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Just Win Baby? Determinants of NCAA Football Bowl Subdivision Coaching Compensation

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Abstract

The paper estimates the key determinants of compensation for head football coaches in the NCAA's Football Bowl Subdivision (the former D-IA) during the years 2006-2010. Coaching compensation is regressed on variables capturing a coach's personal characteristics, productivity, and institutional characteristics. The results yield seven important explanatory variables. Four are coach specific: BCS ranking, recruiting success, lifetime winning percentage, and years of experience. The remaining three are institutional: football revenue, enrollment, and graduation rate. No estimate of a compensation function for a head football coach has appeared previously in the literature.

Keywords: NCAA, coaching compensation, Football Bowl Subdivision

Introduction

In 2010, head football coaches Nick Saban (Alabama), Mack Brown (Texas), and Bob Stoops (Oklahoma) earned $5.2, $5.1, and $4.2 million, respectively. Average annual pay for the approximately 120 NCAA Football Bowl Subdivision (hereafter FBS) football coaches was $1.36 million, with roughly one-half of the coaches earning at least one million dollars. High coaching salaries have long been a contentious issue in college athletics (Sperber, 1990; Zimbalist, 1999), yet the last decade has seen increased attention paid to coaching salaries by the general population, the media, and the NCAA itself. Coaching salaries are a frequent topic in the *Chronicle of Higher Education* (see, for example, Brainard, 2009). Journalist Mark Yost, who writes about college sports for *The Wall Street Journal* and other news publications, devotes a book chapter to salaries in *Varsity Green*, his recent critique of the college sports industry. Even *Parade* magazine, an insert in many Sunday newspapers across the United States, touched on the issue ("Are college coaches overpaid", 2008).

This skepticism is somewhat reminiscent of the vitriol that has been directed toward CEO pay and, more recently, compensation for Wall Street investment bankers. It is further fueled by the increased scrutiny of athletics spending by colleges and universities and how those expenditures are financed (e.g., Berkowitz et al., 2010), particularly during an era of persistence macroeconomic malaise and strained state government budgets. It has even been suggested that the NCAA itself should seek partial exemption from antitrust laws to enable it to regulate coaching salaries and promote the overall fiscal sustainability of college sports (Zimbalist, 2010).

This paper does not seek to resolve this controversy, but rather to investigate the underlying question of what factors determine coaching compensation. Economic theory and the rhetoric of academic institutions suggest that key factors include winning games, attending bowl games, recruiting top athletes, and guiding student-athletes to academic success. We interrogate this question empirically by examining the compensation of football head coaches from 2006 to 2010, from the six elite FBS conferences: the ACC, Big East, Big Ten, Big 12, Pac-10, and SEC. Our results suggest that four coach-specific variables: BCS ranking, recruiting success, lifetime winning percentage, and years of coaching experience; and three institutional variables: football revenue, enrollment, and graduation rates, are important determinants of college football coaching compensation.

The starting point for our investigation is marginal revenue product (MRP). Economic theory predicts that in well-functioning markets with good information, inputs (in this case college football coaches) will receive no more in compensation than their contribution to program revenue (their MRP). As of June 2009, revenues generated by the football programs at Oklahoma, Alabama, and Texas comprised 52, 62, and 63% of total athletic department revenue, respectively. Bowl games and broadcasting rights create significant streams of income for FBS institutions like Texas. In 2011, the FBS share of the BCS payout was $145.2 million, with $21.2 million going to the Big 12. These income streams are predicated on a successful (winning) football program, and a winning program requires a million-dollar coach.

Coaches are paid based on their expected marginal revenue product, and a coach's marginal revenue product depends both on his productivity, and how much revenue is generated from his contribution to output. The question is how to measure these contributions. Winning seems the obvious answer, for several reasons. It is an unambiguous and readily available performance measurement. A football game is zero-sum and, all else equal, a coach with a record of 10-2 is more productive than someone with a record of 2-10. Winning translates into increased revenue for the university. While the evidence is mixed, the conventional wisdom of athletic directors and other university administrators is that a successful football program will increase attendance and related game-day revenues and will generate valuable publicity in the local newspaper and other media outlets. Contributions by boosters and alumni and the value of broadcasting rights may increase, as well as sales of team and university merchandise like hats and sweatshirts. And it may also result in increased undergraduate applications (the Flutie effect) and an increase in the average quality of applicants. Expectation of these outcomes may contribute to higher coaching salaries, even if these anticipated benefits are never realized.

