

6-1-2024

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Recommended Citation

Traugutt, Alexander and Morton, Jarid (2024) "Salary Disparity and Team Performance: An Empirical Analysis of the English Premier League," *Journal of Applied Sport Management*. Vol. 16 : Iss. 2.<https://doi.org/10.7290/jasm16sktj>Available at: <https://trace.tennessee.edu/jasm/vol16/iss2/4>

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Salary Disparity and Team Performance: An Empirical Analysis of the English Premier League

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Abstract

The English Premier League (EPL) is the top-tier English soccer system, becoming one of the most popular sports leagues in the world. One topic within the EPL that has garnered significant attention is player compensation and roster construction. Given the varied outputs of players and the spending power of each club, the question becomes whether a specific type of pay structure maximizes on-field performance. Thus, this study aimed to understand the effect of intra-team salary disparity on performance. Results indicated that although rosters tend to be organized in a more compressed manner, salary disparity was not a significant predictor of team success. Instead, a roster constructed around a greater number of impact players was found to be the most positive predictor of performance. The insights from this study have practical managerial and strategic planning implications in sports leagues seeking to optimize performance amidst intra-team salary disparities.

Keywords: compensation, EPL, finance, soccer, wage dispersion

Introduction

The English Premier League (EPL) has experienced a remarkable rise in popularity in recent years, solidifying its status as one of the world's most captivating and widely followed football leagues. A key factor underpinning the league's popularity is its financial growth. Over the years, the EPL has attracted substantial investments from broadcasters, sponsors, and investors, resulting in lucrative broadcasting rights deals and sponsorship agreements. Recently, the EPL signed a new international broadcast deal with a total value that will climb over the next 3 years from \$4.74 billion to \$6.08 billion (Athletic Staff, 2022). Most of this is attributable to advances in the United States sports market spurred by the increased popularity of youth soccer. These new fans share the same language as England, making it easier to convert to watching the EPL over the other top five leagues where the primary language is not English (e.g., Bundesliga, La Liga). These increased broadcast revenues have created tremendous growth for the EPL, further bolstering the overall appeal of the league. However, these significant monetary gains have also generated speculation about how clubs should effectively allocate their financial resources.

One notable aspect that captivates fans and observers is the considerable salary discrepancies among players and rosters within the EPL. As a result of media rights and sponsorship deals, coupled with inherent owner wealth, the league boasts some of the highest-paid players globally, creating a significant variance in wages among and across clubs. Wealthier clubs with abundant financial resources can offer lucrative salaries to attract and retain star players, creating a sense of glamour and intrigue around their squads. Conversely, smaller clubs often operate with tighter budgets, resulting in more modest salaries for their players. For instance, the highest-spending club on payroll during the 2022–2023 season was Chelsea at £220,844,000, whereas the lowest was Brentford at £34,580,000. These disparities add an intriguing dimension to the league and highlight the challenges faced by less financially endowed clubs in competing against their wealthier counterparts.

This study aims to evaluate the impact of intra-team salary disparity on team performance in the EPL to better understand the mechanisms that influence match outcomes. By exploring the effects of salary disparities among players, this research will provide valuable insights into how financial factors influence team cohesion, motivation, and overall performance. Such knowledge is crucial for clubs and managers as they navigate the complexities of managing financial resources and fostering a team environment that maximizes performance.

Literature Review

Wage dispersion, or the variation in compensation levels within an organization, has garnered considerable research attention due to its potential impact on organizational success. Two theoretical frameworks are commonly utilized to understand the dynamics of organizational behavior and outcomes. Tournament theory, initially introduced by Lazear and Rosen (1981), posits that organizations can create hierarchical incentive structures resembling tournaments, where employees compete for higher positions, rewards, or promotions (Ramaswamy & Rowthorn, 1991). This framework finds support from numerous studies, predominately from professional leagues outside of soccer, including the National Hockey League (e.g., Cyrenne, 2018) and the National Basketball Association (e.g., Simmons & Berri, 2011). It should be noted that in both contexts, the number of players on the playing surface at a given time is

significantly less than in soccer, which may contribute to these findings. Moreover, Simmons and Berri (2011) offered the perspective of “justified inequality,” wherein players accept the fact that some are more talented than others and thus deserve higher wages (p. 387). They found that both team and player performance outcomes increased as the justified inequality increased, which lends support to tournament theory.

