

The Effects of Revenue Changes on NCAA Athletic Departments' Expenditures

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Abstract

This study uses a panel of National Collegiate Athletic Association (NCAA) Division I athletic department revenue and expenditure data from 225 public colleges and universities to empirically investigate the behavior of athletic departments over the period 2006–2011. Three empirical relationships were explored: (a) how changes in total revenue affect disaggregated expenditure categories, (b) how disaggregated revenue streams influence total expenditures, and (c) whether changes in revenue categories change the size of the athletic department's subsidy. The results show that additional athletic revenue increases expenditures for coaches 7.5 times more than direct expenditures for student-athletes, a ratio that increases for schools in power conferences. For every US\$1 increase in ticket sale revenue, total expenditures can rise by US\$0.83 and reduce a school's athletic subsidy by US\$0.19.

Keywords

NCAA expenditures, athletic subsidy, athletic departments, bureaucracy

Introduction

The landscape of the National Collegiate Athletic Association (NCAA) is dramatically changing. In 2014, 14 Division I NCAA football teams joined new athletic conferences, and Division I football introduced a new playoff system. The football team at Northwestern University, a Division I NCAA program, was granted employee status by the National Labor Relations Board, and the players were given the right to form a

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union, a historic first for collegiate athletics. The U.S Congress is questioning the governance of the NCAA.¹ Furthermore, the NCAA is also the subject of a myriad of potentially devastating lawsuits, including (a) the NCAA's use of athletes' likenesses in television broadcasts, video games, and other consumer products²; (b) the NCAA's treatment of athlete concussions³; and (c) the NCAA's violation of antitrust laws. Jeffery Kessler's antitrust lawsuit opens

the Defendants in this action—the National Collegiate Athletic Association (“NCAA”) and five major NCAA conferences that have agreed to apply NCAA restrictions (the “Power Conferences”)—earn billions of dollars in revenues each year through the hard work, sweat, and sometimes broken bodies of top-tier college football and men's basketball athletes who perform services for Defendants' member institutions in the big business of college sports. However, instead of allowing their member institutions to compete for the services of those players while operating their businesses, Defendants have entered into what amounts to cartel agreements with the avowed purpose and effect of placing a ceiling on the compensation that may be paid to these athletes for their services. Those restrictions are pernicious, a blatant violation of the antitrust laws, have no legitimate pro-competitive justification, and should now be struck down and enjoined. (pp. 1-2)

The primary objective of this article is to analyze the behavior of Division I NCAA institutions and their athletic departments, given their unique set of constraints and incentives.⁴ College athletics are filled with an interesting mix of competitive and heavily restricted markets, operating under a set of guidelines orchestrated by a bureaucracy—the NCAA. Individual institutions and athletic departments, smaller bureaucracies themselves, are actors within these markets. Frey (1987, 1994) finds that because of their subunit structure within a university hierarchy, athletic departments operate within their own subculture, a culture that encourages peer-accepted deviance.

The bureaucracy literature suggests that athletic departments should spend all of their revenues each year and continually request additional funding in subsequent years (Hoffer, 2014; Niskanen, 1971; Wilson, 1991). The manner in which the athletic department can spend its funds is unique, however. Operating like a cartel (Humphreys & Ruseski, 2009; Fleisher et al., 1988), the NCAA explicitly prohibits athletic departments from exercising traditional bureaucratic preferences by restricting payments to certain factor inputs. Most notably, collegiate athletes must be amateurs, receiving no compensation other than payments to cover the costs⁵ of attending the academic institution (i.e., tuition, room, board, etc.)—the basic grounds for the filed antitrust lawsuit.

Although the compensation to athletes is limited, athletic department revenues have soared recently thanks in part to lucrative new television contracts for NCAA football and basketball and because of conference realignment (Hoffer & Pincin, forthcoming). Between 2006 and 2011, median NCAA Division I athletic department inflation-adjusted revenue grew US\$4.14 million, a 27.82% increase. Lawsuits filed suggest that little or none of the money has made its way back to the athletes.

This article empirically examines the claim that athletes are not fully benefitting from the increased revenue. More generally, this article explores three empirical aspects

of NCAA athletic departments' response to recent revenue growth. First, this study investigates the effects revenue changes have on NCAA athletic department disaggregated expenditures. Second, this study disaggregates revenues and tests how each revenue category affects total expenditures. Third, this study explores whether NCAA revenues act as a substitute or complement to subsidy revenue from the institution.

This article proceeds as follows. The section on "Athletic Department Expenditures" discusses the spending habits of athletic departments, given the bureaucratic nature of college athletics. The "Data and Estimation" section describes the data and introduces the empirical specifications. The "Results" section presents the empirical results and provides interpretation. The final section offers concluding remarks.

Athletic Department Expenditures

Athletic departments and universities have several options regarding the allocation of growing athletic department revenues. First, new revenue could offset inter-institution athletic department subsidies, which consist of student fees and general school funds earmarked for athletics. The average Division I NCAA athletic department receives a subsidy of US\$8.8 million annually. Even schools in the six Automatic Qualifying (AQ) conferences receive an average annual subsidy of US\$5.81 million.⁶

Alternatively, institutions could use increased athletic revenue to reward successful athletic personnel or fund additional athletic expenditures. David Marburger finds athletic director compensation to be largely determined by the size of athletic department revenues and athletic director bonuses, though unrelated to revenues, to be positively correlated with football success (Marburger, 2013). Orszag and Israel (2009) also note a strong positive correlation between athletic department revenues and athletic department operating expenditures, suggesting that almost all increased revenues will be converted into expenditures. Farmer and Pecorino (2010) find the cartel nature of the NCAA increases coaches' salaries.

