Aalto University
School of Business | Mikkeli Campus

EXPLORING THE RELATIONSHIP BETWEEN A FOOTBALL CLUB'S FINANCIAL AND COMPETITIVE PERFORMANCE

An empirical analysis of English Premier League clubs

Nicholas Bergius

International Business

Bachelor's Thesis

Supervisor: Marta Zieba

Date of approval: 9 April 2021

Aalto University

School of Business

Bachelor´s Program in International Business

Mikkeli Campus

Aalto University
School of Business | Mikkeli Campus

EXPLORING THE RELATIONSHIP BETWEEN A FOOTBALL CLUB'S FINANCIAL AND COMPETITIVE PERFORMANCE

An empirical analysis of English Premier League clubs

Nicholas Bergius

International Business

Bachelor's Thesis

Supervisor: Marta Zieba

Date of approval: 9 April 2021

Aalto University

School of Business

Bachelor´s Program in International Business

Mikkeli Campus

AALTO UNIVERSITY
SCHOOL OF BUSINESS
Mikkeli Campus

ABSTRACT OF
BACHELOR'S THESIS

Author: Nicholas Bergius

Title of thesis: Exploring the Relationship Between a Football Club's Financial and Competitive Performance: An Empirical Analysis of English Premier League Clubs

Date: 9 April 2021

Degree: Bachelor of Science in Economics and Business Administration

Supervisor: Marta Zieba

Objectives
The main objective of this study was to explore the relationship between a football club's competitive and financial performance. Another objective was determining the effect the chosen explanatory variables had on the sampled clubs' annual revenues. Discussing and analysing how certain qualitative variables such as ownership structure and investment habits affect the clubs financial and competitive performance was also among the research objectives.

Summary
This study utilized empirical methods in the form of panel regression analysis to observe how quantitative variables encompassing league performance and financial success of the sampled football clubs affect their annual total revenues. The effects of various qualitative variables, such as club ownership structure and investment habits, on the sampled clubs' financial and competitive performance were also discussed.

Conclusions
Three of the four explanatory variables were deemed statistically significant and showcased a positive relationship with the dependent variable – *revenue*. The number of achieved English Premier League points was found to have the strongest positive effect, followed by the clubs' level of wage expenditure, followed by the level of transfer expenditure. The study ultimately found empirical evidence supporting a positive relationship between a football club's financial and competitive performance. However, the study also acknowledged that there were still many important qualitative and quantitative variables that the regression model did not account for.

Key words: *football, panel regression, EPL, transfer expenditure, wage expenditure, competitive, financial, ownership, investment habits*

Language: English

Grade:

Table of Contents

1. INTRODUCTION

1.1. Background

The aim of this study is to examine and explore how football clubs operate both competitively and financially. The research conducted in this paper puts specific emphasis on investigating the relationship between the two performances. This study attempts to conduct an empirical regression analysis to see how certain variables encompassing both competitive and financial aspects of a football club affect the team's total annual revenues. It must now be stated, that for the purpose of this study, the term '*football*' bears the same meaning as the term '*soccer'*. Football is the term used for the sport within the United Kingdom, which acts as the focus area for this study.

1.1.1. Brief history of English football

Football is considered to be most played sport in the world. The sport has become a global sensation, as arguably every single country in the world has some form of organized football. The roots of modern football can be traced back to England in 1863, when the Football Association (FA) was formed (The FA, n.d.). Football clubs promptly started to join the FA and by 1887, the number of clubs within the association had grown to 128 (Shiner, 2018). The first FA cup game was played in the 1872, leading to players starting to get paid by their clubs during this decade (Shiner, 2018). A few years later, in 1877, a set of cohesive rules were formed to conceive the game we now know as football (Football Stadiums, n.d.).

In 1888, a group of English teams gathered together in a meeting and decided to formalize the English football scene, officially creating the *Football League* (Buraimo et al., 2006). This league was the primary competition for professional football, meaning any successful team would strive to qualify to play in it. The Football League endured numerous changes over the years, as divisions were added, along with relegation and promotion zones (Football Stadiums, n.d.). However, in 1992, the first division broke away from the Football League and reformed to become what we now know as the *Premier League* (Buraimo et al., 2006).

1.1.2. Evolution from a sport into a business

Ever since the synthesis of professional football, players have received wages for their efforts on the pitch. This essentially meant that teams needed to make money in order to pay their players' wages. Over the years, the structure of football clubs has drastically expanded, requiring an increasing number of staff to be hired. Football clubs have evolved into multimillion-dollar businesses, and now have a multitude of different professional staff working for them. Buraimo et al. (2006) argue that a central reason for the transformation of football teams to operate more like traditional businesses came from the need for financial stability. They also claim that one of the reasons for the formation of the English Premier League (EPL) was to allow teams to gain more revenue, as the league was a sole entity – separate from the other football leagues. Ultimately, the growth in popularity of football, and especially the increase in generated revenues, meant football teams felt a need to start operating in a more business-like manner. Football has continued to grow even since 1992, and the EPL alone has managed to achieve revenues in the billions.

1.2. Research Problems

In modern football, there are a number of cases where teams that have historically been unsuccessful, suddenly skyrocket into the top division and play extremely well. In most cases, this is because the club received new owners who significantly increased the financial capacity of the club. However, this phenomenon is most likely affected by other variables and conditions. Modern professional football is highly influenced by the financial motives of the clubs themselves, and quite often the clubs with more money tend to perform better in both domestic and international competitions. A club's annual revenue often determines how well the club does and is affected by a multitude of factors and variables.

This study will primarily examine the relationship between various EPL clubs' financial and competitive performance. The study will utilize empirical research methods to investigate how different variables affect the annual revenues of the sampled clubs. The research problem of this study can mainly be condensed into trying to answer two questions: (1) Does successful league performance directly lead to wealthy financial performance? (2) Do other fiscal variables such as a club's wage and transfer expenditure positively contribute towards its annual total revenues? These are the main questions the regression analysis will attempt to statistically answer. There is prior research looking into the relationship between the

financial and competitive success of football teams through employing regression analysis. However, the specific model used for this study is unique, as it consists of explanatory variables encompassing both league and financial performances, which have not been used before.

It is not possible to investigate football teams using empirical data only. There are always variables and factors that statistical measures such as regression analysis cannot account for. These variables are discussed and acknowledged within the study, but as they are difficult to quantify, they are not included in the presented regression models. One major variable that is difficult to quantify, is the effect ownership has on the competitive and financial performance of a club. Another challenging variable to quantify is how various investment habits directly contribute towards a team's annual revenues. Variables such as these undoubtedly have a large effect on football teams and cannot fully be ignored when it comes to this study.

Ultimately, financial resources are a core aspect of any football team and have proven to allow teams to expand and play better when the resources are allocated correctly. However, it would be interesting to delve deeper, and examine the relationship between a team's competitive and financial performance even further. This study strives to gather reliable data, model it, and hopefully draw some concrete empirical and qualitative conclusions on how football teams operate, both financially and competitively.

1.3. Research Questions

1. To what extent do explanatory variables encompassing competitive league performance affect a football club's financial performance?
2. Is there a positive relationship between a club's financial expenditure and its total annual revenue?
3. To what degree does a club's investment habits and ownership structure impact its financial and competitive performance?

1.4. Research Objectives

1. In the world today, it is often the case that money puts things into motion. This is especially true for the football world, as money allows teams to buy better players and build better squads. A major research objective is to determine whether the sampled EPL teams with the highest financial capacity are also the most competitively successful.
2. There are multiple different ownership structures a football club can have. Private and public ownership can further be classified into minority and majority ownership. One significant research objective is to determine how clubs with differing ownership structures perform financially, and to compare them to see which ownership structure is the most lucrative.
3. There are many factors that contribute towards how much money a team makes. Usually, the spending habits of a club play a large part in determining how well it does in the league. When a football club does well in competitions, it usually attracts more fans, thus inflating its annual revenues. Another objective is to examine to what extent various financial variables, such as transfer and wage expenditure, along with the number of achieved EPL points, boost a club's total revenues.

1.5. Definitions

Financial performance - encompasses any financial activities a football club is a part of, mainly focusing on how much revenue a football team generates in a season. This term can also refer to other spending habits a football team engages in, such as transfer expenditure and wage allocation.

Competitive performance – describes how a football team performs in the league it competes in, along with any other international or domestic competitions it may be a part of. Essentially, this term refers to how many games the football team actually wins.

Club ownership – refers to who actually owns the club. The owner of a football club can be a single person, a group of people, a corporation, publicly owned or it can also be owned by the supporters of the club itself.

Investment habits – are the spending habits of a football club. Different clubs choose to invest differently, and not all clubs necessarily invest at the same level as each other. Some clubs may want to spend their disposable cash on things related to on-pitch performance, while others may want to focus on investing in affairs that will boost their financial status.

Player transfer – the act of "buying/selling" a football player from one club to another for an agreed upon price.

Wage expenditure – the amount of salary a football club pays its staff. This includes players, managers, executives and any other staff hired by the club.

Football club vs. football team – there is no actual difference between the terms "*club*" and "*team*". For the purpose of this study, they mean the same thing.

2. LITERATURE REVIEW

2.1. Introduction

The purpose of this literature review is to adequately study and summarize the business world of football and analyze pre-existing research. This review will include a summary of the business and ownership structure of football clubs, discussion on the correlation between financial and sporting performance, along with an examination of some additional investment habits football clubs may pursue. Many studies have already investigated the correlation between financial and sporting performance. Furthermore, many researchers have investigated the English Premier League, specifically. However, there is not a lot of prior research looking into how certain investment habits such as youth development programs and player transfers may directly affect the competitive results of a football club. This literature review ultimately aims to showcase how a football club operates similarly to any other business, and how the role of financial profit has become a very important factor within the professional scene of the sport.

2.2. Review of the business structure of football clubs

This section of the literature review attempts to signify how football operates in a corporate manor. Football clubs have historically been known to primarily focus on sporting success. Even today, it is unlikely that people immediately compare football clubs to other more traditional business organizations. However, as time has passed, football clubs have evolved to operate in a more business-like fashion. This business-like approach has escalated the incentive for academics to research the functions and habits of modern-day football clubs, and how they are comparable to businesses in other industries. Galariotis et al. (2018) argue that the main reason for the rise in this academic curiosity is the increasing marketization of professional football, the creation of new revenue streams, and the emergence of lucrative competitive tournaments with highly valuable financial rewards. Football has gradually evolved into a corporate structure in numerous ways, which may not be completely obvious at first glance.

2.2.1. Main features of the sector

Football has been seen by many as just a sport for the considerable time that it has existed. However, global appetites for sporting events have contributed to professional football becoming a large business industry. Football clubs are now looking towards not only winning games, but also making money in the process. The football business has been systematically analyzed by Karpavicius (2009), Szymanski (2010) and Morrow (2017), although most researchers in the field have taken a narrower approach and chosen to research one single variable or aspect within the sector.

Szymanski (2010) argues that the football industry is more recession-proof than other industries due to the vital link between football club and its fans. He finds that fan loyalty is one of the main characteristics that allows football clubs to operate at a relatively normal financial capacity even during detrimental economic shocks, such as the 2008 financial crisis. Morrow (2017) finds that an important characteristic in dealing with economic stability within the football industry is investigating how certain regulations and laws, set by the Union of European Football Associations (UEFA) and domestic league associations, inhibit clubs from taking unnecessary financial risks. Both perspectives seem commendable and can be used to explain how the football industry possesses differing characteristics when compared to any other business industry. Karpavicius & Jucevicius (2009) find that football as a business, can be explained using a simple model, which suggests that football business

relies heavily on close cooperation between individual parties to achieve a common objective. This model is visualized in Figure 1. Each researcher clearly acknowledges the fact that the football sector possesses certain characteristics, such as an incredibly high "brand loyalty" from supporters towards their preferred clubs. Szymanski (2010) endorses this fact by justifying that it is one of the key differentiating characteristics of the football sector when compared with other business industries.

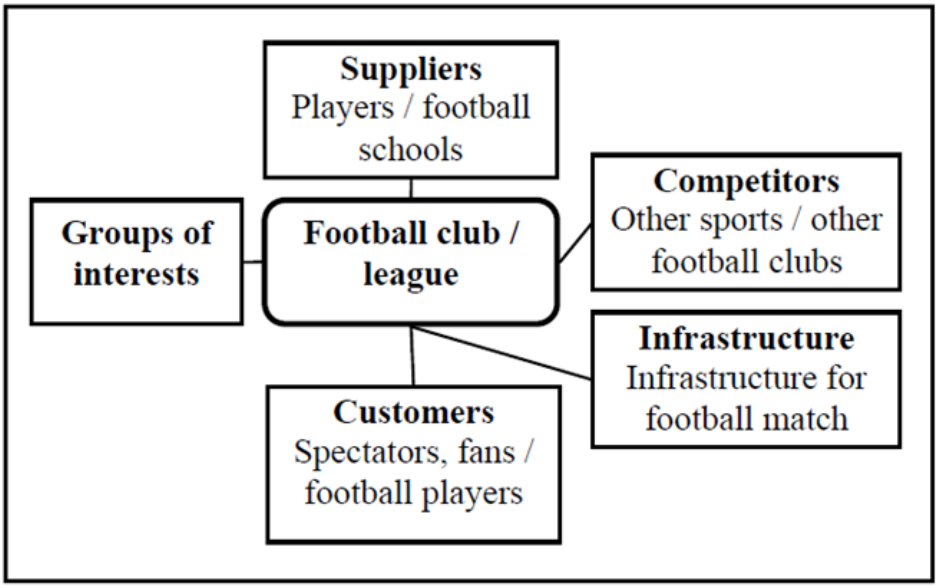

Figure 1. Karpavicius & Jucevicius (2009)

2.2.2. Revenues

In most cases, football clubs have multiple revenue streams. Most of the revenue a football club generates is directly related to the matches it plays. Football clubs receive a considerable volume of revenue through TV broadcasting. According to Deloitte's (2020) review of football finance, English league clubs amassed a staggering €5.85 billion in revenues during the 2018/2019 season. The most significant revenue streams were as follows: broadcasting accounted for 59.1%, commercial sponsorships 27.6% and matchday revenues 13.3% (Deloitte, 2020). This is visualized in *Figure 2*. Based on the figures, it is evident that broadcasting was undeniably the most lucrative revenue stream. Chung (2016) argues that a major reason for the value of broadcasting revenues may be partially attributed to the role of broadcast rights packages and social media. Additionally, a study conducted by Cox (2012), found evidence suggesting that the broadcasting of live matches has a smaller negative effect on gate revenues for teams that are performing better, and a larger negative effect for worse performing teams. It is also worth mentioning, that complete football matches were not televised until the end of the 20th century. The late introduction of

televised matches means that it has only been possible to study the effects of broadcasting on revenues for a relatively small amount of time (Cox, 2012). Borland & Macdonald (2003) support this by claiming there is an insufficient number of research papers examining the effects of live broadcasting on gate attendance.

