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The Interplay of Financial Performance and Sporting Results: A study on Top European Football Clubs

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Abstract

This study aims to analyse the link between the European football and finance namely "The Interplay of Financial Performance and Sporting Results: A Study on Top European Football Clubs". Therefore, to assess this main topic, four hypotheses are proposed and verified: H1: "Average salary per player has a positive impact on sporting success"; H2: Sporting success impacts positively on average salary per player"; H3: "Operating expenses to total assets ratio positively/negatively impact the sporting success"; H4: "Financial performance is positively/negatively influenced by the sporting success". The sample of this study are the greatest European clubs from the top six European leagues and the time frame is from 2014 to 2021. In conclusion this study helps to bring closer the complex interaction between football and finance.

In summary, the empirical findings of this study demonstrate a positive correlation between average salary per player, operating expenses to total assets ratio and sports performance within the context of professional football. This research contributes to a deep understanding of the interplay between financial indicators and sports results in football. Therefore, this thesis serves as a valuable resource for elucidating the complex relationship between the financial performance and the sporting success.

Keywords: European clubs, Football, Finance, Performance.

Resumo

Este estudo tem como objetivo analisar a relação entre o futebol europeu e as finanças, nomeadamente "A interação entre o desempenho financeiro e os resultados desportivos: Um estudo sobre os melhores clubes europeus". Assim, para avaliar este tópico principal, são propostas e verificadas quatro hipóteses: H1: "O salário médio por jogador tem um impacto positivo no sucesso desportivo"; H2: O sucesso desportivo tem um impacto positivo no salário médio por jogador"; H3: "O rácio de despesas operacionais/ativo total tem um impacto positivo/negativo no sucesso desportivo"; H4: "O desempenho financeiro é influenciado positivamente/negativamente pelo sucesso desportivo". A amostra deste estudo são os maiores clubes europeus das seis principais ligas europeias e o período de tempo é de 2014 a 2021. Em conclusão, este estudo ajuda a aproximar a complexa interação entre o futebol e as finanças.

Em resumo, os resultados empíricos deste estudo demonstram uma correlação positiva entre o salário médio por jogador, o rácio de despesas operacionais/ativo total e o desempenho desportivo no contexto do futebol profissional. Esta investigação contribui para uma profunda compreensão da interação entre os indicadores financeiros e os resultados desportivos no futebol. Por conseguinte, esta tese constitui um recurso valioso para elucidar a relação complexa do desempenho financeiro e o sucesso desportivo.

Palavras chaves: Clubes europeus, Futebol, Finanças, Desempenho.

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1. Introduction

Football is one of the most attractive sports that people have created. It moves people all over the world and it brings happiness for people's lives. It has its place in the culture, religion and politics, but even more notably, it is the dream of several young boys and girls who want to follow the same steps as Messi or Cristiano Ronaldo.

Football, as a sport and as an industry, has changed considerably in the last decades. Not only is football a huge market but also it keeps on growing (Forbes, 2022). Thus, football as a business has changed a lot in the last years and it became a worldwide phenomenon with huge impact on the society. This sport in Europe have seen growth over the past ten years as never before, most of this was driven by the increasing values of broadcast rights and this increase in revenues also lead to an increase in expenses especially the ones related with players, transfer fees and salaries. Then, it is important to refer the role of a supporter within the football industry. The so-called "fans" are the basis of every club, and stadiums are a huge money-generating asset that, if well-developed, may improve commercial and match-day revenue. Match attendance has a significant impact on the future sale of one of the most crucial income streams, broadcast rights. Football has evolved into much more than just a sport in recent years. Although fans are an important part of these sports, there have been several advancements that have entirely transformed the football industry.

In the realm of professional football, top European football clubs, with their massive fan bases, commercial partnerships, and global reach, have become lucrative businesses, often generating significant revenues and attracting substantial investments (Rohde and Breue, 2016). This interplay between financial success and on-field achievements has sparked numerous debates among scholars, economists, and sports enthusiasts alike. Understanding the dynamics and implications of this relationship is crucial for club owners, investors, governing bodies, and researchers seeking to unravel the intricacies of the football industry. The fact is that a well-managed club is one that can balance financial and sporting achievement, because in this industry, one cannot thrive without the other (Baroncelli & Lago, 2006). This is demonstrated by teams who were successful in the past but went bankrupt due to bad financial management. Accordingly, in order to clubs achieve a proper management model, Leocini and Silva (2000) in their study concluded that professional clubs should be concerned

with several factors such as figuring a model that considers profitability and sports performance as goals or expected results depending on what a club project for its future.

Furthermore, there were various modifications that amplified the influence of football, making it a worldwide phenomenon. For instances, with the Bosman Case in 1995, the European Court of Justice amended the player transfer system and its associated limitations. Following this decision, it became cleaner for a player to transfer between clubs even though under a specific contract agreement, as well as to have a bigger number of international players, increasing player harassment and resulting in a significant pay increase and financial impact. The implementation of the UEFA Financial Fair Play Regulations has also acted a significant impact in the evolution of this industry. These principles helped European clubs to improve their financial situation and reduce their debt burden. Moving further it is pertinent to present Lago et al (2004) conclusions, the authors stated in their study that there is a Virtuous Circle between sportive results and financial resources. Since, this cycle begins with the financial resources required to acquire enough competent players to form a competitive squad and achieve the sporting success. This fact will raise club earnings through match tickets, advertising rights, TV rights, or merchandise, all of which are required to restart the cycle.

Regarding transfers fees and players' wages in football, it should come as no surprise that many European football teams have failed to generate profit based on transfer costs or player's demand. Impressive revenue growth does not appear to have an impact on club profitability, as more money is frequently spent to hire better players. To ensure football's long-term financial survival, associations and league organizations have had to respond to this change. Consequently, the Union of European Football Associations (UEFA) established Financial Fair Play Regulations, which teams must adhere to avoid certain penalties. Main objective of this regulation is to make clubs operate on the basis of their own generated revenues and to prevent clubs from making continuous losses and covering them by their owner's money.

Moreover, as football industry has a great impact both in the economic and social world. It is important to realize how Corporate Governance influences the financial and sport performance of football clubs and why is so important for them. In addition, the issue of an efficient corporate governance practices has received increased attention by many sport associations and confederations across the world.

Indeed, the purpose of this study is to offer a knowledge of how various performance logics effect a certain subject of study, such as football teams. All businesses must "perform" and convey their accomplishments to important stakeholders. When organizations have just one performance rationale to follow (i.e., profit maximization), this can be a straightforward task, but it gets more difficult in environments with several performance logics. So, for the motives presented above, the financial performance in football industry has become a critical topic for the financial area since financial performance implies a role of guarantee the viability and sustainability of the clubs over the time, especially in top football clubs where all financial decisions need to be strategic with the purpose of creating more value for these clubs. Then, my research aims to extend the existing literature review on this topic, where we can find some studies regarding this subject and studying if there is a strong relation between the financial performance and the sports performance in the top European football clubs. Since this area has developed exponentially over the decades, the financial performance has taken a significant role in this industry. Additionally, this topic becomes even more important when it is required to introduce new corporate governance mechanisms in order to respond to the financial changes of this industry.

2. Literature Review

2.1 The Football Industry

The football industry has undergone significant evolution over the years, transforming from a simple sport into a global phenomenon with immense economic, social, and cultural impact. As it continues to adapt to new challenges and opportunities, the industry's future is likely to be shaped by emerging technologies, sustainability initiatives, and the pursuit of global growth while maintaining the essence of an attractive sport (Giulianotti, Robertson and Roland, 2009). Then, a greater financial performance allows clubs to invest in infrastructure, which leads to job creation, increased tourism, and revenue generation in the regions where they are based.

It started to become clear in the late 1990s that while European football was enjoying considerably larger revenues from the professionalization of the sport, these higher revenues were not translating into clubs' profitability. Instead, these revenues were largely being spent on a race to acquire talent players (Abbas, 2023). This race also led to a dramatic increase in elite players' salaries, leading to concern that leagues across Europe would become a race between owners with the greatest financial resources, and therefore weakening the integrity of the competitions (Barajas and Rodríguez, 2010). According to a common wisdom and the value maximization theory, it makes sense to assume that the primary motivation for shareholders depend on the potential future financial claims from that could occur from its investment in football clubs. Buraimo et al. (2006) and Leach and Szymanski (2015) referred that investors used to bail out their local clubs from financial difficulties because they felt a sense of civic responsibility towards to their communities. Dobson and Goddard (2001) revealed in their study that factors such as influence and prestige were two conceivable motives for individuals to finance their local clubs, hoping for sports achievement rather than monetary success. In response to this shareholder approach, Jensen (2000) argued that each managerial decision should be prepared with the main objective of raising a company's market value. Nevertheless, academics and economists in the sports industry refer that shareholders of European football clubs were not primarily motivated by financial gains and profit maximization.

Regarding the European football market, the Premier League celebrates 30 years since its first ever 1992/1993 season, where the total revenue generated by 22 clubs in the inaugural Premier League season was slightly over €233M, less tant the average club's revenues in the 2020/2021 season and compared to total revenues of €7,1 billion (Deloitte, 2022). According to Deloitte Annual Review of Football Finance 2022, this industry shows an exponential increase on revenues in the big five European leagues over the period in analyses (figure 1).