Although the NCAA's amateur-athlete provision prevents institutions from converting extra revenue into higher player salaries, schools are able to compete by offering players non-monetary benefits. One high-profile arena of non-monetary competition is stadium and facility upgrades. Dubbed a "facilities arms race," AQ schools constructed stadium and facility *upgrades* in excess of US\$1 billion in 2012 (Bennett, 2012). Table 1 details several of the college football facility renovations.⁷ Alabama's US\$9 million locker room renovation includes an arcade, a nutrition bar, a "hydrotherapy area" (a hot and cold pool with a waterfall), and a "no expenses spared" locker area. Nick Saban, Alabama's head football coach—the highest paid public employee in the United States at US\$5.5 million per year⁸—says about Alabama's new facility, "Now, our players have one-stop shopping. They can do everything in one place. They don't need to go outside."

Similarly, the University of Kentucky built a US\$7 million dorm facility to house its men's basketball players. The facility includes single rooms for each resident, a private chef, flat-screen monitors describing each player's itinerary, and a lounge complete with a pool table.

Table 1. Recent Facility Upgrades at Division I Universities.

Team	Facility upgrade
University of Alabama	A US\$9 million locker room upgrade
University of Arizona	A US\$378 million north end zone expansion at Arizona Stadium that will add about 7,000 seats
University of Arkansas	A new, US\$35 million football operations center
Baylor University	Building a new stadium at estimated cost of US\$250 million
Boise State University	A new US\$22 million football complex
University of California–Berkeley	Completely renovating Memorial Stadium at an estimated cost of US\$321 million
University of Iowa	US\$57 million plan to build a new practice facility and operations building
Kansas State University	A US\$75 million project to upgrade west side of Bill Snyder Family Stadium
Louisiana State University	Recently approved US\$100 million expansion of Tiger Stadium, bringing capacity close to 100,000 seats
University of Louisville	Has begun fundraising for a US\$7.5 million, 18,000-foot addition to its football complex
Michigan State University	Installing new US\$10 million scoreboard at Spartans Stadium that will be largest in the state
Mississippi State University	US\$25 million football complex
University of Nebraska–Lincoln	A US\$63.5 million expansion of the east side of Memorial Stadium that will add about 6,000 seats
Oklahoma State University	A US\$16 million indoor practice facility, plus new outdoor fields that will cost US\$3 million
Ohio State University	Spending US\$7 million for new scoreboard and improved sound system and other touches at Ohio Stadium
University of Syracuse	Upgrading locker rooms and other team areas at a cost of US\$5 million
University of Tennessee	A US\$45 million new football complex that will contain 145,000 square feet
Texas Christian University	US\$164 million expansion and renovation to Amon G. Carter Stadium
University of Southern California	Scheduled to open the US\$70 million, 110,000-square foot John McKay Center this summer; complex includes locker rooms, training areas, football offices, and a two-story video board
University of Utah	Coaches are working in trailers as a new, US\$30 million football complex is being built
Virginia Tech University	Has announced plans to build a US\$20 million indoor practice facility
University of Washington	Work is ongoing on a US\$250 million renovation of Husky Stadium
University of Wisconsin–Madison	An US\$86 million upgrade to locker rooms, weight training and academic areas at Camp Randall Stadium, which also got new turf



Figure 1. Highest paid public employee by state (2011-2012).

Source. Reuben Fischer-Baum of Deadspin.com (<http://deadspin.com/infographic-is-your-states-highest-paid-employee-a-co-489635228>)

Note. The data in the map were compiled by comparing public government and university salary databases to public coaching contracts on a state-by-state basis. In an email correspondence, Mr. Fischer-Baum confirmed that the details of many of the contracts could only be gleaned from “trusted media reports,” and that the “results of this map were independently fact-checked by Harper’s Magazine for use in their July Harper’s Index.” Given these caveats, this figure should only be used anecdotally.

^aIn Pennsylvania, Penn State, the University of Pittsburgh, and Temple University are “state-related” schools and do not have the same disclosure requirements as public schools.

^bAs noted by Mr. Fischer-Baum, “It’s difficult to track down salary information for employees at Ole Miss and Mississippi State, but the highest non-coach salaries we could find top out at around \$500,000. While we can’t prove that nobody [sic] at these schools earns more than Dan Mullen’s [Mississippi State’s football coach] \$2.65 million per year, we think it’s very unlikely.”

Although the market for student-athletes has strict compensation restrictions, the market for coaches is relatively unregulated. The result is that the salaries paid to head coaches in college football and basketball have skyrocketed, although colleges and universities that pay the highest salaries to their head coaches are guaranteed success (Tsitsos & Nixon, 2012). In 39 states, the highest paid public employee is a college football or basketball coach, illustrated in Figure 1. In the following section, we present data and a formal econometric model to explore athletic department spending practices.

Data and Estimation

The article utilizes a panel of athletic department revenue and expenditure data covering 225 public colleges and universities in the NCAA’s Division I from 2006 to 2011. Private schools are not required to release revenue and expenditure reports publicly, and some states shield public schools from full data disclosure so they are excluded

(e.g., University of Notre Dame and Temple University). The panel is unbalanced because not every school disclosed their data during each year of the sample. Revenue and expenditure data are in constant 2012 USD.

