Can schools buy success in college football? Coach compensation, expenditures and performance

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Abstract

Using unique data of Football Bowl Subdivision college football games, we examine the determinants of coach compensation, football expenses and performance. We find that coach compensation is highly related to the coach's past success. Additionally, coach pay is higher when the institution has a larger fan base and the program has achieved a higher profit in the previous year. Football expenses are likewise determined by institutional characteristics such as the fan base, past profitability and historical success. Results suggest that coach compensation has no measurable impact on performance. A coach's past success may impact their salary but their salary has no significant impact on future success. Though, an additional, aspirational increase in spending of $1 million on the football program can improve the probability of winning any particular game by 3.5% to 7.0%. Thus, the budget of an administrator is a better predictor of future performance than the coach's salary.

JEL Classification: L83, I23

Keywords: college football, performance, coaching, compensation, spending

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Introduction

In the 2009 Bowl Championship Series (BCS) title game Alabama beat Texas to win the national championship. Southeastern conference champion Alabama had football expenses that year totaling $31.1 million and its head coach, Nick Saban, received a salary of $3.9 million. On the opposite sideline was the Big Twelve champion, Texas, whose football expenses were $25.1 million coached by Mack Brown, who was paid approximately $3 million. Did Alabama's success on-the-field have anything to do with the 24% greater spending on their football program or the 30% greater compensation package for their coach? Can on-the-field performance be

bought? Coach pay has become an important public issue as concerns arise as some state employees earn disproportionately high salaries, and pay increases, while many of the state institutions tighten belts elsewhere[1]. Many football coaches now make four or five times the salary of the college president.

While there is a great body of research on success in sports and spending there is very little research on collegiate (amateur) athletics and nothing about college football which is the most popular collegiate sport. To examine the issue of whether a school can spend its way to victory, we make use of a particularly rich dataset. In the first stage of our approach, we determine the institutional components of coach compensation and football expenses. In the second stage, we test both the predicted values of coach compensation and football expenses as well as the unpredicted, non-institutionally related values of coach compensation and football expenses. As we will show, football expenses and coach compensation are highly correlated with the size of the school's fan base, the school's historical success and recent profitability. Using these institutional characteristics we predict the football program's expenses and coach compensation; the residuals from these equations thus represent a level of spending that is out of line with peer institutions. We will refer to these residuals as "aspirational spending" throughout the paper. We examine two hypotheses: 1) that institutional factors drive spending and thus drive on-the-field performance; and 2) that aspirational spending (i.e., spending above what would be normal for that type of institution) drives on-the-field performance.

[1] For a recent review of these issues please see the USAToday article here: http://www.usatoday.com/sports/college/football/story/2011-11-17/cover-college-football-coaches-salaries-rise/51242232/1 Accessed Nov. 2011

In the second stage, we test whether predicted institutionally-based spending and unpredicted aspirational spending have any impact on the probability of winning. With a data set of thousands of individual games we test whether higher levels of spending increase on-the-field success. Our results suggest that coach compensation, whether it is predictable (based on institutional characteristics) or aspirational, has no statistically significant impact on the probability of winning individual games. The data implies that while coaches are paid highly for past success, such salaries do not impact future success.

Institutional expenses for the football program tell a different story. When the football expenses are based on predictable, institutional characteristics, there is no significant impact on success on-the-field. However, when the expenses are aspirationally high, then the relatively high levels of spending, which are inconsistent with peer institutions, can improve the probability of winning. Likewise, relatively low levels of spending reduce the probability of winning. The estimates suggest that an exogenous shock of an additional $1 million in football related expenses can improve a team's probability of winning any individual game by 3.5% to 7.0%. Over the course of a 12-game season, this equates to an increase of .5 to 1 additional wins.

Literature and Data

In the existing literature of college athletics, Farmer and Pecorino (2010) examine the theoretical link between coach pay and recruiting. The authors argue that highly paid coaches attract better recruits in a signaling game. Because the highly paid coaches have better recruits there should be a correlation between on-the-field performance and coach pay. Clement and McCormick (1989) find that good college basketball coaches are better at allocating the playing

time of their team, making appropriate substitutions that improve the probability of winning; implying that some coaches have better management skills which directly lead to better performance.

Grant et al (2010) examine coach pay and performance in 2006 then separately in 2007. The authors find that more highly paid coaches tend to have higher BCS rankings at the end of the year and have better recruiting success in the last five years. However, the study is limited because of a lack of data availability with no more than 60 coach compensation observations in any given year. Orzag and Isreal (2009) and Zimbalist (2010) also examine the relation between annual performance and annual compensation and find no statistically significant impact. However, all of these studies are limited to using annual measurements of performance such as the final ranking of the team or the win-loss record from the end of the year.

We overlay several different data sources including *NCAA.com*, *Covers.com*, *Cfbdatawarehouse.com*, *Rivals.com*, *Scouts.com*, *Prepstar.com*, "equity in athletics" (as reported by the Department of Education), USA Today, as well as various University athletics websites and countless newspaper articles. The data represents a uniquely deep set of information on football games from 2001 through 2009. However, because of incomplete information from online data sources, we lack some observations over the entirety of the dataset. All data is reviewed and any questionable data point is excluded.

The rich dataset herein allows us to examine over 500 different observations of head coach compensation, from both BCS and non-BCS conference teams from 2001 to 2009 when the salary information is made publicly available[2]. The coach compensation includes salary and

[2] Private universities are not required to disclose coach salaries as most public universities are. As such, salaries of private university coaches were obtained (when available) from newspaper sources.

other sources which may include separate apparel or media contracts but excludes potential compensation from any bonuses. The distribution is shown in Figure 1.

