwise, the value is zero.
POP	This variable is the total population in 1980 for the state in which the school is located. Population is measured in millions.
BB	This variable is the winning percentage of the school's (men's) basketball team for the 1980–81 season.
$POPBB$	This is an interaction term resulting from the multiplication of POP and BB.
$COMP$	This is a dummy variable identifying the existence of professional competition for the college. A value of one indicates the existence in 1980–81 of a professional football franchise in the same state as the school; otherwise, the value is zero.

For the most part, the independent variables are self-explanatory. The information on total home football attendance for 1980 ($FBAT$), bowl participation ($BOWL$), and basketball winning percentage (BB) are available from references published by the National Collegiate Athletic Association [19; 20]. Information on Atlantic Coast Conference affiliation (ACC) is common knowledge. The population variable (POP) was available in the *Survey of Current Business* [25]. POP was derived by dividing total state income by per capita state income. The interaction term ($POPBB$) is the result of combining POP and BB. The professional competition variable ($COMP$) is a dummy variable for the existence of a professional football franchise in the same state as the school. Once again, this is common knowledge.

Attention can be focused upon the empirical results which are presented in Table II. Two sets of results are provided for the complete model. Variant 1 used all of the 56 big-time schools represented in the *Omaha World-Herald* survey, while Variant 2 omitted the University of Oklahoma and Stanford University because of their likely inclusion of fund-raising for special projects in their estimates of athletic contributions. The results indicate that the theory has identified a number of the key determinants of contributions to athletic departments. With almost no exception, the variables were statistically significant at the .01 level. The independent variables will be examined in turn.

Strong support was found for the explanatory power of $FBAT$. In both variants $FBAT$ has a significant positive relationship and the square of $FBAT$ has a significant

Table II. Contributions Model—Regression Results

Dependent Variable *CONT*		
	Parameter Estimates[a]	
Independent Variables	Variant 1	Variant 2
Intercept	−1980.95***	−1992.57***
	(−3.13)[a]	(−3.42)
FBAT	12.33***	11.55***
	(4.44)	(4.96)
$FBAT^2$	−0.0157***	−0.0156***
	(−3.87)	(−4.57)
ACC	763.84***	779.58***
	(3.27)	(4.05)
BOWL	667.82***	536.89***
	(3.18)	(3.07)
POP	224.29***	169.16***
	(4.57)	(3.32)
BB	1633.35**	1928.00***
	(2.16)	(2.80)
POPBB	−324.61***	−251.27***
	(−3.75)	(−2.94)
COMP	−497.96**	−241.98
	(−2.41)	(−1.37)
Summary Information		
R^2	.55	.55
F-Ratio	7.22	6.94
Sample Size[b]	56	54

**Coefficient is statistically significant for a two-tailed test with $\alpha = .05$.

***Coefficient is statistically significant for a two-tailed test with $\alpha = .01$.

a. The figures in parentheses are *t*-ratios.

b. Fifty-six big-time schools were represented in the *Omaha World-Herald* survey. Variant 2 excludes the University of Oklahoma and Stanford University for reasons provided in the text.

negative relationship with *CONT*. In other words, increases in *FBAT* increase *CONT* at a decreasing rate. This is precisely what athletic department pricing policies suggest.

A closer examination of the results concerning *FBAT* reveals the possible substitution of ticket revenue and other types of revenue for revenue from contributions. Athletic contributions reach a maximum at football attendance of 392,643 in Variant 1 and 370,430 in Variant 2. In 1980, 14 of the 56 schools used in the regressions had home attendance exceeding 370,000. Consequently, the possibility of a non-binding breakeven constraint exists for approximately 25 percent of the big-time schools. Exactly what is happening to this percentage over time is a matter of conjecture, but the behavior of Ohio State cited earlier in the paper suggests that even the schools with the largest attendance are not immune to the cost pressures of intercollegiate athletics.

FBAT was simply one of a number of factors which exhibited a significant impact upon *CONT*. *ACC* was significant in both variants. Fund-raising by Atlantic Coast Conference schools generates, ceteris paribus, in excess of $760,000 more than other schools. It is clear that the combination of tradition and methods used by Atlantic Coast Conference schools is very productive.

