Coaching Salary Disparity and Team Performance: Evidence from the Football Bowl Subdivision

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Salary disparities and their impact on performance have long been a topic of research and debate in both the business and sport sectors. However, no studies to date have examined the impact these disparities have in the collegiate football setting within coaching staffs specifically. The purpose of this study was to determine how intra-staff salary disparity impacts team success, using salary data for the years 2010-2017 and the Gini index as the measure of dispersion. Results indicated that pay disparity had no impact on wins. Rather, on-field metrics were found to be the primary drivers of success.

Keywords: coaches, salary, wages, disparity, NCAA

INTRODUCTION

The salaries paid to college football coaches at the Division I level have become a major topic of conversation. This issue becomes even more captivating when one considers the amount of money universities invest in athletics and the fact that the National Collegiate Athletic Association (NCAA) prohibits college football players from receiving a fair market salary for the product they produce. Those issues aside, in examining the salaries paid to Football Bowl Subdivision (FBS) coaches over the past 10-15 years a scenario unfolds that should garner significant attention. In 2006, eight head coaches made over $1 million, while only two earned over $2 million. Fast forward to the start of the 2019 season, 83 head coaches will earn over $1 million and 67 will receive over $2 million. Moreover, the top 10 head coaches, will all earn over $6 million in school pay alone for the 2019 season, not factoring in bonuses and endorsements. Similarly, during this time the salaries of assistant coaches have also been on the rise. In 2015, 57 assistants at public schools in the Power Five conferences (Big Ten, Big 12, Southeastern Conference [SEC], Atlantic Coast Conference [ACC], Pac-12) made more than the average head coach in either the Sun Belt or Conference USA. During the same season, the average salary for an assistant coach in the SEC was $449,000, a number that surpassed 12 FBS head coaches (Wolken, Berkowitz, & Schnaars, 2015). For the 2019 season, 21 assistant coaches will receive over $1 million, surpassing 38 head coaches all from Group of 5 (American Athletic Conference [AAC], Conference USA [C-USA], Mid-American Conference [MAC], Mountain West Conference [MWC], Sun Belt) conferences (Berkowitz et al., 2019).

Related to these spending patterns, Orzag and Israel (2009) found no evidence to link higher spending patterns with increased on-field success. In their comprehensive analysis of athletic department finances, however, they did find that an extra million dollars of operating expenditures in football could increase a team's winning percentage by 1.8 points and subsequently, their chances of ending the season in the top 25 of the Associated Press (AP) poll. A more in-depth analysis, however, uncovered that there was no significant relationship between coaches' salaries and team success. (Orzag & Israel, 2009).

Much of the previous salary disparity literature has been grounded in the business sector or focused on professional sport and players' salaries specifically. While some may opt to apply these findings to college sport, such generalizations should not be considered valid. Collegiate sport, and football specifically, is a unique construct and as such requires its own analysis. Therefore, the primary contribution of this study is to provide an understanding of how intra-staff salary disparities affect team performance. To test this interaction, the Gini index was utilized as the dispersion metric while the models also accounted for factors related to coach, team, and player quality.

LITERATURE REVIEW

Research that has examined the impact of intra-staff salary disparity on team performance at the Division I FBS level has yet to be completed. The business/economic literature provides a wealth of information, however, regarding the impact of pay disparity on performance, productivity and product quality in the workplace. This strand of literature can be segmented into two distinct groups focused on either compressed or hierarchical pay structures.

To briefly summarize, a compressed wage structure is one in which pay is less dispersed and spread more equally across jobs within a firm. Those that favor pay compression advocate that wage equality increases firm performance and teamwork (Akerlof & Yellen, 1990; Lazear, 1991; Levine, 1991). Employees who feel underpaid, relative to their coworkers, may reduce their overall effort, sabotage their employer, and be more absent from work on a consistent basis (Cowherd & Levine, 1992). Conversely, a hierarchical wage structure features pay that is concentrated near the top of the organization, resulting in a greater degree of dispersion (Bloom, 1999; Lazear & Rosen, 1981; Ramaswamy & Rowthorn, 1991). Proponents of a hierarchical pay structure rationalize that the larger the disparity the more likely that firm performance will increase as employees will be more motivated by external factors (e.g., pay raises and advancement opportunities).