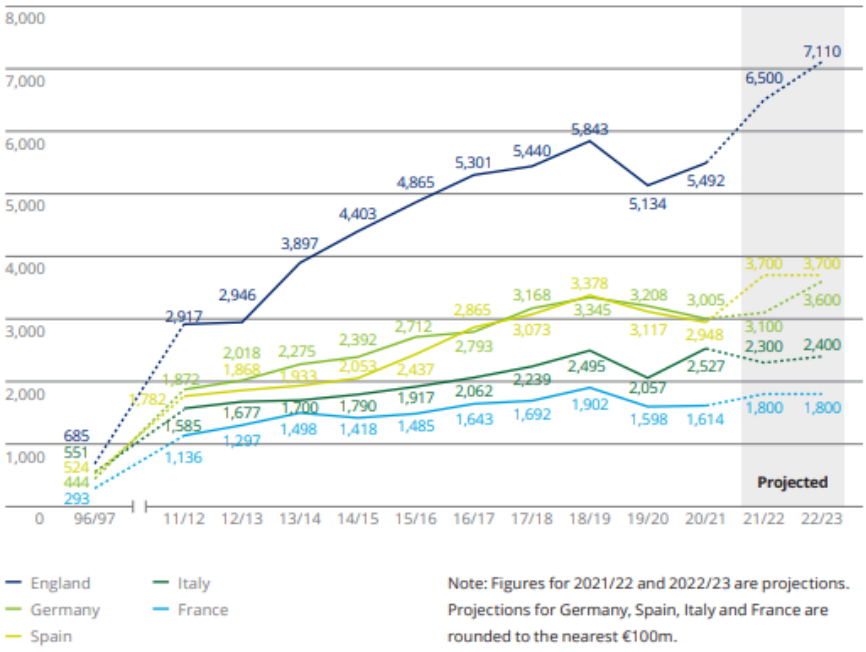

Figure 1: "Big five" European leagues' revenues - 1996/97 and 2011/2012 to 2022/2023

In general, Premier League clubs' operating profits bounced back over the course of the season by cumulatively increasing from €57M to €562M, then the only other "big five" league to improve its operating results was Serie A (Italian League). However, Premier League pre-taxes losses remained significant although decreasing from €1.16B to €783M where Serie A registered only a marginal decrease in losses (Deloitte 2022). As the Premier League enters its third decade and, it seemingly will remain as the leading football league throughout that time, its further growth should now help build financial sustainability throughout the domestic game. It is vital that this is a collaborative effort, working as an industry to improve governance and sustainability for the long-term.

Moving further it is pertinent to look for figure 2, the European football market has witnessed significant growth in size from the 2011/2012 season to the 2020/2021 season. During this period, the European football market has experienced a remarkable expansion in terms of total revenue generated by football clubs. The report highlights that the combined revenue of the top 20 European football clubs reached a new milestone, surpassing €10 billion in the 2020/2021 season. This signifies a substantial increase compared to the revenue figures recorded in the 2011/2012 season.

The growth in the European football market size can be attributed to various factors. Firstly, broadcasting rights have played a pivotal role in driving revenue growth. The Deloitte annual report indicates that broadcasting revenue has consistently increased over the years, fuelled by the rise in the value of television and media rights deals across Europe's major leagues. Secondly, commercial revenue, which includes sponsorship deals, merchandise sales, and stadium operations, has also been a significant contributor to the market's expansion. The report emphasizes the importance of clubs' ability to leverage their brand value and global fan bases to secure lucrative commercial partnerships and generate substantial income outside of matchday-related revenue streams.

It is worth noting that while the European football market has experienced overall growth, the impact of the COVID-19 pandemic has posed challenges and disruptions to the industry. The review acknowledges the financial implications of the pandemic, including reduced matchday revenues due to restricted attendance and potential declines in commercial income.

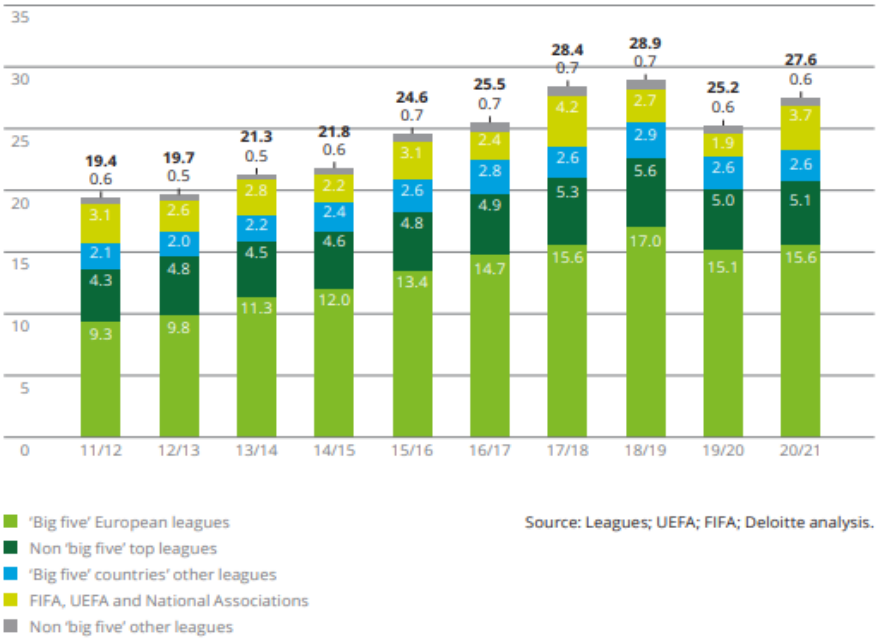

Figure 2: European football market size (revenues) – 2011/2012 to 2020/2021 (€billion)

In conclusion, the 'big five' European leagues generated €15.6 billion in combined revenue and registered an increase of 3% relative to the previous season, but significantly below revenues observed prior to COVID-19 pandemic (€17 billion in 2018/19). This has been a contributory factor in some leagues and clubs to explore deals with external investors, with some willing to sacrifice future revenues to help meet immediate cash flow needs. On the other hand, European football is emerging from one of its most challenging periods in history and proved the resilience of the industry that is now well on the road to recovery and the same tenacious attitude should continue to build strength for the long-term. Those responsible for promoting and regulating the sport have the chance to ensure that they now can create a sustainable and inclusive environment for the next generation of clubs, owners, investors, players and supporters.

2.2 The Pursuit of Excellence: Main Objectives of European Football Clubs

Football clubs, as any other businesses, have various objectives related to their financial performance. One of the primary objectives for football clubs is to generate profits by guaranteeing that their revenues exceed their expenses, enabling them to invest in a player, stadium improvements, youth development, and other areas. Then, football clubs strive to achieve financial stability by managing their finances responsibly. This involves avoiding excessive debt, maintaining a healthy cash flow, and having sustainable revenue streams. Financial stability is essential for weathering economic downturns and maintaining the club's operations.

The analysis of sporting and financial performance becomes crucial when we want to study what are the strategic objectives to be achieved by managers of football clubs. Sloane (1971) in his study argued that European football club owners are mostly maximizing utility instead of unique profit maximization. At the time, English football clubs were repeatedly reporting deficits, which also led to other popular topic of research that studies the reasoning behind persistent losses and association between ownership structure and clubs' performance (Leach & Szymanski, 2015).

Szymanski (2012) suggests that it might be club owners' irrational exuberance, which encourages them to overinvest in playing talent in hopes of achieving sporting success. Vrooman (2007) on the other hand argues that in the upper extreme it is the hope of reaching Champions League revenue and in lower extreme to avoid relegation that causes European football clubs to maximize wins instead of profits. However, too high expectations for a football club to achieve sporting success are often followed by the underperformance of the team on the field, which could lead to negative productivity and Szymanski (2012) suggests that this is even more important factor behind persistent losses than owners' behaviour. Nevertheless, owners' position shouldn't be underestimated because they might have numerous different objectives also in their other businesses that might not be related with a football club, but the coverage or the popularity of their club might contribute to achieving these other objectives and thus increase owner's utility. Club owners could also allow unprofitability for short time if there's a chance that it leads to higher revenues, for example from

achieving a spot from Champions League. Thus, even intentional financial losses are not always irrational (Terrien, et al., 2017).

Other essential objectives are related to corporate social responsibilities, attendance of the public, financial health of the league and market share/coverage of the club. Especially the latter could be highly beneficial for the club owners to promote their other businesses. Thus, although the trade-off between sporting success and profit is in the core of the football clubs' strategies, other objectives should be considered as well, and their impacts shouldn't be underestimated. In this study, the focus will be on the relation of financial and sporting success, which goes hand in hand with the club managers' objectives to maximize profits or sporting success.

