Pergamon

Economics of Education Review, Vol. 13, No. 3, pp. 265–270, 1994

0727-7757/94 $7.00 + 0.00

0272-7757(93)E0007-E

The Relation Between a University's Football Record and the Size of Its Applicant Pool

ROBERT G. MURPHY* and GREGORY A. TRANDEL†‡

*Department of Economics, Boston College, Chestnut Hill, MA 02167, U.S.A.
†Department of Economics, University of Georgia, Athens, GA 30602-6254, U.S.A.

Abstract — We show that the winning record of a university's football team is positively (and statistically significantly) related to the number of applications for admittance received by that university. Our parameter estimates indicate that an increase in winning percentage by 0.250 (from 0.500 to 0.750, for example) tends to produce a 1.3% increase in applicants in the following year.

INTRODUCTION

IN 1985, athletic departments at 192 Division I US universities spent an average of over $4.6 million on operating expenses related to intercollegiate athletic competition (Raiborn, 1986). The amount of money devoted to competitive sports creates a great deal of controversy. Some people believe that the emphasis placed upon intercollegiate athletics "subvert[s] many cherished academic values" (Sack and Watkins, 1985, p. 299) and distracts a university from its primary mission. In the view of such people, each dollar used to support athletics reduces the amount that can be spent on teaching and research. Others, however, believe that sports can have a positive effect on a university's academic programs. Such an effect might be due, for example, to the "goodwill" that successful athletics creates among alumni or non-alumni fans.

A number of possible beneficial spillovers between athletics and academics have been investigated. To date, the issue that has received the most attention is whether athletic success boosts a college's general (as opposed to athletic department) fundraising. In spite of anecdotal evidence that such a relationship exists, most of the formal research on this issue has indicated that there exists no significant link between winning and giving (see, for example, Gaski and Etzel (1984), Frey (1985), and Sack and Watkins (1985)).[1]

Two recent papers look at another possible link between athletics and academics. McCormick and Tinsley (1987) indicate that there is a positive correlation between the winning record of a university's football team and the average SAT score of that school's freshman class. McCormick and Tinsley explain this correlation by suggesting that athletic success "advertises" a university's name, and thus leads more high school students to apply to that school. As a result, the university can be more selective in its admissions decisions, and can thus enroll a more accomplished group of students. McCormick and Tinsley, however, offer only anecdotal evidence of the supposed relationship between athletic success and applicant totals.[2] Tucker and Amato (1993) also present evidence that links football success with increases in SAT scores. While Tucker and Amato discuss the role that student applications play in this process, their study employs no data on applicants.[3]

‡Corresponding address: Prof. Gregory A. Trandel, Department of Economics, Terry College of Business, University of Georgia, Athens, GA 30602-6254, U.S.A.
[Manuscript received 26 May 1993; revision accepted for publication 22 November 1993.]

In contrast with these two papers, the present paper focuses directly on the issue of applications and shows that a statistically significant link between football records and applicant totals does indeed exist. This result supports the view that one rationale for the resources devoted to athletic competition is the valuable advertising that a winning team can create.

This paper proceeds as follows. The next section describes the data and the econometric procedures used in the paper, and the last section describes the paper's results and offers concluding comments.

DATA AND ECONOMETRICS

This paper considers the extent to which a university's success in intercollegiate major-sport athletics affects the number of applications for undergraduate admittance it receives. Following McCormick and Tinsley (1987), we use the record of a university's football team as the measure of that school's athletic success.[4] Also following McCormick and Tinsley, we control for year-to-year variations in the strength of a team's opponents by restricting our attention to the games that a team plays against the other members of its athletic conference. Our measure of football success is thus a team's within-conference winning percentage. This procedure leads us to study only schools that are members of one of the six major US college football conferences — the Atlantic Coast, Big Eight, Big Ten, Pacific Ten, Southeast, and Southwestern Conferences. Over the period of our study, 1978 to 1987, these conferences contained a total of fifty-five schools.