[Figure 1]

From the distribution in Figure 1 it appears that coach salary follows a power law. A few coaches are paid quite highly while roughly half of the observations are for coaches paid less than $1 million. In the next section we'll examine the determinants of coach compensation and test if coach compensation has any impact on the probability of winning.

Orszag and Orszag (2005) suggest that football expenses are unrelated to short-term success, and that there is only a weak positive effect between the spending levels of peer institutions. There remains very little other research on the determinants of college football expenses, and, to our knowledge, no studies linking college football expenses to on-the-field performance.

Temporarily putting aside the issue of how head coaches' salaries impact on-the-field success, we now turn to the role of institutional spending on the football program. In particular, we address two questions. What are the determinants of the football program's expenses, and more importantly, how do the program's expenses impact on-the-field performance?

The distribution of more than 1,000 observations on football expenses from 2001-2009 is shown in Figure 2. The distribution of football expenses appears similar to coach compensation; the shape conforms to that of a power law with the exception of the tail of the distribution where a dramatic drop-off in football expenses is observed. Because the data comprises 2001-2009 the upper end of expenses represents the most recent years of the highest spending institutions while the tail consists of the earliest years of the most austere programs.

[Figure 2]

The USAToday NCAA College athletics finance database provides detail on 36 revenue and expense items from most public university's budgets for the athletic department[3]. Additionally, the Indianapolis Star assembled a database for the 2004-2005 school year using the same detailed revenue and expense categories broken out by sport[4]. To our knowledge, this is the most recent data available that allows us to examine the actual components of total revenue and total expense, which are each used in the models. The data used in this study from Equity in Athletics, which includes many more years and schools but much less depth in expense and revenue sources, mirrors the basic patterns found from the 2004 detailed data discussed below.

In Figure 3, we examine the variation in football revenue across conferences. Admittedly, this data represents only a single season (2004), and many teams have since changed conferences, but this does provide an excellent insight into collegiate athletic financing. The percentages of revenue from each source are generally similar across conferences. Ticket sales, guarantees, and contributions to the football program account for the lion's share of the revenue. Large differences exist, though in conference distributions, media rights, licensing, advertising and sponsorships, with the largest and most powerful institutions capitalizing on the brand power of their football programs.

[Figure 3]

Generally, the average percentage of the athletic budget devoted to football expenses is very similar across conferences even as the average percentage of the athletic revenues from football varies dramatically. Using the 2004 data, we observe that the highest average expense per team is the Big Ten conference, which averaged expenses only 4.5 times that of the lowest

[3] http://www.usatoday.com/sports/college/ncaa-finances.htm Accessed August 2011.

[4] http://www2.indystar.com/NCAA_financial_reports/ Accessed August 2011.

expense per team conference, the Sun Belt. Compare this ratio with discrepancies in revenue as the average SEC revenue per team was 15 times the average for the Sun Belt conference.

In Figure 4, we examine what line items comprised expenses during the 2004 football season. As noted, expenses exhibit considerably less variation between conferences than revenue. In absolute terms, each university hands out roughly the same amount of student aid. While coaching salaries and support staff salaries vary significantly from conference to conference, they exhibit much less variation as a percentage of total expenses. Likewise, recruiting, team travel, equipment, and other operating expenses remain a relatively constant percentage of total expenses. In the next section we'll examine the determinants of football expenses to determine if football spending can impact performance on-the-field success.

[Figure 4]

Methodology and Results

To analyze the impact of football expenses ($FootballExp$) and coach compensation ($CoachComp$) on performance we make use of a two-stage methodology. In the first stage we predict the level of football expenses and coach compensation using relevant information about the institution and the coach characteristics collected before the beginning of the season. In the second stage we take the forecasted levels of spending as well as the residuals and determine the effect of spending on on-the-field success. This methodology was used first in Grossman and Levinsohn (1989) to econometrically separate predictable portions of economic variables from unpredictable portions.

Regressions for each measurement of spending are listed below.

$$FootballExp_{i,t} = \alpha + \beta_{\pi} FootballProfit_{i,t-1} + \beta_S Stadium_{i,t} + \beta_W CumWins_{i,t} + \beta_Y Year + \sum \beta_C I_C + \varepsilon_{i,t} \quad (1)$$

$$CoachComp_{j,t} = \alpha + \beta_{\pi} FootballProfit_{i,t-1} + \beta_S Stadium_{i,t} + \beta_W CumWins_{i,t} + \beta_E Seasons_{j,t} + \beta_F FirstYear_{j,t} + \beta_5 5YearWin\%_{j,t} + \beta_Y Year + \sum \beta_C I_C + \varepsilon_{j,t} \quad (2)$$

Institutional characteristics are denoted by the *i* subscript while coach characteristics are denoted by the *j* subscript. In the regression for football expenses we use a variety of institutional determinants including the program's profit from the previous year ($FootballProfit$), the size of the team's stadium which we use to approximate the fan base ($Stadium$), the cumulative number of wins by the institution to control for both longevity and historical success ($CumWins$), the year ($Year$) and a set of indicator variables for the conference that the school is associated with during that year (I_C). Football profit from the previous year could be derived from recent success (as better teams attain higher bowl payouts, increased financial support from fans) or denote competent, cost-effective administration. Additionally, the size of the team's fan base and the institution's history will likely impact their expenses.

In forecasting coach compensation we use all of the institutional information as well as coach characteristics including the coach's years of experience as a head coach ($Seasons$), an indicator variable equal to 1 when the coach is in their first year at a particular institution ($FirstYear$) and the winning percentage of the coach when acting as a head coach in the previous five years ($5YearWin\%$).

