Year : 2024

Playing Talent in the Context of Revenue Generation and Expenses in Professional Team Sports: Empirical evidence from European football

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Playing Talent in the Context of Revenue Generation and Expenses in Professional Team Sports: Empirical evidence from European football

THÈSE DE DOCTORAT

présentée à la

Faculté des sciences sociales et politiques
de l'Université de Lausanne

pour l'obtention du grade de

Docteur ès Sciences en sciences du mouvement et du sport

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"Playing Talent in the Context of Revenue Generation and Expenses in Professional Team Sports : Empirical Evidence from European Football."

Nicky LE FEUVRE
Doyenne

Lausanne, le 10 janvier 2024

ABSTRACT

This dissertation comprises four peer-reviewed articles that investigate some of the consequences of the war for talent in European professional sports and its impact on club revenues, expenses, and league competition. Article A analyzes the relationship between talent concentration and competitive imbalance in European professional soccer leagues. Findings reveal that talent concentration significantly impact points concentration in the overall sample, but controlling for year, country, and division, this impact becomes weakly significant or insignificant. Article B examines the significance of club revenues in determining player salaries and transfer costs and aims at predicting the impact of the COVID-19 pandemic on the English Premier League. The results show an influence of various revenue streams on player salaries and market values, while predicting the expected decreases due to the pandemic. Article C explores, among others, the relationship between talent acquisition costs and ticket pricing policies, showing that player salaries impact ticket prices, for both, cheap and expensive tickets. Article D investigates the impact of non-discriminatory talent acquisition policies on revenue streams that are unrelated to on-field performance, showing that some leagues display a negative association between the share of black players in a squad and commercial revenues. These articles collectively enhance understanding of talent selection and its consequences in European professional league football.

RÉSUMÉ

Cette thèse comprend quatre articles évalués par des pairs qui étudient certaines conséquences de la guerre des talents dans le sport professionnel européen et son impact sur les revenus des clubs, les dépenses et la compétition entre les ligues. L'article analysé la relation entre la concentration des talents et l'équilibre compétitif dans les ligues de football professionnel européennes. Les résultats révèlent que la concentration des talents a un impact significatif sur la concentration des points dans l'échantillon global, mais en contrôlant l'année, le pays et la division, cet impact devient faiblement significatif ou insignifiant. L'article B examine l'importance des revenus des clubs dans la détermination des salaires des joueurs et des coûts de transfert, et vise à prédire l'impact de la pandémie de COVID-19 sur la Premier League anglaise. Les résultats montrent une influence de diverses sources de revenus sur les salaires des joueurs et les valeurs marchandes, tout en prévoyant les baisses attendues en raison de la pandémie. L'article C explore, entre autres, la relation entre les coûts d'acquisition de talents et les politiques de tarification des billets, montrant que les salaires des joueurs ont un impact sur les prix des billets, à la fois pour les billets bon marché et chers. L'article D examine l'impact des politiques d'acquisition de talents non discriminatoires sur les flux de revenus qui ne sont pas liés aux performances sur le terrain, montrant que certaines ligues affichent une association négative entre la part de joueurs noirs dans une équipe et les revenus commerciaux. Ces articles améliorent collectivement la compréhension de la sélection des talents et de ses conséquences dans le football professionnel des ligues européennes.

ACKNOWLEDGEMENT

"Life is a journey, not a destination."

(Ralph Waldo Emerson)

First, I would like to thank my advisor, Prof. Dr. Markus Lang, who invited me to work for the Institute of Sports Sciences of the University of Lausanne in 2019. His great strengths are diplomacy, kindness, helpfulness, and a strategic- mathematical mindset. He allowed freedom to create, while at the same time providing guidance when needed. I am really thankful that our paths have crossed, and today I can call him a friend. Thank you.

Furthermore, I would like to express my gratitude to Prof. Dr. Emmanuel Bayle, another exceptionally kind, thoughtful, and cooperative individual, as well as the former Director of ISSUL.

Moreover, it is a special honor for me to have Prof. Dr. Wladimir Andreff and Prof. Dr. Christian Deutscher as external reviewers of my thesis. Their know-how and expertise are second to none in the area of sports economics, and I am very grateful for their roles.

The team at the Sports Economics and Sports Management Department has been exceptional. Almost like a family where people support and care for each other. I want to thank those that I had been able to meet and spend time with during our journey together, Zahid, Bertrand, Olivier, Jeremy, and Vincent, as well as my office mates, Tess, Flora, Timothy, and Charles.

But not only does the Sports Economics and Sports Management Department have great people, but I also would like to thank some of the many wonderful people within the Institute of Sports Sciences, people like Prof. Dr. Patrick Clastres, Prof. Dr. Fabien Ohl, Dr. Jérome Barral, Dr. Fabienne Crettaz von Roten, as well as Prof. Dr. Mickael Terrien of IDHEAP, to name a few.

I further have to thank Prof Dr. Hans Muhlbacher (IUM Monaco), Prof. Dr. David Cockayne (University of Liverpool), as well as Prof. Dr. Babatunde Buraimo (University of Liverpool) of my old institutions for their mentorship and continued support. As well as Prof. Dr. Christoph Breuer of the German Sport University of Cologne for have given me the chance to earn my first mileage in lecturing. I also owe many thanks to the co-author of four papers we have written together, Prof. Dr. Bernd Frick, I have learned a lot from your practical approach, your experience, and your easiness.

Finally, yet most importantly, I want to thank the person that had been the most important pillar in my life, who supported me through all stages of my life as long as she could, and who literally made everything possible for me - my mother, Dr. Barbara Quansah. Despite having lost her on new year's Eve in 1999, she will never leave my heart or thoughts. Mama, I wished time had allowed you to meet your grandchildren, Liam and Liv, two really wonderful kids. I will never forget your unconditional love, kindness, and your sacrifices.

Jo, thank you for raising our two kids, for your support, warmth, and simply for being a wonderful person and mother.

Merci.

Tommy

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Introduction to the research context

In contrast to North American major league sports, which are structured around profit maximization and a clubs' focus on generating revenue and profitability, sports leagues in Europe are often considered win maximizers under budget constraints - sporting success is regarded as the ultimate goal. This is particularly true in association football, where the importance of winning championships and qualifying for international competitions is central to the sport's culture and history (Fort, 2015).

Prior findings in sports economic research suggest that sporting success is determined by the size of the financial resources deployed: several authors have shown a positive correlation between wage costs and sports performance (Carmichael et al., 2011; Frick, 2013; Garcia-del-Barrio & Szymanski, 2009). In other words, teams that invest more in player-related expenditures, such as transfer fees and salaries, are more likely to achieve success on the field. This relationship is particularly evident in professional association football, where the European top teams in Europe tend to have the highest wage bills and are consistently successful in domestic and international competitions.

In the quest of achieving sporting success, the war for talent in association football has intensified over the years, as the competition to attract the best players has become increasingly fierce (McNamara et al., 2013). Clubs attempt to outdo each other in terms of salaries, transfer fees, and other perks in order to secure the best talents. The availability of increased financial resources, driven by factors such as the commercialization of football and the emergence of new types of club owners and investors, led to a significant increase in player salaries and transfer fees. This "war for talent" affects a range of factors, both at a league- and on a club

individual level. Talent selection has a significant impact on both the sporting performance of clubs and their economic performance - it influences both, expenditures and revenue. However, several of these factors and their interrelationships have remained underexplored in the sports economic literature as of today.

Through a thorough analysis of various aspects related to talent selection, the current dissertation sheds light on several of these previously unexamined or under-examined factors and interrelationships. In doing so, it contributes to the broader understanding of the complex nature of talent selection and its impact on sporting and economic performance. The dissertation itself thereby consists of four peer-reviewed papers that have been (or are about to be) published in the years 2021 and 2023. The papers aim at exploring some of the many overlooked consequences of the war for talent in sports on factors such as club revenues, club expenses, as well as national football leagues as such. It is clear that only a diminutive fraction of the many interrelationships between playing talent, club revenues and expenditures, and the leagues can be investigated in the context of this dissertation.

The study hereby seeks to resolve the following four questions:

1. How does the increased funding of major football clubs, such as prize money earned through participating in European League competitions and injections of funds from investors, affect the distribution of talent and the competitive (im)balance of local leagues over an extended period of time?
2. How do revenue fluctuations within the football industry, including those caused by external shocks like the Covid-19 pandemic, impact prices for acquiring playing talent in a league?

3. To what extent, if any, do the costs associated with acquiring playing talent impact the pricing policies of tickets for stadium visitors?
4. To what extent might non-discriminatory talent acquisition policies within sports clubs affect revenue streams that are not directly linked to the club's on-field performance?

A further objective is to draw conclusions and point out the connective features of the four articles. Based on the findings highlighted in the four articles, this study seeks to uncover some of the inconspicuous interdependencies between the war for talent, club revenues, costs, and league competition in European sports, using the example of European professional league football.

I. CHAPTER ONE: OVERVIEW OF THE DISSERTATION

1. Statement of the Research Problem

Playing talent

In recent times, there has been a notable increase in scholarly discourse regarding playing talent, as evidenced by an expanding body of research articles (e.g. Horrocks et al., 2016; Saward et al., 2016; Skorski et al., 2016). These contributions have been complemented by a range of academic books (e.g. Baker et al., 2017; Farrow et al., 2013), research literature reviews (e.g. Cobley et al., 2009; Coutinho et al., 2016; Faber et al., 2016; Rees et al., 2016), specific models of talent development (e.g. Côté & Fraser-Thomas, 2007; Gagné, 2004), as well as popular books (e.g. Epstein, 2014).

Establishing a universally agreed-upon definition of talent poses a challenge, as evidenced by the lack of consensus in the existing literature (Schorer et al., 2017). Traditionally, talent has been linked to two main aspects: the inherent predisposition or potential for success in athletes (e.g., innate abilities) and the manifestation of athletic excellence attained through the developmental process, particularly during youth (Helsen et al., 2005; Williams & Reilly, 2000). According to Carl (1988, p. 11) the term "talent" refers to individuals who are believed to have a special talent or high aptitude for athletic performance due to their behavior or inherited/acquired behavioral conditions. Athletes with superior aptitudes are expected to outperform their counterparts with the aid of focused training. While particular training resources may enhance an athlete's performance at a given point in time, they may not necessarily improve another athlete's athletic potential. Therefore, as Joch and Ückert (2012, p. 62 f) highlights, there are diverse characteristics that contribute to the makeup of talent, illustrating the complex nature of the concept and the multiple criteria that can influence talent development (Table I-1).

Table 1-1 Characteristics that make up a talent (Joch, 2012, p. 62 f.).

Characteristics	**Examples**
Anthropometric requirements	height, body weight, ratio of muscle and fat tissue, body centre of gravity, harmony of proportions
Physical characteristics	aerobic and anaerobic endurance, reaction and activity speed, speed endurance, static and dynamic strength, strength endurance, joint flexibility, and fine coordination of movements
Techno-motor conditions	balance ability, spatial, distance and tempo sense, ball, blade sense, musicality, expressive ability, rhythmic ability, gliding ability
Learning ability	comprehension, observation and analysis skills, learning speed
Performance ability	diligence in training, willingness to exert physical effort, perseverance, tolerance of frustration
Cognitive control	concentration, motor intelligence, creativity, tactile ability
Affective factors	psychological stability, stress management, readiness to compete
Social conditions	role assumption, team classification

In the study of athletic talent, researchers make a distinction between high ability-based research and expertise-based research. Some scholars define talent in terms of genetic predisposition, while others seek to explain later high performances in an athlete's development through an active and purposefully controlled training process. The differentiation between these two fields of study is as follows: Giftedness research assumes that the most gifted children will also be the

most successful adults. However, this approach implies that talent development is unnecessary since it solely relies on innate talent, disregarding the influence of training on future performance. In such a case, talent development systems implemented by associations and clubs could be disregarded, and genetics alone could be relied upon. Nevertheless, empirical observations demonstrate that talent alone does not guarantee a successful professional career, highlighting the complexities involved in talent development. In expertise research, it is assumed that the training and action process are critical for achieving peak performance, with genetics accounting for only a small portion of an individual's success. However, this assumption is subject to debate as physical attributes such as body size in basketball or muscle fiber composition in sprinting are important factors for success, primarily determined by genetic factors and modifiable to a limited extent. Nonetheless, it has been demonstrated that attaining peak athletic performance in sports requires approximately ten years of focused training (Ward et al., 2004). This principle also applies to football, where ten years of practice are needed to achieve an international performance level (Helsen et al., 1998).

Nonetheless, within various sports domains, athletes are recognized as talented either by outperforming their peers or by being recognized as possessing the potential to attain the elite level (Schorer & Elferink-Gemser, 2013).

Context and Research Questions

Even though a growing number of football clubs operate in the form of private or public limited companies in lieu of member associations (Prigge & Tegtmeier, 2020), football clubs are not run in the same manner as most other businesses in the corporate world. What is commonly referred to as the peculiarities of the sports industry, describes a set of characteristics that distinguish the sports industry from conventional industries, such as the fact that the industry's

output is constant, that competitors are required to cooperate to produce an output, that leagues are natural monopolies, or that output quality increases with the quality of the competitor, among a few other particularities (Dietl & Frick, 2007; Neale, 1964).

Another point that sets professional football apart from other industries is that clubs have not been profit-making for the greater part of history (Franck, 2010). Where companies in most industries seek to maximize profits, football, as a European sport, is rather considered a win-maximization industry (Garcia-del-Barrio & Szymanski, 2009; Késenne, 2006b; Sloane, 1971). Win-maximization in European sports refers to the practice of prioritizing the achievement of sporting success, such as winning championships and trophies, over the pursuit of financial gain. This approach is often contrasted with the profit-maximizing model followed by many North American major league sports, where teams prioritize financial success and profitability above on-field success. While there are some similarities between the two models, they differ in significant ways that have important implications for how teams operate.

North American major league sports are often structured around profit maximization, with teams focused on generating revenue through ticket sales, merchandise, and media rights. Winning is still important, but it is often viewed as a means to an end – a way to attract fans and generate more revenue (Andreff, 2011; Gladden et al., 2001; Leach & Szymanski, 2015). This approach can lead to shorter-term decision-making, with teams focused on signing established players who can make an immediate impact rather than investing in long-term player development.

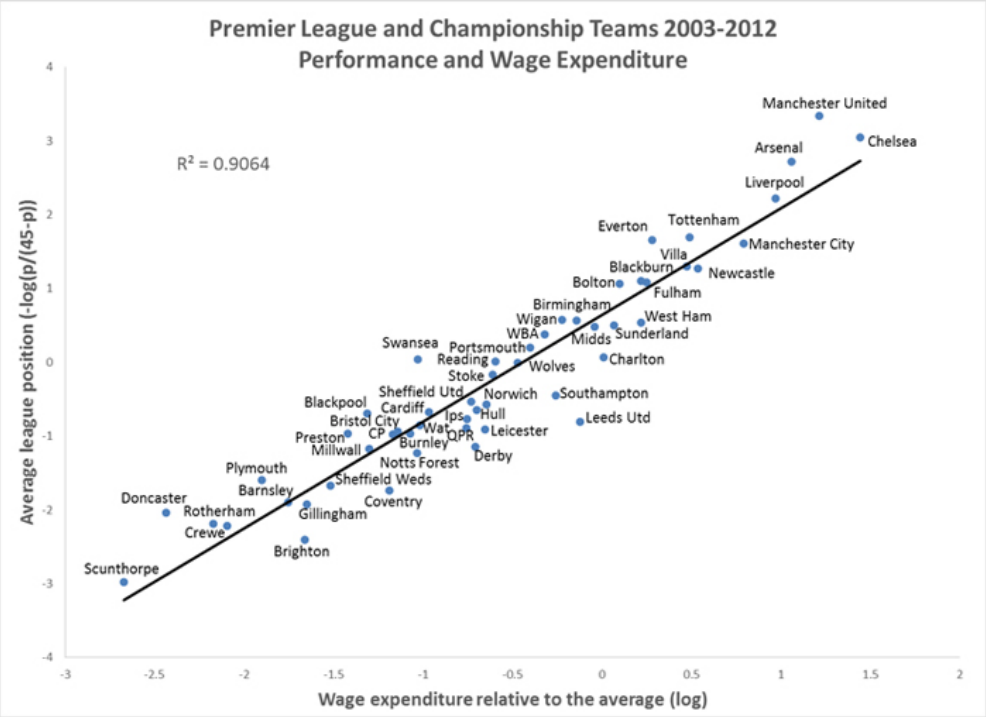
In contrast, in European sports, winning is often seen as the ultimate goal, and teams are willing to invest significant resources in player development, scouting, and recruitment to achieve this goal (Nesti & Sulley, 2014). This is particularly true in association football, where

the importance of winning championships and qualifying for international competitions is central to the sport's culture and history. Teams in Europe often operate with a long-term perspective, investing in youth academies and scouting networks to identify and develop young talent (Radicchi & Mozzachiodi, 2016). This approach can be costly, but it is seen as essential for building sustainable success over time (Lawlor et al., 2021; Nesti & Sulley, 2014).

According to a study by Szymanski (2016), player wages and sporting success in league football show high correlations – in the English Premier League and Championship more than 90 percent of the variation in league position between 2003 and 2012 can be explained by wage spending. A mere 10 percent is captured by all other factors combined, including managerial skills, motivation, and luck. Money buys success with a higher probability (Franck, 2010).

Big clubs with sizeable proceeds from broadcasting, matchday, sponsoring and merchandising can invest in the most promising playing talent, the best coaches, and supporting staff as well as in state-of-the-art training facilities and thus achieve greater sporting success, which consequently leads to more prize money income. As team quality positively impacts spectator demand (Késenne, 2015b; Szymanski, 2003a) these big teams generate even larger income, due to higher match day and commercial revenues – a vicious circle for smaller teams that strain to keep pace with the dominant league players. This phenomenon has been often described in the public discourse, and has been a subject matter in sports management research in the past (Késenne, 2015a) and present (Rappai & Fűrész, 2022; Scelles et al., 2022), but empirical evidence has been inconclusive. Therefore, based on the above, the following research question will be investigated:

Figure 1-1. Average league position and wage spend of top two English division teams 2003-12



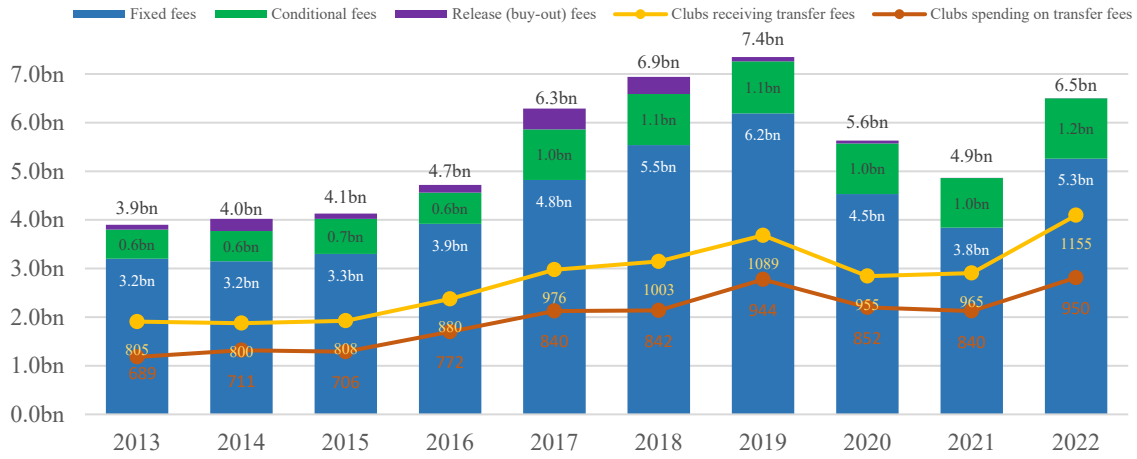
Source: Szymanski, 2016

Research question 1: How does the increased funding of major football clubs, such as prize money earned through participating in European League competitions and injections of funds from investors, affect the distribution of talent and the competitive (im)balance of local leagues over an extended period of time?

Several previous studies have identified the factors that drive professional football into the arms race industry as which it is known today, namely a relegation system, exogenous prizes, increasing revenue differentials within a league and between leagues, a war for talents, as well as a link between playing talent investment and winning probability (Dietl et al., 2008; Franck et al., 2007).

The war for talent denotes the intense competition among organizations to attract and retain the best employees (Chambers et al., 1998). In the context of association football, this phenomenon has engendered a race among clubs to secure the services of the most talented players. The implications of this competition for talent include significant effects on player salaries, transfer expenses, and football club expenses. The quest for top talent has resulted in a remarkable escalation in player salaries, as clubs contend to offer the most attractive compensation packages. The willingness of clubs to offer high salaries reflects the stiff competition for top talent, with each club aiming to gain a competitive edge over its rivals by securing the services of the best players. The race for top talent has likewise led to a substantial increase in transfer expenses. Clubs are paying increasingly exorbitant amounts to secure the rights to sign top players. The willingness of clubs to pay such high fees mirrors the intense competition for top talent, with each club striving to gain an edge over its rivals by signing the best players. In the 2021/2022 season, the combined salaries of the top 20 clubs in European football increased by 13%, reaching a total of €9.2 billion (Deloitte, 2023). Additionally, the total transfer fees paid by the top 20 clubs in the same season reached €3.7 billion, which represents almost 60% of total big-5 league teams' transfer spending (CIES, 2018).

Figure 1-2. Transfer fees in USD by type and number of clubs receiving and spending on transfer fees by year



Source: FIFA Global Transfer Report 2022

The war for talent and the increase in salaries, as well as transfer expenses consequently has an important impact on club expenses. The single highest recurring operating costs are wages, which regularly account for between 55% and 75% of total revenues or 85% to 90% of total costs in most of the dominant European football leagues (i.e. England, Germany, Italy, Spain, and France), but in smaller leagues, such as in Switzerland and Belgium, as well (Deloitte, 2022). While club revenues have increased over the past years in most leagues so have salaries and transfer expenses (Deloitte, 2023), which rendered potential profits null and void – and making clubs vulnerable to external shocks (such as the Covid-19 pandemic). The question thus is, whether the player labor market reacts to those shocks in terms of adjusting salaries and transfer fees and whether the player market is primarily driven by the revenues of the industry rather than other factors. Therefore, based on the above, the following research question will be investigated:

Research question 2: How do revenue fluctuations within the football industry, including those caused by external shocks like the Covid-19 pandemic, impact prices for acquiring playing talent in a league?

Franck (2010) posits that the competitive position of a club is not determined by its profitability but by its spending power. A football club's spending power is set by the club's ability to generate funds and by its capability to redirect these funds into on-field performance. A club can improve its competitive advantage by tapping monetary sources that its competitors are unable to exploit and by channeling more of its generated funds into football while minimizing rent payments to other stakeholders (Franck, 2010).

Just like companies in conventional industries, professional football clubs generate revenues and induce costs. While the revenue dimensions and the revenue mix greatly vary depending on the league- as well as sports club- and team individual characteristics, the main revenue sources have traditionally been subdivided into media- and broadcasting income, commercial income (i.e. sponsorship and merchandising), match day income (i.e. ticketing and ancillary sales, such as food and beverage, as well as and parking) (Bühler, 2006)with the more recent additions of income from player trading, and prize money - especially the ones obtained through the qualification for and competition in UEFA club tournaments (Dima, 2015).

While commercial and broadcasting income has become a significant contributor to the revenue of the world's top sports leagues, the importance of match-day revenues has decreased proportionally over time. Nonetheless, match-day revenue remains the primary source of income for many sports and leagues around the globe. Even for the largest sports organizations, match-day revenue still makes a significant contribution to their overall revenue streams. For instance, in the English Premier League, where match-day revenue comprises only 13% of the

total revenue for the league in 2020, it still generated an absolute value of €683 million. This amount is non-negligible and highlights the continuing significance of match-day revenues even for the biggest sports organizations (Deloitte, 2021).

Against the backdrop of increasing transfer fees and player salaries, and the differences in revenue among various clubs frequently suggested by the media, the question arises regarding the influence of player costs on the ticket pricing policies, and therefore on revenues and spending power of clubs: Do stadium visitors have to pay for excesses in the player labor market? Therefore, based on the above, the following research question will be investigated:

Research question 3: To what extent, if any, do the costs associated with acquiring playing talent impact the pricing policies of tickets for stadium visitors?

