THE EMPIRICAL EFFECTS OF COLLEGIATE ATHLETICS: AN INTERIM REPORT

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ABOUT THIS INTERIM REPORT

This study was commissioned by the National Collegiate Athletic Association (NCAA) as an independent analysis of the empirical effects of college athletics.

The views and opinions expressed in this study are solely those of the authors and do not necessarily reflect the views and opinions of the NCAA or the institutions with which the authors are associated.

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EXECUTIVE SUMMARY

Observers of college athletics hold dramatically different views regarding the empirical effects of athletics on institutions of higher education. One view, reflected in the so-called Flutie effect, suggests that athletic programs generate a variety of direct and indirect benefits for the school sponsoring them. Another view, reflected in two reports from the Knight Commission, suggests that college athletics is suffering from "a financial arms race" and college athletics "threaten to overwhelm the universities in whose name they were established." Unfortunately, the debate between these two schools of thought is often based more on assertions and anecdotes than on empirical evidence.

The purpose of this paper is to examine empirically the effects of college athletics, with a particular focus on the financial effects. In particular, the paper draws on evidence contained in previous academic studies; statistical analysis of a new, comprehensive database compiled from school-specific information collected as part of the Equity in Athletics Disclosure Act (EADA) merged with data from other sources (such as the Integrated Post-Secondary Education Data System managed by the Department of Education); and a detailed survey of chief financial officers from 17 Division I schools. These various sources of data have important limitations, especially in areas such as the treatment of capital expenditures, but they nonetheless represent a comprehensive empirical effort to shed light on key issues related to college athletics.

The paper specifically examines ten hypotheses about college athletics, focusing primarily on Division I-A schools. Using our data and the existing academic literature, we examine each of the hypotheses. Our analysis confirms five of the hypotheses; the other five are not proven and require further empirical analysis:

Hypothesis #1: Operating athletic expenditures are a relatively small share of overall academic spending.

- According to Department of Education data, reported athletic spending represented roughly three percent of total higher education spending for Division I-A schools in 1997 (the most recent comprehensive Department of Education data publicly available).

- In 2001, NCAA/EADA data suggest that operating athletic spending represented roughly 3.5 percent of total higher education spending for Division I-A schools.

- The share of operating athletic spending in a university's total budget is higher for smaller schools than for larger schools because of the fixed costs associated with an athletic department.

- The share of operating athletic spending in overall higher education spending has increased only slightly over time. In recent years, there is indirect evidence of a modest acceleration in athletic spending relative to total spending, but comprehensive data are not yet available to confirm such a trend.

- We conclude that operating athletic expenditures in the aggregate are a relatively small share of total higher education spending for Division I-A schools.

Hypothesis #2: The football and basketball markets exhibited increased levels of inequality in the 1990s.

- A common measure of inequality is the Gini coefficient, which would equal one if one school accounted for all spending and zero if spending were the same across schools. Increases in the Gini coefficient represent increased levels of inequality and vice versa.

- Between 1993 and 2001, the Gini coefficient for Division I-A football spending rose from 0.26 to 0.29. To put that increase in perspective, it is approximately equal to the increase in income inequality in the United States during the 1980s. The Gini coefficient for Division I-A basketball spending rose even more sharply, from 0.26 to 0.31.

- Inequality also increased among top-spending schools. The Gini coefficient for football spending among schools in the top 25 percent of the spending distribution, for example, rose from 0.08 in 1993 to 0.11 in 2001.

- We conclude that the football and basketball markets exhibited increased levels of inequality between 1993 and 2001.

Hypothesis #3: The football and basketball markets exhibit mobility in expenditure, revenue, and winning percentages.

- More than two-fifths of the schools that were in the top quintile of Division I-A football spending in 1993 were no longer in the top quintile by 2001. Nearly 60 percent of the schools in the middle quintile in 1993 were no longer there in 2001; more than one-third had moved up and more than one-fifth had moved down.

- Net revenue also exhibited some degree of mobility: Among the schools in the middle quintile of football net revenue in 1993, roughly two-thirds were no longer in the middle quintile in 2001.

- A school's winning percentage exhibits only modest levels of persistence. For example, the correlation of winning percentages from one year to the next is only about 50 percent. The correlation dissipates over time: The correlation between winning percentages ten years apart is 20 to 30 percent.

- We conclude that the football and basketball markets exhibit some degree of mobility in expenditure, revenue, and winning percentages.

Hypothesis #4: Increased operating expenditures on football or basketball, on average, are not associated with any medium-term increase or decrease in operating net revenue.

- Our statistical analyses suggest that between 1993 and 2001, an increase in operating expenditures of $1 on football or men's basketball in Division I-A was associated with approximately $1 in additional operating revenue, on average. The implication is that spending an extra $1 was not associated with any increase or decrease in *net* revenue, on average, from these sports.

- These results, although based on better data than previous studies, nonetheless have limitations. For example, our database extends only from 1993 to 2001. It is possible that increased spending on athletics has long lags – that is, it produces significant benefits or costs after a long period of time. If this were the case, our database may be too short to capture the "true" effects of increased spending. In addition, the NCAA/EADA data do not adequately record capital expenditures; our analysis therefore focuses on operating spending. It is possible that the effects of operating spending differ from the effects of capital spending.

- We conclude that over the medium term (eight years), increases in operating expenditures on football or men's basketball are not associated with any change, on average, in operating net revenue.

Hypothesis #5: Increased operating expenditures on football or basketball are not associated with medium-term increases in winning percentages, and higher winning percentages are not associated with medium-term increases in operating revenue or operating net revenue.

- A variety of econometric exercises suggests no statistical relationship between changes in operating expenditures on football and changes in football winning percentages between 1993 and 2001.

- A variety of econometric exercises also suggests no statistical relationship between changes in winning percentages and changes in football operating revenue or net revenue between 1993 and 2001.

- We conclude that increased operating expenditures on football or basketball are not associated with medium-term increases in winning percentages, and higher winning percentages are not associated with medium-term increases in operating revenue or operating net revenue.

Hypothesis #6: The relationship between spending and revenue varies significantly by sub-groups of schools (e.g., conferences, schools with high SAT scores, etc.).

- We examined the relationship between spending and revenue across various subsets of schools. We were not able to detect evidence of systematic differences

when separating the schools by characteristics such as: public vs. private schools; schools with high SAT scores vs. schools with low SAT scores; large student populations vs. small student populations; schools that were ever in the Associated Press (AP) rankings; and schools that were ranked in the top 25 in the AP poll in 1993.

- Some schools benefited from moving up to Division I-A, but the experience varied across schools. For example, two schools experienced significant increases in football net revenue after moving to Division I-A; one school experienced a decline in football net revenue after moving to Division I-A.

- In many cases, the sample sizes for the subsets of schools were quite small; given the paucity of data in some cases, it is difficult to reject the hypothesis outright. Instead, we conclude that the hypothesis that the relationships vary significantly by sub-groups of schools is not proven.

Hypothesis #7: Increased operating expenditures on big-time sports affect operating expenditures on other sports.

- Our statistical analysis suggests that each dollar increase in operating expenditures on football among Division I-A schools may be associated with a $0.21 increase in spending on women's sports excluding basketball and $0.35 including basketball, but the results are not robust to changes in the econometric specification. Such a potential spillover effect may be expected given Title IX and other pressures to ensure equity between men's and women's sports.

- Previous studies have found that increases in football spending are associated with increased spending on women's sports.

- Given the lack of robustness of the results, we conclude that the hypothesis that increased operating expenditures on big-time sports affect operating expenditures on other sports is not proven.

Hypothesis #8: Increased operating expenditures on sports affect measurable academic quality in the medium term.

- Our statistical analysis suggests no relationship – either positive or negative – between changes in operating expenditures on football or basketball among Division I-A schools and incoming SAT scores or the percentage of applicants accepted.

- The academic literature is divided on whether athletic programs affect academic quality. While our results suggest no statistical relationship one way or the other, our data are limited to eight years and such a relationship may exist over longer periods of time. In addition, the relationship between athletics and academic

quality may manifest itself in ways other than the effect on SAT scores or other directly measurable indicators.

- We conclude that the hypothesis that changes in operating expenditures on big-time sports affect measurable academic quality in the medium term is not proven.

Hypothesis #9: Increased operating expenditures on sports affect other measurable indicators, including alumni giving.

- Econometric analysis using our database shows little or no robust relationship between changes in operating expenditures on football or basketball among Division I-A schools and alumni giving (either to the sports program or the university itself).

- The academic literature is again inconclusive on this issue. As with the previous hypothesis, our results suggest little or no statistical relationship – but our data are limited to eight years and such a relationship may exist over longer periods of time.

- We conclude that the hypothesis that increased operating expenditures on sports affect other measurable indicators, including alumni giving, is not proven.

Hypothesis #10: The football and basketball markets exhibit an "arms race" in which increased operating expenditures at one school are associated with increases at other schools.

- Analysts have used the term "arms race" to describe a variety of phenomena. We use the term to refer to a situation in which increased spending at one school are associated with increases at other schools.

- Some of our econometric analyses suggest that increased operating expenditures on football at one school may be associated with increases in operating expenditures at other schools within the same conference, but other specifications suggest no relationship.

- We conclude that the hypothesis that the football and basketball markets exhibit an "arms race" in which increased operating expenditures at one school are associated with increases at other schools is not proven.

- It is important to emphasize that the existence of an "arms race" may be concentrated in capital expenditures, which are not adequately recorded in the NCAA/EADA data, rather than in operating expenditures.

Conclusion

This interim report reflects an effort to advance the debate over college athletics by using data to assess the validity of different hypotheses. We find that many widely held perspectives about spending on big-time sports by colleges – by both proponents and opponents of such spending – are not supported by the statistical evidence.

Our results must be qualified, however. Although the data in this paper are more comprehensive than other datasets that have been used in the past, they are nonetheless imperfect: They are available only since 1993, and they fail to capture fully various components of athletic activities (especially total capital expenditures and staff compensation from all sources). Further efforts to improve and analyze the data are likely to provide additional insights into the effects of college athletics on institutions of higher education. Given the available data, neither the proponents of the Flutie effect nor those who argue that big-time college athletics are imposing directly measurable financial harm on higher education have proven their case.

The Empirical Effects of Collegiate Athletics: An Interim Report

Introduction

Observers of college athletics hold dramatically different views regarding the effects of athletics on institutions of higher education. One view suggests that athletic programs generate a variety of direct and indirect benefits for the school sponsoring them. This perspective is reflected in stories about the surge in applications and other benefits that accrue to schools with winning sports teams. For example, the *Washington Post* noted in 2001, "Winning teams put Maryland in a national spotlight, inspiring more alumni to give money and more high school students to apply."[1] Clemson University experienced an unprecedented 17-percent increase in applications in the year following its 1981 football championship.[2] Boston College experienced a 30-percent increase in applications in the two years following the famous game-winning "Hail Mary" pass by Boston College quarterback Doug Flutie.[3] Ever since, the potential direct and indirect benefits associated with winning sports teams have been referred to as the "Flutie effect." Many athletic directors and others rely on this perspective to justify significant increases in athletic spending.

A contrasting view suggests that athletic programs impose substantial financial and other costs on universities and undermine the academic mission of higher education. The Knight Foundation Commission on Intercollegiate Athletics, which included university presidents along with business and sports leaders, has been a particularly forceful advocate of this perspective. In 1991, the Knight Commission issued an influential report criticizing the role of athletics in higher education.[4] In 2001, the Commission issued an update that concluded, "The Commission is forced to reiterate its earlier conclusion that 'at their worst, big-time college athletics appear to have lost their bearings.' Athletics continue to 'threaten to overwhelm the universities in whose name they were established.'"[5]

The debate between these two different schools of thought has unfortunately often been based more on anecdote than on empirical evidence. Furthermore, even those researchers who have brought empirical evidence to bear on the effects of college

[1] "U-Md's Other Winning Team," *Washington Post*, December 27, 2001.
[2] "20 Years Ago, Life Changed Forever at Clemson with National Title," *Scripps Howard News Service*, November 2, 2001.
[3] Mary Beth Marklein, "Colleges' Sport Success Is Not A Major Draw," *USA Today,* March 20, 2001.
[4] Knight Commission (1991).
[5] Knight Commission (2001). Others have raised questions about the effects of college athletics. James Duderstadt, the former President of the University of Michigan, has written that the "mad race for fame and profits through intercollegiate athletics is clearly a fool's quest." Duderstadt (2000), page 146. Barbara Bergmann, a professor emerita of economics at the University of Maryland, has concluded that the "assumption that institutions derive financial benefits from sports programs is false in most cases." Bergmann (1991), page 28.

athletics have been forced to examine a narrow subset of schools or a narrow subset of issues.

The purpose of this paper is to examine the financial and other effects of college athletics using data for a broad array of Division I-A schools. In particular, the paper draws on the available empirical evidence contained in previous academic studies; statistical analysis of a new, comprehensive database compiled from school-specific information collected as part of the Equity in Athletics Disclosure Act (EADA) merged with data from other sources, such as the Integrated Post-Secondary Education Data System managed by the Department of Education; and a detailed survey of chief financial officers from 17 Division I schools. These various sources of data have important limitations – especially in areas such as the treatment of capital expenditures – but they nonetheless represent the most comprehensive empirical resource to date for shedding light on the key issues related to college athletics. Our focus is primarily football and men's basketball within Division I-A, which are the most contentious subjects of debate.