Descriptive statistics of these relevant variables can be found in Table 1. The total expenses of the program average $9.2 million while coach compensation (which includes all

compensation from the university and any outside sources) averages $1.1 million. The 5-year coach winning percentage is occasionally equal to one when the head coach acted as a head coach in a previous year perhaps for only one game[5].

[Table 1]

Regression results for Eq. 1 and Eq. 2 are displayed in Table 2 and Table 3 respectively. As shown in both tables we run a series of stepwise regressions. Both the coach compensation and football expenses are highly related to the profitability of the program in the previous year. An additional $1 million of profit from the previous year translates into $187,000 of additional compensation for the coach and $121,000 of additional football expenses (Estimates taken from Reg. 4 of both tables). This relationship is very important as the most profitable teams are able to successfully reinvest revenues in the football program and outspend their peers on head coaches, assistant coaches, recruiting, and program fundraising, which all are thought to be associated with future success.

The simplistic model in Reg. 2 performs quite well especially when compared to the model based on conference identity in Reg. 3. Even the inclusion of the conference dummy variables does little to improve the R-squared statistic in Reg. 4 relative to the model in Reg. 2. These results suggest that a few institutional characteristics account for most of the differences in spending between schools, while the association of a school within a conference plays a minor role. All models perform quite well as even the most simplistic formulation, Reg. 1, produces an R-squared around 0.50. This R-squared statistic compares quite favorably to the model used in

[5]For example, Bo Pelini at Nebraska has a 100% winning percentage at the beginning of the 2008 season because he acted as interim head coach for one game when Nebraska won the 2003 Alamo Bowl.

Grant et al (2010) as the models examined herein include more observations with fewer explanatory variables.

[Table 2]

[Table 3]

Both coach compensation and football expenses are higher when the school has a larger stadiums (and larger fan bases) as well as when the program as a long history of success as denoted by C$umWins$. Coaches with a greater level of success in the past year also have higher salaries, however there's little evidence to suggest that coach experience is rewarded with higher pay as $Seasons$ is either insignificant or negatively significant. First year coaches may be paid substantially lower than the peers. Coaches are not rewarded for longevity, nor are there giant salaries for newly hired coaches. Instead, coaches are highly paid when they have a history of success and are employed by historically successful, profitable schools with a large fan base.

Using Reg. 4 we can split each measurement of spending into *predicted spending* and *unpredicted spending*. We are following the methodology used in Grossman and Levinsohn (1989) because we want to see what effect there may be from a seemingly unpredictable, seemingly exogenous shock to spending. Grossman and Levinsohn find that often it is the unpredictable effects, which they call "news", which impact other economic outcomes. In this study, we want to examine precisely the same thing. Does predictable spending, based on an institution's characteristics or coach's history, have any effect on the probability of winning? Or is there any effect when an institution spends an unpredictable amount, more or less, than their peers?

Predicted spending is defined as the forecasted level of football expenses and coach compensation from the Reg. 4 (the $X\hat{\beta}$) and unpredicted spending which is not based on the

institutional or coach characteristics (the respective ε from Eq. 1 and Eq. 2). Thus, we have four different measurements of spending that are used to test if and what type of spending impacts success. One, predicted football expenses ($X\hat{\beta}$ from Eq. 1) notes the level of expenses that are typical for that type of institution. Two, unpredicted football expenses (residuals from Eq. 1) indicates an institution that invests more heavily, or less heavily, in their football program relative to their peer institutions. Three, predicted coach compensation ($X\hat{\beta}$ from Eq. 2) details the level of compensation that a coach would receive on average compared to their peers. Four, unpredicted coach compensation (residuals from Eq. 2) indicates when the coach is underpaid or overpaid relative to their peers.

We include predicted spending and unpredicted spending for coach compensation and football expenses separately. As might be expected from Table 2 and Table 3, coach compensation and football expenses are highly correlated. The predicted coach compensation ($PredCC$) and predicted football expenses ($PredFE$) have a correlation coefficient of 0.93 while the unpredicted coach compensation ($UnpredCC$) and unpredicted football expenses ($UnpredFE$) have a correlation coefficient of 0.38. Meanwhile, both the unpredicted football expenses and unpredicted coach compensation have very small correlation coefficients with their predicted counterparts (0.018 and 0.035 respectively). Given the similar structure of the RHS variables in Eq. 1 and Eq. 2 the correlation between the predicted values of football expenses and coach compensation is not surprisingly. However, if we were to include both predicted spending values as independent variables to explain the probability of winning then we would introduce a potentially unstable level of multicollinearity. Because of the correlation between football expenses and coach compensation we use four separate regressions (Eq. 3, Eq. 4, Eq. 5 and Eq. 6) to test if spending impacts on-the-field success.

$$HomeWin_{ik,t} = \alpha + \beta_{PF} PredFE_{ik,t} + \beta_{SC} SchoolSeasonCatg_{ik,t} + \beta_{CW} CumWin\%_{ik,t} + \beta_{ME} MaleEnroll\%_{ik,t} + \beta_{CR} ClassRank_{ik,t} + \beta_{4Y} 4YearRecruits_{ik,t} + \beta_{PO} PrevPPG\_OC_{ik,t} + \beta_{PD} PrevPPG\_DC_{ik,t} + \beta_{PW} PrevWin\%_{ik,t} + \mu_{ik,t} \quad (3)$$

$$HomeWin_{ik,t} = \alpha + \beta_{UF} UnpredFE_{ik,t} + \beta_{SC} SchoolSeasonCatg_{ik,t} + \beta_{CW} CumWin\%_{ik,t} + \beta_{ME} MaleEnroll\%_{ik,t} + \beta_{CR} ClassRank_{ik,t} + \beta_{4Y} 4YearRecruits_{ik,t} + \beta_{PO} PrevPPG\_OC_{ik,t} + \beta_{PD} PrevPPG\_DC_{ik,t} + \beta_{PW} PrevWin\%_{ik,t} + \mu_{ik,t} \quad (4)$$