Therefore, it becomes important to analyse the trade-offs between profit and sporting success on which are usually divided in three different objective combinations that have been found to be used by professional football clubs: profit maximization under sporting constraint, sporting success maximization under hard budget constraint and sporting success maximization under a soft budget constraint. Later, club owner's main decision is whether to maximize profits or sporting success, whereas constraints may be dependent also on environmental conditions (Terrien, et al., 2017). As a result, football clubs have limited opportunities to compete in various tournaments, which restricts the money that may be made by playing more games and in other competitions. Then, external actors can also impose budget limits; for example, UEFA requires that their Financial Fair Play Regulations are followed.

2.3 UEFA Financial Fair Play Regulations

The Union of European Football Associations (UEFA) is the governing body of European football. UEFA is most recognized for organizing European cup events like as the Champions League and Europa League. Along with domestic competitions, these tournaments are frequently the most crucial for European football clubs, despite the fact that only a few teams from domestic leagues qualify for these tournaments each year. Playing in either Champions League or Europa League increases a team's revenues significantly, hence qualification is greatly desirable by any European club. These events offer UEFA control over

European football clubs, which they have recently begun to use more for the sake of European football.

UEFA requires that every team qualified for their tournaments has to provide audited financial statements and show that the club meets UEFA's criteria. If the criteria are met, UEFA rewards the club with a license that allows them to play in the tournament. So, the UEFA Financial Fair Play (FFP) concept was approved in 2010 and its first requirements were added to criteria set in 2011. In depth, FFP Regulations are a set of financial regulations implemented by UEFA to promote financial stability and sustainability in European football. The FFP Regulations have had a significant impact on the football industry by introducing financial discipline and transparency with the main idea of protecting the viability and sustainability of European football clubs. Amongst other things regulations aim to protect clubs' creditors and employees. Financial Fair Play concept also aims to encourage clubs to operate on the basis of their own generated revenues and to spend responsibly (UEFA, 2015).

In a wider perspective, with the introduction of the UEFA rules, the European professional football´s governing body aims to protect the long-term financial stability of European football clubs and restore the competitive balance between clubs and leagues (UEFA, 2018). In order to achieve these goals, UEFA monitors the clubs´ financial position and performance on the basis of the accounting information reported, which restricts the influence of money-injecting from private investors (Morrow, 2013). Secondly, UEFA has a lot of other disciplinary procedures as of warning, reprimand, fine or deduction of points from European competitions. Although the list of sanctions is long, UEFA sometimes might choose more rehabilitative approach instead of punishing clubs, which has led to conclusion of settlement agreements between a club and UEFA's Club Financial Control Body. This is in line with the objectives of protecting the sustainability of all the European football clubs instead of making punishing itself an objective (UEFA, 2022).

In addition to UEFA Financial Fair Play Regulations, it is pertinent to refer that each league organisation in the field of European football can of course define their own rules and regulations, which clubs need to follow if they wish to participate in the competition. As already discussed, Financial Fair Play Regulations only affect clubs that achieve a place in UEFA's tournaments. Therefore, each league organisation can individually evaluate if they want to introduce similar regulations to other clubs as well.

To conclude, the impact of the FFP Regulations on the football industry appears to be mixed. Fans argue that these regulations have helped to curb excessive spending and prevent clubs from falling into financial ruin. They believe that the FFP Regulations have contributed to a more balanced and competitive European football landscape. However, critics claim that the FFP Regulations have created a barrier to entry for ambitious clubs that seek significant investment to compete with more established clubs. Some critics also claim that the regulations have reinforced the existing hierarchy of wealthier clubs and hindered upward mobility for smaller clubs.

In general, the FFP Regulations have brought an increased financial accountability and stability in European football. Nonetheless, ongoing discussions and potential revisions to the regulations are necessary to address the evolving challenges and ensure a fair and sustainable football industry.

2.4 Corporate Governance in the Football Industry

Corporate governance in the football industry refers to the structures, processes, and practices that govern the operations of football clubs, leagues, and governing bodies (UEFA). It involves the establishment of principles, policies, and guidelines to ensure transparency, accountability, and fairness in the management and decision-making processes within the industry. Thus, there are some key factors of corporate governance in the football industry that were stablished by UEFA and FIFA that must be consider:

- Ownership and Ownership Structures: Corporate governance in football starts with the ownership of clubs. It involves defining the ownership structure, whether it's owned by individuals, consortiums, corporations, or supporter trusts. Governance mechanisms should be in place to ensure responsible and sustainable ownership, preventing conflicts of interest and promoting long-term stability.
- Board of Directors: Football clubs typically have a board of directors responsible for strategic decision-making and overseeing club operations. The board should be composed of individuals with diverse skills and expertise relevant to the club's needs. Good corporate governance ensures that the board acts in the best interests of the club and its stakeholders, including fans, sponsors, and local communities.

- Transparency and Disclosure: Transparency is crucial for effective corporate governance. Football clubs and governing bodies should disclose relevant information to stakeholders, including financial statements, ownership structures, sponsorship deals, and transfer activities. Transparent governance practices build trust among fans, investors, and other stakeholders.
- Financial Management: Rigorous financial management is essential for the long-term sustainability of a football club. Proper financial governance includes budgeting, financial reporting, risk management, and adherence to financial fair play regulations (such as those established by UEFA). Clubs should avoid excessive debt, maintain responsible spending, and develop sustainable revenue streams.
- Ethical Conduct and Integrity: Corporate governance in football should uphold ethical conduct and integrity. It involves implementing and enforcing codes of conduct, promoting fair play, and combating corruption, match-fixing, and other forms of unethical behavior. This includes adopting and enforcing policies to ensure compliance with regulations, fair competition, and anti-doping measures.

In turn, Dimitropoulos (2011) analysed the Corporate Governance mechanisms effects on football clubs and concluded that for a positive correlation between them and the financial performance and viability. In order to assess this topic, the author measured the efficiency of the Corporate Governance mechanisms by the size of the board of directors, the level of board independence, the level of ownership structure, the presence of institutional investors, and a negative correlation of the financial performance and viability with the role of the CEO as the chairman of the board.

Moreover, Dimitropoulos and Tsagkanos (2012) studied the role of corporate governance in the football clubs. They utilized a sample of 67 clubs, where the majority where non-listed clubs and employed as dependent variables accounting indicators such as the Return on Assets (ROA) and the Solvency Ratio. Thus, was concluded that the European football clubs are controlled in 47% by insiders and 49% from institutional investors. It was also observed that most of the Boards are constituted by nine members, with 47% of them being independent. The authors also found that listed football clubs are related with higher values of the solvency ratio, therefore, presenting small probability of default relative to their

unlisted counterparts. Additionally, listed football clubs are characterized by higher board size and board independence compared to the unlisted ones.

It is important to refer that corporate governance practices in the football industry can vary across countries, leagues, and clubs. Different governing bodies may have their own specific rules and regulations. Nonetheless, the overarching ambition is to ensure transparency, accountability, and sustainable management practices to protect the interests of all stakeholders and maintain the integrity of the sport.

2.5 The Financial Performance

Financial performance is a crucial aspect of any organization, including football clubs. Examining the literature on financial performance in the context of top European football clubs provides valuable insights into the factors that contribute to their economic success and long-term sustainability.

The first study about the importance of financial performance in football were conducted by Sloan (1971) where the author pointed out that profit-making clubs were not the rule regarding English football clubs. Throughout the years, the number of studies associated with this topic is on the rise. A substantial part of these studies focused on the effects of sporting success on financial outcomes. There are various studies analysing the effects of match scores on revenues (Arnold, 1991; Syzmanski and Kuypers, 1999; Solberg and Gratton, 2004; Barajas and Férnandez-Jardón and Crolley, 2007; Leach and Szymanski, 2015). These studies determined that sports success induces a greater financial performance and vice versa.

Szymanski and Smith (1997), Barajas and Rodríguez (2010) and Szymanski (2017) found in their investigation that an increase in revenues may led to a larger increase in costs for signing capable players, especially in the top European football clubs. Solberg and Haugen (2010) enlightened this phenomenon as a result of the necessity of the clubs to gain scarce talent to win on the pitch. However, with the entrance of UEFA in terms of preventing the financial fair play among professional football clubs transformed these circumstances. Additionally, Noll (2002) referred in his study that players earn higher salaries by taking into account if the club gets promotion or relegation. The authors stated that promotion is financially attractive as well as cherished by fans.

In detail, football started as a sport of amateur teams competing against one another, and the clubs' main priority was only to achieve the sporting success. However, with the recognition of the sport over time, the main objectives of clubs were shuffled by the professionalization of the sport and the rise of investors as club owners. Hence, profitability and revenues that were coming from the sport has emerged as a central priority to the managers of the clubs. Sánchez, Barajas and Sanchez-Fernandez (2020) found that profitability and success on the football field may be linked in several ways. Sporting results may lead to profits by the fact that victories on the pitch attract fans to the stadiums and increase attention from the media. With that, clubs will have higher attendance and TV rights, and more attention from sponsors or even potential investors. And so, the authors proved that this effect will be positive if the rise in revenues is higher than the expenses but will be negative if the increase in revenues is smaller. Then, Dimitropoulos and Alexopoulos (2014) also investigated the financial performance on the Greek League clubs by evaluating their financial profitability. According to the findings, match attendance and club profitability of football clubs are positively related to short and long-run performance. On the other hand, Tiscini and Dello-Strologo (2016) in their study that the value of a football club could not be assessed based on expected financial results only. It is required to consider also general benefits that came from shareholders, which are represented by private funds.