While we anticipate that winning is the primary driver of compensation, there are additional factors that may influence how much a university is willing to pay its head coach. The university may value other characteristics of the coach such as academic performance (as reflected by team GPA and graduation rates). It may also take into consideration the number of years of experience of the coach, race, lack (or preponderance) of NCAA infractions, both major and secondary, and off-campus behavior (has he been arrested for a DUI; does he frequent strip clubs?). Most coaches are also expected to act as fundraisers; how well does the coach persuade alumni and boosters to contribute? Finally, to the extent that winning does matter, related indicators like recruiting ability and post-season appearances come into play.

Our hypothesis is that among FBS programs, the most important determinant is winning. While this may seem like a banal assertion, it has important implications. Many institutions claim their choice of coach goes beyond winning. A coach is chosen not only because of his on-field performance of his team, but because he is person of good character and integrity who emphasizes classroom success of his players. In other words, the coach upholds the core principles of the NCAA: education and amateurism.

Rhetoric about academic goals does not hold up to close scrutiny, at least not anecdotally. For example, former Notre Dame coach Tyrone Willingham was well-liked by his players and praised by athletic director Kevin White for the academic success of his players and for running a "clean" program. But that was apparently insufficient. White said, "[f]rom Sunday through Friday our football program has exceeded all expectations, in every way." However, "[w]e have not made the progress on the field that we need to make" ("AD cites," 2004). Willingham was fired in December 2004 after coaching the Irish for three seasons. His overall regular season record was 19-12.

In coaching contracts it is common to find a variety of performance-based incentive clauses (e.g., if the team meets or exceeds a specific graduation rate). But academic-based payments are trivial compared to bonuses based on winning. For example, Fish (2003) notes that Bob Stoops' contract with Oklahoma contains 10 performance-related bonus clauses ranging from $10,000 (if the team has a graduation rate of 70% or better) to $150,000 (if the team is declared the national champion). Ex-coach Bobby Bowden of Florida State University earned in excess of $2 million a year and qualified for a meager $16,000 bonus based on his team's graduation rate.

Literature Summary

Little has been written about coaching salaries in intercollegiate athletics. Fort's (2010) list of the academic literature on coaching and coaching efficiency includes four contributions only: Clement and McCormick (1989), and Fizel and d'Itri (1996, 1997, 2004). Only Clement and McCormick address—albeit tangentially—coaching compensation. To this list we add Farmer and Pecorino (2008), Holmes (2011), and two non-peer-reviewed publications: Orszag and Israel (2009) and Zimbalist (2010). Orszag and Israel, and Zimbalist address coaching salaries empirically.

Clement and McCormick (1989) consider the factors that make a college basketball coach successful by regressing winning percentage on the decision by the coach to allocate playing time. Over half of the variation in the allocation decision is determined by player productivity (e.g., shooting percentage, assists, blocked shots). Coaches who do a better job in allocating minutes according to player skills produce higher winning

Table 1. Variable Definitions

Variable	Definition	Source
Salary	Base salary, deferred payments, annuity payments, payments based on ticket revenue, contractual expense accounts, housing allowances, etc.	*USA Today* (http://www.usatoday.com/sports/graphics/coaches_contracts07/flash.htm)
Other Income	Income from other agreements, e.g., shoe and apparel contracts, media related income, public appearances, summer camps	*USA Today* (http://www.usatoday.com/sports/graphics/coaches_contracts07/flash.htm)
Total Compensation	Salary plus other income, not including value of perks, standard university benefits, and one-time pay such as signing bonus and other bonuses related to performance goals	*USA Today* (http://www.usatoday.com/sports/graphics/coaches_contracts07/flash.htm)
Winning percentage lifetime	Lifetime winning percentage as head coach	College Football Data Warehouse (http://www.cfbdatawarehouse.com)
Winning percentage lagged	Winning percentage for previous season	College Football Data Warehouse (http://www.cfbdatawarehouse.com)
Experience	Total years as head coach as of contract year	Wikipedia (http://www.wikipedia.com) for each coach
Bowls per year	Total bowl appearances divided by years as head coach	Wikipedia (http://www.wikipedia.com) for each coach