$$HomeWin_{ik,t} = \alpha + \beta_{PC} PredCC_{ik,t} + \beta_{SC} SchoolSeasonCatg_{ik,t} + \beta_{CW} CumWin\%_{ik,t} + \beta_{ME} MaleEnroll\%_{ik,t} + \beta_{CR} ClassRank_{ik,t} + \beta_{4Y} 4YearRecruits_{ik,t} + \beta_{PO} PrevPPG\_OC_{ik,t} + \beta_{PD} PrevPPG\_DC_{ik,t} + \beta_{PW} PrevWin\%_{ik,t} + \mu_{ik,t} \quad (5)$$

$$HomeWin_{ik,t} = \alpha + \beta_{UC} UnpredCC_{ik,t} + \beta_{SC} SchoolSeasonCatg_{ik,t} + \beta_{CW} CumWin\%_{ik,t} + \beta_{ME} MaleEnroll\%_{ik,t} + \beta_{CR} ClassRank_{ik,t} + \beta_{4Y} 4YearRecruits_{ik,t} + \beta_{PO} PrevPPG\_OC_{ik,t} + \beta_{PD} PrevPPG\_DC_{ik,t} + \beta_{PW} PrevWin\%_{ik,t} + \mu_{ik,t} \quad (6)$$

Because the data set herein is so rich we can examine each individual game as opposed to a final ranking or win-loss record at the end of the season. By examining each game individually we will be able to assess how different spending decisions between home team *i* and away team *k* impacts the end result of the game. Because we are studying the outcome of the game between home team *i* and away team *k*, all RHS variables in Eq. 3, Eq. 4, Eq. 5 and Eq. 6 are the difference between the home team *i* and away team *k*. This is denoted in the subscript of each

RHS variable as *ik*. If the RHS variable is positive, then the home team's value will be greater than the away team's value. When the dependent variable is significantly associated with the probability of winning, then the dependent variable will be more likely to have the same sign as the independent variable. As such we can read a positive significant coefficient of any of the RHS variables as being related to a higher probability of winning.

We use a logistic model (the LHS variable is equal to 1 when the home team *i* wins) with robust standard errors to examine the marginal effects of spending as well as other pre-season indicators. The logistic model calculates marginal effects, operating differently from a typical logit model where only sign and significance can be interpreted. While a traditional two-stage methodology typically only makes use of the predicted values from the first stage, we choose to use both the estimated values as well as the residuals. As noted, we make use of the residuals to draw a distinction between levels of spending that are consistent with peers (the predicted values) and the levels of spending that violate normal values of other institutions (the unpredicted values). Because of this distinction we can test for causation, not merely correlation, with the predicted values of spending *and examine how abnormal patterns impact on-the-field performance.* It may be that higher pay increases recruit quality (Farmer and Pecorino, 2010), but do aspirant salaries, which are greater than those typically offered by the school's peers, increase on-the-field success? By examining the residuals of spending we can determine if aspiring schools, which pay higher salaries and have greater football expenses relative to their peers, have more on-the-field success.

Additional control variables are included in Eq. 3, Eq. 4, Eq. 5 and Eq. 6. $SchoolSeasonCatg$ indicates the number of years the team has had a Div. 1A football team[6]. $CumWin\%$ represents the team's cumulative winning percentage over the history of the program. $MaleEnroll\%$ is the percentage of the student body that is male[7]. $ClassRank$ is the rank of last year's recruiting class according to Rivals.com to account for player quality[8]. $4YearRecruits$ is the total number of recruits over the last four years according to Rivals.com[9]. $PrevPPG\_OC$ are the points per game scored by the offensive coordinator's team in the previous year and $PrevPPG\_DC$ are the points allowed per game by the defensive coordinator's team in the previous year. Lastly, $PrevWin\%$ is the team's winning percentage from the previous year. As noted above, these variables are the difference between home team *i* and away team *k*. Results for Eq. 3, Eq. 4, Eq. 5 and Eq. 6 are given in Table 4. Because we use a logistic model we are attempting to calculate the marginal effect. Coefficients equal to 0 denote no marginal effect, while a coefficient greater than 0 denotes a positive effect and a coefficient less than 0 denotes a negative effect.

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[6] We make use of categorical values of the school's history because arguably there is more difference between two teams with 20 and 10 year history than if the two teams have 110 and 100 years of history. A team records a value of 1 if the program has less than 30 years of history, 2 if the program has 31-75 years of history, 3 if the program has 76-100 years of history and 4 if the program has more than 100 years of history.

[7] There are two reasons to use this variable. One, schools that do a better job at recruiting male students may also be better at recruiting male football players. Two, male students may be more likely to attend schools with good football programs (aka "the Flutie effect") so that the variable may also account for recent success.

[8] Player quality was found to impact success in both Herda et al (2009) and Langlett (2003).

[9] Schools with a large number of recruits may be reliant on transfers or are unable to turn older recruits into starting players for some reason. Older recruits may transfer away, drop out of school, become ineligible, lose their scholarship for disciplinary grounds or a variety of other reasons.

