Athletic Director and Collegiate Athletic Administration Compensation Modeling

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I. Introduction:

In 2024, two legendary college coaches Nick Saban and John Calipari departed from their respective programs at Alabama and Kentucky. While these high-profile coaching changes grabbed headlines, these major collegiate athletic programs will more-than-likely remain as relevant as ever. These programs' Athletic Directors (ADs) are the pseudo-CEOs who will manage these transitions and head the futures of these prestigious programs. However, they remain largely out of the spotlight. ADs, being these college athletic department administrators, are responsible for numerous internal and external responsibilities (Marburger, 2015). Yet, few studies have been conducted to date on the determinants of the salaries and bonuses that these highly valued employees receive.

This study attempts to reinforce Marburger's (2015) work on AD compensation by examining ADs' compensation determinants on a broader scale with an extended timeframe. While Marburger focused on 2010-2011 data, this paper extends the analysis from 2013 through 2023, incorporating new methods and attempting to reflect the changing landscape of college athletics.

II. Literature Review:

Research has shown that financial/budgetary oversight and the fundraising to support athletic programs lie atop an AD's list of responsibilities (Hardin et al., 2013; Wood et al., 2019). With revenue creation as a key driver of success, college ADs operate much like CEOs of medium and large companies. They look for methods of innovation and try to carve out a niche in a competitive environment. While simple metrics, such as revenue, are paramount to a firm's financial success, there are other factors usually at play. This is no different with an athletic department, as there are many ways to invest in a school's future success. Exploring these areas of interest, along with the bottom-line finances, will be key to a deeper understanding of ADs' roles and their inherent value to an athletic department.

Recruiting

Natke et al. (2024) found that football attendance, a key revenue driver, is strongly predicted by on-field success and quality bowl game appearances. When combined with Bergman & Logan (2014), one can really begin to recognize the importance of recruiting for an athletic department. This paper found that higher-quality recruits had a significant and positive effect on team success and the likelihood of making a "bowl" game. Bowl games have also been linked with significant, positive effects on future team revenues (Brook, 2022). Similarly, Borghesi (2018) found that, in the case of college basketball, this same relationship persisted. Better recruits produce better financial outcomes. For college basketball, 5-star recruits generated around $625,000 of marginal revenue for their universities, and it was also found that the team success they brought with them resulted in an average of nearly $6 million in university academic donations (Borghesi, 2018). Al of these papers combine to paint a picture that for ADs, finding ways to bring in stronger recruits and recruiting classes can drive revenue, which is an AD's true top priority (Hardin et al., 2013).

Coaches

Luckily for us, Athletic Directors have a very similar leadership positions counterpart in collegiate athletics and administration, coaches. We can examine how college coaches are paid in order to get some idea of how to approach researching ADs alike. However, there are key differences to note between the roles, responsibilities, and pay structure of the two positions. First of all, head coaching salaries provide insight into how athletic departments value and compete for top talent. Hoffer & Pincin (2015) found that additional athletic department revenues resulted in coaching expenditures that were 7.5 times greater than student-athlete scholarships, suggesting revenue generation heavily influences compensation decisions. Tying back into our understanding of the importance of recruiting, it is key to note the findings of Farmer and Pecorino (2010). This paper established that, in a world before new Name, Image, and Likeness (NIL) freedoms for student athletes, the most effective method of recruiting higher quality student-athletes to was to employ the best and most established coaches available. Brook (2016) supports this conclusion when finding that "being a great recruiter" (a 1 SD increase in recruiting effectiveness) and years of coaching experience both have significant, positive effects on the predicted salary of a college football head coach. The result of these factors influencing coaches' pay is an all-out bidding war for the most experienced college head coaches. This is reflected in Magnusen et al. (2018), which finds that a head coach's career winning percentage was likely to influence the recruiting decision of a women's college basketball recruit, among other factors. Overall, this landscape of college coaching pay can give us a window into the type of market precedent that is set by athletic departments for hiring at top positions, and this knowledge raises some interesting questions about athletic directors alike.

NACDA Directors' Cup

The NACDA Directors' Cup provides a comprehensive measure of athletic program success across all sports. Per their website, "The overall champion is the institution which has a broad-based program, achieving success in many sports, both men's and women's." ("What is NACDA and What does it do?", 2024). This metric is particularly relevant for evaluating AD performance, as it captures the broad oversight responsibilities of the position. Jones (2012) found that spending's effect on Directors' Cup success was particularly significant among FBS institutions, and Lawrence et al. (2012) identified positive relationships between program spending and Directors' Cup performance. NACDA

Directors' Cup performance was also a key factor studied in Marburger's (2015) paper that is serving as our basis and inspiration for research.