Sport-specific studies concentrated on pay disparities have focused primarily on players' salaries in the four major North American sports leagues. Results have largely concluded that higher levels of salary dispersion have a negative impact on team performance, thus advocating, whether directly or indirectly, for a more compressed wage structure. (Depken, 2000; Harder, 1992; Sommers, 1998). More specifically, DeBrock, Hendricks, and Koenker (2004) in their examination of Major League Baseball (MLB) players' salaries found that teams with greater degrees of dispersion performed more poorly. This may imply that compressed wage distributions would equate to a more successful on-field product as opposed to having a few high-salary players and an abundance of lower salary players. Further, Annala and Winfree (2011) and Mondello and Maxcy (2009) evaluated the effects of players' salary dispersion on team performance in professional leagues in North America using the Gini index as their measure of inequality. In both studies, a larger salary dispersion (higher Gini coefficient) had a negative impact on team performance. Frick, Prinz, and Winkelmann (2003) found conflicting results, however, citing that a greater degree of inequality can either be positive or negative based on the level of cooperation needed among the players in that sport (Frick et al., 2003). In all situations, however, the authors emphasized that player quality is also an important determinant of on-field success.

Within the realm of college sport, research related to salary inequality has primarily focused on the ethical concerns surrounding the high dollar figures attached to compensation packages. Zimbalist (2010a) argued that the most egregious waste of money in college athletics is the salaries paid to head football coaches. He goes on to make similar statements regarding assistant coaches' salaries before pointing out that highly paid coaches do not necessarily produce better performance outcomes (Zimbalist, 2010b).

Empirically, two studies have provided insights into the Division I FBS context. Tsitsos and Nixon (2012) found that institutions that were paying large salaries to their head football coaches were not assured short-term or long-term success as measured by their entrance/exit into the *USA Today* Top 25 rankings. In their analysis which spanned three seasons from 2003-2007, only five teams with coaches who ranked in the top 25 in terms of compensation remained ranked in the Top 25 each season while six never entered into the ranks (Tsitsos & Nixon, 2012, p. 78). Tsitsos and Nixon characterize the former schools as members of the "established football elite" and the latter as "elite seekers" (p. 78). These elite seekers can be characterized as schools that offer their head coaches large compensation packages with the hopes that they will either return to national prominence or rise to the level of the elites for the first time. No mention, however, is made of the assistant coaches and how their compensation tied into these performance measures.

In contrast, Colbert and Eckard (2015) found that coaches pay had a positive effect on team performance. With the Sagarin rating as their measure of performance, the researchers found a positive correlation between coach pay and team performance, leading the authors to assert that programs get what they pay for. The results did indicate, however, that there are diminishing returns to these investments and that at the highest levels, universities tend to overpay for results. Once again, no direct measurement of assistant coaches' salaries was included. Colbert and Eckard (2015) did utilize a net expenditures variable and assert that higher expenditures will permit the hiring of better assistant coaches, but they do not assess the salaries independently.

SALARY DETERMINANTS IN COLLEGE FOOTBALL

The question that this research sought to answer is how intra-staff salary disparity impacts team performance. Previous studies focused on college football have generally assessed the influence that the head coach compensation has on performance outcomes. Given the rise in salaries paid to both head and assistant coaches, however, it is evident that both should be considered. Collegiate coaching staffs are formed under the premise that they will function as a single unit and not as a collection of separate constituents. That is, all parties involved are driven to achieve the same goal of on-field success by way of wins. Therefore, it would be remiss to assess the potential relationship between salary and performance for a single coach (e.g., head coach) without placing him in the context of his coaching staff. Currently, the NCAA mandates that coaching staffs at the Division I FBS level may employ one head coach, ten assistant coaches, and four graduate assistants (National Collegiate Athletic Association, 2018). In general, these assistant coaches will occupy coordinator (e.g., offensive coordinator, defensive coordinator) and position-group specific roles (e.g., quarterbacks, running backs linebackers, defensive backs), with coordinators generally earning the highest salaries.