[Table 4]

As shown in Table 4, the predicted football expenses are not significantly related to on-the-field success but unpredicted football expenses are associated with a greater probability of winning. Specifically, increases in football expenses are only associated with success when the increased expenses are exogenous, unrelated to the institution's history and characteristics. An example of Oklahoma State provides some anecdotal evidence of how such exogenous shocks can affect the football program. At the end of the 2005 season Boone Pickens, a billionaire alumnus of Oklahoma State University, began a series of donations to his alma mater, with a considerable percentage of the money earmarked for athletics. The football expenses for Oklahoma State University were $8.1 million in 2005 but had reached $15.4 million in 2009; this 90% increase in expenses dramatically outpaced the 29% average increase observed across the rest of the Big 12 conference. The 2000-2005 winning percentage for Oklahoma State University was 49% but the 2006-2009 winning percentage was 66%. These donations and the ensuing increases of football expenses at Oklahoma State University can be seen as an exogenous, unpredictable event. The coefficient estimates of our model suggest that an additional, unpredictable $1 million increase in football spending improves the probability of winning an individual game by 3.5% - 7.0% (from the 95% confidence interval).

Although coach compensation levels have no statistically significant impact on the probability of winning, this is not to suggest that coach pay has no relationship with coach quality. As shown in Table 3 coaches with a better winning percentage in the last 5 years receive higher compensation. Coach compensation appears to be a reward for past success but it is not indicative of future success according to the results in Table 4. For example, in 2007 Navy replaced outgoing head coach Paul Johnson who won 60.8% of his games during his 2002-2006

tenure. During the 2006 season, Paul Johnson was paid over $1 million while the replacement coach, Ken Niumatalolo, was hired for a salary less than $500,000. At the end of the 2010 season Ken Niumatalolo's winning percentage was 67.5%, besting his more highly paid predecessor.

To check for the robustness of the relationship between football expenses and winning as well as coach compensation and winning we include an additional regression specification which incorporates the Vegas line. The Vegas line is a market based forecast of the margin of victory and winner of a given game, set by gamblers and casinos. The efficient market hypothesis would suggest that the Vegas line would take account of all available information related to the expected performance of each team. By including the Vegas line into the model we can theoretically control for all other factors that may impact the outcome of the game. The inherent drawback to including the Vegas line is that its inclusion does not give any information about *why* one team may have an advantage over another.

When the Vegas line is included many variables which had been statistically significant in the previous specification become statistically insignificant or less significant. This change is expected as the Vegas line should incorporate all available information affecting the outcome of the game. Yet, the coefficient on the unpredicted expenses remains statistically significant, though the estimated coefficient has decreased. In the Vegas line specification an additional aspirational $1 million in expenses increases the probability of winning any particular game by 1.7% - 5.2% based on the 95% confidence interval.

Conclusion

These results suggest that college football coach salary has no impact on the probability of winning though having an aspirationally high budget can improve on-the-field performance. Coaches receive a high salary because of past performance but this is not indicative of future performance which implies that if institutions were to reduce their expenditures on coach salary then there would be little statistically significant impact on the success of the team. Instead, administrators of college football programs can better encourage success by increasing the available budget of the football team. As noted in Table 2, football expenses are remarkably predictable across different schools; if the football budget is increased by an ambitious $1 million then our estimates would suggest a 3.5% - 7.0% increase in the probability of winning any particular game.

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Table 1
Descriptive Statistics for Eq. 1 and Eq. 2

	Obs.	Mean	Median	Std.Dev.
FootballExp (millions)	1148	9.22	7.99	5.41
CoachComp (millions)	558	1.10	0.97	0.84
FootballProfit (millions, 1 year lag)	1287	5.08	0.19	9.70
Stadium (thousands)	1287	53.02	50	22.13
CumWins	1287	483.02	476	138.34
Seasons	1287	8.24	6	7.63
FirstYear	1287	0.08	0	0.27
5YearWin%	1287	0.54	0.56	0.18

Table 2
Determinants of Football Expenses – Eq. 1

	Reg. 1	Reg. 2	Reg. 3	Reg. 4
FootballProfit (millions, 1 year lag)	0.330** (0.016)	0.089** (0.016)		0.122** (0.015)
Stadium (thousands)		0.107** (0.006)		0.053** (0.006)
CumWins		0.00763** (0.00075)		0.00544** (0.00069)
Year	0.554** (0.040)	0.695** (0.032)	0.796** (0.036)	0.675** (0.029)
Constant	-1102** (80.5)	-1393** (64.3)	-1586** (72.2)	-1350** (57.6)
Conference Indicators?	No	No	Yes	Yes
R-squared	0.5384	0.6797	0.6306	0.7508
Observations	1148	1148	1148	1148

Note: Robust standard errors are given in parenthesis. Significance at the 5% level and 10% level is denoted by ** and * respectively.

Table 3
Determinants of Coach Compensation – Eq. 2

	Reg. 1	Reg. 2	Reg. 3	Reg. 4
FootballProfit (millions, 1 year lag)	0.050** (0.003)	0.018** (0.005)		0.019** (0.005)
Stadium (thousands)		0.014** (0.002)		0.009** (0.002)
CumWins		0.00039** (0.00018)		0.00015 (0.00017)
Seasons		-0.00640 (0.00429)		-0.00597* (0.00357)
FirstYear		-0.157** (0.061)		-0.110** (0.058)
5YearWin%		1.182** (0.148)		1.182** (0.146)
Year	0.067** (0.013)	0.103** (0.012)	0.099** (0.014)	0.105** (0.012)
Constant	-134** (25.8)	-207** (25.1)	-198** (28.2)	-211** (24.3)
Conference Indicators?	No	No	Yes	Yes
R-squared	0.5108	0.6388	0.4829	0.6967
Observations	558	558	558	558

Note: Robust standard errors are given in parenthesis. Significance at the 5% level and 10% level is denoted by ** and * respectively.