While existing research has examined various aspects of collegiate athletic administration, there remains a gap in understanding the comprehensive determinants of AD compensation in the modern era. The literature suggests that revenue generation through football and basketball programs, successful recruiting, coaching staff management, and overall program performance as measured by the Directors' Cup all play crucial roles in athletic department success. However, Marburger's (2015) foundational work on AD compensation deserves updating to reflect the rapidly evolving landscape of collegiate athletics, including the advent of NIL, conference realignment, and expanding media rights deals. This study aims to bridge that gap by examining AD compensation from 2013-2023, providing insights into how these various factors translate into administrative compensation.

III. Data:

Athletic Director Compensation

Publicly available databases previously used for researching athletic director salaries, notably the USA Today database utilized in Marburger's 2015 paper, are no longer accessible. As a result, obtaining relevant data for this research would require submitting Freedom of Information Act requests to individual schools, reviewing their contracts, and manually compiling the necessary information. This approach is time-intensive and requires significant administrative effort, making it impractical for broad-scale and longitudinal research without significant time and resources.

Instead of relying on these requests, this study utilizes publicly available data from IRS Form 990 filings. These filings, either by schools themselves or athletic departments, provide compensation details for a sample of universities across the country. To address the missing data and ensure a complete dataset, a small predictive model will be constructed. The model will use the 990 data in combination with information from the NCAA Membership Financial Reporting System, to which I have access through my collaboration with the Knight Commission on College Athletics via Syracuse University. This database includes yearly records of overall administrative compensation paid by a much larger and more complete dataset of universities. By modeling the relationship between the 990 data and administrative compensation figures from the NCAA dataset, I will estimate athletic director salaries for the remaining schools. This imputed dataset will allow for my following comprehensive analysis of athletic director compensation across institutions.

Due to the issues with finding comprehensive data, this analysis will focus solely on base yearly salary values as reported in IRS Form 990 filings. This will provide a reliable measure of compensation through the information detailed in Schedule J. While AD contracts often include a range of bonuses and incentives tied to performance or other stipulations, these additional payments are inconsistent and sometimes unearned or deferred. This makes them impractical to track and incorporate. The focus on base salary ensures a clear understanding of the compensation actually paid to athletic directors.

Meanwhile, from the NCAA Membership Financial Reporting System data, I will be modeling based on the “Support Staff/Administrative Compensation, Benefits and Bonuses Paid by the University and Related Entities” category. This category’s description includes “compensation, bonuses, and benefits paid to all administrative and support staff reportable on the university or related entities (e.g., foundations or booster clubs) W-2 and 1099 forms, as well as any non-taxable benefits.” Specific components include gross wages, bonuses, allowances, speaking fees, retirement benefits, stipends, memberships, media income, tuition reimbursement, and earned deferred compensation, including those funded by the state. Along with a few other specific notes, this broad and detailed category serves as a valuable dataset for modeling administrative compensation trends and patterns across universities.

With the methodology for collecting athletic director compensation data established, this analysis will interpret the effects of the independent variables through the broader context of their impact on the athletic department's overall budgetary decisions. Rather than attributing each result to a direct increase in athletic director salary, the findings will be understood as indicative of the department's willingness to reinvest in retaining the current individual or potentially hiring a new one at an increased cost. They will also reflect a department’s willingness to provide additional support through investments in the director’s supporting staff and resources. This perspective captures a more holistic view of administrative investment priorities within athletic programs, but still allows us to reflect on the successes or failures of ADs and see how those might drive changes in spending.

This approach also logically supports this study’s investigation of the “lead” of the compensation variable to assess how athletic departments respond to the prior year’s performance in key metrics. By examining the lead, the analysis can capture the department’s strategic decisions based on athletic directors’ previous successes or failures, reflecting how past outcomes influence future compensation and budgetary priorities.

Other Data

For the various predictor variables investigated , several data sources were utilized to provide a comprehensive analysis of athletic department performance and compensation. Categorical data regarding schools' conference affiliation and division were drawn from the same NCAA Membership reports, offering a clear classification of institutions based on their athletic league and division. Yearly revenue data, specifically reported as "Total Operating Revenues," was also extracted from these reports, serving as an essential indicator of each school’s financial capacity and stability.

