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Pay and Performance: An Examination of Texas High School Football Coaches

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Abstract

Salaries paid to high school coaches and team managers have recently generated media and public debate over their justifiability. This research represents an earnings function estimation designed to identify salary determinants for high school football coaches. The theoretical model supporting the analysis builds on models presented in the sports economics literature. To conduct the empirical estimation, we used salary, human capital, performance, and institutional data for coaches of Class 4A and Class 5A 11-man high school football programs in Texas (*N* = 95). Our results indicate that the determination of overall coaching compensation is significantly affected by human capital investment, measured through experience; by job performance, captured in winning percentage; and by school characteristics, such as location and stadium size.

Pay and Performance: An Examination of Texas High School Football Coaches

Over the past decade, economic investigations of professional sports teams—particularly pay-for-performance studies—have become increasingly prevalent. This emerging research trend has evolved in part because of the broad applicability of economic principles to sporting contexts and also because of the increasing availability of performance and salary data for professional sports participants. Although it has not always been the case, reliable data for selected amateur sports, such as NCAA golf, are also starting to become available, allowing researchers to apply economic reasoning to these varied and important sports environments. (Examples are Callan and Thomas, 2004, 2006, which are investigations of the determinants of success in amateur golf that employed two different samples of NCAA golfers.)

From a theoretical perspective, economic research on sports salaries and performance builds on human capital theory, as first suggested by Becker (1964). Critical to this theory is the belief that education and experience play a significant role in the determination of a worker's performance and earnings. Simply stated, investments in human capital, such as education, training, and work-related experience, are expected to positively influence compensation.

As for the empirical testing of these theoretical models, most salary investigations within the professional sports literature have focused on individual players as opposed to coaches or managers. It is also the case that most used an earnings function model similar to the one developed by Scully (1974), who studied salary determinants for Major League Baseball players. Consistent with Becker's (1964) fundamental hypothesis, Scully's model assumes that a professional baseball player's development of human capital and skill are critical determinants of his earnings. Since Scully's original work, numerous studies have adapted his model to other sports settings. For example, Jones and Walsh (1988) examined salary determination for players in the National Hockey League, and Hamilton (1997) did the same for players in the National Basketball Association.

Despite the accumulating research on players' salaries in various sports, we know of only two papers that adapted Scully's (1974) original model to an examination of the earnings of team managers or coaches. One is a study by Kahn (1993), and the other is an investigation conducted by Humphreys (2000). A brief overview of each follows.

Kahn (1993) used 1987 data for professional baseball teams to estimate an earnings function for team managers, which in turn was used to analyze managerial quality. Following human capital theory, Kahn's model specifies earnings as the natural log of manager salary and includes the following as explanatory variables: years of managerial experience; lifetime winning percentage; and a binary variable to control for league (i.e., American or National). Kahn asserts that there are at least two reasons why experience is expected to have a positive effect on earnings. Specifically, more years of experience should reflect (a) greater skills, developed through on-the-job training, and (b) longevity, based on relatively high-quality management ability exhibited over time. Winning percentage captures team performance or success, which also should positively affect earnings, and the binary league variable controls for any league-specific differences in the demand for managerial quality. As expected, Kahn's results showed that a manager's experience level and career winning percentage have significant and positive effects on salary, although the league variable was not found to be statistically significant.

Humphreys (2000) used Division I NCAA basketball program data for the 1990–1991 academic year to test for possible gender-based differences in compensation among head basketball coaches. Similar to Kahn's model, Humphreys's earnings function defines the dependent variable as the log of annual base salary. Two groups of hypothesized salary determinants are specified: a set of coach characteristics and several control variables to represent the institution where each coach is employed. For the coach characteristics, Humphreys included a dummy variable for gender; experience, in years, to represent investment in human capital; and career winning percentage to measure job performance. In accordance with conventional human capital theory, both experience and winning percentage were assumed to have a positive effect on salary. The institution-specific control variables were intended to capture potential demand-side influences on a coach's earnings. Included among these were total student enrollment, ticket revenues, and school location. The underlying hypothesis was that greater demand for basketball entertainment, which can be proxied by higher enrollment and larger revenues, should positively influence a coach's salary.