The paper has five sections. The first section summarizes the findings from the existing academic literature. The second section describes the EADA data and the supplementary data used to compile our database. The third section uses the data to examine basic facts about, and trends in, collegiate athletic spending. The fourth section applies econometric and other statistical methods to explore the effects of higher athletic spending on various financial and other variables. The third and fourth sections together explore ten commonly asserted hypotheses that can be evaluated with the available data. A final section offers conclusions.

Section I: Existing Empirical Literature

The extant literature has explored a variety of aspects of athletics in higher education, albeit often using limited sample sizes, relatively old data, and/or somewhat unsophisticated statistical techniques. Despite these limitations, the literature does provide useful background for assessing the impact of athletics on higher education. This section summarizes the literature.

A major focus of this study – the effect of increased athletic expenditures on athletic net revenue – has not been thoroughly examined in previous studies. The few studies that have been undertaken on the topic generally find that changes in spending on football or men's basketball are not associated with significant increases or decreases in financial net revenues. For example, Sheehan (2000) uses NCAA data from 1995-1996 and concludes: "For football, a $1 increase in expenditures generates approximately $1 in additional revenue." Shulman and Bowen (2001) examine data from eight Division I-A schools, four Ivy League schools, seven liberal arts colleges, and three Division III schools. They conclude, "In only the rarest case can athletic expenditures be justified as an 'investment' that will somehow benefit the institution's bottom line." Zimbalist (1999), relying on aggregate data published by the NCAA, notes, "Since it is only the top IA schools that generate significant positive net income, it is not surprising that new arrivals to the big time do not flourish financially." It is important to note that none of

these studies found that expanding athletic programs causes a significant reduction in net revenue.

The finding that increased spending on football or basketball is not associated with substantial changes in net revenue (either positive or negative) can be examined further by exploring the relationships between (a) spending and winning, and (b) winning and net revenue. We are unaware of any studies that have examined the relationship between spending and winning. The only study of which we are aware on the second linkage, Sheehan (2000), finds no statistical relationship between winning and net revenue.

Although the evidence suggests no direct financial benefit (in terms of increased net revenue) from expanded or more successful athletic programs, a variety of indirect effects may exist. Such indirect effects come in two quantifiable forms: indirect financial effects and indirect non-financial but nonetheless quantifiable effects. Examples of the former include alumni donations; examples of the latter include improvements in the quality of freshman applications. In addition, there may be non-quantifiable effects (e.g., effects on school spirit), which by definition are difficult to examine in an empirical fashion but may manifest themselves indirectly through quantifiable factors (e.g., applications).

The academic literature is mixed regarding whether athletic success increases alumni donations. This issue has received perhaps the most attention to date in the academic literature. Sigelman and Carter (1979) find no significant relationship between athletic success and alumni giving. Brooker and Klastorin (1981) find that athletic success increases the share of alumni who donate and the average gift to the annual fund. Sigelman and Bookheimer (1983) find that contributions to the athletic department are significantly positively correlated with football success, but annual fund giving is negatively correlated with athletic success. Coughlin and Erekson (1984) find that bowl participation and basketball winning percentages increase gifts to the athletic department. Frey (1985) and Grace (1988) suggest that athletic success does not increase contributions. McCormick and Tinsely (1990) find a "positive, significant relation between academic philanthropy and gift giving to support athletics; athletic fundraising does not appear to crowd out gifts to academics." Grimes and Chressanthins (1994) focus on a single school and find that the winning percentage for men's basketball and for the total athletic program raises alumni contributions. Baade and Sundberg (1996), using data from 1973 to 1990, find that bowl appearances increase giving, and basketball success increases giving at state schools but not private schools. Goff (2000) finds that athletic success appears to substantially increase general giving to universities; these effects are present for both average and major improvements in athletics.

Turner, Meserve, and Bowen (2001), using the College and Beyond database that disproportionately covers elite schools, find that changes in the won-lost record of the most visible athletic teams do not affect the percentage of graduates who make general gifts. They also find that variation in won/lost records *negatively* affects in Division I-A the amount that donors contribute for general purposes; the share of graduates who make

gifts specifically for athletics is not affected by athletic success, but amounts given to athletics are positively affected; and giving by former varsity athletes is more sensitive to competitive success than giving by other former students. Shulman and Bowen (2001) find no evidence that gifts to athletics crowd out gifts to general university funds. As noted, the literature is thus mixed: Several studies find no effect of athletic success on general alumni giving, whereas others do find an effect.

Athletic success may also affect applications and enrollment. For schools that are at capacity (i.e., cannot expand the number of students enrolled), increased applications could translate into reductions in acceptance rates and corresponding improvements in student quality. For schools not at capacity or for schools with the ability to expand capacity, increased applications could translate into increased enrollment and higher general revenue. The literature generally finds that athletic success is associated with increased applications and enrollment: Murphy and Trandel (1994), using panel data on schools in major conferences from 1978 to 1987, find that schools with more successful football teams receive more applications, although the effect is relatively modest. Zimbalist (1999) similarly finds, using panel data from 1980 through 1995, that athletic success is associated with increased applications. Mixon and Hsing (1994) find that out-of-state students prefer schools with larger sports programs. Mixon and Rand (1995) find that doubling the number of NCAA basketball tournament games played would lead to a six percent increase in out-of-state enrollment. Goff (2000) finds that dropping football can have measurable, negative effects on enrollments, even for second-tier schools.

Despite the evidence that athletic success increases applications, the academic literature is divided on whether athletic success is associated with improved student quality. This result may reflect the absence of capacity constraints at many schools, or it may reflect increased applications primarily from non-competitive students. For example, if the entire expansion in applications reflected students who did not meet the school's acceptance criteria, applications could increase without any measurable impact on academic quality. In any case, the evidence on the issue is mixed. McCormick and Tinsley (1988) find that membership in a major athletic conference has a positive and significant effect on incoming SAT scores. Tucker (1992), using data on the same schools as McCormick and Tinsley, finds that football success may have a positive impact on incoming SAT scores, but a negative effect on graduation rates. The study finds that basketball success is unrelated to the graduation rate. Tucker and Amato (1993) find no robust relationship between athletic success and SAT scores. Bremmer and Kesselring (1993), using 1989 data for schools in major athletic conferences and those that are not, find that membership in a major conference does not have a statistically significant effect on SAT scores. They also find no evidence to suggest that athletic success raises the SAT scores of students. Mixon (1995) finds that basketball success does have a positive and significant effect on SAT scores. Zimbalist (1999), using panel data on Division I-A schools for 1980 through 1995, finds that athletic success is not associated with changes in SAT scores or applicant yields. Goff (2000) finds that athletic success can substantially increase national exposure and that such exposure may lead to an improved pool of entering students (in terms of aptitude tests).

The literature has also examined other related issues. For example, Rishe (1999) uses data from 308 Division I programs and finds that a $1 increase in football net revenue is associated with a $0.20 increase in expenditures on women's sports. Sheehan (2000) finds that each $1 in football net revenue raises women's expenditures by $0.32 and other men's expenditures by $0.13. Shaheen (2000) also finds that increases in expenditures on women's sports are associated with a reduction in net revenue from those sports.

Section II: Description of Data

To build upon the existing literature, we constructed a database of higher education athletic and financial data. The core of the database is based on reports filed under the Equity in Athletics Disclosure Act (EADA). Under EADA, institutions are required to report the total revenues and expenses attributable to the institution's intercollegiate athletic activities; the revenues and expenses attributable to football, men's basketball, women's basketball, all men's sports combined except football and basketball, and all women's sports combined except basketball; the number of participants for each varsity team and an unduplicated head count of individuals (by gender) who participate on at least one varsity team; and whether a coach is assigned to a team full- or part-time, and if part-time, whether the coach is a full- or part-time employee of the institution.

The National Collegiate Athletics Association (NCAA) collects supplemental data that provides more detail than available on the EADA form. These NCAA data are proprietary. For this research project, we were granted access to the NCAA/EADA data since 1993, the first year in which they are electronically available.[6] The data are available for 1993, 1995, 1997, 1998, 1999, 2000, and 2001. For years prior to 1993, data on individual athletic programs by school are unavailable, but overall summaries are available from an NCAA publication.[7] For some purposes, we were able to use these pre-1993 data.

The post-1993 NCAA/EADA data were merged with a variety of other data to create a large panel data set. The other data sources included most importantly the Integrated Postsecondary Education Data System (IPEDS) collected by the Department of Education. IPEDS provides a variety of overall financial and other data by school and year. Unfortunately, the data are publicly available only through 1997. Win-loss records, bowl appearances, and Associated Press rankings for Division I-A football teams were obtained from various sources.[8] Alumni giving, incoming SAT scores, applications, and other variables were also added to the database.

The end result was a panel data set with more than 100 schools and hundreds of variables per school. Much of the analysis focuses on Division I-A schools. The construction of the database revealed numerous inconsistencies both across and within

[6] The year "1993" corresponds to the academic year 1992-1993.
[7] Fulks (2002).
[8] Win-loss records were obtained from www.jhowell.net/cf/scores/byName.htm; bowl appearances from cfbdatawarehouse.com/data/bowls/; and AP rankings from www.infoplease.com/ipsa/A0002709.html.

various data sets. To our knowledge, no one had ever created a panel dataset out of the NCAA/EADA data before; doing so revealed non-trivial reporting errors from year to year. We therefore discarded or corrected obvious data errors, such as recorded athletic expenditures that represented more than 100 percent of total institutional spending or football expenditures that were clearly too high by a factor of ten. The resultant database, although an improvement relative to previous data efforts in this area, clearly has important limitations that are discussed in more detail below.

Section III: Basic Facts about Athletic Spending

This section uses the database described in Section II to present some basic facts about Division I-A athletic spending. For more information about patterns of Division I-A athletic spending, see Fulks (2002). We first examine data on spending and then on revenue.

Division I-A athletic spending

The first empirical finding is that operating athletic expenditures represent a relatively small share of overall higher education spending. For example, one source of information on athletic and overall spending is IPEDS; the most recent comprehensive IPEDS data publicly available from the Department of Education are for the 1996-1997 academic year. We merged an identifier for Division I-A schools onto the IPEDS data to restrict the sample to Division I-A schools.[9] The results suggest that reported operating athletic expenditures represented 2.8 percent of total higher education spending, and 3.6 percent of educational & general spending, for Division I-A schools in 1996-1997 (Table 1).

Table 1: IPEDs data on athletic and overall spending for Division I-A schools, 1996-1997

	Division I-A schools ($ million)
Operating athletic spending	$1,454
E&G spending	$40,606
Total spending	$52,258
Athletic spending as % of E&G	3.6%
Athletic spending as % of total	2.8%

Source: IPEDs data and authors' calculations. Note: "Athletic spending" may exclude capital expenditures and other factors.

Another source for athletic and overall spending is the NCAA/EADA data, which include information on total institutional spending. Of the 114 Division I-A schools filing the NCAA/EADA report for the 2000-2001 academic year, 13 either failed to report a total institutional spending figure or reported a clearly erroneous amount (e.g., a total institutional spending amount that was precisely equal to the amount spent on

[9] We computed athletic spending as the sum of "amount for intercollegiate athletic spending – auxiliary," "amount for intercollegiate athletic spending – instruction," "amount for intercollegiate athletic spending – student services," and "amount for intercollegiate athletic spending – corporate/foundation."

athletics). We excluded these schools from the analysis below, so the results are not directly comparable to those shown in Table 1 both because the schools included and the definition of spending may differ. Table 2 shows the data from the NCAA/EADA reports, excluding the 13 schools with missing or inaccurate total institutional spending figures. The remaining schools all had athletic spending shares that were less than 14 percent. The results suggest that for Division I-A schools reporting credible figures for total institutional spending, operating athletic spending represented 3.2 percent of total higher education spending (Table 2).[10]

Table 2: NCAA/EADA data on athletic and overall spending for Division I-A schools, 2000-2001

	Division I-A schools ($ million)
Operating athletic spending	$2,357
Total spending	$72,669
Athletic spending as % of total	3.2%

