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Winning solves everything

The relationship between financial and sports performance in English football

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Abstract

This study provides a view of the correlation between clubs' financial performance and sports performance in English football's two top leagues: Premier League and Championship, during 1998-2019. The football industry has experienced immense growth and increased investment interest in recent years. The purpose of the study is to investigate if this development has affected the relationship between financial performance and sports performance, compared to previous empirical studies. We find a strong correlation between wage expenditure and sports performance for both leagues, in line with previous research. Moreover, in Premier League we find that profitability is positively correlated with sports performance, while wage margin is negatively correlated with sports performance. Our results further suggest that the player registration amortization margin is not significantly correlated with sports performance.

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1 Introduction

All organizations seek to perform and thrive. Structuring activities with that in mind can be relatively straightforward when having only one performance logic to abide by (e.g., maximizing shareholder value). It does, however, become more complex when several performance logics come into play. In the case of multiple logics, it is critical to analyze their co-existence, respective priorities, and how they influence each other. The football industry relies on two significant logics: sports performance on the one hand, and economic and financial performance on the other. In the early days of football, sports performance was arguably the most important, if not only, logic clubs had to consider. But along with the sector growth where the European football market now is a billion-dollar industry, the financial aspect has become increasingly important for clubs. Quirk & El-Hodiri (1974) early discussed how clubs prioritize these two logics and assumed that clubs are profit maximizers, while Sloane (1971) took the stance and argued that clubs maximize sports performance, while having to relate to financial constraints. Solberg & Haugen (2010) later found that European football clubs are closer to being win maximizers. Carlsson-Wall et al. (2016) argue that the two logics sometimes challenge each other, while other times they work in harmony.

With that in mind, the primary theoretical motivation for this study lies in analyzing the relationship between these two logics. Whether football clubs' sports and financial performance correlate has been extensively researched. According to Deloitte (2021), revenue comprises mainly broadcasting, matchday, and commercial revenue streams, and is significantly correlated with sports performance according to previous studies (Szymanski, 1998; Barajas et al., 2005; Ferri et al., 2017). Sass (2016) argues that a club's revenue potential positively depends on its sports performance. Success on the pitch results in more interest and spectators, increasing revenues and enabling greater investment in players, leading to even greater sports performance. This reasoning resembles the repetitive 'virtuous circle' presented by Lago et al. (2004), which also proposes a cyclicity that sports performance leads to increased revenues, which leads to increased ability to invest in players, coming full circle by further increasing sports performance.

The results are more inconclusive regarding previous research on profitability and sports performance. Some studies successfully find a correlation, while others fail to do so (Dimitropoulos, 2009; Ferri et al., 2017; Szymanski, 1998; Barajas et al., 2005). Contrary, there

is a strong consensus in the literature that a distinct relationship exists between clubs' wage expenditures and sports performance (Szymanski, 1998; Lago et al., 2004; Barajas et al., 2005; Rey & Santelli, 2017). These results are proposed as intuitive due to a relatively effective player market where talent is reflected in players' wages, and that the majority of clubs' wage expenditure consists of player salaries. A team with more talented players lays the foundation for improved sports performance. Hall et al. (2002) reason that a team's total payroll should be a perfect predictor of performance unless too much noise disturbs the relationship (e.g., managerial talent, injuries, luck, poor judgment, etc.). However, the mentioned noise has not seemed to be a significant issue, as all above mentioned studies have found a strong positive relationship between wages and sports performance. Rey & Santelli (2017) further study clubs' wage margin in terms of revenue, and found a negative correlation with sports performance. In other words, better teams are able to spend a smaller share of their incomes on player wages, proposedly thanks to economies of scale.

1.1 Purpose

This study aims to investigate the relationship between economic performance and sports performance. We aim to examine if economic variables, namely: wage, wage margin, EBIT margin, and player registration amortization margin, correlate with sports performance. This subject is of most interest to the literature regarding sports accounting. Still, it can further be of general interest regarding how financial variables correlate with performance in a specific industry. To understand the correlation, the following research question has been formulated:

Is there a relationship between financial and sports performance?

Based on previous research, we expect a positive correlation between all the economic variables tested except wage margin, where a negative correlation is expected. Our study also looks at the amortization of player registration rights, which extends beyond previous literature. To examine the research question, we will perform a multivariate regression analysis with data from the top two leagues in England – Premier League and Championship, between 1998 and 2019. The most prominent argument for looking at English football is that England is considered the best country in the world based on their leagues. Premier League is ranked the best league globally, and Championship shortly after.

1.2 Contribution

This study contributes to existing research in three ways. Firstly, we compare a first- and second league in a country, which contributes by providing insights into possible structural differences based on league rankings. Secondly, we also test if wage margin and amortization of player registration margin correlate with sports performance, which has not been previously researched in English football, thus extending the literature in terms of tested economic variables. Thirdly, the relationship between financial performance and sports performance of English football clubs has been researched before. Still, at the time of writing this study, it is nearly twenty years since the last study of our knowledge was conducted. Hence, we contribute with updated research within this field - heavily motivated by the industry's immense growth in the last two decades.

The results show a significant positive correlation between most economic variables and sports performance, in line with our expectations. The partial negative correlation between wage margin and sports performance was also in line with our expectations. In addition, we found no significant results for the amortization of player registration margin.

1.3 Structure

Our study consists of six sections. Section 2 will provide theoretical background and relevant theories regarding sports and economic performance, ending with the formulation of hypotheses. Section 3 describes the method, data set, and regression model. In addition, delimitations, validity, reliability, and statistical considerations are discussed. In section 4, our results are presented, including descriptive statistics, Pearson correlations, and regression results. In section 5, we analyze our results, and the hypotheses are discussed individually. In section 6, we present our conclusions and suggest future research.

2 Literature Review

This section provides a theoretical background on which the study is based. We review the football industry, sports performance, financial performance, and empirical literature. Finally, we formulate our hypotheses in this section.

2.1 Background

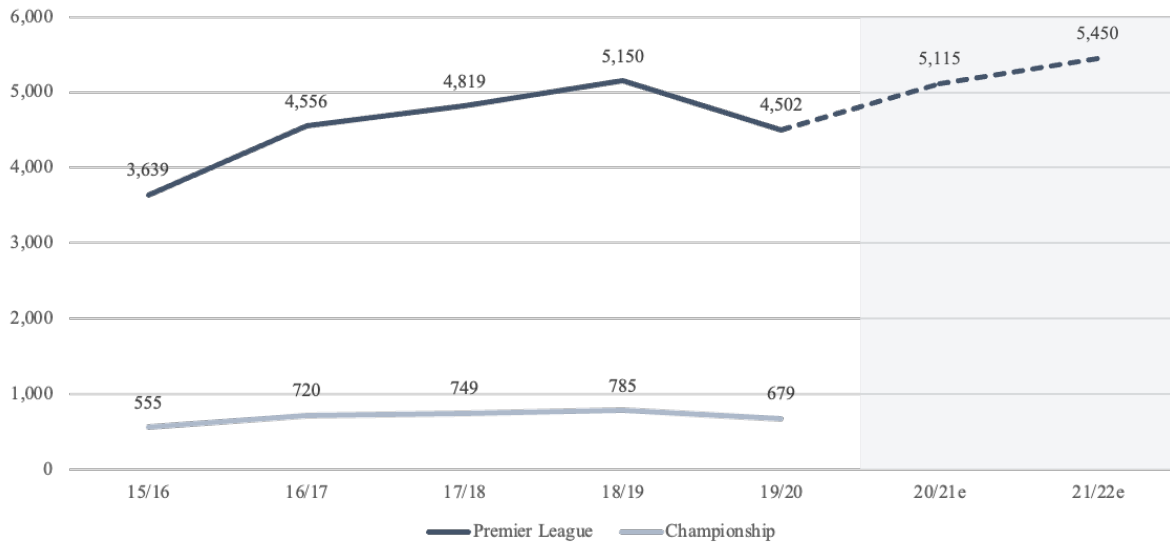
Studies trying to find a link between accounting information and various types of performance have been extensively conducted within the field of accounting research, commonly financial measures' relevance to performance in terms of stock price (Ball & Brown, 1968; Collins et al., 1997; Wild, 1992; Sadka, 2007). Wild (1992) extends previous research by confirming that the informativeness of specific accounting numbers on performance varies between industries. That financial measures' correlation with performance differs between industries, contains the structural logic of our case in this study, analyzing accounting measures in the football industry and the correlation with sports performance. Subsequent topics will discuss the football industry structure, how to measure performance, and previous research conducted on the link between accounting measures and sports performance.