Conversely, cohesion theory suggests that lower levels of wage dispersion promote a sense of fairness and cooperation, thus facilitating greater productivity (Akerlof & Yellen, 1990; Levine, 1991). The resulting synergy contributes to higher levels of coordination and, ultimately, better organizational performance. Studies focused on professional sport have primarily concluded that higher levels of salary disparity negatively impact team performance, although these outcomes can vary based on their specific dynamics and structure.

In the top division of Italian soccer, Serie A, a league structured identically to the EPL, a study by Buccioli et al. (2014) revealed that greater salary dispersion negatively impacted team performance. Domizio et al. (2021) theorized that their findings of a negative correlation between high levels of salary dispersion and total season points in this league might be explained by envy among squad members leading to a lack of cohesion towards a unified goal of team success. This concept of peer effects on team cohesion was explicitly studied by Molodchik et al. (2021) in their analysis of talent dispersion among 234 soccer teams and 5,457 soccer players. Using the video game FIFA’s player ranking system as their proxy for talent, they found that greater talent dispersion among squad members was negatively correlated with individual performance. Thus, a more equal distribution of ranked talent on a roster was a significant predictor of team performance. In Major League Soccer (MLS), Coates et al. (2016) determined that a more balanced wage structure leads to greater team performance. However, it should be noted that this league operates as a single entity that limits player wages, a function that is not present in European soccer.

Lastly, researchers have concluded that the ideal wage structure to maximize performance outcomes is context-dependent. In the first league of German soccer, the Bundesliga, Franck and Nüesch (2011) found a U-shaped curve related to team performance and intra-team salary dispersion. Teams adopting either an egalitarian or tournament-style structure enjoyed more on-field success than those with medium levels of disparity. In a study of four European soccer leagues, Gasparetto and Barajas (2022) found that firm size was the most significant variable in explaining team success. The optimal wage a team should adopt depended on their financial strength and relative payroll. Frick et al. (2003), in their analysis of four professional sports leagues in the United States, concluded that the ideal roster construction and salary dispersion is dependent on the level of cooperation required within the team. Players in Major League Baseball, for example, preferred more equal levels of pay, whereas players in the National Basketball Association favored higher degrees of disparity, a finding that aligns with Simmons and Berri (2011).

Each of the studies referenced above and many others (e.g., Breunig et al., 2014; Jang, 2019; Yamamura, 2015) uses a select number of dispersion metrics in their analysis. The most common form is the Gini Coefficient, which calculates a measure of inequality between 0 and 1, with 0 indicating complete equality and 1, complete inequality. Another common form is the coefficient of variation, a straightforward measure expressing the standard deviation as a percentage of the mean. Although both measures are valid, the Gini Coefficient is often preferred when examining income or wage inequality because it measures the overall distributional inequality by considering the dispersion across all income levels. It

also considers the cumulative share of income received by the members of a team, offering a more comprehensive view of inequality.

Previous research has shown that wage dispersion plays a significant role in shaping organizational outcomes (e.g., Frick et al., 2003). The tournament and cohesion theory perspectives provide a foundation for understanding the complex relationship between salary disparity and success. A roster constructed with a more dispersed salary structure, in line with tournament theory, may motivate players to strive for higher performance, resulting in the opportunity for increased earnings and, consequently, contributing to organizational success. On the other hand, low wage dispersion among a team, as advocated by cohesion theory, may promote fairness, cooperation, and collaboration, which in turn can enhance team and organizational performance. As such, sport organizations must carefully consider how to structure their rosters to maximize on-field success.

Hypothesis

We predict that higher levels of intra-team salary disparity among EPL clubs will be associated with a negative impact on team success. Specifically, we hypothesize that rosters constructed with greater wage disparity will exhibit lower levels of overall performance, measured by the number of points earned, compared to those with more compressed wage structures. This study aims to offer essential insights into the causal relationship between financial factors and on-field success within the EPL. The findings can serve as a foundation for understanding the impact of how financial resources are managed to enhance team dynamics and optimize overall performance.

Data

The data for this study include yearly observations for teams competing in the EPL from 2013/14–2022/23, for a total of nine seasons and 180 observations. Consistent and reliable salary data were unavailable before the 2013/14 season, which led to the 2013/14 season being the first year in the sample. The 2020/21 COVID-19 impacted season was removed to ensure consistency and validity across the sample. It should be noted that there is evidence of endogeneity between crowds and performance (e.g., Bryson et al., 2021); however, this study was not interested in exploring this relationship.