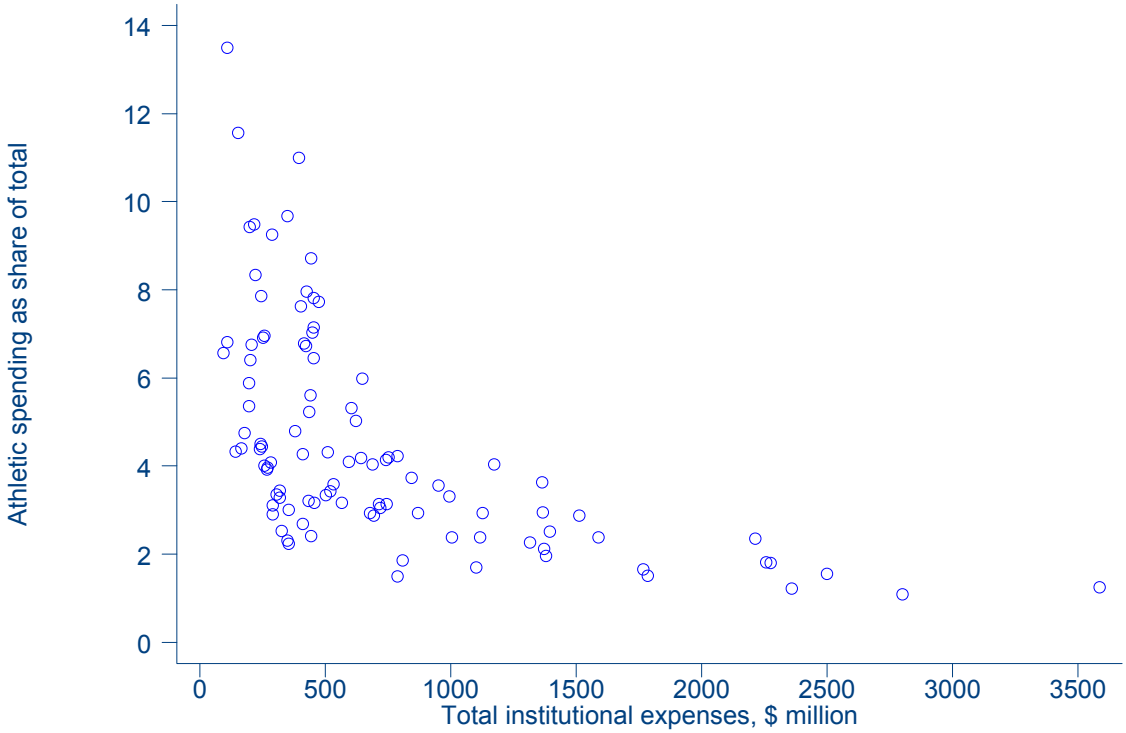
Source: NCAA/EADA data and authors' calculations. Note: "Athletic spending" may exclude capital expenditures and other factors. As indicated in the text, 13 schools were excluded because of missing or clearly erroneous data.

One concern about Tables 1 and 2 is that some operating expenditures on athletics may not be included. For example, the NCAA/EADA data do not appear to fully capture the compensation paid to football and basketball coaches. (See further discussion below.) Any such excluded expenditures should not substantially affect the conclusion that operating athletic spending is a relatively small share of total academic expenditures, however. For example, if we assume that actual operating athletic spending at each Division I-A school were $2.5 million higher than reported, aggregate spending on athletics in Division I-A would be approximately $275 million higher than reported, and athletic spending would be 3.6 percent of total academic spending.

The conclusion from Tables 1 and 2, along with other supporting evidence, is that operating expenditures on athletics are a relatively modest share – roughly 3.5 percent – of Division I-A budgets. The share does vary across schools, however, reflecting the fixed costs associated with running an athletic department. Figure 1 shows that among Division I-A schools, the share of operating athletic spending in total spending is higher for schools with smaller overall budgets than for schools with larger overall budgets. Similarly, the athletic spending share also varies somewhat across conferences within Division I-A and tends to be higher for Division II and III schools than I-A schools.

[10] The precise share is slightly affected by the process for evaluating the credibility of the total institutional spending figures. Reasonable changes in the filter used can raise the overall share to as high as 3.4 percent.

Figure 1: Athletic spending share and total institutional spending, Division I-A schools, 2000-2001



Source: NCAA/EADA data and authors' calculations. Note: "Athletic spending" may exclude capital expenditures and other factors.

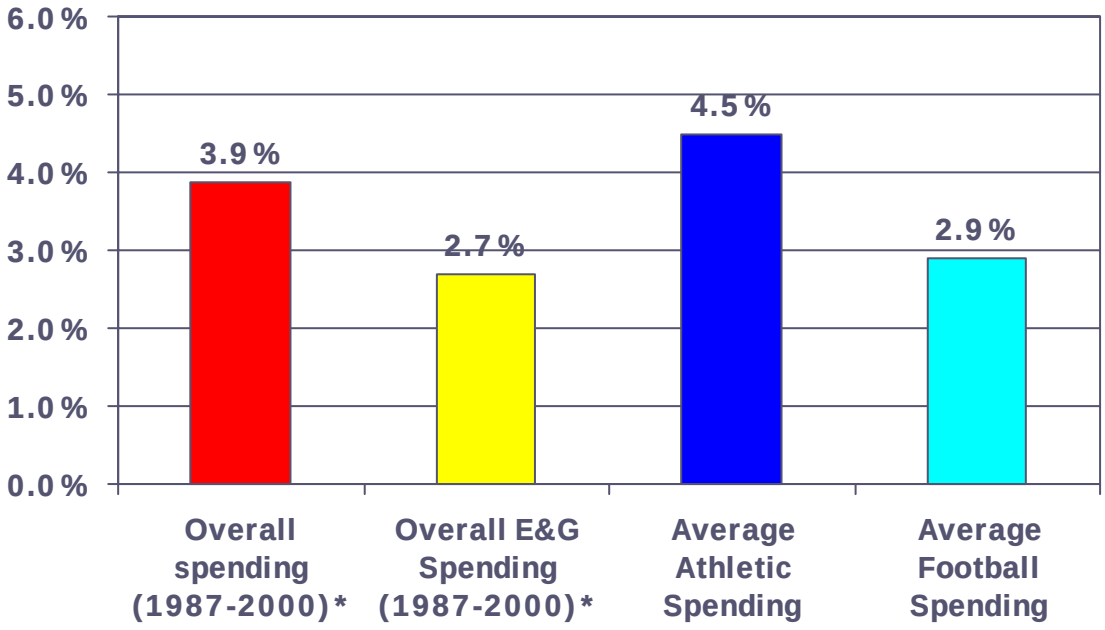
Although definitive data are not available because of inconsistencies across datasets, the operating athletic spending share in Division I-A has likely increased modestly since 1985. Figure 2, for example, shows that mean operating athletic spending grew slightly faster than overall academic spending between 1985 and 2001. NCAA data suggest that Division I-A real mean operating athletic spending rose by an average of 4.5 percent per year; IPEDS data suggest that real institutional spending among Division I-A schools rose by slightly less than 4 percent per year. (Care should be applied in interpreting the IPEDS figures on institutional spending because the data for Division I-A schools are incomplete across time, and the growth rate was computed using the sub-sample of schools for which the required data are available in all years.) The implication is that the ratio of average operating athletic spending to average overall spending rose by slightly less than ten percent – which would be consistent with an increase from slightly less than 3.0 percent to about 3.2 percent.

Two caveats are worth noting about the relative growth rate of athletic and academic spending. First, relative to educational and general (E&G) spending, athletic costs rose somewhat more rapidly. Second, real operating athletic spending appears to have accelerated in the late 1990s: real mean spending rose by 3.7 percent per year between 1985 and 1995, and by 5.7 percent per year between 1995 and 2001. It is difficult to know whether this acceleration is temporary and reflects the unusual

economic conditions of the late 1990s, or whether it underscores a concern about the longer-term growth rate of athletic spending.

One other point is worth emphasizing. Despite popular perceptions to the contrary, football spending has increased less rapidly than total operating athletic spending since 1985; the most rapidly growing components of operating athletic spending were in women's sports. Spending on men's sports other than football and basketball has declined in real terms since 1985.

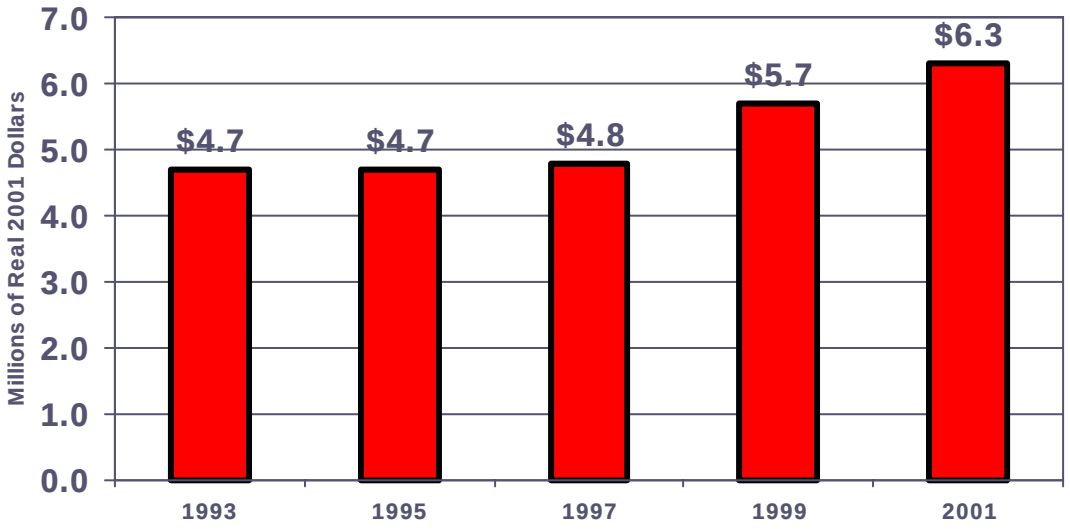
Figure 2: Growth rates of spending, Division I-A 1985-2001



Sources: Nominal athletic data based on averages from Daniel Fulks, "Revenue and Expenses of Division I and II Intercollegiate Athletics Programs: Financial Relationships and Trends-2001," Tables 3.1 and 3.10. Nominal academic data based on aggregates from Department of Education, IPEDS database, restricted to the 57 Division I-A schools for which data were recorded in both 1986-1987 and 1999-2000. Real growth rates computed using the CPI-U. The overall spending and educational & general spending figures should be viewed as approximations, given accounting changes and the restricted sample.

Further insight into athletic spending is obtained by examining data on specific sports. Figure 3 shows the mean operating expenditure on football among Division I-A schools, by year, in real (inflation-adjusted) dollars. As the figure shows, mean operating spending on Division I-A football rose significantly in real terms between 1993 and 2001. We examine data from 1993 to 2001 in this section, because we lack detailed school-specific data before 1993.

Figure 3: Mean expenditures on Division I-A football (millions of 2001 dollars)



Source: NCAA/EADA data and authors' calculations. Note: "spending" may exclude capital expenditures and other factors.

Inequality in football spending

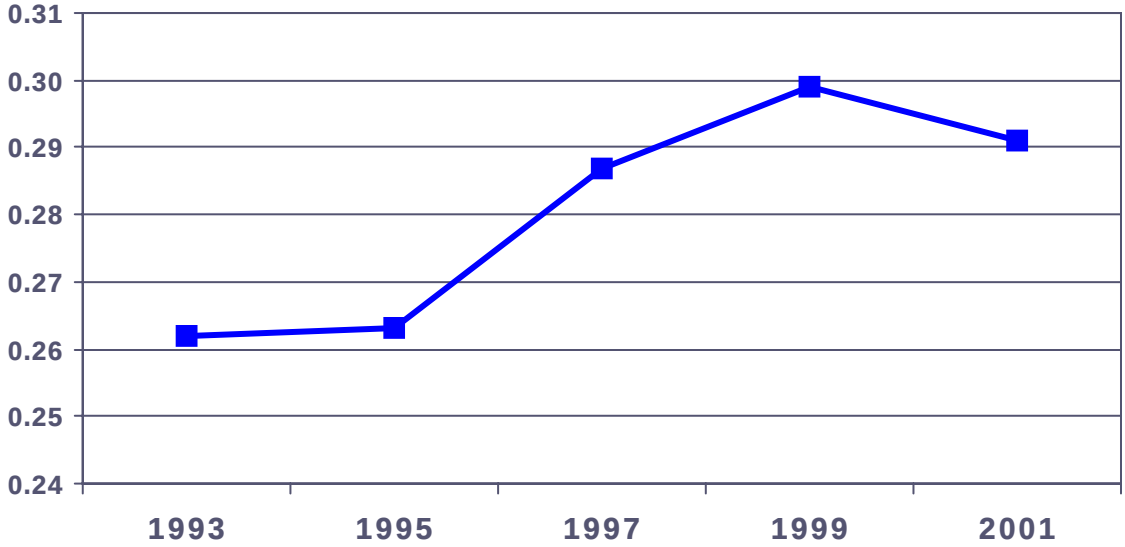
Football spending has grown disproportionately rapidly at the top of the football spending distribution, generating an increase in inequality in such spending in the 1990s. For example, one common measure of inequality is the Gini coefficient. The Gini coefficient equals one if a single school accounts for all spending, and zero if all schools have equal spending. Figure 4 shows the increase in the Gini coefficient for football spending among Division I-A schools between 1993 and 2001.[11] The Gini coefficient rose from 0.26 in 1993 to 0.29 in 2001 – an increase that is roughly equal to the increase in household income inequality in the United States during the 1980s.[12]

Other measures on football inequality (such as the ratio of spending at the 90th percentile to spending at the 10th percentile) also suggest an increase in football spending inequality among Division I-A schools during the 1990s. In addition, inequality even among the largest football programs increased: The Gini coefficient for the top 25 percent of schools in the operating football spending distribution rose during the 1990s, from 0.08 in 1993 to 0.11 in 2001. As Figure 4 indicates, there appears to have been some decline in inequality between 1999 and 2001. It is difficult to predict whether inequality will revert to its earlier levels or whether it will continue to increase, as it did during the 1990s.