Regarding the relation between wages/salaries among players and staff towards the sporting success of football clubs, Kern and Süssmuth (2009) validated the association between financial and sporting outcomes in German teams, by reaching conclusions about the relationship between the expenses of wages and the revenues and sports performance of Germany football clubs. Barajas, Fernández-Jardón, and Crolley (2007) developed an index (IND) to describe the income structure of Spanish football clubs based on sporting results in several competitions. The authors discovered a strong relationship between sports earnings and wages expenses in an interval of 1998 to 2002 where wages expenses increased up to 70% of the club's total revenues over the time in analysis, resulting in comparatively low profitability for Spanish football clubs.

Previous studies used other methods to analyze the efficiency of football clubs. Specifically, McNamara et al. (2011) utilized a linear regression model to investigate the relationship between sports results and the adopted business model, revealing that financial stability is associated with improved financial performance. This suggests that sports success may not significantly influence the profitability and sustainability of clubs, prompting investors to

shift their focus towards maximizing financial returns on investment. Moreover, previous research indicates that financial and sports performance are correlated with returns on equity rather than risk. Barajas and Rodríguez (2010) employed logistic regression to explore the financial situation of Spanish clubs. Their findings revealed operating losses and debt exceeding revenues in many cases, with clubs exhibiting low debt repayment capacity and inefficiencies in player acquisition spending. The detrimental effects of an "arms race" among top football clubs, as exemplified by Spanish teams, were also highlighted, where excessive spending on new players resulted in insolvency for nine clubs in 2009. Additionally, the market value of players typically aligns with their wages, with the acquisition of highly valued players requiring substantial transfer fees and high salaries.

3. Data and Methodology

The study will adopt a quantitative research approach, utilizing relevant financial data, player salary figures, sporting performance metrics, and club financial reports. The sample will consist of the greatest European clubs from the top six European leagues, including but not limited to the English Premier League, Spanish La Liga, Italian Serie A, German Bundesliga, French Ligue 1, and Portuguese Primeira Liga. The data will be collected for the period from 2014 to 2021, allowing for a comprehensive analysis of trends and patterns over time.

3.1 Motivation for the study and research contributions

The interplay between financial performance and sports results has been a subject of growing interest across academia and industry alike. In the past two decades, the financial industry surrounding sports, and football in particular, has undergone a evolution that is nothing short of remarkable. Researchers and scholars have been focusing their studies on the significant transformations that have occurred in the football industry, particularly marked by an escalation of investments since the beginning of the century.

In turn, the European football environment serves as an ideal microcosm for this study, given its global reach, substantial financial turnover, and highly competitive landscape. The football clubs at the apex of this ecosystem are not merely sports teams, but extensive enterprises with revenue streams encompassing ticket sales, sponsorships, merchandising, and media rights, among other avenues. Understanding the interplay between these financial indicators and sports performance can offer valuable insights, not just for the clubs themselves, but also for investors and stakeholders.

In a nutshell, this research makes the following contributions to the existing literary works:

- Firstly, by deploying rigorous statistical methods, it plans to provide empirical evidence that either supports or refutes the prevailing belief that financial competency invariably leads to better sports results. By doing so, it hopes to unravel the intricacies of a multi-dimensional relationship that has far-reaching implications.
- Secondly, the study aims to establish a grouping of financial variables that are influential in affecting sports performance. This understanding can guide managerial decisions concerning resource allocation, thereby leading to improved performance

metrics.

- Thirdly, the study endeavours to extend its findings beyond the scope of football clubs, potentially offering a generalizable framework that could be applied to other sports or even other industries where performance is a key metric.

3.2 Data and Sample

The data regarding the sports performance was collected from some official football websites, as UEFA and FIFA whereas the financial performance such as the income statements, balance sheets as well some ratios of the clubs is taken from the Refinitiv Workspace, Yahoo Finance, Capology and the annual reports that the clubs provide publicly on their websites.

As referred previously, this study focuses on the main European football clubs because of their relevance for the industry. They not only rule the world of football from a financial standpoint, by having the biggest revenues, but they also rule it from a sporting perspective by winning most competitions.

The initial selection consists of the top European clubs from England, France, Italy, Germany, Portugal, and Spain, which are, at the moment, the most relevant leagues in Europe. The list of selected clubs is presented in Table 1.

List of Clubs		
Ac Milan	FC Internazionale Milano	Sevilla FC
Borussia Dortmund	Juventus Football Club	Sport Lisboa e Benfica
Chelsea FC	Manchester United FC	SS Lazio
Club Atletico de Madrid	Manchester City FC	Sporting Clube de Portugal
FC Barcelona	Napoli	Arsenal FC

Futebol Clube do Porto	Paris Saint Germain	Liverpool FC
FC Bayern Muenchen	Real Madrid FC	Tottenham Hotspurs FC
Leicester City	Olympique de Marseille	Villarreal Club de Fútbol

Table 1: List of the Sample of clubs selected.

The bulk, if not all, of the Big 6 leagues' national league champions during the course of our study period belonged to the 24 teams proposed to examine. Only the French League, which has 71% of the winners in our sample, does not have 100% of the winners (Table 2).

National League						
Year	**England**	**Spain**	**Italy**	**Germany**	**France**	**Portugal**
2016	Leicester City	FC Barcelona	Juventus Football Club	FC Bayern Muenchen	Paris Saint-Germain	Sport Lisboa e Benfica
2017	Chelsea Fc	Real Madrid	Juventus Football Club	FC Bayern Muenchen	Monaco	Sport Lisboa e Benfica
2018	Manchester City	FC Barcelona	Juventus Football Club	FC Bayern Muenchen	Paris Saint-Germain	FC Porto
2019	Manchester City	FC Barcelona	Juventus Football Club	FC Bayern Muenchen	Paris Saint-Germain	Sport Lisboa e Benfica
2020	Liverpool FC	Real Madrid	Juventus Football Club	FC Bayern Muenchen	Paris Saint-Germain	FC Porto
2021	Manchester City	Atletico de Madrid	FC Internazionale Milano	FC Bayern Muenchen	Lille	Sporting CP

2022	Manchester City	Real Madrid	Ac Milan	FC Bayern Muenchen	Paris Saint-Germain	FC Porto
% of the 24	100%	100%	100%	100%	71%	100%

Table 2: Winners of National Leagues (2016-2022)

Regarding European competitions (Champions League and Europa League), the dominance of the Elite European Football clubs in European Competitions is even more pronounced. From the 24 selected teams account for 100% of Winner and Runner up finishes in the Champions League during our study's time period, which is between 2016 to 2022. Our club sample includes 86% Europa League champions, and the second place over 71% (Table 3).

	Champions League		**Europa League**	
Year	**Winner**	**Runner-up**	**Winner**	**Runner-up**
2016	Real Madrid	Atletico de Madrid	Sevilla FC	Liverpool FC
2017	Real Madrid	Juventus Football Club	Manchester United FC	AFC Ajax
2018	Real Madrid	Liverpool FC	Atletico de Madrid	Marseille
2019	Liverpool FC	Tottenham Hotspurs FC	Chelsea FC	Arsenal FC
2020	FC Bayern Muenchen	Paris Saint-Germain	Sevilla FC	FC Internazionale Milano
2021	Chelsea FC	Manchester City	Villarreal Club de Fútbol	Manchester United FC
2022	Real Madrid	Liverpool FC	SG Eintracht Frankfurt	Rangers FC
% of the 24	100%	100%	86%	71%

Table 3: Winners of Champion League and Europa League (2016-2022)

. In a first moment, one assumption can be made on which the clubs in the selected sample have won the majority of the main competitions, this supports the premise that the chosen sample exhibits a successful sport performance.

3.2 Hypothesis

This research endeavours to scrutinize the intricate interplay between European football and finance, specifically, it focuses on the relationship between financial performance and sporting outcomes in top-tier European football clubs. The relationship between financial performance and sporting results in the context of top European football clubs has long been a subject of interest and debate. This dissertation aims to explore and examine this intricate interaction, shedding light on the potential impact of average player salary, sporting success, club profits, and financial performance on one another. By investigating these relationships, the study seeks to enhance our understanding of the complex dynamics between football and finance. Therefore, given the importance of football in local and national economies, it is critical to understand how a club's management operates and how to apply the financial resources to maximize the return on those resources.

Ultimately, this study aims to shed light on the complex dynamics of finance in football, thereby fostering a more nuanced understanding of the synergistic relationship between sporting success and financial performance. The sample for this investigation comprises the most prominent European football clubs from the top six European leagues, within a time frame spanning from 2014 to 2021. To explore these relationships, this study proposes the following hypotheses:

H1: "Average salary per player has a positive impact on sporting success"

H1 proposes that the average salary per player positively influences sporting success. This hypothesis posits that an increase in average player salary within a football club will correspond to an improvement in the club's sporting success. The study will explore whether higher player salaries attract better talent, enhance performance levels, and contribute to achieving positive sporting outcomes.