Revenues are divided among six categories: ticket sales, student fees, school funds, contributions, rights and licensing, and other revenue. Ticket sales are the sale of admissions to athletic events. Student fees represent the fees levied on students to support a school’s athletic program. School funds are the direct and indirect financial support from the college or university toward athletic programs. Contributions are any additional financial contributions beyond ticket sales, such as alumni giving toward athletic programs.⁹ Rights and licensing represent revenue from media rights, sponsorships, licensing, advertisements, trademarks, and royalties. Any additional revenue stream, such as revenue from tournament or bowl game appearances, is captured in the category of other revenue. Total revenue is the sum total of the six revenue categories.

Expenditures are divided among four categories: scholarships, coaching staff, building and grounds, and other expenditures. Scholarships represent athletically related student aid. Coaching staff captures expenditures on coaching salaries, bonuses, and benefits. Building and grounds are all expenditures on facilities and maintenance. Any additional expenditure, such as conference dues and travel expenses, is lumped into other expenditures. Total expenditures is the sum total of the four revenue categories. Table 2 includes a more detailed description of the expenditure and revenue variables, and Table 3 provides summary statistics.

The article explores the relationship between revenues and expenditures using two-way fixed-effects panel estimations.¹⁰ Robust standard errors are used to reduce idiosyncratic disturbances through time.¹¹ To explore asymmetries in athletic department behavior, each model is tested with all colleges included, when only Football Bowl Subdivision (FBS) conferences are included, when only non-FBS conferences are included, and when only AQ conferences are included.

The first model measures the effect of an additional dollar of total revenue (lagged to alleviate certain endogeneity concerns) on each expenditure category. The basic specification of the empirical model is as follows:

$$\text{Expenditure Category}_{i,t} = \alpha_{i,t} + \beta_1 \text{Total Revenue}_{i,t-1} + \varepsilon_{it}, \tag{1}$$

where i and t are the school and year indices, respectively, $\alpha_{i,t}$ represents school and time fixed in each regression.¹²

The second model explores the degree to which each revenue category affects total expenditures. The basic specification of the empirical model is as follows:

$$\begin{aligned} \text{Total Expenditures}_{i,t} = & \alpha_{i,t} + \beta_1 \text{Ticket Sales}_{i,t-1} + \\ & \beta_2 \text{Student Fees}_{i,t-1} + \\ & \beta_3 \text{School Funds}_{i,t-1} + \\ & \beta_4 \text{Contributions}_{i,t-1} + \beta_5 \text{Other Revenue}_{i,t-1} + \varepsilon_{it}. \end{aligned} \tag{2}$$

Table 2. Variable Description and Sources.

Variable	Description	Source
Ticket sales	Includes ticket sales to the public, faculty and students, and money received for shipping and handling of tickets. Does not include amounts in excess of face value (such as preferential seating) or sales for conference and national tournaments that are pass-through transactions.	<i>USA TODAY</i> public records requests to each university
Student fees	Fees assessed to support athletics.	<i>USA TODAY</i> public records requests to each university
School funds	Includes both direct and indirect support from the university, including state funds, tuition, tuition waivers, etc., as well as federal Work Study amounts for athletes. It also includes university-provided support such as administrative costs, facilities and grounds maintenance, security, risk management, utilities, depreciation, and debt service.	<i>USA TODAY</i> public records requests to each university
Contributions	Includes amounts received directly from individuals, corporations, associations, foundations, clubs, or other organizations by the donor for the operation of the athletics program. Report amounts paid in excess of a ticket's value. Contributions include cash, marketable securities, and in-kind contributions such as dealer-provided cars, apparel, and drink products for team and staff use. Also includes revenue from preferential seating.	<i>USA TODAY</i> public records requests to each university
Rights and licensing	Includes revenue for athletics from radio and television broadcasts, Internet and ecommerce rights received from institution-negotiated contracts, the NCAA and conference revenue sharing arrangements, and revenue from corporate sponsorships, licensing, sales of advertisements, trademarks, and royalties. Includes the value of in-kind products and services provided as part of the sponsorship (e.g., equipment, apparel, soft drinks, water, and isotonic products).	<i>USA TODAY</i> public records requests to each university
Other revenue	All other sources of revenue including game guarantees, support from third parties guaranteed by the school such as TV income, housing allowances, camp income, etc.; tournament/bowl game revenues from conferences; endowments and investments; revenue from game programs, novelties, food, or other concessions; and parking revenues and other sources.	<i>USA TODAY</i> public records requests to each university

(continued)

Table 2. (continued)

Variable	Description	Source
Total revenue	Includes Ticket Sales, Student Fees, School Funds, Contributions, Rights and Licensing, and Other Revenue.	USA TODAY public records requests to each university
Scholarships	Athletically related student aid, including summer school and tuition discounts and waivers (including aid given to student-athletes who have exhausted their eligibility or who are inactive due to medical reasons), and aid for non-athletes such as student managers.	USA TODAY public records requests to each university
Coaching staff	All salaries, bonuses, and benefits reported on the university's tax forms for coaches and staff, as well as third-party contributions.	USA TODAY public records requests to each university
Building and grounds	Facilities costs charged to the athletics program, including debt service, maintenance, utilities, and rental fees.	USA TODAY public records requests to each university
Other expenditures	Includes guarantees paid to other schools, severance payments to past coaches and staff, recruiting, team travel, equipment and uniforms, game day and camp expenses, fundraising and marketing costs, spirit group support, medical expense/insurance, and conference dues. It also includes expenses charged to athletics by the university, such as building maintenance.	USA TODAY public records requests to each university
Total expenditures	Includes Scholarships, Coaching Staff, Building and Grounds, and Other Expenditures.	USA TODAY public records requests to each university
Subsidy	Student Fees plus School Funds	USA TODAY public records requests to each university
Change in conference	Binary dummy variable where Change in Conference = 1 represents a school that has changed conference affiliation, and Change in Conference = 0 represents a school that has not changed conference affiliation.	Individual school websites
Football	Binary dummy variable where Football = 1 represents a school with a football program, and Football = 0 represents a school without a football program.	Individual school websites