[11] Figure 4 reflects data for all Division I-A schools, regardless of whether data are available for all years. When the sample is restricted to those schools reporting data for each year, the Gini coefficient shows an increase from 0.26 in 1993 to 0.28 in 2001.

[12] The Gini coefficient for household income in the United States rose from 0.404 in 1979 to 0.431 in 1989. See http://www.census.gov/hhes/income/histinc/h04.html.

Figure 4: Gini coefficient for operating football spending, Division I-A schools



Source: NCAA/EADA data and authors' calculations.

Mobility in football spending

Another aspect of football expenditures is the degree of spending mobility among schools. Table 3 shows Division I-A schools ranked by quintiles in 1993 and 2001, according to their football spending. The NCAA/EADA data contain football spending in both 1993 and 2001 for 88 of the Division I-A schools; we restricted the sample to these 88 schools. Table 3 shows that of the 17 schools in the middle 20 percent of the football spending distribution in 1993, 7 were still there in 2001, four had moved up a quintile, two had moved up two quintiles, and four had moved down a quintile. Of the 17 schools in the top 20 percent of the football spending distribution in 1993, 10 were still there in 2001, five had moved down one quintile, and two had moved down two quintiles.

Table 3 suggests a moderate degree of mobility. For example, the share of schools that remain in the same football spending quintile over eight years is smaller than the share of families in the United States that remain in the same income quintile from one year to the next -- suggesting more mobility in football spending over eight years than in family income over one year. However, the share of schools remaining in the same quintile is higher than the share of families who remain in the same income quintile over three decades -- suggesting less mobility in football spending over eight years than in family income over three decades.[13] The degree of mobility across quintiles displayed in Table 3 appears to be similar to the mobility of labor earnings in the United States over a five-year period.[14] Although comparisons of this type are difficult to make, the conclusion is that over a comparable period of time, the degree of mobility in football spending appears to be roughly similar to the degree of income mobility in the United States.

[13] For data on family income mobility in the United States, see Gottschalk and Danziger (1997).
[14] For data on earnings mobility, see Burkhauser, Holtz-Eakin, and Rhody (1997).

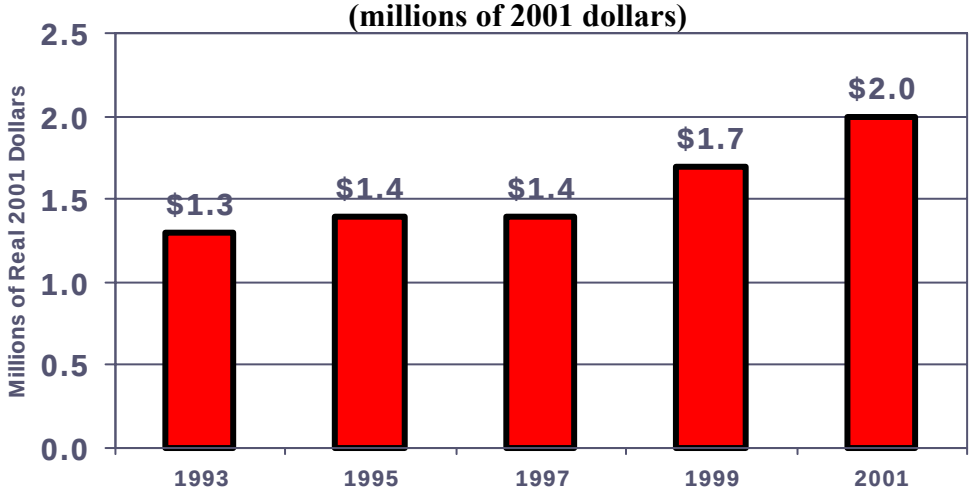
Table 3: Mobility of Division I-A football spending, 1993-2001

		2001					
		Bottom 20 percent	Second 20 percent	Middle 20 percent	Fourth 20 percent	Top 20 percent	Total
1993	Bottom 20 percent	14	4	0	0	0	18
	Second 20 percent	4	9	3	2	0	18
	Middle 20 percent	0	4	7	4	2	17
	Fourth 20 percent	0	1	5	7	5	18
	Top 20 percent	0	0	2	5	10	17
	Total	18	18	17	18	17	88

Basketball

Trends in men's basketball spending among Division I-A schools are somewhat similar to those in football. Figure 5 shows mean spending on men's basketball among Division I-A schools. As with football, spending inequality in men's basketball has risen significantly since 1993. The Gini coefficient for Division I-A men's basketball operating expenditures increased even more sharply, from 0.26 in 1993 to 0.31 in 2001, than the Gini coefficient for football spending.

Figure 5: Mean expenditures on Division I-A men's basketball (millions of 2001 dollars)



Source: NCAA/EADA data and authors' calculations. Note: "spending" may exclude capital expenditures and other factors.

Division I-A gross athletic revenue and net athletic revenue

The NCAA/EADA data also include data on total institutional revenue and athletic revenue. It is therefore possible to examine athletic revenue as a share of total institutional revenue. To do so, we subtracted institutional support from the reported athletic revenue figures. As with the expenditure data, we also excluded schools that reported no figure for total institutional revenue or a clearly erroneous figure. (In total, 14 schools were excluded for these reasons.) The remaining Division I-A schools reported $2.2 billion in athletic revenue and $74 billion in total institutional revenue in 2000-2001. Athletic revenue thus amounted to 3.0 percent of total institutional revenue.

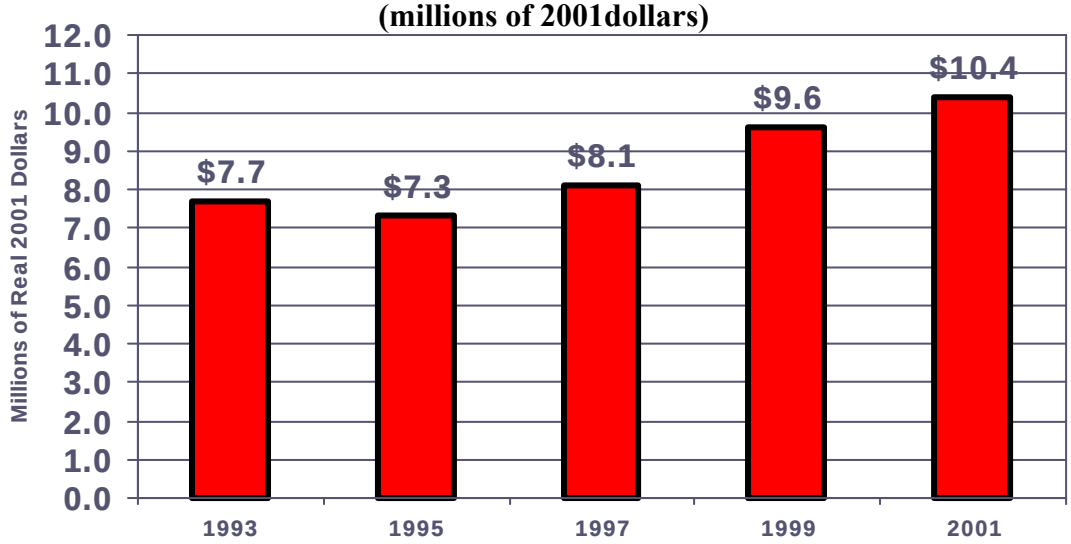
Table 4: NCAA/EADA data on athletic and overall revenue for Division I-A schools, 2000-2001

	Division I-A schools ($ million)
Athletic revenue excluding institutional support	$2,237
Total institutional revenue	$74,421
Athletic revenue as % of total	3.0%

Source: NCAA/EADA data and authors' calculations. As indicated in the text, 14 schools were excluded because of missing or clearly erroneous data.

As with the expenditure data, further insight into the revenue figures is obtained by examining revenue by sport. For example, revenue from football increased (in inflation-adjusted terms) by more than a third between 1993 and 2001 (Figure 6). As with spending, there appears to have been an acceleration in revenue in the late 1990s: In the four years between 1993 and 1997, real football revenue rose by six percent; in the four years between 1997 and 2001, revenue rose by 28 percent.

Figure 6: Mean revenue for Division I-A football (millions of 2001dollars)



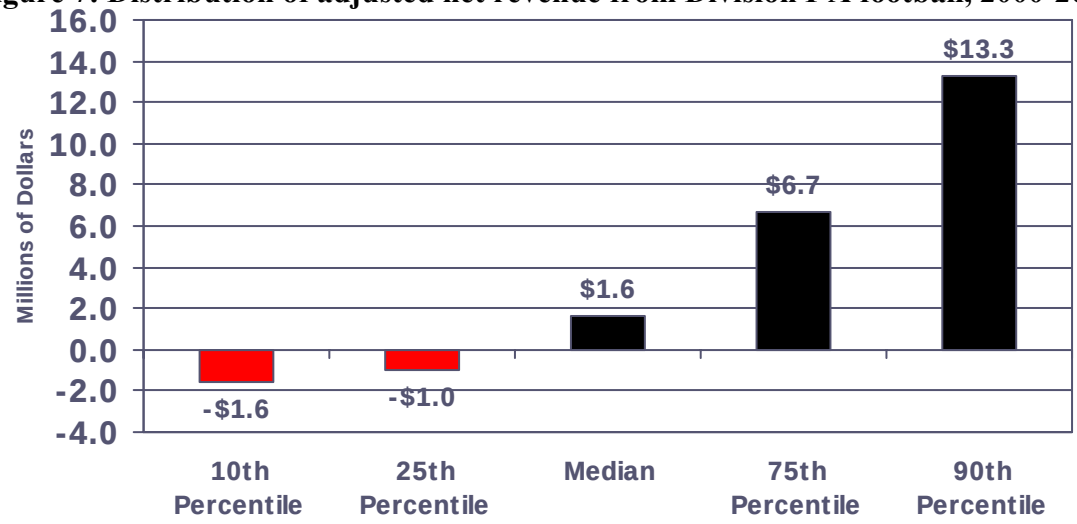
Source: NCAA/EADA data and authors' calculations.

Many analysts have expressed interest in operating *net* revenue figures; that is, athletic revenue minus operating expenses. Key issues in computing such figures are what "revenue" to include and what "expenses" to include. For example, in 2001, about 40 percent of Division I-A schools reported positive net revenue from athletics. That figure, however, includes institutional and state support (as sources of revenue), and capital expenses and debt service (as expenditures). Once institutional support, state support, capital expenses, and debt service are excluded, a much smaller share of Division I-A schools reported positive net revenue. Below, we refer to net revenue excluding institutional and state support from revenue and excluding capital expenses and debt service from expenditures as "adjusted net revenue." The operating net revenue figures vary significantly across schools within Division I-A. Net revenue also fluctuates from year to year.[15]

For many schools, football has by far the highest operating net revenue. In 2001, for example, 67 percent of Division I-A schools reported positive net revenue from football; the figure declines only slightly (to 62 percent) using adjusted net revenue. Figure 7 shows the distribution of adjusted net revenue from football in 2001 among Division I-A schools. The median school had $1.6 million in positive adjusted net operating revenue from football.

Men's basketball in Division I-A also generates significant positive adjusted operating net revenue at the majority of schools. Roughly two-thirds of Division I-A schools report positive adjusted operating net revenue from men's basketball. Other sports generate negative operating net revenue, on average.

Figure 7: Distribution of adjusted net revenue from Division I-A football, 2000-2001



Source: NCAA/EADA data and authors' calculations. Note: Adjusted net revenue excludes state and institutional support, as well as capital expenses and debt service.

[15] For example, slightly more than half of the Division I-A schools reporting positive net revenue from athletics in 1997 reported negative net revenue in 2001; more than a third of the Division I-A schools reporting negative net revenue in 1997 reported positive net revenue in 2001. Among the schools in the middle quintile of football net revenue in 1993, nearly two-thirds were no longer in the middle quintile in 2001.