Table 1 contains a complete list of variables, their source, and a brief description of each. The dependent variable, Points, was tallied at the end of the season for each team. Unlike leagues that use a traditional win/loss metric, the EPL uses a point system to measure overall success. Three points are awarded for a win, one point is awarded for a tie, and zero points are awarded for a loss. The primary independent variable of interest, the Gini Coefficient, was used to measure salary dispersion for each team. The coefficient calculates a measure of inequality between 0 and 1, with 0 indicating complete equality and 1, complete inequality. In addition, the Gini Coefficient was preferred over other metrics, such as the coefficient of variation, due to its sensitivity to inequality, which is necessary given that absolute salary amounts vary widely among players (Allison, 1978). Variable selection was guided by prior studies, particularly those examining soccer leagues in Europe and the United States (e.g., Coates et al., 2016; Franck & Nüesch, 2011; Gasparetto & Barajas, 2022; Molodchik et al., 2021).

Table 1*Variable Descriptions*

Variable	Data Source	Description
FIFA rating	fifaindex.com	A measurement tool of talent available to a team. The maker of the video game FIFA, Electronic Arts (EA), uses more than 300 independent variables that are simplified into six categories and 29 attributes to derive a rating for each team.
Gini Coefficient	capology.com	Salary data was collected for each team and then used to calculate the Gini Coefficient.
Impact players	myfootballfacts.com	Impact players are designated as the top 20% of players with goal contributions. The decision to include the top 20% was informed by the Pareto distribution. Goal contributions are the combined total of goals and assists. To be considered for this, a player must have at least one goal or one assist.
Players rostered	soccerbase.com	Accounted for the number of players on the roster that saw game action during the regular EPL season or in associated tournaments.
Points	premierleague.com	Points are how the premier league tracks results. A win is 3 points, a tie is 1 point, and a loss is 0 points.
Relegation	premierleague.com	For the Premier League, the bottom three teams at the end of each season are relegated to the English Football League Championship, the second-highest soccer division in England.
Top 10 wages	capology.com	Dummy variable indicating whether a team was in the top 10 in total team wages in a given season.
Total team wages	capology.com	The total wage bill for a team in the given season.
Years in EPL	premierleague.com	The number of consecutive seasons a team has remained in the English Premier League since its founding in 1992.

Methodology

This study utilized a fixed effects multiple linear regression model to identify those variables that significantly impacted team performance (e.g., Coates et al., 2016; Franck & Nüesch, 2011). The panel nature of the data, supported by the results of the Hausman test, justified this model choice. Despite a smaller sample size, the use of such a model is further supported by the unbalanced nature of our dataset due to the promotion and relegation system, wherein certain teams do not consistently participate in the EPL. The process of teams being promoted or relegated (known as attrition) is a nonrandom occurrence primarily associated with the unobserved playing strength of a team. The fixed effects model accommodates the correlation between attrition and the unobserved effect, which helps mitigate the impact of nonrandom attrition on the estimation process (Wooldridge, 2010).

The dependent variable, Points, for a given team, i , during season t was estimated using the following structure. β_0 is the constant term, $\beta_1 \dots \beta_8$ are the coefficients that represent the relationship between the independent and dependent variable, α is the individual fixed effect that captures the unobserved heterogeneity specific to each team, and u is the error term.

$$Points_{it} = \beta_0 + \beta_1 FIFA_Rating_{it} + \beta_2 Gini_Coefficient_{it} + \beta_3 Impact_Players_{it} + \beta_4 Players_Rostered_{it} + \beta_5 Relegated_{it} + \beta_6 Top_10_Wages_{it} + \beta_7 Total_Team_Wages_{it} + \beta_8 Years_in_EPL_{it} + \alpha_i + u_{it}$$

Table 2 contains descriptive statistics for each variable. A notable metric is the mean of the Gini Coefficient at .34, which suggests that EPL team salaries skew toward equality, indicating that wages are more compressed.