Table 1. Variable Definitions, continued

Variable	Definition	Source
BCS bowls per year	Total BCS bowl appearances divided by years as head coach (from start of BCS system)	Wikipedia (http://www.wikipedia.com) for each coach
BCS rank	Points in *USA Today* coaches' postseason poll	USA Today Coaches' Poll (http://espn.go.com/college-football/rankings)
APR	NCAA Academic Progress Rate, averaged since 2002	NCAA Division I Head Coach APR Porfolio (http://web1.ncaa.org/coachAprSearch/)
Recruiting	Scout.com recruiting points, averaged for five previous seasons	Scout.com (http://recruiting.scout.com/)
Enrollment	Total undergraduate enrollment	Common Data Set for each school
Applications	Total number of undergraduate applications	Common Data Set for each school
Admits	Total number of applications accepted for admission	Common Data Set for each school
SAT & ACT	Average SAT and ACT scores for entering freshmen	Common Data Set for each school
Graduation rate	Six-year graduation rate for most recent cohort	Common Data Set for each school
Football revenues	Institutional revenue attributable to football program	US Department of Education, Office of Postsecondary Education, Equity in Athletics Data Analysis Cutting Tool (http://ope.ed.gov/athletics/)

percentages. In a footnote to their paper, Clement and McCormick note that coaching salary data was available for a bit less than one half the coaches in their sample. For this sub-sample they regressed salary on winning percentage and found a statistically significant relationship that suggests that a 10% boost in winning percentage increases salary by a roughly equivalent amount. We take a similar approach, regressing salary on both lifetime and lagged winning percentage.

Farmer and Pecorino (2008) analyze football coaching salaries from a strictly theoretical perspective. They develop a contest-for-rents model in which the monopsonistic rents produced in the labor market for athletes are dissipated in the form of higher salaries for coaches. Without price competition in the labor market, schools cannot compete for talent directly and student-athletes only receive their opportunity cost (in the form of the scholarship). Instead, schools compete for talent indirectly by attempting to hire the coach who will attract the top talent. The coach becomes the beneficiary of competition among schools as rents are redirected toward his salary. One implication of this model for our study is that an important determinant in coaching salary is recruiting ability, a factor we include in our model. Another interesting implication of the paper, which we do not test for, is that the competition for coaches by institutions can lead to over-dissipation of rents, an idea well established in the rent-seeking literature (Tollison, 1982).

Orszag and Israel (2009) and Zimbalist (2010) regressed winning percentage on football coaching salaries and were unable to find evidence that salaries had a positive and significant impact on winning percentage. Our model reverses this causal relationship to determine the effect winning has on total compensation.

We recognize that coaching salaries may be discussed elsewhere and we extend our literature review to articles concerning donations to the athletic department and university, and articles on discrimination. There are numerous contributions of the former; Fort (2010) lists 18 papers. We refer the reader to Frank (2004) for a useful summary of this literature. There is overlap between the donations literature (e.g., Humphreys and Mondello, 2007; Stinson and Howard, 2007) and this study. Both papers include athletic success as an explanatory variable and donations as the dependent variable while the focus of this study is coaching compensation (to which donations may be an explanatory variable).

Discrimination is another area of the college sports literature where discussion of coaching salaries may appear; Fort (2010) lists eight papers, of which two consider coaching salaries. Of these, the most relevant is Humphreys (2000); we also add Brook and Foster (2010).

Humphreys (2000) examines salary differentials between Division I male and female women's basketball coaches in 1990-1991 to determine if they are attributable to gender. He also compares salaries for the head coaches of men's and women's teams. Gender is not found to explain these differentials, rather coaching performance, years of experience, institutional specific characteristics, and, additionally, for men's teams, preferences of the athletic director and possibly customer discrimination.