2.2 The Football Industry and Sports Performance

The football industry has evolved from being a general sport to becoming a multi-billion-dollar industry in the last decades. The European football market is estimated to be worth €25.2 billion in 2020. English Premier League clubs' combined revenues are projected to be £5.45 billion in the 2021/22 season, more than doubling the clubs' combined revenues from 2011. Premier League has established itself as the largest football league globally. Championship is the second division in England and reports significantly lower income (Deloitte, 2021).

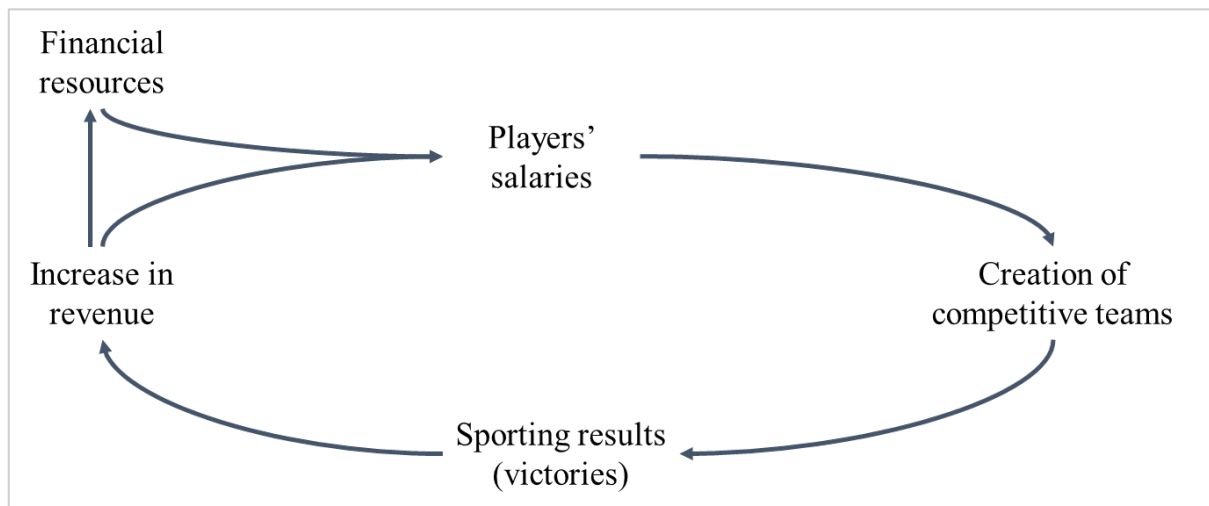
Table 1. Premier League and Championship clubs' revenue - 2015/16 to 2021/22 (£m)

(source: Deloitte, 2018; Deloitte, 2019; Deloitte, 2020; Deloitte, 2021)



The objectives of football clubs have been widely debated in the literature, and performance can be viewed as either financial or sports performance (Szymanski, 1998). Carlsson-Wall et al. (2016) analyze institutional logic in a football organization and argue that business and sports objectives in some situations are in harmony, while there also can be situations where they challenge each other. Quirk & El Hodiri (1974) assumed that teams are profit maximizers in the early literature. Sloane (1971) instead assumed that clubs must be utility maximizers, aiming for non-profit performance while abiding by financial constraints. A study on the Spanish and English leagues found that clubs' behavior can be explained by a win maximization strategy subject to financial constraints (Garcia-del-Barrio & Szymanski, 2009). Solberg & Haugen (2010) take a similar stance and argue that European football clubs are being win maximizers and prioritize sporting success over financial profits. On the other hand, they argue that teams in North American sports are profit maximizers but emphasize that all teams consider both objectives. Lago et al. (2004) extend that point by arguing that financial and sports performance are correlated, that there is a repetitive 'virtuous circle' where increasing financial resources, in terms of increased revenue, will result in the club being able to attract better players, hence becoming a more competitive team, and reach better sports performance, see Figure 1 below. The relationship is a cyclicity since improved team performance will consequently attract even more fans, sponsors, and revenues, which can be reinvested in the team again, closing the full circle.

Figure 1. Virtuous circle (source: Lago et al., 2004)



2.2.1 Sports Performance

Sports performance is guided by a team's ability to win matches and competitions in which it competes domestically and internationally. Szymanski (1998) argues that a lot can be learned from the football industry on business strategy due to the highly structured competition and strictly measurable outcomes. He emphasizes that a club's success is not only measured in financial terms but also in the team's success on the pitch: through games won, league position achieved, and trophies seized etc. Samagaio et al. (2009) discuss what determines performance on the pitch and conclude that sports performance is determined by the skills of players, coaches and strategic actions undertaken by the clubs. Hall et al. (2002) argue that teams compete in attracting talented players, that having the best team should lead to the best performance, and that in an efficient market, wages are increased until they equal the marginal revenue product. Payroll should thus be a perfect predictor for performance. Contrary, Brentford Football Club has adopted an alternative approach and constantly outperformed its wage bill since being promoted to the Championship in 2014, even managing to reach Premier League in 2020. Brentford FC's owner is the founder of Smartodds, a statistical research company providing modeling services to professional gamblers. Using extensive data analytics and statistical models, Brentford has identified players with high-performance potential that have been more affordable to acquire (Deloitte, 2021). It immediately brings to mind Michael Lewis' book, *Moneyball*, based on the American baseball team Oakland Athletics that used analytical data to purchase undervalued players— with great success. Other clubs have tried to imitate Brentford FC's strategy, but so far with less success. It is a compelling story that challenges the view of an efficient market with payroll as the perfect predictor of success.

Hall et al. (2002) further discuss the absence of regulations in European football and argue that it makes it easier for clubs to buy success. However, even if the football market is less regulated than most American sports, the authors conclude some institutional rules teams have to empathize with. The Bosman case, transfer market, and UEFA Financial Fair Play are essential constituents of the football market structure and will be discussed further below.

2.2.2 The Bosman Case and Transfer Market

Before 1995, the European football transfer market was characterized by two principles restricting the player labor market. Firstly, the player's new club had to pay a transfer fee even if the player's old contract with another club had expired. Secondly, bigger European leagues had strictly protectionist regulations regarding the allowed number of foreign-born players appearing in a team in any given game. In 1995, the Belgian player Jean-Marc Bosman raised the issue in the European Court of Justice after having been restricted by these conditions personally. It was ruled that both principles were incompatible with *Article 48* of the "Treaty of Rome" which concerns the freedom of movement of labor (Frick, 2009). Kesenne (2007) argues that the Bosman ruling has substantially opened up the European player market and increased professional player mobility. Frick (2007) observes that the percentage of player moves involving payment of a transfer fee has dramatically decreased from more than 95% pre-Bosman to less than 40% in the period leading up to his study.

2.2.2.1 *Attracting Player Talent and Transaction Accounting Principles*

There are numerous ways for a team to attract new players. A permanent transfer is acquiring a player currently contracted by another club, which usually involves a transfer fee paid by the acquiring team to the selling team. All costs directly attributable to the purchase of player registration rights are considered intangible assets, which are later capitalized and linearly amortized over the contract period, including but not limited to the transfer fees (PwC, 2018). However, clubs can attract new players without paying this often-hefty transfer fee by promoting players from the youth teams, signing players without current contracts, or entering into a loan agreement of a player with another club. For example, in 2021, Lionel Messi was considered the best football player in the world, with him being awarded the prestigious Ballon d'Or (The Athletic, 2021). The same year his contract with Barcelona FC expired and he went on a free transfer to Paris Saint-Germain, leaving Barcelona empty-handed. However, it does

not mean that players without contracts are always cheaper than contracted players, as the new team often pays a signing bonus to the player, which partly offsets the effect of not paying a transfer fee and burdens the amortization of player registration rights (Frick, 2007).

2.2.3 UEFA Financial Fair Play

The UEFA Financial Fair Play (FFP) regulation was imposed in 2009 to improve the financial stability of clubs. The cornerstone of the FFP is the *Break-Even Requirement*, which essentially forces clubs to keep their player expenditures within football-related income. This rules out over-investments in playing talent financed with external equity injections (Dimitropolous & Scafarto, 2021).

The following impact on the industry has been heavily debated since its debut. It is somewhat a consensus that it has improved clubs' financial stability. On the contrary, the competitive balance between clubs is argued to have worsened as it restricts spending not to exceed a club's income (Peeters & Szymanski, 2013). Dimitropolous & Scafarto (2021) further study the impact of FFP. Their findings show that it has negatively affected the relationship between wages and sports performance, but has positively affected the relationship between net transfer fees and performance in Italy's Serie A. Noteworthy is that FFP, being regulated by UEFA, is most apparent for teams in the first leagues due to second and lower divisions being generally unable to qualify for any UEFA tournaments.