Table 4
Determinants of Winning

	Eq. 3	Eq. 4	Eq. 5	Eq. 6
PredCoachComp (millions)	-0.00015 (0.003)			
UnpredCoachComp (millions)		-0.0008 (0.007)		
PredFootballExp (millions)			-0.0032 (0.005)	
UnpredFootballExp (millions)				0.0511** (0.008)
SchoolSeasonCatg	0.00419 (0.023)	-0.0029 (0.038)	0.00587 (0.023)	0.0108 (0.023)
CumWin%	1.287** (0.340)	0.759 (0.546)	1.335** (0.341)	1.667** (0.334)
MaleEnroll%	1.338** (0.418)	1.500** (0.727)	1.345** (0.421)	1.419** (0.409)
ClassRank	-0.0155** (0.001)	-0.0161** (0.002)	-0.0156** (0.001)	-0.0145** (0.001)
4YearRecruits	-0.0042* (0.003)	-0.0018 (0.003)	-0.0043* (0.003)	-0.0024 (0.002)
PrevPPG_OC	-0.0183** (0.005)	-0.0142** (0.007)	-0.0182** (0.005)	-0.0159** (0.004)
PrevPPG_DC	0.00553 (0.004)	0.0103* (0.006)	0.00494 (0.004)	0.00549 (0.004)
PrevWin%	1.891** (0.127)	1.782** (0.226)	1.898** (0.127)	1.831** (0.125)
R-squared	0.1529	0.1447	0.1534	0.1572
Observations	6,129	2,438	6,097	6,381

Note: Robust standard errors are given in parenthesis. Significance at the 5% level and 10% level is denoted by ** and * respectively.

Table 4 (continued)
Determinants of Winning

	Eq. 3+	Eq. 4+	Eq. 5+	Eq. 6+
PredCoachComp (millions)	-0.00334 (0.003)			
UnpredCoachComp (millions)		-0.0045 (0.007)		
PredFootballExp (millions)			-0.0074 (0.005)	
UnpredFootballExp (millions)				0.0340** (0.009)
VegasLine	0.109** (0.004)	0.0972** (0.007)	0.108** (0.004)	0.107** (0.004)
SchoolSeasonCatg	0.00266 (0.025)	0.0109 (0.040)	0.00405 (0.025)	0.00259 (0.025)
CumWin%	0.386 (0.368)	0.224 (0.576)	0.407 (0.368)	0.577 (0.360)
MaleEnroll%	0.559 (0.451)	0.581 (0.761)	0.548 (0.454)	0.627 (0.441)
ClassRank	-0.0026* (0.001)	-0.0035 (0.002)	-0.0028* (0.001)	-0.0021 (0.001)
4YearRecruits	-0.00222 (0.003)	-0.001 (0.004)	-0.0023 (0.003)	-0.0007 (0.003)
PrevPPG_OC	-0.00614 (0.005)	-0.0069 (0.008)	-0.006 (0.005)	-0.004 (0.005)
PrevPPG_DC	-0.00578 (0.005)	-0.0043 (0.007)	-0.0064 (0.005)	-0.0046 (0.004)
PrevWin%	0.181 (0.153)	0.438* (0.253)	0.182 (0.154)	0.14 (0.150)
R-squared	0.2529	0.2222	0.2532	0.2541
Observations	6,068	2,438	6,038	6,322

Note: Robust standard errors are given in parenthesis. Significance at the 5% level and 10% level is denoted by ** and * respectively.

Figure 1

Coach Salary (from highest paid to least paid)

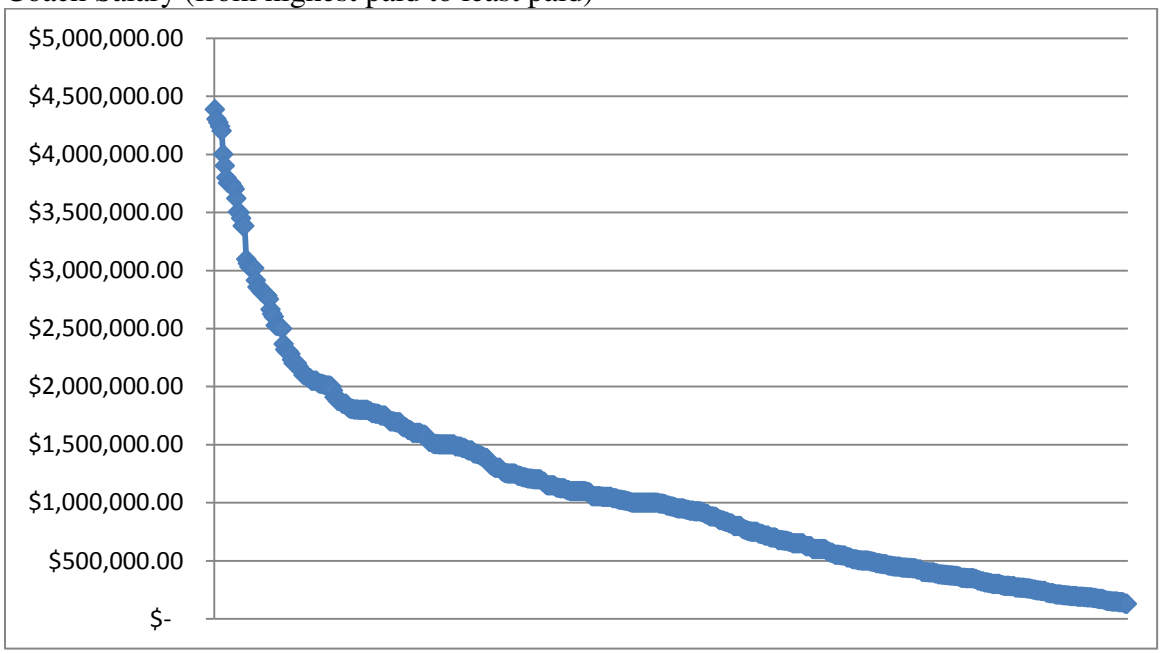


Figure 2
Football Expenses (from highest spending to lowest spending)