Humphreys's empirical estimation across several variations of his model found neither gender nor experience to be significant. However, the results did suggest that performance (measured through career winning percentage) positively affects earnings. Humphreys believed that a high correlation between performance and

experience in his sample likely explained the lack of significance found for the experience parameter. Among the institutional control variables, Humphreys found that total enrollment, participation in Division IA games, and ticket revenues exhibited consistently positive effects on collegiate basketball coaches' salaries.

Clearly, the studies by Kahn (1993) and Humphreys (2000) have helped to identify some of the factors responsible for manager or coach salaries at the professional and collegiate level, respectively. However, to our knowledge, no analogous earnings function estimations exist for noncollegiate amateur coaches, leaving many questions unanswered.

At least until recently, the primary reason for this lack of research on noncollegiate school sports was, apparently, limited or nonexistent data. However, reliable data on high school football in some regions of the United States have now become available. That such a turn of events is timely is evidenced in part by recent media attention to high school coaches' salaries, particularly in comparison to teachers' and other school administrators' salaries. Some journalists report on the relatively high salaries earned by high school football coaches, particularly in the southern and western United States, where high school football is markedly more important to local communities than in other regions (Jacob, 2006; Associated Press, 2006). Others, such as Abramson (2006), counter with a different perspective about coaches' earnings, referring to long hours worked, particularly in so-called football states like Texas, Florida, and Georgia.

A related issue raised by the media is the extraordinary level of monetary investments made in some high school football programs, an observation that some find particularly striking in the face of funding cuts for educational resources and programs. In a recent issue of a national newspaper, Wieberg (2004) reported on multimillion-dollar projects in Texas, Georgia, and Indiana to build state-of-the art high school football stadiums. This trend, he argued, arises from a competitive race involving high-end facilities and highly paid coaches that has trickled down from the college level. In some states, such competition arises from open enrollment policies, under which schools literally compete for students to preserve their state funding (which is linked to enrollment). Schools also compete for a strong fan base to generate revenues to help support the costs of football programs—including elevated salaries for coaches, some reportedly reaching six figures. Such activity, which is consistent with the demand-side effects on salary suggested by Humphreys (2000), identifies another motivation for exploring the issue empirically.

The present research addressed the critical issues by empirically examining salary determinants for a sample of high school football coaches in Texas. There were a number of reasons for using Texas as the context of the analysis. First, high school football is enormously popular in Texas, and schools there invest heavily in football programs. These observations translate to a favorable opportunity to study demand-side salary determinants for coaches along with the usual human capital factors. Second, and perhaps not unrelated to the first reason, the necessary sample data to conduct an empirical estimation of earnings have become available for the state. Third, because Texas high school football is nationally recognized, we anticipated that our findings concerning Texas coaches would both call attention to underlying issues and stimulate new research on salary determination for those who coach in other parts of the country and in other high school sports.

Method

Sample

Reflecting both data availability and our motivation to capture possible demand-side factors in our model, the sample for this study was 95 head coaches at Class 4A and Class 5A Texas high schools during the 2005–2006 football season. Oversight of high school football in Texas is provided by the University Interscholastic League (UIL). The UIL is a nonprofit organization with a purpose to "organize and properly supervise contests that assist in preparing students for citizenship" (About the UIL, n.d., ¶3); extracurricular activities outside athletics also fall within UIL's purview. The UIL organizes Texas high school football contests based on schools'

geographic locations and enrollments. It divides football programs into 6-man and 11-man classifications. Most small schools (i.e., those with fewer than 100 enrolled students) participate in 6-man football, but the majority of Texas high school football programs are 11-man programs. The sample for this study was drawn from 11-man programs only.

Giving greater context for our analysis, table 1 presents the breakdown by classification of the 1,033 11-man high school football programs in Texas. The UIL identifies 32 geographic districts within Texas. The average number of football teams within each district ranges from 5.13 in Class 1A, to 7.53 and 7.69, respectively, in the larger 4A and 5A classes. The data indicate that significant enrollment differences exist across these various conferences. Classes 4A and 5A comprise the largest schools, those with enrollments as high as 2,084 and 5,852, respectively.