The decision of a high school student about the universities to which he or she will apply is an issue that has received little formal study.[5] One factor that may play a significant role in such a decision is the student's perception of the "quality" of education provided by various universities. Unfortunately, educational quality is very difficult to measure on an objective scale. While we employ variables that we believe proxy for quality, our econometric procedure is designed to reduce the need for such measures. Specifically, we employ panel data and use an estimation technique that controls for unobservable differences in quality between schools.

All of the results presented below are obtained by employing OLS on an equation that contains both fixed-effect, school-specific dummies and time dummies, as well as variables that control for changes over time in various factors possibly related to applications. The specific equation to be estimated is

$$\mathrm{APPLY}_{it} = \alpha_i + \alpha_t + \beta_1 \mathrm{FBR}_{it-1} + \beta_2 \mathrm{GRAD}_{it} + \beta_3 \mathrm{INC}_{it} + \beta_4 \mathrm{COST}_{it} + \beta_5 \mathrm{SALARY}_{it-1} + \epsilon_{it} \quad (1)$$

where i indexes schools, t indexes time, APPLY_{it} is the number of applications received by a university from potential incoming freshmen, FBR_{it-1} is the within-conference winning percentage of the university's football team (lagged one year), GRAD_{it} is the number of public high school graduates in the state in which the university is located, INC_{it} is the real *per capita* income in the state in which the university is located, COST_{it} is a real measure of a university's (in-state) tuition plus room-and-board costs, SALARY_{it-1} is a lagged real measure of the average salary paid to a university's full professors, and ϵ_{it} is a random error. All variables other than FBR are measured in logs.

The fixed school effect α_i captures the unmeasurable characteristics of a university that do not change over the period covered by our study; the fixed time effect α_t captures national effects common to all schools in a given year. The variable FBR, which is the main focus of this paper, captures the potential advertising effect of athletic success. The remaining variables all control for other influences on applicant totals. The variable GRAD is a rough control for the size of a university's potential applicant pool.[6] The variable INC controls for two potential influences on applicant totals. First, yearly variations in *per capita* income may capture business-cycle-related influences on an individual's decisions about whether to attend college and/or about the colleges to which to apply. Second, trends in a state's *per capita* income may reflect migration-induced changes in its demographic makeup that alter the fraction of its high school students who wish to attend college. The variable COST could also affect applicant totals through two possible effects: either a pure demand-curve effect (higher costs leading to a decrease in applications) or a quality-signaling effect (higher costs signaling higher quality and thus leading to an increase in applications).[7] Finally, SALARY is a proxy for the quality of the faculty at a given school, and therefore

possibly also for the quality of the education available at that school.

In the second regression reported below, another variable, ADMIT, is added to those given in equation (1). ADMIT is the fraction of a university's applicants (lagged one year) who are admitted to the school.[8] This variable could affect applicant totals in two ways. A decrease in ADMIT, in other words a "toughening" of admissions standards, can be caused either by a change in a school's admissions policy or by an increase in the number of applicants to that school. In the first case, if a decreased likelihood of being accepted by a college leads fewer people to apply, APPLY and ADMIT would be related positively. On the other hand, if a school is increasing in popularity (caused perhaps by an increase in the school's quality) then APPLY and ADMIT would be related negatively.

Since equation (1) includes school-specific intercepts, the β_is in it are derived solely from changes over time in the variables describing particular schools. For example, β_1 picks up the impact on applications of a change in a school's winning percentage, but not the impact of a consistently high (or low) winning percentage, which is instead impounded in that school's α_i. Such "within" coefficient estimates of the β_is thus provide no evidence about the extent to which differences in average applicant totals among schools should be attributed to their cross-sectional differences in the variables defined above, as opposed to their many other unmeasured differences. While we employ this econometric procedure to control for unmeasurable differences among the universities, we note that the β_1 it produces could underestimate the full impact that a high level of football success has on applicant totals. We return to this issue below.