As pointed out above, spending power and competitive advantage can be improved by a club's ability to tap monetary sources that its competitors are unable to exploit and/or by minimizing rent payments to other stakeholders (Franck, 2010). Thus apart from initiatives like adjusting ticket prices to improve match-day revenues and finding ways to increase the commercial value of clubs to sponsors, some clubs have been exploring the player market for promising yet undervalued talent to minimize salary and transfer expenses in a market that is considered inefficient (Zaytseva & Shaposhnikov, 2023), at least in leagues outside the Big-5.

Thus more recently, clubs have increasingly reinforced efforts of recruiting players from regions outside Europe, such as from South American and African leagues (Andreff & Szymanski, 2006), where scouting networks are less dense, player salaries are low, and thus chances of finding the next big talent for relatively small fees are high (Littlewood et al., 2011). This trend coincides with an ever-growing number of foreign national and black players in

European football - the number of black players in the Big-5 clubs increased by 44 percent between the 2008/09 and 2018/19 seasons (Quansah, Lang, et al., 2023).

However, given well-documented discriminatory acts by football fans towards non-white players, such as instances of fans hurling bananas at African-origin players accompanied by ape noises during Serie A matches in Italy (Doidge, 2015) and racist chants in English soccer (Holland, 1995), pose the question whether higher percentages of foreign, black and sub-Saharan African players in a squad could affect spectator demand and thus match-day revenue on a club-individual level (Quansah, Lang, et al., 2023). But not only sports demand might be impacted by the talent acquisition policies of a club, also other factors might be impacted, such as sponsorship income.

Marketing research found that the ethnicity of models appearing in advertisements might significantly influence the audience's processing of the presented information (e.g. Qualls & Moore, 1990). Some researchers argue that consumers tend to prefer advertisements with actors of their ethnicity (Whittler, 1989; Whittler & DiMeo, 1991). Whittler (1991) reports that Caucasian study participants perceive themselves as less similar to black than to white actors. Caucasians evaluate the advertisement and the product more favorably and express higher degrees of purchase intentions when Caucasian rather than African-American models endorse a product. Kim and Cheong (2011) show that athlete endorsers add to the persuasive impact of advertising to Anglo-American and Asian-American undergraduates when ethnicity matches between athletes and the target audience.

If sports sponsors following former research results anticipate their dominant target customer group as favoring athletes of their own ethnicity, sponsors might display statistical discrimination. They might adjust their selection of sponsees and their size of investment

accordingly. Therefore, based on the above, the following research question will be investigated:

Research question 4: To what extent might non-discriminatory talent acquisition policies within sports clubs affect revenue streams that are not directly linked to the club's on-field performance?

In summary, playing talent is the linchpin of the operational sports business in win-maximizing leagues such as in Europe. It is a crucial factor for achieving sporting success, yet it also represents the largest cost factor for clubs. Moreover, it is a decisive factor in the economic success of sports organizations and their spending power. This dissertation aims at uncovering some of the more inconspicuous relationships between the war for talent, club revenues, costs, and league competition in sports, using the example of European professional league football - interdependencies that have so far received little or no attention in the sports economics literature. To this end, four specific questions are pinpointed.

1. How does the increased funding of major football clubs, such as prize money earned through participating in European League competitions, affect the distribution of talent and the competitive (im)balance of local leagues over an extended period of time?

2. How do revenue fluctuations within the football industry, including those caused by external shocks like the Covid-19 pandemic, impact prices for acquiring playing talent in a league?

3. To what extent, if any, do the costs associated with acquiring playing talent impact the pricing policies of tickets for stadium visitors?

4. To what extent might non-discriminatory talent acquisition policies within sports clubs affect revenue streams that are not directly linked to the club's on-field performance?

These four objectives are illustrated in Table I-1. Each article aims to answer one objective. The fifth objective is to draw conclusions and point out the connective features of the four articles.

2. Summary of Articles

The body of the dissertation consists of four articles. Each of the articles approaches the subject of playing talent in the context of club revenues, club expenses, and clubs' competitiveness within a league. These papers are separate works based on separate data sets and have been published or are accepted to be published in peer-reviewed scholarly journals in the field of sport management- and economics, as well as marketing. Quansah has been the lead author in three of the four articles and has had the main responsibility for planning, data collection, analysis, writing, and managing the review processes. Article A is co-authored by Frick, Quansah, and Lang. Article B is co-authored by Quansah, Frick, Lang, and Maguire. Article C is co-authored by Quansah, Buraimo, and Lang. Article D is co-authored by Quansah, Amo-Agjey, and Mühlbacher.

The empirical data for all articles included in this study were collected from publicly accessible sources. For Article A, the dataset comprised 5,299 observations of club seasons in professional football leagues across twelve Western European countries from the 2005/06 season to the 2020/21 season. This dataset included the market values of each squad at the beginning of the respective season and the final league position of the clubs at the end of the season. The data for Article A was sourced from transfermarkt.de and footballworld.net.

In the case of Article B, the empirical model was estimated using data from 20 clubs that participated in the English Premier League (EPL) over a span of 27 seasons, ranging from 1992/1993 to 2018/2019. This resulted in a total of 540 observations of club seasons. The accounting data, such as club revenues, team wage bills, and net transfer spending, were obtained from the annual reports of the individual clubs. Additionally, player market values were retrieved from the website transfermarkt.de.

For Article C, the dataset consisted of 3,040 price observations of English Premier League matches spanning from the 2014/15 season to the 2018/19 season. These observations were collected from the websites and ticketing platforms of the respective clubs. The data for the explanatory variables used in the analysis were obtained from various sources, including the Centre for Cities (relative average weekly workplace earnings), annual reports of the individual clubs (adjusted total labour costs), worldfootball.net (performance data and capacity utilization), as well as Wikipedia and football fan-related websites (derby matches).

In Article D, to determine the ethnicity of players participating in the Bundesliga and EPL during the eleven seasons from 2008–2009 to 2018–2019, a manual examination of 14,515 player photographs was conducted on the transfermarkt.de website. The players were classified into two categories: Black or non-Black. Additionally, data on sponsorship amounts and other independent variables were obtained from football websites such as sponsors.de, offthepitch.com, sportingintelligence.com, and worldfootball.net. The robustness and validity of these data were ensured through comparisons with information available from other industry sources and clubs' press releases. Table I-3 provides an overview of the Manuscripts of the Dissertation.

Figure 2-1. Structure of dissertation

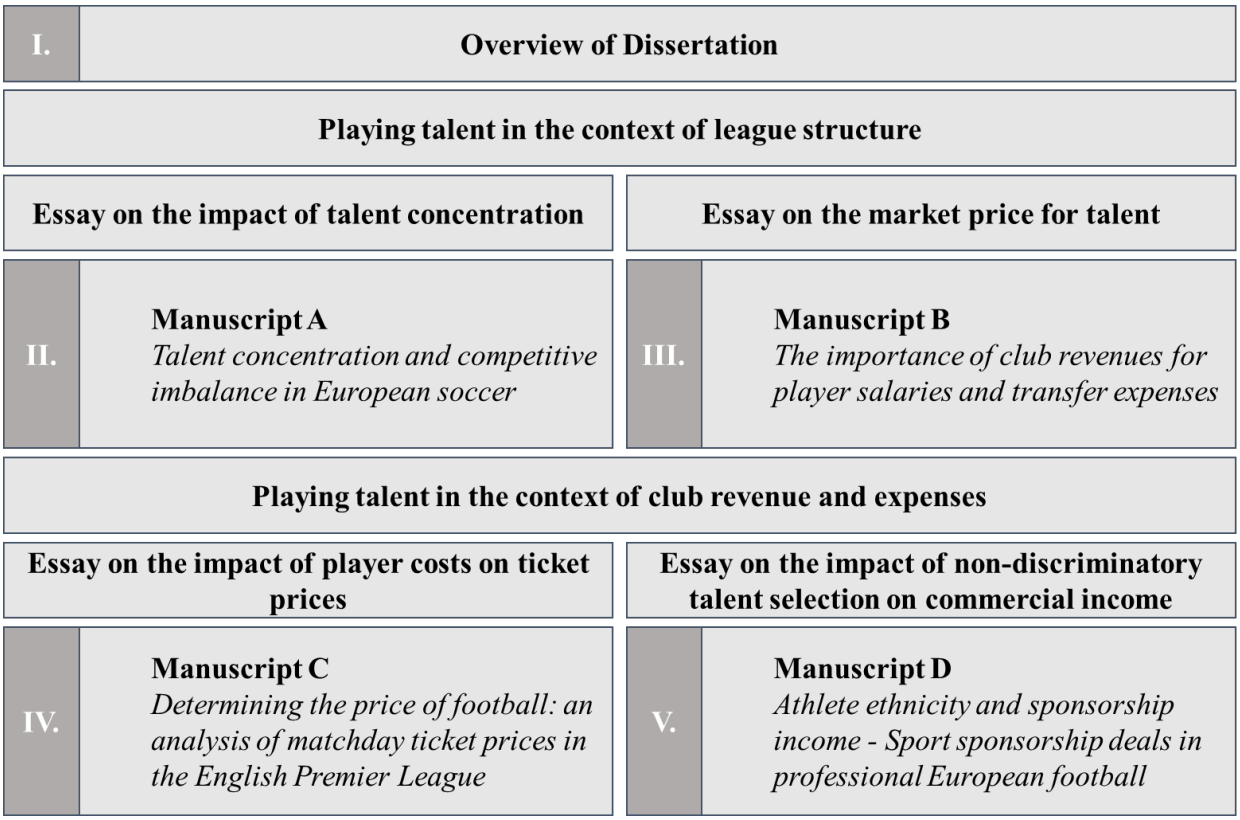


Table 2-1. Overview of the Manuscripts of the Dissertation

Article	Authors	Journal	Status
Talent concentration and competitive imbalance in European soccer	Frick, B.; Quansah, T.; Lang, M.	Frontiers in Sports and Active Living	Revised in two rounds at European Sports Management Quarterly (ISSN: 1746031X) (Scimago Journal & Country Rank: Q1). Accepted (published) at Frontiers in Sports and Active Living (ISSN 2624-9367)
The importance of club revenues for player salaries and transfer expenses	Quansah, T.; Frick, B.; Lang, M.; Maguire, K.	Sustainability	Accepted (published) at Sustainability (ISSN 2071-1050) (Scimago Journal Rank: Q1)
Determining the price of football: an analysis of matchday ticket prices in the English Premier League	Quansah, T.; Buraimo, B.; Lang, M.	European Sport Management Quarterly	Accepted (published) at European Sport Management Quarterly (ISSN 1746031X) (Scimago Journal Rank: Q1)
Athlete ethnicity and sponsorship –ncome - Sport sponsorship deals in professional European football	Quansah, T.; Amo-Agjey, S.; Mühlbacher, H.	Quantitative Marketing and Economics	Currently undergoing revisions at Quantitative Marketing and Economics (ISSN 15707156) (Scimago Journal Rank: Q1)

Source: Own table

Article A - Talent Concentration and competitive imbalance in European Soccer

Link: https://www.frontiersin.org/articles/10.3389/fspor.2023.1148122/full

The conclusion of the 2018/19 soccer season saw English Premier League (EPL) teams as finalists in both, the UEFA Champions League (UCL) and the UEFA Europa League, while in 2020/21, three out of the four finalists were from the EPL. The EPL's commercial success and their clubs' possibility to pay high player salaries and price out smaller leagues have raised public concerns about the competitive imbalance in European football. Moreover, the discourse among the general public highlights a discernible escalation in the economic and sporting imbalance between clubs within the same league.

The majority of previous studies on competitive balance (CB) have primarily focused on analyzing the impact of CB on sports demand using various measures – and only limited investigations focused on competitive balance as a dependent variable. Notably, the impact of revenue-sharing mechanisms, such as media rights distribution and parachute payments, on the competitive balance of a league has received some attention. However, this approach is constrained as it typically analyzes one or a limited number of leagues with varying revenue compositions among clubs. In the current study, the authors adopted a different approach by examining whether leagues with a more equal distribution of player talent foster a more balanced competition compared to leagues with a less equal talent distribution.

The initial dataset encompassed 5,299 observations of club seasons from professional soccer leagues in twelve Western European countries, spanning the period from the 2005/06 season to the 2020/21 season. This dataset included information regarding the market value of each team's squad at the beginning of the respective season, as well as the final league position

achieved by each club at the conclusion of that season. Squad market values were available from the 2006/07 season, with the exception of German teams, where the market values were already available for the 2005/06 season.

To present an accurate assessment of the concentration of playing talent and the competitive (im)balance within each league, the authors calculated two measures: the Gini coefficient of clubs' player market values and the Gini coefficient of the number of league points obtained at the end of each season. These calculations allow for a comprehensive evaluation of the distribution of playing talent and the degree of competitiveness within the leagues across different seasons.

Results reveal variations in talent concentration across leagues, with the Primeira Liga in Portugal exhibiting the highest concentration, followed by La Liga in Spain and Eredivisie in the Netherlands. The Swiss Super League displays the lowest talent concentration. Additionally, the analysis shows that talent concentration tends to be lower in the second and third divisions compared to their respective first divisions.

The study further explores the relationship between talent concentration and point concentration. The findings suggest a positive correlation in the Big-5 leagues, indicating that higher talent concentration among top teams is associated with greater point disparities. In contrast, leagues outside the Big-5 (excluding Greece) show a negative correlation, suggesting more even point distributions despite concentrated talent.

The evolution of talent concentration over time varies among the Big-5 leagues. The French Ligue 1 experienced increased talent concentration, while the English Premier League

remained relatively stable over time. The Italian Serie A and German Bundesliga display U-shaped and inverted U-shaped patterns, respectively.

Regarding points concentration, there is no discernible trend across the Big-5 leagues over the observation period, indicating relatively stable levels of competitive balance.

Regression analysis confirms a significant positive impact of talent concentration on points concentration. Various model specifications and alternative measures consistently support this relationship, suggesting that talent concentration plays a crucial role in shaping competitive balance within leagues. However, in specifications controlling for year, country, and division, this impact is only weakly significant or insignificant, suggesting that talent concentration does not significantly affect competitive balance in that league. The inclusion of division dummies indicates that talent concentration has a weaker influence on points concentration in lower divisions compared to higher divisions, aligning with the observation that lower divisions tend to exhibit greater balance.

Article B - The Importance of Club Revenue for player salaries and transfer expenses - How Does the Coronavirus Outbreak (COVID-19) Impact the English Premier League?

Link: https://www.mdpi.com/2071-1050/13/9/5154

Driven by their desire for on-field success and maximizing their chances of winning, and fueled by escalating revenues from match days, sponsorships, and broadcasting rights, especially in the English Premier League (EPL), the years prior to COVID-19 in 2020 have seen an intense competition among football clubs for talented players and a consistent upward trend in transfer fees and player salaries. In 2019, global football transfer fees reached a record high of USD 7.4

billion, nearly tripling the amount paid in 2012. In modern professional football, player salaries and transfer fees represent the most significant cost factors for clubs and prior research suggests a statistically significant and positive impact of clubs' staff expenditures, such as player salaries and transfer fees, on sporting achievements.

However, the outbreak of the coronavirus pandemic (COVID-19) caught the sports industry off guard. It has proven to be a disastrous event, raising concerns about the sustainability of the sports business model. Some football leagues, such as those in France, Belgium, and the Netherlands, decided to prematurely end their 2019/2020 seasons, while others continued without spectators, resulting in significant revenue losses for the clubs in both cases. Although various professionals in the football industry have expressed their belief that this situation might lead to a contraction in the player market, academic studies investigating the potential effects of the COVID-19 epidemic have been lacking. Therefore, the current paper aimed to address this knowledge gap by examining the likely consequences of COVID-19 on professional football.

Using data from the EPL, an empirical model was developed to achieve two main objectives: Firstly, to investigate the significance of club revenues in determining player salaries and transfer costs, and secondly, to estimate the impact of major market downturns, such as the COVID-19 pandemic, on the EPL. In particular, the study predicts the probable developments in player salaries, net transfer expenses, and player market values under three potential coronavirus scenarios.

The regression models employed in this study were estimated using data from 20 clubs that competed in the English Premier League (EPL) over a span of 27 seasons, from 2005/2006 to 2018/2019, resulting in a total of 540 observations of club seasons. However, it should be

noted that if data for all clubs were available for the entire period, the number of observations would have been 546, as the EPL comprised 22 clubs during the seasons from 1992/1993 to 1994/1995. The predictions are based on several fixed-effect models that consider unobserved heterogeneity among clubs. The dependent variables used in this study include the team wage bill, net transfer spending, and average player value of each club in a given season. The explanatory variables consist of the clubs' revenues from the previous season, or the specific components of these revenues, namely match income, TV revenues, and commercial income. The purpose of these regression models was to assess the relative impact of the three revenue sources (match, broadcasting, and commercial revenues) on the substantial growth observed in player salaries, market values, and net transfer expenses over the past three decades.

The authors assumed that the influence of these revenue sources remained consistent during both periods of economic expansion and recession - the factors contributing positively to the growth of salaries, market values, and net transfer expenses during previous boom periods contribute to their reduction to an equal extent during recession periods.

Hence, the econometric analysis combines elements of forecasting and prediction. While forecasting employs historical data to extrapolate future trends, prediction involves a more subjective judgment that considers anticipated changes. Initially, the authors estimate a series of regression models using historical data on EPL clubs' revenue trends and subsequently derive three distinct scenarios that represent the most plausible development of club revenues, based on the understanding of the potential consequences of COVID-19 on revenue sources for EPL clubs (as of 2020). By combining the results of the regression analyses with these three forecast scenarios, the authors predicted the future trajectory of player salaries (which account

for a significant portion of overall wage expenses), net transfer expenses, and average player market values in light of the COVID-19 pandemic

Three models are estimated to examine the impact of match revenues, TV revenues, and commercial revenues on these variables. The coefficients in the models are interpreted as elasticities, with results indicating that TV revenues have the greatest influence on player salaries, followed by match revenues and commercial revenues. For net transfer expenses, each additional British Pound from TV revenues leads to an increase of 44.3 pence, and the impact of match and commercial revenues is similar. Regarding player market values, TV revenues again have the most significant effect.

Furthermore, the study explores the impact of the COVID-19 pandemic on club revenues and predicts its consequences on player salaries, net transfer expenses, and player market values. Three scenarios are outlined based on the anticipated decline in revenue sources. TV revenues are expected to decrease by a fixed amount in all scenarios, while commercial revenues may decline by 10% to 40% and match revenues may see reductions between 50% and 70%. Considering the regression coefficients obtained from the models, the study predicts that a 10% drop in total revenue will lead to a 7.28% decrease in player salaries, a 9.55% loss in player market values, and a 19.7 pence reduction in net transfer expenses.

Additionally, the study examines the impact of the pandemic on big clubs (the "Big 6") compared to smaller clubs. It finds that changes in club revenues have a more substantial effect on player salaries at big clubs than at smaller ones. However, for net transfer expenses and player market values, there is no significant difference between big and small clubs.

The study demonstrates the expected decline in club revenues and its repercussions on various financial aspects of the EPL due to the COVID-19 pandemic. The findings suggest that player salaries, net transfer expenses, and player market values will be negatively affected, with varying degrees depending on the revenue source and club size.

Article C - Determining the Price of Football: An Analysis of Matchday Ticket Prices in the English Premier League

Link: https://www.tandfonline.com/doi/full/10.1080/16184742.2023.2191633

The continuous rise in commercial and broadcasting revenue has led to a gradual decline in the proportion of match-day revenues for prominent sports leagues worldwide. Nevertheless, match-day revenue remains a crucial income source for many sports and leagues, even for the largest organizations. For instance, in the English Premier League (EPL), match-day revenue accounted for only 13% of the league's total revenue in 2020. However, the absolute value of match-day revenue in the EPL amounted to €683 million, signifying its economic relevance.

While empirical analyses of ticket pricing factors in North American major sports leagues have been facilitated by the availability of relevant information, similar analyses have been challenging due to limited access to match-day pricing data in most European sports. The paper aims to address two primary questions. Firstly, it investigates whether stadium visitors are required to pay a premium for the sporting success of teams. Secondly, it examines whether stadium goers bear the costs associated with excessive player wages in the labor market. The study also explores other factors that influence ticket prices. Sports clubs can benefit from understanding the relationships between ticket prices and benchmarking their pricing strategies.

The dataset used in the study includes information on the cheapest and most expensive ticket prices for each game in the English Premier League from the 2014/15 to 2018/19 seasons, amounting to 3,040 observations. Data on ticket prices were collected from individual club websites and ticketing platforms. Various factors, including economic variables, game attractiveness, quality of viewing, and stadium capacity, are considered to analyze the determinants of ticket prices in the EPL.

To model ticket prices, the study uses the logarithm of prices as the dependent variable. This choice allows for interpreting the coefficients as proportional rather than absolute changes and addresses any skewness in the price distribution. The models employ linear regressions estimated through ordinary least squares (OLS) and fixed effects techniques. Fixed effects estimation includes intercept terms specific to each home club season, capturing constant unobserved factors within each panel. The logarithmic transformations and fixed effects help provide a more comprehensive understanding of the relationship between ticket prices and the explanatory variables, controlling for unobserved heterogeneity across home club seasons.

The study highlights the influence of externalities associated with hosting well-known teams and high-level players, which contribute to higher ticket prices. The performance of the home team in the previous season has a significant impact on the prices of the most expensive tickets. Furthermore, the results indicate that average weekly workplace earnings have a statistically significant impact on ticket prices. Higher earnings positively affect the prices of both the cheapest and most expensive tickets, suggesting that clubs consider the level of wealth in their market when setting prices. Stadium utilization is also found to be influential, with capacity utilization in the previous season affecting prices in the following season. As capacity increases, prices rise at an increasing rate, particularly for matches with high demand and fewer

available seats. The study also examines the effects of factors such as newly promoted teams, "Big Six" clubs, local derby matches, visiting teams, and the previous season's team performance on ticket prices. The presence of "Big Six" clubs as visiting teams leads to price increases for the most expensive tickets, while local derby matches also result in higher prices for both ticket types.

The findings suggest that factors such as labor costs and star players, earnings, stadium utilization, team status, and performance play significant roles in determining ticket prices in the EPL. These results have implications for both clubs and fans in understanding the pricing dynamics in professional football.

Article D - Athlete ethnicity and sponsorship income - Sport sponsorship deals in professional European football

Sponsorship is the act of providing resources to individuals or organizations in exchange for promotional benefits. It is a crucial element of strategic marketing, accounting for a significant portion of global marketing expenditure, with sports sponsorship being the dominant category. European professional sports organizations heavily rely on sponsorship for revenue generation, particularly in football leagues like the English Premier League and Germany's Bundesliga. Front-of-shirt deals contribute significantly to sponsorship income in these leagues.

While scholars have shown great interest in sponsorship and its effects on consumer responses, there is a lack of focus on the sponsee's perspective and certain aspects of sponsorship management, such as asset pricing and process management. Moreover, the influence of athlete ethnicity on sponsorship decisions and the financial amounts allocated to athletes and teams remain largely unexplored.

To address these gaps, the study examines the impact of ethnic composition on sponsorship contracts in top-flight football teams. The analysis focuses on the Bundesliga and EPL, which are situated in countries with different ethnic profiles, namely Germany and England. Data from eleven seasons were collected, encompassing factors such as economic variables, viewing quality, game attractiveness, and the number of Black players in the squads.

The study examined a sample of 24 German clubs and 33 English clubs that participated in the Bundesliga and EPL, respectively, for a minimum of two seasons between 2008 and 2018. The study employed panel data analysis to explore the relationship between a club's ethnic composition, specifically the percentages of foreign, Black, and sub-Saharan African players in the squad, and the club's annual front-of-shirt sponsorship income. This approach accounted for within-club variations over time and considered potential biases arising from unobserved club-specific and season-specific factors.

The results of the study suggest that a club's annual front-of-shirt sponsorship income is influenced by its squad's ethnic composition in the Bundesliga but not in the EPL. There was no significant link found between a club's annual front-of-shirt sponsorship income and the presence of foreign players in its squad neither in the Bundesliga nor the EPL.

However, in the case of Bundesliga clubs, a strong negative relationship was observed between annual front-of-shirt sponsorship income and the presence of Black players, regardless of their nationality, as well as sub-Saharan African players. Bundesliga clubs with a higher percentage of Black players received significantly less sponsorship income compared to similar clubs with fewer or no Black players. Similar results were observed for sub-Saharan African players in the Bundesliga. In contrast, the relationship between the percentage of Black players and sponsorship income was not significant for EPL clubs.

Furthermore, the study found that the log of average player value and the club's reputation ranking had a positive impact on the annual front-of-shirt sponsorship income in both the Bundesliga and the EPL, although the coefficient for reputation ranking was not statistically significant. No significant associations were observed between sponsorship income and other independent variables.