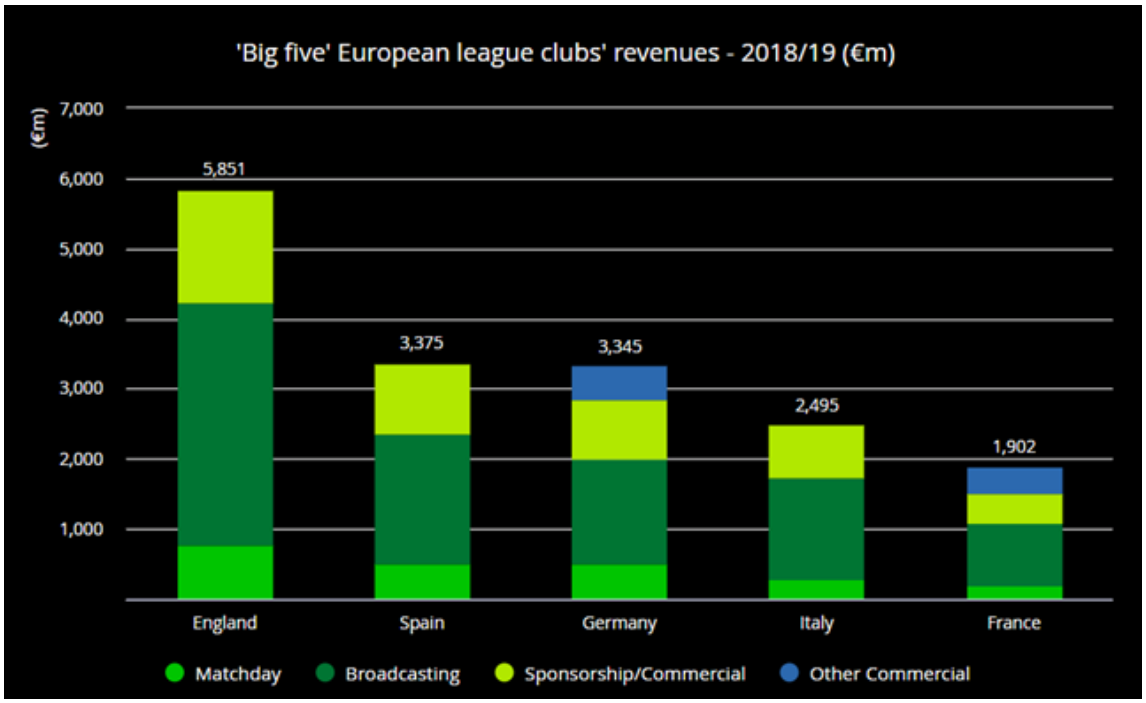

Figure 2 Deloitte: Annual review of Football Finance (2020)

Whenever a football club plays a match, it generates revenue for the club. In addition to broadcasting, a football club receives the gate entry revenue. Different football clubs price their entry tickets to matches differently. According to Cox (2012), some clubs price their tickets solely on the seating location. He goes on to state that other clubs price their tickets according to how “entertaining” the matchup against the opponent is, meaning more famous clubs warrant a higher ticket price. Buraimo (2008) finds that televised matches usually decrease stadium attendee numbers, but the presence of larger stadium audiences tends to increase the amount of people watching the match on television. However, Cox (2015) suggests that the desire of a TV spectator and a stadium spectator may be different. He argues that supporters who go to matches at the stadium prefer games with a more certain outcome, whereas spectators watching on TV prefer more uncertain outcomes. He ultimately concludes that due to this, it is hard for clubs to implement efficient revenue sharing policies, as there does not seem to be a match scenario that fully satisfies both TV and stadium audiences. The mentioned research ultimately supports the idea of ticket and broadcasting revenues act as complements towards each other.

Tournament prize money may be counted as an additional major revenue generator for football clubs. Most competitions worldwide have a cash prize for the winner, and during the 2011/2012 season, Chelsea FC was awarded an incredible €59.9 million bonus for winning the Champions League (UEFA, 2012). This accounted for roughly 23% of Chelsea's total €261 million earned revenues for that season (Conn, 2013). In view of these figures, one would assume prize money to be a large part of football clubs' revenues. However, Menary (2015) argues that the prize allocation system of the Champions League (CL) is a major cause for severe financial inequality among domestic league teams. He advocates that clubs who win the CL receive such a significant prize, that it results in an increasingly higher revenue gap among the stronger and the weaker teams. He then moves on to propose that UEFA should shift towards implementing a different prize allocation system. One alternative system could be to split prizes by allocating 50% of the winnings to the winner, and the other 50% to the rest of the clubs in the domestic league in which the victor competes (Menary, 2015). Menary (2015) also suggests that prize money is only a viable revenue generator for the teams performing at the very highest level, as prize money in lower tier competitions is not significant enough to have any real effect on a club's revenues. In conclusion to this section, there is evidence indicating that inherently larger clubs seem to both suffer less from issues inhibiting revenue, and gain more from certain revenue streams, such as prize money (Cox, 2012; Buraimo, 2008; Menary, 2015).

2.2.3. Expenditures

Just like any business, football clubs must manage expenditures to the best of their abilities. A football club has multiple expenditures resulting from various operations. Three of the most prominent expenditures football clubs deal with are player wages, staff salaries (those who are not players) and transfer fees (Lima et al., 2018). Wage and transfer expenditures often go hand in hand, as the salary of a player is determined in the transfer contract. When discussing transfer fees and wage expenditures, it is important to define the two. Transfer fees are the amount a club pays another club for a player to come and play for them, while the wage expenditure is the salary a club pays its players during a specific period. There is little research regarding staff salaries, as they are completely overshadowed by wage and transfer expenditures. When discussing expenditures, it is worth mentioning that a club's spending habits depend on the owners of the club, and how the staff within the club is

administered (Franck, 2010; Cronqvist et al., 2009; Andreff, 2007; Dimitropoulos & Scafarto, 2019).

Dimitropoulos & Scafarto (2019) provide arguments suggesting that clubs have an inherent problem of spending more than they make. Andreff (2007) advocates that wage and transfer expenditures are one of the driving factors towards financial inequality among clubs. This is caused because teams with more wealthy owners possess soft budget constraints, allowing them to outbid poorer clubs to attract better players through inflated wages (Andreff, 2007). To combat financial inequality, UEFA implemented the financial fair play (FFP) regulation, which aimed to moderate wage expenditures across all European teams (Dimitropoulos & Scafarto, 2019). Regulations like these ultimately work similarly to government policies aimed at promoting competition among firms within a given market.

2.2.4. The English Premier League

The English Premier League (EPL) has been sampled in numerous research papers focusing on economic- and finance-related issues. In essence, the EPL is a private limited company that has 20 shares held by its current competitors (Sroka, 2020). Hamil & Walters (2010) claim that English football has always been chronically unprofitable. They explain that EPL teams have historically never been sustainable, and deal with the frequent losses through seeking wealthy owners to drown out increasing club debt. On the other hand, Vamplew (2017) argues that the EPL has transformed over the years to becoming “less English”. Foreign players and managers have started to play an increasingly influential role in achieving competitive results, and work as a driving factor towards the development of the EPL (Vamplew, 2017). Foreign stakeholders play a significant role in developing the EPL, as the number of foreign owners, players and managers has become increasingly common since the foundation of the EPL in 1992.

Although international influence has helped the EPL grow, it has also had certain consequences. Most foreign funds are directed towards the top EPL teams, while the less successful teams are receiving a diminishing volume of transfer fees (Vamplew, 2017). This has led to a higher income gap between EPL clubs. Holzmayer & Schmidt (2020) assert that the reason for the income gap is that larger clubs gain massive revenue sums through commercial partnerships and broadcasting contracts, while the smaller clubs manage to generate revenue solely from broadcasting contracts. Furthermore, clubs playing in smaller

leagues rely heavily on UEFA prize money (Holzmayer & Schmidt, 2020). Hamil & Walters (2010) believe EPL clubs need to learn to manage their debt by functioning on a break-even financial basis. Most of the issue is not on the income side, but on the cost side, as many EPL clubs have taken on a large amount of debt due to their spending habits (Hamil & Waters, 2010). EPL clubs expect to be bailed out by wealthy stakeholders and act carelessly when it comes to financial decisions.

Terrien et al. (2014) advocate the idea of teams needing other teams to survive, as uncertainty of outcome is what essentially makes football worth following. The EPL is one of the only leagues with more than 2-3 teams capable of winning it each year, meaning that it is often considered the most competitive league out of the five major European football leagues (La Liga, Bundesliga, Ligue 1 and Serie A). This could be a significant reason for why it has amassed the most supporters and revenue over the years.

2.3. Correlation between financial and competitive football club results

Football has evolved over the years from a mere schoolyard game to a multibillion-dollar business. When looking at a football team's achievements, one would mostly think of their sporting performance. However, since the introduction of the Premier League and the global transfer market, financial performance has evolved into another medium of measuring a football team's performance. A football team's primary objective is not as clear cut as it used to be. Normally, a sporting team would strive to maximize its competitive results, while a business aims to make profits. Wilson (2017) argues that football teams operate under multiple objectives, the most critical ones being the ability to uphold a high level of on-field performance, along with the maximisation of off-field profit-making business operations. UEFA advocates that the financial performance of a club should be driven by its on-pitch performance. However, there are examples where a club's financial performance motivates its on-pitch performance, such as when a wealthy investor injects money into a club, allowing it to pay for better players to fund short-term success on the pitch (Plumley, 2014). Carmichael et al. (2010) states that although evidence is somewhat inconsistent, the results of applied research seem to imply a positive correlation between both revenue and wage expenditure and sporting performance.

Carmichael et al. (2010) claim that there are essentially two main strands of empirical research when it comes to measuring sporting success. One strand measures the

relationship between sporting performance and sporting success, and the other measures wage/salary expenditure and sporting success. Barros & Leach (2007) support the double-stranded research approach idea by saying that there are two relevant approaches to measuring efficiency in football: the parametric and the non-parametric approach. The non-parametric approach includes data envelopment analysis (DEA), which was also used by Barros & Leach (2007) to investigate the performance of Premier League football clubs, combining financial and sporting variables. Kulikova & Goshnova (2013) also categorize efficiency measurements in football into two approaches: parametric, and non-parametric.

There are many ways to measure the correlation between financial and sporting performance. Plumley (2014) uses the computation of an overall performance score (OPS), that incorporates financial and sporting indicators to provide a more holistic view of a club's performance. Wilson (2017) uses a performance assessment model that employs statistical analysis (t-tests, ANOVA, and correlations) based on data from financial reports, league tables and performance outcomes. Terrien et al. (2017) utilizes an efficiency analysis conducted through DEA to measure why certain teams fluctuate from a win orientation to a soft budget constraint, and vice versa. Wilson et al. (2013) use correlation analysis to examine the relationship between sporting and financial performance. All the researchers use quantitative methods to measure efficiency and the correlation between financial and sporting performance of football teams. There seems to be a consensus that efficiency can be measured using empirical data.

However, the correlation between financial and sporting performance is more difficult to quantify, as there are numerous variables to consider such as UEFA/league regulations, foreign investment and diverging club objectives. Dimitropoulus & Scafarto (2019) suggest that UEFA's financial fair play regulation is causing a football club's model of business to change, as it is constraining unsustainable club expenditure. This means that the way in which teams operate is constantly being altered, making it difficult to pinpoint which objectives a team is pursuing. Another variable to consider is how spending habits may affect a clubs' financial performance.

2.4. Profit versus Legacy

The eventual goal for practically all professional football clubs is to win games. However, this may be achieved through pursuing different objectives and methods. Some clubs have

a certain image to uphold, as they have acquired an esteemed legacy over the years. The term “legacy” may be defined as the number of matches and titles a football team has already won. Legacy refers to the sporting side of performance exclusively, as opposed to additionally referring to financial or other performances. Acquiring an esteemed legacy means that supporters expect a certain level of competitive performance from the club. Estimating the balance between profit and win maximization is a crucial variable that must be considered in sports economics (Fort, 2015). Szymanski & Kuypers (1999) theorized that there are three possible outcomes when considering the relationship between sporting and financial success. (1) Increasing profits lead to improved team performance, and greater competitive success could lead to a more favorable team performance, meaning that there should be no conflict between satisfying the supporters wish for success and the shareholders ambition for profit. (2) It is possible that competitive success may be unrelated to a club’s profits, meaning the pursuit of profit would not hinder sporting performance, or vice versa. (3) Competitive success may come at the opportunity cost of financial profit, meaning that shareholders would need to choose a suitable trade-off between competitive success and financial profits.

Rottenberg (1956) provides the first model for a sport team’s production function. He investigated the Major League Baseball franchise, and assumed the teams were like “classic firms” chasing profits. Later, Sloane (1971) found that English football club owners were interested in maximizing utility, meaning clubs were pursuing multiple objectives. These objectives did not only include sporting and financial performance, but also attendance maximization along with exposure. On the other hand, Terrien et al. (2017) suggest that a team may switch its primary objective (profit vs. win maximization) from year to year. They also argue that a team may change to pursuing multiple objectives, meaning that the objectives the team pursues change constantly, and depend on economic, cultural, or financial circumstances. However, Plumley et al. (2014) argues that in recent years, directors have become more involved with generating profits from football. The evolution of the football club’s objectives has transformed remarkably. The modern football club values profits far more than it did 30 years ago (Plumley et al., 2014). Certain variables, such as ownership structure and UEFA regulations may be a cause for this.

