



€1 Million Boost: An Empirical Analysis of Revenue's Impact on the Success of European Football Teams

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Abstract

This study aims to quantify the impact of a €1 million change in revenue on the performance of professional football teams. The dependent variable, points per game (PPG), is analyzed in relation to revenue in million euros as the independent variable. The target population comprises European professional football teams, specifically those from the top four leagues according to the Union of European Football Associations' (UEFA) five-year ranking for the 2022/2023 season: the Bundesliga, Premier League, La Liga, and Serie A. From this target population, an initial sample of 78 teams was examined, with 77 teams qualifying after the data cleansing process. Data were thoroughly prepared and subjected to a regression analysis. Our findings indicate that an increase of €1,000,000 in revenue corresponds to an increase of 0.0015 PPG, a statistically significant result with a p-value of less than 0.001. This suggests that increased revenue is associated with enhanced team performance in European leagues. The model explains 38% of the variance in performance, as indicated by an R^2 value of 0.38. This study contributes to existing literature by quantifying revenue's impact on football performance, providing both theoretical insights and practical implications. The results, derived from rigorous scientific methods, can guide stakeholders in making informed decisions. The study also proposes avenues for future research, such as employing time series analysis to investigate revenue's impact over varying periods.

Keywords: Revenue, Performance, Points per Game, Football, Sport Economics, Revenue Impact

1. Introduction

The expansion of academic publications in association to football demonstrates the engagement of the scholarly community with this theme. A thorough analysis of the Web of Science database shows that the term “football” has considerably gained meaning. It has appeared at the beginning of 1995 in academic paper titles. The initial count in 1995 comprises 70 publications. However, this number experienced a considerable growth until the year 2023 with 1,303 publications (Web of Science, 2024). This rise in the number of publications on the topic highlights the enhanced significance and interdisciplinary applications of football within the academic field. Football clubs have increasingly been recognized as business entities (Peco, 2023). This underlines the importance of financial resources in sustaining their operations and covering expenses. In light of this perspective, the current research aims to determine the impact of revenue on football clubs and their on-field performance metrics¹.

The academic environment features a wide range of publications that examine the financial dimensions of football clubs, underscoring the importance of economic considerations in the sporting domain. For example, (Marotz et al., 2024) discussed the financial and sporting performance of football clubs and found that returns and debt levels are influenced by sports performance. Despite the extensive study on the topic of football, the current research addresses a specific research gap that previously has not been extensively explored within the academic setting. Specifically, the research aims to find the relationship between the financial influx for a football club and its performance, as quantified by points per game played. This research commits to enhance the existing body of academic research by offering a quantitative analysis that outlines the precise impact of a one million euro increase in revenue on points per game in the top four football leagues in Europe. The regression model that treats revenue as an independent variable and performance as the dependent variable is the statistical method to achieve the objective of this study.

2. Core of Scholarly Insight: A Literature Exploration

Currently, a variety of research themes related to football are being explored. These themes include the history and development of football, as well as its sociocultural, economic and business aspects. The origins of the sport can be traced back more than 2,000 years to ancient Greece, Rome and China. Nevertheless, modern football originated in 19th-century in England, from where it spread to the rest of Europe. In Germany, the sport was introduced by two schoolteachers, August Hermann and Konrad Koch, in 1847. Concurrently, immigration played a role in bringing the game to the United States. Football underwent rapid developments in the early 20th century, significantly influenced by industrialization. Several domestic leagues were established worldwide, with the English Football League being the first professional football league. The Bundesliga, Germany's premier football league, commenced in the 1963/1964 season. (Bundesliga, 2024)

Throughout its development, football has become an integral part of the socioeconomic sphere, evolving into a significant cultural entity. In Europe, football holds such prominence

¹ In light of the respective Statement by the Executive Committee of the German Research Foundation (DFG) we would like to state, that we used the Large Language Model ChatGPT for the following purposes: Improvement of sentence structure, spelling and search for synonyms.

that it can contribute to identity formation, foster community cohesion, and support local communities. (Crolley et al., 2002)