For recruiting data, both Basketball and Football, the analysis relied on publicly available data from 247sports.com, a well-established and reputable platform for college sports recruiting rankings. This source provided year-specific recruiting scores for both football and basketball, offering insights into the quality of incoming talent at each institution.

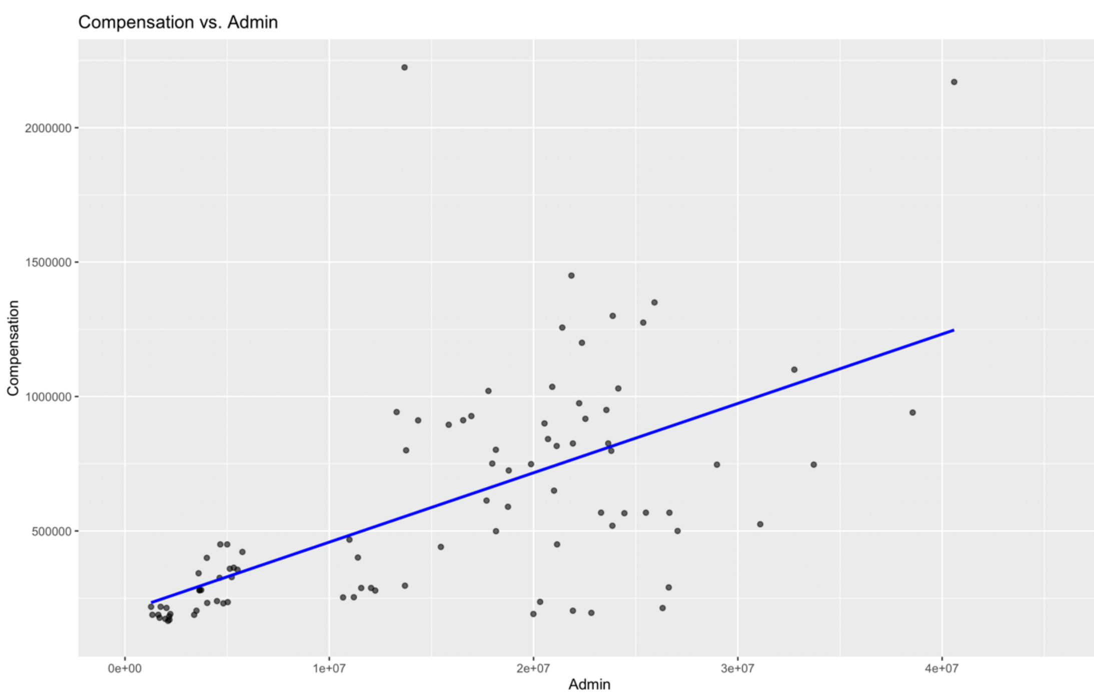
Finally, the NACDA Directors' Cup points were incorporated to measure each athletic department's overall on-field success across various sports, as noted in the literature review. For the sake of simplicity, end-of-year total points were used, as it is unlikely any non-revenue sport is individually having a significant effect in the model. Although the Directors' Cup inherently weighs the "big two" revenue sports—football and basketball—slightly more heavily, any additional effects of success in these sports are captured through the recruiting data, as detailed in the literature review on recruiting.

This study, for all data, will encompass the years 2015-2023, as this is the extent of the years available for the NCAA Membership reports. This date range allows us a much broader look at collegiate athletic directors and departments, compared to the Marburger paper, and we will also be able to investigate year-over-year and lagged effects of variables. The NCAA Membership reports also limit us to simply Division I programs, which includes I-FBS, I-FCS, and I-No Football. These same limits are applied to the recruiting and Directors' Cup data, which are often more restrictive themselves.