2.5. Effect of ownership on financial and sporting performance

The ownership structure of a football team is similar to how ownership works for any other business. A club may be owned either by a private entity or listed on the stock market. The owners of football clubs are mostly the ones who fund the club, and the budget is based on the wealth capacity and spending habits of the owner(s). Although the owners finance the club, they are usually not involved in managing it. A staff is usually hired to take care of domestic operations and manage the club's activity.

Hamil & Chadwick (2010) suggest the emergence of three ownership structures since the foundation of the EPL in 1992: the foreign ownership model, the supporter trust model, and the stock market model. The foreign ownership model involves a foreign entity gaining ownership of a club. The owner brings in their own funding from another country to finance the club. The supporter trust model is based on a "democratic party" called the supporter's trust that may own shares of a club, meaning that the supporters collectively own the club. The stock market model is based on a publicly listed company acquiring ownership of a club. As the holding company is already listed on the stock market, it essentially causes the football club to be floated on the market as well, meaning that anyone with a share in the company also has a share in the football club (Hamil & Chadwick, 2010). Each of these ownership models may pursue different objectives and have varying operational behaviors.

A study conducted by Plumley et al. (2014) reveals that in the EPL, the stock market ownership model produced more lucrative financial results relative to clubs with private ownership. However, they also believe that both clubs with private foreign owners and clubs listed on the stock market performed better in the league when compared to clubs with domestic ownership. Nauright & Ramfjord (2010) claim that virtually all the large and well-known clubs are being targeted by foreign investors, mainly from Russia and the USA. They specifically go into extensive detail on how practically all successful English clubs have international ownership, especially in the EPL. Hamil & Chadwick (2010) also support the hypothesis that foreign ownership has become increasingly prominent in the EPL since the early 2000s. Foreign ownership could also be described as a modern explosion, since prior to 1997, there were no foreign owners in English football (Nauright & Remfjord, 2010).

Acero et al. (2017) found that there is a non-linear relationship (inverted U-shaped curve) between a club's ownership model and its financial performance. They find that there is a

positive correlation between ownership concentration and financial performance. However, if the ownership becomes too concentrated (one person/entity has too much authority), the financial performance begins to dwindle, as the owner often makes decisions based on their own personal interest, and not the interest of the club (Acero et al., 2017). Many clubs are shifting away from an overly concentrated ownership structure, as ever since Tottenham Hotspur became Europe's first publicly traded football club in 1983, the stock market has seen an increasing number of teams being publicly listed (Nauright & Ramfjord, 2010).

Additionally, Rohde & Breuer (2016a) believe that there has been overinvestment in European professional football. They state that a surplus in financial capacity in the European football industry has, at least theoretically, caused an "arms race" between clubs. They go on to explain that this means clubs have a "winner-takes-all" mentality and operate in the belief that small performance differences lead to massive reward bonuses. However, Dimitropoulos et al. (2012) suggest that the level of overinvestment would be drastically higher if it were not for the "Financial Fair Play" regulation introduced by UEFA in 2010. This regulation urged teams to introduce more discipline into their management, along with implementing spending habits according to their generated revenues to operate a long-term investment and infrastructure strategy. Dimitropoulos et al. (2012) found that an increased board size and the separation of CEO and chairman roles were key steps to help clubs increase their profitability and viability. Thus, the idea of diminishing ownership concentration among football clubs seems to be conceived as a favorable action by numerous researchers (Plumley et al., 2014; Rohde & Breuer, 2018; Acero et al., 2017; Dimitropoulos et al., 2012).

2.6. Other investment habits of football clubs

The primary objective of a football club is to win games. There are multiple subobjectives football clubs can pursue to achieve this. Profit maximization is increasingly sought after, and most clubs in top divisions will not stay successful if they do not uphold some level of profit and revenues. However, there are other investment objectives that a club may want to pursue, and these goals can vary drastically depending on the club in question. Gammelsæter and Jakobsen (2008) advocate that the commercialization of football and the intensity of such a result- and performance-oriented environment have an impact on a club's operational culture, thus altering its investment habits. There are several

investment pools that most clubs seek to devote themselves to, at least partially. Additionally, clubs constantly change their approach towards what they want to invest in.

2.6.1. Player transfers

Player transfers have grown tremendously and are now one of the primary investments that football clubs focus on (Furesz & Rappai, 2020). Furthermore, Szymanski & Kuypers (1999) believe that national sporting success is primarily driven by team investments. Giulianottiract (1999) believes that the legislation passed by the European Union (EU) allowing players to move freely among EU countries, along with the Bosman Judgement in 1995 granting players freedom to move between clubs when their contract ends, further boosted the incentive for clubs to focus on player transfers. Furesz & Rappai (2020) believe that transfers can impact a club's profits in three ways; (1) the difference in transfer revenues and expenditure levels directly affect profitability. (2) continuous development of the club's sporting success increases revenues from alternate sources, thus increasing profits; (3) the expectations of supporters/spectators may cause volatility in the club's stock value, as a result of announcements regarding transfers.

Although private majority investors are often considered to hinder the overall efficiency of football clubs, Rohde & Breuer (2016b) provide empirical evidence which suggests that they have a positive effect on team investments. Furesz & Rappai (2020) consider information leakage within the transfer market to be a primary contributor towards driving a club's stock price up. They indicate that since share price is a measure of a club's value, forecasting the effect of a transfer should be an essential concern of the owners and managers. The research suggests that the transfer market is a very important investment pool for football clubs (Szymanski & Kuypers, 1999; Kim et al., 2019; Furesz & Rappai, 2020). Managers and owners should extensively plan out and analyze whether to make a transfer, and they should also carry out further research on how certain transfers affect the club's value (Kim et al., 2019; Furesz & Rappai, 2020).

2.6.2. Youth development programs

Research into the relationship between player youth programs and financial/sporting performance is relatively limited. Football clubs usually consider youth programs a long-term investment, yet almost every football club on the planet has some form of training regime

for its up-and-coming youth players. Clubs managing youth programs must consider a notably vast number of variables to become successful. According to Relvas et al. (2010), youth programs must be capable of incorporating social, physical, psychological, intellectual, educational, welfare and physiological components to ensure talent development. Maguire & Pearton (2000) extend this argument by suggesting that the development of youth talent also depends on how efficient the sports organization is. This includes the allocation of human resources, approaches to coaching and training, and the utilization of sports medicine and rehabilitation processes (Maguire & Pearton, 2000).

The enticement to invest in youth development programs has decreased over the years, as there has been an apparent lack of emerging young talent amongst UEFA Federations (Richardson et al., 2010). Goncalves (2003) believes that this is mainly due to young players being labelled as stars, and then failing to perform at the expected level. As professional clubs increase their operations to match those of a business enterprise, it appears unnecessary for them to risk investment into youth programs, when clubs can transfer players, allowing them to function at a lower risk. Richardson et al. (2010) state that there is a concern about how young players can successfully integrate into the professional environment, and this is ultimately harming youth development programs around the world.

2.6.3. Marketing & Merchandising

Like any other business, marketing and merchandising play a key role in a football club's endeavors. Whether it is the club trying to market itself, or other businesses trying to gain exposure through sponsorship deals with the football club, marketing and merchandising actions have become apparent in the football world. Borland & Macdonald (2003) argue that there are two types of demand when considering the products and services a football club may provide its supporters: direct and derived demand. Direct demand involves demand for the actual matches being played, including the demand for attendance and broadcasting of matches (Borland & Macdonald, 2003). On the other hand, derived demand is associated with products or services that are indirectly involved with the matches the club plays. This includes financial inputs the club seeks through the sale of products to enhance or maintain a certain "identity" for the club. It can also include marketing campaigns aimed at establishing a brand name or certain reputation for the team. Manoli & Hodgkinson (2017) believe teams within the EPL invest more time and effort into developing their brand image

and overall marketing capabilities, than teams from other European leagues. Furthermore, clubs have increased their desire to bring in high profile players to acquire immediate returns and inflate merchandise sales (Relvas et al. 2010).

Social media has become an incredibly practical marketing tool across all business sectors. Gummerus et al. (2011) argue that social media has become a medium in which a business can directly connect to the customer and increase its marketing efficiency. A large percentage of football clubs take advantage of this and exploit social media platforms to reach their supporters. For example, Price et al. (2013) believe that Twitter has been a widely used platform for football clubs to spread relevant news about the club and allow fans to share and voice their opinions. Although social media has ultimately helped football teams gain revenue, Chung (2016) advocates that the real utility of social media is not directly generating revenues but spreading influence and marketing the football club to followers around the world. Chung believes that social media is used as an intermediary towards gaining revenues for the club, and that its' primary benefit is for marketing purposes. Chung's research also found that 94% of studied social media users claim, "social media will continue to expand and rise within football over the upcoming years." (p.64). He argues that this is very likely, as social media is mainly used by younger generations, and as time goes on, more people will become accustomed to using social networks to follow football news. Fans will increase the use of platforms such as Twitter and Facebook to express themselves in ways that were not possible before, allowing the connection between clubs and their followers to grow (Chung, 2016).

2.6.4. Infrastructure

In the football world, infrastructure mainly involves the facilities needed for training, medical and rehabilitation processes, and the stadium where matches are played. A football club may want to reinvest in a new and improved stadium if it feels the need to have a larger audience capacity at its matches. There has been very little research into football infrastructure, and how it may affect sporting or financial performance. Stadiums are a very significant part of a football club. Charleston (2009) conducted a study that found evidence supporting the hypothesis that fans see their preferred clubs' home stadium in a similar way to their actual home. It is often said that to some people football is almost like a religion, and the stadium is where they can practice that religion. Charleston's study provides some evidence to showcase just how meaningful a stadium can be to a supporter.

However, Karak (2016) argues that infrastructure (mostly referring to stadiums) built for the purpose of a single tournament is highly wasteful. The World Cup held in Brazil in 2014 is a prime example of this, as multiple stadiums and training camps were built to host the football games, and then abandoned after the tournament (Karak, 2016). This ultimately led to a welfare loss to society. An example of this in the EPL is when Arsenal practically remodeled a part of London to build its new stadium (Karak, 2016). Karak describes stadiums as "waste stations" and argues that Arenal's new stadium caused harm to most people living in the area, as they now have to live with a waste station on their doorstep.

The sharing of gate revenues between the home and away team is currently banned within the EPL, meaning that the home side receives 100% of the revenues for each game (Simmons & Robinson, 2009). The domestic allocation of these revenues is often circumstantial, as clubs have fluctuating beliefs on where to designate funds. Karak (2016) also argues that the scrapping of gate-revenue sharing incentivizes teams to build bigger and more attractive stadiums as the home team would now receive 100% of the ticket revenues.

Like the clubs themselves, stadiums may be owned either by a public or private entity. The ownership structure for most stadiums is often like that of the club who plays at the stadium. Every team that has played in the EPL has had its own home stadium. Sroka (2020) compiled a dataset on stadium ownership for 34 English teams, all of whom either play or have played in the EPL. Four major stadium ownership structures were identified: (1) the stadium is owned by a holding company and the club is a subsidiary of that holding company. (2) The stadium and club are owned by separate private limited companies (PLCs) under the same holding company. (3) Both the club and stadium are owned by the same individual shareholder. (4) Both the stadium and club belong to the same PLC, while the PLC is owned by a holding company. Sroka also mentions that there were several ownership structures that did not match the four mentioned above due to subjective circumstances.

2.7. Conceptual framework

A conceptual framework is constructed to illustrate how teams may choose to pursue a sporting legacy or seek profit maximization, or some combination of both. It showcases how a club's competitive and financial performance are correlated, along with all the variables

that may affect this relationship. This model is visualized in *Figure 3*. The framework is adapted from a study conducted by Conz et al. (2015), investigating the relationship between universities and cities.

As mentioned in section *2.4. Profit versus legacy* of this literature review, the term “legacy” refers to a football team maximizing its competitive sporting results. In this framework, legacy-pursuing clubs are contrasted by profit-maximizing clubs, and the two objectives act as countermeasures. These countermeasures can be seen on the top and bottom of *Figure 3*. and are the goals a football club may choose to pursue. The curved arrows on the sides represent a spectrum, and clubs may be placed on any section of this spectrum depending on the objective they prioritize. The figure attempts to illustrate that in most cases teams operate towards both objectives, at least to some degree. Therefore, any team may be placed on any portion of the spectrum.

The rectangular shapes labelled “financial performance” and “competitive results” represent a means of measuring the objectives of profit maximization and legacy pursuing. Financial performance is a measure for the objective of profit maximization, while competitive results act as the measure for a team’s legacy. The arrow between these rectangles represents the relationship between them. The labels within the circles represent variables that may affect the relationship. It is important to mention, that these circles do not represent all existing variables, and each variable may influence both financial performance and competitive results simultaneously. The model attempts to portray the idea that no matter where a club places on the spectrum, the variables presented will always be somewhat relevant, as they are fundamental towards running any successful football team. The various variables presented in Figure 3. will be included in the multivariate regression analysis that will be conducted in the next part of this thesis.