Brook and Foster extend Humphreys' research and examine female and male head coaching salaries at Division I institutions in 2004-2005 to determine the extent to which differences in compensation reflect gender discrimination. Their results suggest pay differences are attributable to dissimilar labor markets, notably the considerably

larger revenue streams generated by men's basketball. While they focus on a different sport than we do, our papers use a similar dependent variable as well as winning percentage and a proxy for strength of schedule as explanatory variables.

An input's compensation is associated with its marginal revenue product, but sports economists are particularly aware that marginal revenue product is influenced by the cartel-like market structure of the NCAA. Fleisher, Goff, and Tollison (1992), Zimbalist (1999), and Kahn (2006) provide empirical, historical, and theoretical support for the cartel perspective. One outcome of the NCAA cartel is that it creates rents for its member institutions. Some of these rents come from the monopsonistic labor market created by the cartel. There is no legal price competition for college athletes and the NCAA mandates and enforces price controls in the form of athletics scholarships. Since premier college athletes are not paid their marginal revenue product, there are significant rents left over and coaches may be adept at capturing a portion of them (Humphreys, 2000). In professional sports a franchise devotes about 50-60% of its budget to player payroll; at an average FBS school the student-athletes receive only 16% in scholarships while 32% goes towards salaries and benefits for athletic department coaches and staff (Knight, 2009, 10).

The Model

Our model attempts to explain total annual compensation for head coaches at the six BCS conferences for the five years from 2006 to 2010. As defined in Table 1, total compensation includes salary plus other income (with a few minor exceptions). Our definition follows that provided by *USA Today* which is the source of the compensation data. A coach's compensation is assumed to be a function of his marginal revenue product at that institution, which in turn is a function of both marginal product (e.g., their ability to increase the team's winning percentage) and marginal revenue (e.g., the increase in ticket sales as a result of a higher winning percentage). Based on this, we identify four related sets of influences on coaching salaries. The first is market structure, which was discussed in the prior section of the paper. While all coaches work in a market where monopolistic and monopsonistic powers exist, the degree of power and its effect may vary across schools and over time. The inclusion of fixed-effect dummies by school and year should capture these differences. The second is a vector of personal and productivity characteristics of the coaches, such as experience and winning percentage. The third includes institutional characteristics, both academic and financial. Finally, we believe there are other qualitative factors that could account for considerable unexplained variation. These difficult-to-proxy-for variables include risk aversion, the winner's curse, old boy networks, ratcheting and winner-take-all markets. While some of these effects may be partially captured by our independent variables, such as increasing coefficients for the year dummies over time, most are not.

The general form of the model follows the earning equation used by Humphreys (2000),

$$W_{ij} = \beta X_i + \gamma Z_j + \eta_{ij},$$

where W_{ij} is the real total compensation of head coach i at institution j, X_i is the vector of personal and professional characteristics of head coach i, Z_j is the vector of academic and financial characteristics of the institution employing the coach, and η_{ij}

represents the unobservable equation error that may reflect the qualitative factors noted above. Because we use panel data, we include both school and year dummies.

Total compensation is used rather than base salary because the latter is often only a small proportion of the former. Non-salary income, for example apparel contracts, media and personal appearances, and summer camps, is usually specified in the contract and either paid or guaranteed by the university or its athletic foundation. Given the sensitivity of some university constituents to coaching salaries vis-à-vis other employees, non-salary compensation allow universities to keep the stated salary more in line with the salaries of non-coaching personnel.

Within the vector of personal and professional characteristics, we include the coach's years of experience, lifetime winning percentage, previous season's winning percentage (lagged winning percentage), frequency of bowl game appearances, BCS rank, recruiting success, and academic progress rate (APR) of athletes in the coach's program.

The a priori expectation is that years of experience will be positively correlated with coaching compensation. Experience may reflect greater accumulation of the human capital necessary to coach a team to success. With experience also come recognition and maturity that may capture some risk aversion and old boy network effects.