H2: "Sporting success impacts positively on average salary per player"

H2 posits that sporting success, in turn, exerts a positive impact on the average salary per player. This hypothesis suggests that a club's sporting success influences the average salary per player. It investigates whether successful performance on the field leads to increased revenue, enabling clubs to offer higher salaries to players as a means of reward, retention, and attracting top talent.

H3: "Club operating expenses and total assets significantly affects sporting success"

H3 asserts that the club's operating expenses and total assets significantly shape sporting success. This hypothesis examines the relationship between club gains and sporting success. It explores the potential impact of financial profitability on a club's ability to invest in player acquisitions, infrastructure development, and other resources that contribute to improving sporting performance.

H4: "Financial performance is positively/negatively influenced by sporting success"

H4 hypothesizes that the financial performance of the clubs is either positively or negatively impacted by the club's sporting success. This hypothesis investigates the reciprocal relationship between financial performance and sporting success. It examines whether positive sporting outcomes, such as league titles, trophies, or participation in prestigious competitions, translate into increased revenues, sponsorships, merchandise sales, and overall financial success for football clubs.

By formulating these hypotheses, the study aims to contribute to the understanding of the intricate relationship between financial performance and sporting success in top European football clubs. The findings will provide valuable insights for club owners, investors, and decision-makers, assisting in the development of strategies that strike a balance between financial stability and sporting excellence.

3.3 The Measurement of Sport Performance

Sport performance may be defined as a club's ability to gain a huge number of matches in which it competes. So, when a club achieves great results in these competitions, it will be more closely to have a good sport performance. However, measuring sport

performance could turn as a difficult process since there are several sorts of tournaments with distinct impacts on the club's season and the focus of the club might also alter by taking into account the strategic planning of that season.

In assessing performance metrics within sports, it is imperative to consider a plethora of influencing variables that can be both endogenous and exogenous in nature. For instance, Edmans et al. (2007) highlight the role of emotional elements within the sport as a significant influencing factor. Concurrently, the economics of the sector serve as another pivotal determinant, as argued by Gannon et al. (2006). Additional variables include the impact of human capital (Torgler and Schmidt, 2007), the competitive balance within the league or competition (Peeters, 2011; Marques, 2002), and the quality of club management (Barajas et al. 2005).

From a sporting perspective, several metrics have been proposed in the literature to measure performance effectively. Marques (2002) advocates for the use of the proportion of victories as an indicator. Boulier and Stekler (2003) have presented the goal difference as another plausible metric. A more comprehensive approach by Dimitropoulos and Limperopoulos (2014) incorporates both goals scored and goals conceded. Alternatively, Ferri et al. (2017) introduced a nuanced measure that employs the number of points achieved, normalized by the total number of points possible, as a substitute for the conventional metric of seasonal victories. Thus, it is evident that the measurement of performance in sports is a multifaceted endeavor, influenced by a range of variables that span emotional, economic, and tactical elements, among others. Furthermore, the array of performance indicators available in existing research offers multiple avenues for robust analysis.

Without a doubt, professional football teams should achieve two distinct degrees of performance (Szymanski and Kuypers, 1999). To begin, football clubs are created in order to win or place well in national competitions. Second, clubs are limited firms that must ensure a profit for their shareholders.

In this study, I will assess sport performance in relation to competition where the clubs in this analysis are competing, considering all the major competitions as well as those tournaments with the greatest recognition by the clubs. Therefore, I will be measuring the national championship, the national cup, and the two major European cups (Champions League and Europe League) by follow the same line of thought as Szymanski and Kuypers (1999), who used the following equation:

$$\mu(C_l) = -\log\left(\frac{p}{n+1-p}\right)$$

Equation 1: League performance indicator

Where the authors measured the league performance by using a logarithm transformation of the position that they achieved in the classification over the number of teams that belong to the respective league. Where n is the number of teams in the league and p is the position they achieve in the classification.

As referred previously, the number of wins and the percentage of points obtained in the league will both be used as an alternative sports performance indicator. Barajas et al. (2005) develop a way to measure the competition that has a knockout format. The complexity of these competitions is observed by the way that most of the previous literature exclude competitions with this format. In turn, Barajas et al. (2005) in their study built a diagram where each stage achieved by the team represents a different number of points (Figure 3).

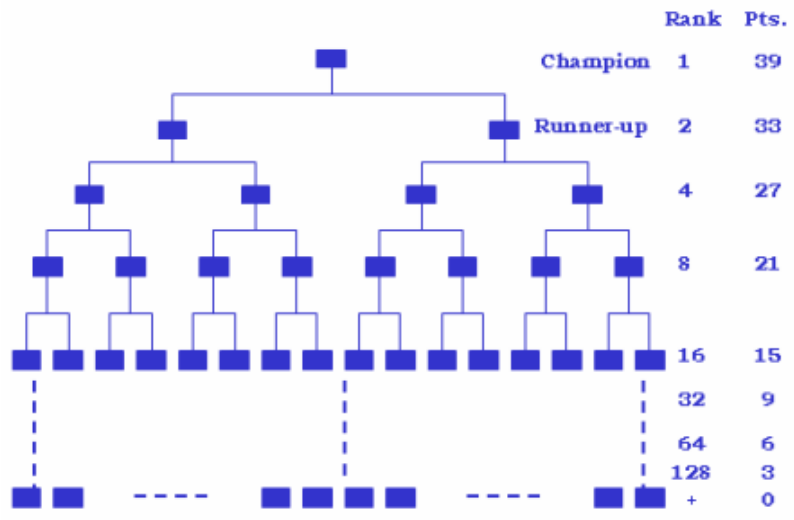

Figure 3: Diagram for points estimation

When it comes to consider national or European cups, this topic becomes even more complicated when this specific competition presents a knock-out structure. Thus, I will employ this measuring method produced by Barajas et al. (2005), who created a diagram where

each step symbolizes a different degree of points to the clubs. However, in these cases is necessary to differentiate the competitions and measure the different effects of the competitions, not also the European but also the domestic competitions. To do that, we will follow the same method used by Barajas et al. (2005), who defined a compound index (IND) in order to differentiate the different competitions and their economic impact. Therefore, the compound index is represented in the following formula:

$$IND = \sum_{i=1}^{4} \alpha_i P_i$$

Equation 2: Compound Index presented by Barajas et al (2005)

Where Pi represents the number of points earned in the i competition in question and αi represents the weight of each competition taken into account. As a result, as these authors, it will assessing the various competitors in light. The national championship will be rated with 2, the national cup with 1, the Europe League with 2, and the Champions League with 3. The index expression is expressed below:

$$IND = \text{Cup Pts.} + 2*\text{UEFA Pts.} + 2*\text{League Pts.} + 3*\text{UCL Pts.}$$

Equation 3: Compound Index presented by Barajas et al. (2005)

Once again, these are weighted according to the importance of the competition for the overall valuation of the performance of the team. If this approach allows the consideration of a large set of sport competitions but increases the importance of some leagues (big 5 leagues and its revenues) and the champions league that assure more resources, this could open the discussion of the weights and if they can be adjusted give more importance to these aspects. One limitation from the previous model is that the weights (2) given to each league are the same for every league. Moreover, not all leagues have the same economic importance, winning the Premier League does not provide the same financial return as winning the Primeira Liga (Portuguese League). For example, the overall distributed in the Premier league are 23x larger than the Primeira Liga.

3.4 Descriptive Statistics

The descriptive statistics for each variable in the study are presented in this section. A detailed understanding of these statistics offers essential insights into the data, supporting the study's core hypotheses. Then, the descriptive statistics analyses, such as mean, standard deviation, minimum, maximum, and median, are computed using STATA software to provide an in-depth understanding of the data distribution and central tendencies by focusing on several financial indicators, including average salary per player, operating expenses, total assets, total revenues, and breach of financial fair play regulations. the research provides a comprehensive overview of these variables and their impact on the performance of football clubs.

Variable	Obs	Mean	Std. Deviation	Min	Max	Median
IND	191	101.6316	52.7801	6.694	232.648	103.046
Average Salary per player	192	3.1443	2.4752	.25	14.04	2.5
OETA	121	.5144	.2166	.1587	1.1186	.45857
ln (Total Revenues)	181	5.5666	.7909	3.1480	6.7346	5.8117
Breach of Financial Fair Play	192	.04688	.2119	0	1	0

Table 4: Descriptive statistics (n = 192)

The variable "IND", representing the sports performances, was observed 191 times, with a mean value of 101.6316. The standard deviation stood at 52.7801, signifying a moderate spread of data around the mean. The minimum and maximum values recorded were 6.694 and 232.648, respectively, with a median value of 103.046. The Average Salary per Player had 192 observations, presenting a mean value of 3.1443. The data variability was indicated by a standard deviation of 2.4752. The observed salaries ranged from a minimum of 0.25 to a maximum of 14.04, with a median salary of 2.5. The OETA variable which is a ratio of operating expenses divided by total assets was observed 121 times, yielding a mean value of .5144. The standard deviation of .2166 signifies a considerable variability in how football clubs allocate resources for their operations relative to their total assets. The minimum and maximum values were noted at .1587 and 1.1186, respectively, with the median value at .45857. It is important to note that operating expenses are indicative of how

efficiently a sports organization manages its funds to achieve its goals. A higher ratio of operating expenses to total assets might suggest that the organization is spending a significant portion of its resources on its operations, which could impact its financial performance. For instance, high operating expenses might indicate investments in player salaries, marketing, infrastructure, and other areas that could influence team performance and competitiveness. So, a higher ratio of operating expenses to total assets could reflect a greater commitment to building a competitive team, potentially leading to better sports outcomes.