To better understand this marketplace, it is important to realize the processes that allows for the offering of these high-priced salaries. The mechanism for these significant increases in compensation paid to both assistant and head coaches is via non-price competition, whereby the schools are not allowed (because of NCAA amateurism rules) to pay the athletes a competitive wage. As a result, schools choose the nearest practical substitutes in terms of the factors affecting the choice of which schools to attend, namely the athletic facilities and coaching staff. This non-price competition leads to additional investment in unrestricted factors (e.g., coaching pay), leading to an inefficient allocation of resources (Schwarz & Rascher, 2017).

CONTRIBUTION

While studies focused on collegiate sport have yielded varying conclusions regarding the degree to which the salaries of head coaches influence on-field success, none have directly measured the impact that intra-staff salary disparity has on team performance. For that matter, no direct measurement of assistant coaches' salaries, and the disparity that these compensation packages create in contrast to the head coach, has been conducted. Much of the previous literature has determined that a more compressed wage structure fosters greater productivity and performance outcomes among the workforce. Given the rapid growth of coaches' salaries at the FBS level, however, this notion will be assessed in the context of college football to determine whether these large contracts and subsequent disparities result in greater on-field performance. Ultimately, this research sought to understand how disparity affects performance, a salient topic for administrators across sport.

DATA AND VARIABLES DESCRIPTION

The assembled data set was comprised of information from a number of sources. All explanatory variables can be assigned to one of four categories: salary, on-field metrics, program quality, and team quality. Salary figures were obtained from the *USA Today* database and spanned the seasons 2010-2017 (Berkowitz et al., 2019). The sample is comprised solely of public institutions in both the Power 5 and Group of 5 conferences, given that private schools are not required to disclose their financial information. To that end, all schools that identified as independents, meaning that they do not align with a specific conference, were removed from the data set in an effort to eliminate the potential for statistical bias. Coincidentally, most of these institutions are also private. A complete listing of the omitted institutions can be found in Table 1 (see Appendix A).

Salaries for both the head coach and the top five assistant coaches were collected for each season during the sample period. The decision to include only the top five assistant coaches was made to acquire a sample that was representative of the population without excluding an abundance of schools. If a higher number, such as ten, was set as the requirement, the sample would have been significantly smaller due to a lack of data availability. The benchmark of five was thus deemed appropriate as it captured the two primary coordinators (offense and defense) and three position-specific coaches. In the event that a school failed to have five assistant coach records in a given year, the entire record for that school, for that year only, was omitted. Such instances were not widespread. These salary records were then used for the dispersion calculations.

On-field performance metrics were considered to control for the fact that team wins may be a function of on-field actions. Two common measures, Points For and Points Against, were used to assess on-field performance. Information was compiled exclusively from teamrankings.com. Assessing these variables allowed for more appropriate models to be constructed to accurately determine if intra-staff pay disparity has a statistically significant effect on team performance.

Program quality factors were considered to appropriately evaluate performance outcomes. The college football landscape is comprised of teams with varying levels of commitment to their respective football programs despite the underlying motive shared by each program to be successful and nationally recognized. Given this understanding, two proxies were utilized to control for program quality. Generally, Power 5 schools compete to win at a high level (e.g., win a national championship), whereas Group of 5 schools may seek national recognition with the understanding that winning a national championship is unlikely. Thus, the first program quality indicator was conference membership, and specifically whether the school was aligned with a Power 5 or Group of 5 conference. In addition, conference affiliation was also considered to determine the influence that conference membership (e.g., Big Ten, MWC) had on wins. These memberships were updated whenever a school realigned with a new conference (e.g., Missouri's departure from the Big 12 to join the SEC). The schools that competed in the now-defunct Big East and WAC conferences were also identified accordingly.