Besides its sociocultural impact, sport, including football, has long been considered a form of entertainment. Over time, it has acquired new characteristics, especially due to its development alongside the emergence of capitalism. As a result, football, as a specific instance of sport, not only encompasses entertainment but also significant business aspects. This industry has experienced rapid growth and continues to expand, evolving into a multi-million-dollar business. (Peco, 2023)

This section presents a concise literature landscape derived from articles highly relevant to the objectives of this study. We utilized multiple academic databases and platforms, including Web of Science, ResearchGate, Google Scholar, and Scopus, to identify relevant literature. The search terms employed were "revenue," "football," and "performance." The selection process consisted of several stages. Initially, we conducted a search for papers that encompassed both "revenue" and "performance" in the context of football. Subsequently, the abstracts of these studies were examined to assess their relevance to our research objectives. The final selection involved a comprehensive review and inclusion of those research papers that directly aligned with the study's aims. This thorough approach ensured that the literature reviewed was both comprehensive and specifically relevant to the research questions addressed in this study.

As in the following, numerous scholarly articles have explored the financial dimensions of football clubs, suggesting the expectation of a positive correlation between revenue and on-field performance. The majority of this research for example (Szymanski, 1998; Barajas et al, 2005; Leach & Szymanski, 2015) predominantly focuses on the Spanish and English leagues (Göllü, 2012).

A study conducted by (Göllü, 2012) indicates that the financial performance of football incorporations does not have a statistically significant correlation with the league ranking within the Turkish leagues. Göllü's study utilizes financial statements spanning the period between 2002 and 2009 from four major football clubs in Turkey, in conjunction with sportive data sourced from the statistics of the Turkish Football Federation. Notably, Spearman's rank correlation coefficient was employed as the research method, showcasing the analytical approach.

Another research conducted by (Dobson & Goddard, 1998) analyzed the relationship between performance and revenue in football. The authors utilized league position and gate revenue as key variables. The sample comprised 77 Football League clubs, selected based on the criterion of continuous league membership from 1946 to 1994. The findings provided evidence of a causal relationship between lagged revenue and current performance, which was more apparent than the reverse. Furthermore, compared to larger teams, the smaller teams revealed a greater dependency of performance on revenue. The argument concerning the causal relationship presented by (Dobson & Goddard, 1998) finds additional support in the work of (Leksowski, 2021). In his study on top European football clubs, Leksowski (2021) demonstrates that the expenditure on player salaries and operational activities has a positive and significant influence on sport performance. A comparable study by (Thakare, 2023) focused on the English Premier League from the 2014/2015 to 2020/2021 seasons. The study concluded that increased profitability enhances on-field performance, primarily due to higher wages.

The findings of another study present two central conclusions (Szymanski, 1998): First, improved league performance leads to a rise in revenue, as higher league standings typically

result in increased ticket prices, sponsorships, and attendance rates. Second, an increase in wage expenditure is claimed to enhance league performance, suggesting a direct relationship between financial outlay in player wages and on-field success. The scholarly investigation conducted by Szymanski involves the utilization of publicly accessible financial data, focusing on the annual gross profits and revenues of 69 English football clubs. The study explored and analyzed the relationship between the revenue generated by these clubs, wage expenditure and their respective positions in the league standings for the year 1996/1997 leading to above mentioned conclusions.

The study conducted by (Barajas et al., 2005) investigated the impact of performance on expected income in Spanish professional football clubs. Utilizing a regression statistical model, the researchers found a nonlinear relationship i.e., performance has a nonlinear positive impact on expected income. Performance indicators, sourced from (Dobson & Goddard, 2001), were based on factors such as the number of teams and their ranking positions. Furthermore, sporting revenue, which includes various income sources like sponsorship and advertising, was considered a crucial variable in the analysis.