Data for the above regression were obtained in two ways. First, salary data were collected from back editions of *Academe*, and other data from back issues of *Peterson's Guide to Four-Year Colleges*. Since some of the *Peterson*'s data were not complete, two attempts were made to collect information (on applicant totals, in particular) directly from university admissions offices. Forty-six of the fifty-five conference schools replied to our letters. As noted above, the data set covers the ten-year period 1978–1987.[9] Four schools are eliminated from the data set due to substantial changes in application policy that occurred during the years of the study.[10] Another nine schools are eliminated due to incomplete or apparently incorrect data.[11] The results reported below are thus based on data from 42 universities.[12]

RESULTS AND CONCLUSION

The results of estimating equation (1) (using a deviations-from-means procedure, so that the α_is are "differenced out" and thus not estimated) are displayed in Table 1. The first (second) column of that table contains the results of a regression that does not (does) include ADMIT. Looking first at our variable of interest, Table 1 indicates that the coefficient on FBR is positive and is approximately twice its heteroskedastic-consistent standard error in both regressions. This result indicates that a school that enjoys unusual success on the football field tends to be rewarded with an increase in the number

Table 1. Dependent variable: number of applications

DUM78	−0.106	
	(0.023)	
DUM79	−0.058	−0.064
	(0.022)	(0.021)
DUM80	−0.002	−0.011
	(0.022)	(0.022)
DUM81	0.014	−0.008
	(0.029)	(0.020)
DUM82	−0.011	−0.023
	(0.019)	(0.019)
DUM83	−0.042	−0.048
	(0.017)	(0.016)
DUM84	−0.030	−0.034
	(0.018)	(0.016)
DUM85	0.033	0.028
	(0.023)	(0.020)
DUM86	0.064	0.053
	(0.028)	(0.025)
DUM87	0.139	0.107
	(0.026)	(0.025)
FBR	0.054	0.053
	(0.027)	(0.027)
GRAD	−0.042	0.049
	(0.164)	(0.165)
INC	0.031	0.221
	(0.204)	(0.203)
COST	0.055	0.114
	(0.102)	(0.101)
SALARY	0.539	0.380
	(0.161)	(0.157)
ADMIT		−0.672
		(0.126)
$\bar{R}^2$	0.450	0.495

Note: Heteroskedastic-consistent standard errors in parentheses.

of applications it receives. While statistically significant, the size of this effect is fairly moderate. For example, if a school increases its football winning record by 0.250 (from 0.500 to 0.750, for example), the results in Table 1 indicate that the school would on average see its number of applicants rise by 1.3%.

The other variables in the regressions generally perform as expected. The fixed time effects show an upward trend in the number of applications sent to our group of universities. The number of public high school graduates (in the second regression) has a positive (but insignificant) effect on applications, as does *per capita* income. A positive relationship between INC and applications is consistent with the literature on the general relationship between income and college attendance. A rise in the cost of attending a university is estimated to have a positive (but insignificant) effect on applications to that school, so that our results appear to pick up the signaling effects of a change in tuition.[13] Increases in faculty salary have a positive (and significant) impact on applications, presumably displaying a link between salaries and school quality. Finally, a past increase in the selectivity of a school (a decrease in ADMIT) is strongly correlated with increased applications. Importantly, however, the estimated effect of FBR is altered very little by the introduction of ADMIT. Thus, even when we control for trends in a school's general popularity, our results indicate that yearly variations in football performance have an effect on applicant totals.

As noted above, the econometric results in Table 1 do not capture the cross-sectional impact that a university's average football record has on its applicant totals. A two-part procedure can be used to address this issue. First, estimate equation (1) using the levels of the variables (rather than their differences-from-means) in a regression that includes the school-specific α_is. Second, regress the set of estimated school dummy coefficients thus obtained on the school-average values of the right-hand-side variables included in (1). When this is done, the results indicate that average football record is positively, but not significantly, related to the estimated school dummies.[14] This result thus provides some weak evidence that consistent, long-term football success raises applicant totals; however, our results do not allow us to disentangle fully this possible effect from the effects of other cross-sectional differences among the universities.