IV. Methodology and Results:

Preliminary Compensation Imputation

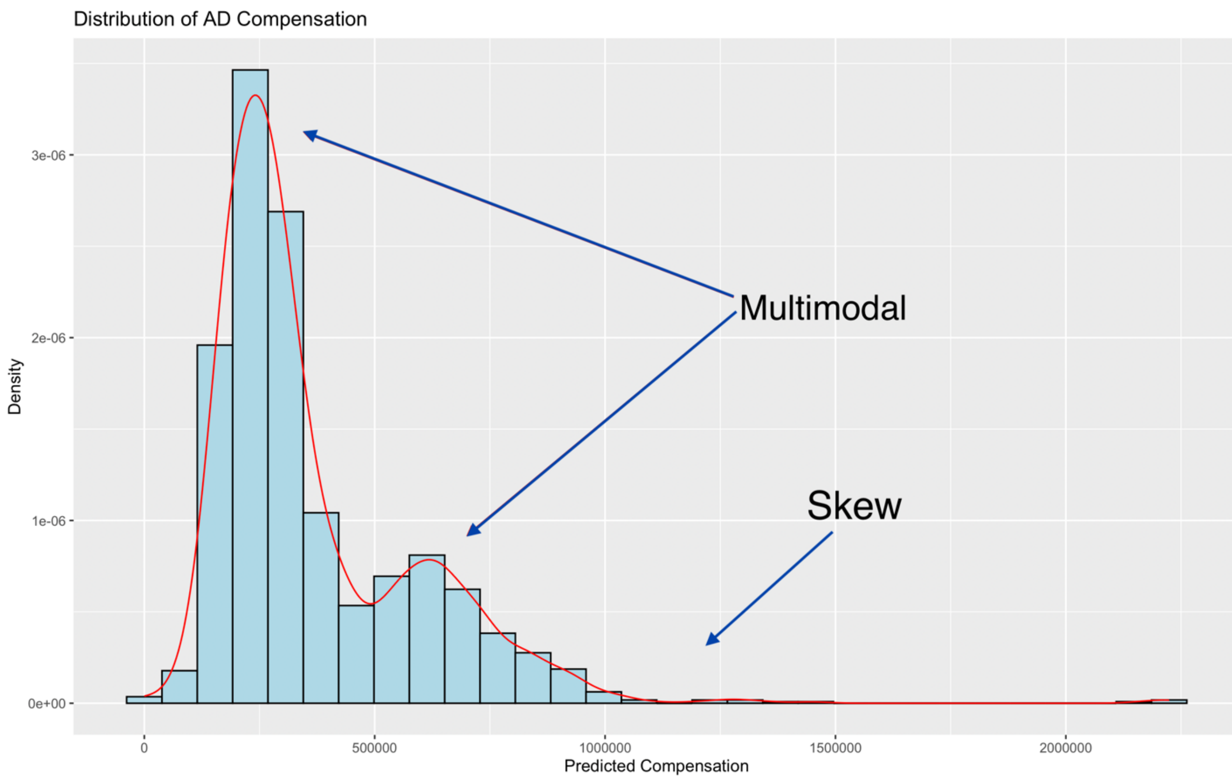
As mentioned above; to estimate missing athletic director compensation data, we first used a predictive model that links IRS Form 990 salary data to the Support



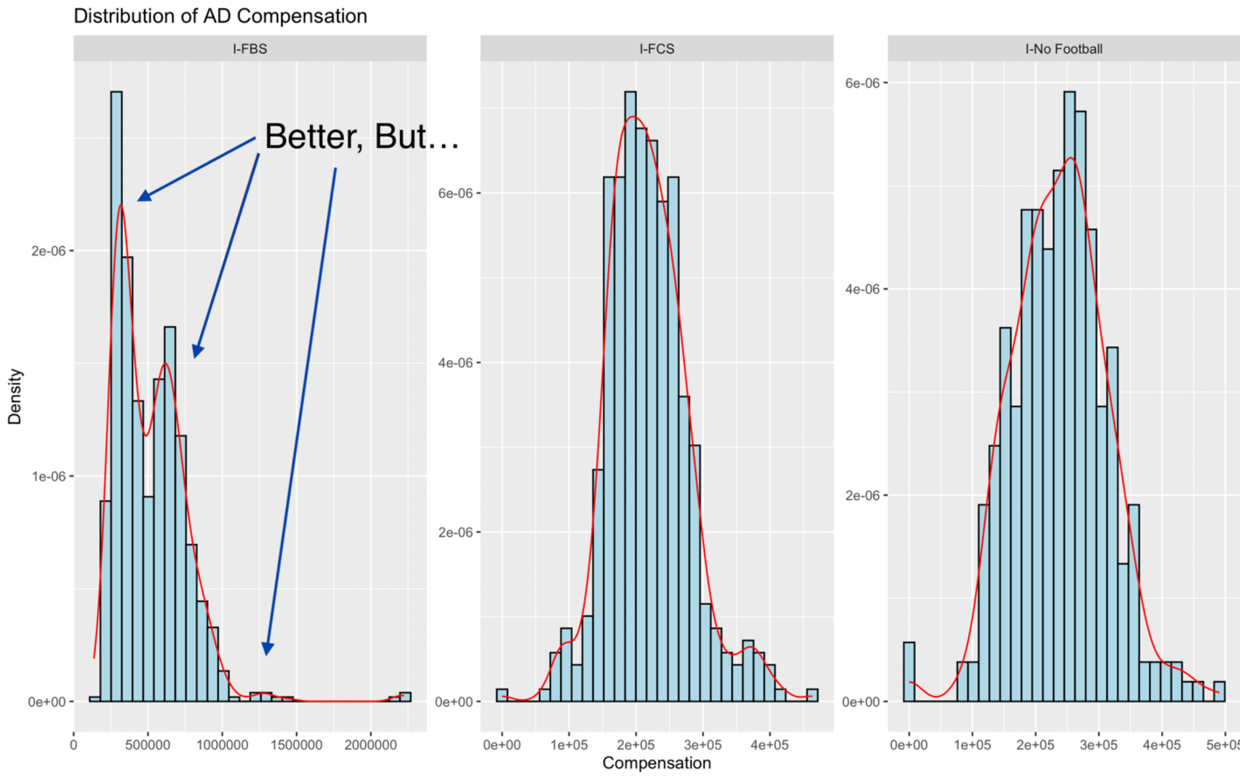
Staff/Administrative Compensation category from the NCAA Membership Financial Reporting System data. To illustrate this relationship, a simple scatterplot is presented below, showing the correlation between the IRS 990 values and their associated "Support Staff/Administrative Compensation" figures.