Note. Data from USA TODAY were compiled by Christopher Schnaars, Jodi Upton, Jerry Mosemak, and Kristin DeRamus. Reporting by Steve Berkowitz, Erin Durkin, and Jodi Upton of USA TODAY; and Jason Bailey, Timothy Burnsed, Andrew Crum, Erin Foley, Yasha Ghamarian, Erin Glueckert, Thomas Hotchkiss, Zachary Keefer, Younghwan Lim, Eduardo Martinez, Amy Mills, Romy Schwaiger, and Joshua Weinfuss of Indiana University's National Sports Journalism Center. The USA TODAY data are publicly available at <http://usatoday30.usatoday.com/sports/college/story/2012-05-14/naaa-college-athletics-finances-database/54955804/1>. NCAA = National Collegiate Athletic Association.

Table 3. Summary Statistics.

Variable	M	SD	Minimum	Maximum	Observations
Ticket sales	5,737.757	9,596.228	0.5896	62,463.13	1,326
Student fees	3,838.907	4,092.905	0	26,377.22	1,326
School funds	4,962.781	4,546.905	0	33,467.59	1,326
Contributions	5,470.987	10,794.68	0	240,325.6	1,326
Rights and licensing	6,753.376	10,138.42	0	47,712.88	1,326
Other revenue	2,185.991	2,795.191	-15,874.57	35,948	1,326
Total revenue	28,950.38	28,676.48	2,259.023	274,880.6	1,326
Scholarships	4,675.963	2,794.828	0	16,661.02	1,326
Coaching staff	9,358.433	8,728.737	0	50,944.74	1,326
Buildings and grounds	3,431.088	5,985.007	0	44,191.15	1,326
Other expenditures	10,336.53	9,960.958	0	69,577.75	1,326
Total expenditures	27,820.79	25,967.34	2,731.44	137,338.3	1,326
Subsidy	8,801.688	5,376.117	0	35,876.32	1,326
Change in conference	0.011	0.1058	1	1	1,326
Football	0.8137	0.3894	0	1	1,326

Note. Revenue and Expenditure categories, including Subsidy, are in constant 2012 US\$ (in thousands).

The third model measures how changes in revenue categories affect the size of the athletic subsidy. Athletic subsidy is defined as the sum of student fees and school funds.

$$\text{Subsidy}_{i,t} = \alpha_i + \beta_1 \text{Ticket Sales}_{i,t-1} + \beta_2 \text{Contributions}_{i,t-1} + \beta_3 \text{Other Revenue}_{i,t-1} + \eta_t + \varepsilon_{it} \tag{3}$$

The appendix re-estimates models one and two with cluster robust standard errors and extends each model by adding a dummy variable indicating if a school has a football program. No substantial differences from the basic results were observed.

Results

Table 4 presents the results from Equation 1. Column 1 presents the effects using all 225 colleges in the data set. When all colleges are included, an additional dollar of total revenue increases scholarship expenditures by US\$0.02 and coaching staff expenditures by US\$0.15. Both coefficients are statistically significant at the 1% level. The coefficients for building and grounds and other expenses are not statistically significant at conventional levels of significance.

We find it important to note that the coefficient on total expenditures was only 0.31. Due to the strong degree of correlation between expenditures and revenues and the

Table 4. Effect of an Additional Dollar of Total Revenue on Each Expenditure Category.

Dependent variables	Regressors	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Scholarships	Total revenue (t - 1)	0.02 (0.004)***	0.01 (0.004)***	0.02 (0.004)***	0.10 (0.021)***
	F statistic	74.95	31.78	38.17	63.11
	R ² (within)	.51	.56	.49	.61
Coaching staff	Total revenue (t - 1)	0.15 (0.021)***	0.10 (0.028)***	0.12 (0.023)***	0.10 (0.031)***
	F statistic	51.81	38.34	40.97	29.15
	R ² (within)	.44	.64	.52	.16
Building and grounds	Total revenue (t - 1)	0.04 (0.054)	-0.005 (0.065)	0.02 (0.059)	0.06 (0.027)**
	F statistic	5.00	2.89†	3.74	5.43
	R ² (within)	.05	.08	.06	.11
Other expenditures	Total revenue (t - 1)	0.01 (0.031)	-0.02 (0.036)	-0.01 (0.032)	0.12 (0.035)***
	F statistic	7.69	3.39	4.56	9.58
	R ² (within)	.04	.06	.05	.15
Number of schools		225	54	100	125
Number of observations		1,094	265	492	486

Note. The regressions cover years 2006-2011. The set of regressors also include school fixed effects, year fixed effects, and a constant term, which are excluded for reasons of space. Robust standard errors are in parentheses. All F statistics are significant at the 1% level unless marked by †, which indicates significance at the 5% level. FBS = Football Bowl Subdivision.

5% significance level. *1% significance level.

gradual upward trend in both expenditures and revenues, we would anticipate a coefficient much closer to 1.0. However, due to the inclusion of institution fixed effects and the relatively short panel of only 6 years, a substantial amount of the variation in expenditures is captured by the fixed effects.¹³ Although the point estimates on the non-fixed-effect variables may underestimate the precise effect of revenue changes on expenditures, the ratios between the coefficients of total revenue for the various expenditure categories still yield very useful information. The coefficients for scholarships (0.02) and coaching staff (0.15) suggest that with additional total revenue, expenditures for coaches increase 7.5 times the direct expenditures for athletes.