Moving further, the Ln (TR) variable is a logarithmized of Total Revenues to analyze the impact of its percentage change on the sports performance was observed across 181 instances, with a mean value of 5.5666. The standard deviation of .7909 indicates substantial data variability and was observed a range between a minimum of 3.1480 and a maximum of 6.7346, with the median recorded at 5.8117. Lastly, the variable "Breach of Financial Fair Play" consists of a dummy variable that takes 1 (0) if a club of the sample fail the financial fair play regulations imposed by UEFA. This dummy variable was observed 192 times, with a mean of 0.04688. Then, a relatively low standard deviation of 0.2119 suggests minor fluctuations in the data. The values ranged between 0 and 1, with a median value of 0, indicating a preponderance of clubs adhering to financial fair play regulations.

These descriptive statistics offer an initial understanding of the data spread and variability, forming a robust foundation for further inferential analysis.

3.5 Preliminary econometric tests

3.5.1 Multicollinearity

Multicollinearity between independent variables means that those inputs are not truly independent, and therefore they can be measuring the same factor, or they can be proportionally related to each other. If that happens, the model loses explanatory power on the dependent variable and one way to fix that problem is to drop problematic variables, which are the significantly correlated ones. To verify the existence or absence of multicollinearity, it is necessary to observe the correlation matrix and the variance inflation factor (VIF).

Variable	Ind	Aver_Sal	TURN	Ln (TR)	FFP	VIF
IND	1.0000					
AVER_SAL	0.4136*	1.0000				2.66
OETA	0.1326*	0.0914*	1.0000			1.02
Ln (TR)	0.5144*	0.7255*	0.9457*	1.0000		2.81
FFP	-0.0660	-0.0660	-0.1027	-0.1477*	1.0000	1.09

Table 5: Pearson's correlation matrix and variance inflation factor

As clarified in this Table, correlation values range from -1.0 to 1.0. A positive value indicates a positive correlation, while a negative value indicates a negative correlation. The closer the value is to 1.0 or -1.0, the stronger the correlation. A value of 0 indicates no correlation. "*" symbol indicates that the correlation coefficient is statistically significant at the 5% level.

Regarding the interpretation of Pearson's correlation matrix, the positive correlation of 0.4136* between IND and AVER_SAL suggests a positive relation between these variables. This might indicate that football clubs with higher average salary per player tend to align with the sports performance. Then, the correlation's statistical significance implies that multicollinearity might not be a major concern between these two variables. However, the relatively high positive correlations between Ln (TR) and both AVER_SAL (0.7255*) and IND (0.5144*) raise a flag of potential multicollinearity. This could imply that these variables might be conveying overlapping information. Further investigation, such as VIF analysis, could shed light on the extent of multicollinearity.

On the other hand, the correlations involving OETA are generally weak, suggesting limited linear relationships. The values (0.0914 with AVER_SAL, 0.1236 with Ln (TR) and -0.1027 with FFP) might indicate that the ratio of operating expenses to total assets does not exhibit strong multicollinearity with other variables. The moderate negative correlation (-0.1477*) between Ln (TR) and FFP, along with the negative correlation of -0.0660 between FFP and both IND and AVER_SAL might indicate that these variables move in somewhat opposite directions. However, the statistical significance is important to assess the strength of these correlations in terms of potential multicollinearity.

Finally, the VIF is the ratio of the variance in a model with multiple independent variables compared to a model with only one independent variable. To interpret this

indicator, there is no universal rule. However, it is usually accepted that the VIF value of each explanatory variable must be below 5 to validate the absence of multicollinearity problems. According to the output, the VIF of independent variables is below 5, therefore, this result indicates the absence of multicollinearity, which is aligned with the result in Pearson's correlation matrix.

3.5.2 Lagrange Multiplier Test – Breusch-Pagan

The Breusch-Pagan Lagrangian Multiplier test was employed to evaluate this, given its ability to examine whether the correlation between the Ordinary Least Squares (OLS) residuals significantly deviates from zero. The null hypothesis in this context posits that homoscedasticity is present with a p-value higher than the critical value of 0.05, suggesting that the Pooled Ordinary Least Squares (POLS) model would be more appropriate than the Random Effects (RE) model. Conversely, the alternative hypothesis argues for the presence of heteroscedasticity, implying a preference for the RE model over the POLS model. Table 10[1] shows the results of the Lagrange Multiplier Test displayed on STATA. the observed p-value is equal to 0.000, which is lower than the critical p-value of 0.05. With this result, the null hypothesis is rejected, meaning that RE is preferred over POLS, and the panel is heteroscedasticity.

This conclusion has profound implications for the subsequent empirical analyses in this thesis. The verification of heteroscedasticity through the Breusch-Pagan Lagrangian Multiplier test endorses the use of the RE model, thereby extending the statistical robustness of these findings. This lends additional credence to the conclusions that will be drawn regarding the complex interplay between financial performance and sporting results, specifically in the domain of top European football clubs.

3.5.3 Hausman Test

Given the above results of Lagrange Multiplier Tests it is also relevant to analyze whether the FE model is preferred or not to the RE model. If that is the case, then it is necessary to confront POLS with FE, if not POLS is the accurate model to use. The Hausman test is used to meet this purpose. Table 11[2] confirms that the observed p-value is 0.0216,

[1] Complete information in Table 10 of the annexes.

[2] Complete information in Table 11 of the annexes.

which is lower than the critical p-value. Therefore, the null hypothesis is rejected, meaning that FE is preferred to RE. So, based on this test, the fixed-effects model is favoured over the random-effects model.

In turn, observing the fixed-effects model, the R-squared values exhibit distinct dimensions of variation within and between groups. The within group R-squared (0.0892) signifies that approximately 8.92% of the variation in sports performance (IND) is captured by the model within each group. The between-group R-squared (0.2878) explains 28.78% of the variation attributed to differences between the groups. The overall R-squared (0.2445) represents the collective explanatory strength of the model. Among the individual coefficients, the average player salary (AVER_SAL) is not statistically significant ($t = 0.58$, $p = 0.564$). However, the ratio of Operating Expenses to Total Assets (OETA) demonstrates potential significance with a p-value close to the conventional threshold ($t = 1.94$, $p = 0.056$). (Ln (TR)) variable represents the logarithm of total revenues and (FFP) represents the compliance with financial fair play regulations and exhibits p-values of 0.061 and 0.300 respectively, suggesting marginal significance.

3.5.4 Autocorrelation

It is also important to validate if the non-diagonal elements of the variance-covariance matrix are equal to zero. If that is the case, then the model is characterized by the absence of autocorrelation. In order to test it, the Breusch-Godfrey test is implemented.

As for the Breusch-Godfrey test specifically, which is used to detect the presence of autocorrelation in the residuals from a regression analysis, we observe a calculated test statistic of 4 (as given by e(r2) *e(N)). This test statistic follows a chi-squared distribution, for 7 degrees of freedom, the critical value of chi-squared at a 5% level of significance is approximately 14.067. Our observed value of 4 falls below this critical value, indicating that we fail to reject the null hypothesis of absence of autocorrelation suggesting that there is insufficient evidence to conclude that the error terms are serially correlated.

3.6 Exogeneity of regressors

This section critically interprets the outcomes of an examination of potential endogeneity using external instruments, along with a subsequent Structural Ordinary Least Squares (OLS) estimation. In addressing the issue of endogeneity, this study pays special attention to the variables Ln (Total Revenues), the Operating Expenses to Total Assets ratio and the Average Salary per Player. These are the only independent variables in our model that could potentially be endogenous since the remaining variable is a dummy variable.

To assess the quality of this external instrument, we consider the F-statistic, a commonly used measure in instrumental variables (IV) and two-stage least squares (2SLS) approaches. According to conventional thresholds, a strong instrument is one where the F-statistic significantly exceeds the critical value of 104.7 linked with the 4 types of Princeton, thus substantially reducing the risk of weak instrument bias. Moreover, it is important to refer that * (**) [***] indicates significant at the 10% (5%) [1%] level, respectively. Standard errors without correction of heteroscedasticity are presented within parentheses.

3.6.1 Ln (Total Revenues)

The relevance of an instrument is determined by its statistical significance in the first-stage regression, where it is used to predict the endogenous variable. In this case, observing Table 6 the Ln (TR)1 variable appears to be relevant as indicated by its statistically significant coefficient (0.7989) in the first-stage regression. This suggests that Ln (TR)1 is associated with changes in the endogenous variable Ln (TR) by reflecting the extent of change in the endogenous variable for a unit change in the instrumental variable.