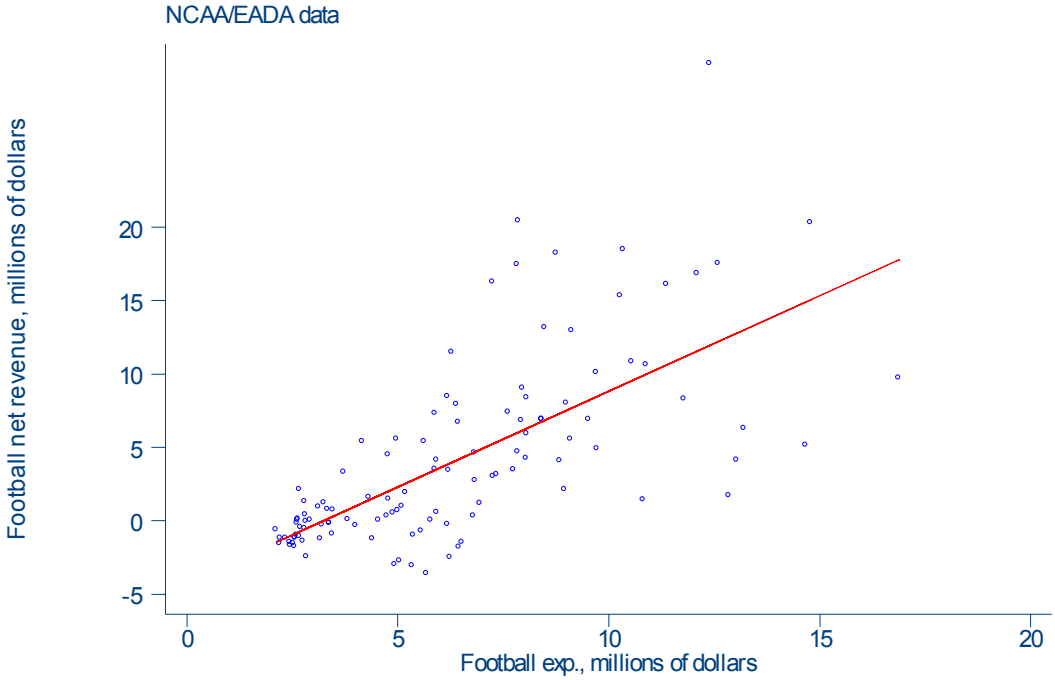
Section IV: The Effects of Athletic Spending

The positive operating net revenue from football and from men's basketball reported by the majority of Division I-A schools may suggest to some observers that expanding such programs would generate substantial financial gains. Indeed, looking across Division I-A in 2001, schools that spent more on football tended to have higher levels of net revenue from football than schools that spent less on football (Figure 8).

Flaws in relying on the simple correlation

The relationship shown in Figure 8 may be misleading, however. For example, assume that school A has a very loyal set of fans who would pay high prices for football tickets regardless of the size of the football program, and school B has a much less loyal set of fans. If school A happens to spend more on football than school B, the relationship shown in Figure 8 could be observed even if *increased* spending on football did not generate *more* net revenue. In addition, schools use different accounting methods, so that examining differences across schools in a single year may be problematic.

Figure 8: Football spending and net revenue, Division I-A, 2001



To delve into the accounting problem, we conducted a survey of 17 Division I-A schools. In particular, in conjunction with Dan Fulks of Transylvania University, we constructed a survey to explore the degree to which accounting practices and NCAA/EADA reporting differed across Division I-A schools. The survey was sent to 22 chief financial officers, chosen from among the universities represented on the NCAA Board of Directors and supplemented with additional schools to ensure a more representative sample of Division I schools; 17 respondent schools completed the survey. The survey indicated substantial differences in accounting across schools:

- Capital expenses: Some athletic programs carry the costs of all their athletic facilities on their own books, while other schools carry such costs on the general university ledger. Roughly half the respondents indicated that all athletic capital expenditures were captured by the NCAA/EADA report, and the other half indicated that at least part of capital spending was not.

- Indirect costs: Schools vary in whether they charge the athletic department with part of the university's indirect costs. Roughly half the respondents indicated that at least some indirect costs were attributed to the athletic department and reflected on the NCAA/EADA forms; the other half reported that no indirect costs were included.

- Revenue side: Some schools attribute items such as concession sales at events to athletic programs, while others attribute such sales to the food services budget of the general university. Again, about half the respondents indicated that all concessions sales were counted as revenue for the athletic department, and the other half indicated that at least part of such sales were not attributed to the athletic department.

A "fixed effects" approach

Given these results, a simple cross-section as shown in Figure 8 may reflect accounting differences across schools rather than a true underlying relationship. With only two exceptions, however, the respondents indicated that they either made no *changes* to their accounting systems since 1993 or that they made only very minor changes. Since the accounting systems vary across schools at a point in time but are largely constant within a school over time, one potentially promising approach to address both the accounting differences and the unmeasured characteristics across schools involves "fixed effects." In essence, instead of looking across schools at a point in time, this approach examines the change at school A relative to the change at school B, and thereby controls for a "fixed effect" at each school.

To the extent that underlying unmeasured differences remain constant over time, and to the extent that the difference between measured outcomes (as captured by the actual accounting system at each school) and a consistent indicator of outcomes (as would be captured if the same accounting system were used at each school) is constant over time, the fixed effects approach should more precisely identify the effects of changes in college athletic spending, rather than being confounded by accounting and other differences across schools.[16]

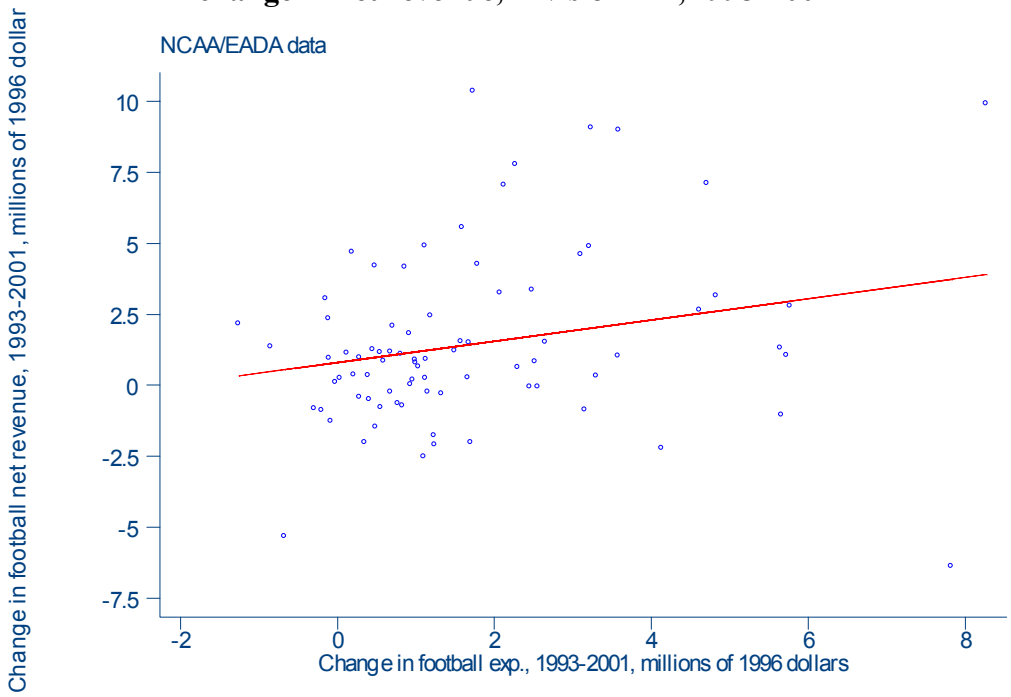
The simplest fixed effects model simply examines the *change* in spending between 1993 and 2001 and the *change* in net revenue between 1993 and 2001. Those who believe that expansions in athletic programs generate substantial increases in net revenue would expect a statistically significant and *positive* relationship between the

[16] It should be noted that the fixed effects approach is not a panacea; it can exacerbate measurement errors if these assumptions do not hold.

change in spending and the change in net revenue; those who believe that expansions in athletic programs impose financial costs on the university would expect a statistically significant and *negative* relationship.

Figure 9 shows that such an analysis presents a significantly different picture than looking across schools at a point in time. Schools that expanded their football programs by larger amounts between 1993 and 2001 did not enjoy increases in net revenue that were larger (in a statistically significant sense) than schools that expanded their football programs by more modest amounts. But they also did not experience decreases in net revenue relative to schools with smaller increases in spending.

Figure 9: Change in football spending and change in net revenue, Division I-A, 1993-2001



Appendix 1 shows the results of more sophisticated panel regressions using biennial data between 1993 and 2001. The results suggest that, on average, each additional dollar that a Division I-A university spends on football is associated with roughly one additional dollar of football revenue – so football net revenue is unchanged. In other words, an inflation-adjusted increase in football spending of one dollar was associated with roughly one additional dollar in football revenue between 1993 and 2001. Such a result may not be surprising to economists: It is what would be expected if schools had already optimized their level of spending, and were making marginal changes relative to that previous level.

Appendix 1 also includes a variety of other regressions that are consistent with this basic finding. It is worth noting that to the extent a revenue increase in football

would induce an athletic director to increase football spending, the figures would overstate the underlying revenue gains from a $1 increase in spending.[17]

Supporters of the view that expanded athletic programs produce significant and direct financial returns often point to anecdotal evidence. And it is indeed possible to find examples of schools that expanded their football programs and experienced rapid revenue gains. Examples from a variety of conferences are illustrative:

- Pac-10: A Pac-10 school increased spending by $6 million between 1993 and 2001. Football revenue rose by $14 million over the same time period.

- Sunbelt: A school now in the Sunbelt conference increased football spending by $2 million between 1993 and 2001. Football revenue rose by more than $3 million.

- Southeast: A Southeast conference school increased spending by more than $7 million between 1993 and 2001. Football revenue increased by well more than the increase in football spending, rising by $10 million.

These selective examples are not inconsistent with the empirical evidence presented above and in Appendix 1, however, because numerous examples exist in which increased expenditures on football were associated with a reduction in net revenue. These latter examples – of additional spending that does not appear to have paid off – are not as likely to be cited by supporters of expanded athletic spending, but they help to explain the econometric results. For example:

- WAC. A WAC school increased spending by $1.7 million between 1993 and 2001, but football revenue actually *fell* in nominal terms.

- Conference USA. A Conference USA school increased spending by more than $1 million between 1993 and 2001, but football revenue *fell* by over $1 million during the same time period.

- Mountain West. A Mountain West school increased spending by more than $2 million between 1993 and 2001, but football revenue increased only $0.5 million.

The picture that results from examining the experiences of all schools is thus mixed. Similarly, some schools benefited from moving up to Division I-A, but the experience varied across schools. For example, two schools earned significant financial

[17] See footnote below for further discussion of the effect of revenue on spending. It is also worth noting that the 1993-2001 results can be modestly affected by outliers, but excluding such outliers does not generally affect the results. The relevant coefficient is also not substantially affected if the regressions are undertaken in the form of the change in revenue on the change in spending (without institutional dummy variables).

returns after moving to Division I-A; one experienced a decline in football net revenue after moving to Division I-A.

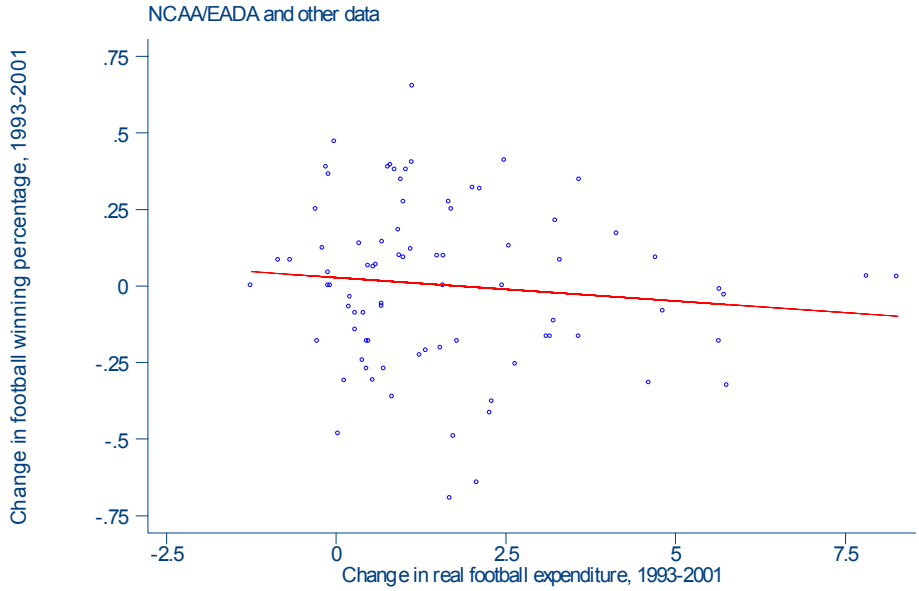
The variety of experiences at individual schools underscores the broader point: On average, expanded spending on football is neither the road to riches nor the road to ruin. We also examined the relationship between spending and revenue within various subsets of schools. As Appendix 2 shows, we were not able to detect any systematic differences when separating the schools by characteristics such as: public vs. private schools; schools with high SAT scores vs. schools with low SAT scores; large student populations vs. small student populations; schools that have been ranked in the Associated Press (AP) poll; schools that were ranked in the top 25 of the AP poll in 1993; and schools that moved up in the AP rankings between 1993 and 2001.

The next section provides further insight into our findings by examining the relationships among football winning, spending, and revenue.