Larger coaching expenditure to athlete expenditure ratios were observed when the data were restricted to only schools in AQ and FBS conferences. In both models, only the coefficients for scholarships and coaching staff are statistically significant (at the 1% level). When only AQ schools are considered, an additional dollar of total revenue increases scholarship expenditures by US\$0.01 and coaching staff expenditures by US\$0.10, suggesting 1 more dollar of total revenue increases coaching expenditures 10 times more than direct expenditures for athletes. The larger ratio among AQ schools matches expectations, because schools that compete in the power conferences have access to greater revenue sources but still operate under the same

Table 5. Disaggregated Revenue Sources' Effect on Total Expenditures.

Variable	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Ticket sales ($t - 1$)	0.83 (0.16)***	0.45 (0.23)*	0.63 (0.17)***	0.54 (0.24)**
Student fees ($t - 1$)	0.36 (0.15)**	0.98 (1.02)	0.15 (0.24)	0.66 (0.09)***
School funds ($t - 1$)	0.20 (0.11)*	0.05 (0.35)	0.10 (0.16)	0.44 (0.08)***
Contributions ($t - 1$)	0.01 (0.040)	0.00 (0.03)	0.01 (0.030)	0.00 (0.09)
Other revenue ($t - 1$)	-0.18 (0.12)	-0.11 (0.11)	-0.17 (0.13)	-0.05 (0.19)
Number of schools	225	54	100	125
Number of observations	1,095	266	493	602
F statistic	28.57	11.87	16.59	43.83
R ² (within)	.31	.36	.32	.56

Note. The dependent variable is Total Expenditures. The regressions cover years 2006-2011. The set of regressors includes school fixed effects and year fixed effects, which are excluded for reasons of space. Robust standard errors are in parentheses. FBS = Football Bowl Subdivision.

*10% significance level. **5% significance level. ***1% significance level.

restrictions of not being allowed to pay for players. Therefore, additional revenue is spent on coaching salaries. For FBS schools, an additional dollar of total revenue increases scholarship expenditures by US\$0.02 and coaching staff expenditures by US\$0.12, a ratio of 6 to 1.

For non-FBS schools, an additional dollar of total revenue increases scholarship expenditures by US\$0.10, coaching staff expenditures by US\$0.10, building and grounds expenditures by US\$0.06, and other expenditures by US\$0.12. For non-FBS schools, additional revenue increases direct spending for athletes and coaches by the same amount. There are two possible explanations for this result. First, non-FBS schools have a more difficult time earning revenue (e.g., lack of access to lucrative bowl games, tournaments, and media deals), thus constraining the financial packages they can offer coaches. Second, coaches at non-FBS schools are more likely to be unproven and therefore cannot command the salary premium coaches at FBS schools (specifically AQ schools) earn.

Table 5 presents the results from Equation 2, using the disaggregated revenue categories to explain total expenditures. The coefficients for tickets sales are positive and statistically significant in every college grouping. An additional dollar of ticket sale revenue increases total expenditures between US\$0.45 and US\$0.83. An additional dollar of student fees increases total expenditures by US\$0.36 when all colleges are included and US\$0.66 when only non-FBS conferences are included. An additional

Table 6. Subsidy Results.

Variable	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Ticket Sales ($t - 1$)	-0.18 (0.04)***	-0.09 (0.05)*	-0.19 (0.05)***	0.54 (0.34)
Contributions ($t - 1$)	0.0002 (0.002)	-0.001 (0.002)	-0.0005 (0.002)	0.13 (0.17)
Other revenue ($t-1$)	-0.03 (0.03)	-0.05 (0.03)	-0.02 (0.03)	0.01 (0.20)
Number of schools	225	54	100	125
Number of observations	1,095	266	493	602
F statistic	20.88	2.5†	7.26	19.23
R ² (within)	.25	.06	.18	.36

Note. The dependent variable is Subsidy. The regressions cover years 2006-2011. The set of regressors includes school fixed effects and year fixed effects, which are excluded for reasons of space. Robust standard errors are in parentheses. All F statistics are significant at the 1% level unless marked by †, which indicates significance at the 5% level. FBS = Football Bowl Subdivision.
 *10% significance level. **5% significance level. ***1% significance level.

dollar of school funds increases total expenditures by US\$0.20 when all colleges are included and US\$0.44 when only non-FBS conferences are included.

These coefficients suggest that ticket sales are the most important revenue factor in explaining increased expenditures for FBS schools. For non-FBS conferences, student fees are most necessary to drive added expenditure.

Smaller schools and non-FBS schools may be more revenue sensitive. Schools in FBS and AQ conferences tend to be larger—larger student bodies, greater university expenditures, greater athletic department budgets, larger stadiums, and more lucrative television deals—than non-FBS schools. Therefore, FBS schools, particularly AQ schools, have the ability to draw more people to their athletic events. Non-FBS schools are more reliant on other sources of revenue, such as student fees, because attendance at their sporting events is lower.¹⁴

With tuition and fees increasing, students, administrators, and legislators are questioning the size of athletic subsidies. The only schools that did not give a subsidy to their athletic departments in all years were Louisiana State University (LSU) and the University of Nebraska–Lincoln. The largest single-year athletic subsidy was at the University of Nevada, Las Vegas (UNLV) in 2010 (US\$35.876 million) and the largest athletic subsidy at a FBS or AQ school was at Rutgers University in 2011 (US\$29.125 million). Rutgers University had the three highest single-year FBS or AQ athletic subsidies in the data.