The results support the hypothesis, indicating that a club's annual front-of-shirt sponsorship income is linked to its squad's ethnic composition in countries with ethnically homogeneous populations, while such a connection is not evident in countries with more ethnically diverse populations. Consequently, sports teams in predominantly white, ethnically homogeneous countries may attract less sponsorship income if they have a high percentage of Black athletes.

II. CHAPTER TWO: ESSAY ON THE IMPACT OF TALENT CONCENTRATION

Talent concentration and competitive imbalance in European soccer

Abstract

While most of the available literature on competitive balance analyses its impact on ticket sales and TV audiences, less empirical research is available that examines the observable variation in competitive balance across leagues and over time. This paper studies the concentration of player talent and end-of-season league points to empirically assess whether leagues with a more equal distribution of player talent produce a more balanced competition than leagues with less equal distribution. The longitudinal data we use to estimate our empirical model comes from professional soccer leagues in twelve Western European countries from 2005/06 thru 2020/21, yielding 5,299 club-season observations. Our empirical analysis indicates that talent concentration in a league significantly and positively impacts points concentration in that league. However, in specifications controlling for year, country, and division, this impact is only weakly significant or insignificant, suggesting that talent concentration does not significantly affect competitive balance in that league. Additionally, our findings demonstrate that the relationship between talent and points concentration does not vary considerably across the European leagues or over time. Our results suggest that repeated participation in the UEFA Champions League, with its considerable monetary returns by (more or less) the same subset of teams, does not increase competitive imbalance in the respective national league. Thus, with relatively few additional regulatory interventions, the promotion and relegation system in the open European soccer leagues seems effective in ensuring a balanced competition.

1. Introduction

At the end of the 2018/19 season, the finalists of the UEFA Champions League (UCL) and the UEFA Europa League all came from the English Premier League ("EPL"). Since the EPL is the commercially most successful league and known to pay the highest player salaries, the press, and the public were quick to agree that (i) competitive balance in European soccer is at risk (Slater, 2019), (ii) on-field success is increasingly determined by money (Evans, 2019; Smith, 2019), with smaller teams being priced out (Kidd, 2019), and (iii) this trend is likely to continue and even to intensify (Slater, 2019). One year later, when the finalists of the two soccer competitions were teams from Germany, France, Spain, and Italy, with no English team among the final four, the claims muted for a while before picking up again in the season 2020/21, when three of the four finalists were again teams from the EPL (Doyle, 2021; Economist, 2021; Venkatesh, 2021).

Apart from the financial imbalance between the European soccer leagues, often symbolized by the distinction between the "Big-5" (i.e., the top five soccer leagues in Europe, which include the Premier League in England, the Bundesliga in Germany, La Liga in Spain, Serie A in Italy, and Ligue 1 in France) and the remaining European leagues (Quansah, Buraimo, et al., 2023), growing economic and sporting imbalances between the clubs within the same league have been identified by some researchers (Késenne, 2016; Martinez & Willner, 2015; Michie & Oughton, 2004; Montes et al., 2014), and contested by others (Koning, 2009; Penn & Berridge, 2019; Szymanski, 2002, 2016).

While the majority of the available studies on competitive balance have used various measures to analyze its impact on sports demand (Cairns et al., 1986; Hogan et al., 2017; Pawlowski & Nalbantis, 2015; Wills et al., 2020), few studies have used competitive balance

measures as the dependent variable, most notably investigating the impact of revenue sharing (i.e., media rights distribution, parachute payments) on the competitive balance of a league (Carreras & Garcia, 2018; Késenne, 2006a; Peeters, 2011; Szymanski, 2003b; Wilson et al., 2018). This approach is limited as the analysis is typically restricted to one or a few leagues where the revenue composition varies across the clubs. Moreover, differences in the clubs' goals (win vs. profit maximization) need to be considered (Fort & Quirk, 2004).

In this study, we take a different approach by analyzing whether leagues with a more equal distribution of player talent produce a more balanced competition than leagues with a less equal talent distribution. We use the concentration of player market values in selected European soccer leagues as a proxy of talent concentration across clubs. In our empirical analysis, we find that the level of talent concentration in a league has a weak and, in most specifications, statistically insignificant impact on the points concentration in this league, suggesting that the concentration of talent in a league leaves that league's competitive balance more or less unaffected. Moreover, we also find that this weak correlation between talent and points concentration does not vary a lot across the European leagues nor over time, suggesting that repeated participation in the UCL with its considerable monetary returns by (more or less) the same subset of teams does not increase competitive imbalance in the respective national league. Thus, our study extends the available research on competitive balance by empirically examining differences between leagues regarding the distribution of sporting talent and its consequences for seasonal competitive balance.

The remainder of the paper is organized as follows: Section 2 presents an overview of the literature on player market values, talent distribution, and competitive balance. Section 3 describes the dataset and the empirical model. Section 4 presents the results of the empirical

investigation. Section 5 provides a discussion of our main findings, and section 6 concludes with a discussion of the limitations of our study and implications for future research.

2. Related Literature

We have structured the literature review in the following manner: Firstly, we offer a concise overview of the measures utilized to quantify competitive balance. Next, we summarize the literature highlighting the importance of competitive balance for ticket and TV demand, as documented in the sports economics literature. Lastly, we analyze the literature on player market values and talent distribution across leagues and clubs.

Competitive balance in the sports economics literature

Rottenberg (1956) stated that "the nature of the industry is such that competitors must be of approximately equal 'size' if any are to be successful; this seems to be a unique attribute of professional competitive sports." This argument was later picked up by Neale (1964, p. 2), emphasizing the "first peculiarity of the economics of professional sports is that receipts depend upon competition among the […] teams, not upon business competition among the […] contenders, for the greater the economic collusion and the more the sporting competition the greater the profits".

Building on these arguments, Cairns et al. (1986) were the first to distinguish between short-, medium- and long-term competitive balance. Short-run competitive balance or game uncertainty (Pawlowski & Nalbantis, 2019) deals with the uncertainty surrounding a particular sporting event, such as a soccer match, while medium-term competitive balance focuses on within-season uncertainty. Long-run competitive balance captures the distribution of championships over time, i.e., domination by one team only or a few teams.

Over time, several measures have been developed to account for short-, medium- and long-term competitive balance. Each measure has specific strengths and weaknesses, which are unavoidable when describing a complex phenomenon with one summary measure (Penn & Berridge, 2019). In our study, we are particularly interested in (changes in) medium-term competitive balance contingent on (changes in) talent concentration. Measures used to capture medium-term competitive balance are – among others – the dispersion of winning percentages, the Gini coefficient (G), the coefficient of variation (CoV), the concentration ratio, the distance to competitive balance, the relative deviation from the mean, the Theil Index, as well as the Herfindahl Index. In the end, as Penn and Berridge (2019) put it, there is no 'Holy Grail' in the measures characterizing within-season competitive balance because no single measure can be considered the correct or the most appropriate one in every circumstance. Each measure focuses on a different feature. The pros and cons of various measures of competitive balance in professional team sports are discussed in more detail by, for example, Humphreys (2002), Utt and Fort (2002), Fort and Maxcy (2003) and Owen et al. (2007).

According to Fort and Maxcy (2003), the large and growing body of literature on competitive balance can be divided into two distinct streams: the literature analyzing levels of and changes in competitive balance (ACB) and the literature testing the uncertainty of outcome hypothesis (UOH). While competitive balance is an ex-post construct based on end-of-season league tables, outcome uncertainty is an ex-ante concept assessing probabilities of game or seasonal outcomes in advance. The ACB literature focuses on the analysis of competitive balance as such, from a time perspective or as a consequence of changes in league structures or mechanisms. The UOH literature analyses the impact of competitive balance on stadium attendance and/or TV viewership. In summary, "ACB aims at tracking (competitive) balance itself," while "UOH is aimed at measuring fan welfare" (Fort & Maxcy, 2003, p. 157).

The ACB literature that analyses the determinants of competitive balance is relatively scarce and relies mainly on a game-theoretical perspective. A particular focus of this stream of literature has been on the impact of revenue sharing on competitive balance. As the relationship between these two variables depends on many factors (such as the clubs' objectives, the specific sharing arrangements, the specifications of the revenue functions as well as the supply of talent), the findings reported in the literature are inconsistent (Helmut M. Dietl et al., 2011; Késenne, 2005).

From an empirical perspective, Andreff and Bourg (2006) compared pooled and individual club ownership of broadcasting rights and their influence on competitive balance across 16 European leagues. They conclude that the broadcasting rights redistribution mechanisms in French and English first-tier soccer in the 1990s not only improved competitive balance within the leagues but also promoted the clubs' incentives to win and invest in playing talent, as broadcasting revenues are determined by the individual clubs' ranking and their number of television appearances. Using a large dataset from 12 major European soccer leagues and covering a period of twenty-five years (1976-2000), Frick (2004) find that a more or less equal redistribution of the revenues earned through the collective sale of broadcasting rights (which may account for up to 50% of the teams' budgets) leaves the survival probabilities of recently promoted teams completely unaffected.

Wilson et al. (2018) examined the impact of parachute payments on competitive balance in the English Championship. They found that an increase in the number of clubs with parachute payments and the overall value of these payments coincides with a reduction in competitive balance. Other authors have looked at the impact of UEFA's Financial Fair Play regulations (Freestone & Manoli, 2017; Grabar & Sonin, 2018; Plumley et al., 2019) and the impact of

financial inequality on competitive balance (Pawlowski et al., 2010; Szymanski, 2002) - resulting in no unanimous conclusion.

Several recent papers have examined the determinants of competitive balance in European soccer. For example, Scelles et al. (2022) explore the determinants of competitive balance in European men's club soccer from 2006-2018. They propose a theoretical framework that includes seven additional variables to explain the drawing power of a league, the revenue distribution between and within leagues, and talent distribution. The results show that GDP significantly impacts competitive balance, while attendance from the previous year has no significant effect. Moreover, Gasparetto et al. (2022) examine the factors influencing competitive balance in 22 of Europe's top-tier soccer leagues from 2004 to 2021. The study found that play-offs for relegation, average age, talent concentration, and standard deviation of team values harm competitive balance. In contrast, the number of teams in the league, Elo rank, local currency to Euro rate, and Gini index have a positive effect. In a similar study, Rappai and Fűrész (2022) examine the relationship between player value, talent, number of superstars, and sports performance regarding competitive balance in the top five European soccer leagues.

Gasparetto et al. (2022) and Rappai and Fűrész (2022) have conducted studies closely related to ours, examining the factors influencing competitive balance in European soccer. In contrast, while Scelles et al. (2022) include talent distribution in their theoretical framework, they do not directly test its impact. However, Gasparetto et al. (2022)and Rappai and Fűrész (2022) test talent concentration in the same manner as our study, and their findings indicate a positive relationship between talent concentration and competitive imbalance, which contrasts with our main finding.

Given the mixed results reported in the above ACB literature that examines the determinants of competitive balance and the correlation of the explanatory variables with other factors such as club objectives, league structure, and sharing arrangements, we conjecture that taking a step back by looking at the link between sports talent concentration and competitive balance is a promising empirical approach to align the conflicting results reported in previous studies.

Player market values and talent distribution across leagues and clubs

Sports fans are typically attracted by the absolute and relative quality of leagues and games and, ultimately, by the playing talent under contract (Buraimo & Simmons, 2015). The absolute quality of a league can be approached by total league revenues, i.e., the sum of the revenues of the individual clubs (Késenne, 2015b). Game theory suggests that in an open league with a flexible talent supply, absolute quality is affected by talent investment and allocation (Dietl et al., 2012). To increase the playing strength of their team and weaken their opponents, the managers of a few wealthy clubs may be tempted to sign "too many" talented players and bench some of them, so some top players are misallocated (Késenne, 2015b). The relative quality of a league refers to the talent distribution between the clubs in a league. Some studies have analyzed the effect of revenue-sharing arrangements on talent concentration (Késenne, 2015b; Robinson & Simmons, 2014). In an open, win-maximizing league, revenue-sharing arrangements with net transfers from large-budget to small-budget clubs result in a more balanced distribution of talent (Robinson & Simmons, 2014), while total talent investment increases (Késenne, 2015b) because small-budget teams invest more than the large-budget teams reduce.

In soccer, Flores et al. (2010) contend that competitive imbalance may arise from ability gaps between the top tier and the remainder of recruited players, mainly when the talent pool is small, for example, when the eligible population is small. Conversely, when the talent pool is large, such as in more populated countries, ability gaps are less pronounced, resulting in an improved competitive balance. In a global marketplace, soccer talent can be bought and sold worldwide, following the simple rules of supply and demand. If a player with given talent is paid less by his current club than he is worth to other clubs, he will be signed by another club, where his marginal product is expected to be higher - given that markets are efficient (Szymanski, 2016). In an investigation of competitive balance in professional baseball in the years 1901 to 2000, Schmidt and Berri (2001) observed that the level of competitive balance in Major League Baseball (MLB) has – in contrast to the prevailing views of sports insiders and sports media - improved after 1960 not because of institutional changes but due to an increase in the size of the talent pool. Similarly, Schmidt (2021) attributes the improved competitive balance in baseball to increases in the population of players that MLB can employ due to player immigration.

Quansah et al. (2021) define a player's market value as a theoretical construct that approximates the current market price for releasing that player from an existing contract, irrespective of the remaining contract length. That value is determined by individual characteristics, such as the player's age, position, and past performance, club characteristics, such as market size and (historical) performance, as well as prevailing market conditions (Frick, 2007).

Using data from www.transfermarkt.de, Herm et al. (2014) find that in a sample of 67 player transfers occurring during the winter break 2011/12 in the German Bundesliga, the

market values explain almost entirely (R2=0.90) the variance in the paid transfer fees. Peeters (2018) finds in a sample of more than 1,000 qualifying matches and World Cup/Euro Cup matches over the period 2008 to 2014 that forecasts of match results based on the crowds' evaluations are far more accurate than standard predictors such as the FIFA ranking or the ELO rating of the two opposing teams. Using data from ten consecutive seasons from 2006 thru 2015 in Major League Soccer, Prockl and Frick (2018) find that player market values and salaries are highly correlated at +0.75, a finding that has recently been confirmed by Frick and Winner (2020) using data from one season in the German Bundesliga (2014/15) and the Italian Serie A (2015/16). Thus, we conjecture that differences in team values explain differences in performance. More specifically, we expect a larger concentration of playing talent to lead to less competitive balance.

3. Methods

Data

Our starting dataset consisted of 5,299 club-season observations from professional soccer leagues in twelve Western European countries from 2005/06 thru 2020/21. It included the market value of each squad at the beginning of the respective season and the clubs' final league position at the end of that season. The first season for which the market values of the squads are available is 2006/07 (except for the German teams, where the market values are already available for 2005/06).

While a club's wage bill has been previously used as an indicator of player quality and as a predictor of team performance (Forrest et al., 2004; Szymanski, 2003a), this approach is limited by the fact that salaries are fixed for the length of a contract (Frick, 2007) and do not reflect longer periods of players' form highs or lows, nor injuries. To overcome these

limitations, the present study instead employs the market value of a squad as an indicator of its absolute quality. Researchers widely use market values at both the individual and team levels as a proxy (e.g. Bryson et al., 2013; Franck & Nüesch, 2012; He et al., 2015).

The market values we use in this study have been retrieved from www.transfermarkt.de, a crowd-driven online platform whose registered users discuss and express their opinions about, among other things, the market values of players in designated forums. It was founded in Germany in 2000 and is now available in eight languages; the English version, for example, was added in 2009. The portal offers different levels of participation, the most exclusive being the discussion of market values, participation in the so-called "rumor mill," and surveys dedicated to specific football-related topics. A user is admitted to the exclusive areas only after s/he has published a minimum of 100 qualitative posts, which leads to promotion to the status of an "expert." After reaching a certain level of blog activity, individual users can also apply for leadership positions such as e.g. data scout or godfather.

Transfermarkt.de is selective because player values are not simply calculated as the mean (or the median) of the individuals' suggestions. Instead, a particularly empowered community member – a "judge" – chooses to aggregate the information provided by the community on a case-by-case basis, implying that s/he is entitled to reduce the impact of values s/he considers "outliers" or even completely delete these. Thus, the judge performs the complex task of filtering, weighting, and aggregating information by viewing the source of information (a person with a limited number of suggestions vs. an experienced community member with hundreds of suggestions) as well as the reason(s) provided as justification(s) for specific estimates (e.g., only one or two-player characteristics vs. a lengthy description of that player's abilities).

Whereas using crowd-sourced data is not without criticism, several studies have found strong correlations between crowd-sourced market values on transfermarkt.de and actual transfer fees (Franck & Nüesch, 2012; Gerhards et al., 2014; Herm et al., 2014). Critics have raised objections about the potential for manipulation, social influence, and knowledge deficiencies among community members (Lorenz et al., 2011; Simmons et al., 2010), as well as concerns about the objectivity and efficiency of the data (Müller et al., 2017). Nevertheless, the results of this study align with previous findings that suggest the use of crowd-sourced market values can provide a valuable indication of a squad's absolute quality. Table II-1 presents the composition of our dataset with 285 league-season observations.

Table 3-1 Composition of the Dataset

Country	Divisions and Number of Teams	Number of Observations
Austria	1st Division: 12 (since 2018/19; 10 before)	156
Belgium	1st Division: 18 (2006/07-2008/09)	248
	16 (2009/10-2019/20)	
	18 (since 2020/21)	
England	1st Division: 20	300
	2nd Division: 24	360
	3rd Division: 24 (23 clubs in 2019/20)	359
France	1st Division: 20	300
	2nd Division: 20	300
Germany	1st Division: 18	288
	2nd Division: 18	288
	3rd Division: 20 (inaugural season 2008/09)	260
Greece	1st Division: 16 (2006/07-2012/13)	240
	18 (2013/14-2014/15)	
	16 (2015/16-2018/19)	
	14 (since 2019/20)	
Italy	1st Division: 20	300
	2nd Division: 22 (2006/07-2017/18)	323
	19 (2018/19)	
	20 (since 2019/20)	
Netherlands	1st Division: 18	270
Portugal	1st Division: 16 (2006/07-2013/14)	254
	18 (since 2014/15)	
Spain	1st Division: 20	300
	2nd Division: 22	330
Switzerland	1st Division: 10	150
Turkey	1st Division: 18 (21 in 2020/21; no relegation)	273

The table shows that the number of clubs in each league varies considerably between the twelve European soccer leagues under consideration. For example, Switzerland has the lowest number of clubs, with only ten teams playing in the first division, whereas the English second and third division counts 24 clubs each.

Model and descriptive statistics

To provide an accurate picture of the concentration of playing talent on the one hand and the competitive balance of a league on the other hand, we calculated, for each season in each of the leagues, the Gini coefficient of the clubs' player market values and the Gini coefficient of the number of end-of-season league points. The traditional Gini coefficient can take any value between zero and one, where a coefficient of zero denotes perfect equality, and a Gini coefficient of one indicates maximal inequality among values. However, these maximal values are not to be expected in soccer.

Consider the concentration of end-of-season league points: a Gini coefficient of one would imply that at the end of the season, one club has won all its matches, while all other clubs have lost all their matches. This outcome is impossible to occur, and thus a value close to one is not to be expected. The same logic applies to the concentration of playing talent: Even the worst teams in a league will have some playing talent under contract (e.g., their market value will be larger than zero) and, therefore, values of the Gini coefficient close to one are again not to be expected.

The maximum value of the Gini coefficient for the end-of-season league points depends on the number of clubs in a league. For example, in a league with 20 clubs, the maximum of Gini coefficient is 0.350 (when the champion wins all its 38 matches, the runner-up wins 36 matches and loses the two against the champion, while the last team loses all its 38 matches,

and the second-last team wins its two matches against the last team). The maximum of the Gini coefficient varies with league size, but the variations are tiny.

It is worth noting that the optimal constellation for maximizing a competitive balance measure highly depends on the specific measure being used. The considerations mentioned above are specific to the Gini coefficient. For instance, the DCB reaches its maximum value of one in a 20-club league where the top seven teams win their games, and the remaining 13 teams draw. Additional details can be found in Avila-Cano et al. (2021), who identify the maximum concentration of results for different sports competitions.

In the predominantly US literature, the limited range of the Gini coefficient has been criticized, as well as the fact that teams in the US do not play balanced schedules. However, the latter is not valid for European soccer leagues, which mostly are played as round-robin tournaments (each team plays each other team once at home and once away). Considering the limited range, we use the Coefficient of Variation (CoV) of points as a second measure. The correlation between the Gini of the number of points and the CoV of points is exceptionally high at r=0.962. A novel and alternative measure that accounts for the number of teams in a league and the point system in soccer, where a win is worth three points, and a draw is worth one point, is the "distance to competitive balance" measure proposed by Triguero Ruiz and Avila-Cano (2019).

Table II-2 presents the descriptive statistics for all main variables included in the analysis (the distribution of points and talent concentration is displayed in Figure A1 in the Appendix).

Table 3-2 Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Gini of Points	0.158	0.034	0.072	0.244
CoV of Points	0.298	0.067	0.129	0.545
Gini Talent	0.343	0.103	0.066	0.611
Austria	0.053	---	0	1
Belgium	0.053	---	0	1
England	0.158	---	0	1
France	0.105	---	0	1
Germany	0.158	---	0	1
Greece	0.053	---	0	1
Italy	0.105	---	0	1
Netherlands	0.053	---	0	1
Portugal	0.053	---	0	1
Spain	0.105	---	0	1
Switzerland	0.053	---	0	1
Turkey	0.053	---	0	1
Division 1	0.635	---	0	1
Division 2	0.267	---	0	1
Division 3	0.098	---	0	1

Notes: n=285 League-Season-Observations, 2005/06 thru 2020/21

It appears from Table II-2 that the average Gini of points GP is 0.158, and the average Gini of talent concentration GT is 0.343. Moreover, Table II-2 shows that the minimum value of the Gini of points is 0.072 (second division in Spain in season 2013/14), and the maximum is 0.244 (first division in Greece in 2019/20). On the other hand, the concentration of playing talent is considerably higher yet similar to the concentration of earnings of full-time employees in most Western European countries (0.340). Here we observe a relatively large dispersion with a minimum of 0.066 (third division in Germany in season 2015/16) and a maximum of 0.611 (first division in Portugal in 2019/20). The average CoV of points is 0.298, the minimum value is 0.129 (second division in Spain in 2013/14), and the maximum is 0.545 (first division in Switzerland in 2011/12).

4. Results

This section presents our results and is structured as follows: First, we examine the average degree of talent and points concentration in the 12 soccer leagues under consideration. Second, we analyze the evolution of talent and points concentration in the Big-5 leagues over time. Third, we empirically examine the relationship between talent concentration and points concentration using a linear regression model.

Talent and Points Concentration by Country and Division

Figure II-1 displays the degree of talent concentration in the twelve soccer leagues averaged over the observation period. The blue bars depict the first divisions, the orange bars are the second divisions, and the grey bars are the third divisions. Recall that a Gini coefficient of zero would indicate a perfectly equal distribution of playing talent in a league. In contrast, a coefficient of one would represent perfect inequality, where one team in the league has all the talent while all other teams have no talent.