In a recent research article by (Aguiar-Noury & Garcia-del-Barrio, 2022), an examination of the financial status of European football clubs was conducted. The study employed i.a. an Ordinary Least Squares (OLS) regression model to analyze a dataset spanning seasons from 1995/1996 to 2015/2016, encompassing teams competing in the Premier League, La Liga, Serie A, and Ligue 1 and hence the premier divisions of respective countries. The dataset comprises seven variables: Total annual revenue, Total annual wages, Domestic points, Elo rating as a Proxy variable, Rounds Champions League, Rounds Europa League, as well as Media visibility. The findings of the study conducted by (Aguiar-Noury & Garcia-del-Barrio, 2022) confirm a positive effect of performance on revenue within the domestic leagues under investigation. Moreover, the authors state that current domestic points employ a more substantial influence on a club's revenues compared to the performance achieved in the preceding season.

A study examining 16 English football clubs that underwent a stock exchange listing in the mid-1990s revealed that there was no apparent change in the operational patterns of these clubs. Additionally, the researchers reported a decline in profits along with an enhancement in on-field performance. The dataset included revenue figures and domestic league standings of football clubs (Leach & Szymanski, 2015). Simplified, their results show that floatation does not have an effect on performance or revenue.

Another relevant study conducted by (Maci et al., 2020) investigated the relationship between share price and key financial metrics such as assets, debt, return on equity, and net income for all European football entities listed on the Stock Exchange between 2012 and 2017. The research employed a multiple regression model for data analysis. The results indicate that sporting performance and revenue have a positive impact on market performance outcomes.

Research conducted by (Galariotis et al., 2018) on the impact of financial performance on sport performance is also of high relevance, especially in the context of football. The study utilizes the PROMETHEE II method and Partial Least Square-Structured Equation Modeling (PLS SEM). This research offers a robust methodology to analyze the relationship between business, especially from a financial perspective, and sport performance for the time period 2010-2013 of 12 French football clubs in the French League 1. The authors found evidence indicating that more revenue positively affects sports achievements.

A different study results indicate the nonexistence of statistically significant relationship between sport success and financial performance (Sakinc et al., 2017). The findings were

derived from analyzing data pertaining to 22 football clubs that are publicly listed on diverse European stock markets.

A study by (Djunaed et al., 2024) revealed that the financial and operational health of sports institutions can yield significant benefits. It was found that effective management contributes to increased efficiency and, concurrently, enhances the overall productivity of these institutions. The named study examines the financial health and efficiency of sports institutions. It has not been included in the following table because it does not encompass the relevant variables being in focus in current study: revenue and team performance.

In the field of sports studies, empirical and theoretical research offers diverse insights into the relationship between performance and revenue. Evidence suggests a weak cointegration between final league positions and gate revenue, as highlighted by (Dobson & Goddard 1998). Similarly, (Carmichael et al., 2011) demonstrate a positive correlation between on-field success and revenue, often driven by mechanisms such as investment in players.

Moreover, revenue linked to time-lagged factors or sharing mechanisms also affects performance outcomes. In a study (Dobson & Goddard, 1998) argue that past revenue serves as a better predictor of current performance. Overall, these findings indicate a positive association between performance and revenue. Additionally, the focus on revenue distribution mechanisms underscores their role as drivers of performance and influencers of competitive dynamics in sports. The following table shows a summary of literature including relevant results and relevant variables, differentiating between Independent Variable (IV) and Dependent Variable (DV) as far as possible.

Table 1: Literature Landscape Overview

No.	Researcher	Methods	Relevant variables	Relevant Results	Time span	Leagues
1	(Göllü, 2012)	Spearman's rank correlation coefficient	Variables under study: league position, revenue	No relationship between variables under study	2002-2009	4 Turkish football clubs
2	(Dobson & Goddard, 1998)	Granger causality tests	Variables under study: league position, gate revenue	causal relationship between lagged revenue and current performance	1946-1994	77 Football League clubs
3	(Szymanski, 1998)	Linear regression	IV: league position, DV: revenue	Positive impact of IV on DV	1996-1997	69 English football clubs
4	(Barajas, Fernandez-Jardon, & Crolley, 2005)	Exponential regression	IV: league position, DV: expected income	Positive impact of IV on DV	1998-2002	134 Spanish football clubs
5	(Aguiar-Noury & Garcia-del-Barrio, 2022)	(OLS) regression	IV: domestic points, DV: revenue	Positive impact of IV on DV	1995-2016	4 Leagues: Premier League, La Liga, Serie A, and Ligue 1
6	(Leach & Szymanski, 2015)	The Generalized Method of Moments (GMM)	IV: flotation in stock exchange DV: revenue, league position	No effect of IV on DVs	1995-1997	16 English football clubs