Table 6 explores whether alternative athletic department revenue sources—ticket sales, donations, or student fees—act as a substitute or complement to school subsidy revenues. For FBS and AQ schools, ticket sales have a negative and statistically

significant coefficient. The negative coefficient suggests that ticket sale revenues are used as a substitute for athletic department subsidies. For every US\$1 of additional ticket sales, the subsidy athletic departments receive from their institution falls by US\$0.18 when all colleges are included, US\$0.09 when only AQ schools are included, and US\$0.19 when only FBS schools are included.

Again, for non-FBS schools, ticket sale revenue is far scarcer and less reliable. Consequently, the large-budget programs may need to use sizable subsidies, because other revenue sources are not available. Greater ticket sales likely correlate with higher subsidies for some of the non-FBS schools, while they may not for others.

Neither contributions nor other revenue was linked to athletic subsidies. This may be caused by a large variance in the quantity of contributions and other revenues.

Conclusion

NCAA athletic departments operate under a unique set of constraints and incentives, dually operating in private and public markets by collecting revenues from ticket sales, donations from alumni, and subsidies from publicly funded academic institutions. Their expenditures carry strict rules. Most notably, athletic departments cannot pay players. However, athletic departments still demand wins and championships, so they compete in markets other than player salary.

This article empirically investigated the behavior of NCAA Division I athletic departments, specifically examining the way in which athletic departments respond to changes in revenues. This article tested three primary relationships: (a) the effect of total revenue on individual expenditure categories (scholarships, coaching staff, building and grounds, and other expenditures), (b) how individual revenue streams influence total expenditures, and (c) how changes in individual revenue categories change the size of the athletic subsidy.

The most important empirical result shows that when a school receives additional athletic revenue, expenditures for coaches are 7.5 times more than direct expenditures for athletes (in the form of scholarships) for all NCAA Division I colleges, and this ratio can be as high as 10:1 when only automatic qualifying schools are considered. We believe this finding is a result of the differing market structures in which schools compete for coaches and athletes.

The market for coaches is relatively unrestricted and coaches have the opportunity to pursue better more lucrative opportunities. Thus, as the returns for team success have increased (e.g., larger bowl game payouts and lucrative television contracts), coaching salaries have grown accordingly.

The market for athletes is highly restricted. Player compensation has a strict ceiling, and the NCAA has strict rules for athletes desiring to transfer schools. Therefore, direct athletic department expenditures on athletes have not been able to keep pace with coaching salaries.

We find merit in attorney Jeffery Kessler's claim that the NCAA and the Bowl Championship Series (BCS) conferences have signed

multibillion dollar contracts wholly disconnected from the interests of “student-athletes,” who are barred from receiving the benefits of competitive markets for their services even though their services generate these massive revenues . . . market forces have been shoved aside and substantial damages have been inflicted upon a host of college athletes whose services have yielded riches only for others (p. 6)

The numerous lawsuits filed against the NCAA suggest the institutions in which amateur athletics operate in the United States may change dramatically. Some are calling for a straightforward pay-for-play system that would model the way professional sports operate, but a wide variety of alternative changes have also been proposed. The initial demands from the Northwestern football players focus on increased health care benefits and guaranteed 4-year tuition waivers, but include no requests for pay or major systematic changes. University of North Carolina professor Steven King has proposed the idea of a lower the NCAA-required number of credits students must take each semester, allowing student-athletes to take more time to complete a degree.

We also consider the attractiveness of separating the academic institutions from their athletic programs. Schools can sponsor athletic teams and continue to offer tuition fee waivers. This would allow for some young men and women to be athletes (employees) first and students second. The athletes would still be able to develop their human capital by pursuing education, albeit at a slower pace, regardless of their educational background. This system would (a) use market forces to presumably determine an appropriate and fair compensation system for the athlete’s contributions,¹⁵ (b) ameliorate concerns of degree dilution from less qualified athlete graduates, and (c) encourage talented athletes who possess poor academic skills to continue their education (in the current system, talented athletes who are unable to meet the NCAA academic requirements have virtually no outlet in which they are able to capitalize on their athletic talents. Unable to participate in college athletics and unqualified to academically participate in higher education, these athletically talented individuals are often denied the opportunity to invest more in their own human capital and are forced to take low-skill jobs), all while maintaining the ties between the athletic program and its college sponsor.

Each proposed change to the current NCAA system carries certain risks and costs. Two major concerns of changing the NCAA framework so that college athletes are eligible for monetary compensation are increased heterogeneity (less competitive balance) and university cuts that would be necessary to offset player payments.

The cap on player compensation likely creates a much more level atmosphere for allocating athletic talent. The result is a highly competitive athletic atmosphere. If that cap were removed, institutions with larger budgets would be able to offer a greater salary and could potentially draw more talented players (e.g., the New York Yankees), therefore decreasing competitive balance.

Second, a frequently asked question is, from where will the money come to pay athletes? As described above, nearly all NCAA athletic departments are not profitable. They rely on institutional subsidies to operate. Opponents of pay-for-play fear that to pay certain athletes (presumable men’s football and basketball players), schools may

have to cut other non-profitable programs. Several years of non-profitability lead to the December 2, 2014, announcement that the University of Alabama at Birmingham (UAB) would terminate their football program. From 2006 to 2011, the UAB athletic department received nearly US\$80 million in institutional subsidies.

College athletics is a major source of revenue and expenditures for most colleges and universities. As the college landscape changes and media deals become more lucrative, the way in which athletic departments spend their money will continue to be an important issue for schools, athletes, coaches, sponsors, and taxpayers. As with many large-scale changes, there will likely be winners and losers, and those parties who are more flexible in their approach are more likely to take advantage of the increased flow of money into college athletics.