Table 2

Descriptive Statistics

Variable	Mean	Standard Deviation	Min	Max
FIFA Rating	77.7	3.54	70	86
Gini Coefficient	.34	.07	.12	.55
Impact Players	3.22	1.81	0	8
Players Rostered	29.08	4.35	20	42
Points	52.42	18.15	16	100
Relegated	.15	.35	0	1
Top 10 wages	0	1	.50	.50
Total Team Wages	£72,303,358	£43,436,382	£15,581,000	£238,850,000
Years in EPL	11.77	10.51	1	31

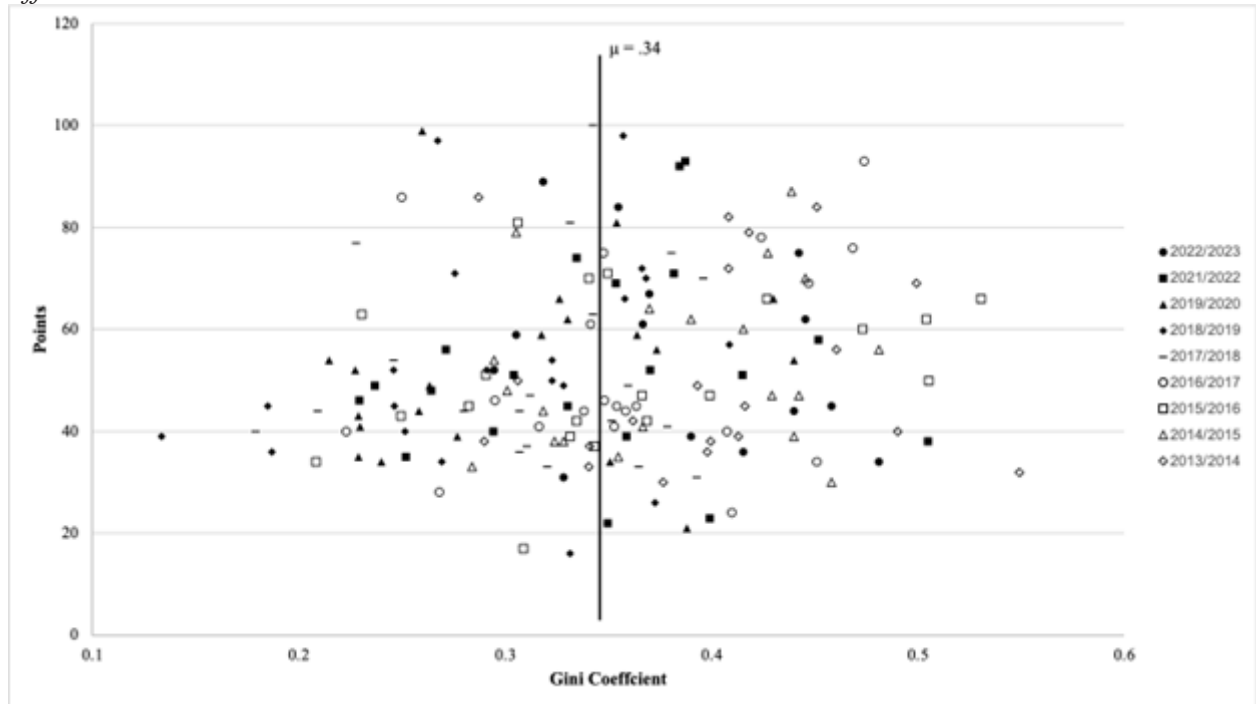
Exploratory Analysis

The previous literature has yielded mixed results regarding the salary structure that maximizes performance. Figure 1 provides a visual depiction of the relationship between the two primary variables of interest, the Gini Coefficient and Points. Interestingly, the highest-performing team in every season did not have the highest Gini Coefficient value. Higher Gini values were generally associated with fewer Points

than those teams at or around the mean value ($\mu = .34$). Thus, this figure suggests that a more compressed wage structure leads to greater on-field success.

Figure 1

Gini Coefficient and Points



A correlation matrix was also constructed to provide an overview of the interrelationships among variables (see the pairwise correlations in Table 3). The results reveal several interesting patterns, focusing on the relationship with the dependent variable, Points. Notably, there is a weak positive association with the Gini Coefficient ($r = .181$, $p < .05$), suggesting that intra-team salary disparity is not a strong driver of performance. The strong positive correlation with Impact Players ($r = .821$, $p < .01$) would indicate that a roster constructed with top-tier talent yields greater success on the pitch. It should also be noted that the FIFA Rating variable ($r = .724$, $p < .01$) was highly correlated with Points, a further indication that overall roster talent is a critical factor in overall performance. Not surprisingly, there was a moderate negative relationship with the Relegated variable ($r = -.530$, $p < .01$). Overall, most variables exhibited positive correlations.