Figure 4-1 Talent Concentration by Country and Division

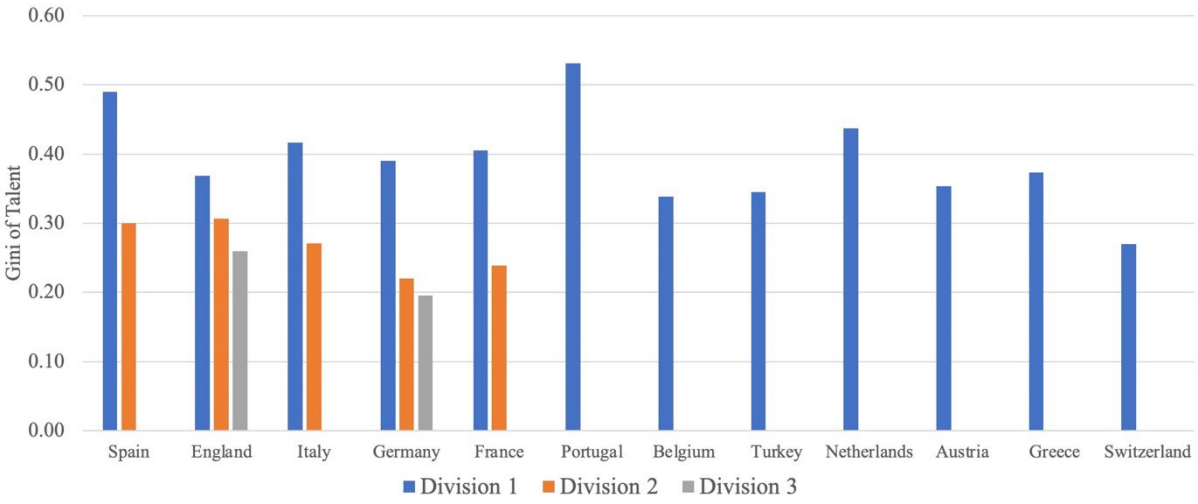
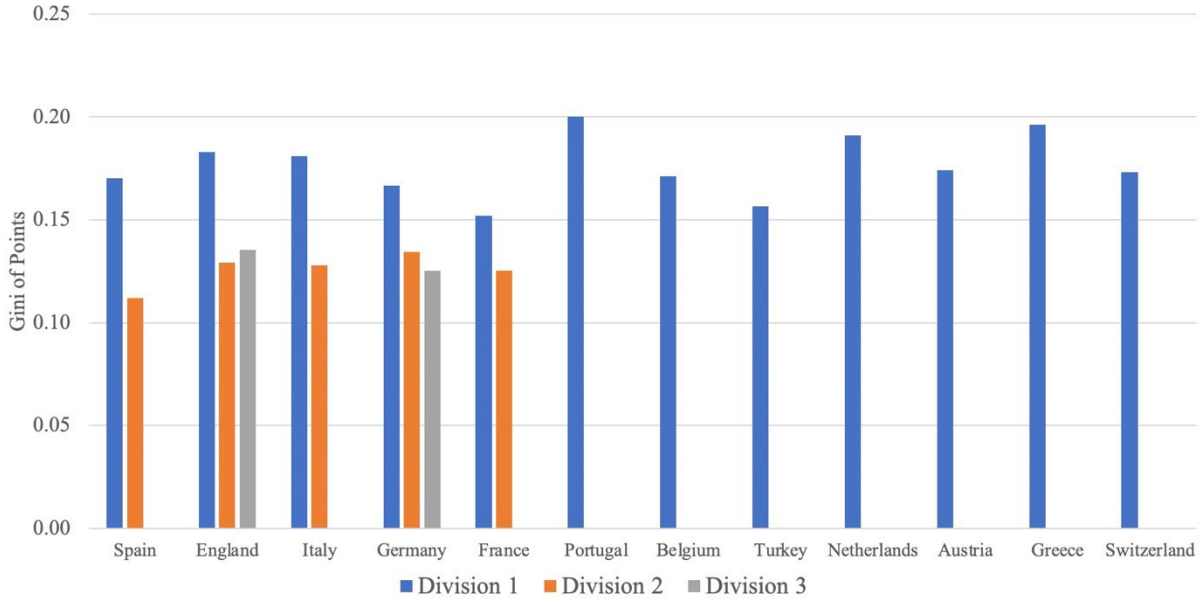


Figure II-1 shows that the Primeira Liga in Portugal has the highest level of talent concentration with 0.525, followed by La Liga in Spain with 0.490 and Eredivisie in the Netherlands with 0.425. The lowest level of talent concentration (0.275) can be found in the Swiss Super League. Moreover, it appears from Figure II-1 that the second and third divisions are characterized by a notably lower degree of talent concentration than the respective first divisions.

Next, we examine the level of competitive (im-)balance measured by our Gini of points concentration. Figure II-2 illustrates the Gini of points concentration in the 12 leagues averaged over the years. The differently colored bars again represent different divisions (blue bars = first divisions, orange bars = second divisions, grey bars = third divisions). For the corresponding figure with CoV of points concentration instead of Gini of points concentration, see Figure A2 in the Appendix.

Recall that the Gini of points concentration has a somewhat limited range compared to the talent concentration measure. For example, in a league with 20 clubs, it can only take values between zero and 0.350. Thus, a coefficient of zero would indicate a perfectly equal distribution of final points, whereas a coefficient of 0.35 would represent perfect inequality in such a league.

Figure 4-2 Gini of Points Concentration by Country and Division



Among the first divisions, we find the Primeira Liga in Portugal to be the least balanced league with a points concentration of 0.2, while the French Ligue 1 turns out to be the most balanced league with a Gini of 0.15. Among the second divisions, Spain has the most balanced and Germany has the least balanced league. Finally, Germany's third division is slightly more balanced than England's League One. Overall, the lower divisions are more balanced than the respective higher division. Thus, one might think that the European leagues are characterized by a relatively high level of competitive balance, with a value of 0.2 for the least balanced league. However, due to the limited range of the Gini of points, a value of 0.2 indicates a relatively high concentration level.

We computed the correlation between these two variables to gain insights into the relationship between talent concentration and points concentration across different countries. The results of our analysis are presented in Table II-3.

Table 4-1 Correlation Gini Talent and Gini Points by Country (Only First Divisions)

Country	Correlation
Austria	-0.041
Belgium	-0.460
England	0.286
France	0.588
Germany	0.381
Greece	0.412
Italy	0.326
Netherlands	-0.108
Portugal	-0.259
Spain	0.561
Switzerland	-0.053
Turkey	-0.267

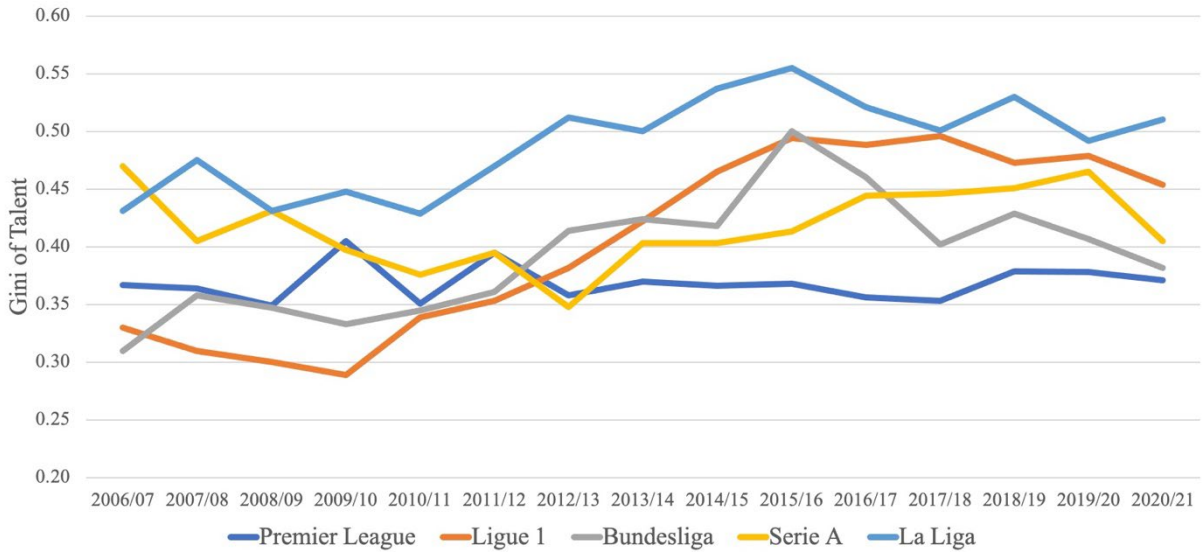
One interesting finding that emerged from Table II-3 is that the correlation between talent concentration and points concentration was positive for all the Big-5 leagues, which suggests that in these leagues, there is a positive relationship between the concentration of talent in a few top teams and the distribution of points across the league. On the other hand, in the rest of the leagues that we analyzed (apart from Greece), we found a negative correlation between talent concentration and points concentration. This result may indicate that in these leagues, a few top teams with a high concentration of talent do not necessarily dominate the league and accrue a disproportionate share of the points. Instead, the points are distributed more evenly across the league, with more teams competing at a similar level.

Before proceeding to the regression analysis, where we estimate the impact of talent concentration on the concentration of points, we use the longitudinal nature of our data set to identify potential time trends.

Evolution of Talent and Points Concentration in the Big-5 Leagues

This section examines the evolution of points and talent concentration over time. Here we restrict our attention to the Big-5 leagues and their respective first division. Figure II-3 displays the Gini of talent concentration in the Big-5 leagues between 2006/07 and 2020/21.

Figure 4-3 Evolution of Talent Concentration in Big-5 Leagues



The evolution of talent concentration has been quite heterogeneous in the Big-5 leagues over the last 15 years. Talent concentration has largely increased in the French Ligue 1 since the 2009/10 season and has been relatively stable in the English Premier League. Interestingly, the Italian Serie A shows a u-shaped development of talent concentration over time, whereas the picture for the German Bundesliga resembles an inverted u-shape.

In Figure II-4, we examine the evolution of the Gini of points in the Big-5 leagues during the observation period (Figure A3 in the Appendix shows the corresponding figure with the evolution of CoV of points concentration in the Big-5 leagues).

Figure 4-4 Evolution of Points Concentration in Big-5 Leagues

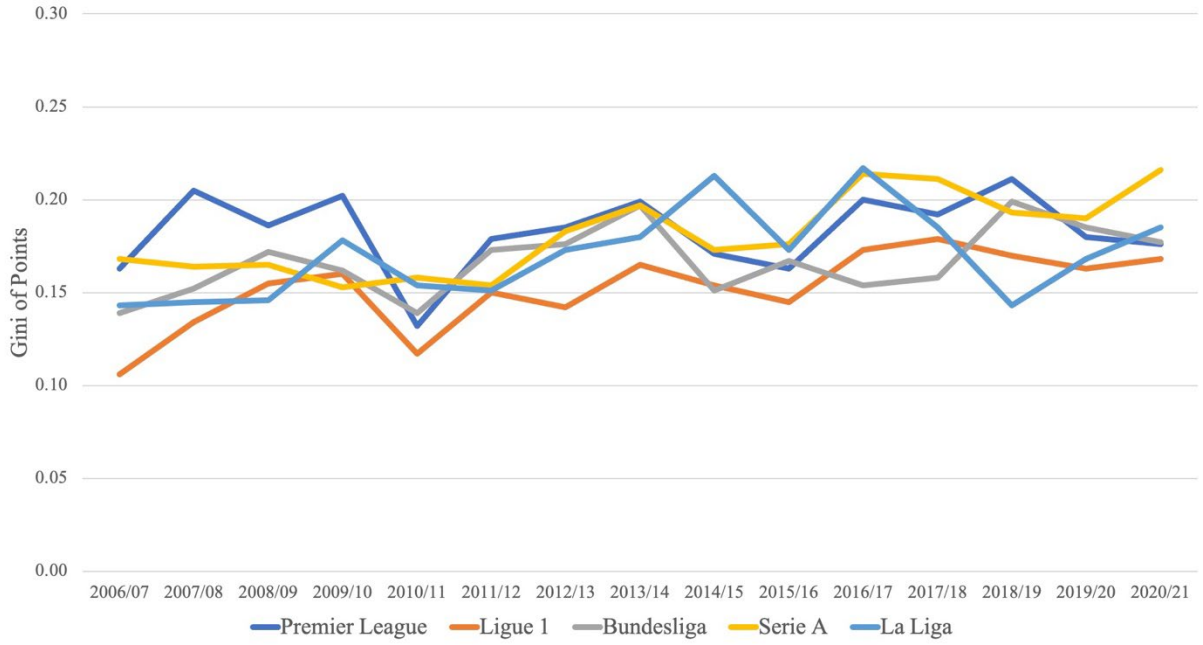


Figure II-4 shows quite some fluctuations concerning the level of points concentration in the Big-5 leagues between 2006/07 and 2020/21. There is, however, no discernible trend in any of the five leagues, suggesting that competitive balance has remained relatively stable over the last 15 years.

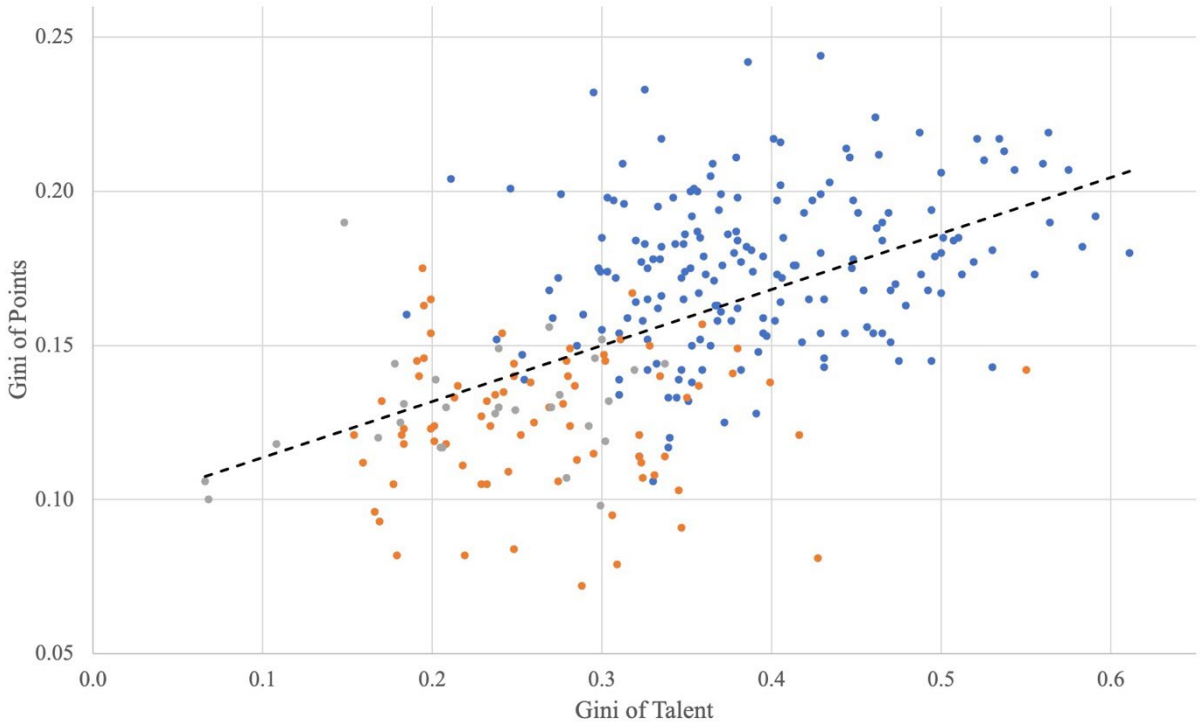
Measuring the Relationship between Talent Concentration and Points Concentration

We now examine the relationship between talent concentration and points concentration to check whether leagues with a high level of talent concentration are characterized by a high level of imbalance in terms of points concentration.

First, we visualize the relationship between talent concentration and the Gini of points concentration in a scatterplot (Figure II-5). Each dot represents the level of talent and points concentration in a particular league in a specific season. The blue dots represent first-division clubs, while the orange and grey dots display second and third-division clubs. The black dashed

line illustrates the regression line (the corresponding Figure A4 with CoV of points can be found in the Appendix).

Figure 4-5 Talent and Points Concentration



It is essential to mention that the outliers we observe in the scatterplot are not systematic, i.e., no single league drives this result. In addition, the regression line is upward-sloping and thus implies a positive correlation between talent and points concentration. In other words, the more unequal talent is distributed, the lower the competitive balance in this league.

This positive correlation between talent and points concentration is confirmed by our regression results in Table II-4 below. The table presents the estimation results where the dependent variable (points concentration) is measured by the Gini coefficient (Panel a) and by the Coefficient of Variation (Panel b) of talent.

Table 4-2 Estimation Results

Panel a: Gini of points concentration

Model	(1)	(2)	(3)	(4)
Dependent Variable		Gini of Points Concentration		
Gini Talent Concentration	0.182***	0.186***	0.182***	0.039
	(0.020)	(0.002)	(0.023)	(0.022)
Year Dummies	No	Yes	Yes	Yes
Country Dummies	No	No	Yes	Yes
Division Dummies	No	No	No	Yes
Constant	0.095***	0.085***	0.098***	0.144***
	(0.008)	(0.006)	(0.001)	(0.008)
N	285	285	285	285
*Adj R2*100*	30.4	32.6	53.0	62.1

Standard errors (clustered at country level) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel b: Coefficient of Variation of points

Model	(1)	(2)	(3)	(4)
Dependent Variable		Coefficient of Variation of Points		
Gini Talent Concentration	0.356***	0.367***	0.357***	0.087*
	(0.040)	(0.041)	(0.0248)	(0.042)
Year Dummies	No	Yes	Yes	Yes
Country Dummies	No	No	Yes	Yes
Division Dummies	No	No	No	Yes
Constant	0.176***	0.154***	0.186***	0.274***
	(0.017)	(0.012)	(0.018)	(0.014)
N	285	285	285	285
*Adj R2*100*	29.8	32.8	55.7	64.1

Standard errors (clustered at country level) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Without any further controls, our econometric analysis seems to confirm the hypothesis that the level of talent concentration in a league has a highly significant and positive impact on the concentration of points or the coefficient of variation of points in this league as an increase of talent concentration leads to an increase in the concentration of end-of-the-season league points.

In other words, the degree of talent concentration seems to be a major driver of competitive balance in a league.

The results do not change qualitatively using alternative measures such as the Theil Index or the Herfindahl Index. Moreover, controlling for the number of teams promoted and relegated each season relative to the number of teams in a league leaves our findings unaffected. This result is perhaps surprising as a larger number of promotions may induce new teams to invest less in the quality of their squads as they anticipate being relegated again – with the consequence that talent concentration increases.

Comparing models (1) to (4) in Panels (a) and (b) yields the following additional insights: In Model (2), we include year dummies to examine whether the correlation between talent and points concentration has changed over time. Our result indicates that this is not the case because the coefficients of talent concentration for both dependent variables (Gini of points and the CoV of points) in Model (2) are not any different from the ones in Model (1). Thus, the relationship between talent concentration and points concentration has been relatively stable over the years.

In Model (3), we include country dummies (together with year dummies) and again find that the coefficient of the talent Gini remains unaffected compared with Model (2). Like the above result, the positive correlation between talent and points concentration does not vary systematically across the European leagues.

Finally, we include division dummies in Model (4) in addition to the other dummy variables and find that the coefficient of our talent concentration measure decreases significantly compared to Model (1) when the dependent variable is measured by the CoV of

points (Panel b), indicating a weaker impact of talent concentration on points concentration. Talent concentration is no longer statistically significant when using the points Gini as the dependent variable (Panel a). These results are intuitive since lower divisions are more balanced than higher ones (see Figure II-2). We obtain the same results if we restrict the analysis to the Big-5 leagues (see Table A1 in the Appendix).

5. Discussion and Conclusion

Our study focuses on talent concentration within and across European soccer leagues and its impact on seasonal competitive balance. We find that across the 12 first divisions and averaged over the observation period from 2005/06 thru 2020/21, the Primeira Liga in Portugal and La Liga in Spain have the most unequal talent distribution, while the Swiss Super League has the most equal talent distribution. However, the differences in talent concentration across the leagues are relatively small. Moreover, for countries where information on second and third-division teams is available, these divisions are characterized by a more equal talent distribution than the respective first division.

During the observation period (2005/06-2020/21), broadcasting and commercial rights of the UEFA Champions League (UCL) competition have witnessed a tremendous increase from €606m in 2005/06 to €2,791m in 2020/21 (Statista, 2022). Likewise, the prize money allocated among the participating teams has increased considerably. UCL winner 2020/21, Chelsea FC, generated an estimated €111m in UCL price money alone - excluding the redistributed market pool and excluding match day revenues, which again add considerably to this amount (Bullough, 2018; Football-coefficient, 2022). Runner-up Manchester City earned €103m in UCL prize money, while Borussia Dortmund, eliminated in the quarter-finals, still made an estimated €72m in UCL prize money (Football-coefficient, 2022). The observed rise

in broadcasting and commercial rights, as well as prize money allocated among the participating teams in the UCL, has caused concern about the potential negative impact on the competitive balance in European soccer (Doyle, 2021; Economist, 2021; Venkatesh, 2021). However, our research findings challenge this notion, suggesting that repeated UCL participation and its monetary returns do not necessarily lead to an increase in competitive imbalance within the domestic leagues. While the UCL may provide significant financial rewards for the participating teams, which account for a large share of the annual revenues even for the biggest clubs in Europe (Deloitte, 2022), our research indicates that other factors, such as revenue-sharing mechanisms and the promotion and relegation system might play a more critical role in determining competitive balance within a league. We acknowledge that our findings are promising, but it is essential to note that further research in this area is necessary. For instance, future studies could investigate the potential impact of UCL participation on the transfer market, as successful teams may be more attractive to higher-quality players, which could widen the gap between the richest and poorest clubs in Europe.

Our study adds to the ongoing debate about the UCL's impact on competitive balance in European soccer. Although it is clear that the competition provides significant financial rewards for the participating teams, it is also essential to consider the potential effects in the broader industry. Our research offers insights that could inform future discussions about maintaining a competitive and equitable soccer environment for all stakeholders.

Regarding competitive balance in the first divisions, we find that the Portuguese league is the least balanced, followed by the Greek and the Dutch leagues (these are relatively small countries with rather large leagues that have been dominated for many years by two or three teams). The most balanced league is the French Ligue 1. Again, the lower divisions are more

balanced than the respective higher divisions. Like in the case of talent concentration, the differences across the leagues are relatively small. In sum, European soccer leagues are relatively homogeneous with respect to talent and points concentration.

Looking at the concentration of talent over time, it appears that it has increased in the French Ligue 1 since 2009/10 and in the German Bundesliga as well as in the Spanish La Liga between 2006/07 and 2015/16, while it has been relatively stable in the English Premier League. Interestingly, the Italian Serie A shows a u-shaped development of talent concentration over time. Concerning points concentration in the Big-5 leagues, we see some fluctuation between 2006/07 and 2020/21, but we do not observe a significant trend (up or down) in either league.

As long as we do not add any further controls, our regression analysis seems to confirm recent studies such as Rappai and Fűrész (2022) and Gasparetto et al. (2022) that have shown statistically significant impact of talent concentration on the concentration of end-of-season league points – suggesting that leagues with a more unequal talent distribution are characterized by a lower level of competitive balance. However, since the significant impact of talent on points concentration is weaker for lower divisions, this effect disappears once we add division dummies to the estimations. Our results thus confirm earlier findings by Szymanski (2002, 2006), who observed a relatively stable competitive balance over time, despite increased financial inequality among clubs in English professional football. Finally, our results show that the impact of talent on points concentration does not vary much across the European leagues, nor over time (i.e., no time trend can be identified).

Our paper contributes to the literature on competitive balance in sports that primarily analyses the impact of competitive balance on sports attendance, while only limited empirical research explores the determinants of competitive balance.

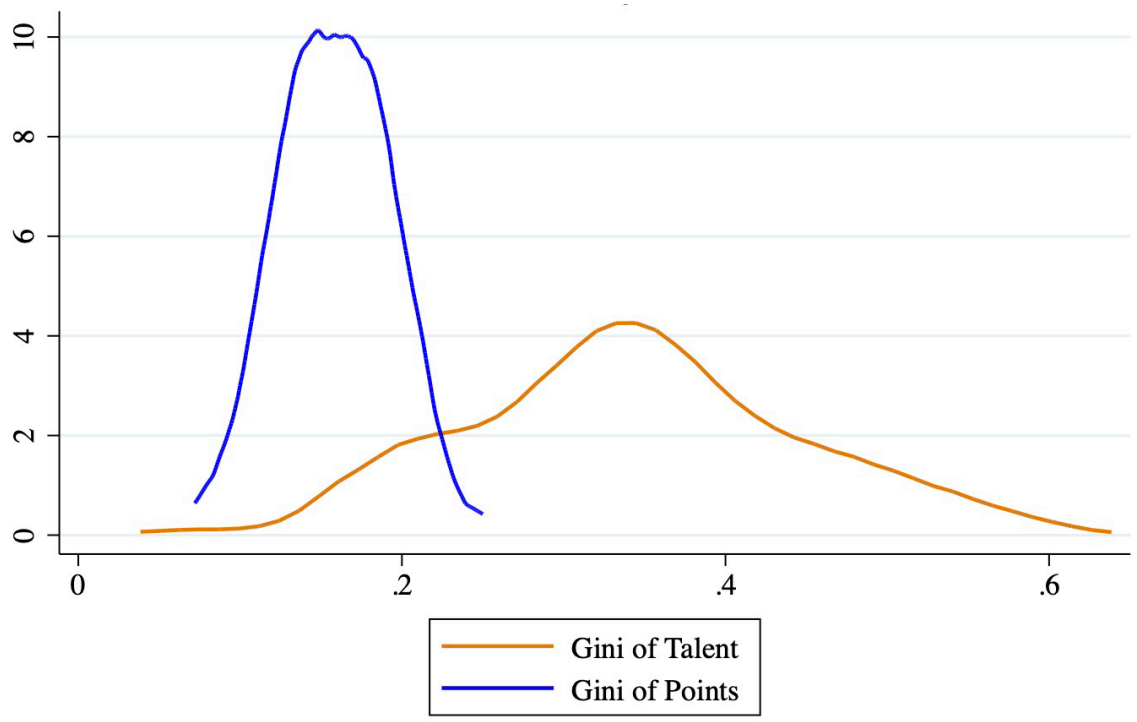
Our study has important implications for league governing bodies in European soccer. Suppose the objective is to retain competitive balance. Our results suggest that with relatively few additional regulatory interventions, the promotion and relegation system in the open European soccer leagues effectively ensures a balanced league. The "punish the loser" (Becker et al., 1997) approach by relegating poorly performing teams and replacing them with the top-performing teams from the next lower division appears to be an effective mechanism. Although recently promoted teams have a disproportionate probability of being relegated again in European soccer leagues, new franchises in the North American major leagues typically struggle even more in their first year. Thus, the "liability of newness" is even more pronounced in North America than in Europe (Frick & Wallbrecht, 2012). In addition, the current system of promotion and relegation in European soccer leagues effectively promotes competitive balance without creating the perverse incentives of "losing to win" that are present in closed leagues operating with reverse-order drafts, such as the North American major leagues (Fornwagner, 2019; Taylor & Trogdon, 2002).