Appendix

Empirical Estimations Controlling for Football Programs and Clustered Standard Errors

Table A1 presents the results from Equation 1 using clustered standard errors, clustered by athletic conference. The results show an increase in model efficiency through marginally smaller standard errors, but there are no substantial differences between Table A1 and Table 4.

Table A2 presents the results from Equation 1 with a binary dummy variable indicating whether a school has a football program. Football is often the most profitable and sometimes, only profitable sport for a school. Because every Football Bowl Subdivision (FBS) and Automatic Qualifying (AQ) school has a football program, only the results for all colleges and non-FBS schools are discussed.

The coefficient for *football* is positive and statistically significant at the 1% level, but only when scholarships are the dependent variable. A school with a football team spends on average US\$780 thousand more on scholarships than schools without a football team. This result makes sense because football typically requires the largest number of athletes. National Collegiate Athletic Association (NCAA) schools can offer 85 scholarships in football for FBS schools, 63 scholarships for Football Championship Subdivision (FCS) schools, and 36 scholarships for Division II.

For non-FBS schools, the coefficients for each of the expenditure categories are positive, of similar magnitudes, and of the same statistical significance as the basic model. An additional dollar of total revenue increases scholarship expenditures by US\$0.09, coaching staff expenditures by US\$0.08, building and grounds expenditures by US\$0.04, and expenditures for other expenses by US\$0.10. Additional revenue increases direct expenditures for athletes 1.125 times the amount for coaching expenditures. A non-FBS school with a football team spends US\$633 thousand more on scholarships and US\$947 thousand more on other expenses than non-FBS schools without a football team.

Finally, Table A3 includes clustered standard errors to the model specification including the football dummy variable. Again, the standard errors in Table A3 are

Table A1. Effect of an Additional Dollar of Total Revenue on Each Expenditure Category With Cluster Robust Standard Errors.

Dependent variables	Regressors	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Scholarships	Total revenue (t - 1)	0.02 (0.004) ^{***}	0.01 (0.003) ^{**}	0.02 (0.003) ^{***}	0.10 (0.018) ^{***}
	F statistic	83.89	86.91	126.36	87.06
	R ² (within)	.51	.59	.49	.61
Coaching staff	Total revenue (t - 1)	0.15 (0.016) ^{***}	0.10 (0.029) ^{**}	0.12 (0.021) ^{***}	0.10 (0.026) ^{***}
	F statistic	75.34	184.6	67.68	39.54
	R ² (within)	.44	.64	.52	.16
Building and grounds	Total revenue (t - 1)	0.04 (0.049)	-0.005 (0.055)	0.02 (0.052)	0.06 (0.021) ^{**}
	F statistic	2.84†	142.50	2.46††	9.73
	R ² (within)	.05	.08	.06	.11
Other expenditures	Total revenue (t - 1)	0.04 (0.018)	-0.02 (0.016)	-0.01 (0.017)	0.12 (0.028) ^{***}
	F statistic	7.35	6.33	3.13†	14.01
	R ² (within)	.04	.06	.05	.15
Number of schools		224	54	100	125
Number of observations		1,094	265	492	486

Note. Robust standard errors clustered according to a school's football conference are in parentheses. Schools that lack a football team are clustered into the same conference. All F statistics are significant at the 1% level unless marked by †, which indicates significance at the 5% level, or ††, which indicates significance at the 10% level. FBS = Football Bowl Subdivision.
[†]5% significance level. ^{***}1% significance level.

Table A2. Effect of an Additional Dollar of Total Revenue on Each Expenditure Category, Including Football.

Dependent variables	Regressors	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Scholarships	Total revenue ($t - 1$)	0.02 (0.004) ^{***}	0.01 (0.004) ^{***}	0.02 (0.004) ^{***}	0.09 (0.018) ^{***}
	Football	780.12 (216.375) ^{***}			633.426 (194.371) ^{***}
	F statistic	70.82	31.78	38.17	77.44
Coaching staff	R ² (within)	.52	.59	.49	.62
	Total revenue ($t - 1$)	0.15 (0.022) ^{***}	0.10 (0.028) ^{***}	0.12 (0.023) ^{***}	0.08 (0.029) ^{***}
	Football	17.67 (373.149)			731.181 (500.491)
Building and grounds	F statistic	46.26	38.34	40.97	24.85
	R ² (within)	.44	.64	.52	.17
	Total revenue ($t - 1$)	0.03 (0.054)	-0.005 (0.065)	0.02 (0.059)	0.04 (0.020) ^{**}
Other expenditures	Football	437.15 (585.442)			758.029 (572.076)
	F statistic	4.55	2.89†	3.74	4.55
	R ² (within)	.05	.08	.06	.13
Number of schools	Total revenue ($t - 1$)	0.01 (0.031)	-0.02 (0.036)	-0.01 (0.032)	0.10 (0.034) ^{***}
	Football	111.48 (309.300)			947.415 (289.335) ^{***}
	F statistic	14.68	3.39	4.56	14.05
Number of observations	R ² (within)	.04	.06	.05	.16
		225	54	100	125
		1,094	265	492	486

Note. The regressions cover years 2006-2011. The set of regressors also include school fixed effects, year fixed effects, and a constant term, which are excluded for reasons of space. Football is omitted in the regressions for FBS Conferences and Automatic Qualifiers for reasons of collinearity. Robust standard errors are in parentheses. All F statistics are significant at the 1% level unless marked by †, which indicates significance at the 5% level. FBS = Football Bowl Subdivision. ***5% significance level. **10% significance level. †1% significance level.

Table A3. Effect of an Additional Dollar of Total Revenue on Each Expenditure Category, Including Football and Cluster Robust Standard Errors.