In all, our results indicate that a university's athletic success can have at least one positive effect on its academic responsibilities. Specifically, our regressions show that an improvement in a school's football winning record appears to boost a school's "advertising" in a way that produces an increase in the number of applicants to that school. One possible result of this increase is that the school in question might then choose to be more "selective" in admitting students (in whatever way the school's administrators choose to implement this "selectivity").

Acknowledgements — We thank Chris Cornwell, participants at the University of Georgia Summer Economics Workshop, and two anonymous referees for helpful comments. We also thank the admissions officials throughout the country (particularly Janet Richardson) who provided us with data, Eric Suber at Peterson's Guides, Brian Carlson, Kumiko Powell, and Margaret Treacy for help in collecting data, and Karim Farah and Michael Mashburn for research assistance. Some of the data used in this paper were obtained from copyrighted data compiled by Peterson's Guides, Inc., to which all rights are reserved. The authors bear full responsibility for any errors contained in the paper.

NOTES

1. Other papers have reported the existence of positive correlations between a university's athletic success and contributions to that school's athletic department (Coughlin and Erekson, 1984) and between contributions to a school's athletic program and contributions to that school's academic programs (McCormick and Tinsley, 1990).
2. McCormick and Tinsley (1987) obtain some of their results by regressing a three-year change in SAT scores onto both a fifteen-year trend in football winning percentage and three-year changes in a number of control variables, so that the two relevant variables are measured over different time periods (they also obtain some results using a one-year, cross-section regression involving SAT scores and a dummy for the presence of a major sports program).

3. Other issues related to university athletics have also been analysed. Long and Caudill (1991) show that males who participated in intercollegiate sports when in college (largely at moderately-sized colleges) earned higher incomes when older than did comparable non-athletes. Maloney and McCormick (1993) show that football players received lower grade-point averages during football season than would be predicted based on individual background or subject-of-class characteristics. Tucker (1992) finds a negative link between a university's athletic success and its overall graduation rate.
4. The obvious alternative would be to instead (or also) use a school's basketball record (as do Tucker (1992) and Tucker and Amato (1993)). A timing problem arises in using basketball records, however, because basketball is played in the winter. At some universities the deadline for applications occurs before the basketball season, while at others the deadline is after the season. Thus, if basketball records have any effect on applicant totals, the lag of that effect would vary among schools.
5. Researchers have, however, studied the decisions of students about whether or not to apply to any college; see Savoca (1990). A great deal of attention has been given to the related issue of whether or not an individual will attend college; see, for example, the studies cited by Clotfelter (1991).
6. Most of the schools covered by this study are public universities that attract a majority of their students from within state.
7. We treat COST as an independent variable; in fact, it could be partly a function of past levels of applications (and thus of variables that affect applications).
8. By lagging ADMIT, we eliminate simultaneity between it and APPLY.
9. The data set includes 1977 figures for FBR but not for ADMIT. Thus, when ADMIT is included in a regression, that regression uses data on APPLY for only 1979–1987.
10. The University of California system changed its rules about the number of campuses to which an individual could apply; two other universities instituted an application fee.
11. If we include in the regressions the schools for which we have questionable data, the strength of the results on FBR is increased.
12. For the schools used in our study, applications range from a low of 1785 (Texas Christian, 1978) to a high of 20,214 (Michigan State, 1987) with an average of 8521.
13. The positive coefficient on COST in Table 1 is consistent with results reported by Clotfelter (1991). Other econometric procedures reveal that increases in tuition (holding other characteristics constant) reduce student demand; see Tierney (1982) and the papers cited by Heath and Tuckman (1987). When out-of-state (rather than in-state) tuition figures are used in the regressions, the coefficient on COST rises (particularly in the first regression). The other coefficients show little change; the coefficients (and standard errors) on FBR, for example, are 0.54 (0.28) and 0.52 (0.27).
14. The regression results are: $\alpha_i = -13.61(4.21) + 0.26(0.28)$ MFBR $- 0.01(0.11)$ MGRAD $+ 1.35(0.49)$ MINC $- 0.56$ (0.18) MCOST $+ 3.41(0.78)$ MSALARY; standard errors in parentheses. Differentiating between public and private schools changes the estimated coefficients (particularly on Mean COST), but generally leaves the coefficient on Mean FBR insignificant (although some results suggest that Mean FBR is more significant for private schools than for public schools.)