BOWL is another variable which was significant in both variants. Participation in a bowl, in addition to other benefits, generated additional athletic contributions in the range of $536,000 to $667,000 for 1980-81.[17] This result appears consistent with the Clemson University estimate that their clinching a national championship in the 1982 Orange Bowl would generate an additional $500,000 of contributions in 1981-82.

Due to the interaction term, the variables — *POP*, *BB*, and *POPBB* — will be considered jointly. The positive signs for *POP* and *BB* were as expected. Assuming the breakeven constraint is binding, increases in population and increases in winning percentage for basketball were expected to have positive effects upon athletic contributions. The net impact of changes in these variables is substantially reduced when the effect of the interaction term is incorporated. An example using Variant 2 will illustrate this effect. Simply focusing upon the coefficient for *POP*, a one million increase in *POP* generates increased contributions of $169,000. On the other hand, when $\partial CONT/\partial POP$ is evaluated at the sample mean for *BB* (.58), the net impact of a one million increase in *POP* is only $23,420. In fact, for values of *BB* in excess of .67, the partial derivative is negative. A similar finding holds for increases in *BB* holding *POP* constant. Simply focusing upon the coefficient for *BB*, an increase of .1 in *BB* generates an increase in *CONT* of approximately $193,000. On the other hand, when $\partial CONT/\partial BB$ evaluated at the sample mean for *POP* (7.66), the net impact of an increase of .1 in *BB* is approximately $5,000. Similar to the previous case, for values of *POP* in excess of 7.68, the partial derivative is negative. Since both *POP* and *BB* affect other sources of revenue, the negative partial derivatives could be indicative of a non-binding breakeven constraint. The increases in the revenue from other sources could allow for a reduction in fund-raising efforts.

The final variable, *COMP*, captures the impact of competition from professional football. As a potential substitute for college athletics and, in particular, college football, *COMP* exhibits the anticipated negative effects. The existence of professional football competition reduced contributions by nearly $500,000 in Variant 1 and by nearly $250,000 in Variant 2. The change in the coefficient was accompanied by an absolute reduction in the t-statistic. While the t-statistic for *COMP* in Variant 2 is not statistically significant for a two-tailed test at the .1 level, it is of sufficient magnitude to be significant at the .1 level for a one-tailed test.[18]

One final observation concerning the statistical results is noteworthy. The dropping of the University of Oklahoma and Stanford University from the sample did not cause either any major qualitative changes in the coefficients or any change in the overall explanatory power of the model. There were, however, some large changes in the numerical estimates

17. An additional dummy variable for participation in the Rose, Sugar, Orange, and Cotton Bowls was tried, but this variable was highly sensitive to sample size and to the specification of the model and added little explanatory power to the model.

18. The discussion has focused upon the variables that were found to be statistically significant. Some variables which were insignificant, and were not mentioned in other parts of the paper, are as follows: number of television appearances, number of varsity sports, and the quality of a school's alumni association.

of selected coefficients. The previously mentioned change in the coefficient for *COMP* is the most dramatic.

IV. Concluding Comments

Contributions are an increasingly important source of revenue for athletic departments. The present research has modelled this aspect of athletic department activity and has identified empirically the primary determinants. The strong empirical results suggest that season football attendance, the square of season football attendance, affiliation with the Atlantic Coast Conference, participation in a bowl, state population, basketball winning percentage, an interaction term with state population and basketball winning percentage, and professional competition are the primary determinants of athletic contributions. In the process of identifying the primary determinants, numerous insights concerning athletic department behavior with respect to ticket pricing and the importance of the breakeven constraint were provided.

It is clear that there are numerous aspects of athletic department behavior deserving scrutiny. One area which appears especially promising to the authors is the relationship between the athletic department and the univerity. Is there a relationship between athletic department fund-raising and general fund-raising by the university? Is increased athletic department fund-raising diverting contributions from academic to athletic purposes? How important is athletic success to university fund-raising?

A second area which raises many questions revolves around the use of specific fund-raising techniques. Which techniques are being used in athletic fund-raising and what determines the effectiveness of specific techniques? Along this same line, research focused upon the reasons for the effectiveness of fund-raising by Atlantic Coast Conference schools might prove to be beneficial for other schools.

The preceding suggestions concerning additional research in this area are far from exhaustive. Much work needs to be done in an area which is of increasing importance for intercollegiate athletics.

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