2.2.4 League Structure

The European football leagues are structured by open memberships where promotion and relegation are based on a team's sports performance. At the end of a season, the worst-performing teams in a league are relegated to the division below and replaced by the top-performing teams from that division. On the contrary, most US sports leagues are based on closed memberships. Ross & Szymanski (2000) argue that open leagues with promotion and relegation tend to increase competition between teams as they want to avoid relegation. Therefore, teams experience greater incentives to invest in better players. The authors further reason that it is ideal for promoting market efficiency where the most efficient entrants replace the least efficient teams. Noll (2002) studies the financial implications of promotion and his results show that both attendance and revenues increase substantially when teams are promoted.

2.2.5 UEFA Champions League

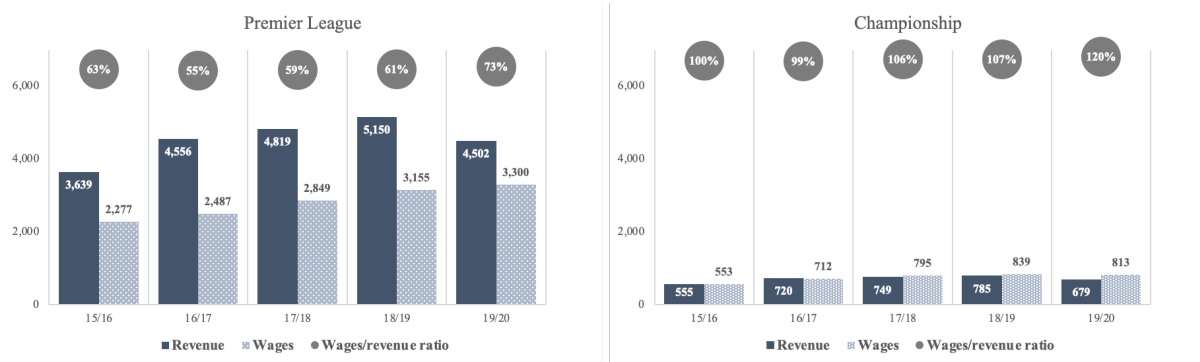
The Champions League (CL) introduction has negatively affected European football leagues' competitive balance. Pawlowski et al. (2010) argue that the increase in payouts to clubs qualifying for CL has impacted top clubs' performance. Their conducted study indicates that there has been a significant decrease in the competitive balance after this policy change due to top clubs growing revenues even more, which allows them to further dominate national leagues. The growing payouts from CL have shifted the financial incentives for clubs according to Breuer and Rohde (2016). Still, the importance of performing in the national league should not have become less of a priority for clubs due to it being the determinant factor of qualification to CL. For example, the top four teams in the Premier League reach CL qualification every year. Finishing in the top four, thus qualifying for CL, is the best shot for mid-tier teams in Premier League to reduce the increasing revenue gap to the top clubs. At the same time, it is a vital revenue stream for top clubs (Deloitte, 2021).

2.3 Financial Performance

To analyze the financial performance of football clubs has become more interesting, and important, with the extensive growth and 'businessification' the industry has experienced in the last decades. Most European football clubs started as non-profit member organizations with the primary intention of playing sport (Peeters & Szymanski, 2013). Still, there has been an incredible upsurge in private investments in football clubs in the last decades. We are now witnessing increased investment interest from institutional investors and private equity in individual football clubs to create- or enhance their portfolio of sports assets. For instance, the 49ers Enterprise, which is the investment division of the American football team San Francisco 49ers, has acquired a minority stake in the Premier League club Leeds United, and the investment firm ALK Capital is since 2020 the majority owner of Burnley Football Club, playing in Championship (Deloitte, 2021). That ALK Capital holds strategic investments in AiSCOUT - an artificial intelligence talent identification platform intended to reach amateur players over the world, is not a coincidence but is already used in Burnley FC's scouting strategy and resembles Brentford FC in making data-driven decisions regarding player prospects (ALK Capital, 2022). That clubs invest in these unconventional player talent strategies indicates that they do not regard the market as entirely effective due to trying to find undervalued players. It is also reasonable to believe that this development will continue in line

with technology development and with wages making up such a significant share of costs, even extending total revenues in the Championship in the last couple of years, see Table 2 below.

Table 2. Premier League and Championship clubs' revenues and wage costs – 2015/16 to 2019/20 (£m)
(source: Deloitte, 2018; Deloitte, 2019; Deloitte, 2020; Deloitte, 2021)



Premier League is substantially larger when it comes to revenues compared to Championship, and its revenue structure consists majorly of broadcasting-related revenues as the largest part, followed by sponsorship/commercial and matchday related revenue. The largest subject of costs for football clubs is undoubtedly wages which majorly consists of player salaries. The average wage-to-revenue ratio for Premier League clubs surged in the 19/20 season to 73%, higher than UEFA's recommended threshold of 70% and up from 61% in the 18/19 season, see Table 2. For Championship, the average wage-to-revenue ratio is consistently higher but surged to a startling 120 % in the 19/20 season. These surges were driven by the decrease in revenues due to the COVID-19 pandemic and the inability to influence wages in the short term (Deloitte, 2021). Having outlined the football industry's general characteristics and broad economic constituents, we are in the coming section going to present and interpret previous studies conducted on the subject.

2.4 Empirical Studies

Numerous empirical studies have investigated the relationship between financial success and sports performance. Barajas et al. (2005) study the relationship between profit and sports performance in Spanish clubs and find that sports performance has a considerably low explaining power of profits. Szymanski (1998) analyzes co-movements in profits and league position in a given year in English football, concluding that an increase in league position was approximately equally likely to increase profit as it was to decrease profit. The same relationship held for a negative change in league position. The correlation between profits and

performance from their studies thus seems to be low, but mentioned studies both find that revenue and performance on the pitch are highly correlated. The high correlation with revenue while the absent correlation with profits is argued to be because of accelerating costs related to an increase in revenue, where the main portion is reinvested in better players to attain a competitive advantage on the field, resulting in higher wages and absent profits. Those empirical findings support that football clubs maximize team performance instead of profits. Dimitropoulos (2009) makes contrasting arguments when studying the Greek Football League and the effects of firm characteristics on clubs' profitability. He finds that sports performance is positively correlated with both revenue and profits, and subsequently discusses that this may be due to successful clubs being able to generate economies of scale by organizing activities more efficiently. Ferri et al. (2017) also find that clubs' profits and revenues correlate with sports performance and argue that it may be due to the benefits of scale. The connection between sports performance and financial performance in terms of profits thus seems to be inconclusive when referring to previously conducted studies. However, looking at revenues, there is a strong consensus within the literature that it is positively correlated with sports performance. Breuer & Rohde (2016) confirms this with their study of the financial success of Europe's top 30 football clubs, which find that national sporting success has a substantially positive effect on revenues. The strong connection between income and performance on the pitch indicates empirical support for the argument made by Lago (2004) illustrated by his 'virtuous cycle.'

Szymanski & Smith (1997) find a positive correlation between clubs' size in terms of total assets and sports performance in Premier League. Rey & Santelli (2017) also find a strong positive correlation between size and sports performance in Italy's Serie A. They argue it is due to economies of scale where large clubs can organize their operations more efficiently and spend more money purchasing talent for their team, leading to better performance.

Assuming that better players imply higher wage expenses is valid if the player market is competitive. Szymanski & Smith (1997) argue it is due to their assumption that the quality of players determines a team's position in the league and the finding that sports performance and wage expenses are highly correlated. Szymanski & Kuypers (1999) further study the relationship between accounting measures and sports performance in English football over 20 years. The results show a significant association between both wage expenditure and income

with sports performance. Hall et al. (2002) compare Major League Baseball in the US with English football and find a closer correlation between payroll and performance in English football due to the deregulated and open market, which allows for player talent to be purchased freely in contrast to the heavily restricted system in baseball. Barajas et al. (2005) contribute to this view with their study which finds a strong correlation between sports performance and wages. Rey & Santelli (2017) look at wage margin in terms of revenue and find a negative correlation with sports performance, implying that better teams can spend a smaller portion of their income maintaining player talent. They also revisit previous topics in their study, showing an existent correlation between wages and sports performance. They point out that the results align with Lago's 'virtuous circle' regarding higher wages leading to better teams and improved league performance. Lastly, Dimitropoulos & Scafarto (2021) found that UEFA's Financial Fair play has negatively impacted the correlation between sports performance and wages in Serie A.

2.5 Formulation of Hypotheses

We aim to contribute to this topic by revisiting empirical studies conducted on the football industry, while further extending previous research by focusing on amortization of player registration margin. It is an interesting topic due to the explosive growth and interest along with the increased investment appetite that the industry has experienced in the last two decades. By looking at both Premier League and Championship, we can study possible differences and similarities in the economics of being a club in England's first or second league and its correlation with sports performance.