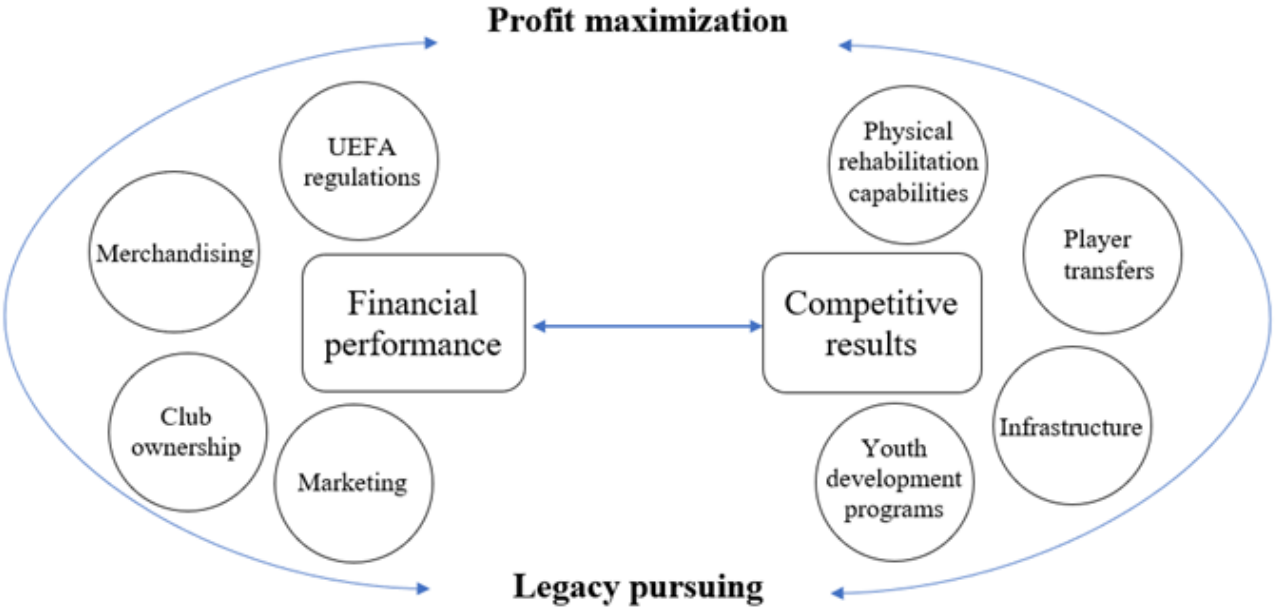

Figure 3. Conceptual Framework

2.8. Conclusion

Based on the pre-existing research, football has evolved drastically over the years. Clubs are now more diverse in their operations, as they have developed a legitimate business structure. There is a lot of prior research on the correlation between sporting and financial performance, along with how ownership structures affect clubs. However, the effect of club investment habits on financial and competitive performance has not been studied as comprehensively. The research has shown that football clubs can rapidly change their operational habits. Due to the current transformation football clubs are going through, it is of paramount importance that researchers continue to study the sport, as the transformation may develop football to have even further corporate behavior. If the football clubs' business characteristics are not consistently observed, we may lose our understanding of how football clubs operate, and in turn, we can lose our understanding of the economics of the sport itself.

3. METHODOLOGY

3.1. Overview of the Design

Researchers have used differing quantitative and qualitative methods to explore the relationship between competitive and financial performance within football. This study utilizes regression analysis to examine how certain variables, such as competitive

performance, affect a team's annual revenues. Ordinary least squares (OLS) and panel regression analysis are conducted for this study, using the observed teams' annual revenues as the dependent variable. Four independent variables are identified and deployed into the regression model: *EPL points, transfer expenditure, transfer income and wage expenditure.*

3.2. Data collection and materials

The data sample for this study includes seven EPL teams that have historically had significant success while competing in the league. All seven of these teams have avoided relegation within the sampled timespan of 2010-2019, meaning that the datapoints for all variables were available while each team was competing in the same league. If there were more teams that have consistently played in the EPL over the sample time period, they would have been included in the sample. However, only the seven teams that were chosen fit this criterion. The teams that are included in the sample of this study are: *Arsenal, Chelsea, Everton, Liverpool, Manchester City, Manchester United and Tottenham Hotspur*. These seven teams consequently are also regarded as the seven most successful teams in modern EPL history. They have not only consistently avoided relegation, but also frequently finished in the top half of the league. The dataset considers the variables for these seven teams over a timespan of ten years. The timespan for this study is measured in seasons, meaning that the annual revenues and EPL points are not measured over a normal fiscal year. The sample starts at the 2009/2010 season and ends at the 2018/2019 season, ultimately giving 70 observations for each variable.

The annual team revenues were extracted from various financial reports assembled by *Deloitte* (a financial auditing and consulting advisory organization). The EPL points achieved by the teams are widely available on the internet, as league positions are public information, thus stored by a multitude of parties. The transfer and wage figures were compiled from multiple sources, since there was no single database containing all the necessary data. This is mainly because these figures are much harder to find for seasons played more than five years ago.

The data analysis mainly utilized *Excel* to gather the data and construct linear correlation graphs, along with descriptive statistics. However, *Stata* was used to conduct the regression analysis. Excel does not have the function to perform OLS or panel regression analysis, meaning that a more sophisticated statistical software was needed to conduct the various regression analyses.

3.3. Statistical treatment

The data for the five variables within this investigation were gathered and compiled into an *Excel* spreadsheet. Simple correlation graphs and descriptive statistics were run within *Excel* to provide some initial general trends on the linear relationship between the dependent and independent variables. After this, the data was transferred over to the statistical software – *Stata*, where they were modelled to perform various regression analyses. The relevant regression analyses used for this study was OLS and panel regression analysis. All 70 observed datapoints were used when running these regressions, and no data points were ignored.

This analysis makes use of panel regression, as utilizing this type of statistical observation has a number of advantages that are specifically suited to the purpose of this study. Panel analysis is especially applicable when there are many observations included within the dataset. In this case, there are 70 observations for each variable, meaning that panel analysis creates a more efficient model to represent the data. The reason panel data is more efficient is because it controls for the unobserved characteristics of each team. The panel regression model used can be described as a long panel, meaning that it contains many time periods (10 seasons/years) and few individuals (7 teams). Furthermore, the model can also be described as balanced, since all individuals are observed for all periods of time – $Ti = T$ for all i.

Panel analysis also controls for unobserved heterogeneity. This study examines the fixed-effects (FE) and random-effects (RE) models, both of which control for this unobserved heterogeneity. The FE model permits regressors to be endogenous, provided they are correlated with a time-invariant component of the error term. In other words, the FE model assumes the heterogeneity is fixed and correlated with the error term, meaning that it

removes the unobserved characteristics for each team that is time-invariant. On the other hand, the RE model holds the assumption of regressors being completely exogenous, meaning that it assumes the heterogeneity is random and not correlated with the error term.

Once both the FE and RE models have been computed, the Hausman test is used to determine which model better represents the data by comparing the two estimators. If the unobserved individual effects are not correlated with the error term, the RE model acts as a more efficient estimator than the FE model. If the null hypothesis of the test is not rejected, this means the coefficients for the FE and RE models are very similar, meaning that the RE model should be used. On the other hand, if the individual effects are correlated, the null hypothesis of the test is rejected, meaning the FE model should be used as it acts as a more efficient estimator. Ultimately, the Hausman test suggests using the FE model if there are few unobserved characteristics, and the RE model is suggested if there are many unobserved characteristics.

3.4. Variables, hypotheses and measures

This investigation uses five variables within its regression model. The annual revenues of the selected seven football clubs serve as the dependent variable, while four independent variables are used to observe the changes in revenue. The independent variables used are as follows: *EPL points, transfer expenditure, transfer income* and *wage expenditure*. All of the variables, excluding EPL points, are measured in millions of euro, while the EPL points are simply measured by how many EPL points each team has managed to achieve during each season. Each variable was modeled into a regression equation using the statistical software called *Stata*. In some cases, the variable names were changed slightly to ease and speed up the coding process.

3.4.1. Revenues

Variable name: *revenue*

The annual revenue for each individual team are used as the dependent variable for the correlation and regression analysis. This variable represents the amount of income the team makes per season. The revenue figures mainly represent how "popular" a team is and include broadcasting, ticket and merchandise sales. The annual revenues are measured in millions of euro.

The descriptive statistics presented in figure 4. show that from the sampled teams, the mean revenue per season is €346 million, with a maximum revenue value of €689 million and a minimum of €90.8 million.

Revenue	
Mean	346.4829
Standard Error	18.23351
Median	352.7
Mode	#N/A
Standard Deviation	152.5525
Sample Variance	23272.27
Kurtosis	-0.70859
Skewness	0.243706
Range	598.2
Minimum	90.8
Maximum	689
Sum	24253.8
Count	70

Figure 4. Descriptive statistics

To reject the null and accept the alternative hypothesis, the z- (random effects) or t- (fixed effects) stat must have an absolute value greater than 1.96, or the p-value of the given model must be below 0.05, indicating a confidence level of five percent.

3.4.2. EPL points

Variable name: *eplpoints*

The EPL points a team achieves over a given season is the only non-financial variable included in this model. This variable serves as one of four independent variables used to measure the dependent variable – *revenue*. The figures used for this variable simply represent how many EPL points the sampled teams have managed to achieve in the given season.

H_0 – achieved EPL points will have no significant effect on revenues

H_1 – achieved EPL points will have a significant effect on revenues

It is expected that EPL points will have an effect on revenues because the more points a team achieves, the higher its chances of winning the league. Supporters are more likely to watch matches and buy merchandise when the team is doing well, thus an increase in EPL points will likely increase revenues.

The descriptive statistics presented in *Figure 5.* reveal the mean value of achieved EPL points per season to be 71, with the highest number of points ever achieved within a single season standing at 100, and the lowest sample value being 47.

EPL points	
Mean	71.44286
Standard Error	1.446297
Median	70.5
Mode	70
Standard Deviation	12.10059
Sample Variance	146.4242
Kurtosis	-0.1312
Skewness	0.187483
Range	53
Minimum	47
Maximum	100
Sum	5001
Count	70

Figure 5. Descriptive statistics

3.4.3. Transfer expenditure

Variable name: *tranexp*

Transfer expenditure encompasses all the capital a football club uses to acquire a player from another club. It is essentially the total price football clubs spend on buying players into their own squad each season. The transfer expenditure is used as the second independent variable and its data points are measured in millions of euro.

H_0 – transfer expenditure will have no significant effect on revenues

H_1 – transfer expenditure will have a significant effect on revenue

A positive relationship is expected between transfer expenditure and revenue, as the more money a team spends on players, the better its players are likely to be. This will lead to supporters wanting to follow the team more since there are new players in the squad and these new players may contribute towards the team performing better.

The descriptive statistics presented in *Figure 6.* indicate a mean value of roughly €98 million per season, while the lowest value stands at an impressive zero. The highest any team has spent on transfer fees in one season is an incredible €317.7 million.

Transfer expenditure	
Mean	97.77171
Standard Error	7.989521
Median	83.1
Mode	#N/A
Standard Deviation	66.84513
Sample Variance	4468.271
Kurtosis	0.612204
Skewness	0.85568
Range	317.5
Minimum	0
Maximum	317.5
Sum	6844.02
Count	70

Figure 6. Descriptive statistics

3.4.4. Transfer income

Variable name: *traninc*

Transfer income is essentially the opposite of transfer expenditure. It is how much money football clubs receive from selling their own players to other clubs. The transfer income also acts as an independent variable, and its figures are measured in millions of euro.

H_0 – transfer income will have no significant effect on revenues

H_1 – transfer income will have a significant effect on revenues

Transfer income is expected to positively influence revenues, as the more income a club receives from transfers, the more disposable cash it has to finance other factors of the club.

The descriptive statistics presented in *Figure 7.* show the mean transfer income level per season to be €53 million, with the maximum value being €192.8 million and the minimum being €1.8 million.

Transfer income	
Mean	53.05843
Standard Error	5.415153
Median	42.285
Mode	#N/A
Standard Deviation	45.30642
Sample Variance	2052.672
Kurtosis	1.341301
Skewness	1.231983
Range	192.8
Minimum	1.8
Maximum	194.6
Sum	3714.09
Count	70

Figure 7. Descriptive statistics

3.4.5. Wage expenditure

Variable name: *wagexp*

Wage expenditure is the fourth and final independent variable used in this model. Wage expenditure embodies the amount of salary a football club pays to its staff. Although a significant portion of this salary goes to the club's players, the variable itself also includes salaries paid to executives, managers, coaches, and so on. Like the transfer-related variables, wage expenditure is also measured in millions of euro.

H_0 – wage expenditure will have no significant effect on revenues

H_1 – wage expenditure will have a significant effect on revenues

Wage expenditures are expected to have a positive effect on revenues, as clubs with higher wage expenditures are likely to have better players. Better players usually demand a higher salary, so if a club has a high wage expenditure it suggests that the club possesses high-quality players.

The descriptive statistics presented in *Figure 8*. show that on average, clubs spend roughly €145 million on wages per season. The lowest wage expenditure figure was €54 million and the highest was a staggering €264 million.

Wage expenditure	
Mean	145.4714
Standard Error	6.401789
Median	139
Mode	166
Standard Deviation	53.56121
Sample Variance	2868.804
Kurtosis	-0.86174
Skewness	0.20093
Range	210
Minimum	54
Maximum	264
Sum	10183
Count	70

Figure 8. Descriptive statistics

3.5. Regression equations

The regressions used throughout this analysis may be expressed as equations. Both the OLS and RE/FE regression equations are different, which is why they present differing statistical results. The OLS and RE regression equations are provided below, as these are the two models utilized to represent the data. Furthermore, the log-log RE model is also computed in order to compare values in percentage changes by transforming all of the observed variables into the natural logarithm. The log-log model reduces the scale of variables, and therefore may be useful to eliminate heteroskedasticity from the model if it exists. The model normalizes the data by reducing the discrepancies in the values of the variables. Finally, the log-log model allows easy interpretation of the estimated coefficients, which can be directly interpreted as elasticities in percentage changes.

OLS regression equation:

$$\textit{Eq. (1)}: \textbf{revenue}_{it} = \propto_0 + \beta_1 \textbf{eplpoints}_{it} + \beta_2 \textbf{tranexp}_{it} + \beta_3 \textbf{traninc}_{it} + \beta_4 \textbf{wagexp}_{it} + \varepsilon_{it}$$

Where *i* is the term for each football team and *t* is the year that ranges from 2010 until 2019. The '*revenue'* term is the total revenue of the football team in euro (€) measuring the overall financial performance of the team *i* in year *t*. Furthermore, the '*eplpoints'* term represents the achieved EPL points of each football team. The '*tranexp'* term represents the transfer expenditure of each team, while the '*traninc'* term represents the transfer income of each team. Additionally, the '*wagexp'* term encompasses the wage expenditure of each club. Finally, ε_{it} is the error term with zero mean and a constant variance, while $\propto_0$ is a constant term that predicts the value of the total revenue when all other variables are at zero.