Table 3
Correlation Mix

Variable	1	2	3	4	5	6	7	8	9
1. FIFA Rating	1	.220**	.701**	-.049	-.321*	.705**	.868**	.767**	.724**
2. Gini Coefficient	.220**	1	.179*	.302**	.011	.280**	.129	.275**	.181*
3. Impact Players	.701**	.179*	1	-.013	-.388**	.561**	.610**	.502**	.821**
4. Players Rostered	-.049	.302**	-.013	1	.096	.073	.049	.080	-.076
5. Relegated	-.321**	.011	-.388**	.096	1	-.358**	-.316**	-.271**	-.530**
6. Top 10 wages	.705**	.280**	.561**	.073	-.358**	1	.744**	.680**	.594**
7. Total Team Wages (ln)	.868**	.129	.610**	.049	-.316**	.744**	1	.733**	.635**
8. Years in EPL	.767**	.275**	.502**	.080	-.271**	.680**	.733**	1	.608**
9. Points	.724**	.181*	.821**	-.076	-.530**	.594**	.635**	.608**	1

**p < .01. *p < .05

Results and Discussion

Utilizing a fixed effects regression model captured time-invariant characteristics of the individual units (e.g., teams) in the panel data. The model was set up to assess the variables that impact Points, with particular emphasis on the Gini Coefficient (see Table 4). Two of the seven independent variables were significant at the 5% level. The model had an R-squared value of .85 (85%), and there were no issues with multicollinearity as measured by a variance inflation factor (VIF) greater than five.

Table 4
Regression Model Results

Variable	Coefficient	p-value
Intercept	96.514	.075
FIFA Rating	-.193	.703
Gini Coefficient	-10.157	.397
Impact Players	4.481	<.001*
Players Rostered	-.198	.237
Relegated	-10.270	<.001*
Top 10 Wages	1.036	.714
Total Team Wages (ln)	-3.604	.624
Years in EPL	-.087	.708
Fixed Effects	Yes – Team	

Note. Results from the fixed effects regression model. N = 180. R-squared: .847.

*p < .05

The results indicated that the Gini Coefficient was not a significant predictor of Points, nor was it approaching significance ($p = .387$). Although there are myriad explanations for this outcome, team payrolls may be constructed so that neither highly dispersed nor compressed wage structures consistently align with greater on-field success. This notion is supported by Figure 1, wherein the highest-performing teams did not have the highest Gini Coefficients, and vice versa. For example, in the 2021/2022 season, Leeds United had the highest Gini Coefficient (.51) and earned only 38 points, finishing the season 17th in the table and narrowly avoiding relegation (Burnley finished in 18th place with 35 points). Conversely, the three teams at the top of the table during the same season, Manchester City, Liverpool, and Chelsea, had the fifth, sixth, and twelfth highest Gini Coefficients, respectively. Thus, rosters are not constructed in a consistent manner as they relate to the dispersion of player salaries, which aligns with the results from previous studies focused on European soccer leagues.

The Impact players variable was the only positive significant predictor in the model ($\beta = 4.481$, $p < .001$). The coefficient would suggest that for every additional impact player a team rosters, their Point total would increase by roughly five. Recall that Impact players were categorized as those within the top 20% of players with goal contributions, which lends support to teams emphasizing the signing of these types of players. Moreover, this result, coupled with the outcome associated with the Gini Coefficient, would suggest that paying these players more, in relation to the rest of the roster, does not negatively affect team performance, potentially justifying higher salaries. The other significant variable, Relegated, held a negative relationship with Points. This outcome is rational, given that high-performing teams earn more points and thus are not relegated at the end of the season. Interestingly, the negative coefficient (-10.270) would suggest that relegated teams, on average, earn 10 points less than teams that are not relegated.

In addition to the significant variables, it is also important to consider the nonsignificant variables. At the onset, the finding that the total amount paid to players on a roster does not impact performance is interesting, as conventional thought would suggest that higher-paid rosters would feature better talent and thus win more. However, utilizing a team fixed effects model, which captures the varying dynamics and heterogeneity across teams, accounts for the strong pairwise correlations between this variable and the dependent variable. A similar conclusion can be drawn for the other nonsignificant factors that relate to team history and composition. The Players Rostered variable exhibited a very weak negative correlation ($r = -.076$) and nonlinear relationship (.005), which may be attributable to diminishing returns or a threshold effect, wherein having more or less players on the roster that saw game action during the regular EPL season or in associated tournaments does not significantly contribute to a team's performance.