H1: There is a positive relationship between clubs' sports performance and wage expense

Clubs' ability to attract good players is arguably the most critical part of creating a competitive team to achieve good sports performance. We measure wage expense as the total wage expenditure of a club, but most of it comprises player salaries which makes it a good proxy according to Szymanski (1998). He further argues that the well-developed market for players results in better players being able to demand higher wages, why a higher wage expenditure should result in better team performance. Numerous studies analyzed this correlation in English football about 20 years ago, and Rey & Santelli (2017) previously confirmed that the relationship still holds for Italy's Serie A. We would like to revisit this connection in English football and see if it still holds after the industry's extensive growth lately, and with clubs

increasingly using data-driven strategies regarding player investment decisions, such as previously mentioned Brentford FC and Burnley FC.

H2: There is a negative relationship between clubs' sports performance and wage margin

Rey & Santelli (2017) find a negative correlation between sports performance and clubs' wage margin in terms of revenue. According to previous literature, this may imply economies of scale in that revenue has an established correlation with team performance. Better teams could use their resources more efficiently by spending a smaller portion of their income on wages, the clubs' largest cost item. If our results indicate a negative correlation regarding this hypothesis, the economies of scale should flow through all the way to profits, all else equal, implying that H4 ought to be confirmed. Because if better teams can spend a smaller portion of their revenues on wages, their biggest cost item, they should attain higher profitability, unless they structurally spend a larger share of their revenue on something else. This gives rise to H3.

H3: There is a positive relationship between clubs' sports performance and player registration amortization margin

Player spending takes form in two significant ways: player salaries and the purchase of player registration rights from other clubs. The latter can be avoided mainly by contracting players when their contracts with another club have expired or promoting talents from the club's youth teams. However, since the supply of talent is limited and the best teams fiercely compete for the best players, the only option is often to buy already contracted players. These player registration rights are linearly amortized during the contract period (PwC, 2018). We hypothesize that better players' registration rights are purchased at a premium, in terms of percentage of revenue, especially for star players in top clubs. In that case, better teams with these 'premium' players have to spend a larger portion of their revenue on amortizing them.

H4: There is a positive relationship between clubs' sports performance and profit

The inconsistent findings in previous studies on the correlation between sports performance and profitability make it interesting to investigate. Barajas et al. (2005) and Szymanski (1998) find no significant correlation between sports performance and profits, while both Dimitropoulos (2009) and Ferri et al. (2017) do find a significant correlation in this regard. The increased investment interest from both private and institutional investors in the past years may

indicate existent profits in the industry. With this hypothesis, we are trying to answer whether the implied profitability is correlated with sports performance.

3 Method

This chapter presents the choice of method, sample, and delimitations of the study. The different economic and sports variables are also defined. This is followed by a presentation of a regression model and its statistical considerations to answer the hypotheses in the best possible way.

3.1 Choice of Method

Since this study aims to investigate the correlation between economic performance and sports performance, a quantitative research method is advantageous. More specifically, the study's research question will be analyzed with a multivariate regression analysis which, according to Newbold et al. (2013), is suitable "*...when determining the simultaneous effect of several independent variables on a dependent variable*". This is in line with the purpose of the study, where a linear regression of several economic variables' correlation with sports performance is analyzed.

3.2 Sample

The data comprises football clubs in Premier League and Championship, the English first- and second league, respectively. Our sample covers a period from 1998 to 2019, containing financial data and sports performance data from 20 clubs in Premier League and 24 clubs in Championship each season. The sample of clubs in the two leagues will vary each season due to the open league system where clubs are promoted and relegated. Therefore, a club can play in Premier League one year, Championship another year, and not even be included in the sample some years.

The choice of looking at football clubs from the top two leagues in England (Premier League and Championship) is because it is the best football country in the world based on the "club coefficient" explaining the results in UEFA European competitions (UEFA, 2022). Testing two of the best leagues in the world implies high standards in sports performance which pave the way for potential explanatory value based on Lago's (2004) 'virtuous cycle' basic assumption – namely that better sports performance increases a club's revenue and financial resources, which in turn is invested in better players, leading to higher wages. The two leagues will be analyzed both together and independently because they are showing distinct signs of differences in both size (see Table 1) and cost structure (see Table 2). Therefore, our study will

provide insights into possible economic differences between the two leagues and their correlation with sports performance. In addition, investigating the correlation over more than twenty years results in a more precise and reliable conclusion than looking at individual seasons.

We started with 968 observations, covering all 44 clubs each year for our 22 years of available data. Out of those were 102 observations missing data. 27 observations reported periods did not cover an entire year. For 117 observations, we did not have available data on reported revenue from the year before which was necessary for our variable on revenue change. This left our regression with 722 observations to analyze. The data for Premier League consists of 360 observations and 42 different clubs, and the data for Championship consists of 362 observations and 59 different teams. Summaries of the samples are presented in Appendix 1 and Appendix 2.

3.3 Collection of Data

All data is collected from the Center for Sports and Business at the Stockholm School of Economics. Their database holds observations of the financial statements of English football clubs between the years 1998 and 2019. Also, it includes sports-related variables such as league position, which is used in this study. The clubs use split financial years when reporting their financial statements to cover an entire season, and our data is based on this arrangement. The database was created by Oliver Lindqvist Pratt in 2020 and is exclusive.

3.4 Multivariate Regression Model

To study the collected data, we will conduct a statistical analysis. Specifically, we will perform an Ordinary Least Square (OLS) multivariate regression analysis, as it is the model that illustrates the relationship between multiple variables most appropriately (Newbold et al., 2013). Based on the hypotheses and variables used in the study, the following multivariate regression model has been designed.

$$Perf_{it} = \beta_0 + \beta_1 Wage_{it} + \beta_2 WageMargin_{it} + \beta_3 PRAMmargin_{it} + \beta_4 EBITmargin_{it} + \beta_5 RevChg_{it} + \beta_6 Size_{it} + YearFixedEffect_{it} + \epsilon_{it}$$

Where $Perf_{it}$ is the sports performance measure based on league position. $Wage_{it}$ is the logarithm of wage expenditure for every club. $WageMargin_{it}$ is the logarithm of the

wage/revenue ratio. $PRAMmargin_{it}$ is defined as the amortization of player registration rights divided by revenue and logarithmized. $EBITmargin_{it}$ is the profitability measure of EBIT divided by revenue. $RevChg_{it}$ is the percentage change in revenue. $Size_{it}$ is the logarithm of total assets. For a further definition of the variables, see Table 3 below.

3.5 Dependent Variable

Sports performance is estimated with a normalized league position formula widely used in the literature by, for example, Barajas et al. (2005) and Dobson & Goddard (2004), following the work of Szymanski & Kuypers (1999):

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

Where n is the total number of competing teams in the league and p is the final position of the given team in each season. The total number of competing teams (n) each year is 20 for Premier League and 24 for the Championship. The final league position (p) will be estimated as follows: Premier League positions range from 1 (the top club) to 20 (the bottom club) and Championship positions range from 1 (the top club) to 24 (the bottom club). When combining the two leagues in the All sample, the final league position (p) is estimated as 1 (the top club in Premier League) to 20 (the bottom club in Premier League), continued by 21 (the top club in Championship) to 44 (bottom club in the championship). Thus, our sample suggests the following formula for the full sample and each league:

$$All: \quad \mu(C_i) = -\log\left(\frac{p}{44+1-p}\right) = Perf$$

$$Premier League: \quad \mu(C_i) = -\log\left(\frac{p}{20+1-p}\right) = Perf$$

$$Championship: \quad \mu(C_i) = -\log\left(\frac{p}{24+1-p}\right) = Perf$$

We will be referring to this formula as the variable *Perf*, the dependent variable in our regression.

3.6 Independent Variables

Our model comprises multiple independent variables chosen to analyze the correlation between sports performance and financial performance.

We have evaluated all independent variables and used the natural logarithm for four of them, namely: *Wage*, *Wmargin*, *PRAMmargin*, and *Size* since it improves their respective linearity.

Table 3. List of independent variables

Variable	Description	Type	Expected correlation
<i>Wage</i>	$\ln(Wage)$	Cost	Positive
<i>Wmargin</i>	$\ln\left(\frac{Wage}{Net\ revenue}\right)$	Cost %	Negative
<i>PRAMmargin</i>	$\ln\left(\frac{Player\ registration\ amortisation}{Net\ revenue}\right)$	Cost %	Positive
<i>EBITmargin</i>	$\frac{EBIT}{Net\ revenue}$	Profitability	Positive
<i>Size</i>	$\ln(Total\ assets)$	Size	Positive
<i>RevChg</i>	$\frac{Net\ revenue_t}{Net\ revenue_{t-1}} - 1$	Income change	Positive
<i>Year</i>	<i>Yearly fixed effect</i>	N/A	N/A

The following are our independent variables:

Wage reflects the staff post in the financial statements. Szymanski & Smith (1997) and Barajas & Rodriguez (2010) have studied the relationship between English respectively Spanish football clubs. Their studies conclude that higher wages can explain a club's sports performance. Hence, we also expect a positive relationship between wage and sports performance.