A positive sign is also expected on the coefficients for lifetime winning percentage, lagged winning percentage, bowl game appearances, and BCS rank. All of these measure coaching success, and theory would predict that greater coaching success would translate into greater fan willingness to pay and, in turn, a larger marginal revenue product for the coach. While they all measure on-field success, we recognize that their contributions to coaching compensation may vary.

Lifetime winning percentage measures overall career success and signals coaching ability to prospective employers. By looking over the span of the career, particularly for those who have coached for many years, it smoothes out the effects of unusually good or bad years that may result from factors outside a coach's control. This measure of coaching success is by itself not sufficient to explain coaching salaries. A high winning percentage at lower level (non-BCS) institutions may not translate into an ability to coach successfully at higher levels.

The previous season's winning percentage should also positively affect the current salary. Coaches with strong records in the previous season are more likely to attract bids from other institutions looking for a quality coach. Even if the coach is in the middle of a long-term contract, his current institution may offer increased compensation to secure loyalty, and in acknowledgement of the additional attention generated by recent success. The short-term perspective of the American media and fan base increases the likelihood that a recent winner will reap the rewards in the form of greater compensation.

Bowl appearances and BCS rankings (*USA Today* coaches' postseason poll) are expected to positively correlate with compensation. Generating a large number (or percentage) of wins is important, but as important in college football is gaining national recognition for program success. This recognition is most easily gained through post-season appearances. Leading teams to bowl games helps coaches signal the ability to produce wins that create additional revenue through bowl appearances and media attention. BCS rankings signal to an even greater extent the coach's ability

to put a team in the national spotlight. Those signaled abilities should generate greater compensation.

On-field success of coaches often depends on their ability to recruit top quality athletes. Recruiting nationally recognized high school athletes, even those that do not ultimately prove to be successful, generates excitement for a program. Apart from wins on the field, this "buzz" can promote revenue-generating ticket sales that justify greater compensation for the recruiting coach. Recruiting success, as measured by organizations such as Scout.com, is expected to positively correlate with compensation.

The final coaching characteristic expected to impact compensation is the team's academic progress rate (APR); however, there is uncertainty regarding the expected sign. On the one hand, some institutions pride themselves on academic quality and integrity, at least in rhetoric. All else equal, these institutions should therefore be willing to offer greater compensation to coaches who produce true scholar athletes. Recognizing that this rhetoric may simply be intended to assuage faculty and other constituents, and that limiting recruits to those with strong academic skills may limit winning potential, a negative sign for the APR variable would not be surprising.

We also collected data on the race of each coach and their history of major violations of NCAA bylaws. Unfortunately, the scarcity of minority coaches made it problematic to estimate the effect of race. With salary data unavailable for the University of Miami (Randy Shannon), our data set only included six black coaches accounting for just 12 observations over the years 2006-2010. Somewhat surprisingly, only two coaches had major violations that resulted in sanctions in the five years prior to the 2006 and 2007 seasons. Again, given the sample size we chose to omit these variables from the regression analysis. Access to data on minor violations is restricted to institutions by NCAA privacy policies.

We recognize that some of the personal and professional characteristics included in the model may be highly correlated with each other. Tests for multicollinearity are discussed in the results section.

Institutional characteristics may also exert a significant influence on coaching salaries apart from the attributes of a particular coach. These characteristics include the financially related variables of enrollment, revenue generated directly by the football program, tuition, and donations (restricted and unrestricted), and academic variables such as selectivity (admits/applications), graduation rates, and the average SAT/ACT scores of the student population.

We expect a positive sign on the coefficients for the financial variables. All of these variables should positively correlate with institutional revenue, a primary source from which university salaries are paid. These variables should also correlate positively with institutional prestige; to the extent this prestige is fueled by athletic success, schools should be more willing to pay coaches able to maintain or enhance the athletic record and reputation.

Institutions gain prestige and attract students through both academic and athletic success. Those that have less academic success rely more on athletic achievements to attract national attention. To that extent, we anticipate that measures of academic quality, graduation rates, and SAT scores will be negatively correlated with coaching compensation. Institutions with weaker academic records have greater incentives to distract current and prospective students with successful athletic programs. High-pro-

file coaches that can take teams to BCS bowls will raise the profile of the institution, and also help foster the "beer and circus" environment necessary to pacify undergraduates receiving a lower quality education.