Random-effects regression equation:

$$\textit{Eq. (2)}: \textbf{revenue}_{it} = \propto_0 + \mu_i + \beta_1 \textbf{eplpoints}_{it} + \beta_2 \textbf{tranexp}_{it} + \beta_3 \textbf{traninc}_{it} + \beta_4 \textbf{wagexp}_{it} + \varepsilon_{it}$$

Where all the variables hold the same meaning as in *Eq. (1)*. However, for this regression equation, the random term μ_i is included to control for unobserved heterogeneity of the football team *i*.

Log-log random-effects regression equation:

Finally, the log-log model is presented in *Eq. (3),* where all variables have the same meaning as in *Eq. (2),* except both the dependent and explanatory variables are transformed into natural logarithm values due to the reasons discussed above.

$$\textit{Eq. (3)}: \textbf{ln(revenue}_{it}) = \propto_0 + \mu_i + \beta_1 \textbf{ln(eplpoints}_{it}) + \beta_2 \textbf{ln(tranexp}_{it}) + \beta_3 \textbf{ln(traninc}_{it}) + \beta_4 \textbf{ln(wagexp}_{it}) + \varepsilon_{it}$$

After these regressions have been computed, the Breusch-Pagan test can be executed to determine whether the OLS or RE model should be used to represent the data.

4. FINDINGS

4.1. General trends

The four observed variables were plotted against the annual revenue figures to create scatter plots containing a trendline illustrating linear relationships between the dependent and given independent variable. The graphs provided, showcase a scatter plot including all 70 observations for each variable. It must be mentioned that these graphs are not meant to completely explain the correlation between the dependent and independent variables but serve to illustrate a general trend on the relationships between revenue and the observed variables. These relationships are often very complex, and there are always going to be factors affecting them that are nearly impossible to quantify. This paper addresses these factors later on.

4.1.1. Revenue vs. EPL points

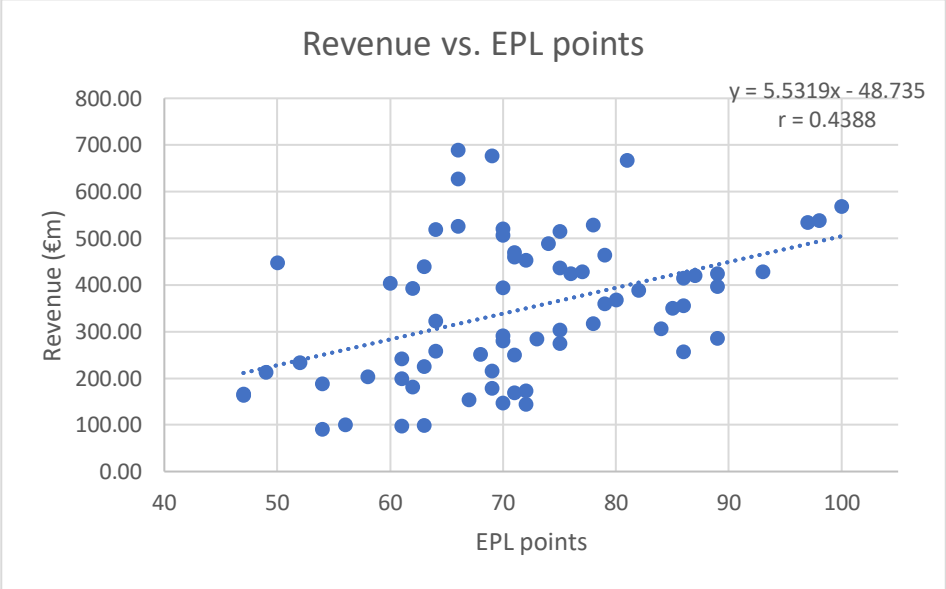

Figure 9. Revenue vs. EPL points

The figure above showcases how the annual revenue of the sampled football teams changes in relation to the amount of EPL points the teams have managed to achieve over the observed 10-year timespan. The gradient of the trendline stands at 5.5319, meaning that y changes at a rate of ~5.53 with respect to x. There appears to be slightly more outliers above the trendline than below, as the data points below the trendline are all far closer to the trendline itself. This linear relationship ultimately hints at a general trend where a team

gaining more points in the EPL will subsequently experience a boost in their annual revenues.

Figure 9. also presents the r-coefficient, alternatively known as the correlation coefficient. The r-coefficient is a measure of correlation that is derived from the square root of the R-squared figure in a two-variable regression model. This coefficient can only be derived when there is one dependent and one independent variable. This is the case in *Figure 9.,* as '*Revenue'* acts as the dependent variable and '*EPL points'* the independent variable. The r-coefficient for the relationship between these two variables stands at 0.4388. This is considered a moderately positive linear relationship, as 'r' values between 0.3 and 0.7 are categorized as suggesting a moderately positive/negative relationship between the variables. It is important to note that the r-coefficient should not be the only indicator used, as it fails to consider multiple factors when dealing with the relationship between the dependent and independent variable.

4.1.2. Revenue vs. transfer expenditure

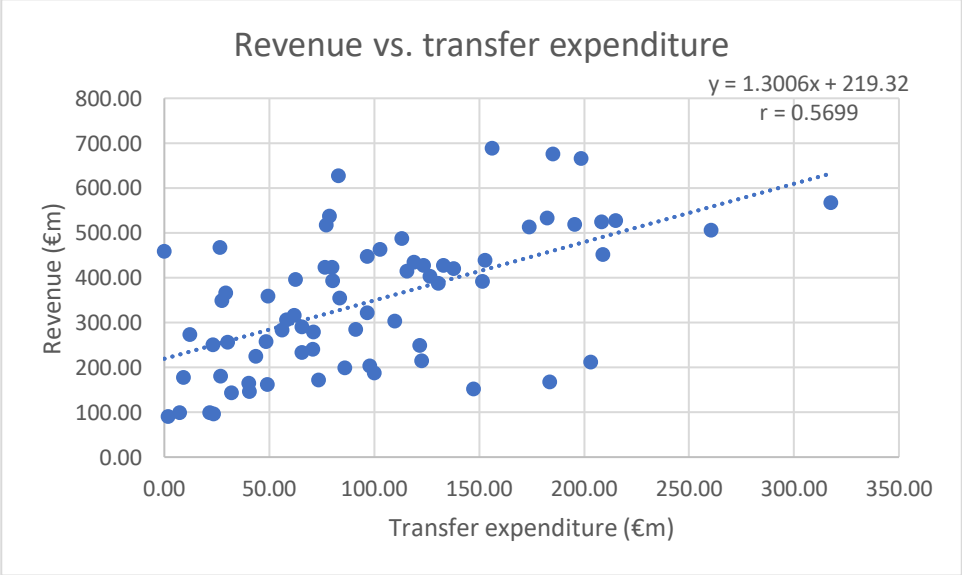

Figure 10. Revenue vs. Transfer expenditure

The showcased trendline in *Figure 10.* presents a positive gradient, indicating a positive marginal effect between revenues and transfer expenditures. Teams spending more money to buy more expensive and potentially better players will consequently boost their revenues.

There are multiple reasons for why this may be true. When compared to *Figure 9.,* the slope of the trendline for *revenue vs. transfer expenditure* is weaker, with a gradient of 1.3006 (compared to 5.5319). Furthermore, the r-coefficient presented in *Figure 10.* stands at 0.5699, indicating a moderately positive linear relationship between revenue and transfer expenditure.

4.1.3. Revenue vs. transfer income

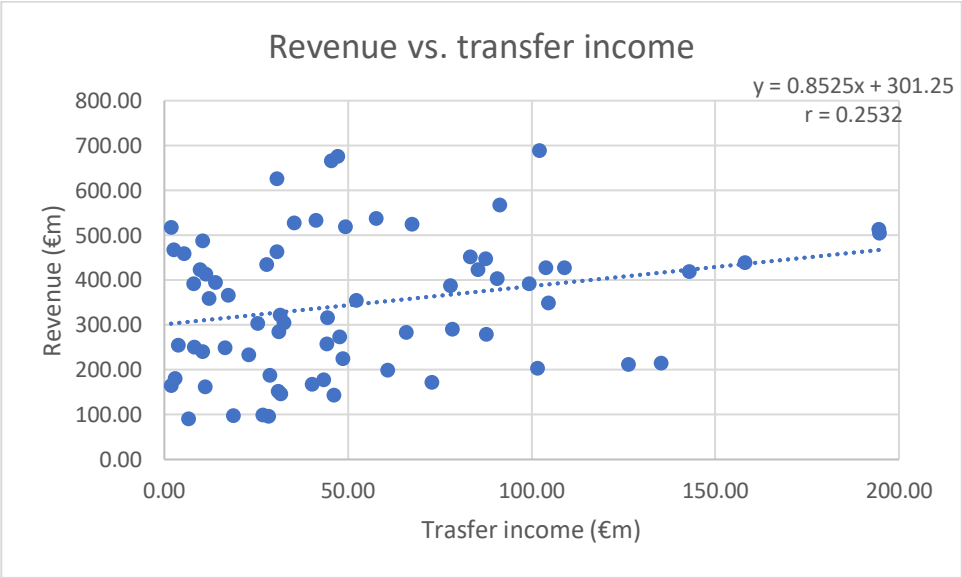

Figure 11. Revenue vs. transfer income

Figure 11. illustrates the linear relationship between revenue and transfer income. This variable had the lowest slope of the four independent variables. The gradient for the trendline stands at 0.8525, which is significantly lower than the gradients in *Figures 4.* and *5.* The r-coefficient stands at 0.2532, which is below 0.3, indicating a weak positive linear relationship. There are roughly the same number of outliers both above and below the calculated trendline, indicating an even spread of data points.

4.1.4. Revenue vs. wage expenditure

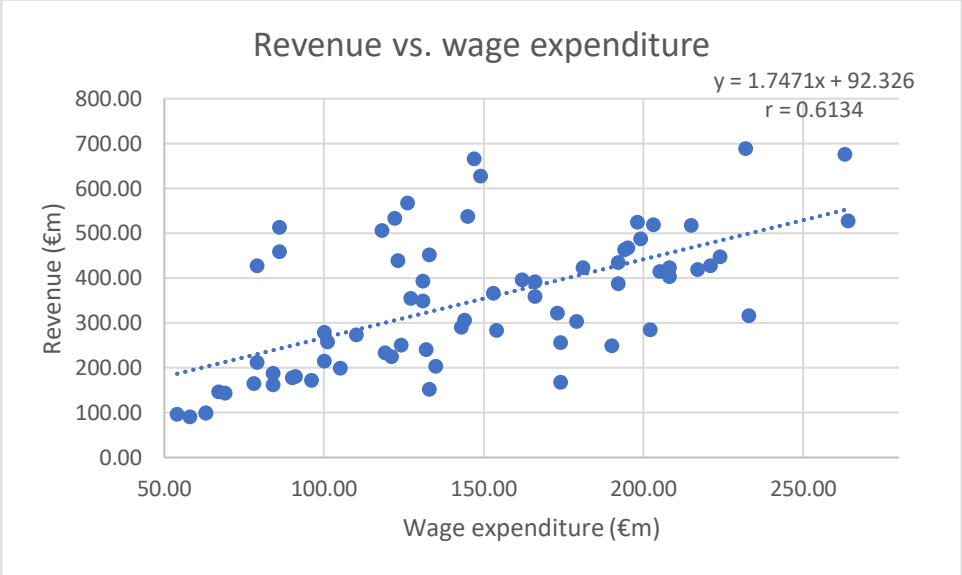

Figure 12. Revenue vs. wage expenditure

The wage expenditure was the fourth studied independent variable. The slope between revenue and wage expenditure is also positive, with a gradient of 1.7471. As *Figure 12*. presents, the gradient between revenue and wage expenditure is higher than the gradient presented in *Figure 10.,* showing the relationship between revenue and transfer expenditure. This essentially suggests that the amount of salary a team pays its players has a higher positive marginal effect on a team's revenues than the actual price the team paid for that player. Additionally, the r-coefficient stands at 0.6134, which is the highest out of the four examined variables, and ultimately suggests a moderately strong positive linear relationship between revenue and wage expenditure.

Based on all four of the presented graphs, there is a positive linear relationship between revenues and the teams' league performance, along with revenues and other financial variables/investments the observed teams may be a part of. As mentioned before, these correlation graphs serve only to show a general trend in how the sampled independent variable datapoints affect the sampled revenues of the seven studied teams. This study will go into more detail and perform different regression analyses to explore the relationships more definitively in section *4.2*.

4.2. Regression analysis

This section employs three different regression models to represent the data. The OLS, RE and log-log RE models are presented to illustrate how the data may differ depending on the model. A number of tests are also computed to determine which models act as the most efficient estimators.

4.2.1. Ordinary Least Squares regression

The estimation results of the Ordinary Least Squares (OLS) regression analysis are presented in *Figure 13.*

Source	SS	df	MS	Number of obs	=	70
				F(4, 65)	=	20.85
Model	902501.686	4	225625.421	Prob > F	=	0.0000
Residual	703284.862	65	10819.7671	R-squared	=	0.5620
				Adj R-squared	=	0.5351
Total	1605786.55	69	23272.2688	Root MSE	=	104.02

revenue	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eplpoints	2.753179	1.108424	2.48	0.016	.5395037	4.966855
tranexp	.7721011	.2448876	3.15	0.002	.2830267	1.261176
traninc	.2256765	.3363612	0.67	0.505	-.4460832	.8974362
wagexp	1.190636	.2700715	4.41	0.000	.651266	1.730006
_cons	-110.8794	76.67576	-1.45	0.153	-264.0114	42.2527

Figure 13. OLS regression model

The overall significance of this OLS model is illustrated with the F-stat. In this case, the F-stat stands at 20.85 and the p-value for the F-stat is zero, meaning that the model holds a statistically significant value. The coefficient of determination denoted as R-squared stands at 0.562. This means that 56.2% of the dependent variable's variation is explained by the explanatory variables. Accordingly, the R-squared figure is significantly different from zero, as indicated by the F-statistics.