Wmargin represents the ratio of Wage/Net revenue. Rey & Santelli (2017) argue that it is useful to look at the proportion of resources used to maintain sports performance following Barajas & Rodriguez (2010). They conclude a negative correlation between wage margin and sports

performance, implying that clubs with a high wage margin perform worse than teams with a lower wage margin. A negative correlation is a result we expect as well.

PRAMmargin is a margin that reflects the amortization of player contracts in terms of revenue. Previous studies have shown a negative correlation between wage margin and sports performance, but research is ambiguous regarding the correlation between profits and sports performance. In the case of a non-correlating result between profits and sports performance, we believe that this is a variable that could affect the result. Earlier studies suggest that bigger clubs have better players and generate higher revenue. However, since there is a surplus demand for great players, the biggest clubs may have to buy those players at a premium. Therefore, we expect a positive correlation between *PRAMmargin* and sports performance.

EBITmargin is the end of split financial year earnings before interest and taxes for every club. We use EBIT as the profitability measure instead of, e.g., EBITDA due to wanting to cover clubs' operations and include depreciation and amortization items, in particular player registration rights. Barajas et al. (2005) study the relationship between profits and sports performance in Spanish clubs and find that sports performance has a considerably low explaining power of net profit. Szymanski (1998) analyzes co-movements in pre-tax profits and league position in a given year in English football and concludes that an increase in league position was approximately equally likely to increase profit as decrease profit. Ferri et al. (2017) also find that clubs' profits and revenues correlate with sports performance and argue that it may be due to the benefits of scale. Hence, we expect a positive relationship between *EBITmargin* and sports performance, even though previous results are inconclusive.

With inspiration from previous studies, our control variables are the following:

RevChg reflects a club's change in net revenue year t in relation to the year before, $t-1$. According to Rey & Santelli (2017), there is a correlation between a club's ability to increase revenues and sports performance. The authors found empirical evidence that clubs that can constantly increase their revenue are more prone to invest in players, improving sports performance. Hence, a positive relationship is expected.

Size is the natural logarithm of total assets. There are differences in which prerequisites small and big clubs face, as for most typical firms in different industries. Having size as a control

variable will allow for better inference in the model. Ferri et al. (2017) confirm Szymanski & Smith's (1997) finding of a positive relationship between a football club's size and sports performance. Ferri et al. (2017) state that the positive relation has its basis in the big club's advantages of economies of scale and more efficiently organized activities compared to smaller clubs. Thus, a positive relationship between size and sports performance is expected.

Finally, since we have data over twenty years, we use yearly fixed effects to adjust for structural differences between the years such as inflation and industry size.

3.7 Delimitations

Our study is limited to the two top leagues in England – Premier League and Championship. The two leagues consist of 44 football clubs and the data we have used consists of information from their financial statements and sports performance measures. This study does not consider sports performance in terms of cups or international tournaments, such as the British FA Cup or UEFA Champions League. Instead, we use league position as a measure for sports performance. We further limit our focus to financial variables mainly extracted from clubs' income statements.

3.8 Quality of the Study

Validity is defined as to what extent a concept is "correct" in a quantitative study. Our study describes one explanation of sports performance, league position. This can be criticized since sports performance is a complex measure and can vary from team to team. Other factors that can be included in sports performance are, for instance, results in cups and tournaments or league position relative to expectations before the season, and or relative to teams in the same league segment. However, we find the league position most suitable as it is commonly used in previous studies as a proxy for sports performance. The reliability of the study is considered high since the data that we used is taken from the Sport and Business Center, which in turn is taken from the financial statements of all English football clubs that are required to report every year. This increases the chances that other researchers who would like to do a similar test would arrive at similar results. If our results would not have been in line with theory or previous studies, then the reliability of our findings would have instead weakened.

3.9 Method Discussion

Multicollinearity is a phenomenon where independent variables in a multivariate regression are correlated, resulting in incorrect coefficient estimates of the model and inconsistent with the Gauss-Markov theorem for ordinary least square (OLS) linear regressions. Since our study is based on economic key figures and sports performance, some variables are possibly correlated. Hence it becomes pivotal to test for multicollinearity. The presence of multicollinearity leads to discrepancies in estimates of the association between an independent variable and a dependent variable. We will consider these potential issues by analyzing the independent variables' Pearson correlation coefficients and conducting a variance inflation factor (VIF) test where VIF scores of 10 or higher indicate severe multicollinearity.

Heteroscedasticity is another factor that might affect the validity of our results as it is another critical component in the Gauss-Markov theorem. A regression model faces heteroscedasticity issues when the error term's variance is not uniform. Looking at the assumptions of Gauss-Markov, we want the opposite - homoscedasticity - because then we know that the error term is being constant in overall observations, hence minimizing the standard errors and residuals from the regression estimates. To avoid issues with heteroscedasticity, we perform our regressions with robust standard errors (RSE).

Outliers can significantly impact regression results due to biasing the regression towards them. Visually analyzing our variables in scatter plots, we identify some potential outliers. About seventy percent of accounting articles use winsorization to treat outliers, predominately at the 1% level (Lien & Balakrishnan, 2021). Winsorizing regressors implies setting extreme values to given percentile values in both tails instead of deleting those observations, which is done when trimming the data. We choose to winsorize the variables in our regressions in line with previous accounting research standards, at the 1% level, setting extreme values to the 1st and 99th percentile.

4 Results

In this section, we present the results of the study. We begin by introducing the descriptive statistics for the variables in our regression model. That is followed by a presentation of the Pearson correlations for all variables in the model. Lastly, we present the regression results.

4.1 Descriptive Statistics

In Table 4 below, descriptive statistics for the chosen variables are presented. The table describes the number of observations, mean, standard deviation, median, percentiles, and minimum- and maximum values.

Table 4. Descriptive statistics

	Obs.	Mean	St.dev.	Min	P5	Median	P95	Max
All								
<i>Perf</i>	839	0.07	1.60	-3.78	-2.64	0.04	3.07	3.78
<i>Wage</i>	839	10.06	1.03	7.42	8.33	10.02	11.80	12.60
<i>Wmargin</i>	839	-0.28	0.33	-1.23	-0.77	-0.30	0.30	0.85
<i>PRAMmargin</i>	836	-1.91	0.80	-6.76	-3.34	-1.77	-0.90	-0.29
<i>EBITmargin</i>	839	-0.20	0.44	-2.96	-1.04	-0.09	0.29	1.19
<i>Size</i>	839	10.79	1.33	6.80	8.41	10.83	13.19	14.25
<i>RevChg</i>	722	0.20	0.74	-0.59	-0.38	0.05	1.32	6.92
Premier League								
<i>Perf</i>	393	0.03	1.50	-3.00	-2.25	0.10	3.00	3.00
<i>Wage</i>	393	10.83	0.74	8.89	9.63	10.82	12.19	12.60
<i>Wmargin</i>	393	-0.45	0.23	-1.23	-0.80	-0.45	-0.10	0.25
<i>PRAMmargin</i>	393	-1.64	0.50	-3.72	-2.62	-1.61	-0.92	-0.29
<i>EBITmargin</i>	393	-0.04	0.26	-1.24	-0.51	0.01	0.29	0.60
<i>Size</i>	393	11.68	0.99	9.48	10.37	11.44	13.68	14.25
<i>RevChg</i>	360	0.42	0.95	-0.33	-0.10	0.11	2.55	6.92
Championship								
<i>Perf</i>	446	0.09	1.52	-3.18	-2.44	0.08	2.44	3.18
<i>Wage</i>	446	9.38	0.74	7.42	8.05	9.39	10.52	11.63
<i>Wmargin</i>	446	-0.13	0.33	-1.13	-0.63	-0.14	0.40	0.85
<i>PRAMmargin</i>	443	-2.15	0.93	-6.76	-3.79	-1.99	-0.87	-0.30
<i>EBITmargin</i>	446	-0.34	0.51	-2.96	-1.31	-0.25	0.28	1.19
<i>Size</i>	446	10.02	1.08	6.80	7.74	10.19	11.58	12.39
<i>RevChg</i>	362	-0.02	0.29	-0.59	-0.45	-0.03	0.47	1.57

In addition to sports performance, the independent variables cover football clubs' economic performance. The values are logarithmized for *Wage*, *Wmargin*, *PRAMmargin*, and *Size* in

Table 4 and are difficult to interpret. Therefore, we will comment on the unlogarithmized values of those variables instead, presented in Appendix 3. *Wage* is significantly higher on average in Premier League than in Championship, in line with the argument that a first division has better players who demand higher wages. *Size* is also significantly higher on average for Premier League, implying that clubs are bigger in terms of total assets. Glancing at the median instead results in the same conclusions for both *Wage* and *Size*. Looking at *Wmargin*, Championship clubs spend 93% of their revenues on wages on average during our sample period, significantly more than Premier League's 65%. This discrepancy is previously discussed in section 2.3. *PRAMmargin* is more uniform between the two leagues, where Premier League clubs, on average, spend 22% of their revenue on amortizing costs related to player registration rights, compared to the Championship's 16%. Comparing the percentiles of the logarithmized variables with the corresponding unlogarithmized values' percentiles, it is easily viewable that the logarithmized values have a less skewed distribution, which implies that it was a good choice to use the logarithmized values in our linear regression.