Our study has a few limitations that should be addressed in future analyses. Firstly, we utilized the market values of teams at the start of their respective seasons to calculate talent Ginis. However, in certain countries, the transfer window remains open for a few weeks into the season, enabling clubs to sign additional players after the official start. Additionally, clubs can recruit mid-season during the winter transfer window, leading to different market values for those teams that remain active on the transfer market. It is crucial to investigate whether and to what extent this affects the results we obtain. Secondly, we purposely focused on leagues in Western European countries. However, it may be valuable to include leagues from Eastern and South-eastern Europe, such as Poland, Russia, Serbia, and Croatia, given that these countries' national associations score high in UEFA's and/or FIFA's rankings.

In conclusion, our study provides important insights into the relationship between player talent concentration and competitive balance in professional soccer leagues across twelve Western European countries. Our findings suggest that while the concentration of talent in a league positively impacts points concentration, this relationship is weak and insignificant when controlling for other factors. Moreover, our research suggests that participation in the UCL, with its considerable monetary rewards, does not significantly increase competitive imbalance in the domestic leagues. Our results have important implications for policymakers, soccer clubs, and fans concerned about maintaining competitive balance in the sport.

APPENDIX

Figure A1: Distribution of Points and Talent Concentration



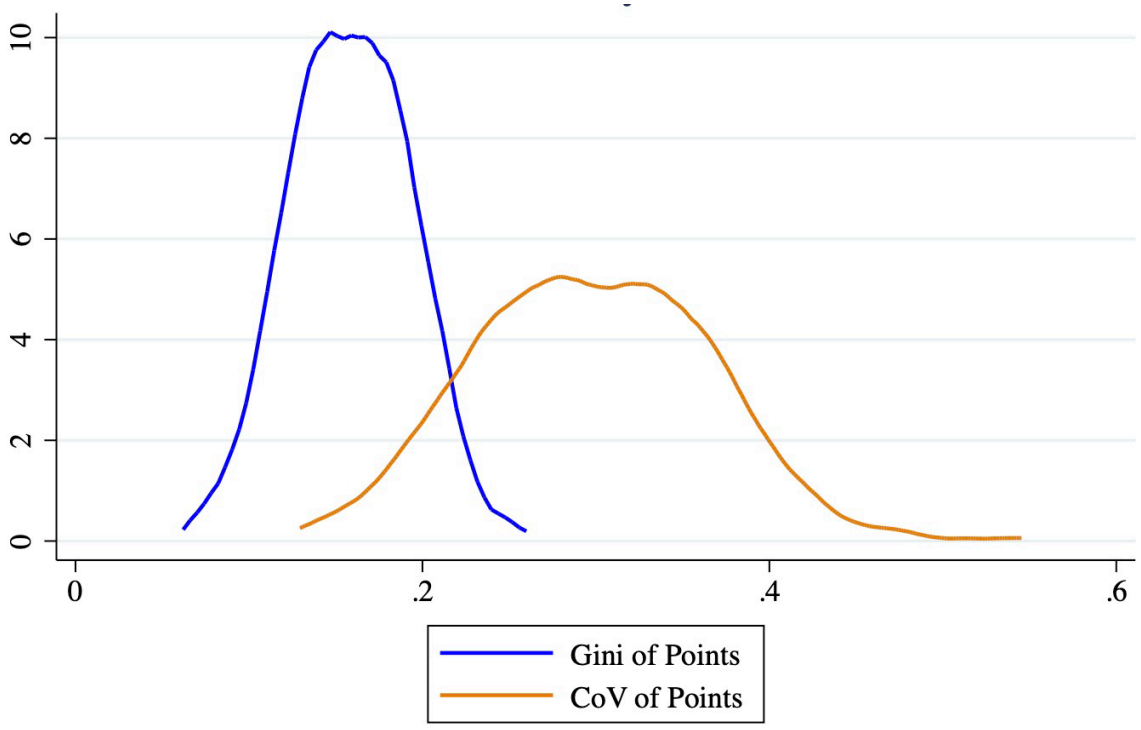


Figure A2: CoV of Points by Country and Division

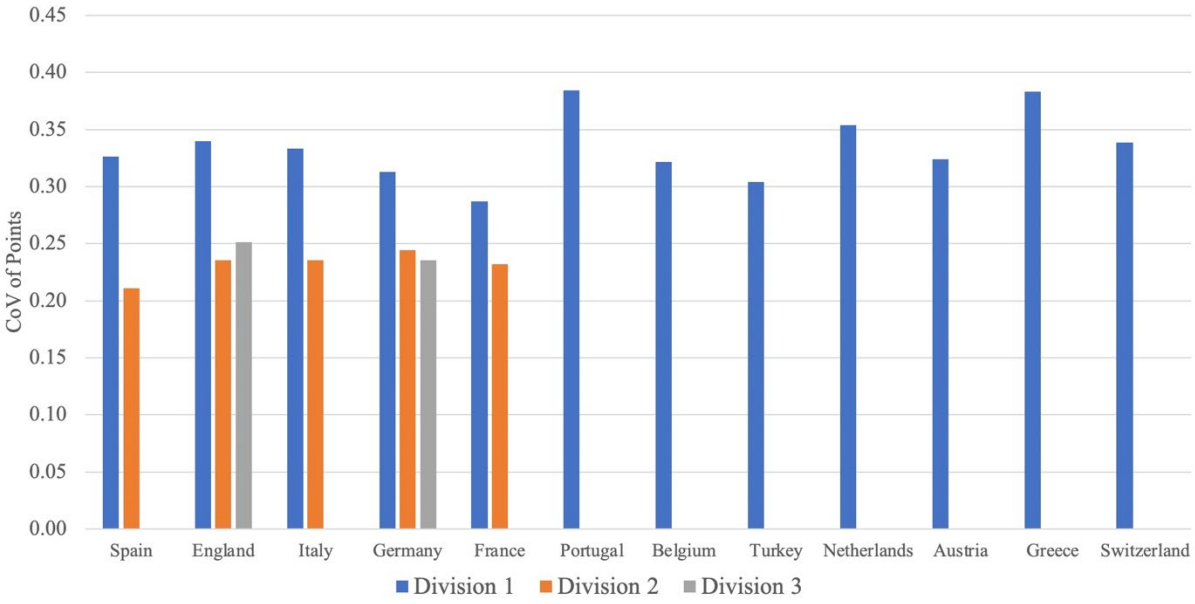


Figure A3: Evolution of CoV of Points in Big-5 Leagues

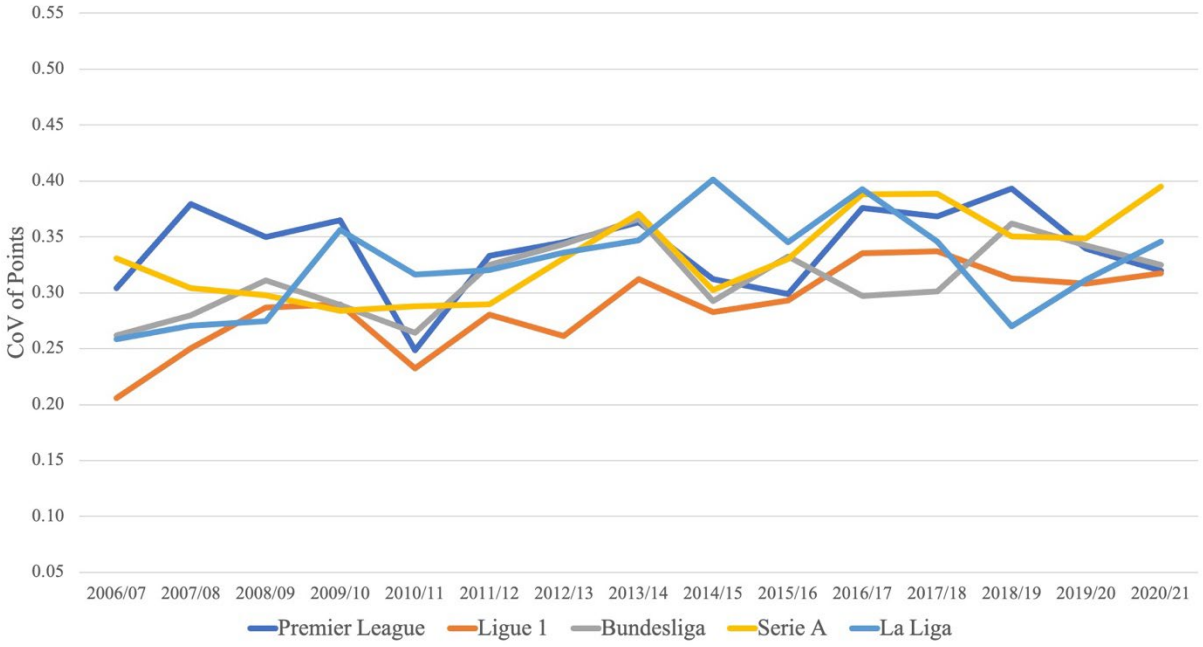


Figure A4: Talent Concentration and CoV of Points

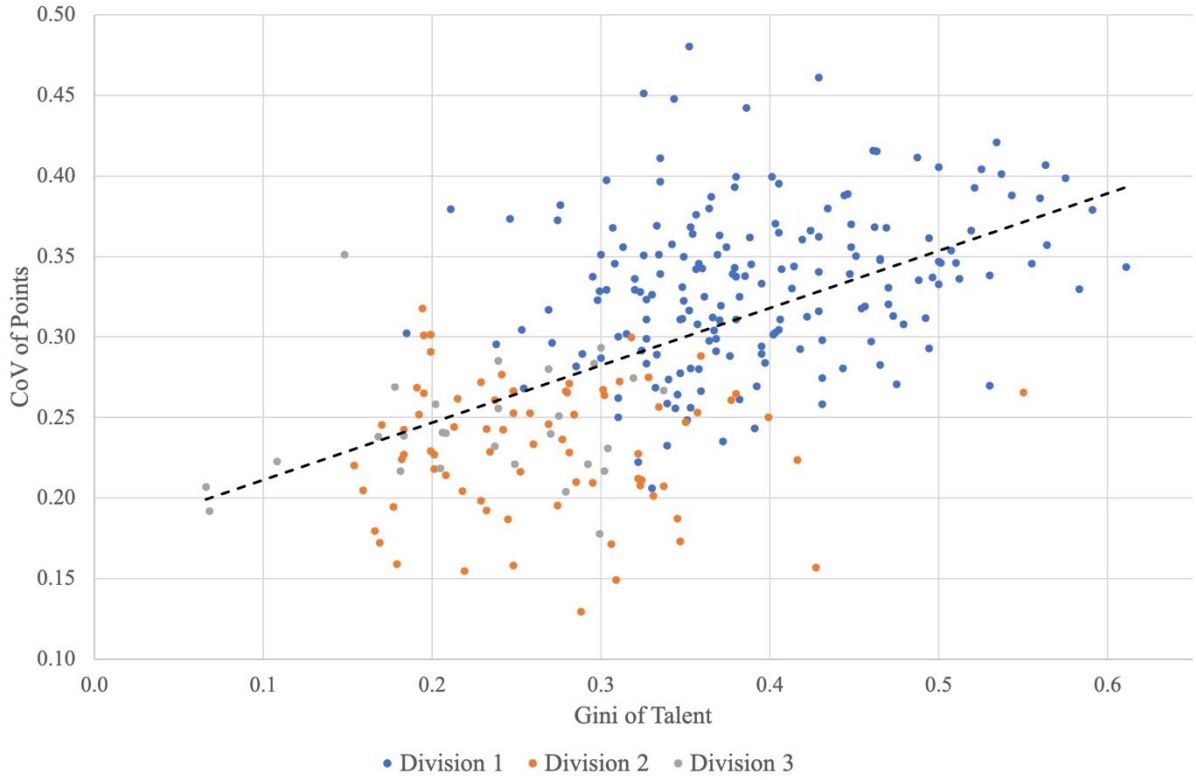


Table A1: Estimation Results for Big-5 Leagues

Model	(1)	(2)
Dependent Variable	Gini of Points	CoV of Points
Gini Talent	0.0621	0.124*
	(0.0299)	(0.0534)
Constant	0.144***	0.264***
	(0.0113)	(0.0209)
N	180	180

Standard errors (clustered at country level) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Estimation Results (controlling for the number of teams promoted and relegated each season)

Model	(1)	(2)	(3)	(4)
Dependent Variable		Gini of Points Concentration		
Gini Talent Concentration	0.175***	0.179***	0.181***	0.0341
	(0.0194)	(0.0200)	(0.0276)	(0.0241)
Year Dummies	No	Yes	Yes	Yes
Country Dummies	No	No	Yes	Yes
Division Dummies	No	No	No	Yes
EXP	0.0129	0.0169	0.00153	0.00313
	(0.0112)	(0.00987)	(0.00953)	(0.00942)
CONT	0.0437***	0.0442***	0.0195***	0.0250***
	(0.00624)	(0.00598)	(0.00288)	(0.00253)
Constant	0.0966***	0.0873***	0.0980***	0.145***
	(0.00808)	(0.00567)	(0.00974)	(0.00771)
N	285	285	285	285
*Adj R2*100*	34.2	36.5	53.5	62.9

Standard errors (clustered at country level) in parentheses. EXP (for expansion) and CONT (for contraction) are dummy variables that take a value of one if there are more or fewer teams in the league compared to the previous season.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Estimation Results
Panel a: Theil Index

Model	(1)	(2)	(3)	(4)
Dependent Variable		Theil Index		
Gini Talent Concentration	0.139*** (0.0162)	0.142*** (0.0161)	0.138*** (0.0218)	0.0217 (0.0155)
Year Dummies	No	Yes	Yes	Yes
Country Dummies	No	No	Yes	Yes
Division Dummies	No	No	No	Yes
Constant	0.0684*** (0.00639)	0.0613*** (0.00455)	0.0749*** (0.00783)	0.111*** (0.00517)
N	285	285	285	285
*Adj R2*100*	27.0	29.2	47.5	56.5

Standard errors (clustered at country level) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Panel b: Relative deviation from the mean

Model	(1)	(2)	(3)	(4)
Dependent Variable		Relative deviation from the mean		
Gini Talent Concentration	0.0914*** (0.0110)	0.0933*** (0.0110)	0.0846*** (0.0133)	0.0134 (0.0122)
Year Dummies	No	Yes	Yes	Yes
Country Dummies	No	No	Yes	Yes
Division Dummies	No	No	No	Yes
Constant	0.0113** (0.00403)	0.00459 (0.00310)	0.0153*** (0.00476)	0.0383*** (0.00407)
N	285	285	285	285
*Adj R2*100*	29.1	31.9	51.1	59.6

Standard errors (clustered at country level) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

III. CHAPTER THREE: ESSAY ON THE MARKET PRICE FOR TALENT

The Importance of Club Revenues for Player Salaries and Transfer Expenses—How Does the Coronavirus Outbreak (COVID-19) Impact the English Premier League?

Abstract

The COVID-19 pandemic has caused significant disruption in the sports industry and has raised the question of whether the football industry is based on a sustainable business model. Using data from the English Premier League (EPL), we develop a regression model to achieve two objectives: First, we examine the relationship between the different revenue sources (TV revenues, match revenues, and commercial revenues) and the main cost drivers of professional football clubs (player salaries and transfer expenses). Second, we seek to predict the likely impact of a major market downturn such as the COVID-19 pandemic in the EPL. Our results suggest that TV revenues are by far the most important source of income for player salaries and market values, followed by match revenues and commercial revenues. We predict that player salaries, market values, and transfer expenses will all decrease in the forthcoming EPL season 2020/21. The magnitude of the reduction depends on the coronavirus scenario and ranges from -20.4% to -9.5% for player salaries and -26.7% to -12.4% for player market values. Our study seeks to explore the relative impact of the three main revenue sources in the EPL on the unprecedented growth of player salaries, market values, and net transfer expenses in the last three decades. In addition, our study adds to the understanding of the pandemic's expected impact on the EPL.

1. Introduction

For many years, transfer fees and player salaries have seen mainly one direction, upwards. Fueled by increasing match, sponsorship, and broadcasting revenues, particularly in the English Premier League ("EPL"), worldwide football transfer fees reached a record high of USD7.4B in the year 2019, almost tripling the fees paid in 2012 (FIFA-TMS). The war for talents among football clubs is driven by the desire for on-field success and win-maximization (Garcia-del-Barrio & Szymanski, 2009; Késenne, 2006b). Player salaries, as well as transfer fees, constitute the most important cost factor of clubs in modern professional football (Deloitte, 2020). Szymanski (2013) has shown a statistically significant and positive impact of clubs' staff expenditures in the form of player salaries and transfer fees on their sporting success.

The coronavirus pandemic (COVID-19), which caught companies worldwide by surprise, had been nothing but a disaster for the sports industry so far and has raised the question of whether the sports industry, in particular the European football industry, is based on a sustainable business model (e.g.,BBC, 2020a; ECA, 2020; LawinSport, 2020). While some football leagues such as France, Belgium, and the Netherlands abandoned the 2019/20 season, other leagues continued without spectators, with significant revenue losses for the clubs in both cases. While several football industry professionals expressed the view that this could lead to a contraction of the player market in the near future (Panja, 2020), no academic study has so far investigated the possible effects of the coronavirus epidemic. Our paper tries to shed first light on this issue by examining the likely consequences of COVID-19 for professional football.

Using data from the EPL, we develop an empirical model to achieve two objectives: First, we aim to study the importance of club revenues on player salaries and transfer costs. In particular, we examine how changes in the different income sources of football clubs (TV revenues, match revenues, and commercial revenues) affect player salaries, player market

values, and net transfer expenses. Second, we seek to estimate the impact of a major market downturn such as the COVID-19 pandemic in the EPL. In particular, we predict the (likely) development of player salaries, net transfer expenses, and player market values in the forthcoming EPL season in three possible coronavirus scenarios.

The main contribution of our paper is to determine the relative impact of the three main revenue sources in professional football on the unprecedented growth of player salaries, market values, and net transfer expenses in the last three decades. In addition, our study adds to the understanding of the economic impacts of the COVID-19 pandemic on sports. Thus, our study aims at providing new insights to sport management professionals on what to expect for the development of the football labor markets in crises. Our study also serves as a reference point for future research on sports labor markets, and managers of football leagues and clubs.

The remainder of the paper is organized as follows: Section 2 introduces the background with the COVID-19 pandemic and the main variables of our model. Section 3 describes the data and the empirical model. Section 4 presents the results of the empirical investigation and predicts the impact of the COVID-19 pandemic. Section 5 provides a discussion, and the paper concludes with Section 6.

2. Background

The COVID-19 pandemic

The Coronavirus disease 2019 (COVID-19) is a highly infectious respiratory illness transmitted through human and animal interaction and caused by the strain of coronavirus, the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The virus appears to have first emerged from Wuhan, China in December 2019 and then spread throughout the world. By February 2020, the virus had reached Italy, where it prompted a high number of infections and deaths,

which eventually forced the Italian government to close schools, companies, and borders and to suspend commercial air traffic during February and March 2020. Other European countries experienced, time-delayed, similar developments, with different degrees of government-imposed measures and ordinances to lower infections and casualties.

Like in other countries, the EPL, together with the Football Association, English Football League, the Women's Super League, and Women's Championship collectively suspended professional football in England in March 2021. After a two-month interruption, during which virtually no sporting events took place worldwide (except for the Belarusian league), the German Bundesliga was the first major professional football league to resume in May 2020, under strict control – and without spectators. The EPL followed suit in June 2020, also without stadium audiences.

Despite having developed hygiene concepts to prevent the spread of Covid-19 among stadium visitors, essentially all major sports leagues started the 2020/21 season without spectators (Barker, 2020; Simmons, 2020; VanOpdorp). And even after the introduction of several vaccines against COVID-19 at the beginning of the year 2021, the majority of sports events have remained closed to the general public due to the relatively low percentages of vaccinated people, increasing new infections as of April 2021, as well as the appearance of mutations, against which current vaccinations are believed to be less effective (Castro et al., 2021). So-called immunity-passes have been in discussion, which would allow immune spectators to enter the stadiums. However, at the time of writing, such immunity-passes do not yet exist, and it has not been established how long an immunization would last (Cunningham et al., 2020).

Research on the COVID-19 pandemic and sports

Research suggests that mass sports events contribute to the spread of the SARS-CoV-2 strain. Olczak et al. (2020), for example, investigated the impact of regular mass outdoor meetings on the spread of a virus by considering football matches in England in February and March 2020 and the spread of Covid-19 into April 2020. They found evidence that mass outdoor events were consistent with more cases and deaths - with around six additional Covid-19 cases, two additional Covid-19 deaths, and three additional excess deaths per 100,000 people.

In a similar vein, Alexander et al. (2020) analyzed how much National Basketball Association (NBA) and National Hockey League (NHL) games held between March 1 and March 11 have contributed to the community spread of COVID-19 in counties surrounding NBA and NHL venues. They conclude that one additional mass gathering increased the cumulative number of COVID-19 deaths in affected counties by 9%.

While the mid-to-long-term impacts of COVID-19 on sports are still to be assessed, first research studies have investigated the instantaneous impacts of Covid-19 on the health and performance of professional athletes. In a multicenter cross-sectional study of professional athletes with prior COVID-19 infection, Martinez et al. (2021) for example, observed only rare cases of athletes having potential cardiac involvement after having been infected with the virus.

Economically, the disease already proved to have massive negative short-term financial impacts on the world of sports, as evidenced by the postponement of the Tokyo Summer Olympic Games 2020 at an alleged cost of USD2.8BN (BBC, 2020c), the discussions surrounding numerous lower-tier football clubs in Europe threatened by insolvency (Franzke, 2020; Wright, 2020), or the loss of sponsors due to coronavirus-caused revenue decreases

(Reinefeld, 2020). Academic research that examines the impact of COVID-19 on sports is flourishing, as evidenced by the special issue of Soccer & Society (Bandyopadhyay, 2021).

Revenue sources of football clubs

The three main revenue sources of football clubs have traditionally been match income (i.e., ticketing, food & beverage, and parking), media and broadcasting income, as well as commercial income from sponsorship and merchandising (Chanavat et al., 2017).

While the loss of match revenues appears to be the most obvious effect that clubs are confronted with due to COVID-19, EPL club revenues are likely to be impacted beyond.

The re-start of the 2019/20 season in June 2020 prevented EPL clubs from having to refund £762M of advance payments to broadcasters, as would have been the case in the event the season was completely canceled. However, the clubs still face financial ramifications from media houses. A league-wide penalty of £330M applies as the league had not been able to fulfill its contractual obligations concerning the timing and delivery of matches played in empty stadiums (Simmons, 2020).

In an industry report published in May 2020, sports marketing company Two Circles predicted a 37% year-on-year decrease of Global sports sponsorship rights fees for the year 2020 as the result of the COVID-19 pandemic (Cutler, 2020). While sponsors are likely to receive considerable rebates due to the cancellation or postponement of sporting events, a large part of new sponsorship agreements had been put on hold, while many existing agreements are likely to end as a result of companies implementing cost-cutting measures. Some of the most important industries for sports sponsorships have been hit hard by the pandemic, most notably, the financial services sector, airline carriers, as well as automotive and energy companies (Cutler, 2020).