No.	Researcher	Methods	Relevant variables	Relevant Results	Time span	Leagues
7	(Maci et al., 2020)	Multiple regression	IV: UEFA Coefficient score, revenue DV: stock price	Positive impact of IV on DV	2012- 2017	22 European football entities listed on the Stock Exchange
8	Galariotis et al., 2018)	PLS-SEM	IV: revenue, DV: league position	Positive impact of IV on DV	2010-2013	12 clubs in French League 1
9	(Carmichael et al., 2011)	behavioral equations	Variables under study: revenue, on-field success	Positive relationship between variables under study	1998–2007	English Premier League

Source: Own creation

In the existing literature and as illustrated in Table 1, researchers have predominantly examined either the general relationship, for example the correlation, between performance and revenue or the specific impact of performance on revenue in football. However, the impact of revenue on performance, particularly in quantitative terms or in terms of money, is not extensively discussed or explored. Therefore, we want to check the impact of revenue on performance in football instead of the impact of performance on revenue. This study systematically addresses this gap in the literature and answers the following research questions:

1. Does revenue influence the performance of European professional football clubs?
2. By how much do points per game change with an increase in revenue of €1 million?

3. Method: Mapping the Research Process

The research population for this study comprises European professional football teams. In total, there are 39 professional football leagues in Europe, which bring together 1,130 football clubs across 33 countries (Leagues European, 2024). The sample data are sourced from four major leagues in Europe, and we have employed a convenient sampling technique. Consequently, the results are specifically applicable to the teams under study. The data for this research encompasses two primary variables: revenue and performance of all professional football teams participating in the top four European leagues during the 2022/23 season. These leagues include the Bundesliga, Premier League, La Liga, and Serie A. One of the main reasons for considering these four leagues is their position within the five-year ranking of football leagues – they are placed on the top of the list (Kicker, 2024). These leagues have been specifically selected due to their high level of competitiveness and their significance in European football. Furthermore, the availability of data is an additional reason for selecting these teams. In total, 77 teams are incorporated into the sample data for the preliminary analysis. Bayer 04 Leverkusen is excluded, as the revenue data for this team is not available.

The variable performance is measured through points per game played, which is provided by the website (Kicker, 2024). Revenue data for 2021/22 is retrieved mostly from the “Footballfinance” website (Footballfinance, 2024), and in few instances from (CAPOLOGY, 2024). The revenue figures are all in Euros. Originally, some were in British Pounds, but we have converted them to Euros using the average conversion rates for the year. After reviewing the data and research methods in the literature using similar data, we chose a linear regression model and the Statistical Package for the Social Sciences (SPSS) for the analysis.

The review of the data and relevant research indicates that regression analysis is an appropriate method for this study. The aim of this study is to find the impact of revenue on the performance of football teams, which can be achieved by analyzing the data with a regression model. Before implementing the regression model, we checked the data for key regression assumptions, such as linearity, homoscedasticity and normal distribution of residuals.

Figure 1 illustrates the scatter plot of the regression residuals. This scatter plot confirms that there is no heteroscedasticity in the data, as it does not present any apparent pattern, and the values are below the threshold level of 3 on both axes.