Table 1

2008–2009 Season Data for Texas High School 11-Man Football Teams, by Class

Class	Number of districts with football programs in the class	Number of schools with football programs	Average number of schools per district	Minimum enrollment	Mid-point enrollment	Maximum enrollment
1A	32	164	5.13	69.00	134.00	199.00
2A	31	205	6.61	201.00	314.75	428.50
3A	32	177	5.53	222.00	599.00	976.00
4A	32	241	7.53	533.00	1,308.50	2,084.00
5A	32	246	7.69	1,515.00	3,684.00	5,852.00

Note. Conference 2A spans 32 districts, but no school in District 24 has an 11-man football program. From “Alignments (updated for 2008–2010),” n.d., retrieved June 14, 2008, from http://www.uil.utexas.edu/athletics/football/

Measures

For each coach in our sample, we collected earnings data for the 2005–2006 academic year from a *Dallas Morning News* article, creating our empirical model’s dependent variable, SALARY (Jacob, 2006). According to a recent article in the popular press, a Class 4A or Class 5A head coach typically works 70–100 hr per week and is under contract for a 226-day work year (Texas Twist, 2006). Some coaches also teach, and some hold administrative positions such as athletic coordinator or athletic director. Our empirical model defined the variable ADMIN as a binary variable equal to 1 for a coach having administrative responsibilities or to 0 otherwise. We expected that coaches with administrative positions in addition to coaching responsibilities would earn higher salaries than those with coaching responsibilities only. Hence, we anticipated that the estimated parameter associated with ADMIN would be positive.

To capture each coach’s investment in human capital, we defined two distinct measures, GAMES and ROOKIE. Because the number of contests each team plays annually is fairly consistent, the GAMES variable was allowed to serve as a proxy for each coach’s cumulative head coaching experience in years (the data we would have preferred as our measure of human capital investment, had they been available). The GAMES variable actually measured the cumulative number of games for which an individual had acted as a head coach. Increases in this human capital variable were expected to have a positive influence on coaches’ salaries. The binary variable ROOKIE equaled 1 for a coach who was a rookie head coach (i.e., had no more

than one year's experience) and 0 for more experienced coaches. We anticipated that the parameter on this variable would be negative, reflecting the market's ability to pay a rookie coach a lower salary than a veteran coach.

The sports economics literature suggests that in addition to experience level, how able a coach is, reflected in job performance, is an important determinant of compensation. Both Kahn (1993) and Humphreys (2000) used a coach's career winning percentage to capture job performance. Following their approach, we defined a variable, WP, to measure the overall career winning percentage for each coach in our sample. If a coach's winning percentage increased, we hypothesized, his salary will be higher, holding all other factors constant.

We further theorized that a coach's salary would be influenced by demand-side characteristics (Humphreys, 2000), which would be linked to attributes of the high school employing the coach. One such characteristic was student enrollment, which we measured in the ENROLL variable, obtaining data from PigskinPrep.com, a website devoted to Texas high school football. (PigskinPrep.com's Class 4A data was found at www.texasfootballratings.com/4ADistEnrollmentRealign.html and its Class 5A data at www.texasfootballratings.com/5ADistEnrollmentRealign.html). Schools with larger enrollments are expected to pay their coaches higher salaries, so we expected to find a positive relationship between ENROLL and SALARY.

Moreover, because Texas football has a following that extends beyond the student body, it was important to include some measure of community demand for the sport. Indeed, H. G. Bissinger (1990) suggests, in his best-selling book *Friday Night Lights*, that football in Texas is a community event. Therefore, we included the variable STADIUM in our empirical model to measure seating capacity at the facility where each coach's school played its home games; the Texas High School Stadium Database (www.texasbob.com/stadium) provided the measures for each stadium. STADIUM was intended to capture a community's market demand for high school football. Adapting Humphreys's (2000) logic to our model, we expected that high school teams playing in larger stadiums would generate more revenue than those playing in smaller facilities, yielding more funds with which to compensate their head coaches, and hence we expected STADIUM to be positively related to SALARY. While we viewed stadium capacity as a reasonable proxy, we would have preferred including ticket revenues directly in our model, as Humphreys did, had such data been available for the individual Texas high schools. UIL does track football gate receipts for Texas high schools as a group. They totaled $1,102,798 for the 2005–2006 season, more than any other high school sport in Texas generated (West, Davis, and Company, 2008).

Lastly, following Humphreys (2000) we included a location-specific variable, DALLAS, in our model. The measure is a binary variable equal to 1 for a school located in the Dallas school district or to 0 otherwise. The variable controls any salary differences associated with location in the Dallas urban district. Earnings levels in urban districts may differ from those in other districts, due to differences in cost of living and/or population. However, since the relative magnitude of any such effect was not known a priori, the qualitative relationship between SALARY and DALLAS could not be predicted.