Relationships among winning, spending, and revenue

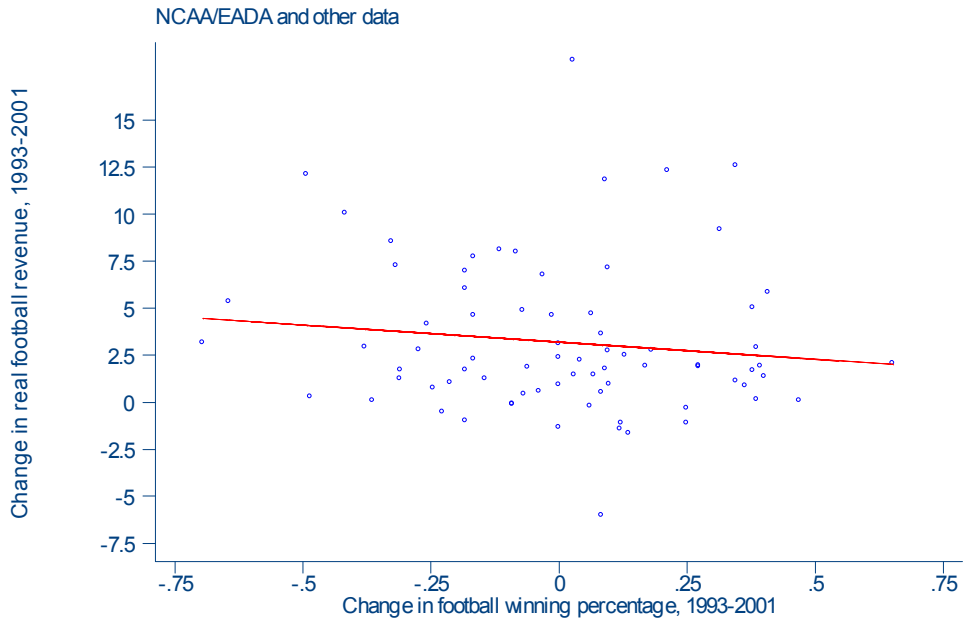
The empirical results suggest that increased operating spending on men's football is not associated, on average, with a substantial increase or decrease in net revenue from football. This linkage between spending and revenue can be divided into two components: the relationship between spending and winning, and the relationship between winning and revenue. Our analysis suggests that both of these links are weak. At least over our sample period, there appears to be no statistical relationship between changes in spending and changes in winning (Figure 10) or between changes in winning and changes in revenue (Figure 11). Appendix 3 provides the relevant econometric details.

Figure 10: Change in football spending and change in winning percentage, Division I-A, 1993-2001



Note: Real football expenditures are in millions of 1996 dollars.

Figure 11: Change in winning percentage and change in football revenue, Division I-A, 1993-2001



Note: Real football revenue is in millions of 1996 dollars.

A related issue involves the persistency of winning percentages in football. Some observers appear to view college football as relatively static: Powerhouse schools always perform well, and others always perform poorly. To examine this issue, we compiled football records from 1955 to 2001 for Division I-A schools. We first focus on the persistency of winning percentages within the 1993-2001 period for which we have detailed NCAA/EADA data. One way of examining persistence is to analyze the correlation between winning percentages in one year and winning percentages in another year; the higher the correlation, the greater the persistence in winning records.

Table 5a gives the correlation of football winning percentages for Division I-A schools for the years 1993 through 2001. The correlation of winning percentages two years apart is 33 to 51 percent; that correlation suggests some degree of mobility in winning percentages from year to year. The correlation of the winning percentage in 1993 and the winning percentage in 2001 is only 29 percent.

Table 5b presents the correlation of winning percentages over longer periods of time. Between 1955 and 2001, the average correlation between the winning percentage in one year and the winning percentage in the previous year was 59 percent. The average correlation for winning percentages five years apart was 36 percent. The correlation drops to 26 percent at a time horizon of a decade and 16 percent at two decades. (We do not show the results beyond two decades both because of limited data for such longer time horizons and because the correlation appears to be relatively stable as the time horizon lengthens.)

Table 5a: Correlations of football winning percentages, Division I-A, 1993-2001

	1993	1995	1997	1999	2001
1993	100%				
1995	51%	100%			
1997	37%	44%	100%		
1999	26%	37%	33%	100%	
2001	29%	46%	32%	38%	100%

Table 5b: Correlations of football winning percentages, Division I-A, 1955-2001

	Correlation Between Year T and:
Year T	100%
Year T-1	59%
Year T-2	47%
Year T-5	36%
Year T-10	26%
Year T-15	18%
Year T-20	16%

Finally, Table 5c shows the correlation of winning percentages averaged over a decade. From one decade to the next, the correlation varies from 42 percent to 59 percent. The correlation between winning percentages averaged between 1955 and 1964 and between 1985 and 1994 is 25 percent. Again, the results suggest a significant, albeit not perfect, degree of mobility over time.

Table 5c: Correlations of decade-averaged football winning percentages, Division I-A, 1955-2001

	1955-1964	1965-1974	1975-1984	1985-1994
1955-1964	100%			
1965-1974	42%	100%		
1975-1984	30%	55%	100%	
1985-1994	25%	49%	59%	100%

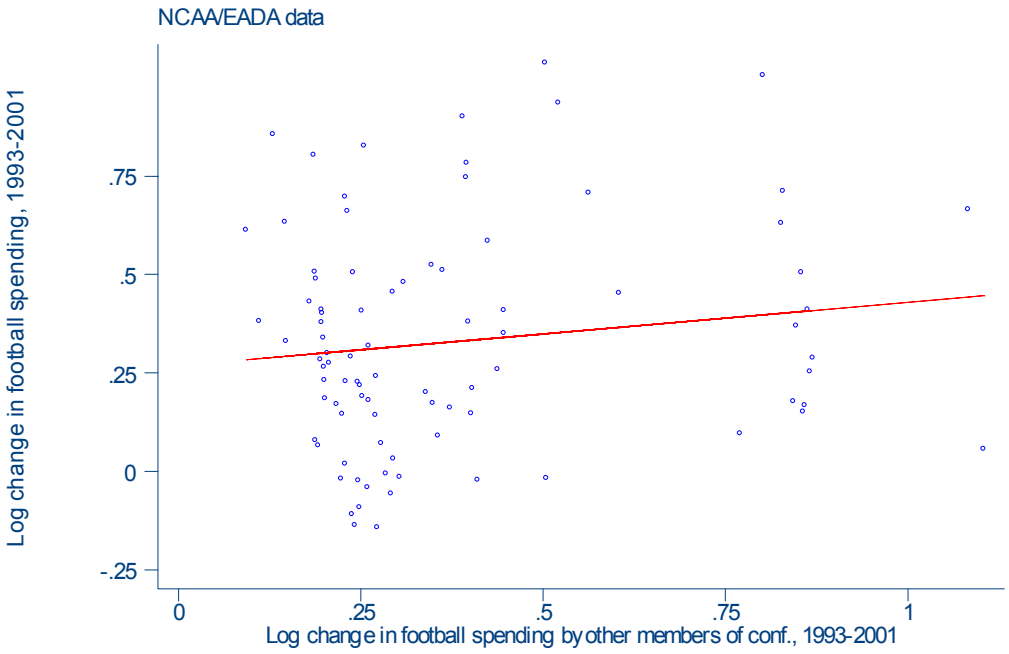
Relationship between football spending at one school and football spending at another

Another issue of interest to observers of collegiate athletics is whether schools are engaging in an "arms race." The arms race appears to mean different things to different observers. For example, some observers define an arms race as an increase in inequality in athletic spending or merely an absolute increase in aggregate spending. As we documented above, inequality and aggregate spending have both increased in the 1990s. Under this definition, therefore, an "arms race" would appear to be an apt characterization of the 1990s.

A somewhat more precise definition of an "arms race" is that increased spending at School A triggers increased spending at School B, which then feeds back into pressure on School A to further raise its own spending. To examine this definition of an arms race, we examined whether increased spending by other members of a school's conference was statistically associated with increased spending by the school itself. Figure 12 shows that growth in spending by other members of a school's conference did not trigger a statistically significant increase in spending by the school itself. (The relationship shown in Figure 12 is positive, but not statistically different from zero.) Appendix 4 presents the relevant econometric backup.

Our conclusion is thus that, at least over the period 1993 to 2001, the existence of an arms race in operating spending is unproven. It is worth noting that an arms race could potentially exist in capital spending even if it does not exist in operating spending. We discuss capital spending further below.

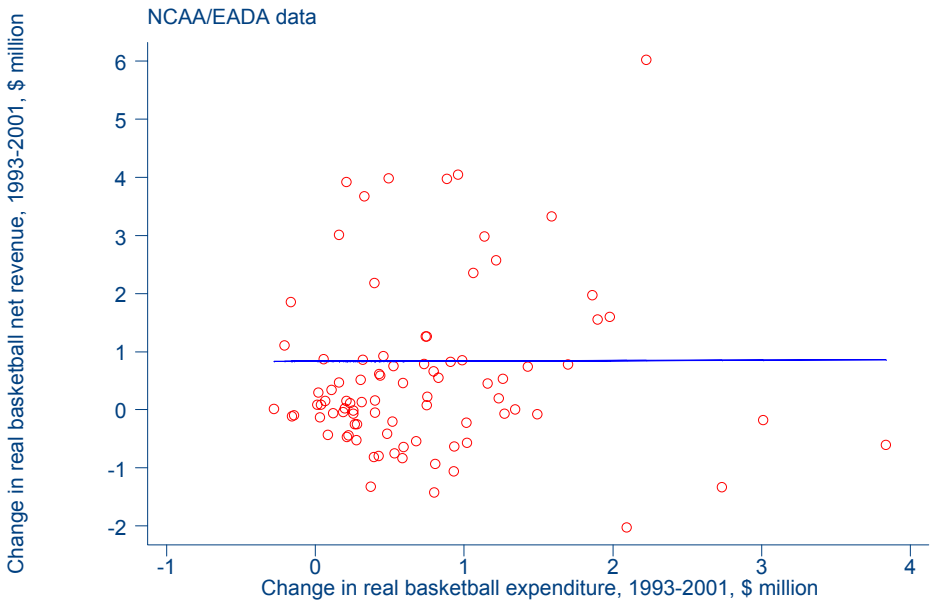
Figure 12: Change in football spending and change among other members of conference, Division I-A, 1993-2001



Men's basketball

The basic analysis conducted above for football has also been conducted for men's basketball. The results are generically similar. Figure 13, for example, shows that increases in operating expenditures on men's basketball were not associated with statistically significant increases in net revenue, on average. Appendix 5 provides the econometric details.

Figure 13: Change in men's basketball spending and change in net revenue, Division I-A, 1993-2001



Non "big-time" sports

The results for sports other than football and men's basketball are substantially different. Regression analysis suggests that each additional dollar that a Division I-A university spends on sports other than football or men's basketball is associated with roughly $0.25 of additional revenue (which is statistically different from $1). In other words, increased spending on non-football/non-men's basketball sports results in a loss in net revenue of $0.75, on average.

Our statistical analysis also suggests that each dollar increase in football spending among Division I-A schools may be associated with a $0.21 increase in spending on women's sports excluding basketball and $0.35 including basketball. Such a spillover effect may be expected given Title IX and other pressures to ensure equity between men's and women's sports. To the extent such a spillover does exist, the net financial effect of an increase in football spending of $1 may be more negative than suggested by examining football alone, since an increase in football spending could also generate an increase in spending on non-revenue sports. The results for this spillover effect, however, are not robust. In particular, in various alternative specifications, the spillover effect is not statistically significant. Appendix 6 provides the econometric details.

Other quantifiable effects

Part of the supposed Flutie effect is that athletic programs generate other benefits for institutions of higher education. These benefits could manifest themselves in a variety of ways, including increased applications, increased student quality, and increased annual giving. Our database allows us to examine some of these issues statistically. The results are provided in Appendix 7. Our analysis, for example, suggests no robust relationship between football spending or success and alumni giving; no robust relationship between football spending or success and reported alumni giving to the football program; no robust relationship between football spending or success and average incoming SAT scores; and no robust relationship between football spending or success and the university's acceptance rate (that is, the percentage of applicants accepted by the university). As noted above, the existing empirical literature on these issues is mixed.

In addition to these quantifiable effects, athletic programs may have non-quantifiable effects on higher education. For example, it is possible that athletic programs boost "school spirit" and the enjoyment of the educational experience in ways that do not manifest themselves in measurable indicators. On the other hand, it is also possible that athletic programs lead to a "beer and circus" environment in which the principles and standards of higher education are eroded by the distraction of a major non-academic presence on campus. For example, according to a recent survey conducted by the Chronicle of Higher Education, 67 percent of respondents agreed that "four-year colleges and universities place too much emphasis on athletics." Only 35 percent of Americans agreed or strongly agreed that "sports should be a priority for universities."[18] Such factors are clearly beyond the scope of this analysis and would require a substantial effort by specialists in sociology and education to evaluate thoroughly.

Limitations

The econometric analyses in this paper are subject to four important caveats:

- *Limited time-series database:* Our database extends only from 1993 to 2001. It is possible that increased spending on athletics has long lags – that is, it produces significant benefits or costs after a long period of time. If this were the case, our database may be too short to capture the true effects of increased spending. Since the detailed NCAA/EADA data are not available before 1993, the effects of athletic spending over longer periods of time can be examined only in coming years, after more data have been collected.

- *Omitted variables:* As with any statistical exercise, it is possible that omitted variables bias the results. The omitted variables that could bias our results include factors such as changes in "school spirit" that are artificially correlated with changes in athletic spending, and that also affect athletic revenue.