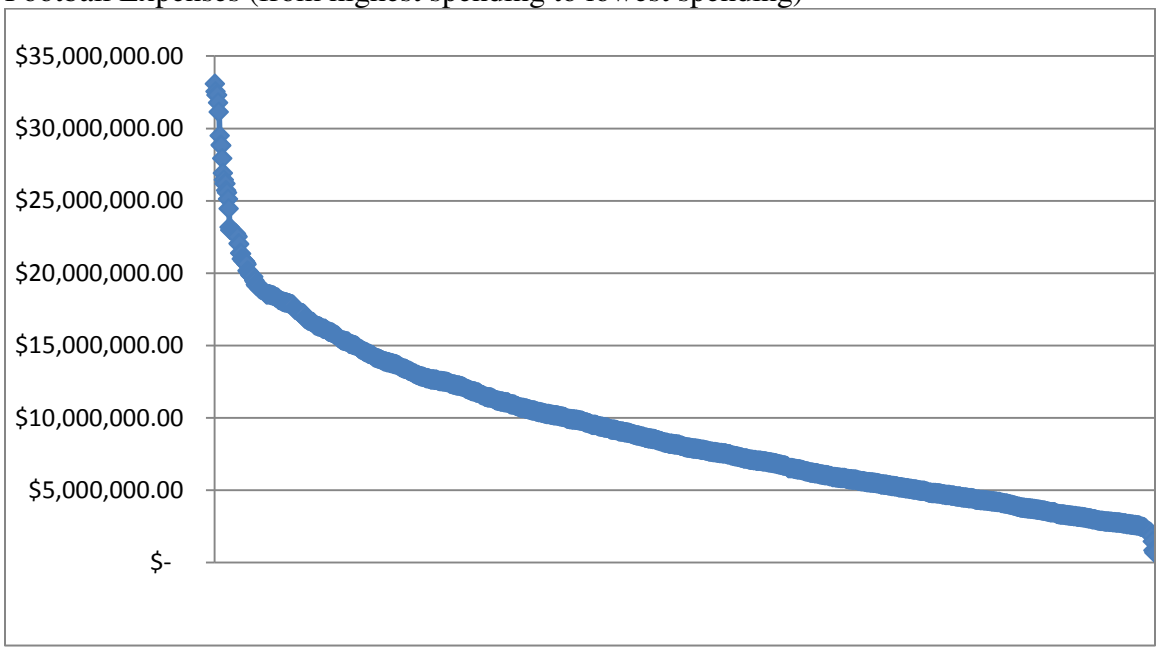
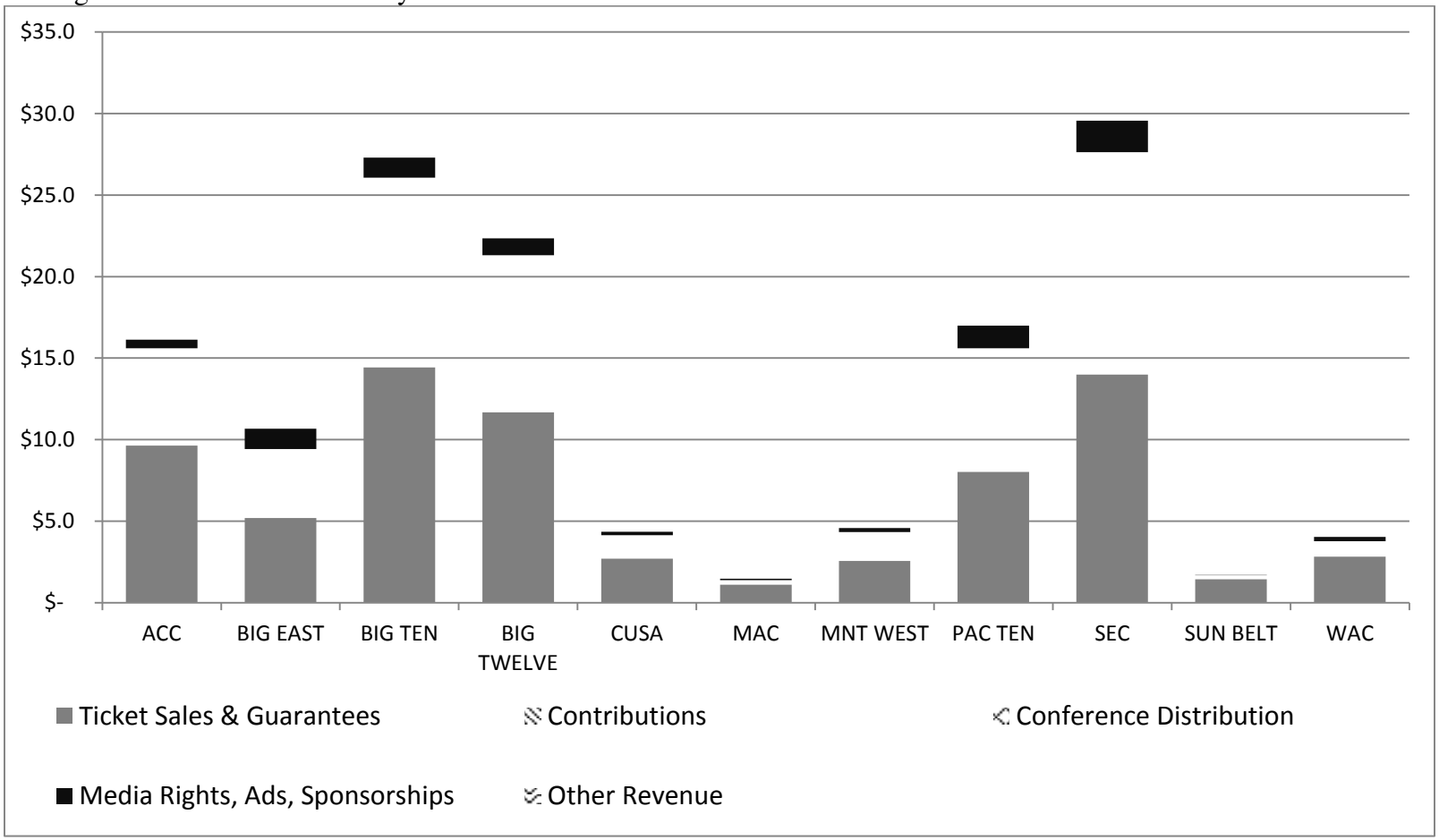
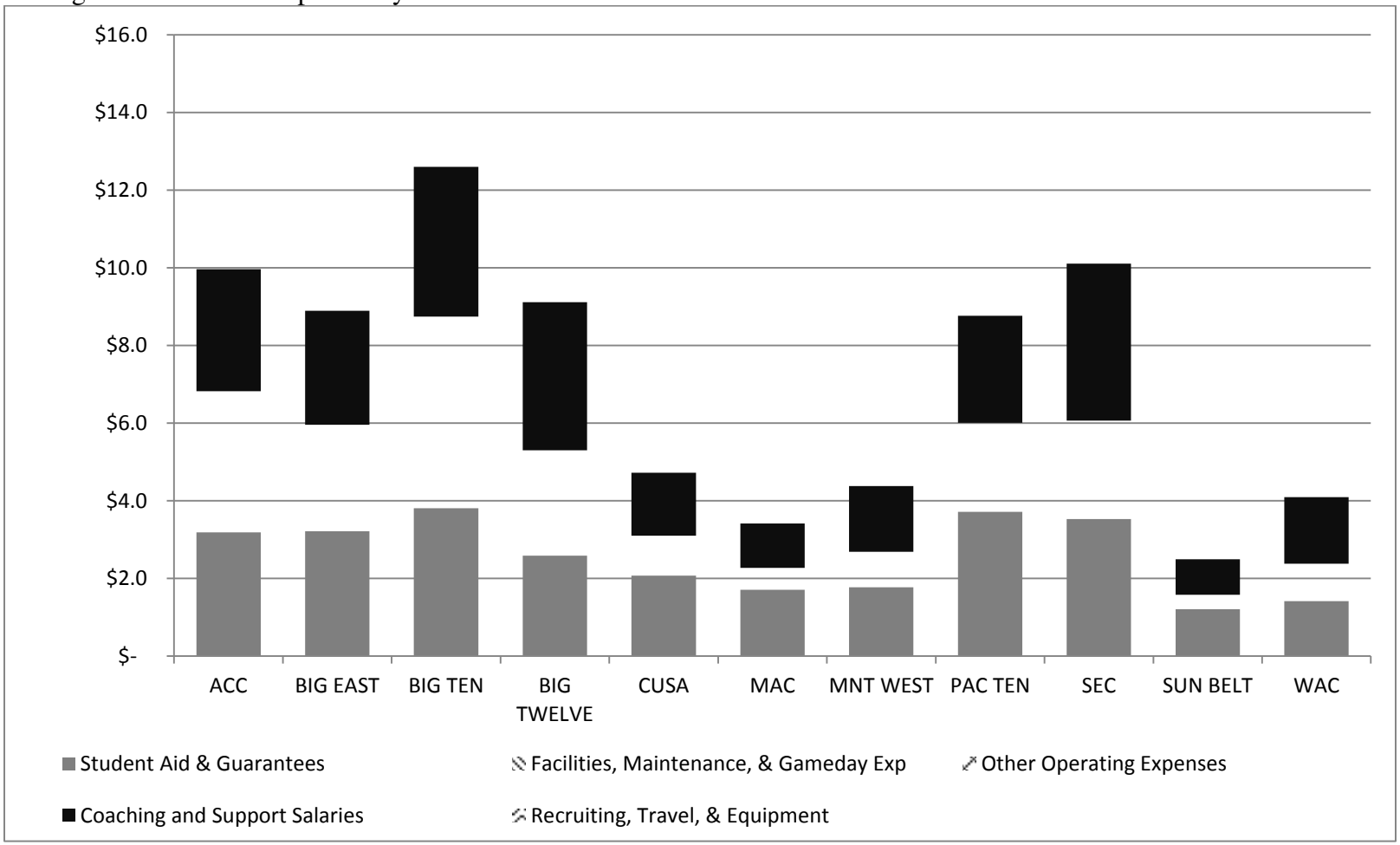


Figure 3
Average 2004 Football Revenue by Conference and Source



Note: Other Revenue includes the following line items: Student Fees, Third Party Support, Government Support, Direct Institutional Support, Indirect Institutional Support, Concession Sales, Sports Camps, and Investments. Not all institutions are included in the calculation due to data limitations.

Figure 4
Average 2004 Football Expenses by Conference and Source



Note: Other Operating Expenses include the following line items: Severance packages, Promotion, Sports Camps, Spirit Groups, Indirect Institutional Support, Medical, and Memberships expenses. Not all institutions are included in the calculation due to data limitations.