Further, the average Premier League team has an *EBITmargin* of -4%, while the average *EBITmargin* is -34% in the Championship. In other words, clubs in both leagues are unprofitable on average, supporting that English clubs' logic resembles a win-maximizing strategy more than a profit-maximizing strategy. However, profits are to be collected in both leagues, noticeable when looking at P95 and the maximum values, and whether those profits are correlated with sports performance is further analyzed below. *RevChg* presents a significant difference between the leagues. On average, clubs in Premier League have a greater change in revenue than Championship, implying that Premier League has experienced higher growth than Championship. It is also interesting to see that Championship has a negative mean value which could indicate stagnating, if not small negative revenue growth.

4.2 Pearson Correlations

A presentation of the correlation between variables is presented for All (Premier League and Championship) in Table 5, for Premier League in Table 6, and the Championship in Table 7.

Table 5. Pearson correlations - All

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) <i>Perf</i>	1.00						
(2) <i>Wage</i>	0.73***	1.00					
(3) <i>Wmargin</i>	-0.41***	-0.16***	1.00				
(4) <i>PRAMmargin</i>	0.34***	0.44***	0.24***	1.00			
(5) <i>EBITmargin</i>	0.24***	0.06*	-0.75***	-0.31***	1.00		
(6) <i>Size</i>	0.75***	0.87***	-0.30***	0.41***	0.13***	1.00	
(7) <i>RevChg</i>	0.15***	0.10***	-0.27***	-0.07*	0.20***	0.05	1.00

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Pearson correlations - Premier League

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) <i>Perf</i>	1.00						
(2) <i>Wage</i>	0.46***	1.00					
(3) <i>Wmargin</i>	-0.31***	0.03	1.00				
(4) <i>PRAMmargin</i>	-0.08	0.11**	0.50***	1.00			
(5) <i>EBITmargin</i>	0.14***	-0.03	-0.65***	-0.56***	1.00		
(6) <i>Size</i>	0.60***	0.83***	-0.27***	0.06	0.09*	1.00	
(7) <i>RevChg</i>	-0.25***	-0.16***	-0.21***	-0.27***	0.20***	-0.22***	1.00

*** p<0.01, ** p<0.05, * p<0.1

Table 7. Pearson correlations - Championship

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) <i>Perf</i>	1.00						
(2) <i>Wage</i>	0.38***	1.00					
(3) <i>Wmargin</i>	0.17***	0.47***	1.00				
(4) <i>PRAMmargin</i>	0.29***	0.44***	0.49***	1.00			
(5) <i>EBITmargin</i>	-0.17***	-0.39***	-0.73***	-0.45***	1.00		
(6) <i>Size</i>	0.46***	0.72***	0.17***	0.39***	-0.20***	1.00	
(7) <i>RevChg</i>	0.05	-0.25***	-0.09*	-0.18***	0.06	-0.21***	1.00

*** p<0.01, ** p<0.05, * p<0.1

The results above show a high correlation between sports performance and most independent variables for the combination of leagues in All and when looking at them individually. Wage costs are positively correlated with performance in both leagues and in All, as expected, and in line with previous research (Szymanski & Kuypers, 1999; Hall et al., 2002; Barajas et al., 2005; Rey & Santelli, 2017). Wage margin is negatively correlated with performance in All and Premier League, and EBIT margin shows a positive correlation, both variables on the 1% significance level. In Championship, the significant correlation persists, but the coefficient signs are opposite: positive for wage margin and negative for EBIT margin. This could imply distinct differences in the league's economics and its correlation with sports performance. Worth noticing is that wage margin and EBIT margin are significantly negatively correlated in both leagues, which arguably makes sense due to wages being the largest cost item for football clubs. A high (low) wage margin could thus at least partly explain a low (high) profit margin. *PRAMmargin* shows a significant positive correlation with performance in All and Championship but not in Premier League. *RevChg* is negatively correlated with *Perf* in Premier League, which is the opposite of our expectations.

Further, a general rule is that if Pearson correlation coefficients have an absolute value of > 0.8 , multicollinearity is likely to exist (Shrestha, 2020). For our independent variables, *Wage* and *Size* have a correlation coefficient of > 0.8 in All and Premier League. This has been noted and is further analyzed with a variance inflation factor (VIF) test, see Appendix 4. Due to also receiving alarming VIF estimates for All and Premier League, the control variable *Size* is excluded in our regressions for All and Premier League, which results in significantly lower VIF estimates (all variables < 5). We choose not to exclude *Size* in our regression for Championship due to it not surpassing the multicollinearity threshold values for neither the Pearson correlation coefficient nor the VIF estimates.

4.3 Regression Results

We have performed an OLS multivariate regression to elaborate further on analyzing the correlation between financial- and sports performance. In Table 8 below are the regression results for All, Premier League, and the Championship, performed with robust standard errors, winsorized variables, and yearly fixed effects. We find multiple significant correlation coefficients in all three samples, which we will discuss below.

Table 8. Regression results

Dependent variable: *Perf*

	All			Premier League			Championship		
	Coeff.	RSE	T-val	Coeff.	RSE	T-val	Coeff.	RSE	T-val
<i>Wage</i>	1.55***	0.05	33.34	2.45***	0.12	21.29	1.22***	0.20	6.19
<i>Wmargin</i>	-0.37*	0.16	-2.27	-0.86**	0.33	-2.59	0.68*	0.33	2.07
<i>PRAMmargin</i>	-0.02	0.06	-0.27	-0.11	0.14	-0.77	0.15	0.12	1.31
<i>EBITmargin</i>	0.23	0.12	1.85	1.07**	0.34	3.16	0.33	0.22	1.49
<i>RevChg</i>	0.16***	0.04	4.40	-0.03	0.06	-0.43	1.63***	0.26	6.35
<i>Size</i>	Omitted			Omitted			0.47***	0.08	5.58
Constant	-15.77***	0.55	-28.56	-27.13***	1.23	-22.04	-15.67***	1.57	-9.99
FE Year	YES			YES			YES		
Observations	722			360			362		
Adjusted R^2	0.783			0.635			0.369		

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The regression results for All show a significant positive correlation with *Wage* and *RevChg* at the 1% significance level and a negative correlation with *Wmargin* at the 10% significance level. The remaining variables *PRAMmargin* and *EBITmargin* are not correlated with the independent variable in the regression model at any of the chosen significance levels for the combination of the two leagues.

Looking only at Premier League, also outlined in Table 8 above, the results show numerous significant correlations. *Wage* is correlated with sports performance on a 1% significance level, implying that higher wage expense teams perform better. Contrary, *Wmargin* is negatively correlated with performance and means that teams with better sports performance can spend a smaller percentage of their revenues on wages, which could partly explain *EBITmargin*'s significant positive correlation with the dependent variable.

The regression results for the Championship also show a strong positive correlation with *Wage*, as expected. Neither *Wmargin* nor *EBITmargin* shows any significant correlations in the Championship. However, for Championship we also find a positive correlation between

RevChg and *Size*. Further, we find no significant correlation for *PRAMmargin* in the Championship either, which could be due to it fluctuating greatly between years.

The adjusted R^2 value covers the explanation power of data variation in the regression, in this case, how much the financial variables explain sports performance. We can conclude that the chosen independent variables better explain sports performance in Premier League than in Championship, with an adjusted R^2 of almost double. But the model best explains sports performance for the combination of leagues in All, with an adjusted R^2 of 0.783. There are no signs of over-specification issues in the models. Instead, we can assume that more variables explain sports performance, which are not included in the models. This is due to the constants showing significant correlation, implying occurring omitted-variable-bias.