The second program quality proxy was related to coach turnover. In the current college football landscape, lack of program success is oftentimes attributed to inferior coaching, thus the replacement of a coach is thought to remedy unsatisfactory performance. Research, however, has proven that this is not always the case. Adler, Berry, and Doherty (2012) found that replacing a head football coach had little influence on team performance, especially if the program was severely underperforming, and boosts in performance were not recognized until year two or three. As such, coaching changes were recognized in the first and second year of a new coach's tenure, to capture the potential that a head coach needs time to develop a program and improve performance metrics.

The final variable, team quality, was captured by the teams recruiting rank. As programs recruit top players, their ranking will rise, leading to the general assumption that the higher the ranking the greater the potential for more wins. Rivals.com publishes rankings for the top 100 programs, so all programs were not assigned a ranking. For interpretation purposes, rankings were inverted such that, the team with the best recruiting ranking would be 100 and the team with the lowest would be 1. Unranked teams were assigned a 0 value.

The primary independent variable of interest, the Gini coefficient, was calculated for each school that met the criteria of having one head coach and at least five assistant coaches' salary figures. The Gini index, for reference, provides a measure of inequality between 0 & 1 for a certain population, with 0 delineating complete equality and 1 signifying complete inequality. This measure of dispersion is widely used across disciplines, and in the sport setting specifically, to assess earning distributions. This metric was preferred over standard deviation or coefficient of variation measures because these metrics are more susceptible to influence by exceedingly high or low values which were present in the data set due to the varying size of football programs. In total, 720 indices were calculated for the seasons spanning 2010-2017.

The dependent variable of interest was total wins and took into account the regular season, conference championships and bowl games. Even though not all conferences have a conference championship nor does every team play in a bowl game, assessing wins in their totality presented a more accurate depiction of performance. Moreover, the decision to use wins and not win percentage was motivated by the desire to present results that could be easily interpretable. Given the nonlinear nature of the win percentage metric, interpretations for the practitioner may be complex (e.g., going from a win percentage of 0.500 to 0.600 is not a 10% increase, but rather a 20% change) and could lead to the drawing of inaccurate conclusions.

Table 2 contains summary statistics for the variables used in the analysis. The Gini index was the primary independent variable of interest and was utilized as the sole measure of pay dispersion. Of initial significance was the mean Gini coefficient of .4288, which implies that the average coaching staff salary skewed marginally toward equality. Head coach and total assistant coach pay were included in the descriptive table despite not being utilized in the statistical analysis to provide a more comprehensive description of the data.

Table 3 presents the Gini coefficient metrics for all schools in the sample by season. Since salaries have continued to rise in college football, it is instructive to consider the impact of time on the data. As the statistics indicate, pay disparities have remained relatively consistent from year to year despite the significant increases in pay. Thus, it can be initially concluded that salaries are generally increasing for all coaches and not just the head coach. Table 4 compares the Gini coefficients of the various conferences to provide a more detailed depiction of pay dispersion. Not surprisingly, the Power 5 conferences featured the highest average Gini coefficient values, led by the SEC and the Big 12. In the Group of 5, the MAC and Sun Belt conferences had the highest average Gini coefficients. While these summary statistics do not provide any indication of performance outcomes, they present an illustrative depiction of the nature of pay disparities within college football.

TABLE 2
SUMMARY STATISTICS

Variable	Min	Max	Mean	Std. Dev.
HC School Pay	$140,000	$11,132,000	$1,911,915	$1,527,063
Total AC School Pay	$342,020	$4,850,000	$1,377,037	$836,208
Total Staff Pay	$502,376	$15,672,000	$3,288,953	$2,293,506
Gini Index	.1702	.6506	.4288	.0867
New Coach – Year 1	0	1	.20	.400
New Coach – Year 2	0	1	.19	.392
Recruiting Rank	0	100	42.47	33.30
Points For	117	723	382.20	104.85
Points Against	106	572	343.01	77.59