The t-stat for all four independent variables is above zero, indicating some level of statistical significance. If the t-stat has an absolute value of above 1.96, we consider it statistically

significant enough to reject the H_0 for that variable. The regression shows that '*eplpoints'* (EPL points), '*tranexp'* (transfer expenditure) and '*wagexp'* (wage expenditure) are all statistically significant enough to reject their H_0, meaning that they all have a statistically significant effect on revenues. However, '*traninc'* has a t-stat with an absolute value below 1.96, meaning that it is not significant enough to reject its H_0. These same results can be seen in the independent variable's p-values, as '*traninc'* has a p-value of 0.505, meaning that it is capable of confidently explaining roughly half the variance of the term, which is not a sufficient confidence level to reject the null hypothesis. EPL points are significant at the five percent level, meaning that the model is capable of explaining 95% of its variance. The other two variables ('*tranexp'* and '*wagexp'*) possess an even smaller p-value, meaning that the model is able to confidently explain 99% of their variance.

All of the variables have positive coefficients, suggesting an overall positive relationship between the dependent and independent variables. In practice, this means that revenues would increase along with any of the observed independent variables increasing. The coefficient for '*eplpoints'* stands at ~2.75, meaning that for every single EPL point a team achieves, its revenues see an increase of ~€2.75 million euro. The magnitude between '*wagexp'* and revenue is roughly 1.2, meaning that an increase of €1 million in wage expenditure results in an increase in revenues of €1.2 million. Transfer expenditure and income are both seen to have the lowest magnitudes at ~0.772 and ~0.226. Hence, a €1 million increase in transfer expenditures would result in a ~€772,000 increase in annual revenues, and a €1 million increase in transfer income would result in an increase of roughly €226,000.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of revenue

         chi2(1)      =     1.75
         Prob > chi2  =   0.1862
```

Figure 14. Breusch-Pagan test

The model was tested for heteroskedasticity using the Breusch-Pagan test. This test identifies whether the model possesses heteroskedastic errors in its regression analysis. The null hypothesis for the Breusch-Pagan test is that variances of the error term are equal. *Figure 14.* illustrates the result after running the Breusch-Pagan test. Since the p-value of the test stands at 0.1862, we cannot reject H_0, suggesting that the model has constant variance. For the null hypothesis to be rejected, the p-value must be below 0.05, indicating that the variance of the error term is constant (that is, the errors are homoskedastic). This means that the '*robust*' option in *Stata* is unnecessary when running the model.

```
White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(14)     =      9.16
         Prob > chi2  =    0.8207

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	9.16	14	0.8207
Skewness	3.90	4	0.4197
Kurtosis	3.45	1	0.0631
Total	16.51	19	0.6228

Figure 15. White test

The 'White test' was conducted to further observe if the model has heteroskedasticity. The null hypothesis for this test assumes homoskedasticity. The results provided by running the test fail to reject the null hypothesis, meaning that the variance or the errors in the regression model are constant.

```
Ramsey RESET test using powers of the fitted values of revenue
       Ho:  model has no omitted variables
                  F(3, 62) =      0.11
                  Prob > F =      0.9548
```

Figure 16. RESET test

A RESET test was also conducted to determine whether the OLS model had any omitted variables. *Figure 16*. illustrates H_0 to state that the model has no omitted variables. The p-value of the test stands at 0.9548, meaning that we cannot reject H_0, as the probability is not statistically significant enough. For the H_0 to be rejected, the p-value would need to be below 0.05. In this case, the p-value is nowhere near 0.05, meaning that we cannot reject the null hypothesis with strong confidence, ultimately suggesting that the OLS model is specified.

4.2.2. Panel regression

This section discusses the findings of the panel regression analysis. Two panel models were tested: the *random-effects* and the *fixed-effects* model. These models were both computed using *Stata.* To determine specifically which of these models represents the data more appropriately, the Hausman test was conducted. The RE model acts as a more efficient estimator than the FE model. However, the FE model is the only consistent estimator if the unobserved characteristics of the football teams are correlated with the error term. The RE model can be used if the unobserved characteristics are uncorrelated with the error term. This can be proved by computing the Hausman test.

	Coefficients			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
eplpoints	2.320409	2.471171	-.1507615	.359606
tranexp	.9822413	.9519569	.0302844	.0551054
traninc	.165729	.1763428	-.0106138	.0598068
wagexp	.9051566	.990219	-.0850625	.1559704

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 2.59
Prob>chi2 = 0.6280

Figure 17. Hausman test

Figure 17. illustrates the results given after running the Hausman test on *Stata*. The test is designed to determine whether the FE or RE model should be used. Given that the p-value of the Hausman test seen above is 0.628, we can conclude that the random-effects model should be used to represent the data, as the p-value is above 0.05. This indicates that we should use a model that assumes regressors to be completely exogenous, which is true for the RE model. Thus, the unobserved characteristics are not correlated with the error term and hence the RE model will be presented instead of the FE model as the RE model has proved to be a more efficient estimator.

Breusch and Pagan Lagrangian multiplier test for random effects

revenue[teamid,t] = Xb + u[teamid] + e[teamid,t]

Estimated results:

	Var	sd = sqrt(Var)
revenue	23272.27	152.5525
e	7768.444	88.13878
u	3852.958	62.0722

Test: Var(u) = 0
chibar2(01) = 20.26
Prob > chibar2 = 0.0000

Figure 18. Breusch and Pagan Lagrange multiplier test

Figure 18. presents Breusch and Pagan Lagrange multiplier test that was computed to compare the OLS and the RE models. The nature of this test is similar to the Hausman test, as the results tell us which of the compared models represents the dataset better. The null hypothesis for this test states that there are no random effects. However, the results give us a p-value that is below 0.05, meaning that we can reject the null hypothesis and conclude that random effects are present. Due to the fact that random effects exist within the data, we can conclude that using the RE model represents the data better than the OLS model.

```
Random-effects GLS regression                   Number of obs     =         70
Group variable: teamid                          Number of groups  =          7

R-sq:                                           Obs per group:
     within  = 0.4182                                         min =         10
     between = 0.6873                                         avg =       10.0
     overall = 0.5550                                         max =         10

                                                Wald chi2(4)      =      54.93
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

revenue	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
eplpoints	2.471171	1.043748	2.37	0.018	.4254627	4.516879
tranexp	.9519569	.2232565	4.26	0.000	.5143821	1.389532
traninc	.1763428	.3048148	0.58	0.563	-.4210831	.7737688
wagexp	.990219	.2930809	3.38	0.001	.415791	1.564647
_cons	-76.54416	90.03654	-0.85	0.395	-253.0125	99.92422
sigma_u	62.072199					
sigma_e	88.138778					
rho	.33153985	(fraction of variance due to u_i)				

Figure 19. Random-effects regression model

Figure 19. shows the results after running the RE panel regression model according to *Eq. (2),* which uses the same dependent variable and four explanatory variables as the OLS model in *Eq. (1).* The RE model uses a z-stat value instead of the usual t-stat value used in many other models such as FE and OLS. For this RE model, the z-stat for all four independent variables is above zero, indicating some level of statistical significance. If the

z-stat has an absolute value of above 1.96, we consider it statistically significant enough to reject the H_0 for that variable. The regression shows that '*eplpoints'*, '*tranexp'* and '*wagexp'* are all statistically significant enough to reject their H_0 ($z > 1.96$), meaning that they all have a significant effect on revenues. However, '*traninc'* has a z-stat with an absolute value below 1.96, meaning that it is not significant enough to reject its null hypothesis ($z < 1.96$). These same results can be seen in the independent variables' p-values, as '*traninc'* has a p-value of 0.505, meaning that it is capable of confidently explaining roughly half the variance of the term, which results in an insufficient confidence level to reject the null hypothesis. EPL points are significant at the five percent level, meaning that the model is capable of explaining 95% of its variance. The other two variables, '*tranexp'* and '*wagexp'*, possess an even lower p-value, meaning that the model is able to confidently explain 99% of their variance.

The coefficients for all four independent variables are positive, indicating a positive relationship between them and the dependent variable. In practice, this means that revenues would increase along with any of the observed independent variables increasing. The coefficient for '*eplpoints'* is the highest of the four, standing at roughly 2.47. This means that the model predicts that if one of the sampled teams were to earn one additional EPL point, they would see their revenues increase by approximately €2.47 million. The magnitude for '*wagexp'* is the second highest, as the model predicts that if a team's wage expenditure were to increase by one million euro, its revenues would consequently increase by roughly €990,000, giving us a near one-to-one ratio between the two. The coefficient for '*tranexp'* stands at roughly 0.952, meaning that as transfer expenditures increase by €1 million, revenues would rise by roughly €952,000. The coefficient for '*traninc'* is significantly lower, resulting in the lowest magnitude out of the four observed variables. The coefficient stands at ~0.176, meaning that as transfer income increases by one million, the revenue would only increase by roughly €176,000.

The coefficients of the RE and OLS models were similar to each other in value. Both models presented positive coefficients for all explanatory variables. The '*eplpoints'* coefficient for the OLS model stood at ~2.75, while for the RE model it was ~2.47. The '*tranexp'* figure for the OLS model stood at ~0.77, while the coefficient in the RE model was ~0.95. The coefficient for '*traninc'* in the OLS model was ~0.23, while for the RE model it was ~0.18. Finally, the

‘*wagexp’* figure for the OLS was ~1.19, while for the RE it stood at ~0.99. Although all the figures were different, they still differed only minimally. The OLS model presented coefficients that were higher than the RE coefficients for all variables, except for ‘*tranexp’*. In conclusion, the RE model accounts for the random effects the data may have, and therefore has been ultimately used to present the findings. However, the results obtained from the OLS model are very close to those provided by the RE model, meaning that there is not a large difference between the results of the two computed models.

Figure 20. illustrates the double-log model with random effects according to *Eq. (3).* This model has taken the dependent and independent variables datapoints and converted them into natural log (*ln*) values. Doing this allows us to interpret the magnitudes between the variables in terms of percentage change. It is evident that all coefficients for the explanatory variables have positive values, indicating a positive percentage change between revenues and the observed independent variables.

```
Random-effects GLS regression                   Number of obs     =         69
Group variable: teamid                          Number of groups  =          7

R-sq:                                           Obs per group:
     within  = 0.4296                                         min =          9
     between = 0.8282                                         avg =        9.9
     overall = 0.6612                                         max =         10