Conclusion

The results of this study provide an avenue for understanding how wage disparity impacts team performance in the EPL and can also be applied to other sports leagues. Our results indicate that clubs do not strictly adhere to tournament or cohesion theories, contradicting our hypothesis and previous studies that have suggested a statistical relationship between salary dispersion and success (e.g., Coates et al., 2016; Domizio et al., 2021; Franck & Nüesch, 2011). Nevertheless, our findings build upon the existing literature by providing unique insights into the relationship between wage dispersion and team performance. Although prior research has predominantly focused on leagues with fewer players on the surface

at a given time, such as the National Hockey League and the National Basketball Association, our investigation specifically targeted the complex dynamics of the English Premier League. This nuance is crucial as soccer's distinct gameplay and team structure, particularly within this league, may influence how wage dispersion impacts performance. Through our focus, we sought to enrich the current discourse on wage dispersion and its implications for organizational success.

The insights derived from this study have practical implications for managerial decision-making and strategic planning within sports leagues that face similar challenges in optimizing team performance amidst intra-team salary disparities. The findings that salary disparity is not a significant predictor of team performance may be attributable to various factors unique to the EPL. First, the EPL is known for its competitive imbalance as a mixture of six clubs have finished in the top three in the table throughout the sample period and many years prior (the exception in the sample was Leicester City in 2015/16). Despite these successes, their Gini Coefficient measures vary considerably, suggesting that financial strength is not the key driver of performance. Second, although the EPL exhibits significant wage disparities among its clubs, its financial structure and revenue distribution may mitigate the impact on team performance outcomes. Moreover, the League's lucrative broadcasting deals and commercial revenues may create a financial cushion for all clubs, potentially minimizing the performance and talent differentials expected from wage inequalities. Last, the influence of impact players may negate the potential effect of wage distribution within a team. Because the performance of top clubs appears driven by the exceptional skills and contributions of key players, the Gini Coefficient may not adequately reflect this impact.

The aforementioned factors may also provide an explanation for the significant variables in our analysis. Season after season, the top-performing clubs also featured the greatest number of Impact Players. This would suggest that teams prioritize signing such players, which is a clearly ingrained club management strategy in the EPL. However, there is a caveat in that these top-tier players generally sign with clubs with greater financial strength, so the talent is pooled at the top of the table. From a managerial perspective, there appears to be little regard for the potential intra-team salary disparity that the signing of these players creates, as the emphasis is on winning championships. The fans' expectations of these top clubs should also be considered and may influence the organizations to invest more heavily in these impact players, regardless of the financial ramifications.

It is also interesting to consider the significant finding associated with the Relegated variable from a strategic management perspective. Our results indicate that Relegated teams earn 10 fewer points than those not relegated. This information can be a helpful barometer for club front offices to use in-season to evaluate their potential risk for relegation to The Championship, the second tier of Professional English Football. A team on the cusp may face various challenges, including increased pressure, squad morale issues, and the need for strategic adjustments to navigate a competitive environment. Moreover, a demotion to The Championship carries various consequences, including financial implications, loss of prestige, and potential adverse effects on the team's fanbase. As such, management should continuously monitor their teams' standing at the table, and these results provide a framework for analyzing their position relative to the rest of the clubs at a given point in the season.

By understanding how intra-team salary disparity influences team dynamics and outcomes, clubs can make informed decisions regarding player acquisitions, contract negotiations, and wage distribution. Although this study was effective in purpose, some limitations should be addressed that may impact the generalizability and robustness of our results. One noteworthy limitation is the sample size coupled with the fixed effects model utilized in our analysis, which, despite being carefully developed, may still be subject to constraints that influence

the precision of our estimates. Furthermore, alternative analytical methods, such as time-series analysis, might offer a complementary perspective and potentially enhance the accuracy of the results. Incorporating lagged values, for example, could allow for a more nuanced understanding of evolving dynamics within the league. Additionally, the exclusion of certain variables, which could exert a notable influence on team performance outcomes and points earned, is another aspect that should be considered. Although we purposefully selected variables based on the previous literature, omitting certain pivotal factors may have influenced our results.

Future studies should consider including the relative operating budget of each franchise. This would control the fact that clubs have varied spending power, which will undoubtedly impact their ability to spend on players. In addition, utilizing a per-game versus average attendance metric would allow for more specific conclusions to be drawn and would significantly increase the sample size as a function of collecting per-game data. Future research endeavors could explore avenues to address these constraints for a more nuanced understanding of the dynamics between club finances and performance in the English Premier League.

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