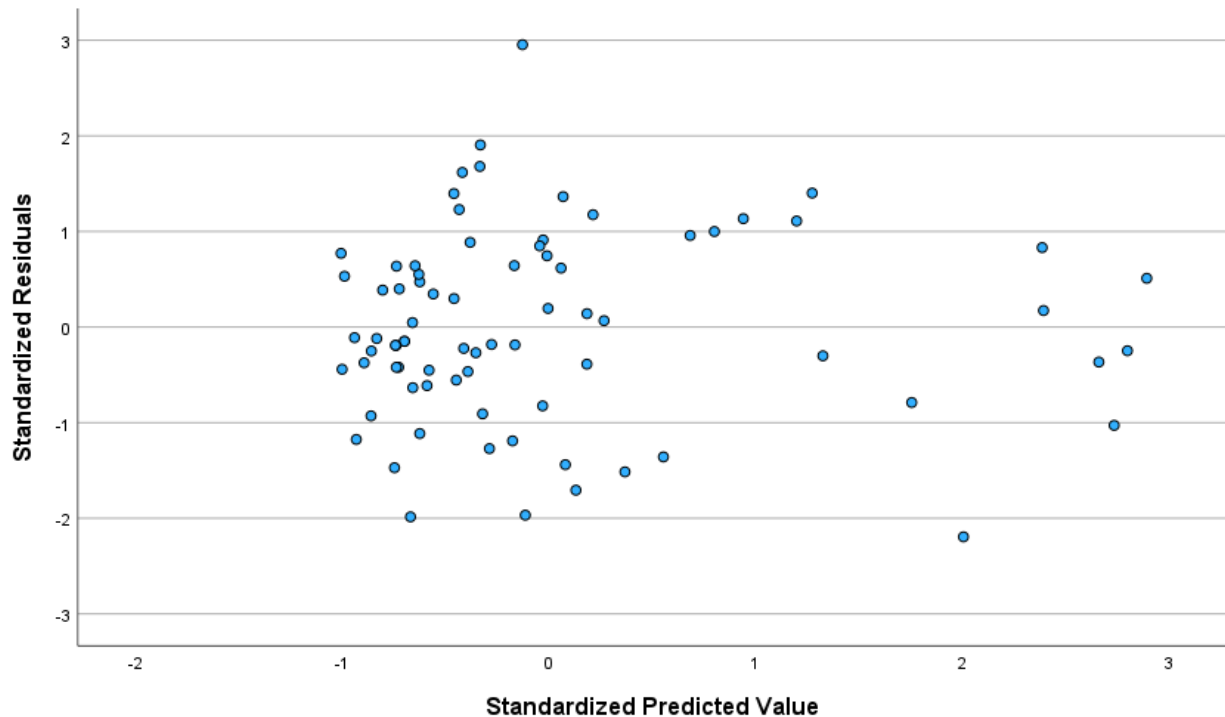


Figure 1: Residual Plots
Source: Own creation

To ensure normality of the data, a normality test was conducted. According to the histogram shown in Figure 2, the data appears to be normally distributed, satisfying the assumption of regression analysis.