                                                Wald chi2(4)      =      68.46
corr(u_i, X)   = 0 (assumed)                    Prob > chi2       =     0.0000
```

lnrevenue	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lneplpoints	.5850332	.2242299	2.61	0.009	.1455506	1.024516
lntranexp	.2085369	.0478911	4.35	0.000	.114672	.3024018
lntraninc	.0212682	.0347808	0.61	0.541	-.0469008	.0894373
lnwagexp	.461244	.1332445	3.46	0.001	.2000897	.7223984
_cons	.0024886	1.081899	0.00	0.998	-2.117994	2.122971
sigma_u	.16582604					
sigma_e	.26282912					
rho	.2847278	(fraction of variance due to u_i)				

Figure 20. Log-log random-effects model

The coefficient for '*lneplpoints'* stands at roughly 0.585, meaning that a 1% increase in EPL points would result in a 0.585% increase in revenues. The rest of the explanatory variables have lower magnitudes when compared to the revenues. The variable encompassing the natural log values for wage expenditure ('*lnwagexp'*) has a coefficient of roughly 0.461, indicating that for every 1% increase in a team's wage expenditure, its revenues will also increase by 0.461%. The '*lntranexp*' variable has a coefficient of ~0.209, meaning an increase in revenues of 0.209% for every 1% increase in transfer expenditures. Finally, the '*lntraninc*' explanatory variable has the lowest coefficient, standing at roughly 0.0212, meaning a 1% increase in transfer income would only result in a 0.0212% increase in revenues for the given team.

4.3. Summary of results

A number of tests were conducted to determine which of the models, the OLS, FE or RE, would represent the data most accurately. The Hausman test was conducted to test whether the FE or RE model should be used. The test showed that the RE model should be used for a more accurate representation of the data. The Breusch and Pagan Lagrange multiplier test was used to determine if the OLS or RE model would represent the data more appropriately. This test also suggested using the RE model, as the datapoints seemingly have random unobserved variance, which would be accounted for by the RE model. However, the coefficients generated by both the OLS and RE model were very similar in value, meaning that the RE model represented the data better, as the difference was minimal. The RE model showed that three of the four explanatory variables had a statistically significant effect on revenues, indicating that both competitive and other financial variables have a significant effect on the sampled teams' revenues. The model ultimately provided some interesting results supporting the hypothesis that a football team's competitive and financial performance have a strong positive correlation. The estimation results obtained mostly from the more appropriate RE model will be discussed and analyzed in the next chapter of the thesis.

5. DISCUSSION AND ANALYSIS

5.1. Discussion on regression analysis

The models used throughout this analysis consisted of quantitative explanatory variables to measure the effect on the dependent variable - *revenue*. The analysis found that of the explanatory variables, '*eplpoints'* had the strongest effect on revenues. However, the three other independent variables all had positive coefficients with the dependent variable.

The scatter plot graphs on the data's general trends show us that there is a positive linear relationship between the datapoints, as all models had an upwards sloping trendline. According to the scatter plot graphs, EPL points had the strongest positive marginal effect on revenues, followed by transfer expenditure and wage expenditure. Transfer income had the smallest marginal effect on revenue, as the gradient of its trendline held the lowest value.

The conducted regression analysis agreed with what the general trend scatter plot graphs suggested. In both the OLS and RE models, all explanatory variables had a positive effect on revenues, EPL points being the strongest, and transfer income being the weakest. Both transfer and wage expenditure had seemingly similar effects/coefficients in all computed models. All these three explanatory variables were deemed statistically significant. However, the explanatory variable encompassing transfer income was found to be statistically insignificant, meaning that we cannot draw any concrete conclusions from the relationship between revenue and transfer income. In summary, the application of the detailed regression analysis provided empirical evidence to prove there is a link between financial and competitive performance. Other financial indicators were included in the model to examine their correlation with financial performance, and more importantly, to observe what kind of effect the indicators have on a team's financial performance.

Interestingly, according to the regression analysis, a team's spending on players has a statistically higher effect on revenues than the income it generates from selling players. A possible reason for this may be that supporters are more likely to watch games or buy a team's merchandise when a new player enters the club. On the other hand, it is less likely for supporters to show a higher interest in a club when a player leaves the squad. Although transfer income boosts the club's disposable cash, it does not affect its revenue significantly, as supporters are unaware of club finances in real time since the club's financials are only

released at the end of the season/year. Based on the models, the null hypothesis regarding transfer income, stating that '*traninc'* will have no significant effect on revenues, could not be rejected. This null hypothesis could not be rejected because the t- and z-stat values did not have an absolute value above 1.96 and the p-value was substantially above 0.05 in all computed models.

Multiple statistical tests were performed to determine which regression model to use. The RESET and Breusch-Pagan test were both run for the OLS model, accounting for omitted variables and any potential heteroskedasticity. The Hausman test was computed to indicate whether the FE or RE model represented the data more fittingly. Furthermore, the Breusch and Pagan Lagrange multiplier test was conducted to determine whether the OLS or RE model holds a more accurate representation of the data. The Hausman and Lagrange test both suggested that the RE model was the preferred model, as it fit the data the best and assumed unobserved variance (something the FE model does not assume). However, the coefficients between the RE and OLS models were very similar, meaning that the RE was ultimately a more fitting model, but the difference in values was minimal.

A major limitation of the dataset was the fact that the sample size only compared seven of the most successful teams in the EPL. A more varied and larger data sample would have provided more accurate findings. A larger dataset would be more applicable to study the relationship between financial and competitive performance. Another limitation of the model was that it only contained four explanatory variables, meaning that there were many other factors that were not considered. This analysis mainly focused on quantitative data and applied it to the models. Qualitative data could have also been applied, but this would have been challenging to execute in this study. Therefore, the random-effects model was ultimately used to account for this unobserved variance.

5.2. Unobserved variables

Unobserved variance is evidently a very important factor to consider throughout this analysis, as football possesses many variables that relate to the physical playing of the sport and are usually hard to quantify. Unobserved qualitative variables are highly relevant to the quantitative analysis performed throughout this study, as no qualitative variables were directly accounted for within the models. This serves as a limitation to the study and must

be discussed to determine the possible effects of how these qualitative variables may skew the data.

Many qualitative variables are linked to the physical performance of the players. It is difficult to quantify the effect of the occurrence of player injuries and how they affect the club's actual revenues. This is mainly because any numbers that are attributed to how much a player's absence would affect revenues, is completely hypothetical, and would serve only as a forecast for how things might be if the player never got injured in the first place. Another qualitative variable that is difficult to quantify is how effectively the club's rehabilitation processes work to mend the injuries incurred by the players. It is logical that clubs with better physiotherapists and medical staff rehabilitate injured players far quicker. Faster rehabilitation, in turn has a positive effect on the club's financial and competitive performance, as players are injured for a shorter period of time.

Another variable this study has failed to consider in its regression analysis is how club ownership may affect the club's revenues. Some clubs are owned privately, and some are owned publicly. The ownership structure of a club mainly determines the club's budgetary limits and spending habits. In most cases, clubs with wealthier owners are less likely to care about profits and are more willing to spend large sums of capital on player transfers and wages. It is hard to quantify just how much of an effect the ownership structure has, since the ownership itself contains many variables to consider, such as management structure and executive club policy.

A team's youth training program is often an overlooked variable. This study has been unable to directly account for how much of an effect a successful player coming from youth development programs actually has on the final competitive and financial results of the club. This variable is extremely hard to quantify, since players only start affecting revenues when they are performing in games played by the club's first squad. Some players are drafted onto the first team at a very young age, meaning that they do not spend as much time in youth development programs. Like ownership, youth development programs themselves have many internal and external variables to consider. Many processes within a club are interconnected. For example, the management of a club affects practically all internal aspects, such as youth programs, squad tactics, player investment and the overall financing level from the owner(s).

There are also other important annual competitions that teams allocate resources towards. The UEFA Champions League (UCL) is a primary competition that any successful European team wants to thrive in. However, there is a quota on how many teams from each league can qualify to play in the UCL each year. The top four teams from the EPL are eligible to qualify for the UCL, meaning that EPL teams are always looking to finish a season as one of the top four teams. The qualification for the UCL results in more annual high-level competitive games being played. Extra games being played consequently leads to more ticket and broadcasting revenue, along with higher merchandise sales. Additionally, the UCL prize money can boost a team's revenue significantly (like it did for Chelsea in 2012). This analysis has only measured the sampled teams' performance in the EPL and has not considered other competitions and their possible effects. The main reason this study has not accounted for external competitions is because it would result in an uneven number of datapoints for each team, as it is impossible for all seven sampled teams to play in the UCL each season.

The stadium a club plays at may also have a significant effect on its revenues and league performance. Clubs playing at stadiums with higher capacity have an opportunity to sell more tickets per game, thus increasing revenues. Furthermore, the geographic location of a club is another important factor to consider, as clubs located in populated areas are most likely to have higher match attendance than clubs located in less populated areas. The density of the population within the area where the club's stadium is located may also affect the attendance levels at games. All of the seven sampled clubs play in cities that are largely populated, meaning that they experience a higher influx of supporters coming to games than clubs located in smaller towns. Three of the sampled clubs (Arsenal, Chelsea & Tottenham) have stadiums located in London, one of the most populated cities in Europe. Two (Manchester United & Manchester City) of the teams are located at Manchester, the UK's second most populated city. The remaining two (Everton and Liverpool) play in Liverpool, another major city within the UK. London, Manchester and Liverpool are among the most populated cities in England, meaning that these teams have an inherently higher chance of receiving larger attendance levels at their games, as more supporters live close to where these clubs play.

The geographical location of where a club's home ground is located also bears another major variable that is likely to affect a club's competitive and financial performance. The number of rival clubs located in the same area can have a significant impact on a club's local supporter count, therefore affecting revenues too. The sample used for this study contained seven teams from only three cities. When there is more than one successful team from a city or location, local supporters are essentially divided among the clubs competing in that area. All of the sampled clubs deal with rival teams, and therefore do not have a "monopoly" on supporters within their area. However, it is hard to quantify just how significant the effect of rivalry is on supporter numbers and revenue, as forecasting this would require a completely imaginary situation where the given city would only possess one major EPL competitor. On the other hand, rivalry may also boost a team's competitive results, as competition usually breeds an incentive for a club to beat their rivals, leading them to fare better in competitions. This is also difficult to quantify, as it is hard to assess if a club would compete differently if its main geographic rival did not exist. The correlation and regression analysis did not consider this variable either, as it was too difficult to produce quantitative results to indicate the effect of this variable.

5.3. Analysis from previous research

The relationship between competitive and financial performance has been investigated by numerous researchers in the past. Hall & Szymanski (2002) performed a correlation analysis focusing on both the Major League Baseball (MLB) and EPL. The analysis explored the relationship between payroll and competitive performance and found that this correlation was consistently strong in the EPL throughout the studied time period (1980-2002). Hall & Szymanski suggest that one of the main reasons for the importance of financial power within football is the open structure of the player transfer market, allowing rich teams to leverage their financial capacity to gain better players. Hall & Szymanski provide sufficient empirical evidence on the correlation between competitive and financial performance of EPL teams. However, the regression model used in chapter 4 of this study has included other specific financial variables to explain not only a team's financial capacity, but also its spending habits. The empirical evidence of the regression analysis in this study, and the correlation analysis performed by Hall & Szymanski, both find a strong positive relationship between payroll and a team's competitive performance.

Rohde & Breuer (2016) investigate how financial success has affected Europe's top 30 football teams from 2004 to 2013. They also employ regression analysis but use a fixed-effects model to represent the data. Their findings show that financial success is driven by sporting success, and sporting success is motivated by team investments. These findings fall in line with the findings of the evidence found from the random-effects model provided in chapter 4 of this study. Rohde & Breuer's model arguably comes the closest to the model used throughout this study from any previous research. However, the sample size used in their model is far larger, as teams from all over Europe are observed. Additionally, Rohde & Breuer consider numerous dummy variables within their model, such as ownership and achieved titles. However, their model does not consider the impact of a club's wage expenditure. Nonetheless, the findings between both studies align, and suggest that financial and competitive performance of football teams have a strong positive correlation. Additionally, Rohde & Breuer's (2016) model accounts for ownership, while the model used in this study does not. However, there is a consensus based on previous research, that diminishing ownership concentration among football clubs allows clubs to achieve higher profitability and viability (Rohde & Breuer, 2018; Dimitropoulos et al., 2012; Plumley et al., 2014; Acero et al., 2017).

Iorwerth et al. (2017) looked at the relationship between spending habits and league success of various EPL clubs. They use a Transfer Price Index to measure club spending, along with various on-pitch competitive indicators to measure league performance. Correlation analysis is used to determine the relationship between their two main variables. Their gathered empirical evidence indicates that financial power has a significant effect on the teams' league success, and make an argument saying that the performance advantage given by financial doping is "contrary to the spirit of sport". The regression analysis employed throughout this study also supports the idea that wealthier teams generally perform better.

There is a wide variety of pre-existing research regarding the relationship between competitive and financial performance of a football team. Studies have ranged from investigating how football teams perform during economic recessions (Szymanski, 2010) to examining the impact of certain competition prize money awards on a team's overall annual revenue (Menary, 2015). There are also multiple studies exploring the effect of club ownership on a team's financial performance (Plumley et al., 2014; Acero et al., 2017; Dimitropoulos et al., 2012). Furthermore, studies have been made looking into the varying

investment habits of football clubs, and how they affect both competitive and financial performance (Furesz & Rappai, 2020; Richardson et al., 2010; Manoli & Hodgkinson, 2017). Most of the research papers that have been analyzed throughout this study have had similar findings. There is a consensus that a football team's financial performance has a strong positive effect on its competitive performance, and vice versa. The model used in this study has not been used before, as other models used in other studies have not included variables encompassing league performance, transfer expenditures, and wage expenditures simultaneously. Furthermore, the model presented in this study considered a team's wage expenditure, which can be seen as a proxy variable for the quality of the players. In conclusion, the empirical evidence provides findings that fall in line with previous research and may be considered fresh empirical evidence.