In the ongoing, the First Stage regression analysis encapsulates the statistical properties of the instrument Ln (TR)1 in predicting changes in the endogenous variable. The model's performance is characterized by essential metrics, providing valuable information for instrument selection, and addressing endogeneity concerns.

Regarding the external instrument's quality, the respective F-statistic has a value of 177.8400 with an associated p-value of 0.0000 which implies that it corresponds to a strong instrument meaning it has a significant impact on the endogenous variable in the first-stage regression. As we can infer from Table 6, the respective coefficient is significant, which implies rejecting the hypothesis that Ln (TR) is exogenous. Therefore, the final regression model should replace the endogenous variable Ln (TR) by the predicted values associated with the one-period lagged instrument of Ln (TR^)1.

Method	OLS		2SLS/IV
Type of equation	Structural equation (1)	First stage (2)	Second stage (3)
Target	IND	Ln (TR)	IND
Internal instruments			
AVER_SAL	3.0379	0.0513**	6.2831
	(3.5796)	(0.0234)	(4.1729)
OETA	17.8943	-0.1531	33.4968
	(19.6493)	(0.1355)	(21.2510)
Ln (TR)	29.7693***		
	(8.7212)		
FFP	11.2728	-0.8240***	17.7494
	(24.2765)	(0.1692)	(29.0109)
Independent term	-74.5507*	1.1089***	-44.7130
	(41.4270)	(0.2655)	(54.3715)
External instrument			
Ln (TR)1		0.7989***	
		(0.0579)	
Ln (TR^)1			20.7338*
			(11.4733)
Significance tests			
Global: F (4, 89)		177.8400***	
Global (only external IV): F (1, 151)		1010.7700***	

Table 6: Procedure to detect the presence of endogeneity for Ln (TR)

3.6.2 Average Salary per Player

In the quest to determine the endogeneity or exogeneity of the Average Salary per Player (AVER_SAL) in Table 7, the first stage of the IV regression is designed to assess the strength and appropriateness of AVER_SAL1 as an instrument for AVER_SAL. The F-statistic of 122.2400 exceeds the conventional threshold of 104.7. However, according with the rule, the instrumental variable should be sufficiently higher than the critical value, suggesting that AVER_SAL1 is a weak instrument. Moreover, the non-significance observed in initial estimations, the predicted AVER_SAL^1 now has a coefficient of 5.598 but is still not statistically significant (p-value=0.178), thereby lending mixed support to its endogeneity. Even though, the IV approach confirms the strength of the instrument, the subsequent structural OLS model gives a mixed message on the endogeneity of AVER_SAL.

In summary, based on the available evidence, it will be considered that AVER_SAL variable is exogenous. Since the moderate F-statistic suggests that the instrument could not be valid and also presents a lack of statistical significance.

Method	**OLS**		**2SLS/IV**
Type of equation	**Structural equation (1)**	**First stage (2)**	**Second stage (3)**
Target	**IND**	**AVER_SAL**	**IND**
Internal instruments			
AVER_SAL	3.0379		
	(3.5796)		
OETA	17.8943	-0.0975	30.3835
	(19.6493)	(0.3839)	(20.6637)
Ln (TR)	29.7693***	0.3313*	24.6121**
	(8.7212)	(0.1788)	(9.6245)
FFP	11.2728	-0.0079	19.4581
	(24.2765)	(0.5144)	(27.7739)
Independent term	-74.5507*	-1.1786	-62.8079
	(41.4270)	(0.8585)	(45.0445)
External instrument			
AVER_SAL1		0.8959***	
		(0.0774)	
AVER_SAL^1			5.5978
			(4.1249)
Significance tests			
Global: F (4, 89)		122.2400***	
Global (only external IV): F (1, 165)		634.4200***	

Table 7: Procedure to detect the presence of endogeneity for AVER_SAL

3.6.3 Operational Expenses to Total Assets ratio

In the current analysis, the question of endogeneity vis-à-vis the variable operational expenses to total assets ratio is scrutinized in Table 8. In this regard, the F-statistic stands at a compelling 70.7800, which is below the conventional threshold of 104.7. This implies a weak instrument resulting that OETA variable is exogenous.

Then, transitioning to the second stage of the 2SLS approach, it is noteworthy that the coefficient for OETA fails to reach statistical significance (p=0.333). The insubstantial statistical evidence regarding OETA necessitates a revaluation of its status as an endogenous variable in the model.

Supplementing the 2SLS results, a Structural Ordinary Least Squares (OLS) estimation is conducted, utilizing the predicted values of OETA^1. Here again, the coefficient for OETA^1 is not statistically significant (p=0.207). This corroborates the finding from the 2SLS estimation, signalling a lack of compelling evidence for the endogeneity of OETA.

Method	**OLS**		**2SLS/IV**
Type of equation	**Structural equation (1)**	**First stage (2)**	**Second stage (3)**
Target	**IND**	**OETA**	**IND**
Internal instruments			
AVER_SAL	3.0379	0.0057	6.9579*
	(3.5796)	(0.0093)	(3.5363)
OETA	17.8943		
	(19.6493)		
Ln (TR)	29.7693***	0.0120	20.4913**
	(8.7212)	(0.0235)	(9.2874)
FFP	11.2728	0.1113	13.0316
	(24.2765)	(0.0825)	(21.9836)
Independent term	-74.5507*	-0.2049	-47.68873
	(41.4270)	(0.1141)	(45.3263)
External instrument			
OETA1		0.8659***	
		(0.0519)	
OETA^1			31.5035
			(24.8200)
Significance tests			
Global: F (4, 75)		70.7800***	
Global (only external IV): F (1, 83)		246.1900***	

Table 8: Procedure to detect the presence of endogeneity for OETA

3.7 Models

In the forthcoming empirical analysis, we will employ a hierarchical modelling approach to investigate the impact of various factors on four distinct sports performance indicators assuming the outcome of Hausman Test on which the decision to employ the fixed-effects model. Hence, the final regression model with fixed effects to be estimated in the relation between financial performance and the sports results analysis is given by:

$$IND_{it} = \alpha_i + \beta_1 AVER_{SAL} + \beta_2 OETA + \beta_3 \ln(TR)_{it-1} + \beta_4 FFP + u_{it} + e_{it}$$

i=1,2, ..., n and t=1, 2, ..., T, N=n x T

Equation 4: The Impact of the Financial Performance in the Sports Performance.

Where,

IND, represents the sportive performance;

$AVER_{SAL}$, represents the average salary per player;

$OETA$, represents the operating expenses divided by total assets;

Ln $(TR)_{it-1}$, represents the lag of the variable logarithm of total revenues;

FFP, represents the breach of financial fair play regulations.

Indeed, the first model serves as a baseline and incorporates only the average salary per player (AVER_SAL) as the independent variable. This model aims to assess the rudimentary relationship between financial investment in players and sports performance.

In the second model, we extend the set of independent variables to include operational expenses to total assets ratio (OETA) and the lag of the logarithm of total revenues (Ln (TR^)1). This expanded model aims to account for additional strategic and financial aspects that may influence sports performance.

Lastly, the third model further augments the variable set by incorporating a Financial Fair Play (FFP) dummy variable. This inclusion allows for the evaluation of whether adherence to financial regulations has a statistically significant impact on performance.

By structuring the analysis in this hierarchical manner, the study will aim to shed light on the incremental explanatory power of each set of variables and to provide a comprehensive understanding of the diverse factors influencing sports performance across different financial metrics. Thus, the models are:

Model 1 – IND = α + β1 AVER_SAL +ε, fe

Model 2 - IND = α + β1 AVER_SAL+ β2 OETA+ β3 Ln (TR)^1 +ε, fe

Model 3 - IND = α + β1 AVER_SAL+ β2 OETA+ β3 Ln (TR)^1 + β4 FFP +ε, fe

4. Empirical Analysis

4.1 Model Results

In the pursuit of understanding the relation between the financial performance and sporting results among top European football clubs, the study conducted a preliminary exploration observed on Table 5 from Pearson's Correlation Matrix. A significant finding was the positive correlation between the average salary per player and sporting success. This statistic lends initial support to the Hypothesis 1 and 2 that greater investment in player salaries is associated with better sporting outcomes.

Interestingly, this estimation also serves as a vantage point to explore the bidirectional relationship between sporting success and player remuneration. It can be interpreted that players are likely to demand higher remuneration from clubs that are more successful, thus validating that sporting success and average salary share a bidirectional positive relationship. Therefore, clubs experiencing better sporting performance tend to offer higher average salaries, in this manner affirming the concept that success on the field can impact financial decisions off it.