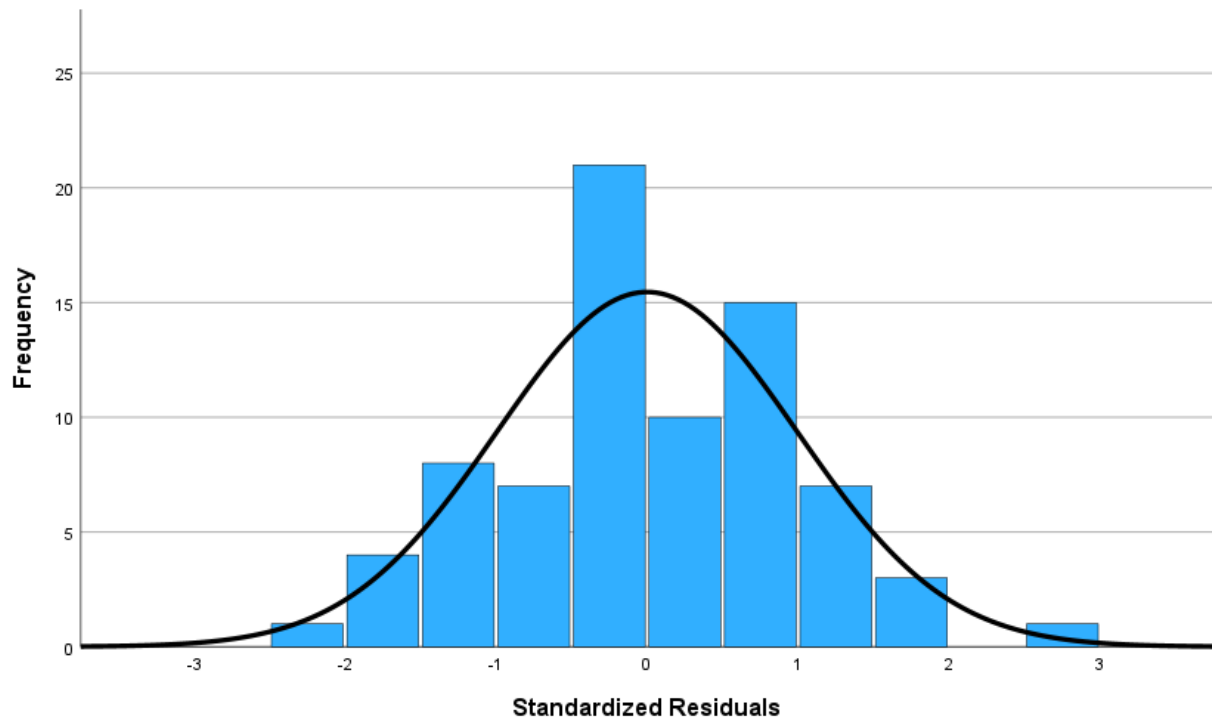


Figure 2: Normality Test
Source: Own creation

In addition to the test above, the Cook's Distance test is implemented in Table 2 to determine if there are any influential observations that need to be addressed. The maximum value of 0.182 is well below the rule-of-thumb threshold of 1, indicating the nonexistence of any influential observations or outliers that need to be removed from the data before proceeding with further analysis.

Table 2: Cook-Distance Test

	Minimum	Maximum	Mean	Std.-Deviation	N
Cook-Distance	.000	.182	.012	.024	77

Source: Own calculations

In Table 3, heteroscedasticity-consistent standard errors are reported to ensure the robustness of the results. In this test, the regression coefficients are identical to those obtained from the linear regression presented in Table 6.

Table 3: HC3 – Heteroscedasticity-Consistent Standard Errors

Parameter	Regression Coefficient (B)	Robust Standard Error	t-value	Sig. (p-value)	95% Confidence Interval (Lower)	95% Confidence Interval (Upper)
Constant	1.078	0.052	20.732	< .001	0.975	1.182
Revenue	0.0015	0.000	7.457	< .001	0.001	0.002

Source: Own Creation

4. Results: The Story Behind the Numbers

To achieve the objective of this research, we applied a regression model. In this model, points per game is the dependent variable, while revenue (in millions) serves as the independent variable.

Table 4 presents the results of the descriptive statistics. The total number of observations is 77. The maximum revenue is 731 million euros, while the minimum is 14.57 million euros, with a mean value of 199.05 and median of 137.98 million euros. Similarly, points per game have a maximum value of 2.37, a minimum of 0.50, and a mean of 1.37 and median of 1.28 points per game. This table also presents the names of various teams based on the maximum, minimum, and median values of revenue as well as points per game.

Table 4: Descriptive statistics

	Minimum	Maximum	Mean	Median
Revenue	14.57	731.00	199.05	137.98
Points per game	.50	2.37	1.37	1.28
Teams based on Min/Max/Median revenue	AC Monza (N)	Manchester City		Real Sociedad San Sebastian
Teams based on Min/Max/Median PPG	Sampdoria Genua	SSC Neapel		FC Sevilla FC Girona Rayo Vallecano

Source: Own calculations

After using exploratory descriptive analysis and analyzing the satisfaction of regression assumptions, we have implemented the regression model.

Figure 3 shows the scatter plot with the fitted regression line of the dependent and independent variables. It can be seen in Figure 3 that revenue, as the independent variable, and points per game, as the dependent variable, have a positive relationship, resulting in a positive slope of the regression line.