Following this, a screenshot of the resulting prediction model is provided, demonstrating how the data points are utilized to “fill” values for schools missing compensation information, creating the new "Predicted Compensation" category. Notably, the model was kept simple without any adjustments, in order to maintain the integrity of the predictions for the next step of analysis. This allows for a clear and straightforward evaluation in the following model, where the imputed compensation will serve as the dependent variable. Going forward when using “Predicted Compensation”, we will remember our adjusted interpretation of this variable in relation to athletic department decision making.

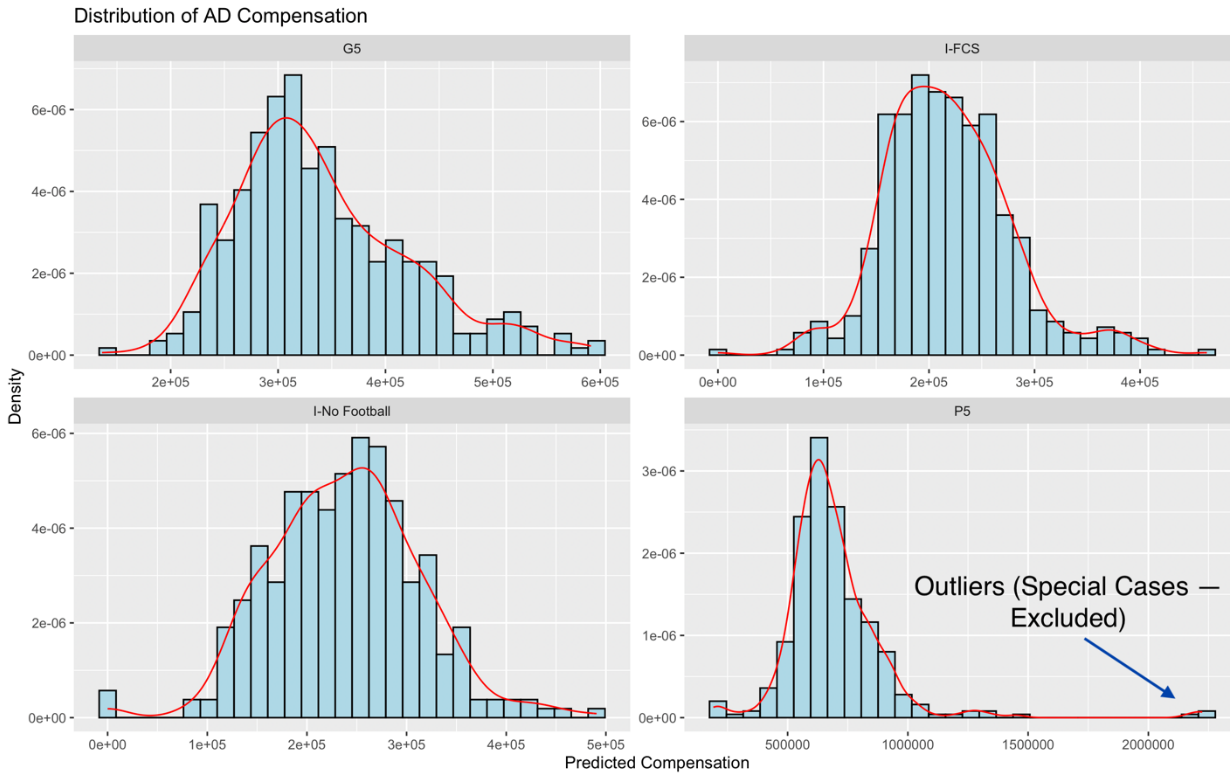
Conference Realignment // Distribution of Predicted Compensation
To better understand the distribution of the newly created "Predicted Compensation" variable, a histogram was first generated. The initial distribution revealed both a multimodal pattern and a long right skew, which can be problematic for modeling purposes. A screenshot of this histogram is provided below for reference.