Procedures

To estimate the earnings function for each head coach in the sample, we used multiple regression analysis to examine the relationship between earnings and the defined human capital investment measures, job performance, and demand-side characteristics. As the literature suggests is typical, we transformed the dependent variable, SALARY, by natural logs. This transformation meant that the effect of each explanatory variable on earnings could be interpreted as a percentage change.

Results and Discussion

Fundamental statistical analysis was used to describe the variables in our data set. Table 2 presents the basic descriptive statistics for the sample of 95 Class 4A and Class 5A head football coaches. Note that, on average, a coach in this sample earned slightly more than $82,000 per year, and that 9 out of 10 coaches performed some administrative duties. The average coach had participated in approximately 107 games and achieved an overall career winning percentage of 53.41. Because a typical season consists of approximately 10 games, the mean value of 106.8 for GAMES suggests that the average coach in our sample had over 10 years of head coaching experience. Only 7% of the coaches were rookies.

Regarding institution-specific characteristics, the mean value for school enrollment was 2,310 students, and the average high school stadium seated 10,963 fans. The difference between the two measures indicates that demand for Conference 4A and 5A football extends well beyond the student body to the larger community. We also observed that 20% of coaches in the sample were employed at schools in the Dallas school district.

Table 2

Basic Descriptive Statistics for Class 4A and Class 5A Head Coaches (*N* = 95)

VariableMeanStandard DeviationMinimumMaximum

SALARY	82,179.00	10,457.00	50,117.00	106,044.00
GAMES	106.80	89.67	10.00	401.00
ROOKIE	0.07	0.26	0.00	1.00
WP	53.41	17.30	5.00	84.00
ADMIN	0.91	0.29	0	1.00
STADIUM	10,963.00	3,795.00	3,500	21,193
ENROLL	2,310	849.12	1,076	5,652
DALLAS	0.20	0.40	0.00	1.00

Table 3 presents the multiple regression estimates for our hypothesized earnings function model. (Several model specifications were estimated; overall results for the alternative model specifications did not differ significantly from the results presented in table 3.) On the basis of the adjusted R-squared statistic, our regression model explains over 58% of the variability in the natural log of earnings. The overall fit of our model compares favorably with those presented by other researchers. Each regression model presented by Kahn (1993) and Humphreys (2000) explained less than 50% of the variability in, respectively, professional coaches' salaries and collegiate coaches' salaries.

Table 3

Regression Model Parameter Estimates (Dependent Variable = Natural Log of Salary)

Determinant	Parameter estimate
Intercept	11.11†
Human capital variables	
GAMES	3.96 E-04†

ROOKIE	-0.09**
Job Performance variable	
WP	8.88 E-04†
Institution-specific characteristics	
ENROLL	2.94 E-05**
STADIUM	3.55 E-03†
DALLAS	-0.17†
Other factors	
ADMIN	0.04
F-statistic	19.81 (p value < 0.001)
R-squared	61.45
Adjusted R-squared	58.34

* $p < 0.05$, assuming a one-tailed test of hypothesis for ENROLL and two-tailed tests elsewhere. ** $p < 0.01$, assuming a one-tailed test of hypothesis for GAMES and two-tailed tests elsewhere. † $p < 0.10$, assuming a one-tailed test of hypothesis for WP and STADIUM.

Turning attention next to the model's individual parameter estimates, we made a series of important observations, starting with the two measures of human capital investment. First, as anticipated, the algebraic sign on the ROOKIE parameter was negative, meaning that a coach with no more than 1 year of experience received less compensation than veteran coaches. On average, the difference was approximately 9%. Second, the estimated directional effect for a coach's level of experience, measured through the GAMES variable, was consistent with expectations. Specifically, we found that GAMES had a statistically significant positive effect on a coach's salary. Holding all other factors constant, each additional year of coaching experience increased salary by, on average, approximately 0.4 percentage points. (We assumed that 10 games represented about 1 year of play; the GAMES parameter estimate hence indicates that each additional game coached translated to a salary increase of about 0.04%, a year's worth of games thus representing 10 times that salary increase, or 0.4%.) In contrast Kahn's (1993) investigation of Major League Baseball managers showed that each additional year of experience in professional ball increased a manager's salary by 2.35%. Humphreys's (2000) investigation of NCAA basketball coaches did not find the analogous effect on salary to be statistically significant. He argued that a high correlation (0.60) between career winning percentage and years of experience most likely produced the insignificant result for the latter variable. The correlation coefficient between GAMES and WP in our model was markedly lower (0.46).