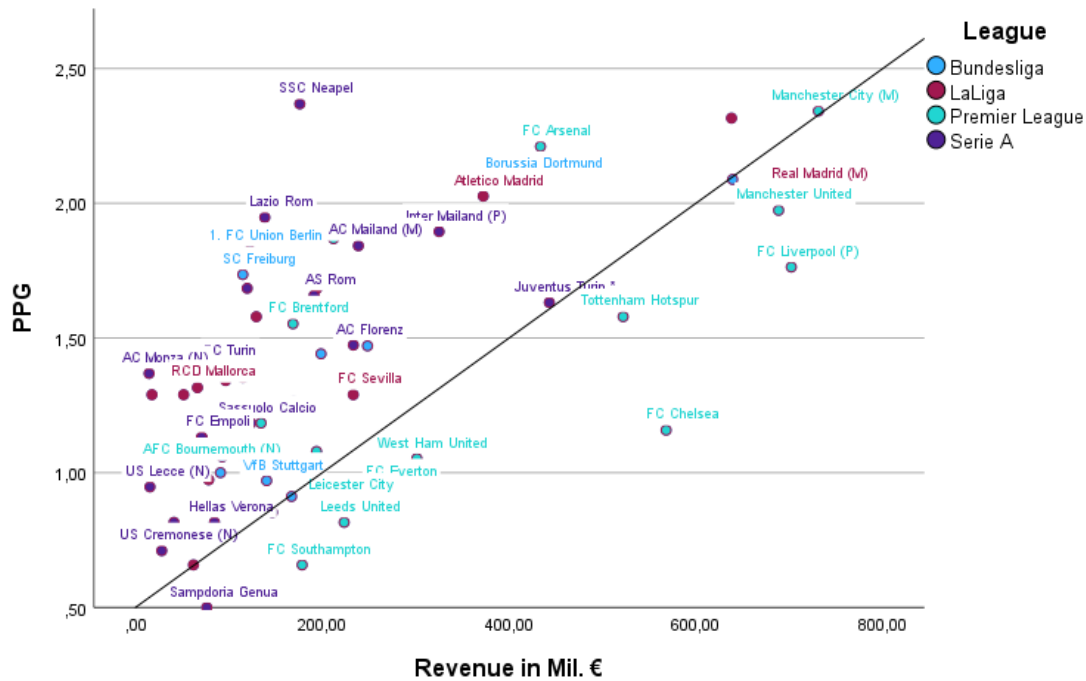


Figure 3: Plots of Revenue and Points per game
Source: Own creation

Table 5 presents a summary of the regression model. The results indicate that the p-value for the model is less than 0.001 and therefore, below the 5% significance threshold, implying that the model is statistically significant. The R² value of the regression model in Table 5 is 0.38, signifying that 38% of the variance in the dependent variable, Points per Game, is explained by the independent variable, Revenue. An R² value above 30% is generally considered an acceptable range of variance in many fields of research, suggesting that the model provides a meaningful explanation of the relationship between Revenue and Points per Game.

Table 5: Summary of Regression Model

R	R2	Adjusted R2	Std error	Sig.
.619 ^a	.38	.38	.348	<.001

^aindependent variable: (Constant), Revenue

Source: Own computation

Table 6 presents the coefficients of the regression model. The regression coefficient for the independent variable Revenue is found to be 0.0015, which is statistically significant with a p-value of less than 0.001. This indicates that for every one-unit increase in the revenue i.e., €1,000,000, the PPG increases by approximately 0.0015 on average, holding other variables constant.

Furthermore, with a 95% confidence interval, the regression coefficient is expected to lie between 0.001 and 0.002. Calculating the deviations (with more precision and decimals) of the upper (0.0019) and lower bounds (0.0010) from the coefficient value (0.0015) in table 6, yields approximately ± 33.33%. This means the actual coefficient can deviate by about ± 33.33% based on the given confidence interval.

The final estimated regression model can be expressed as:

$$y = 1.078 + 0.0015 \text{ Revenue} + \varepsilon \quad \dots (1)$$

Table 6: Coefficients

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.	95,0% Confidence intervals for B	
	Regression Coefficient B	Std.-error	Beta			Lower Bound	Upper Bound
Constant	1.078	.059		18,359	<.001	.961	1.195
Revenue	.0015	.000	.619	6.834	<.001	.001	.002
Dependent Variable: Points per game							

Source: Own computation (SPSS results)

As a mathematical example, we consider Real Sociedad San Sebastian, as its revenue is close to the median value of 137.98 million euros. With a 30% increase in revenue for the club under consideration, we apply this value into the regression equation to obtain the increment in points per game. As a result, points per game (in this particular example) would increase by approximately 0.062 points per game due to a 30% increase in revenue for this club. Assuming 38 games, this would lead to 2.360 additional points per season. In addition to that, with respect to their position, Real Sociedad San Sebastian would improve in terms of points and get closer to Atletico Madrid, but would not overtake them in the Laliga with an additional 2.360 points. This is because in the 2022/2023 season Real Sociedad San Sebastian has 71 points, while Atletico Madrid has 77 points.