Variable definitions and sources are reported in Table 1, and descriptive statistics in Table 2.

Table 2 – Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Dev.
Total comp	303	293,297	5,997,349	1,718,483	888,536
APR	292	874.5	997.0	942.4	20.1
BCS per year	297	0	1	0.11	0.19
BCS rank	279	0	1471.0	267.18	366.96
Bowls per year	298	0	1	0.60	0.32
Enrollment	312	4,332	56,562	22,640	9,172
Experience	320	1	45	10.81	8.49
Football revenue	317	4,856,257	93,942,815	28,883,107	16,580,000
Graduation rate	313	41	95	71.48	12.21
Lagged win %	295	0.000	1.000	0.592	0.204
Lifetime win %	295	0.083	1.000	0.591	0.150
Recruiting	293	30	4059	1466.29	821.37
SAT mean	274	1045	1420	1201.89	80.70

Valid N = 256

Results

The sample size was limited by the lack of compensation data for coaches at some of the private universities and a lack of past performance data (e.g., lifetime winning percentage as a head coach) for first year head coaches. For the 62 schools in the six BCS conferences, complete data was available for 256 observations out of a possible 372 over the five years.

The selection of a parsimonious set of independent variables was based on data availability and collinearity. For example, data on university donations restricted to athletics was not available for about one third of the schools. Rather than try different combinations of the independent variables and report the one that comes closest to our expectations, we examined the results of regressions using all 14 independent variables for evidence of collinearity. As suspected, eliminating one variable often caused the estimated coefficient for the other variable to become significant. For example, a school's average SAT score for incoming freshmen was correlated with its six-year graduation rate and its selectivity (the percentage of applications accepted for admission). Similarly, rank in the coaches' BCS poll was related to BCS bowl game appearances. This approach reduced the number of independent variables to 10.

We estimated regression models using both linear and log-linear specifications. The results were similar, and plots of the data do not suggest any obvious nonlinearity, so the discussion that follows will focus on the linear model. The results are reported in Table 3.

Table 3 –Regression Results for Total Compensation 2006-2010

	Linear	Log-linear
APR	–2873.708 (0.265)	–0.002 (0.115)
BCS rank	570.415 (0.002)***	0.000 (0.066)*
Bowls per year	-220546 (0.260)	–0.122 (0.282)
Experience	14357.237 (0.117)*	0.005 (0.309)
Recruiting	124.370 (0.075)*	1.674E-5 (0.677)
Winning % lifetime	1766346.125 (0.002)***	1.568 (0.000)***
Winning % lagged	154475.158 (0.441)	0.057 (0.626)
Football revenue	0.016 (0.003)***	5.189E-9 (0.098)*
Enrollment	–92.970 (0.018)**	–4.549E–5 (0.045)**
Graduation rate	–45025.612 (0.021)**	0.019 (0.096)*
2006	–379333.850 (0.003)***	–0.304 (0.000)***
2007	–355251.955 (0.001)***	–0.253 (0.000)***
2008	–185870.720 (0.043)**	-0.081 (0.054)*
2009	–11382.532 (0.881)	0.010 (0.823)
R Square	0.882	0.881
Adjusted R Square	0.837	0.835
Sample size	256	256

The probability of the null hypothesis that the variable has no effect is in parentheses.

Our initial regression results identified two observations with residuals larger than three standard deviations, Nick Saban at Alabama and Mack Brown at Texas, both for 2010. Both were paid more than predicted by the estimated equation. While these

observations also had large studentized deleted residuals and Cook's Distance values, this is a result of changes to the coefficients for those school dummies rather than the other independent variables. We chose not to omit those two observations.

To determine whether multicollinearity exists among the independent variables, tolerance values were calculated for each variable (excluding the school and year dummies). The smallest values were above 0.3, indicating that each variable is at least 30% uncorrelated with the other independent variables. Although not conclusive, this suggests that multicollinearity does not contribute to model instability.