[18] Welch Suggs, "Sports as the University's 'Front Porch'? The Public is Skeptical," *Chronicle of Higher Education*, May 2, 2003, page A17.

- *Endogeneity:* Many of the regressions treat spending as an exogenous variable, but it may itself be affected by revenue.[19] This may bias any estimate of the effect of spending on revenue upward. Alternative econometric techniques that are designed to address this concern did not significantly alter the fundamental results. (The only true solution to this problem would be a randomized experiment in which additional spending was randomly distributed across schools. We are unaware of any such experiment, and it seems unlikely that such an experiment would be conducted merely for this purpose.)

- *Measurement error:* The spending data may be misreported, which may bias the estimates. We know that various components of spending – such as staff compensation from all sources[20] and total capital spending – are poorly measured.

The final issue deserves further examination; measurement error in the capital expenditures data is an area of particular concern. The NCAA/EADA data clearly exclude substantial amounts of capital expenses, many of which are not carried on the books of the athletic department. For example, more than half of all Division I-A schools have either opened a new football stadium or undertaken a major renovation of their old stadium since 1990. Much of these expenditures may not be reported in the NCAA/EADA data. As noted above, roughly half of the respondents to our CFO survey indicated that the NCAA/EADA report did not capture all athletic capital expenditures. In most of the analyses above, we therefore excluded all reported capital expenses (including debt service costs) and focused only on *operating* expenses. The analysis is thus inherently limited by the available data, and the conclusions should not necessarily be extended to behavior with regard to capital expenditures.

Section V: Conclusions and Next Steps

Our analysis fails to find robust empirical support for either the Flutie effect or claims that expanded athletic programs involve substantial financial losses. Expanded athletic programs appear to be neither the road to riches nor the road to financial ruin. Using the database we constructed and the existing academic literature, we conclude:

- Operating athletic expenditures in Division I-A are a relatively small share of overall academic spending.

[19] For example, athletic spending may reflect a "flypaper effect," whereby additional revenue "sticks" to the athletic program and induces additional spending. To evaluate this hypothesis, we examined the effect on spending from increased television revenue (which, in some cases, may have been unanticipated due to the fact that the TV contract was renegotiated). Given the available data, we were unable to detect any evidence of a significant flypaper effect in athletic spending. But one should view these results with caution since the data were limited.

[20] The measurement error in coaching salaries is unlikely to have a substantial effect on our conclusions: Reported salaries for the head football coach are about five percent of operating expenditures on football, on average, for Division I-A schools. Even if the error in the reported salary has increased to 50 percent in recent years, the error relative to overall operating spending on football is only 2.5 percent. It seems unlikely that such errors would dramatically change the results above.

- The football and basketball markets in Division I-A exhibited increased levels of inequality in the 1990s.

- The football and basketball markets in Division I-A exhibit some degree of mobility in expenditure, revenue, and winning percentages.

- Increased operating expenditures on football or basketball in Division I-A, on average, are not associated with any medium-term increase or decrease in operating net revenue.

- Increased operating expenditures on football or basketball in Division I-A are not associated with medium-term increases in winning percentages, and higher winning percentages are not associated with medium-term increases in operating revenue or net revenue.

- The available data do not permit a definitive judgment regarding whether the relationships vary significantly by sub-groups of schools in Division I-A (e.g., conferences, schools with large stadiums, etc.).

- The available data do not permit a definitive judgment regarding whether increased operating expenditures on big-time sports in Division I-A affect operating expenditures on other sports.

- The available data do not permit a definitive judgment regarding whether increased operating expenditures on sports affect measurable academic quality in the medium term.

- The available data do not permit a definitive judgment regarding whether increased operating expenditures on sports affect other measurable indicators, including alumni giving.

- The available data do not permit a definitive judgment regarding whether the football and basketball markets exhibit an "arms race" in which increased operating expenditures at one school are associated with increases at other schools.

It is worth emphasizing that although the data in this paper are more comprehensive than any other previous dataset, they are imperfect: They are available only since 1993, and they fail to adequately capture various components of athletic activities (especially capital spending). Further efforts to improve and analyze the data are likely to provide additional insights into the effects of college athletics on institutions of higher education.

Appendix 1:
Econometric Analysis of Spending and Net Revenue

To examine the relationship between spending and revenue, our basic regressions are of the form:

$$R_{it} = \alpha + \beta S_{it} + \sum \beta_j X_{jit} + \phi_i D_i + \delta_t Y_t + \varepsilon_{it}$$

where R is a measure of real revenue for school i in year t, S is a measure of real spending for school i in year t, X is an array of school-and-year-specific control variables, D is a dummy variable for school i, and Y is a dummy variable for year t. Different specifications used various measures of R, S, and X.[21]

Tables A1a and A1b show the results of panel regressions using biennial data between 1993 and 2001.[22] The dependent variable is real football revenue. The results in Tables A1a and A1b suggest that, on average, each additional dollar that a Division I-A university spends on football (given its previous spending level) is associated with roughly one additional dollar of football revenue – so football net revenue is unchanged. In particular, an inflation-adjusted increase in football spending of one dollar was associated with roughly one additional dollar in football revenue between 1993 and 2001. The revenue gain, however, was not in general statistically different from the critical threshold of one dollar. (As noted in the text, this result may not be surprising to economists: It is what would be expected if schools had already optimized their level of spending, and were making marginal changes relative to that previous level.)

Table A1a shows the results for regressions including the unadjusted football revenue and expenditure data (i.e., revenue includes institutional and state support, and expenditure includes reported capital and debt expenses).[23] Columns (1) through (4) use different arrays of control variables and model specifications.[24] The coefficient on real

[21] For a comprehensive treatment of panel data regressions, see Baltagi (1995) and Hsiao (1986). An alternative to the fixed effects approach is the so-called random effects model. After conducting a variety of tests and given the nature of the data, we concluded that a fixed effects approach was preferable in this context.

[22] The authors have tested a wide variety of additional specifications beyond those presented here. Interested readers should contact the authors regarding the extensive other specifications and tests conducted.

[23] The panel regressions shown in most of the tables below are unbalanced; some schools included in the regressions lack data for some years. We have also undertaken balanced panel regressions, which are restricted to schools with complete data for all years. The results from the balanced regressions are not qualitatively different from the unbalanced results; as an example, Table A1e presents balanced regressions for this appendix.

[24] In many specifications, the errors appeared to be heteroskedastic. All results are therefore reported using robust standard errors. In addition, running the regression in first differences, rather than levels, appeared to attenuate substantially (or remove) the heteroskedasticity. These regressions in first differences are of the form:

$$\Delta R_{it} = \alpha + \beta \Delta S_{it} + \sum \beta_j X_{jit} + \delta_t Y_t + \varepsilon_{it}$$

football expenditure is not statistically different than 1.0 in the first three regressions; in the first difference regression, it is slightly lower than 1.0. Note that column (3) includes lagged real football spending (i.e., real football spending in year t-2).[25]

Table A1a: Panel regressions of real football revenue (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *First Difference*
Football Spending	1.04 (0.14)	0.98 (0.13)	0.81 (0.15)	0.71 (0.12)
Lag in Football Spending	No	No	0.20 (0.15)	No
Institutional Dummies	Yes	Yes	Yes	No
Year Dummies	Yes	Yes	Yes	Yes
Conference Dummies	No	Yes	Yes	No
Robust Std. Errors	Yes	Yes	Yes	Yes
R^2	0.95	0.95	0.96	0.19
N	494	479	367	357

It is worth noting that to the extent a revenue increase in football would induce an athletic director to increase football spending, the figures in Table A1a would overstate the underlying revenue gains from a $1 increase in spending.[26]

Table A1b shows the results for adjusted revenue and expenditure. In the first three columns, the coefficient on real football spending is slightly higher than 1.0, but again is not statistically different from 1.0. In column (4), the coefficient is slightly, but not statistically, below 1.0.

Table A1c attempts to address one substantial concern about these regressions: that current spending is not exogenous, as is assumed in the classical regression model. Instead, spending could be affected by some third factor that also affects revenue, introducing a spurious correlation between revenue and spending. A typical approach in the presence of such an econometric problem is an instrumental variables regression. The goal is to find a variable highly correlated with current spending, but not with other unmeasured influences on current revenue. That instrument is then used to identify the

[25] We have also run the regressions in logs, a specification which changes the interpretation of the coefficient. The results are generically consistent with those shown in the text.

[26] It is also worth noting that the 1993-2001 results can be modestly affected by outliers. But excluding such outliers does not generally affect the results.

underlying relationship between current revenue and current spending while attenuating or eliminating the spurious correlation potentially induced by other factors. A common instrument is the lagged variable of the independent variable, in this case spending. Table A1c therefore presents alternative regressions in which lagged real football expenditure is used as an instrument for current real football expenditure. Under the first two alternative specifications, the coefficient on spending increases, but the standard error does also. In the final specification, the regression is run in first differences rather than levels, with the lagged change in football spending used as an instrument for the contemporaneous change. The coefficient in this case is smaller than 1.0. The overall conclusion that the coefficient is not statistically different from 1.0 remains in these specifications, however.

Table A1b: Panel regressions of adjusted real football revenue (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *First Difference*
Adjusted Football Spending	1.18 (0.23)	1.04 (0.17)	1.02 (0.19)	0.95 (0.17)
Lag in Adjusted Football Spending	No	No	0.23 (0.17)	No
Institutional Dummies	Yes	Yes	Yes	No
Year Dummies	Yes	Yes	Yes	Yes
Conference Dummies	No	Yes	Yes	No
Robust Std. Errors	Yes	Yes	Yes	Yes
R^2	0.97	0.98	0.98	0.26
N	321	310	291	200

Further insight could potentially be gained by undertaking the analysis separately by conference. Running a separate regression by conference allows the coefficient on revenue to vary from conference to conference. Tables A1d shows the results. In general, the coefficient on football spending is not statistically different from one.[27]

[27] Given 11 conferences and a limited number of observations per conference, one would expect some of the observed coefficients by conference to be statistically different from 1.0 because of random sampling even if all the underlying coefficients were actually 1.0.

Table A1c: Panel regressions of real football revenue using instrumental variables (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *First Difference*
Football Spending	1.04 (0.14)	1.49 (0.48)	1.30 (0.43)	0.67 (0.60)
Use Lag in Football Spending As Instrumental Variable for Spending	No	Yes	Yes	Yes
Institutional Dummies	Yes	Yes	Yes	No
Year Dummies	Yes	Yes	Yes	Yes
Conference Dummies	No	No	Yes	Yes
Robust Std. Errors	Yes	Yes	Yes	Yes
R^2	0.95	0.95	0.96	0.28
N	494	367	356	244

Table A1d: Panel regressions of real football revenue by conference (standard errors in parentheses)

Variables:	ACC	Big Ten	Big 12	Big East	Conf USA	MAC	Mount. West	Pac 10	SEC	Sunbelt	WAC
Football Spending	0.23 (0.12)	1.03 (0.30)	1.16 (0.51)	1.22 (0.20)	1.93 (0.75)	0.94 (0.29)	0.74 (0.24)	0.49 (0.24)	0.74 (0.35)	1.23 (0.34)	0.83 (0.32)
Institutional Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Robust Std. Errors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.96	0.89	0.91	0.92	0.70	0.72	0.88	0.93	0.93	0.81	0.81

As a further sensitivity test, we allowed the coefficient on football spending to vary from school to school by running an individual regression for each school. The disadvantage to this approach is the extremely limited number of observations (five) per school. The benefit is that it could provide insight into whether the relationship between spending and revenue varies substantially across schools. The results suggested no systematic relationship between the coefficient on spending from school-level regressions and the size of the football program. In other words, neither larger nor smaller programs appear to enjoy unusually high returns to an additional dollar of spending.

Finally, we undertook all the econometric analysis with a sample restricted to the schools that have complete data throughout the 1993-2001 time period. The results of these "balanced" panel regressions are shown in Table A1e. Again, the results are

generally consistent with those shown above for the unbalanced panels: The coefficient on football spending is not statistically different from 1.0, except in the first-difference regression (Column 3 of Table A1e) in which the coefficient does not lie within the 95-percent interval of 1.0.

Table A1e: Balanced panel regressions of real football revenue (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *First Difference*	Column (4)
Football Spending	0.94 (0.14)	0.79 (0.15)	0.62 (0.12)	1.27 (0.44)
Lag in Football Spending	No	0.14 (0.12)	No	No
Use Lag in Football Spending As Instrumental Variable for Spending	No	No	No	Yes
Institutional Dummies	Yes	Yes	No	No
Year Dummies	Yes	Yes	Yes	Yes
Conference Dummies	No	No	No	No
Robust Std. Errors	Yes	Yes	Yes	Yes
R^2	0.95	0.96	0.19	0.95
N	325	260	260	260

Appendix 2:
Differences Among Subsets Of Schools

Appendix 1 provides some insight into differences in the relationship between spending and revenue among various subsets of schools. This appendix provides additional regressions on that topic. In particular, we interact a variety of dummy variables with real football spending, and then examine whether the interaction term is significant. To the extent the coefficient on the interaction term is not significantly different from zero, we reject the hypothesis that the relationship between spending and revenue differs significantly across the types of schools defined by the dummy variable. The dummy variables are:[28]

- The school's average incoming student SAT in 1999 was above 1105 (SAT=1)
- The school's total enrollment in 1999 was above 22,100 (ENR=1)
- The school is a public university (PUBLIC=1)
- The school's in-state tuition in 1999 was above $3,200 (TUIT=1)
- The school was ranked among the top 25 in the AP rankings in any year between 1993 and 2001 (FBEVER=1)

As Table A2a suggests, the coefficients on the interaction terms are not statistically different from zero. Our conclusion, as in Appendix 1, is that there does not appear to be any significant difference in the relationship between spending and revenue across broad types of schools.