5. Conclusion and Discussion

We have chosen to explicitly analyze the impact of revenue on football performance due to its theoretical and empirical validation. For instance, Szymanski (1998) claims that an increase in wage expenditure enhances league performance, indicating a direct relationship between financial outlay for player wages and on-field success. It is evident that football clubs utilize both direct and indirect revenues to pay players and invest in management, thereby improving team performance on the field. Supporting this, (Galariotis et al., 2018) have presented similar empirical findings.

Furthermore, the revenue data pertains to the year 2021/2022, while the points per game data corresponds to the year 2022/2023. This approach is taken based on the rationale that the revenue generated within the same year would not yield satisfactory conclusions regarding its impact on performance. By utilizing revenue data from the preceding year, we aim to more accurately assess its influence on the subsequent year's performance. This is because the prior year's revenue is typically used to cover player wages and other club expenditures, which are critical factors in determining team performance. Additionally, using the previous year's revenue data eliminates any influence of current or future performance on revenue calculations, as the performance outcomes would occur after the revenue figures have been established. It is worth mentioning, that in few instances the revenue data is from the end of 2021 because of the unavailability of the data for the season 2021/2022 in this case.

The findings of this study indicate a positive and statistically significant relationship between revenue and the performance of football teams in Europe. The regression model has an R2 of 38% and the regression coefficient for revenue is 0.0015. Specifically, an increase in a football club's revenue is associated with a statistically significant improvement in the team's performance. As a result, if the revenue of a club increases by one million euros, this would lead to an increment of 0.0015 points per game for the team, assuming other factors remain unchanged. Our finding is also in line with the results of Dobson & Goddard (2010), who

claim a causal relationship between lagged/prior revenue and current performance of football clubs. In the current study, 38% of the variation in points per game is explained by revenue. However, the remaining 62% could be attributed to other potential factors, such as injuries and team dynamics. The general relationship between team performance and revenue is supported by prior research, including studies by (Aguiar-Noury & Garcia-del-Barrio 2022), (Szymanski, 1998), and (Maci et al.2020). However, it is important to note that contrasting viewpoints exist within the literature. For instance, (Göllü,2012) and (Sakinc et al., 2017) state that there is no correlation between these variables in the context of football clubs.

Moreover, the results of this study align with findings from related research conducted within corporate sectors. For instance, (Olaoye & Olaoye, 2022) claim that sales revenue growth positively impacts corporate performance. Similarly, (Thuy et al., 2023) in another study conclude that revenue, when perceived as a determinant of financial performance, significantly influences business efficiency.

The findings of this research hold both statistical and practical significance. The statistical significance is evidenced by a p-value of less than 0.001, indicating that the results are unlikely to be due to chance. Practically, the research provides a quantifiable measure of the impact of revenue on points per game, allowing managers and other stakeholders to use estimated regression equation (1) to calculate this effect easily. It is worth mentioning that in this research, only revenue is used as an independent variable. This can be considered a methodological limitation of this study, as there could be other potential factors influencing team performance in football, which can be addressed in future research.

This research identifies valuable opportunities for future investigation, particularly in examining the impact over various time periods utilizing time series analysis and using various controls such as wage bill, squad value, payroll. Such an approach would allow for a comprehensive examination of how financial and performance metrics fluctuate over time, thereby providing deeper insights into their dynamic relationship. Additionally, future research could examine how changes in revenue impact the ranking of teams in their leagues, specifically by analyzing changes in revenue and changes in league placement. This would enhance our understanding of the causal effects between financial changes and league performance. Moreover, future research can extend this study by examining the same issue across all European teams with the consideration of corona pandemic.

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