The values of R-squared for the linear and log-linear models were 0.881 and 0.882, respectively. A linear model without the fixed-effect dummies, both schools and year, had an R-squared of 0.577. Based on the value of the F-statistics, we can conclude that at least one independent variable has an effect on compensation at the 0.1% level.

For the linear model, four coach-specific variables, years of experience as a head coach, BCS rank (average points in the previous five years of *USA Today* coaches' BCS polls), recruiting success (five-year average of the Scout.com measure of recruit quality), and lifetime winning percentage, were statistically significant. Three institutional variables, revenue for the football program, total undergraduate enrollment, and the school's most recent six-year cohort graduation rate, were also statistically significant.

With the exception of enrollment and graduation rates, all of the significant estimated coefficients were of the expected sign. Enrollment has a negative estimated coefficient. A larger school may have more financial resources but it may also have less incentive to use athletic success to increase student applications. The graduation rate has a positive estimate coefficient, which is contrary to the theory that schools use athletic success as a substitute for strong academic programs to recruit students, but would support the rhetoric that coaches are hired and rewarded for the academic success of their teams.

The estimated coefficients for the year dummies indicate a continuous upward trend in head coach compensation. The largest effects occurred in 2008 and 2009, with year-to-year increases of $169,381 and $174,488, respectively. The increases for 2007 and 2010 were just $24,081 and $11,382, respectively. This result is consistent with many factors, including increasing revenue from media contracts and the ratchet effect (including clauses guaranteeing some coaches a salary no lower than their highest-paid colleague).

The variables that were not statistically significant were the academic success of athletes (the coach's average Academic Progress Rate since the inception of the APR in 2002), lagged winning percentage, and the frequency of bowl appearances (appearances per year averaged for years coaching in the Football Bowl Subdivision). For those that believe that elite programs put more emphasis on success on the field than in the classroom, the first result would be expected. The lack of significance for the frequency of bowl appearances is more surprising, but this variable does not distinguish between major and minor bowls, an important distinction for elite programs.

For the log-linear model, years as a head coach and recruiting success were not significant and the signs of the coefficients were the same as for the linear model.

Conclusion

The purpose of our paper is two-fold: first, we analyze the primary influences on compensation for NCAA FBS head football coaches. Second, we test the hypothesis that the

most important influence on compensation is winning. We find that while win-loss record affects compensation, other factors also have a significant impact.

Winning percentage is statistically significant, with a 10 percentage point increase adding an estimated $175,000 to total annual compensation in the linear model. However, BCS ranking is also significant, and this suggests the relationship between winning and compensation may be more subtle than just counting wins and losses. Winning percentage is an absolute measurement that does not take into consideration the quality, or lack thereof, of opposing teams or the decisiveness of wins or losses. Two coaches may have similar lifetime or lagged winning percentages but may have faced opponents of vastly different quality (this is the point raised by Fizel and d'Itri for college basketball). Any evaluation of coaching success should also consider factors such strength of schedule and winning margins. One way to capture this is to use the BCS rankings.

Coaching success may also reflect input quality, which is why an explanatory variable like recruiting should also be included in the specification. Unlike the coach of a professional franchise, who relies on the general manager and front office to acquire talent, recruiting is one of the most important responsibilities of a college coach and it is expected, ceteris paribus, that he should be rewarded for signing the premier high school and junior college players.

Also, as indicated previously, there are other not-so-obvious influences on coaching compensation like risk aversion, the winner's curse, ratcheting, winner-take-all markets, and the old boy network (these are defined and discussed in Grant et al., 2008). These influences may be difficult to proxy for or, as with our years of experience variable, only imperfectly capture the effect of old boy networks. But even the inclusion of crude proxies may yield a higher R-squared.

In summary, to the best of our knowledge no estimate of a compensation function for a head football coach has appeared previously in the literature. While our results are a modest first attempt at such a function, they confirm that winning is important and yield additional explanatory variables, such as BCS ranking and recruiting success, that should form the building blocks of more refined estimations in the future.

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