Next, the distribution was examined by dividing the data into different athletic divisions: I-FBS, I-FCS, and I-No Football. This stratification helped to address some of the issues with the distribution. Specifically, the distribution became much more normal for both the I-FCS and I-No Football groups, as shown in the faceted plot below. However, the I-FBS division still exhibited both a multimodal shape and a right skew.



To further refine the distribution, I broke down the I-FBS group into two subcategories: Power 5 (P5) conferences and Group of 5 (G5) conferences. This is a common distinction made in the world of college athletics and NCAA football, in order to separate out the high revenue conferences, consisting of the Southeastern, Atlantic Coast, Big 10, Big 12, and (formerly) Pacific 12 Conferences. This additional stratification resolved the distribution issues for the I-FBS group, resulting in a much more normal distribution. As a result, a new categorical factor variable, comprising P5, G5, FCS, and No Football divisions, was created. This factor variable was subsequently included in the main model to address the skew and multimodality issues. The final histograms, faceted by this new factor variable, are shown below. These adjustments provide a more suitable foundation for our main model, ensuring that the distribution of the dependent variable aligns more closely with the assumptions of normality.



Taking a quick look at the summary statistics of this new variable in Table 1 can show the significant differences between each level of competition. Most notable of the Divisions are the Power 5 conferences, which have an average predicted base salary over $400,000 larger than that of the next highest, the Group of 5 conferences. However, this increase also comes with added variation, as seen in the high standard deviation, as well as the distribution above.

Table 1. Summary Statistics by Division

Division	Predicted Compensation Mean ($)	Predicted Compensation Standard Deviation ($)
G5	352,148	71,428
I-FCS	263,336	37,350
I-No Football	279,269	44,821
P5	769,409	231,972

The Model

Much like the study by Marburger, base salaries for athletic directors are modeled as a function of revenues and our other relevant variables. In this analysis, the predicted compensation for school i in year t is treated as a function of a constant term β_0 , the vector of predictors X , and an error term ϵ. The mathematical expression for the model is as follows:

$$Predicted\ Compensation_{i,t} = \beta_0 + \beta_1 X_{i,t} + \epsilon_{i,t}$$

Here, $X_{i,t}$ represents a vector of predictor variables for school i in year t, which are all described above and found in Figure 2. $\epsilon_{i,t}$ is the error term for the equation, capturing unobserved factors.

In addition to modeling current predicted compensation, this study also includes the lead of the predicted compensation variable. The lead model accounts for the possibility that athletic departments' decisions regarding compensation may be influenced by prior-year data, reflecting the department's willingness to invest in leadership and support staff based on the previous year's performance. This approach aligns with the adjusted interpretation of athletic director salaries as an indicator of the department's fiscal priorities. The model with the lead of predicted compensation is expressed as:

$$Predicted\ Compensation_{i,t+1} = \beta_0 + \beta_1 X_{i,t+1} + \epsilon_{i,t+1}$$

This setup allows for the examination of how past performance and other predictors influence future salary decisions, providing a more dynamic understanding of how athletic departments allocate resources to support their leadership.