N = 720

TABLE 3
SUMMARY STATISTICS – GINI COEFFICIENT BY SEASON

Year	*n*	Min	Max	Mean	Std. Dev.
2010	67	.1702	.6506	.4549	.0968
2011	75	.2096	.6042	.4377	.0958
2012	84	.2395	.5967	.4352	.0887
2013	91	.2823	.5850	.4336	.0866
2014	99	.1939	.6145	.4241	.0828
2015	105	.2336	.5721	.4146	.0835
2016	94	.2436	.6110	.4289	.0818
2017	105	.2416	.6034	.4140	.0792

N = 720

TABLE 4
SUMMARY STATISTICS – GINI COEFFICIENT BY CONFERENCE

Conference	*n*	Min	Max	Mean	Std. Dev.
AAC	32	.2916	.5735	.4282	.0729
ACC	60	.2096	.5709	.4717	.0621
Big 12	62	.2336	.6506	.4899	.0746
Big East	16	.3008	.5492	.4453	.0813
Big Ten	78	.3008	.6145	.4723	.0760
C-USA	76	.2669	.5252	.3890	.0613
MAC	84	.2176	.4403	.3416	.0380
MWC	64	.2481	.5199	.3709	.0663
Pac 12	70	.3499	.6034	.4791	.0553
SEC	100	.2395	.6049	.4917	.0645
Sun Belt	66	.1702	.4947	.3487	.0669
WAC	12	.2990	.5156	.3874	.0647
Power 5	382	.2096	.6506	.4800	.0689
Group of 5	338	.1702	.5735	.3706	.0656

N = 720

RESULTS

Similar to the Colbert and Eckard (2015), regression models were created to determine the influence that the predictor variables had on team performance as measured by wins. Specifically, a series of hierarchical models were developed to allow for comparisons to be made between models and variable categories. To assess the performance of FBS football programs four hierarchical linear regressions were created. The first model contained only the on-field performance metrics, Points For and Points Against. As indicated in Table 5, both variables were significant predictors. Model 2 included the on-field variables as well as the program quality variables. For this analysis, Power 5 was included in the model which made Group of 5 the reference variable. Both the Points For and Points Against variables held their significance and associated sign as found in Model 1. Both the Power 5 and coaching turnover variables were not found to be significant predictors of wins. The third model included all of the variables from Model 1 and 2 as well as the team quality variable related to recruiting. Again, the on-field variables were found to be statistically significant, holding the same sign as in Model 1 and 2. The Power 5 variable kept the same negative sign but was found to be a significant predictor. The added recruiting variable was found to be a significant positive predictor of wins. The final model contained all of the aforementioned variables in addition to the Gini coefficient variable. The on-field, Power 5, and recruiting rank variables kept their sign and significance from Model 3. The New Coach and Gini coefficient variables were not found to be significant predictors of wins.

TABLE 5
FBS PROGRAMS REGRESSION RESULTS

	Model 1		Model 2		Model 3		Model 4	
Variable	β	SE	β	SE	β	SE	β	SE
Points For	.021***	.000	.021***	.000	.021***	.000	.021***	.000
Points Against	-.018***	.001	-.017***	.001	-.017***	.000	-.017***	.000
Power 5			-.072	.094	-.381**	.161	-.017**	.210
New Coach – Year 1			-.118	.329	-.123	.120	-.135	.121
New Coach – Year 2			-.107	.377	-.124	.121	-.137	.122
Recruiting Rank					.006**	.003	.007***	.003
Gini Index							-.698	.725
Constant	5.043***	.295	5.139***	.305	5.036***	.307	5.302***	.413
Adj. R-square	.841		.841		.842		.842	