Changes in their income situation are likely to result in changes in the expenditures of the clubs. While most professional teams in Europe are considered to be win- rather than profit-maximizers, clubs can only spend as much as they receive because they are subject to budget constraints (Késenne, 2006b).

Player salaries

The war for playing talent among the top European clubs is driven by the desire for on-field success and win-maximization (Garcia-del-Barrio & Szymanski, 2009; Késenne, 2006b; Sloane, 2015). Player salaries constitute the single largest cost factor of clubs in modern professional football (Simmons, 2013). Wages represent anything between 60% and 72% of revenues in each of the five large European football leagues (Deloitte, 2020) and account for between 70% and 80% of total operating costs in the EPL. The previous growth of club revenues in the EPL was accompanied by considerably increasing wage bills.

Apart from the well-documented correlation of club revenues and team wage bills (Simmons & Frick, 2008), several player-specific variables have been found to impact individual salaries. These variables include measures of performance and talent, such as age, position, number of appearances, and goals scored, as well as popularity. Past performance serves as an indicator of future performance, making an athlete's recent sporting performance and talent relevant for salary negotiations and serves as an important determinant in salary models (e.g. Bryson et al., 2013; Franck & Nüesch, 2012; Frick, 2006, 2011)). Empirical studies have further observed an inverse U-shaped relationship between age and salary. On-field experience is associated with higher salaries up to a certain point when the salary starts to decline again. In football, players reach their maximum salary between the age of 26 and 28 (Bryson et al., 2013; Frick, 2007). Additionally, certain players are more popular than others,

irrespective of performance or mere talent, which significantly and positively influences their salary (Franck & Nüesch, 2012).

While individual player salaries are typically not disclosed in European football (Thrane, 2019), evidence from the North American Major Leagues suggests that salaries in professional sports are generally right-skewed, with a relatively large number of low salaries and a few players earning far more (Deutscher, 2018). These large salary differences are often explained by the 'superstar' effects as discussed by Adler (1985) and Rosen (1981). Adler (1985) explains the emergence of superstars and the resulting skewed income distribution among athletes by network externalities of popularity, whereas Rosen (1981) suggests that the supply of talent is fixed, and the distribution of talent is freely observable. As top talent cannot be substituted by less talented players, the demand for over-achievers is particularly high. Thus, relatively small differences in talent at the top of the talent distribution lead to large differences in earnings (Deutscher, 2018).

Net transfer expenses

Transfer fees had been on the rise before the COVID-19 pandemic. In 2019, worldwide football transfer fees reached USD7.4B, compared to USD2.71B in the year 2012 (FIFA-TMS). There had been as many as 39 transfers with fees in excess of USD50m in 2019 alone (FIFA-TMS), costs that are to be amortized by the clubs over the length of the player´s contract.

From a legal perspective, the "transfer fee is a payment made between clubs in relation to a transfer operation usually including an early termination of a player's contract without just cause, excluding training compensation" (KEA). In other words, it is compensation for releasing a player before contract-end, which enables the releasing club to offset financial losses incurred from the contractual expiry of its asset. The subject is therefore not the player himself,

but the player contract and the releasing club's registration of the player with the member association (Simmons, 2007). The fee can either be negotiated between the releasing and the acquiring club or can be a fixed fee as part of a release clause in the player's existing contract. Contracts in Spain have such a release clause, as Royal Decree (1006/1985) explicitly grants athletes the right to early-terminate their contractual relationship conditional on the payment of a predetermined compensation (de Dios Crespo Pérez, 2014).

Numerous clubs have developed a distinct business model by focusing on the discovery, development, and subsequent profitable on-sale of players. For some of these clubs, transfer fees have become an indispensable income source. EPL clubs are rather net spenders, buying established players from other leading European and non-European leagues. Net transfer expenses as used here are the sum of transfer fees received and money spent for signing new players. Transfer fees represent discretionary spending in the present market as opposed to wages, which are mandatory in relation to an existing contract.

Player market values

In the sports management literature, there appears to be some ambiguity regarding the concepts of transfer price (or fee) and player market value and their relationship to each other.

Müller et al. (Müller et al., 2017) describe player market values as estimates of the transfer fees that are most likely to be paid, while Kirschstein and Liebscher (2019) describe transfer fees as estimates of player market values. Herm et al. (2014) define the market value of a player as an estimate of the amount of money a club is willing to pay to sign that player, ignoring the possibility of money laundry, bribery, and backroom deals that influence this "willingness" and the amount to be offered, which would eventually lead to distorted player market values.

To separate the terms “market value” and “transfer price”, it is thus helpful to look at the two concepts in more detail. In analogy to other areas such as marketing or finance, we distinguish between value and price. While no single measure of value has gained universal acceptance (Sánchez-Fernández et al., 2009), finance scholars consider valuation as an assessment of assets based on their intrinsic characteristics, while pricing manifests itself in the form of comparisons across transactions (Damodaran, 2009). In contrast to value, the price of an asset is determined in large part by mood and momentum, liquidity, incremental information as well as groupthink (Damodaran, 2014).

Traditionally, the players’ market values have been estimated by the sporting departments of football clubs themselves in anticipation of the transfer fees to be paid or to be received in case a player contract is prematurely terminated (Müller et al., 2017). Researchers and service providers usually generate player values by comparing and contrasting individual player characteristics and performances with those of players in recent transactions and the transfer fees realized there. The approaches used do not aim at generating intrinsic value, but at comparing prices in similar transactions. Thus, what is generally referred to as player market value is a “price estimation” rather than a “valuation”. Player market values in this sense are subjective, are influenced by the methods and parameters used (Damodaran, 2009), can be biased (Kirschstein & Liebscher, 2019), and depend on the overall pricing situation on the player market which itself is influenced by supply and demand. The market value of a player is, thus, a theoretical construct. Unlike products and services where the value or the price is associated with a property right, there are no rights associated with a player’s market value – in contrast to a player’s transfer fee.

One can distinguish between two valuation approaches: data-driven and crowd-driven. Data-driven approaches are methods that make use of statistical models with an established set

of indicators and empirically derived weights to estimate a player's market value (Müller et al., 2017). In the case of crowd-driven valuation approaches, registered community members perform their subjective estimations of player market values on dedicated platforms, based on arbitrary indicators and subjective weighting. Using a hierarchical approach with several different indicators such as user evaluations, dedicated judges then assign subjective weightings to all prior estimations after performing a market value estimation themselves (Müller et al., 2017). These market values are available at individual and team levels for most professional football leagues in the world and are regularly used by researchers as a proxy for transfer fees (e.g., Bryson et al., 2013; Franck & Nüesch, 2012), since actual transfers do not happen regularly, and data is not always publicly available. The largest and most well-known crowd-driven valuation platform is the German website transfermarkt.de, established in 2001.

In this paper, we consider the market value of a player as a theoretical construct that aims at approximating the current market price for releasing that player from an existing contract, irrespective of its remaining length or status. The market price of a player is determined by the overall situation on the player market, i.e., supply and demand, the player's performance, his individual characteristics, as well as his popularity. In contrast, a transfer fee is compensation money to offset the financial losses incurred by the releasing club from the contractual expiry of the asset, either as part of an agreement between the releasing and the acquiring club or following the execution of a release clause included in the players' current contract. The two concepts are summarized in Table III-1. Despite these differences, market values are a good proxy for transfer fees as they are highly correlated (Franck & Nüesch, 2012; Herm et al., 2014).

Table 2-1 Market value versus transfer price

Concept	Market value	Transfer price / fee
Subject	The player as a theoretical construct, irrespective of contract status	The player registration with member association, which ties the player to a club for the life of his contract
Manifestation	Non-observable, estimated by club officials, sports journalists, academics and service providers	Negotiated cash-settlement between two clubs for premature termination of contract or as pre-defined in player contract
Determinants	▪ Overall pricing situation on the player market (supply/demand) ▪ Player performance ▪ Popularity of player ▪ Player characteristics	Market value determinants in addition to the current contract status and contract conditions (release clause, duration, free agency)
Issues	▪ Have a subjective element ▪ Might be biased depending on evaluator or model used (club characteristics, nationality, etc.)	▪ Player market not efficient and fee depends on club needs, know-how, negotiation skills, and market power ▪ Not always publicly available ▪ Can be distorted due to money laundry, corruption and secret "deals" ▪ Conditional fees are often not displayed

To sum up this section, we added Table III-2 that categorizes all income and outcome variables of our study.

Table 2-2 Categorization of income and outcome

Club revenues	Club revenues are the sum of income generated from the three main source: matchday receipts, broadcasting rights and commercial transactions. Revenues are recognized in the profit or loss account after applying a five-step test: 1. There must be a contract between the club and the customer; 2. The club has an obligation to the customer; 3. There is an agreed price; 4. The price is allocated to the obligation; 5. Revenue/income is recognized as the club delivers the obligation
Player salaries	Player salaries constitute the single largest cost factor of clubs in modern professional football. Salaries in the model are proxied by the Team Wage Bill, a club's total personnel expenses, as provided in the Income Statements of the clubs
Net transfer expenses	Net transfer expenses are the sum of transfer fees received and money spent for signing new players. Transfer fees represent discretionary spending in the present market as opposed to wages which are mandatory in relation to an existing contract.
Player market values	is a theoretical construct that aims at approximating the current market price for releasing that player from an existing contract, irrespective of its remaining length or status. The market price of a player is determined by the overall situation of the player market, i.e., supply and demand, the player's performance, his individual characteristics, as well as his popularity

3. Data and empirical model

Player market values

The data we use to estimate our regression models (see below) comes from the 20 clubs playing in the EPL for the 27 seasons between 1992/93 and 2018/19, yielding a total of 540 club-season-observations. If we had the relevant information for all clubs over the entire period, our number

of observations would be 546 because in the seasons 1992/93 through 1994/95 the number of clubs in the EPL was 22. Moreover, we did not include season 2019/20 because the financial data of the clubs were not available for this season at the time of writing the article.

Due to promotion and relegation, the number of different clubs over the observed time period is 49, with some clubs appearing in the dataset only once and others in every single year. Information on club revenues, team wage bills, and net transfer spending were retrieved from the annual reports of the individual clubs. The player market value estimates are available only from the season 2005/06 onwards and were retrieved from the website "transfermarkt.de". In each season, each of the 20 clubs employed a squad consisting of 20 to 48 players, yielding 10,043 player-season-observations for the 15 seasons 2005/06 to 2019/20.

Empirical model

Several fixed-effects models that account for unobserved heterogeneity across the clubs form the basis of our predictions that we will present below. We used STATA 16 for our empirical analysis. The dependent variables we employ here are the team wage bill of the team *i* in season *j*, the net transfer spending of club *i* in season *j,* and the average player value of club *i* in season *j*. The explanatory variables are the clubs´ revenues in season *j-1* (or the components of these revenues, i.e., match income, TV revenues, and commercial income respectively). Thus, we hypothesize:

(1) Team Wage Bill = f (Total Revenues of Club)

(2) Net Transfer Expenses = f (Total Revenues of Club)

(3) Squad Market Value = f (Total Revenues of Club)

Our regression model is, therefore, of the following general form:

$$(1)\ ln(WB_{ij}) = \alpha_0 + \alpha_1\ ln(CR_{ij-1}) + \sum SD + \varepsilon$$

$$(2)\ NTE_{ij} = \alpha_0 + \alpha_1\ CR_{ij-1} + \sum SD + \varepsilon$$

$$(3)\ ln(APV_{ij}) = \alpha_0 + \alpha_1\ ln(CR_{ij-1}) + \sum SD + \varepsilon$$

Where

$ln(WB_{ij})$: natural log of wage bill (WB) of club *i* in season *j*,

NTE_{ij}: net transfer expenses (NTE) of club *i* in season *j* (given that net transfer spending includes positive as well as negative values, we cannot use the natural logarithm as negative values are not defined),

$ln(APV_{ij})$: natural log of average player value (APV) of club *i* in season *j* to control for differences in squad size,

$ln(CR_{ij-1})$ or CR_{ij-1}: (natural log of) club revenues (CR) or sources of income, i.e. match income, TV revenues, commercial income of club *i* in season *j*-1,

$\sum SD$: vector of season dummies (SD),

ε: error term.

The purpose of the regression models is to identify the relative impact of the three revenue sources (match, broadcasting, and commercial revenues) on the unprecedented growth of player salaries, market values, and net transfer expenses in the last three decades. We conjecture that the impact of the three revenue sources will be the same in a boom and in recession period. Thus, we assume that the factors, which contributed positively to the growth of salaries, market

values, and net transfer expenses in the recent boom period, will–- to the same extent–- contribute to a reduction of salaries, market values, and net transfer expenses in the current recession period.

Our econometric analysis is, therefore, a combination of forecasting and prediction. While forecasting uses historical data to extrapolate from past developments into the future, prediction is more judgmental and takes into account changes taking place in the future. Thus, we first estimate a series of regression models using historical data on the development of the EPL clubs' revenues and then derive three different scenarios representing the most likely development of club revenues, based on what we know to date with respect to the likely consequences of COVID-19 on the revenue sources of the EPL clubs. Based on the results of the regression analyses and the three forecast scenarios, we then predict the development of player salaries (that account for between 70% and 90% of all wage expenses paid by the clubs), net transfer expenses, and average player market values due to COVID-19. Table III-3 presents the descriptive statistics for all main variables included in the analysis.

Table 3-1 Descriptive statistics

Variables	Obs	Mean	SD	Min	Max
Total Club Revenues (in £m)	542	91.52	102.98	4.31	627.10
Log(Total Club Revenues)	542	3.99	1.07	1.46	6.44
Match Revenues (in £m)	542	19.80	23.80	0.00	111.64
Log(Match Revenues)	538	2.49	0.98	-0.47	4.72
TV Revenues (in £m)	542	46.22	47.59	0.00	260.79
Log(TV Revenues)	540	3.20	1.29	0.18	5.56
Commercial Revenues (in £m)	542	25.39	41.95	0.00	276.10
Log(Commercial Revenues)	540	2.49	1.19	-5.26	5.62
Net Spending (in £m)	542	17.17	32.52	-45.33	249.67
Wages (in £m)	542	55.99	58.11	2.70	332.30
Log(Wages)	542	3.50	1.11	0.99	5.81
Average Player Value (in £m)	296	4.91	3.98	0.41	21.69
Log(Average Player Value)	296	1.32	0.74	-0.89	3.08

4. Results

The impact of income sources on player salaries, net transfer expenses, and player market values

First, we estimate model (1) to understand how the three different revenue sources of football clubs influence player salaries. Given that the revenues from the three sources (match, TV, and commercial) are highly correlated at r>0.80 we cannot include them in the regression models simultaneously as this leads to multicollinearity.

Since we use the natural logarithm of the variables on both sides of the equation, the coefficients can be interpreted as elasticities: Thus, according to the results displayed in Table III-4, a 1% increase (10% increase) in total club revenues increases player salaries by 0.728% (7.28%). It also appears from Table III-4 that TV revenues are by far the most important revenue source with respect to player salaries, followed by match revenues and commercial revenues.

Table 4-1 Impact of Revenue Sources on Player Salaries in the EPL

	(1) Log(Wages)	(2) Log(Wages)	(3) Log(Wages)	(4) Log(Wages)
Log(Total Club Revenues)	0.728***	---	---	---
	(0.0693)			
Log(Match Revenues)	---	0.334***	---	---
		(0.0844)		
Log(TV Revenues)	---	---	0.487***	---
			(0.120)	
Log(Commercial Revenues)	---	---	---	0.273***
				(0.0781)
Year Dummies	included	included	included	included
Constant	-0.135	1.059***	1.035***	1.187***
	(0.156)	(0.124)	(0.137)	(0.100)
N of Observations	*542*	*538*	*540*	*540*
N of Teams	*49*	*48*	*48*	*48*
N of Observation per Team	*1-27*	*1-27*	*1-27*	*1-27*
R2 within	*97.5*	*96.3*	*96.2*	*96.2*
R2 between	*95.6*	*92.5*	*86.9*	*87.9*
R2 overall	*97.0*	*94.3*	*90.3*	*93.2*

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

When estimating model (2), we cannot use logs because net transfer expenses (net spending) also include negative values (i.e., clubs earn more from selling players than they spend to sign new players) and the log of negative values is not defined. As a consequence, the interpretation of the coefficients in Table III-5 is slightly different: Here, each additional British Pound coming from, e.g., TV revenues increases net transfer expenses by 44.3 pence. What is perhaps surprising is that each revenue source seems to have a similar impact on net transfer expenses, because the respective impact of match and commercial revenues is almost identical to that of TV revenues.

Table 4-2 Impact of Revenue Sources on Net Spending in the EPL

	(1) Net Spending	(2) Net Spending	(3) Net Spending	(4) Net Spending
Total Club Revenues	0.197***	---	---	---
	(0.0324)			
Match Revenues	---	0.428***	---	---
		(0.138)		
TV Revenues	---	---	0.443***	---
			(0.132)	
Commercial Revenues	---	---	---	0.415***
				(0.0432)
Year Dummies	included	included	included	included
Constant	-1.013	-2.181	-0.935	-0.367
	(2.526)	(3.247)	(2.723)	(2.246)
N of Observations	*542*	*542*	*542*	*542*
N of Teams	*49*	*49*	*49*	*49*
N of Observations per Team	*1-27*	*1-27*	*1-27*	*1-27*
R2 within	*41.7*	*35.6*	*37.2*	*44.8*
R2 between	*78.7*	*73.2*	*77.0*	*81.8*
R2 overall	*47.1*	*39.0*	*42.6*	*51.2*

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In the case of player market values (model 3), we again use logs on both sides of the equation. It appears from Table III-6 that a 1% (10%) increase in total income is associated with an

0.955% (9.55%) increase in player values. Similar to the results of model (1), TV revenues are far more important than either match or commercial revenues.

Table 4-3 Impact of Revenue Sources on Average Market Values in the EPL

	(1) Log(Average Player Value)	(2) Log(Average Player Value)	(3) Log(Average Player Value)	(4) Log(Average Player Value)
Log(Total Club Revenues)	0.955***	---	---	---
	(0.111)			
Log(Match Revenues)	---	0.487***	---	---
		(0.125)		
Log(TV Revenues)	---	---	0.844***	---
			(0.200)	
Log(Commercial Revenues)	---	---	---	0.347**
				(0.156)
Year Dummies	included	included	included	included
Constant	-2.973***	-0.397	-1.930***	0.0421
	(0.462)	(0.354)	(0.685)	(0.410)
N of Observations	*296*	*296*	*296*	*296*
N of Teams	*39*	*39*	*39*	*39*
N of Observation per Team	*1-15*	*1-15*	*1-15*	*1-15*
R2 within	*68.0*	*62.4*	*64.2*	*60.7*
R2 between	*73.4*	*68.4*	*46.0*	*49.9*
R2 overall	*80.5*	*74.6*	*59.9*	*68.2*

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In further analyses (see Tables III-7, III-8, and III-9), we distinguish the "Big 6" clubs (Arsenal, Chelsea, Tottenham Hotspur, Liverpool FC, Manchester City, and Manchester United) from the other 14 teams, the composition of which changes every year due to promotion and relegation. This split between large clubs and the rest allows us to examine whether the above results change depending on the clubs' market size.

Table 4-4 Revenue Sources and Player Salaries in the EPL, by Size of Club

Dep. Variable: Log(Player Salaries)	(1.1) Big 6	(1.2) Rest	(2.1) Big 6	(2.2) Rest	(3.1) Big 6	(3.2) Rest	(4.1) Big 6	(4.2) Rest
Log(Total Revenues	0.753**	0.669***	---	---	---	---	---	---
	*							
	(0.127)	(0.0729)						
Log(Match Revenues)	---	---	0.480**	0.235***	---	---	---	---
			*					
			(0.116)	(0.0813)				
Log(TV Revenues)	---	---	---	---	0.402	0.491***	---	---
					(0.216)	(0.0888)		
Log(Commercial Revenues)	---	---	---	---	---	---	0.248	0.310***
							(0.153)	(0.0661)
Year Dummies	incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.
Constant	-0.213	-0.00658	0.848**	1.124***	1.419***	0.920***	1.438***	1.071***
	(0.348)	(0.139)	(0.273)	(0.0651)	(0.314)	(0.0721)	(0.283)	(0.0624)
N of Observations	158	384	158	380	158	382	158	382
N of Teams	6	43	6	42	6	42	6	42
Observations per Team	23-27	1-17	23-27	1-27	23-27	1-27	23-27	1-27
R2 within	98.7	96.8	98.0	95.7	97.0	96.2	97.0	96.0
R2 between	62.0	95.5	45.5	93.5	93.5	92.6	35.3	86.7
R2 overall	97.5	96.3	96.4	94.7	94.7	94.0	95.1	94.5

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4-5 Revenue Sources and Net Spending in the EPL, by Size of Club

Dep. Variable: Net Spending	(1.1) Big 6	(1.2) Rest	(2.1) Big 6	(2.2) Rest	(3.1) Big 6	(3.2) Rest	(4.1) Big 6	(4.2) Rest
Total Revenues	0.308**	0.351**	---	---	---	---	---	---
	(0.0865)	(0.134)						
Match Revenues	---	---	-0.0314	0.687**	---	---	---	---
			(0.390)	(0.281)				
TV Revenues	---	---	---	---	0.0994	0.396**	---	---
					(0.299)	(0.191)		
Commercial Revenues	---	---	---	---	---	---	0.672***	0.877*
							(0.0868)	(0.444)
Year Dummies	incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.
Constant	-4.154	-1.549	0.980	-1.272	0.444	0.0998	-2.352	-0.912
	(6.416)	(1.758)	(5.935)	(1.800)	(6.823)	(1.464)	(5.475)	(1.899)
N of Observations	158	384	158	384	158	384	158	384
N of Teams	6	43	6	43	6	43	6	43
Observations per Team	23-27	1-27	23-27	1-27	23-27	1-27	23-27	1-27
R2 within	47.9	40.8	42.6	39.0	42.7	39.7	53.8	40.3
R2 between	16.8	83.4	29.1	86.2	77.5	87.5	44.5	79.3
R2 overall	43.8	46.1	38.7	45.1	39.2	47.9	52.6	45.0

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4-6 Revenue Sources and Average Player Values in the EPL, by Size of Club

Dep Variable:	(1.1)	(1.2)	(2.1)	(2.2)	(3.1)	(3.2)	(4.1)	(4.2)
Log(Average Player Value)	Big 6	Rest	Big 6	Rest	Big 6	Rest	Big 6	Rest
Log(Total Revenues)	1.053***	1.007***	---	---	---	---	---	---
	(0.122)	(0.232)						
Log(Match Revenues)	---	---	0.689**	0.654***	---	---	---	---
			(0.213)	(0.184)				
Log(TV Revenues)	---	---	---	---	1.091***	0.625***	---	---
					(0.256)	(0.202)		
Log(Commercial Revenues)	---	---	---	---	---	---	0.560	0.336
							(0.286)	(0.204)
Year Dummies	incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.
Constant	-3.290***	-3.243***	-0.804	-0.931**	-2.417*	-1.414**	-0.296	-0.118
	(0.616)	(0.891)	(0.868)	(0.420)	(0.986)	(0.649)	(1.020)	(0.426)
N of Observations	90	206	90	206	90	206	90	206
N of Teams	6	33	6	33	6	33	6	33
Observations per Team	15	1-15	15	1-15	15	1-15	15	1-15
R2 within	40.8	60.5	39.9	59.2	39.7	55.6	40.3	55.7
R2 between	83.4	37.0	86.2	40.7	87.5	19.5	79.3	34.3
R2 overall	46.1	51.1	45.1	50.5	47.9	33.4	45.0	41.9

Standard errors (clustered at team id) in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regarding player salaries, we find that a decrease of total club revenues leads to a larger reduction of salaries for Big 6 clubs than for the other 14 teams (see Table III-7), suggesting that player salaries at large clubs respond more to changes in club revenues than at small clubs. In addition, a change in match revenues impacts player salaries at Big 6 clubs more than the salaries at the remaining 14 teams.

Interestingly, in contrast to player salaries, the results from Table III-8 indicate that large clubs are expected to adjust their net transfer expenses less than small clubs due to a change in club revenues. Finally, there is no significant difference between large and small clubs regarding the impact of changes in club revenues on average player values (see Table III-9).

The impact of the COVID-19 pandemic

We proceed in two steps: First, we derive three possible coronavirus scenarios and calculate the COVID-19 induced impact on the three revenue sources (match revenues, TV revenues, and commercial revenues) in each scenario. Second, we predict the impact of the COVID-19 pandemic induced revenue losses on player salaries, transfer expenses, and player market values in the three coronavirus scenarios based on the regression coefficients obtained from our empirical models.