Table 2. List of Independent Variables

Variable	Description
Department Revenues	Revenue generated by the athletic department in year t
Directors' Cup Points	The number of total points earned in the Directors' Cup in year t
Football Recruiting Score	The total football recruiting "score" accumulated for the class of year t
Basketball Recruiting Score	The total basketball recruiting "score" accumulated for the class of year t
Year	Year t, evaluated as a numeric impact, expecting a trend over time
I-FCS	Dummy variable for schools belonging to FCS subdivision, as compared to "Group of 5" Conference teams
I-No Football	Dummy variable for schools in Division I with no football program, as compared to "Group of 5" Conference teams
P5	Dummy variable for schools belonging to one of the "Power 5" conferences, as compared to "Group of 5" Conference teams

Table 3 displays the results of both the normal and lagged regression models. Both models exhibit high explanatory power, with adjusted R^2 values of 0.825 and 0.808, respectively. These values indicate that the predictors account for a substantial portion of the variance in the dependent variables. The F-statistics for both models are highly significant ($p < 0.01$), further supporting the overall strength of the models.

In both models, department revenues, Directors' Cup points, basketball recruiting scores, the Power 5 (P5) alignment, and the year variable emerge as significant predictors ($p < 0.01$ or $p < 0.05$). These variables demonstrate consistent positive associations with athletic director compensation, with the P5 variable yielding the largest coefficients in both models.

Notably, football recruiting scores present contrasting results across the two models. While negatively associated with predicted compensation in the first model ($p < 0.01$), the relationship is positive but not significant in the second model, indicating a shift in dynamics when examining the lead variable. Similarly, the coefficients for I-FCS and I-No Football schools are negative in both models, but their magnitudes and significance levels decrease when using the lead dependent variable.

The constant term is negative and highly significant in both models, which, when combined with the positive year coefficients, indicates an upward trend in compensation over the years. Overall, the models provide insights into the factors influencing both current and following-year athletic director compensation.

Regression Results

	Dependent variable:	
	Predicted Compensation	Lead of Predicted Compensation
	(1)	(2)
Department Revenues	0.003***	0.002***
	(0.0001)	(0.0002)
Directors' Cup Points	43.896***	37.399**
	(14.083)	(16.898)
Football Recruiting Score	-3,093.609***	1,387.590
	(897.913)	(1,742.487)
Basketball Recruiting Score	706.929***	761.731**
	(251.207)	(308.474)
Year	6,217.208***	9,059.064***
	(1,287.291)	(1,839.075)
I-FCS	-40,786.300***	-24,552.880*
	(8,746.536)	(12,753.530)
I-No Football	-27,901.720***	-11,058.840
	(9,266.420)	(13,458.550)
P5	172,499.600***	185,508.600***
	(14,521.020)	(17,811.030)
Constant	-12,079,837.000***	-18,163,695.000***
	(2,619,061.000)	(3,693,833.000)
Observations	1,431	1,148
R^2	0.826	0.809
Adjusted R^2	0.825	0.808
Residual Std. Error	100,878.300 (df = 1422)	110,152.300 (df = 1139)
F Statistic	841.272*** (df = 8; 1422)	603.866*** (df = 8; 1139)
Note:		*p<0.1; **p<0.05; ***p<0.01 Standard errors in parentheses.

Statistical Testing and Adjustment

To evaluate the assumptions of homoscedasticity and absence of autocorrelation in the residuals, both the Breusch-Pagan (BP) and Durbin-Watson (DW) tests were conducted for each model.

For Model 1, the results of the Breusch-Pagan test indicate a highly significant p-value (BP = 90.162, df = 8, p = 4.312×10^{-16}), suggesting the presence of heteroscedasticity in the residuals. Additionally, the Durbin-Watson test for autocorrelation yielded a statistic of DW = 1.3045 ($p < 2.2 \times 10^{-16}$), indicating strong evidence of positive autocorrelation in the residuals.

Similarly, for Model 2, the Breusch-Pagan test also identified significant heteroscedasticity (BP = 89.599, df = 8, p = 5.61×10^{-16}). The Durbin-Watson test revealed a statistic of DW = 1.4481 ($p < 2.2 \times 10^{-16}$), which again points to the presence of positive autocorrelation in the residuals.

The results of both tests clearly give of both heteroscedasticity and autocorrelation in the residuals. This demonstrates violations of key regression assumptions, which can lead to biased standard errors, and ultimately diminish the validity of our testing and the coefficients. To address this, Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors were applied. HAC adjustments provide new standard error estimates that are valid even in the presence of heteroscedasticity and serial correlation. The results of the models incorporating HAC-adjusted standard errors are presented below.