5 Analysis and Discussion

In this section, we will analyze and discuss our findings. We will be analyzing the hypotheses, summarized in Table 9 below, and discussing the variables individually.

Table 9. Research results in terms of hypotheses

Nr	Variable	Expect.	All		Premier League		Championship	
			Coeff.	Findings	Coeff.	Findings	Coeff.	Findings
H1	<i>Wage</i>	Pos.	1.55***	Support (p < 1%)	2.45***	Support (p < 1%)	1.22***	Support (p < 1%)
H2	<i>Wmargin</i>	Neg.	-0.37*	Support (p < 10%)	-0.86**	Support (p < 5%)	0.68*	No support
H3	<i>PRAMmargin</i>	Pos.	-0.02	No support	-0.11	No support	0.15	No support
H4	<i>EBITmargin</i>	Pos.	0.23	No support	1.07**	Support (p < 5%)	0.33	No support

*** p<0.01, ** p<0.05, * p<0.1

5.1 Wage

The incentive to invest in a club's most important resources - the players, is high. As mentioned earlier, it is now nearly two decades since many of the studies investigating the relationship between wage and sports performance were published. Since the beginning of the 2000s, three major things have happened that had the potential to interfere with the wage-performance relationship. Firstly, we have seen massive growth in the entire football industry. Secondly, clubs like Brentford FC and Burnley FC, among others, have increasingly started to use data-driven strategies regarding player investment decisions. Thirdly, the FFP was implemented in 2009, which harmed the relationship (Dimitropulos, Scafarto 2021). However, despite the following events and the FFP's concluded negative impact, our results still show a significant result for p<1% for All, Premier League, and Championship. Thus, our hypothesis holds that wage is positively correlated with sports performance. Hence, these events have not significantly affected the relationship over our entire twenty-year period. Therefore, we can conclude the same result as numerous previous studies. In addition, that our results go in line

with previous studies further supports Lago's 'virtuous cycle' (2004), with the argument that higher salaries imply better players and thus better sports results.

Furthermore, the strong relationship between wages and performance provides a seemingly strong incentive to invest in players and could be explained by the open football leagues. As Ross & Szymanski (2000) reasons, the open leagues in English football imply tougher competition and the pressure to invest in sufficiently good players that will generate results good enough not to be relegated; hence, football teams in England should be win maximizers. Contrary to the closed and restricted salary regulations in North America, where sports clubs are more seen as profit maximizers and thus do not have the same incentive to invest in good players (Solberg & Haugen, 2010).

5.2 Wage Margin

Investigating clubs' wage expenditures against revenue is useful when analyzing the proportion of income used to maintain sports performance. We observed structurally higher wage margins for Championship than Premier League in section 4.1 and found different results for the two leagues in our regression analysis. On the one hand, for Championship, we find no support for our hypothesis that a clubs wage margin is negatively correlated with sports performance. Instead, the results indicate a positive significant correlation, however only at the 10% significance level. In Premier League, on the other hand, the regression results show that *Wmargin* is negatively correlated with sports performance on a 5% significance level, implying that we can reject the null hypothesis – that there is no correlation. The negative correlation for Premier League is in line with the previous study on Italy's Serie A, conducted by Rey & Santelli (2017), and contributes to the negative significant correlation for the combination of leagues in All.

The different results for our two leagues give further rise to the argument of differing economics between leagues and their correlation with sports performance. The discrepancy in this regard could lie in the economies of scale potential regarding the star players who have a higher presence in Premier League in general, and in top-performing teams in Premier League in particular. It would be reasonable to assume that these top-performing players in multiple regards have a higher revenue potential, in terms of their salary, than other players (e.g., merchandise sales, ticket sales, team's potential to qualify for international tournaments, and

winning the league) that contributes to increased revenues for the club. The rumors that Real Madrid recouped their transfer fee for David Beckham in a matter of days through player's replica jersey sales following his transfer from Manchester United in 2003 is disappointingly only a compelling myth. But the phenomena could give us some confidence in our discussion of exponential revenue potential for star players, resulting in wage margin negatively correlating with sports performance in Premier League. Besides, Real Madrid's commercial revenue from merchandise sales did increase 67% in Beckham's first season alone (Hill et al., 2009). As noted, Championship clubs do not enjoy the presence of star players to the same extent and our regression instead shows a slight positive significant correlation. This could be explained by better clubs in Championship instead aggressively spending a large share of their revenues on wages in aspiration to reach superior sports performance and get promoted to Premier League. The logic in this regard thus seems to differ between the two leagues.

5.3 Amortization of Player Registration Rights

Our line of thought, including the amortization of player registration rights in terms of revenue, partly stemmed from what is discussed regarding star players' exponential revenue potential. If that is the case, clubs should be aware of that and presumably demand a transfer fee premium on those players in an eventual transfer sale. The transfer fee premium could be visible in the amortization of player registration rights, implying that clubs would have to spend a larger portion of their revenues to attain these players, and lead to a higher *PRAMmargin*. However, our regression results do not show any significant correlation for any of our samples, which a few reasons could explain. Firstly, it could be that these star players are not purchased at a premium but that their transfer fee fairly reflects their revenue potential. Secondly, the amortization margin may too poorly reflect star players' presence in a team due to the many different ways of acquiring talent (see section 2.2.2.1) and its respective impact on amortization (e.g., free transfers, loans, player contract extensions, uplifting young talents, etc.). Further, clubs' transfer activity fluctuates significantly over the years, as acquiring players is more discretionary than other expenses such as wages. Those points highlight our chosen variable's limitations as a proxy and may be why we fail to reject the null hypothesis of no correlation for all samples.

5.4 Profitability

We observe interesting differences between the samples in profitability's correlation with sports performance in terms of EBIT margin. We find a positive significant correlation at the 5% significance level for Premier League, while no significant results for All and Championship. The Pearson correlation coefficients in section 4.2 show that *EBITmargin* and *Wmargin* are negatively correlated in all three samples. Clubs spending a larger portion of their revenues on wages are thus implied to have a lower profit margin, a reasonable relationship since wages are such a significant cost item for clubs. That the results support our hypothesis on *Wmargin* for Premier League probably contributes to us also rejecting the null hypothesis of no correlation regarding profitability for Premier League. To conclude, better-performing teams in Premier League can attain higher profitability, while we can draw no such conclusion from our regression results for Championship.

We have found two possible explanations for this result. Firstly, we have witnessed increased private investments from institutional investors and private equity during the last decades. These increased investments may enhance profit opportunities for football clubs, mainly in Premier League. The second explanation overlaps with section 5.2 above regarding the 'star player phenomenon', where top performing players have a higher revenue potential than other players in terms of their salary. Being able to spend a smaller share of revenues on wages likely contributes to profitability's positive correlation with sports performance in Premier League.

6 Conclusion

This study examines the correlation between financial performance and sports performance, the two most relevant institutional logics for football clubs. We study the top two leagues in England – the world's biggest football country: Premier League and Championship. We have looked at the two leagues combined to draw general conclusions, and separately to gain interesting perspectives on the similarities and differences between playing in a first and second division. The football industry has experienced aggressive growth in the past two decades. Our study aims to provide an updated view on the financial performance of English clubs and its correlation with sports performance. Based on the results presented and the analysis made, we can draw the following conclusions:

- There is an evident correlation between sports performance and a club's wage expense for Premier League, Championship, and the combination of leagues; something that is in line with the conclusions drawn from numerous previous studies (Szymanski, 1998; Rey & Santelli, 2017; Barajas et al., 2005), giving support for Lago's (2004) 'virtuous cycle'.
- A club's wage margin is negatively correlated with its sports performance in All and Premier League, in line with Rey & Santelli's (2017) similar results. This conclusion should support the argument of economies of scale where better clubs can use their resources more efficiently.
- The before untested economic variable, player registration amortization margin, turned out to be insignificant. Hence, we cannot conclude that this variable contributes to sporting success.
- Finally, we can conclude that profitability is positively correlated with sports performance in Premier League, as Ferri et al. (2017) and Dimitropoulos (2009) have previously concluded.

6.1 Limitations and Suggestions for Future Research

This study provides an insight into the relationship between economic and sports performance for English football clubs. However, the study is subject to some limitations that require careful interpretation of the results and has given rise to ideas about suitable areas for future research. The one-sided definition of sports performance, only based on league position, may not reflect sports performance sufficiently. Further, looking closer into different segments of a league, for

example investigating how well a bottom club performs relative to another bottom club or incorporating performance in domestic cups and international tournaments could be valuable additions. Further research could investigate top performing clubs, e.g., the “big six” in Premier League (Arsenal, Liverpool, Manchester City, Manchester United, Chelsea, and Tottenham). Those clubs that constantly outperform everyone else. Can similar phenomena be observed in other leagues or even compared to other industries? Is it an oligopoly? And is it even possible for other teams to catch up?