Note. N = 720; *p < .10, **p < .05, ***p < .01

The second set of models (Table 6) were specifically designed to assess the influence of conference affiliation on wins, while also considering most of the variables from Table 5. Once again, four models were created. Model 1 contained only the variables from Table 5, except Power 5, which will henceforth be referred to as team-specific variables for clarity purposes. The Power 5 variable was removed as this set of models was created to assess conference-specific outcomes. Points For and Points against were the only two significant predictors of the six measured, explaining roughly 84% of the variation in the outcome variable. Model 2 included all of the team-specific variables from Model 1 in addition to the individual conferences that make up the Power 5. Points For and Points Against held their significance and sign. Recruiting Rank was found to be a significant positive predictor of wins in this model. In addition, all of the conference-specific variables, except the Big Ten, were significant negative predictors of wins. Model 3 assessed all of the team-specific variables and the conferences that make up the Group of 5. Points For, Points Against, and Recruiting Rank held their sign and significance from Model 2. All of the conference-specific variables, except the AAC, were found to be significant positive predictors of attendance. The final model, Model 4, considered all of the variables described previously. Points For, Points Against, and Recruiting Rank maintained their sign and significance. Of the conference-specific variables, the Pac-12 variable was found to be a significant negative predictor, while the remaining conferences were not significant.

TABLE 6
CONFERENCE REGRESSION RESULTS

	Model 1		Model 2		Model 3		Model 4	
Variable	β	SE	β	SE	β	SE	β	SE
Points For	.021***	.000	.021***	.000	.021***	.000	.021***	.000
Points Against	-.017***	.001	-.017***	.001	-.017***	.001	-.017***	.001
New Coach – Year 1	-.126	.121	-.153	.121	-.126	.121	-.142	.121
New Coach – Year 2	-.115	.122	-.148	.122	-.126	.122	-.142	.122
Recruiting Rank	.003	.002	.008***	.003	.007**	.002	.009**	.003
Gini Index	-1.013	.711	-.540	.731	-.463	.747	-.334	.753
ACC			-.513**	.217			-.466	.115
Big 12			-.494**	.212			-.447	.297
Pac 12			-.663***	.204			-.615**	.291
Big Ten			-.235	.191			-.184	.279
SEC			-.491**	.218			-.457	.293
AAC					.260	.241	-.058	.316
C-USA					.327*	.189	.021	.274
MAC					.478**	.207	.206	.277
MWC					.462**	.205	.164	.282
Sun Belt					.386*	.215	.109	.284
Constant	5.419***	.410	5.079***	.429	4.839***	.471	4.890***	.493
Adj. R Square	.841		.843		.842		.842	

Note. N = 720; *p < .10, **p < .05, ***p < .001

The final set of models tested the interaction of specific variables and pay disparity, as measured by the Gini Index (see Table 7). Model 1 contained all of the team-specific variables, in addition to the interaction between the Gini Index and the Power 5 variable. Points For, Points Against, and Recruiting Rank were found to be statistically significant predictors of wins. Points For and Recruiting Rank were positive predictors, while Points Against was a negative predictor. The interaction between the Gini Index and Power 5 was found to be a significant negative predictor of wins. Model 2 considered all of the variables from Model 1 except the interaction variable between the Gini Index and Power 5, which was removed due to multicollinearity. The conference-specific interaction variables between the Gini Index and Power 5 were also included in this model. Points For, Points Against, and Recruiting Rank held their sign and significance. All of the conference interaction terms were found to be significant negative predictors of wins except for the Big Ten interaction variable which was not significant. Model 3 included all of the team-specific variables from Model 2 as well as the interaction terms between the Gini Index and Group of 5 conferences. Similar to Model 1 and 2, Points For, Points Against, and Recruiting rank maintained their sign and significance. All of the conference interaction terms were significant positive predictors except for the AAC interaction variable which was not significant. Model 4 contained all of the team-specific variables from Model 2 and 3 in addition to all of the conference-specific interaction terms. The team-specific outcomes were identical, while only the Pac-12 interaction term was found to be significant.