Holding constant a coach's investment in human capital, we obtained further results indicating that a coach's job performance, measured by WP, has a statistically significant positive effect on compensation (a one-tailed test was used). Qualitatively, this result is consistent with those presented by Kahn (1993) and Humphreys (2000). The specific estimated value suggested that an increase of 10 percentage points for WP increased a

coach's salary by approximately 0.9%. Clearly, this finding suggests that winning is important in high school football. However, the common sports adage "Winning is everything" seems an overstatement, at least in the context of how high school football coaches' salaries are determined.

Quite predictably, our results also indicate that demand-side factors are relevant to the determination of coaches' overall compensation. For two of the demand-side, institution-specific variables, STADIUM and ENROLL, each of the obtained parameters had the predicted positive sign. Using a one-tailed test, the parameter on STADIUM was statistically significant at the 10% level. This suggests that coaches at schools with larger stadiums, and hence greater demand for high school football, receive higher compensation than those at schools with smaller stadiums. The parameter on ENROLL was positive and statistically significant on the basis of a two-tailed test. As expected, then, larger schools tend to compensate coaches at higher rates than do schools with relatively fewer students. The specific estimated value implies that for every additional 100 students enrolled in a school, its football coach's salary is about 0.29% higher. The underlying premise is that demand for football games is greater when the student body is larger.

The algebraic sign of the parameter on the urban location variable, DALLAS, was negative and statistically significant at the 1% level. This finding differs from Humphreys (2000), who in his study of NCAA basketball coaches did not find the urban location variable to be significant. It might be the case that the result in our model is specific to the Dallas, Texas, area and cannot be generalized to other urban areas. In any case, we can say that the subsample of Texas high school coaches employed by the Dallas school district earned about 17% less than their counterparts in other districts. This negative effect might reflect a larger population of available coaches in the area, which would mean greater competition for available positions and hence lower salaries. It might also be a function of the relatively low cost of living in Dallas, suggested by consumer price index levels for Dallas versus other areas (U.S. Department of Labor, 2008).

Finally, while the parameter on ADMIN had the expected sign, the finding was not statistically significant. This result may be due to the fact that over 90% of the head coaches in our sample held some type of administrative position in addition to their regular coaching duties. The resulting lack of variability in this measure may be responsible for its insignificance in our earnings function.

Conclusion

It is well documented in the sports economics literature that, holding ability constant, a player's investment in human capital and his overall performance contribute significantly to the determination of overall compensation. Building on these findings, recent research in sports economics has applied earnings function analysis to an examination of salaries paid to professional and collegiate team managers and coaches. Although this segment of the sports literature is still in its infancy, thus far the empirical findings are generally consistent with those for players. That is, investments in human capital and job performance seem to be significant determinants of managers' and coaches' salaries, just as they are of players' salaries.

In this research study, we extended the analysis of sports managers' and coaches' salaries to the noncollegiate amateur level, using a sample of Texas high school football head coaches employed during the 2005–2006 season. Following the approach used in investigations of professional sports, we modeled and estimated an earnings function, using conventional regression analysis. Our model specified a series of potential salary determinants, including human capital measures, a performance variable, and institution-specific demand-side factors.

Our statistical findings indicate that coaches' salary determinants at the high school level are qualitatively consistent with those identified in the literature for professional and collegiate coaches. Specifically, a high school coach's development of human capital was shown to be a statistically significant determinant of his salary. Moreover, a coach's performance or ability to win games, as measured by career winning percentage,

also affected his earnings. Lastly, consistent with findings presented by Humphreys (2000), we found that demand-side, institution-specific influences such as the size of the fan base can affect a coach's compensation.

Taken together, the results of this research, we believe, make an important contribution to the literature examining compensation paid to sports participants, because they broaden its scope to include coaches at the high school level. The findings are timely, as well, given recent media attention to coaching salaries and the associated debate about rising investments in high school sports programs concurrent with funding cuts for education. We are hopeful that, as new data become available, other researchers will seek to validate our findings in other locations and for other high school sports throughout the country. This in turn could help stimulate important dialogue about the level of compensation for coaches relative to other educational professionals and whether that compensation appropriately rewards experience and performance.

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