Coronavirus scenarios

We outline three possible scenarios for the economic development of EPL clubs in the post-COVID-19 era. The scenarios distinguish the three revenue sources and are summarized in Table III-10.

Table 4-7 Possible COVID-19 scenarios

in £m	FY2019 Actual EPL Club Revenues		Covid-Scenarios EPL			Covid-Scenarios (in %)		
	Total	Average	Worst-case	Medium-case	Best-case	Worst-case	Medium-case	Best-case
Matchday	679.7	34.0	0.0	10.2	17.0	-100%	-70%	-50%
Commercial	1456.6	72.8	43.7	58.3	65.5	-40%	-20%	-10%
Broadcast	3032.6	151.6	143.4	143.4	143.4	-5%	-5%	-5%
Total	**5169.0**	**258.5**	**187.1**	**211.8**	**225.9**	**-28%**	**-18%**	**-13%**

	FY2019 Actual Big-6 Club Revenues		Covid-Scenarios Big-6			Covid-Scenarios (in %)		
	Total	Average	Worst-case	Medium-case	Best-case	Worst-case	Medium-case	Best-case
Matchday	494.5	82.4	0.0	24.7	41.2	-100%	-70%	-50%
Commercial	1141.5	190.3	114.2	152.2	171.2	-40%	-20%	-10%
Broadcast	1362.3	227.1	218.8	218.8	218.8	-4%	-4%	-4%
Total	**2998.3**	**499.7**	**333.0**	**395.7**	**431.2**	**-33%**	**-21%**	**-14%**

	FY2019 Actual Other-14 Club Revenues		Covid-Scenarios Other-14 Clubs			Covid-Scenarios (in %)		
	Total	Average	Worst-case	Medium-case	Best-case	Worst-case	Medium-case	Best-case
Matchday	185.2	13.2	0.0	4.0	6.6	-100%	-70%	-50%
Commercial	315.1	22.5	13.5	18.0	20.3	-40%	-20%	-10%
Broadcast	1670.3	119.3	111.1	111.1	111.1	-7%	-7%	-7%
Total	**2170.7**	**155.1**	**124.6**	**133.0**	**137.9**	**-20%**	**-14%**	**-11%**

Scenarios

Worst case	No spectators allowed for the upcoming seasons, negative impact on commercial income of 40%, £330m of broadcast penalties spread over 2 seasons
Medium case	30% spectators allowed back to stadium, negative impact on commercial income of 20%, £330m of broadcast penalties spread over 2 seasons
Best case	50% spectators allowed back to stadium, negative impact on commercial income of 10%, £330m of broadcast penalties spread over 2 seasons

TV revenues: The EPL signed its latest broadcasting agreement in 2019 for the three seasons up to 2022, which, together with the broadcasting proceeds from UEFA club competitions, guaranteed an average amount of £152M per club for 2019. This represented 59% of total

revenues per club. While numerous media experts expect lower income from broadcasting in the future (Dixon), this possible reduction will not come before the new broadcasting agreement is signed, which is post-2022. We, therefore, assume the reduction to be in line with the penalty payment of £330M for the postponed games in the 2019/20 season in all three scenarios, which translates into a decrease of 5.4% for the two successive seasons.

Commercial revenues: Interviews with industry experts confirmed the predictions made by sports marketing company Two Circles expecting a 37% year-on-year decrease in global sports sponsorship rights fees as a result of the COVID-19 pandemic. According to one expert, sponsorship prices in the EPL were down by 30% to 40% by August 2020, while several front-of-shirt sponsorships were still available for Championship clubs shortly before the start of the season, which was unprecedented according to that source. In our worst case scenario, we thus assume a 40% decrease in commercial revenues, while our average case scenario assumes a 20% decrease. In the best case, premium sports sponsorship opportunities will recover quickly, leading to a reduction in commercial revenues of only 10%.

Match revenues: During the 2018/19 season, EPL clubs enjoyed an average capacity utilization of 96% (worldfootball.net), and match revenues contributed 13% to the total revenues of the average EPL club. While the EPL did not communicate its plans for spectator admissions at the start of the season 2020/21, the Deutsche Fussball Liga (DFL), which served as a trailblazer among sports leagues in terms of measures and actions in times of COVID-19, released a hygiene concept to prevent the spread of the virus among stadium visitors for the German Bundesliga. This concept contained three scenarios, including different numbers of visitors to be allowed in each stadium. In case of a high pandemic level, with ≥ 35 new infections per week per 100,000 inhabitants, no spectators were to be allowed in the stadium. In case the pandemic level was medium, with ≥ 5 and <35 new infections per week per 100,000

inhabitants, the concrete number of fans allowed in the stadium was to be defined, while in the case of <5 new infections per week per 100,000 inhabitants, a successive return to normal operations was planned, depending on agreements between the clubs and the respective local health authorities. In any case, according to the concept, not more than 30% to 50% of the stadium capacity was planned to be used. In terms of match revenues, this means that in the worst case scenario we assumed no match revenues at all since no spectators will be allowed in the stadium. In the average case scenario, we assume a reduction in match revenues of 70% and, in the best case scenario, a decrease of 50%.

Predicting the impact of the COVID-19 pandemic

To predict the impact of the COVID-19 pandemic, we assume that the correlations between revenues and expenses from Section 4.1, determined for a phase of uninterrupted growth, will also be observed in the opposite direction in a recession period when club revenues decline.

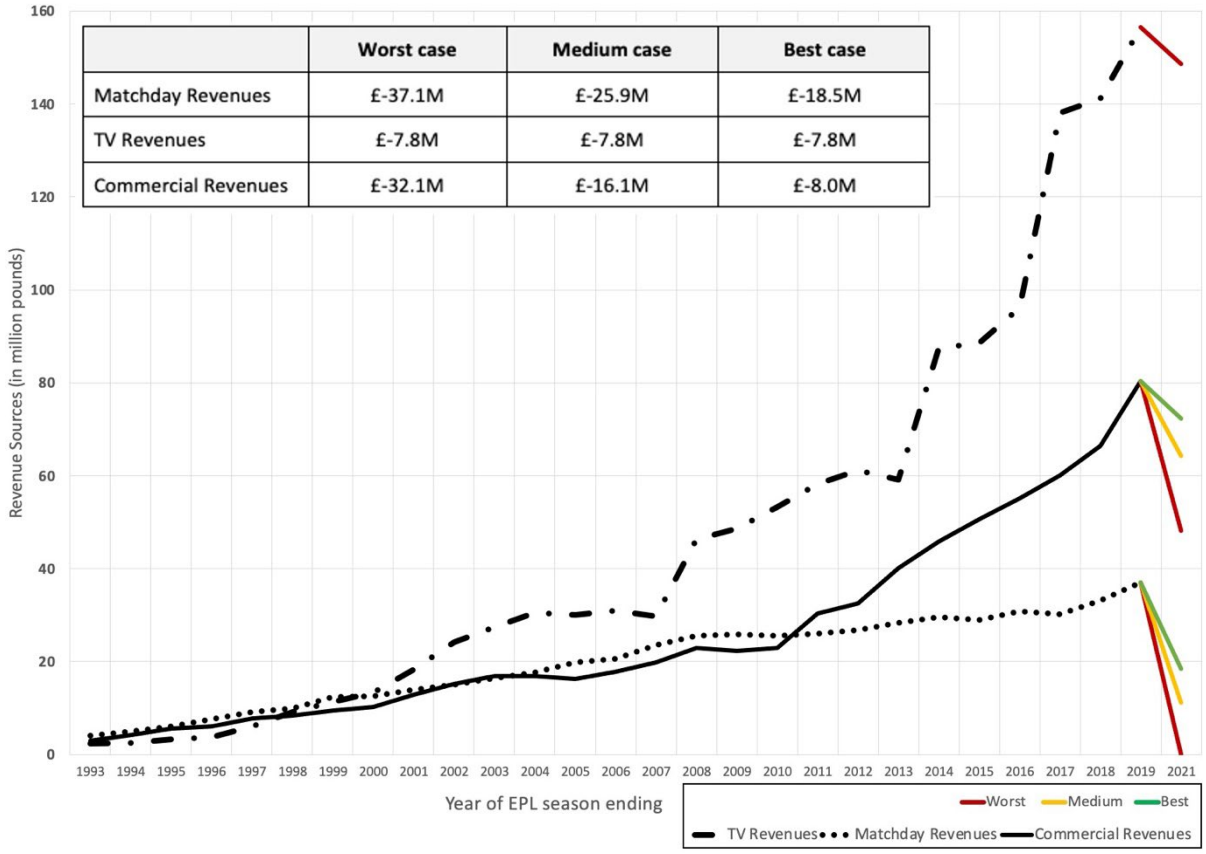
The rationale for this assumption can be justified by one of the economic peculiarities of professional team sports, which is the associative character of competition: No team can improve its position in the standings without worsening the position of at least one other team. If sportive and economic success are correlated, which they usually are, this rank order contest can lead to a rat race which induces clubs to overinvest in playing talent and may result in a ruinous competitive interaction between clubs (Whitney, 1993). It is well-known in contest theory of professional team sports (Dietl et al., 2009; Szymanski, 2003a) that club revenues crucially impact this rat race: Higher (lower) revenues induce clubs to increase (decrease) their investments in playing talent and thus lead to higher (lower) player salaries and higher (lower) transfer expenses (Dietl et al., 2008).

Anecdotal evidence seems to confirm our assumption that clubs react swiftly with a reduction in player salaries to an exogenous shock such as the insolvency of the Kirch group in 2002 that triggered a significant revenue decline for the German Bundesliga clubs (Frick & Prinz, 2006). After the Kirch group went insolvent in 2002, the 36 first- and second-division teams in the German Bundesliga received about €270 million less in TV revenues than expected in the three seasons from 2001-02 to 2003-04. Clubs reacted swiftly to this reduction in revenues because average player salaries per club went down from €28.7 million in 2001-02 to less than €26 million in 2004-05 (Frick & Prinz, 2006).

Based on the above assumption and the regression coefficients from our empirical model, we conclude that a drop in total revenue of 10% will lead to a decrease in player salaries of 7.28% (based on Model 1) and a loss of player market values of 9.55% (based on Model 3). In addition, a drop in total revenue of £1 results in a reduction of net transfer expenses by 19.7 pence (based on Model 2).

Next, we illustrate the expected impact of COVID-19 on club revenues in the three scenarios in Figure III-1 which displays: (i) the pre-pandemic evolution of the different revenue sources (black lines) from season 1992/93 up to season 2018/19 and (ii) the expected impact of the COVID-19 pandemic on the different revenue sources for the three coronavirus scenarios (colored lines and small table).

Figure 4-1 Revenues by Source in the English Premier League and expected impact of COVID-19



The figure shows that the football clubs of the English Premier League have experienced strong positive growth in terms of broadcasting revenues (dashed line) and commercial revenues (solid line), and more conservative growth in terms of match revenues (dotted line) since the inaugural season 1992 until 2019.

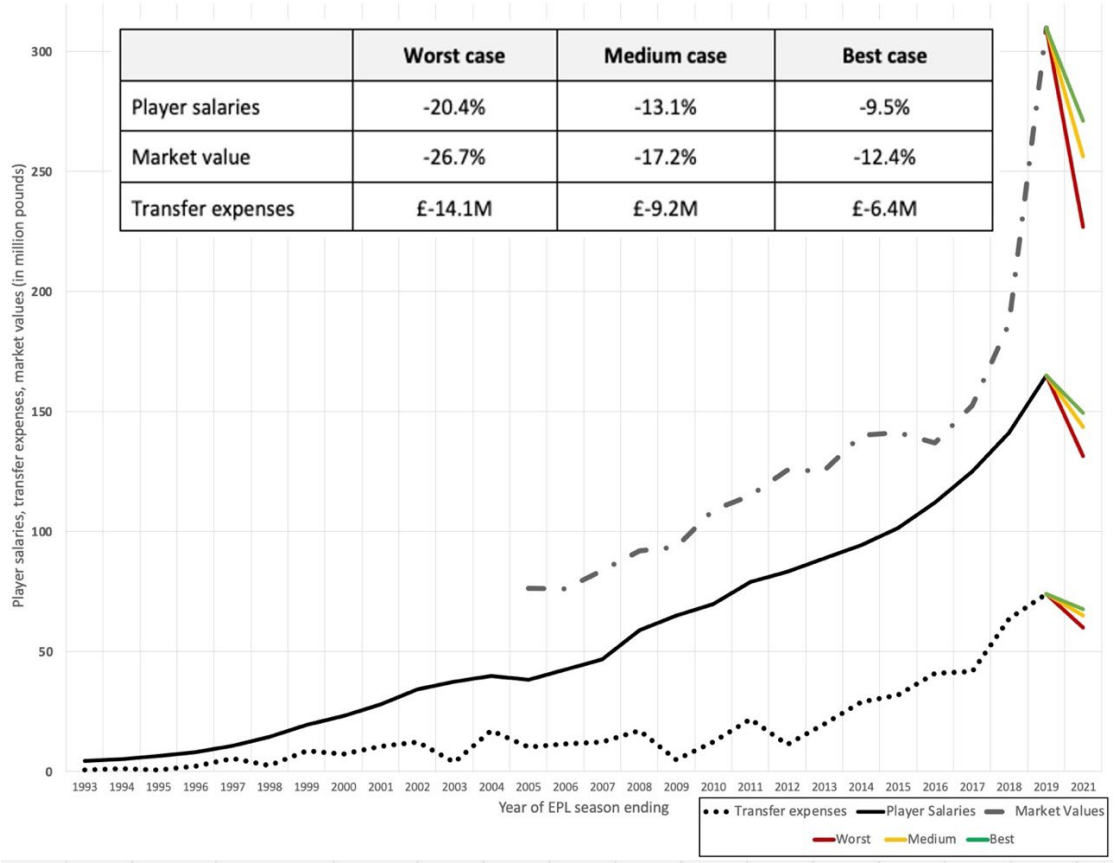
The COVID-19 pandemic is the first shock at a bigger scale for this relatively young league. We predict that the COVID-19 pandemic will have a negative impact on all three revenue sources in all scenarios as shown in the small table of Figure III-1. We expect match revenues to experience the strongest decline. Here, our model predicts a reduction of £18.5M (best case), £25.9M (medium case) up to £37.1M (worst case). TV revenues are expected to

decrease by £7.8M in all three scenarios, while commercial revenues might drop between £8.0M (best case) and £32.1M (worst case).

Figure III-1 also graphically illustrates the revenue drop in all three scenarios by the colored lines: red displays the worst case scenario, orange the medium case scenario, and green the best case scenario. The COVID-19 induced reductions in all three revenue sources are clearly visible. Note that TV revenues are expected to drop similarly in all three scenarios, so we only display the red line.

Based on the above calculations and the results from our regression models, we are now able to calculate the COVID-19 induced impact on salaries, net transfer expenses, and player market values for the upcoming EPL season 2020/21. The results are presented in Figure III-2, which displays: (i) the pre-pandemic development of player salaries (solid line), net transfer expenses (dotted line), and player market values (dashed line) for the seasons 1992/93 up to 2018/19 and (ii) the expected impact of the COVID-19 pandemic on the different variables for the three coronavirus scenarios (colored lines and small table).

Figure 4-2 Player salaries, net transfer expenses, and player market values in the English Premier League and expected impact of COVID-19



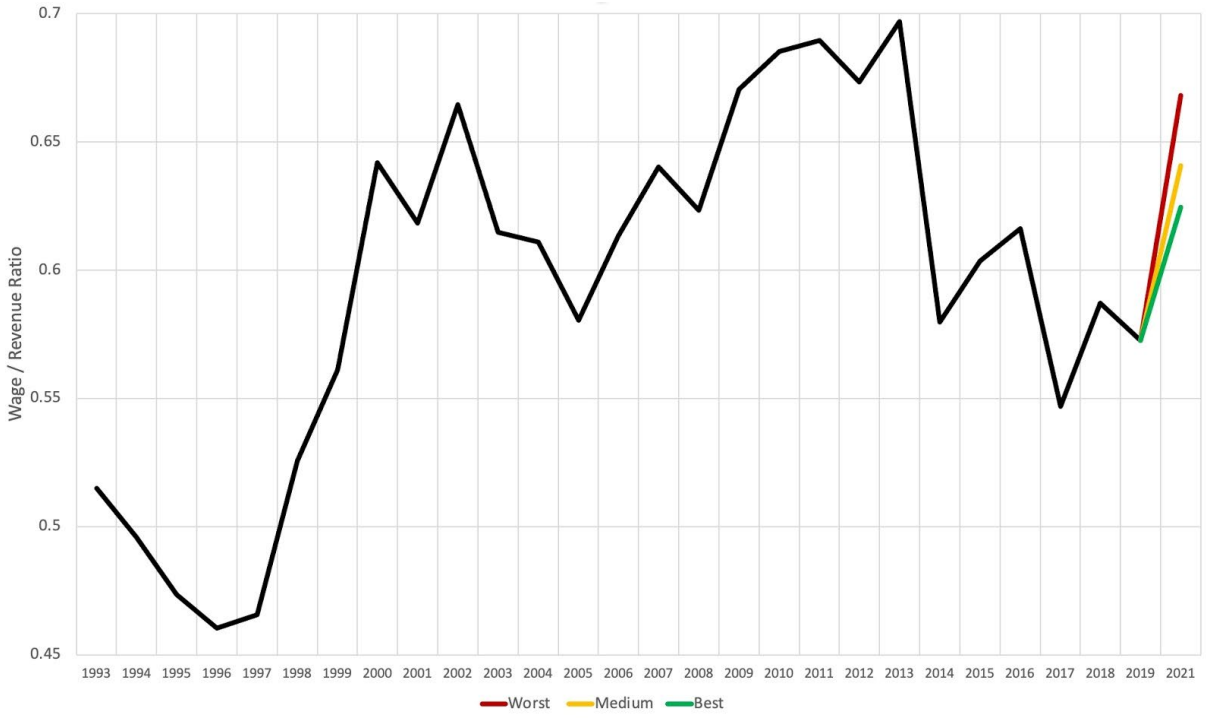
The figure shows that player salaries and player market values have experienced a strong positive growth until 2019, while net transfer expenses have been relatively stable until 2013 and then accelerated their growth rate until 2019.

Our model predicts a significant drop in all three variables (compare small table and colored lines): Player market values are expected to experience the largest drop: -26.7% in the worst case (red line), -17.2% in the medium case (orange line), and -12.4% in the best case (green line) scenario. Net transfer expenses and player salaries follow a similar pattern. Remember that the impact on net transfer expenses is calculated in absolute values since we cannot use logs to estimate the model.

Moreover, as derived in Section 4.1, we expect the reduction in player salaries to be stronger for the Big 6 clubs compared to the other 14 teams. The opposite is true for net transfer expenses. Here, we expect a larger drop for the other 14 teams compared to the Big 6 clubs.

Finally, we examine the development of player salaries as a percentage of club revenues to demonstrate how the COVID-19 pandemic affects this relationship. Figure III-3 plots the wage / revenue ratio (solid line) for the season 1992/93 up to 2018/19. The colored lines illustrate the different coronavirus scenarios: red displays the worst case scenario, orange the medium case scenario, and green the best case scenario.

Figure 4-3 Wage/revenue ratio in the English Premier League and expected impact of COVID-19



The figure shows that the wage/revenue ratio oscillates considerably over time before the COVID-19 outbreak: the ratio reaches its minimum of 0.46 in the season 1994/95 and its maximum of 0.69 in the season 2012/13. Our model predicts that total club revenues are expected to drop more than player salaries due to the COVID-19 pandemic in all three scenarios.

As a consequence, the wage / revenue ratio is expected to increase in all three scenarios as shown by the red, orange, and green lines.

To check the robustness of our prediction model, we estimated our main models (the results of which are displayed in Tables III-3-5) using a restricted data set covering the seasons 1992/93 to 2013/14 only (our "testing period"). Using the coefficients obtained for the testing period to predict player salaries, net spending, and player market values for the seasons 2014/15 to 2017/19, we find that the difference between the predicted and the observed values is very small in all three cases, suggesting that our prediction model does a very good job. The results of the additional estimations are available from the authors upon request.

5. Discussion

What is commonly referred to as the peculiarities of the sports industry, describes a set of characteristics that distinguishes the sports industry from conventional industries. These peculiarities are as follows: (i) constant industry output, (ii) competitors are needed to produce an output, (iii) a league is naturally a monopoly, and (iv) output quality increases with the quality of the competitors (Dietl & Frick, 2007; Gerrard, 2003).

Another point that distinguishes professional football from other industries is that clubs have not been profitable for most of their history (Franck, 2010). 18 out of 20 football clubs of the English Premier League published their financial accounts for the 2018/2019 season in March 2020, immediately before the Covid-19 outbreak. In defiance of having achieved the 20th consecutive record-revenue high in a row, 16 out of these 18 clubs posted net income losses. While companies in most industries seek to maximize profits and are thus able to build up financial reserves, European football is often considered a win-maximization industry where additional revenue is used to acquire playing talent (Garcia-del-Barrio & Szymanski, 2009;

Késenne, 2006b; Sloane, 2015) to maintain competitiveness in the rat-race of winning titles and avoiding relegation. In football clubs, the by far largest part of their operating costs are player salaries, which regularly account for between 60% and 72% of revenues in each of the five large European football leagues (Deloitte, 2020), and account for between 70% and 80% of total operating costs in the EPL.

Against this background, the COVID-19 pandemic has raised the question of whether the football industry is based on a sustainable business model (e.g., BBC, 2020a; ECA, 2020; LawinSport, 2020), or whether the modus operandi needs to change to be sustainable and to prevent bankruptcies of clubs in the event of external shocks such as the current COVID-19 pandemic.

Thus, one of the key contributions of our paper is to examine the relationship between the different revenue sources and the main cost drivers of professional football clubs. In particular, we show how changes in the different income sources of football clubs (TV revenues, match revenues, and commercial revenues) affect player salaries, player market values, and net transfer expenses. Our results suggest that TV revenues are by far the most important source of income for player salaries and market values, followed by match revenues and commercial revenues. Not surprisingly, each revenue source seems to have a similar impact on net transfer expenses.

Based on our regression estimations, we estimate the expected impact on the three revenue sources of EPL clubs and predict their impact on player salaries, market values, and transfer expenses in three possible coronavirus scenarios. We conjecture that the COVID-19 induced negative effects on EPL club revenues will translate into reductions in team wage bills, squad market values, and net transfer expenses. In particular, we expect total club revenues to

decrease by 28% (worst case), 18% (medium case), and 13% (best case) in the forthcoming EPL season 2020/21.

Match revenues will most likely suffer the most (in the worst case scenario they will be zero), while TV revenues are the least affected of the three revenue sources (only -5%). Our empirical model suggests that player salaries, market values, and transfer expenses will all decrease in the upcoming season. The magnitude of the reduction depends on the scenario and ranges from -20.4% to -9.5% for player salaries, from -26.7% to -12.4% for player market values, and from £-14.1M to £-6.4M for transfer expenses. Thus, with an average annual salary for an EPL player of around £4M, this means a loss of salary of £400'000 (best case) or £800'000 (worst case) per year. The traditionally negative transfer balances of most English clubs, on the other hand, will fall from an average of £74.1M to £60.1M (worst case) or £67.7M (best case).

When splitting the sample into the Big 6 clubs and the remaining 14 teams, our model predicts that player salaries will decline more in the Big 6 clubs than in the other 14 teams, while the opposite is true for net transfer expenses. Player market values are expected to decrease equally across all 20 clubs.

In sum, while the impact will be economically relevant for each of these variables (player salaries, market values, and transfer expenses), their impact will remain rather small from a historical perspective. Even in the worst case scenario, team wage bills, squad market values, and net transfer expenses only decline to the level in the 2017/18 season. Nevertheless, if the coronavirus pandemic is going to last for a longer period of time and football clubs continue the current modus operandi, their business model is likely to fail, and bankruptcies of clubs can be expected.

One might argue that already the committed "costs" in terms of player salaries written down in long-term contracts prior to the coronavirus pandemic cannot be easily reduced when club revenues decline as a consequence of the crisis. However, the average contract length is around 2.3 years (Buraimo et al., 2015), which means that more than 40% of all player contracts are renegotiated every year. This gives clubs ample possibility to lower their wage bill, apart from the voluntary salary cuts that have happened due to the coronavirus pandemic induced reduction in club revenues (Ames, 2020).

Thus, those clubs that have player contracts with longer contract durations, are less flexible to renegotiate player salaries downwards in contracting markets, such as witnessed in the current COVID-19 crises.