Dependent variables	Regressors	All colleges	Automatic qualifiers	FBS conferences	Non-FBS conferences
Scholarships	Total revenue ($t - 1$)	0.02 (0.004) ^{***}	0.01 (0.003) ^{**}	0.02 (0.003) ^{***}	0.09 (0.021) ^{***}
	Football	780.12 (216.282) ^{***}			633.426 (278.524) ^{***}
	F statistic	70.93	86.91	126.36	57.27
Coaching staff	R ² (within)	.52	.56	.49	.62
	Total revenue ($t - 1$)	0.15 (0.016) ^{***}	0.10 (0.029) ^{**}	0.12 (0.0210) ^{***}	0.08 (0.011) ^{***}
	Football	17.67 (171.672)			731.181 (256.766) ^{***}
Building and grounds	F statistic	214.76	184.6	67.68	33.89
	R ² (within)	.44	.64	.52	.17
	Total revenue ($t - 1$)	0.04 (0.049)	-0.005 (0.055)	0.02 (0.052)	0.04 (0.025)
Other expenditures	Football	437.15 (265.319)			758.029 (344.01) ^{**}
	F statistic	57.91	142.50	2.46 ^{††}	41.38
	R ² (within)	.05	.08	.06	.22
Number of schools	Total revenue ($t - 1$)	0.01 (0.018)	-0.02 (0.016)	-0.01 (0.017)	0.10 (0.030) ^{***}
	Football	111.48 (403.620)			947.415 (408.226) ^{***}
	F statistic	6.98	6.33	3.13 [†]	14.99
Number of observations	R ² (within)	.04	.06	.05	.16
		225	54	100	125
		1,094	265	492	486

Note. Football is omitted in the regressions for FBS Conferences and Automatic Qualifiers for reasons of collinearity. Robust standard errors clustered according to a school's football conference are in parentheses. Schools that lack a football team are clustered into the same conference. All F statistics are significant at the 1% level unless marked by †, which indicates significance at the 5% level, or ††, which indicates significance at the 10% level. FBS = Football Bowl Subdivision.
[†]=5% significance level. ^{††}=10% significance level.

marginally smaller than the standard errors in Table A2, but no substantial differences were observed.

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Notes

1. In a July 9, 2014, Congressional hearing, National Collegiate Athletic Association (NCAA) President Mark Emmert was harshly questioned by senators of both parties. See <http://blogs.rollcall.com/wgdb/ncaa-congressional-hearing-cory-booker-jay-rockefeller/?dcz=>; <http://www.indystar.com/story/sports/college/2014/07/09/ncaa-president-mark-emmert-calls-scholarships-life/12426805/>
2. See http://espn.go.com/espn/otl/story/_id/11045682/ed-obannon-lawsuit-ncaa-paying-players-set-begin
3. See http://www.al.com/sports/index.ssf/2014/02/whos_suing_the_ncaa_alcom_data.html
4. See Nite, Singer, and Cunningham (2013) for a case study analysis of Division II athletics at religious colleges and universities.
5. The term *costs* in this sentence does not include opportunity costs of attending college or participating in amateur athletics.
6. Football Bowl Subdivision (FBS) consists of 10 conferences (formerly known as Division IA) for football, the 6 Automatic Qualifying (AQ) conferences, and the 4 non-AQ conferences. An AQ conference is an athletic conference whose league champion receives an automatic berth in one of the five football Bowl Championship Series bowl games. The six AQ conferences are the American Athletic Conference (formerly the Big East), the Atlantic Coast Conference (ACC), the Big 10 Conference, the Big 12 Conference, the Pac-12 Conference, and the Southeastern Conference (SEC). The four non-AQ conferences are Conference USA, the Mid-American Conference (MAC), the Mountain West Conference (MWC), and the Sun Belt Conference.
7. Virtual tours of the new Alabama locker room can be found at <http://www.rolltide.com/allaccess/?media=394427>
8. Nick Saban signed a contract extension at the University of Alabama in 2013 that will result in him being paid approximately US\$7 million annually.
9. For a systematic analysis of the economic determinates of athletic contributions, see Coughlin and Erekson (1984).
10. Hausman test statistics are available on request.
11. The models were also estimated using standard errors clustered by conference and with the inclusion of a football dummy variable. These changes did not alter the basic results, and these estimates are found in the appendix.
12. A general rule of thumb for outliers suggests any data point three or more standard deviations from the mean is defined as an outlier. Total revenue from Oklahoma State University in the year 2006 is excluded, because total revenue is 9.58 standard deviations from the

- mean. Oklahoma State's total revenue in 2006 was abnormally high because of a US\$165 million donation from alumnus T. Boone Pickens, the largest single donation given to an NCAA athletic department.
13. At the extreme, fixed effects for a 1-year regression would account for all of the variation in the dependent variable. This effect grows smaller as the time component of the panel grows larger. Our hypothesis that the coefficient on total revenue should be approximately 1.0 is further supported by regression estimates (not presented) run without the fixed effects, which generated a statistically significant coefficient of 1.03.
 14. Foreexample, in 2012, six of the top seven basketball conferences in terms of attendance were AQ conferences. (http://fs.ncaa.org/Docs/stats/m_basketball_RB/Reports/attend/2012.pdf). For football, the AQ conferences were the top conferences in terms of attendance, and the rest of the FBS conferences had higher attendance than any of the Football Championship Subdivision (FCS) or Division II and III conferences (http://fs.ncaa.org/Docs/stats/football_records/Attendance/2012.pdf).
 15. Brown (1993) and Kahane (2012) provide estimates for top-end college football and hockey players, respectively.

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