TABLE 7
INTERACTION REGRESSION RESULTS

	Model 1		Model 2		Model 3		Model 4	
Variable	β	SE	β	SE	β	SE	β	SE
Points For	.021***	.000	.021***	.000	.021***	.000	.021***	.000
Points Against	-.017***	.001	-.017***	.001	-.017***	.001	-.017***	.001
New Coach – Year 1	-.145	.121	-.150	.121	-.132	.121	-.150	.121
New Coach – Year 2	-.146	.122	-.148	.122	-.132	.122	-.148	.122
Recruiting Rank	.007***	.003	.009***	.003	.007***	.002	.009***	.003
Gini Index	-.171	.789	.042	.919	-.810	.723	.042	.919
Gini Index*Power 5	-.907***	.374	--	--	--	--	--	--
ACC*Gini			-1.197**	.470			-1.025	.661
Big 12*Gini			-1.146**	.453			-.973	.657
Pac 12*Gini			-1.498***	.444			-1.319**	.652
Big Ten*Gini			-.577	.421			-.394	.630
SEC*Gini			-1.113**	.461			-.982	.647
AAC*Gini					.626	.547	-.100	.733
C-USA*Gini					.788*	.455	.078	.657
MAC*Gini					1.358**	.557	.750	.704
MWC*Gini					1.353**	.511	.665	.689
Sun Belt*Gini					1.177**	.561	.545	714
Constant	5.117***	427	4.885***	.442	4.967***	.441	4.706***	.459
R Square	.844		.846		.845		.846	

Note. N = 720; *p < .10, **p < .05, ***p < .001

DISCUSSION

The construction of coaching staff salaries at the Division I level, and the subsequent on-field performance outcomes, is a topic that warrants exploration given the unique nature of collegiate sports. The primary goal of this study was to determine the influence that intra-staff pay disparities have on team wins. In order to appropriately assess team performance, on-field production metrics must first be considered. As the results in Table 5 suggest, Points For and Points Against are consistently significant predictors that maintain their sign throughout the various analyses. The positive and negative sign associations are logical, given that the more points a team scores, the more likely they are to win, while the inverse is also generally true. Model 3 also found that the Power 5 variable was a significant negative predictor of wins. This outcome speaks to the increased level of competition among these schools in comparison to the Group of 5 conferences. This is not to suggest that Power 5 affiliation is inherently negative, especially given the lucrative television contracts associated with the various conferences. Rather, it is indicative of the talent level, which is significantly greater thus making it more difficult to achieve success.

Model 4 (Table 5) is the most relevant to the purpose of this study. The Gini index, however, was not found to be a significant predictor of wins, leading to the initial conclusion that intra-staff pay disparity does not have a significant impact on on-field performance outcomes. Of further interest is the amount of variability explained by each of the models in Table 5. Since the R-square value will always increase with the addition of variables, an adjusted R-square was utilized to better capture the performance of the various models. As shown in Table 5, Model 1 explained virtually the same degree of variability in the outcome variable as Models 2 – 4. Thus, the results would indicate that team wins are primarily a function of on-field actions.

Table 6 displays the results of individual conference regressions. Model 1 accounted only for the team-specific variables, of which Points For and Points Against were the only significant predictors. In Model 2, the specific Power 5 conferences were included. Each of the conferences, except the Big Ten, were significant negative predictors of wins. This would suggest that being affiliated in one of these conferences would lead to a marginal decrease in wins per season. Model 3 presents the opposite results. All of the Group of 5 conferences, besides the AAC, were significant positive predictors of wins. As previously stated, the level of competition is likely driving these results. When considering all of the variables (Model 4), it becomes clear that conference affiliation does not significantly explain win variability. Rather, on-field actions coupled with recruiting success were found to be the primary drivers of wins. Once again, it is instructive to consider that the adjusted R-square values do not increase significantly with the addition of the conference variables.

The final set of models in Table 7 considers the interaction between pay disparity and conference affiliation. These outcomes are of particular interest given the scope of this study. In Model 1, the usual variables were significant, as well as the interaction between the Gini Index and Power 5 variable. As the results further suggest, greater pay disparities in the Power 5 conferences have a negative impact on wins compared to the Group of 5. Specifically, for every unit increase in the Gini coefficient, a Power 5 school can expect to see a decrease of roughly 1 win per season. As such, a highly paid head coach in relation to his assistants (e.g., greater disparity) would likely have a more positive on-field impact in a Group of 5 program.