REFERENCES

Academe (various issues) The Annual Report on the Economic Status of the Profession.

CLOTFELTER, C.T. (1991) Demand for Undergraduate Education. In *Economic Challenges in Higher Education* (Edited by CLOTFELTER, C.T. *et al.*), pp. 19–139. Chicago: University of Chicago Press.

COUGHLIN, C.C. and EREKSON, O.H. (1984) An Examination of Contributions to Support Intercollegiate Athletics. *Southern Economics Journal* **51**, 180–195.

FREY, J.H. (1985) The Winning-team Myth. *Currents* **11**, 32–35.

GASKI, J.F. and ETZEL, M.J. (1984) Collegiate Athletic Success and Alumni Generosity: Dispelling the Myth. *Social Behavior and Personality* **12**, 29–38.

HEATH, J.A. and TUCKMAN, H.P. (1987) The Effects of Tuition Level and Financial Aid on the Demand for Undergraduate and Advanced Terminal Degrees. *Econ. Educ. Rev.* **6**, 227–238.

LONG, J.E. and CAUDILL, S.B. (1991) The Impact of Participation in Intercollegiate Athletics on Income and Graduation. *Review of Economics and Statistics* **73**, 525–531.

MALONEY, M.T. and MCCORMICK, R.E. (1993) An Examination of the Role that Intercollegiate Athletic Participation Plays in Academic Achievement. *J. Hum. Res.* **28**, 555–570.

MCCORMICK, R.E. and TINSLEY, M. (1987) Athletics versus Academics? Evidence from SAT Scores. *J. Polit. Econ.* **95**, 1103–1116.

MCCORMICK, R.E. and TINSLEY, M. (1990) Athletics and Academics: a Model of University Contributions. In *Sportometrics* (Edited by GOFF, B.L. and TOLLISON, R.D.) 193–204. College Station, TX: Texas A & M University Press.

Peterson's Guide to Four-Year Colleges (various issues) Princeton, NJ: Peterson's Guides.

RAIBORN, M.H. (1986) *Revenues of Expenses of Intercollegiate Athletics Programs.* Mission, KS: National Collegiate Athletic Association.

SACK, A.L. and WATKINS, C. (1985) Winning and Giving. In *Sport in Higher Education* (Edited by CHU, D., SEGRAVE, J.O. and BECKER, B.J.) pp. 299–306. Champaign, IL: Human Kinetics.

SAVOCA, E. (1990) Another Look at the Demand for Higher Education: Measuring the Price Sensitivity of the Decision to Apply to College. *Econ. Educ. Rev.* **9**, 123–134.

TIERNEY, M.L. (1982) The Impact of Institutional Net Price on Student Demand for Public and Private Higher Education. *Econ. Educ. Rev.* **2**, 363–383.

TUCKER, I.B., III (1992) The Impact of Big-Time Athletics on Graduation Rates. *Atlantic Economic Journal* **20**, 65–72.

TUCKER, I.B., III, and AMATO, L. (1993) Does Big-time Success in Football or Basketball Affect SAT Scores? *Econ. Educ. Rev.* **12**. 177–181.