Table A2a: Panel regressions with interaction terms

Variables:	Column (1)	Column (2)	Column (3)	Column (4)	Column (5)	Column (6)
Football Spending	0.92 (0.22)	1.39 (0.29)	1.45 (0.38)	1.10 (0.19)	1.37 (0.30)	1.72 (0.55)
SAT*football spending	0.25 (0.25)					0.35 (0.25)
ENR*football spending		-0.43 (0.30)				-0.30 (0.34)
PUBLIC*football spending			-0.45 (0.39)			-0.13 (0.47)
TUIT*football spending				-0.10 (0.24)		-0.24 (0.24)
FBEVER*football spending					-0.40 (0.30)	-0.41 (0.27)
R^2	0.95	0.95	0.95	0.95	0.95	0.95
N	465	446	464	455	494	421

Note: All regressions include institutional dummies and year dummies, and apply robust standard errors.

[28] With the exception of dummy variables, such as the one for public universities and the others for the Associated Press rankings, the threshold values were chosen so that approximately half the schools were in each category. (Other variations examined, among others, whether the school was ranked among the top 25 in the AP rankings in 1993, the difference between the school's pre-season AP ranking and its post-season AP ranking, the size of the football stadium.)

Appendix 3: Relationships Between Spending And Winning, Between Winning And Revenue, And Between Winning And Net Revenue

This appendix explores the relationships between operating football spending and winning, between winning and operating revenue, and between winning and operating net revenue. Table A3a shows panel regressions of football winning percentages of real football spending, lagged real football spending, and a set of control dummies. The coefficient on spending is not statistically significantly different from zero in any of the regressions. In general, Table A3a suggests no high-frequency correlation between spending and winning.

Table A3a: Panel regressions of football winning percentages (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *In Logs*	Column (5) *In Logs*	Column (6) *First Difference*	Column (7) *Tobit Regression*
Football Spending (in millions for columns 1-3, 6-7)	-8.95 (6.77)	-8.98 (6.94)	-11.5 (9.97)	-0.01 (0.10)	-0.06 (0.12)	0.00 (0.11)	-7.93 (7.87)
Lag in Football in Spending (in millions for columns 1-3, 6-7)	No	No	-9.41 (9.62)	No	-0.19 (0.11)	No	No
Institutional and Year Dummies	Yes	Yes	Yes	Yes	Yes	Year Only	Yes
Conference Dummies	No	Yes	Yes	No	Yes	No	No
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes	No
R^2	0.53	0.53	0.58	0.48	0.55	0.00	n.a.
N	475	465	356	467	348	344	475

Table A3b examines the effect of winning on operating football revenue; Table A3c examines the effect of winning on operating football net revenue. Neither the coefficient on the winning percentage nor the coefficient on the lagged winning percentage is statistically significant in either table. Tables A3a, A3b, and A3c collectively suggest no statistically significant relationship between (a) operating

spending and winning, (b) winning and operating revenue, and (c) winning and operating net revenue, at least during the mid to late-1990s.

Table A3b: Panel regressions of football revenue
(standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *In Logs*	Column (4) *In Logs*	Column (5) *First Difference*
Football Winning Pct.	-691,295 (505,350)	-541,925 (621,138)	-0.03 (0.04)	-0.03 (0.05)	-386,622 (474,798)
Lag in Football Winning Pct.	No	-140,815 (823,376)	No	0.06 (0.05)	No
Institutional and Year Dummies	Yes	Yes	Yes	Yes	Year Only
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes
R^2	0.93	0.94	0.94	0.95	0.04
N	469	377	461	364	339

Table A3c: Panel regressions of football net revenue
(standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *In Logs*	Column (4) *In Logs*	Column (5) *First Difference*
Football Winning Pct.	-315,564 (424,891)	-82,591 (503,002)	0.005 (0.125)	0.05 (0.16)	-356,351 (440,326)
Lag in Football Winning Pct.	No	336,059 (709,048)	No	0.26 (0.19)	No
Institutional and Year Dummies	Yes	Yes	Yes	Yes	Year Only
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes
R^2	0.91	0.92	0.82	0.83	0.01
N	469	377	313	251	339

Appendix 4:
Spending by Other Members of a School's Conference

Table A4 presents the results of panel regressions with a school's own spending as the dependent variable and the spending by other members of the school's conference as one independent variable. There is some support for the arms race perspective in the first two regressions (Columns 1 and 2 of Table A4), since an increase in average conference spending (excluding School A) of $1 appears to be associated with an increase in spending by School A itself of about $0.30, and the coefficient is statistically significant. However, the other regressions in Table A4 suggest that the relationship is not robust to changes in specification. In particular, when the regressions are undertaken in level changes or logs, the coefficient is no longer statistically significant. Similarly, when the sample is restricted to those schools with data in each year, the coefficient is no longer statistically significant (Column 6 of Table A4). We also experimented with adding the spending level of the highest spending school in the conference as an additional explanatory variable; the results are generally consistent with those presented in Table A4.

Our conclusion is thus that, at least over the period 1993 to 2001, the existence of an arms race in operating spending is unproven. It is worth noting that an arms race could potentially exist in capital spending even if it does not exist in operating spending. We discuss capital spending further in the main text.

Table A4: Panel regressions of football spending and average spending by conference (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *First Difference*	Column (4) *In Logs*	Column (5) *In Logs*	Column (6)
Average Football Spending in the Conference (ex. Own Spending)	0.29 (0.11)	0.27 (0.14)	0.01 (0.10)	0.02 (0.13)	0.03 (0.17)	0.24 (0.14)
Lag in Average Football Spending in the Conference (ex. Own Spending)	No	0.17 (0.21)	No	No	0.20 (0.18)	No
Institutional Dummies	Yes	Yes	No	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Unbalanced panel	Yes	Yes	Yes	Yes	Yes	No
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.87	0.88	0.06	0.89	0.89	0.84
N	499	386	360	499	386	335

Appendix 5:
Men's Basketball

This appendix shows the results of panel regressions of basketball revenue on basketball spending and control variables. The results are similar to those in Appendix 1: increased spending on men's basketball is associated with an increase in revenue that is not statistically different from 1.0.

Table A5: Panel regressions of basketball revenue, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *First Difference*
Basketball Spending	0.83 (0.12)	0.71 (0.13)	0.76 (0.13)
Lag in Basketball Spending	No	0.05 (0.16)	No
Institutional and Year Dummies	Yes	Yes	Year Only
Robust Standard Errors	Yes	Yes	Yes
R^2	0.93	0.95	0.17
N	494	364	356

Appendix 6:
Non "Big-Time" Sports

Table A6a shows the regression results for non-football, non-men's basketball sports. It suggests that each additional dollar that a Division I-A university spends on sports other than football or men's basketball is associated with roughly $0.25 of additional revenue (which is statistically different from $1).

Table A6b suggests that each dollar increase in football spending among Division I-A schools may be associated with a $0.21 increase in spending on women's sports excluding basketball; Table A6c shows that each dollar increase in football spending is associated with a $0.35 increase in spending on women's sports including basketball. The results, however, are not robust under certain changes in specification, as indicated in Tables A6b and A6c.

Table A6a: Panel regressions of non-football, non-men's basketball revenue, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)
Non-Football, Non-Men's Basketball Spending	0.25 (0.14)	0.30 (0.22)
Lag in Non-Football, Non-Men's Basketball Spending	No	-0.50 (0.23)
Institutional and Year Dummies	Yes	Yes
Robust Standard Errors	Yes	Yes
R^2	0.69	0.74
N	318	199

Table A6b: Panel regressions of women's non-basketball expenditures, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *First Difference*	Column (5) *With lag used as instrumental variable*
Football Spending	0.21 (0.11)	0.26 (0.13)	No	0.20 (0.13)	-0.05 (1.00)
Lag in Football Spending	No	-0.03 (0.10)	-0.006 (0.10)	No	No
Institutional and Year Dummies	Yes	Yes	Yes	Year only	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes
R^2	0.85	0.87	0.86	0.05	0.85
N	321	292	292	200	292

Table A6c: Panel regressions of women's expenditures, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4) *First Difference*	Column (5) *With lag used as instrumental variable*
Football Spending	0.35 (0.10)	0.30 (0.13)	No	0.31 (0.13)	0.45 (0.32)
Lag in Football Spending	No	0.04 (0.10)	0.13 (0.11)	No	No
Institutional and Year Dummies	Yes	Yes	Yes	Year only	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes
R^2	0.75	0.77	0.76	0.06	0.76
N	502	367	367	362	367

Appendix 7:
Other Quantifiable Effects

This appendix explores three other quantifiable channels through which athletics could affect higher education: alumni giving, average incoming SAT scores, and university selectivity (as measured by the share of applicants accepted). Our conclusion for each of these metrics is that neither football spending nor football success appears to have a significant influence on them, at least over the medium-term horizon of this study.

Alumni giving

Table A7a shows panel regressions of alumni giving on football spending and football winning percentages. It suggests no robust relationship between football spending or success and alumni giving over the medium term (e.g., a period of a little under a decade or so). The data also show no robust relationship between football spending or success and reported alumni contributions to the football program. As noted in the main text, the existing empirical literature on this issue is also mixed.

Table A7a: Panel regressions of alumni giving, Division I-A, 1993-2001
(standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *First Difference*	Column (4)	Column (5)	Column (6) *First Difference*
Football Spending	1.03 (0.75)	1.80 (1.04)	1.43 (1.15)	No	No	No
Lag in Football Spending	No	-0.69 (1.12)	No	No	No	No
Football Winning Percentage	No	No	No	-982,493 (3,335,772)	-4,469,106 (3,114,553)	-28,575 (2,673,676)
Lag in Football Winning Percentage	No	No	No	No	-2,347,573 (3,244,681)	No
Institutional and Year Dummies	Yes	Yes	Year Only	Yes	Yes	Year Only
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.82	0.86	0.02	0.81	0.84	0.00
N	377	287	260	371	301	242

Table A7b: Panel regressions of football giving, Division I-A, 1993-2001
(standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3) *First Difference*	Column (4)	Column (5)	Column (6) *First Difference*
Football Spending	-0.02 (0.07)	0.00 (0.07)	-0.02 (0.06)	No	No	No
Lag in Football Spending	No	0.08 (0.05)	No	No	No	No
Football Winning Percentage	No	No	No	-504,089 (418,586)	-889,947 (564,146)	-902,287 (481,117)
Lag in Football Winning Percentage	No	No	No	No	71,910 (302,374)	No
Institutional and Year Dummies	Yes	Yes	Year Only	Yes	Yes	Year Only
Robust Standard Errors	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.94	0.91	0.02	0.94	0.95	0.06
N	304	234	203	299	243	191

SAT scores

A second quantifiable metric is whether football spending or success is associated with an improvement in incoming student SAT scores. For schools that use the ACT, we adopt the College Board's mapping of ACT scores into SAT scores. For years in which the mean SAT score was not given, we take the average of the SAT score at the 25th percentile and the SAT score at the 75th percentile. The results suggest that neither changes in football spending nor changes in football success have a significant effect on average incoming SAT scores, at least over the time period examined.

Table A7c: Panel regressions of average incoming SAT scores, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4)
Football Spending	-1.96e-06 (2.46e-06)	-3.73e-06 (2.75e-06)	No	No
Lag in Football Spending	No	2.055e-06 (2.92e-06)	No	No
Football Winning Percentage	No	No	20.41 (13.94)	21.52 (16.79)
Lag in Football Winning Percentage	No	No	No	-6.99 (18.29)
Institutional and Year Dummies	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes
R^2	0.86	0.88	0.86	0.87
N	399	300	395	319

University selectivity

Finally, we adopt a different measure of university selectivity: the share of applicants accepted by the university. Table A7d shows the panel regression results. Again, no significant relationship is apparent.

Table A7d: Panel regressions of acceptance rates, Division I-A, 1993-2001 (standard errors in parentheses)

Variables:	Column (1)	Column (2)	Column (3)	Column (4)
Football Spending	-1.12e-06 (1.07e-06)	-6.85e-07 (7.11e-07)	No	No
Lag in Football Spending	No	-1.86e-06 (1.38e-06)	No	No
Football Winning Percentage	No	No	-1.16 (2.50)	0.93 (3.42)
Lag in Football Winning Percentage	No	No	No	2.46 (3.78)
Institutional and Year Dummies	Yes	Yes	Yes	Yes
Robust Standard Errors	Yes	Yes	Yes	Yes
R^2	0.88	0.92	0.88	0.90
N	311	211	307	229

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