Table 4: Adjusted HAC Regression Results

	Dependent variable:	
	Predicted Compensation	Lead of Predicted Compensation
	(1)	(2)
Department Revenues	0.003^{***}	0.002^{***}
	(0.0004)	(0.001)
Directors' Cup Points	43.896	37.399
	(28.806)	(30.511)
Football Recruiting Score	$-3{,}093.609^{*}$	1,387.590
	(1,805.519)	(3,354.755)
Basketball Recruiting Score	706.929^{*}	761.731^{*}
	(419.220)	(461.798)
Year	$6{,}217.208^{***}$	$9{,}059.064^{***}$
	(1,513.108)	(1,835.469)
I-FCS	$-40{,}786.300^{***}$	-24,552.880
	(13,736.570)	(19,589.270)
I-No Football	$-27{,}901.720^{**}$	-11,058.840
	(14,133.990)	(20,077.620)
P5	$172{,}499.600^{***}$	$185{,}508.600^{***}$
	(32,758.030)	(37,466.700)
Constant	$-12{,}079{,}837.000^{***}$	$-18{,}163{,}695.000^{***}$
	(3,099,298.000)	(3,702,970.000)
Observations	1,431	1,148
R^2	0.826	0.809
Adjusted R^2	0.825	0.808
Residual Std. Error	100,878.300 (df = 1422)	110,152.300 (df = 1139)
F Statistic	841.272^{***} (df = 8; 1422)	603.866^{***} (df = 8; 1139)
Note:		*p<0.1; **p<0.05; ***p<0.01
		Adjsuted HAC Standard errors in parentheses

The use of HAC-adjusted standard errors introduced changes in the precision of the coefficient estimates while leaving the values themselves unchanged. HAC adjustments significantly increased the standard errors across most predictors. For example, the standard error for *Directors' Cup Points* nearly doubled, from 14.083 to 28.806 in Model 1 and similarly increased in Model 2. This adjustment accounts for heteroskedasticity and autocorrelation in the data. However, the increased standard errors resulted in fewer variables meeting significance thresholds. For example, *Basketball Recruiting Score*, which had been highly significant previously, dropped to marginal significance (p<0.1) in both models after the adjustment. Adjusted $R^2$and F-statistics were unaffected by the HAC adjustments, as these pertain to model fit and not standard error estimation. Thus, the models still explain a substantial portion of the variance in compensation.

V. Conclusion:

While these models provide valuable insights, it is important to first acknowledge their limitations. They were constructed using a patched-together dataset that relied heavily on imputed compensation values due to the lack of salary data for Athletic Directors. In an ideal scenario, the analysis would have access to complete data on base salaries, bonuses, and other forms of compensation over the full time frame and across all levels of college athletics. Additionally, a more expansive set of independent variables, such as measures of student-athlete academic performance, investments in athletic facilities, or broad institutional financial health, would surely enhance the models' explanatory power. Also, the model ends up with multicollinearity concerns, as some predictors, like department revenues and conference affiliation, are highly interrelated, which complicates the interpretation of their effects.

Despite these challenges, the completed models demonstrate significant predictive capabilities. The overwhelming influence of Power 5 conference membership stands out, highlighting the financial advantages afforded by enhanced branding, lucrative TV deals, and expansive athletic department budgets. Department revenues also consistently emerge as a predictor in every model, solidifying their importance in ADs' and athletic departments' minds alike. Also, the year variable's persistent significance underscores a clear upward trend in Athletic Director pay, reflecting broader increases in spending on college athletics.

The lagged model offers intriguing insights into potential shifts in the dynamics of compensation decisions. The loss of significance for football recruiting scores suggests that strong recruiting classes may often follow weaker seasons, diminishing their influence when evaluating previous-year metrics. Similarly, the diminished and statistically insignificant effects of FCS and no-football affiliations over the one-year lag raise compelling questions about financial strategies. These results may indicate that smaller athletic programs adjust their administrative spending more significantly in response to immediate changes, whereas Power 5 institutions maintain their advantage over time due to structural and financial disparities.

In sum, while imperfect, these models shed some light on the factors influencing Athletic Director compensation and hopefully offer a foundation or new ideas for future research. The persistent impact of revenues and Power 5 membership, coupled with the nuanced differences observed in lagged effects, point to this entire discussion having more complexity of administrative decision-making layers than we may have previously expected from college athletics.

VI. References:

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The rest of them in a bit