6. CONCLUSIONS

6.1. Main Findings

Three of the four explanatory variables have a statistically significant effect on the dependent variables' revenues. EPL points was found to have the strongest positive relationship with revenues, followed by wage expenditure and then transfer expenditure. Transfer income was the only explanatory variable that was found to be statistically insignificant. The regression model supports that the sampled teams' competitive league performance directly affects its financial performance. However, it also indicates that other fiscal variables, such as transfer and wage expenditure, affect the sampled team's financial performance. On the other hand, there are many other unquantifiable variables that may affect a team's revenues. These variables may be studied using qualitative methods. This study found statistical evidence to support the belief that teams who achieve more EPL points and have higher expenditures on player transfers and wages, ultimately generate higher annual revenues.

6.2. Implications for International Business

Football is often considered the most global sport on the planet. The professional football industry as a whole is completely interconnected, and clubs rely on each other to uphold the competitive market both on and off the pitch. Although this study focused on teams exclusively from England, there are many variables and aspects that can be related to international business. For example, the transfer market is a global market that clubs from

any nation can conduct business in. This study sheds some light on how transfer expenditures affect the revenues generated by English teams specifically. Clubs should consider how their supporters are spread across the world and implement marketing strategies to appeal to their international fanbase. Teams from different countries often have contrasting methods on running a club. This study may be useful towards looking at how English clubs are managed, and what values and goals they usually hold. From an international perspective, if every country's football scene were extensively understood, it would allow the flow of business to be even smoother, as clubs would be more knowledgeable on differences in how they conduct business.

6.3. Suggestions for Further Research

This study did not put much focus into using qualitative methods to study variables that are difficult to quantify. Further research may look into how, for example, a team's youth program may affect its revenues and competitive results. Studying how much of an effect the presence of a rivalry within one city has, may also be useful in understanding how some teams are affected either positively or negatively by this. Although this study looked at some investment habits concerning the transfer and salary of players, future research may look into other investment habits, such as how a team's marketing capabilities may directly affect its revenues. This study used a sample of only seven of the currently most successful EPL teams, while other studies could use a larger sample, possibly comparing the highly successful teams to the less successful teams that have competed in the EPL or other leagues.

Another major variable that was ignored for this study is how a club's ownership structure affects both its competitive and financial performance. Although there have been qualitative studies on this (Dimitropoulos et al., 2012; Plumley et al., 2014; Acero et al., 2017), there are possibilities to conduct quantitative studies regarding this variable. Doing this would create further insight and help answer the third research question included in chapter *1*. Furthermore, according to Symanski (2010), football clubs are found to be more recession-proof than more traditional businesses. Investigating why this may be and understanding specifically what makes football clubs recession-proof would possibly allow us to improve businesses in other industries to be better equipped to deal with recessions.

In conclusion, the relationship between a football club's financial and competitive performance has been widely studied from multiple perspectives. Most studies have looked at fiscal variables and compared them to a club's performance in various competitions (Carmichael et al., 2010; Barros & Leach, 2007; Wilson et al., 2013). Other studies have focused on ownership structure and its effects on the team's competitive and financial performance (Rohde & Breuer, 2016a; Nauright & Ramfjord, 2010; Acero et al., 2017). The main area for further research would be to investigate how specific club investments can affect both their financial and competitive results. Examining how investment habits such as youth programs, infrastructure and marketing practices can boost a club's league performance and revenue could be the next step into fully understanding the relationship between a football club's financial and competitive performance.

7. REFERENCES

1. Acero, I., Serrano, R. and Dimitropoulus, P., (2017). 'Ownership Structure and Financial Performance In European Football.' Corporate Governance. [online]. 17 (3). 511-523.
2. Alaminos, D. (2020). 'Financial Performance Analysis In European Football Clubs.' Entropy [online] 22 (9) 1056.
3. Andreff, W. (2007). French Football. *Journal of Sports Economics*, 8(6), pp.652–661.
4. Athanasios, D., (2013). 'The Market Reaction To Football Player Transfers In Europe.' M.A. Thesis. Tilburg, Netherlands: Universiteit Van Tilburg [published].
5. Barros, C. and Leach, S. (2007). 'Performance Evaluation of The English Premier Football League With Data Envelopment Analysis.' Applied Economics. [online] 38 (12). 1449-1458.
6. Borland, J. (2003). Demand for Sport. *Oxford Review of Economic Policy*, 19(4), pp.478–502.
7. Buraimo, B. (2008). Stadium attendance and television audience demand in English league football. *Managerial and Decision Economics*, 29(6), pp.513–523.

8. Buraimo, B., Simmons, R. and Szymanski, S. (2006). English Football. *Journal of Sports Economics*, 7(1), pp.29–46.
9. Carmichael, F., McHale, I. and Thomas, D. (2010). 'Maintaining Market Position: Team Performance, Revenue and Wage Expenditure in the English Premier League.' Bulletin of Economic Research, 63(4), pp.464–497.
10. Chadwick, S. and Hamil, S. (2010). Managing football : an international perspective. Amsterdam ; London: Elsevier/Butterworth-Heinemann.'
11. Charleston, S. (2009). The English football ground as a representation of home. Journal of Environmental Psychology, 29(1), pp.144–150.
12. Chung, S., (2016). 'Social Media And Football In The Barclays Premier League: An Investigation On The Usage Of Social Media Within The Changing Relationship Between Football And Its Supporters.' B.A. Dissertation. Cardiff, UK: Cardiff Metropolitan University [published].
13. Conn, D. (2011). *Record income but record losses for Premier League*. [online] the Guardian. Available at: https://www.theguardian.com/football/2011/may/19/premier-league-finances-black-hole [Accessed 15 Mar. 2021].
14. Conn, D. (2013). *Premier League finances: turnover, wages, debt and performance*. [online] the Guardian. Available at: https://www.theguardian.com/news/datablog/2013/apr/18/premier-league-club-accounts-debt [Accessed 11 Feb. 2021].
15. Conz, E., Denicolai, S., Zucchella, A. and Riccardi, M.P. (2015). University-territory interaction models: a case study survey. The role of universities in promotion of cities and regions, 1, pp.43–58.
16. Cox, A. (2012). Live Broadcasting, Gate Revenue, and Football Club Performance: Some Evidence. *International Journal of the Economics of Business*, 19(1), pp.75–98.
17. Cox, A. (2015). Spectator Demand, Uncertainty of Results, and Public Interest. *Journal of Sports Economics*, 19(1), pp.3–30.
18. Cox, A.J. (2016), 'An economic analysis of spectator demand, club performance, and revenue sharing in English Premier League football'. PhD Dissertation. Portsmouth, UK: University of Portsmouth [published].

19. Cronqvist, H., Heyman, F., Nilsson, M., Svaleryd, H. and Vlachos, J. (2009). Do Entrenched Managers Pay Their Workers More? *The Journal of Finance*, 64(1), pp.309–339.

20. Deloitte. (2020). *Annual review of football finance* 2020.
21. Dimitropoulos, P. and Scafarto, V. (2019). The impact of UEFA financial fair play on player expenditures, sporting success and financial performance: evidence from the Italian top league. *European Sport Management Quarterly*, 21(1), pp.1–19.

22. Dimitropoulos, P. and Tsagkanos, A. (2012). Financial Performance and Corporate Governance in the European Football Industry. International Journal of Sport Finance, 7(4), pp.280–308.
23. Drust, B., Reilly, T. and Williams, M., 2010. International Research In Science And Soccer. 1st ed. New York: Routledge, 29-31.
24. Fionn Shiner (2018). *Who invented football - the story of the beautiful game from China to England*. [online] mirror. Available at: https://www.mirror.co.uk/sport/football/who-invented-football-story-beautiful-12656196.

25. Franck, E. (2018). Private Firm, Public Corporation or Member's Association Governance Structures in European Football. *International Journal of Sport Finance*, 5(2), pp.108–127.

26. Fűrész, D.I. and Rappai, G. (2020). Information leakage in the football transfer market. European Sport Management Quarterly, pp.1–21.
27. Galariotis, E., Germain, C. and Zopounidis, C. (2017). A combined methodology for the concurrent evaluation of the business, financial and sports performance of football clubs: the case of France. *Annals of Operations Research*, [online] 266(1-2), pp.589–612. Available at: https://link.springer.com/article/10.1007/s10479-017-2631-z [Accessed 23 Jan. 2020].

28. Gammelsæter, H. and Jakobsen, S.-E. (2008). Models of Organization in Norwegian Professional Soccer. European Sport Management Quarterly, 8(1), pp.1–25.
29. Giulianotti, R. (1999). *Football : a sociology of the global game*. Cambridge, Uk: Polity Press ; Oxford ; Malden, Ma.

30. Gonçalves, C. (2003). ‘Fórum: Selecção e detecção de talentos. *Treino Desportivo’*. 21(3): 32–33.
31. Guzmán, I. & Morrow, S. (2007), ‘Measuring efficiency and productivity in professional football teams: evidence from the English Premier League: CEJOR’, Central European Journal of Operations Research, [online] 15, (4). 309-328.
32. Hall, S., Szymanski, S. and Zimbalist, A.S. (2002). Testing Causality Between Team Performance and Payroll. *Journal of Sports Economics*, 3(2), pp.149–168.
33. Hamil, S. and Walters, G., (2010). ‘Financial Performance In English Professional Football: ‘An Inconvenient Truth’.’ Soccer & Society. [online] 11 (4). 354-372.
34. Holzmayer, F. and Schmidt, S. (2020). Financial performance and corporate diversification strategies in professional football – evidence from the English Premier League. Sport Business and Management, 10(3).
35. Holzmayer, F. and Schmidt, S.L. (2020). Financial performance and corporate diversification strategies in professional football – evidence from the English Premier League. Sport, Business and Management, 10(4), pp.291–315.
36. Iorwerth, H., Tomkins, P. and Riley, G. (2017). Financial Doping in the English Premier League. *Sport, Ethics and Philosophy*, 12(3), pp.272–291.
37. Karak, A. (2016). Accumulation by Dispossession: A Marxist History of the Formation of the English Premier League. Review of Radical Political Economics, 49(4), pp.615–632.
38. Karpavicius, T. and Jucevicius, G. (2009). The Application of the Business System Concept to the Analysis of Football Business. Engineering Economics, [online] 63(3). 86-95.
39. Lima, E.M.R., De Oliveira, V., Pavlović, V., Fischer, C.N., Machado, A.A. and Tertuliano, I.W. (2018). The Influence of Expenditures in Football Industry Results: Case Study of the Brazilian Football League. *Management:Journal of Sustainable Business and Management Solutions in Emerging Economies*, 23(1), p.1.
40. Madsen, D., (2018). ‘Wage Expenditures and Sporting Success: An Analysis of Norwegian And Swedish Football 2010–2013.’ Cogent Social Sciences [online] 4 (1).
41. Maguire, J. and Pearton, R. (2000). The impact of elite labour migration on the identification, selection and development of European soccer players. Journal of Sports Sciences, 18(9), pp.759–769.

42. Manoli, A. and Hodgkinson, I.R. (2017). Marketing outsourcing in the English Premier League: the rights holder/agency interface. European Sport Management Quarterly, 17(4), pp.436–456.
43. Manoli, A., (2018). 'Brand Capabilities In English Premier League Clubs.' Brand Research in Sport Management. [online] 20 (1), 30-46.
44. Matesanz, D., Holzmayer, F., Torgler, B., Schmidt, S.L. and Ortega, G.J. (2018). Transfer market activities and sportive performance in European first football leagues: A dynamic network approach. PLOS ONE, 13(12), p.e0209362.
45. Menary, S. (2015). One rule for one: the impact of Champions League prize money and Financial Fair Play at the bottom of the European club game. *Soccer & Society*, 17(5), pp.666–679.
46. Nauright, J. and Ramfjord, J. (2010). 'Who Owns England's Game? American Professional Sporting Influences And Foreign Ownership In The Premier League.' Soccer & Society. [online] 11 (4). 428-441.
47. Pereira, T., (2018). The Relation of Financial Performance And The Sports Performance In Football Clubs. M.A. Dissertation. Porto, Portugal: Universidade Do Porto [published].
48. Plumley, D., Wilson, R. and Ramchandani, G. (2014). 'Towards a model for measuring holistic performance of professional Football clubs.' Soccer & Society [online] 18 (1), 16-29.
49. *Premier League - Transfer income and expenditures*. [online] Available at: https://www.transfermarkt.com/premier-league/einnahmenausgaben/wettbewerb/GB1/plus/0?ids=a&sa=&saison_id=2018&saison_id_bis=2018&nat=&pos=&altersklasse=&w_s=&leihe=&intern=0.
50. Price, J., Farrington, N. and Hall, L. (2013). Changing the game? The impact of Twitter on relationships between football clubs, supporters and the sports media. *Soccer & Society*, 14(4), pp.446–461.
51. Relvas, H., Littlewood, M., Nesti, M., Gilbourne, D. and Richardson, D. (2010). 'Organizational Structures and Working Practices In Elite European Professional Football Clubs: Understanding The Relationship Between Youth And Professional Domains.' [online] European Sport Management. 10 (2). 165-187.

52. Rohde, M. and Breuer, C. (2016). Europe's Elite Football: Financial Growth, Sporting Success, Transfer Investment, and Private Majority Investors. *International Journal of Financial Studies*, [online] 4(2), p.12. Available at: https://www.mdpi.com/2227-7072/4/2/12.
53. Rohde, M. and Breuer, C. (2016b). Europe's Elite Football: Financial Growth, Sporting Success, Transfer Investment, and Private Majority Investors.' IJFS [online] 4 (2). 12.
54. Rohde, M. and Breuer, C. (2018). 'Competing by investments or efficiency? Exploring financial and sporting efficiency of club ownership structures in European football.' Sport Management Review, 21(5), 563-581.
55. Rohde, M. and Breuer, C., (2016a). 'The Financial Impact Of (Foreign) Private Investors On Team Investments And Profits In Professional Football: Empirical Evidence From The Premier League.' Applied Economics and Finance. [online] 3 (2). 243-255.
56. Rottenberg, S. (1956). The Baseball Players' Labor Market. Journal of Political Economy, 64(3), pp.242–258.
57. Sepp, M., Liljander, V. and Gummerus, J. (2011). Private bloggers' motivations to produce content – a gratifications theory perspective. *Journal of Marketing Management*, 27(13-14), pp.1479–1503.
58. Simmons, R & Robinson, T (2009). Gate Sharing and Talent Distribution in the English Football League. Manchester Business School Working Paper No 570 available: http://www.mbs.ac.uk/research/workingpapers/index.aspx
59. Sloane, P. (1971). The Economics of Professional Football: The Football Club as a Utility Maximiser*. Scottish Journal of Political Economics, 18(2), pp.121–146.
60. Spotrac.com. (n.d.). *EPL 2018 Payroll Wages Tracker*. [online] Available at: https://www.spotrac.com/epl/payroll/2018/.
61. Sroka, R. (2020). Convergence and Divergence in Stadium Ownership Structures. DePaul Journal of Sports Law, 16(1), pp.167–194.
62. Super User (2012). *The History of Football | The Origins of Football, Rule Changes, The Formation of the Football League and More | Football-Stadiums.co.uk*. [online] Football-stadiums.co.uk. Available at: https://www.football-stadiums.co.uk/articles/the-history-of-football/.

63. Szymanksi, S. (1998), ‘Why is Manchester United so successful?’ Business Strategy Review, 9 (4). 47.
64. Szymanski, S. (2010), "The Financial Crisis and English Football: The Dog That Will Not Bark", International Journal of Sport Finance, 5 (1). 28-40.
65. Szymanski, S. and Kuypers, T. (1999). Winners and losers. London: Viking ; New York, N.Y.
66. Terrien, M., Scelles, N., Morrow, S., Maltese, L. and Durand, C., (2017). ‘The Win/Profit Maximization Debate: Strategic Adaptation as The Answer?’ Sport, Business and Management [online] 7 (2). 121-140.
67. UEFA, (2013). Champions League: Distribution to clubs 2011/2012.
68. Vamplew, W., (2017). ‘Creating The English Premier Football League: A Brief Economic History With Some Possible Lessons For Asian Soccer.’ The International Journal of the History of Sport [online] 34 (17-18) 1807-1818.
69. Wilson, R. (2017). ‘An analysis of factors affecting financial performance in English professional team sports’. PhD Dissertation. Sheffield, UK: Sheffield Hallam University [published]’
70. Wilson, R., (2013). ‘The Relationship Between Ownership Structure And Club Performance In The English Premier League.’ Sport, Business and Management [online] 3 (1). 19-36.
71. www.transferleague.co.uk. (n.d.). *Club Finances 2016 - 2017 - Premier League - Transfer League*. [online] Available at: https://www.transferleague.co.uk/content/club-finances/club-finances-2016-17 [Accessed 15 Mar. 2021].

8. APPENDIX

Fixed-effects regression model

```
Fixed-effects (within) regression               Number of obs      =        70
Group variable: teamid                          Number of groups   =         7

R-sq:                                           Obs per group:
     within  = 0.4192                                         min =        10
     between = 0.6766                                         avg =      10.0
     overall = 0.5498                                         max =        10

                                                F(4,59)            =     10.64
corr(u_i, Xb)  = 0.0542                         Prob > F           =    0.0000
```

revenue	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
eplpoints	2.320409	1.103959	2.10	0.040	.1113921	4.529427
tranexp	.9822413	.2299567	4.27	0.000	.522099	1.442384
traninc	.165729	.3106266	0.53	0.596	-.4558334	.7872914
wagexp	.9051566	.3319988	2.73	0.008	.2408285	1.569485
_cons	-55.79697	100.1318	-0.56	0.579	-256.1602	144.5663
sigma_u	66.508163					
sigma_e	88.138778					
rho	.36281296	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(6, 59) = 5.26                     Prob > F = 0.0002
```