We further suggest future scholars to study the relationship between sports and financial performance before and after a promotion or relegation. This kind of event study would be interesting to investigate due to the large financial differences between the two leagues. Finally, it would be interesting to dig deeper into the causality aspect, being aware of the statistical complexity with doing so. Is better sports performance a result of financial performance, or is economic performance a product of good results on the pitch? This would broaden and develop the research view even further on the relationship between sports and accounting.

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8 Appendix

Appendix 1. Clubs included in the Championship sample

Club	Year																					Total
	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	
AFC Bournemouth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Aston Villa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3
Barnsley FC	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	-	-	-	1	-	8
Birmingham City	1	1	1	1	-	-	-	-	1	-	1	-	-	1	1	1	1	1	1	1	-	13
Blackburn Rovers	-	1	1	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	-	7
Blackpool FC	-	-	-	-	-	-	-	-	-	-	1	1	-	1	1	1	1	-	-	-	-	6
Bolton Wanderers	1	1	1	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	7
Brentford	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	3
Brighton Albion	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	1	1	1	1	-	-	6
Bristol City	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	-	-	1	1	-	7
Burnley FC	-	-	-	1	1	1	1	-	-	1	1	-	1	1	1	1	-	1	-	-	-	11
Burton Albion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Bury	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Cardiff City	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	-	1	1	1	1	-	13
Charlton Athletic	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-	1	1	1	-	-	-	6
Colchester United	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1
Coventry City	-	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	11
Crewe Alexandra	1	1	1	1	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Crystal Palace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Derby County	-	-	-	-	-	-	1	1	1	-	1	1	1	1	1	1	1	1	1	1	-	13
Doncaster Rovers	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	3
Fulham FC	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	5
Gillingham	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Grimsby Town	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4
Huddersfield Town	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	2
Hull City	-	-	-	-	-	-	-	-	1	1	-	-	1	1	1	-	-	1	-	1	-	7
Ipswich Town	1	1	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	18
Leeds United	-	-	-	-	-	-	1	1	-	-	-	-	-	1	1	1	1	1	1	1	-	9
Leicester City	-	-	-	-	-	-	1	1	1	1	-	-	1	1	1	1	-	-	-	-	-	8
Manchester City	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Middlesbrough FC	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	1	1	-	1	-	6
Millwall	-	-	-	-	1	1	1	1	-	-	-	-	-	1	1	1	1	-	-	-	-	8
Newcastle United	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	2
Norwich City	1	1	1	-	-	1	-	1	1	1	1	-	-	-	-	-	1	-	1	1	-	11
Nottingham Forest	-	1	1	1	1	1	1	-	-	-	-	1	1	1	1	1	1	1	1	-	-	14
Oxford United	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Peterborough United	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Plymouth Argyle	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	4
Preston North End	-	-	-	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	1	1	-	12
Queens Park Rangers	1	1	1	-	-	-	-	1	1	1	1	1	1	-	-	1	-	1	1	1	-	13
Reading FC	-	-	-	-	-	1	1	1	-	-	1	1	1	1	-	1	1	1	1	1	-	12
Rotherham United	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2
Scunthorpe United	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Sheffield United	1	1	1	1	1	1	1	1	-	1	1	1	1	-	-	-	-	-	-	-	-	12
Sheffield Wednesday	-	-	1	1	1	-	-	-	1	1	1	1	-	-	-	1	1	1	1	-	-	11
Southampton FC	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	2
Stockport County	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Stoke City	-	-	-	-	-	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	5
Sunderland AFC	1	-	-	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	1	-	5
Swansea City	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	2
Swindon Town	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Tranmere Rovers	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Walsall	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Watford FC	-	-	1	1	1	1	1	1	-	1	1	1	1	1	1	1	1	-	-	-	-	14
West Bromwich	1	1	1	1	-	1	-	-	1	1	-	1	-	-	-	-	-	-	-	-	-	8
West Ham United	-	-	-	-	-	1	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	3
Wigan Athletic	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	-	-	-	-	3
Wolverhampton	1	1	1	1	1	-	1	1	1	1	1	-	-	-	1	-	-	1	1	1	-	14
Total	15	16	16	14	13	16	20	18	16	20	20	19	18	18	21	21	21	20	20	19	1	362

Appendix 2. Clubs included in the Premier League sample

Club	Year																				Total	
	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	Total
AFC Bournemouth	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	2
Arsenal FC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21
Aston Villa	1	1	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	1	-	-	-	16
Birmingham City	-	-	-	-	1	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	5
Blackburn Rovers	1	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	12
Blackpool FC	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Bolton Wanderers	-	-	-	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	11
Brighton Albion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
Burnley FC	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	1	1	-	4
Cardiff City	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1
Charlton Athletic	1	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	8
Chelsea FC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	20
Coventry City	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
Crystal Palace	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	-	5
Derby County	1	1	1	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	5
Everton FC	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	20
Fulham FC	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	13
Huddersfield Town	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1
Hull City	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	1	-	-	3
Leeds United	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6
Leicester City	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	-	4
Liverpool FC	-	1	1	1	1	1	1	1	1	1	1	1	1	-	-	1	1	1	1	1	-	17
Manchester City	-	-	1	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	15
Manchester United	1	1	1	1	1	1	-	-	1	1	1	1	1	1	1	1	1	1	1	1	-	18
Middlesbrough FC	1	1	1	1	1	1	-	-	-	1	1	-	-	-	-	-	-	-	1	-	-	9
Newcastle United	1	1	1	1	1	1	1	-	-	1	1	-	1	1	1	1	1	1	-	1	-	16
Norwich City	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-	3
Nottingham Forest	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Portsmouth FC	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	4
Queens Park Rangers	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	-	-	-	3
Reading FC	-	-	-	-	-	-	-	-	1	1	-	-	-	-	1	-	-	-	-	-	-	3
Sheffield United	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Sheffield Wednesday	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Southampton FC	1	1	1	1	1	1	1	-	-	-	-	-	-	-	1	1	1	1	1	1	-	13
Stoke City	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	-	10
Sunderland AFC	-	-	-	1	1	-	-	1	-	1	1	1	1	1	1	1	1	1	1	-	-	13
Swansea City	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	-	-	1	1	-	5
Tottenham Hotspur	1	1	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	18
Watford FC	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	1	-	5
West Bromwich	-	-	-	-	1	-	1	1	-	-	1	-	1	1	1	1	1	1	1	1	-	12
West Ham United	1	1	1	1	1	-	-	1	1	1	1	1	1	-	1	1	1	1	1	1	-	17
Wigan Athletic	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	-	-	-	-	-	-	8
Wolverhampton	-	-	-	-	-	1	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-	4
Total	17	16	15	17	20	18	17	17	17	19	19	18	19	19	18	18	18	19	18	18	3	360

Appendix 3. UnLogarithmized independent variables

	Obs.	Mean	St.dev.	Min	P5	Median	P95	Max
All								
Wage	839	39,333	45,863	1,666	4,138	22,465	133,306	295,935
Wmargin	839	0.80	0.29	0.29	0.46	0.74	1.35	2.34
PRAMmargin	839	0.19	0.12	0.00	0.03	0.17	0.40	0.75
Size	839	115,278	204,713	901	4,486	50,648	535,091	1,546,386
Premier League								
Wage	393	66,488	54,083	7,251	15,209	50,002	197,584	295,935
Wmargin	393	0.65	0.15	0.29	0.45	0.64	0.91	1.29
PRAMmargin	393	0.22	0.10	0.02	0.07	0.20	0.40	0.75
Size	393	205,588	269,906	13,101	32,033	93,126	877,513	1,546,386
Championship								
Wage	446	15,405	12,621	1,666	3,123	11,998	37,087	112,187
Wmargin	446	0.93	0.32	0.32	0.53	0.87	1.49	2.34
PRAMmargin	446	0.16	0.13	0.00	0.02	0.14	0.42	0.74
Size	446	35,700	34,575	901	2,303	26,532	107,463	239,424

Appendix 4. VIF estimates

	All		Premier League		Championship
	Incl. Size	Excl. Size	Incl. Size	Excl. Size	Incl. Size
Wage	6.41	2.48	11.68	3.14	5.40
Wmargin	3.55	3.24	3.41	2.47	2.82
PRAMmargin	1.89	1.89	2.05	1.99	2.06
EBITmargin	2.71	2.66	2.68	2.68	2.57
Size	5.24	Omitted	7.74	Omitted	2.60
RevChg	1.16	1.12	1.42	1.40	1.37
Observations	722	722	360	360	362