	(1) IND	**(2) IND**	**(3) IND**
AVER_SAL	-1.1911	3.5334	3.1883
	(1.8595)	(4.2915)	(4.3559)
OETA		96.7517**	92.9457**
		(43.7534)	(44.4859)
Ln (TR)^1		5.3211	9.3297
		(16.0689)	(17.6500)
FFP			16.5356
			(29.3903)
Independent variable	105.3925***	16.1909	-3.4575
	(6.5299)	(89.1207)	(96.1272)
Fixed effects			
Prob > F	0.5227	0.1089	0.1756
R - Squared	0.1710	0.1613	0.1826
N of Observations	191	96	96

Table 9: Regression Results with dependent variable IND

Proceeding to the Table 9 estimations, the variable for operating expenses and total assets ratio (OETA) showed coefficients around 96.7517 and 92.9457 across the second and third models, respectively, with standard errors that make them statistically significant at least at the 5% level. The results indicate that there is a statistically significant relationship between OETA and sports performance. So, whenever the instrument associated with the OETA ratio increases 1 percentage point, this has a positive impact on the sporting performance indicator by 92.9 p.p.; that is, in economic terms, it is estimated that the ratio only needs to increase 1 p.p. to practically guarantee an additional victory, in average terms and ceteris paribus. This lends credence to the Hypothesis 3, which suggests that a higher operating expenses and total assets ratio has a significant positive impact on sporting success to European football clubs that were included into the data.

The lagged variable for the logarithm of total revenues (Ln (TR)^1) appeared in the second and third models, showing a positive relation with coefficients from 5.3211 to 9.3297. This positive correlation offers preliminary evidence that better sporting performance correlates with higher revenues through the sale of player passes, sales of media rights and prizes for competing in national and European competitions.

In turn, the Financial Fair Play (FFP) dummy variable also made an appearance in the last two models with a coefficient around 16.5356. The standard errors associated with this variable are large, suggesting that while there may be some relationship, it is not statistically robust enough to suggest that adherence or non-adherence to FFP variable significantly impacts sporting success.

Finally, it is important to refer that the F-test probabilities (Prob > F) varied considerably across the models, ranging from a high 0.5227 in the first model to a much stronger 0.1756 in the final model. This range suggests that the models became progressively better at explaining the variation in the dependent variable (IND), as more independent variables were introduced as well as the introduction of the dummy variable.

In conclusion, the model 3 is the one that represents the impact of the financial performance on the sports results and suggests that operating expenses to total assets ratio (OETA) do have a significant and positive impact on sporting success. However, the other financial variables such as average salary per player, total revenues, and Financial Fair Play adherence do not show a statistically significant relationship with sporting performance within this model.

5. Discussion

When analysing such a complex field of study as football, some considerations must be taken. Firstly, the club selection could be larger in order to incorporate more clubs. The sample is using only European football clubs.

Secondly, measuring the sportive performance is a very complex task because of the different importance of matches and competitions. In the rigorous evaluation of athletic performance within the sport, the task is complicated by the variable significance attributed to different matches and competitions.

Additionally, employing simplistic performance indicators may provide an incomplete or skewed representation of a club's overall performance. Such indicators often focus on singular metrics or competitions, neglecting the multifaceted nature of athletic performance in this sport.

Thirdly, it is imperative to note that the data set for the present study incorporates the 2020/2021 season, a period significantly disrupted by the COVID-19 pandemic. The effects of the pandemic were critical, affecting not only spectator attendance, due to public health regulations that limited crowd sizes, but also the economic stability of the clubs. Forced to recalibrate their financial strategies, numerous clubs encountered economic hardships during this atypical season. This observation is substantiated by the database employed in the current research.

For future research, it would be useful to conduct a comparative analysis of the football market segmented by selecting leagues from other continents specifically, Saudi Arabia league and US league since these ones referred are receiving attention from everyone. Such a study could look at football clubs in emerging markets or other continents to compare the dynamics identified in this study.

Then, a more extended time period would provide a deeper understanding of how financial performance and sporting results influence each other in the long term since this study only cover a time period between 2014 and 2021.

Furthermore, comparing football with other sports could offer insights into whether the relationship between financial and sports performance is unique to football or a generalizable phenomenon across sports.

By addressing these limitations and incorporating the suggested recommendations, future research can provide a more comprehensive understanding of the intricate

relationship between financial performance and sporting results in the realm of professional football.

6. Conclusion

The relation between the financial performance and sporting results in top European football clubs is an intricate interplay that continues to hold both academic and practical significance. The competitive nature of the sport has led clubs to seek an equilibrium between financial stability and sporting achievements. However, the relationship between these two dimensions remains elusive and contentious. While there exists a robust body of literature exploring this intersection, the findings are often conflicting, thereby leaving room for further exploration.

The present study, which extend over the years 2014 to 2021 and included a sample of 24 European football clubs, aimed to explore this relationship in depth. Specifically, the objective was to discern how football clubs can effectively prioritize between financial and sporting performance, in such a way that neither sphere is adversely affected.

A review of existing literature illustrates the equivocal nature of academic consensus on this topic. Various studies have ventured into this terrain but have often produced contradictory results. This incongruity signals an urgent need for more analyses. Moreover, the present study is situated within an immediate real-world context where football clubs, even those with solid financial statements, often face challenges in translating this stability into on-the-field success and vice versa.

While the study advances our understanding of the relationship between financial and sporting performance in European football clubs, it is not without its limitations. The principal hurdle faced was the difficulty in obtaining comprehensive financial data, especially for non-public clubs. Additionally, the quality of the available data was another obstacle that restricted a more detailed analysis.

As delineated in the objectives of this dissertation, the central question under scrutiny was whether a club's financial health would translate into future sporting successes, including but not limited to victories and trophy wins. The culmination of our rigorous analysis reveals a noteworthy insight. A club's sporting performance is intricately tied to its wage measure since there is a strong relationship between the average player per salary and sports results. This conclusion finds resonance in existing literature, specifically those by Szymanski and Kuypers (1999), Barajas, Fernández-Jardón & Crolley (2007) and Barajas and Rodríguez (2010). These studies provided empirical evidence supporting the notion that better salaries levels enable clubs to acquire top-tier talent, which in turn catalyses better on-field

performance which is aligned with the Hypothesis 1 and 2 of this study.

Regarding Hypothesis 3, the operating expenses-to-total assets ratio was found to have a considerable effect on sporting success. This indicates the presence of an optimal level of spending, beyond which the law of diminishing returns may come into play and suggests that efficient use of assets is positively related to sports performance. Existing literature has examined various financial indicators such as revenues, profitability, and market valuation to understand their relationship with sports performance. However, there is a gap in the literature concerning the ratio of Operating Expenses to Total Assets as a financial measure linked to sports results.

Then, pertaining to Hypothesis 4, the study establishes a dynamic link between financial performance and sporting success. While the directionality of this relationship could vary based on contextual factors, its existence is beyond doubt and confirms the existing literature as Barajas and Rodríguez (2010) and Sánchez, Barajas and Sanchez-Fernandez (2020) accomplished in their study. Here, the correlation between the increase of revenues (even though without statistical significance) and operating expenses to total assets ratio to the sports performance is proven analysing both estimations for the second and third model. Indeed, clubs experiencing a consistent uptick in revenues are inherently better positioned to invest in high quality players, thereby elevating their sporting performance. This observation emphasizes the transformation of modern football into a predominantly business-centric enterprise. It is increasingly evident that football today transcends its roots as a mere sport; the diverse streams of financial revenue have endowed clubs with greater capital, enabling them to acquire superior talent.

Upon a comprehensive analysis of our empirical data, it is evident that clubs exhibiting robust financial stability are more likely to achieve superior sporting results. This finding has significant implications for how revenues and performance-based premiums should be structured to enhance the competitiveness of football leagues and tournaments. Governance and regulation emerge as salient themes, given the expanding influence of private investment funds that can potentially distort the competitive balance of football competitions.

In recent years, there has been a noticeable rise in teams previously not considered contenders, owing largely to injections of private capital. Such influxes have led to a sharp inflation in player transfer values, levels that are largely unsustainable for a majority of clubs. This financial polarization risks undermining the competitive integrity of leagues and tournaments, thereby raising important questions about how best to regulate external funding

sources. As a result, it becomes imperative for club executives to articulate a clear organizational mission that harmonizes financial prudence with on-field aspirations. Striking this balance is pivotal for ensuring medium-to-long-term growth and sustainability. This strategic alignment is not merely a managerial best practice but a critical precondition for preserving football's stature as both the "king of sports" and a key source of global entertainment.

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Annexes

The Breusch-Pagan Lagrangian Multiplier test is presented in the following table 10.

Table 10: Lagrange Multiplier Test – Breusch-Pagan

Breusch and Pagan Lagrangian multiplier test for random effects

ind[c_id,t] = Xb + u[c_id] + e[c_id,t]

Estimated results:

	Var	SD = sqrt(Var)
ind	2904.133	53.89
e	1404.954	37.48272
u	680.9514	26.09505

Test: Var(u) = 0

chibar2(01) = 15.33
Prob > chibar2 = 0.0000

Hausman's test for IND is presented in the following table 11.

Table 11: Hausman's test for models with dependent variable IND

. hausman fixed random

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
aver_sal	1.99037	2.818109	-.8277388	1.023953
turn	78.43876	33.99962	44.43915	31.05798
lntr	24.75742	28.89015	-4.132734	8.964885
ffp	23.46201	24.81299	-1.350977	5.890626

b = Consistent under H0 and Ha; obtained from xtreg.
B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 11.48
Prob > chi2 = 0.0216