This finding related to Group of 5 programs could possibly be explained by the hierarchical wage structure present within many of these coaching staffs. Such a structure creates motivation via external factors, such as pay raises and advancement opportunities, to perform well and advance to a more high-profile position in a Power 5 program (Bloom, 1999; Lazear & Rosen, 1981; Ramaswamy & Rowthorn, 1991). This idea of advancement aligns with the current coaching trends within Group of 5 programs, as many of these coaches are looking to further their careers by earning a job at a Power 5 program with the expectation of increased financial benefits.

Model 2 provides further support for the results in Model 1. Each of the significant Power 5 conference variables are negative, indicating that greater disparity leads to fewer wins on average. The opposite is true for the Group of 5 schools as shown in Model 3, where a greater disparity is associated with roughly one additional win on average. Such a notion is supported when one considers the large pay disparities among coaches at Power 5 schools who do not win a large number of games per season.

This contrast in pay disparity and wins between Power 5 and Group of 5 programs is illustrated in Figure 1 (see Appendix B). What is particularly important to note is the cluster of Group of 5 programs within the Gini range of .300 and .400. These schools which accounted for 72% of the Group of 5 sample, had a large disparity in average wins despite smaller Gini Indices. Therefore, the data would suggest that these programs are driving the results of the various regression models. This supports the conclusion that these coaches are doing more (in terms of wins) with less (in terms of smaller overall coaching staff budgets). In comparison, the Power 5 schools have greater disparities in both pay (between .400 and .600) and average wins.

When considering all of the variables in Model 4, it again becomes clear that on-field actions (measured by Points For and Against) coupled with recruiting success are the primary drivers of wins. The adjusted R-square value of the various models in Table 7, similar to previous models, did not vary significantly when predictors were added which further supports the conclusion that on-field actions drive wins, not the observed disparities in coaching staff pay. Notably, the Gini Index as a standalone variable was not a significant predictor of wins in any of the Models in Table 7, or in any of the models in Table 5 or 6.

CONCLUSION

Unlike previous studies that have linked greater pay disparity with a decrease in team success, this study did not find a consistent linkage. Based on these findings, it does not appear that an ideal wage structure (e.g., compressed, hierarchical) exists in college football which can be subsequently applied across the entire landscape. When assessed in totality, pay disparity did not have a statistically significant impact on wins. In fact, pay disparities only had a marginally significant influence when assessed at the conference level. Ultimately, success appears to be driven primarily by on-field performance measures.

FUTURE RESEARCH

The results of this study provide an understanding of how intra-staff pay disparity influences team performance. Areas for future research may include the exploration of different coaching contexts, as NCAA Division I football has many attributes that make it unique from other college and professional sports. Furthermore, the majority of sport wage dispersion literature has utilized team performance (i.e., winning) as the outcome variable. However, this is not the main concern for all sport organizations. Thus, future researchers could explore the impact of wage dispersion on firm performance for organizations that identify as profit-maximizers, where the ultimate goal is primarily financial in nature.

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APPENDIX A

TABLE 1
INSTITUTIONS NOT INCLUDED IN SAMPLE

Institution	Conference
Army	Independent
Baylor	Big 12
BYU	Independent
Duke	ACC
Hawaii	MWC
Liberty	Independent
Miami (FL)	ACC
Navy	AAC
Northwestern	Big 10
Notre Dame	Independent
Penn State	Big 10
Pittsburgh	ACC
Rice	C-USA
Southern California	Pac 12
Southern Methodist	AAC
Stanford	Pac 12
Syracuse	ACC
Temple	AAC
Texas Christian	Big 12
Tulane	AAC
Tulsa	C-USA/AAC
Vanderbilt	SEC
Wake Forest	ACC

APPENDIX B

FIGURE 1
MEAN WINS AMONG POWER 5 AND GROUP OF 5 PROGRAMS