In contrast to the other Big 5 European football leagues, where most players agreed to voluntary pay-cuts, the majority of EPL players refused to accept any salary reductions in the light of COVID-19 (Harris, 2020). With average remaining contract lengths between 1.5 years (Crystal Palace) and 3.2 years (Tottenham Hotspur) (CIES, 2018), it is, however, only a matter of time until lower player salaries will be observed across EPL teams too. Moreover, new player contracts are likely to include clauses allowing clubs to cut wages in case of another pandemic or similar events leading to a lockout of fans.

The discussion of the pros and cons of salary caps, which are common practice in North American Major League sports (e.g., Dietl, 2013; MacInnes, 2017), have gained new momentum in light of the financial consequences of COVID-19 for football clubs. For a long time, legal specialists questioned whether salary caps are consistent with national and European anti-trust regulations. However, recent expertise by the Scientific Services of the German

Parliament concludes that salary caps are compatible with national and European law if introduced and monitored by UEFA (Bundestag, 2020).

According to media reports, UEFA is currently indeed assessing the possibility of introducing salary caps on a European level (Rumsby). Meanwhile, the English Football League has been a first mover and introduced salary caps for English third- and fourth-tier football in August 2020, with salary caps at £2.5M and £1.5M per annum, respectively (BBC, 2020b). However, an arbitration panel ruled in February 2021, that the cap must be withdrawn after the Professional Footballers' Association argued it was "unlawful and unenforceable" (Fischer, 2021).

The question remains whether salary caps can prevent those clubs that are willing to spend more than allowed, to do so in the absence of rigorous monitoring to detect and sanction violations (Helmut M Dietl et al., 2011). Monitoring the sources of players' ancillary remuneration requires far more effort than monitoring possible "creative accounting" by clubs violating UEFA´s Financial Fairplay regulations.

6. Conclusion

All countries worldwide are affected by the coronavirus and most sports events have been postponed or canceled. 2020 was supposed to be an important sports year with major events such as the UEFA Euro 2020 and the Summer Olympics in Tokyo. Both events have been postponed to 2021 causing significant financial, as well as political disturbances.

The economic consequences of the COVID-19 pandemic on the sports industry in general and on European football, in particular, are still underexplored. Our paper tries to shed light on the pandemic's expected impact on professional football. Using data from the English Premier League (EPL), we develop a regression model to achieve two objectives: First, we

examine the relationship between the different revenue sources (TV revenues, match revenues, and commercial revenues) and the main cost drivers of professional football clubs (player salaries and transfer expenses). Second, we seek to predict the likely impact of a major market downturn such as the COVID-19 pandemic in the EPL.

Our study shows that salaries, transfer fees, and market values are linked to the level of club revenues and adjust to emerging market conditions. However, market contractions lead to short-term losses, as clubs cannot make fast expenditure adjustment due to longer-term contracts and obligations and because they – driven by the rat race – do not build up reserves under favorable market conditions. As a result, clubs are reliant on external funding sources in unfavorable situations and the current model cannot be considered self-sustainable. However, as football clubs are in many cases treated as Trophy Assets, there might often be external funding possibilities.

Admittedly, our assumptions as well as the available data have influenced the results presented above in a particular way. First, while the coefficient of determination between club revenues on the one hand, and salaries (0.97), as well as market values (0.80), is high, club revenues explain only about 47% of the variation in net transfer expenses, indicating the possible existence of other influencing factors. Future research with an emphasis on complementing these factors would be beneficial. Second, apart from the categorization of clubs into Big-6 and Other-14, a comparative classification of club owner strategies would, in this respect, offer a good approach for further refining the analysis because differences in owner strategies are likely to translate into differences in spending behavior – be it in wages or transfer fees. Third, because the future is inherently uncertain, all predictions into the future need to cope with uncertainties (Cardenas & Halman, 2016; Khosravi & Jha-Thakur, 2019), as the most recent developments on the creation of a European Super League, as well as the reform of the

UEFA Champions League drastically show. The scenario analysis is a means of developing possible futures to deal with this uncertainty (Tapinos, 2012). The focus is thus not to look into the most likely development but to consider different possible developments under key assumptions, i.e. 'What happens if…'? (van Vuuren et al., 2012). We thus have specifically looked for each of the variables on how they could develop in each of the three cases and deduce the consequences according to our model. Our approach to predicting the revenue paths of EPL clubs post-COVID-19 may serve critics to develop their own (more realistic?) perspective and to come up with figures that are different from the ones we have presented here.

However, the most recent developments clearly support our scenario approach. On March 8, 2021, the German Football Association reported that the match revenues of the 18 first division clubs had decreased by more than 30% and transfer expenses by 12% in the season 2019/20 compared to the season before. Thus, since about three fourth of that last season were still played in full stadiums, our best case projections for the EPL are virtually identical with what actually happened to match revenues and transfer expenses in the Bundesliga in the last season already. This, in turn, suggests that the product, as well as the labor market, reacts very quickly in the expected duration.

Future research may replicate this study with data from other leagues where club financials are accessible, such as the French Ligue 1/2 or the English Championship. The economic consequences and implications of the COVID-19 pandemic remain a fertile and important line of inquiry for sport management scholars

IV. CHAPTER FOUR: ESSAY ON THE IMPACT OF PLAYER COSTS ON TICKET PRICES

Determining the Price of Football: An Analysis of Matchday Ticket Prices in the English Premier League

Abstract

Match day revenue is still an essential source of income for many professional sports clubs worldwide. However, literature on determinants of ticket pricing has been, almost exclusively, based on data from the North American sports market. This paper studies the determinants of ticket pricing in the English Premier League and examines whether stadium goers pay a premium for sporting success and any excesses in the players' labour market. We estimate regression models for the cheapest and most expensive tickets of clubs playing in the English Premier League for the five seasons between 2014/15 and 2018/19 inclusive. Our study shows that ticket prices are driven by several variables: the status of the opponent and local derbies. The impact of team performance is asymmetric and affects only the most expensive tickets. Capacity utilisation and total labour cost impact the prices of both the cheapest and most expensive tickets. Additionally, the identity of the opposing team matters in pricing strategies. This research provides insights for both leagues and individual clubs. For example, the findings can be used as a benchmark to assess the magnitude of price increases that the market may be willing to bear. Additionally, clubs can explore the extent to which greater revenues can be extracted from different types of consumers.

1. Introduction

The influx of considerable commercial and broadcasting income for the most prominent sports leagues in the world meant a gradual decline over the years in the share of match day revenues as a proportion of total revenue. However, for most sports and leagues worldwide, match day revenue is still the primary source of income, and even for the largest sports organisation, the contribution of and size of match day revenue is essential. For example, in the English Premier League (EPL), in which match day revenue is dominated by that of broadcasting and represents just 13% of total revenue for the league in 2020, the absolute value of match day revenue was €683 million, a non-trivial amount and of great economic relevance (Deloitte, 2021).

With the end of the government-imposed restrictions on attendance after the Covid-19 pandemic in the years 2020 and 2021, and the return of fans to stadia, questions of how sports organisations price their tickets have re-emerged. Whilst the availability of information on ticket pricing in North American major sports leagues allows empirical analyses of the factors that influence ticket prices (Rishe & Mondello, 2004; Rishe & Mondello, 2003), the limited accessibility of match day pricing data for the most European sport make similar analyses difficult.

The purpose of this paper is two-fold: firstly, the paper aims to address the question of whether stadium visitors must pay a premium for the sporting success of teams. Secondly, whether stadium goers must pay for excesses in the player labour market. Additionally, we explore other factors that drive ticket prices. From a managerial perspective, sports clubs may wish to explore the relationships between ticket prices and assess how their pricing strategies conform with benchmarks. With additional research and data, clubs can evaluate potential revenue improvements from changes in the determinants that affect the price.

This data set's exciting and unique feature is the cheapest and the most expensive ticket prices for each game. We performed the arduous task of collecting the most expensive and cheapest ticket price data for each English Premier League game for five years from 2014/15 to 2018/19 inclusive. These were sourced from individual websites and ticketing platforms of the participating clubs. Accounting for missing observations, there were 3,040 observations across these two different prices[1]. To analyse the determinants of ticket prices in the EPL, several possible influencing factors are considered. These include economic variables, variables capturing game attractiveness, quality of viewing variables, and stadium capacity.

We find that the relative average weekly earnings, capacity utilisation for the equivalent fixture from the previous season, local derbies, total costs of labour, and playing certain oppositions, generally the six biggest clubs (Manchester United, Manchester City, Chelsea, Arsenal, Liverpool, and Tottenham Hotspurs), affect the price of both the cheapest and most expensive tickets. The positive externalities on ticket prices for the six biggest away teams are interesting in that their magnitudes reflect their 'bigness'. Home teams use these opponents as an opportunity to freeride by significantly increasing ticket pricing for both the cheapest and the most expensive tickets. Additionally, we find that improvements in the home team's performance from the previous season positively influence the price of the most expensive ticket but not the cheapest.

The paper is structured as follows: first, we review the relevant literature. Next, we present the data and our empirical model. We then discuss the explanatory variables and present and analyse the results of our investigation. We then provide insight into the managerial

[1] Wage costs and ticket prices of a few teams were not available for all years, such as those for Manchester City and Everton for all five seasons, Newcastle United's most expensive match day tickets for the four seasons they played in the EPL, as well as Hull City's ticket match day pricing data for the 2014/15 season.

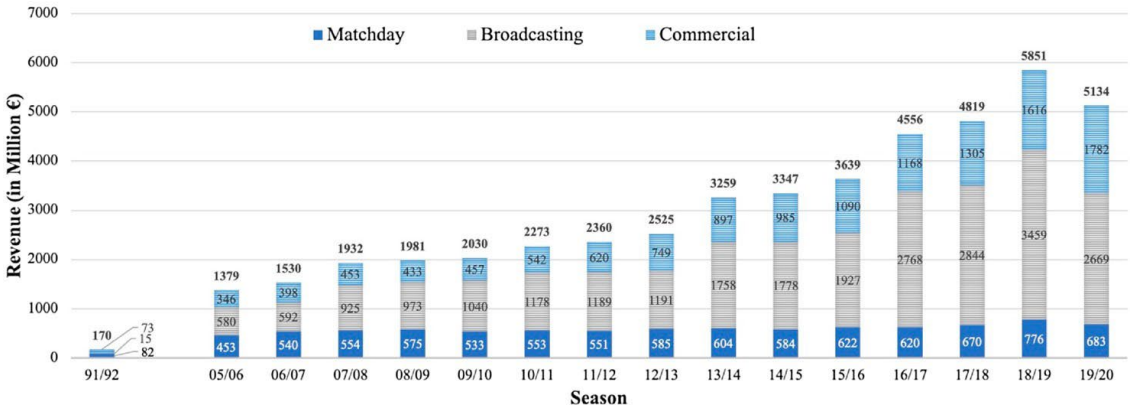
implications of our findings before summarizing our conclusions and discussing limitations and potential areas for future research.

2. Related Literature and Theoretical Background

Ticket Pricing

In 1998, an industry report on English Football published by Deloitte noted that for most clubs in the EPL, "gate revenues remain the primary income source that ensures that the clubs' financial backbone is maintained" (Deloitte, 1998). As of the 2018/19 season and as a direct consequence of the enormous growth in commercial and broadcasting income (see Figure IV-1), match day revenues represented a mere 13.3% of the clubs' total revenues (Deloitte, 2021). In absolute terms, however, the amounts of match day revenues are still of great importance to EPL clubs (Quansah et al., 2021), even for the biggest clubs in the league, as can be seen in Figure IV-2, where five out of the big six[2] have a significant dependency on match day revenues in the season 2018/19.

Figure 2-1 Evolution of revenues in the English Premier League.

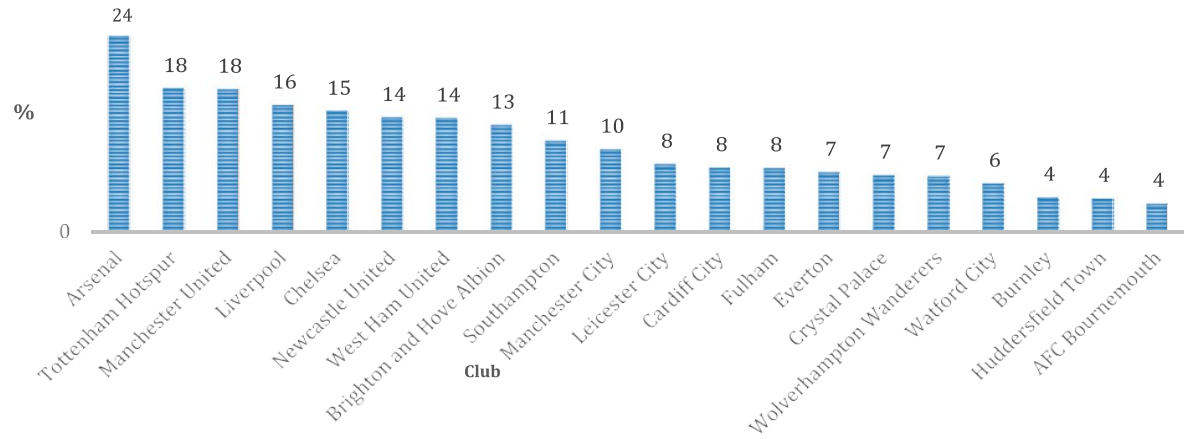


Notes: Own figure based on Deloitte (1998, 2013, 2016, 2019 , 2021). The figure displays the evaluation of total revenues for the three main revenue sources in the English Premier League from the season 2005/06 up to season 2019/20 in addition to total revenues in the founding season of the EPL 1991/92. The three major revenue sources are match day revenue, broadcasting revenue and commercial revenue.

[2] There is empirical logic to the notion of Big Six. In a study of television audience demand by Buraimo et al. (2022), the six biggest clubs boosted demand significantly compared with the others. As such, the reputation of the Big Six can be supported empirically.

Ticket pricing remains a key tool by which clubs can generate appropriate match day revenue. Lovelock and Wirtz (2004) assert that club pricing objectives fall into three categories: revenue, operations, or patronage orientation. While revenue orientation aims to improve revenues in pursuit of generating profits or accumulating surplus to be spent in the players' labour market, operations orientation tries to balance supply and demand to ensure maximum utilisation of the available capacities at any given time. On the other hand, patronage orientation aims to maximise a club's appeal among its supporter base. Drayer et al. (2012) posit that clubs have maintained a focus on attendance maximisation in the past without much consideration for revenue orientation, while other authors suggest that football clubs have the motivation to under-price tickets to maximise attendance and increase ancillary revenues from food and beverages, parking, merchandise and to enhance the fan experience (Courty, 2003; Fort, 2004). For example, research from North American intercollegiate athletics suggests a unique attendance-oriented pricing objective not prominently found in professional sports (Morehead et al., 2021). Apart from having to cope with heterogeneous stakeholder interests within a university, as well as with the NCAA's attendance requirements, the athletic departments have to consider attendance because of media attention, institutional reputation, school spirit, and the recruitment of talent for their sports teams (Morehead et al., 2021).

Figure 2-2 Match day revenues as a percentage of total revenues by club, 2018/19.



Notes: Own figure based on Quansah et al. (2021). The figure displays match day revenues as a percentage of total revenues for each club that played in the English Premier League in the season 2018/19.

In the early 2000s, football clubs in England started to implement advanced price discrimination policies, such as price banding (i.e., the notion of premium pricing for match day tickets against certain opponents) and price bundling (i.e., offering combinations of two or more match day tickets in a package to be purchased together in one transaction) (Clowes & Clements, 2003). However, it is not so much the implementation of demand-based pricing strategies that causes resentment among English football fans but the perceived or actual excessive high ticket pricing, particularly in the EPL (Conn, 2014).

Determinants of Ticket Pricing

Demand theory and analysis of professional team sports are well-established and are essential to the sports and management literature. Even as far back as 2003, Borland and McDonald provided a survey, and more recently, Schreyer and Ansari (2022) provided a scoping literature review. We borrow from this rich tradition but place ticket pricing at the centre stage and in doing so we adopt an inverse demand function (Ferguson et al., 1991). The inverse demand function has price as the dependent variable. The analysis of ticket prices as the dependent variable and its determinants helps us explore several relationships. Research on the determinants of ticket pricing compared with attendance is relatively new (Diehl et al., 2016), and studies are relatively scarce, especially those focusing on ticket pricing in European sports.

Whereas pricing data on North American major league sports have often been obtainable, historic match-by-match ticket price data for European football have been challenging to acquire (Coates & Humphreys, 2007).

In an exploratory study on ticket prices in the NFL, Reese and Mittelstaedt (2001) were the first to explore the criteria used to establish pricing strategies in the North American primary market. They found that the previous year's team performance, revenue needs, and socio-demographic factors, such as income, market size, population, and having a new stadium, influenced match day ticket prices in American Football. Rishe and Mondello (2003) empirically investigated price determinants in the NFL and the four major North American sports leagues, respectively. While their studies suggest that the factors that influence ticket prices in the NFL are the previous season's team performance, fan income, population, as well as stadium age, the existence of a new stadium was found to be the most important driver of ticket prices in all four major league sports. Population size and the previous season's capacity utilisation were significant and positively associated with ticket prices in three of the four leagues, except for the NFL. Interestingly, their evidence suggests that a team's payroll does not influence ticket prices in the NFL or NHL but does so in the NBA and MLB (Rishe & Mondello, 2004). Furthermore, prior season success only marginally affects ticket prices in most North American major league sports. According to a more recent study on football spectator attitudes in Brazil, club specifics, the form of the ticket purchase, and stadium quality further determined the price, according to a more recent study on football spectator attitudes (Forti & De Lima, 2021).

While traditional sports demand studies have considered ticket pricing as one of many variables affecting spectator demand, few studies have examined the factors influencing ticket pricing in European sports markets. Kemper and Breuer (2016a, 2016b) have focused on

dynamic ticket pricing applications in European sports, Kemper and Breuer (2015) have studied the secondary ticket market in the German Bundesliga by analysing ticket prices on ebay.de, and Nufer and Fischer (2013) have conducted a descriptive study on ticket prices in European football. In a sports marketing study, Woratschek et al. (2020) analysed secondary ticket market premia for German women's national football using conjoint analysis. Solberg (2001) examined ticket price optimisation strategies during the 1999 World Hockey Championship in Norway by utilising price bundling. To the best knowledge of the authors, the factors that determine ticket prices in the English Premier League, Europe's most important football league, have not been previously investigated. Nor have the determinants of ticket prices in the primary market of any other sports league in Europe been examined.

Another factor influencing ticket pricing is the type of opponent a home team faces, given the joint nature of sports production. As Neale (1964) notes, the production process in professional team sports differs from other industries. While the elimination of competition can benefit a firm in most markets, in sports, a single team is unable to produce a marketable product without at least one opponent. This particularity necessitates a joint production process where multiple teams participate in producing the final product, which is the championship race. Furthermore, not only is the existence of other teams essential for the industry, but also their relative competitiveness is crucial for the sport's marketability. The relationship between the quality of competition and a team's revenue is not linear in professional team sports (Michie & Oughton, 2004). As the opposing team's strength increases, it can lead to an increase in attendance and revenue as fans are drawn to more competitive and exciting matches. However, if the opposing team becomes too dominant, it may result in a decline in attendance and revenue, as fans may lose interest in one-sided matches.

According to Berri and Schmidt (2006): "Despite the joint nature of sports production, the compensation of talent in the industry is organized as if the individual firms were largely independent [...] teams negotiate with players, and these negotiations result in a salary that is paid by the individual team. Hence, if a player generates revenue for his opponent, such revenue generation is largely uncompensated. Therefore, to the extent that individual team-revenue streams are increased by the quality of players on other teams' rosters, an externality exists." For instance, Hausman and Leonard (1997) found that Michael Jordan generated US$53 million for teams other than his team, the Chicago Bulls. The evidence for such externalities also extends to Major League Soccer (Jewell, 2017; Lawson et al., 2008).

Our study addresses the presence of externalities by incorporating the six most popular teams as dummy variables and evaluating their effect on ticket prices. Using ticket prices as a measure, home teams can take advantage of the positive externalities of popular opposing teams. Neglecting to do so may result in the home team not fully realising the potential benefits.

3. Data and Empirical Model

Our unit of observation is the match day, and we consider two dependent variables: the cheapest and most expensive price for a match day ticket. We manually collected data on weekly ticket prices charged for games to the EPL for the five seasons between 2014/15 and 2018/19 inclusive. Due to promotion and relegation, the number of different clubs observed over the observed period is 26, with some clubs appearing in the dataset only once and others in every single season. Every one of the 20 eligible clubs in a given season had 19 home and 19 away matches, with a season comprising 380 matches, bringing the total to 1,900 matches for the five seasons. As the prices collected for each match were the cheapest and the most expensive match day ticket prices, the total number of observations across both types of tickets was 3,800. However, some ticket prices were unavailable: Manchester City and Everton for all five

seasons; Newcastle United's most expensive tickets for four seasons; and Hull City's ticket for the 2014/15 season. After omitting these and accounting for other missing data, the observations were further reduced to 1,520 for each of the cheapest and the most expensive tickets. During the sample period, all but four teams: Huddersfield Town; AFC Bournemouth (2015/16, 2016/17); Swansea City (2014/15, 2015/16); and West Bromwich Albion (2014/15, 2016/17) applied a seat-location approach, a price discrimination strategy based on the perceived quality of seat where prices reflect the distance from the pitch or the quality of the view.

Differences between the lowest and the highest match day ticket prices reveal substantial disparities in the additional premium per match charged by each club. Watford, for example, demanded another £6 for tickets based on seat location. Chelsea charged an additional £26.00, while Arsenal charged £31.50 more for their most expensive ticket price than the cheapest seat.

The principles of price banding – price discrimination based on the perceived attractiveness of the opponent – are an integral part of most clubs' pricing decisions. Only six out of the 26 teams in the sample – Manchester United (all seasons), AFC Bournemouth (2015/16, 2016/17, 2017/18, 2018/19), Watford (2015/16, 2016/17, 2017/18, 2018/19), Liverpool (from 2016/17 onwards), Burnley (2016/17, 2017/18, 2018/19), and Huddersfield Town (2017/18, 2018/19) – abstain from applying price banding. Everton abandoned price banding in the season 2019/20 to reduce and simplify ticket pricing (Everton, 2019). As noted earlier, price banding potentially extracts any additional surplus consumers are willing to pay and leads to higher income for a club (Rascher et al., 2007). According to a survey by Clowes and Clements (2003), most clubs that do not apply price discrimination based on opponents do so consciously as they believe it is unfair to discriminate between teams in the Premier League

or because they do not see the need to do so. There are also likely to be administration costs associated with price discrimination.

Of the clubs that applied price banding, there are differences in the number of categories, the opponents that trigger a premium, and the magnitude of the premium charged. While most clubs divide the opponents into three categories (e.g., A, B, and C or A+, A and B), clubs like Fulham, Middlesbrough, Swansea City, and Wolverhampton Wanderers prefer only two categories. On the other hand, Norwich City had five different categories for the 2015/16 season.

But there are also considerable differences concerning the magnitudes of price premia based on the opposition. Arsenal charged £27 for the cheapest ticket category in a game against AFC Bournemouth in 2018/19, while the price for the same seat was £65.50 against Chelsea. On the other hand, Chelsea charged £52 for the cheapest ticket against AFC Bournemouth and £61 for the same seat against Arsenal. The ticket price range of EPL clubs during the 2018/19 season is displayed in Table IV-1.

Table 3-1 EPL ticket price range for the 2018/19 season (in £).

	Lowest ticket price	Highest ticket price
Arsenal	27	97
Chelsea	52	87
West Ham United	30	80
Tottenham	20	75
Fulham	25	75
Brighton	30	65
Liverpool	37	59
AFC Bournemouth	32	55
Manchester United	31	53
Crystal Palace	38	53
Southampton	33	52
Newcastle United	34	50
Leicester City	26	50
Cardiff City	27	42
Watford	36	42
Wolverhampton Wanderers	22	40
Burnley	30	40
Huddersfield	30	30

To procure the option of buying match day tickets early, membership is required at many clubs, with only limited discounts for these tickets, if any. Several clubs also purchase top category A or A+ match tickets contingent on either being a club member, having collected bonus points in previous games, or buying the tickets as price-bundles together with tickets for other less popular games. There is no publicly available data on the number of seats provided at these prices or within these schemes.

To model ticket prices, the dependent variables are the logarithm of prices. The log values are preferred as the coefficients can be interpreted as a proportional rather than an absolute change. This approach is an obvious choice since the impact of a change in any of the explanatory variables will likely have different effects at different price levels. Additionally, the use of logarithms will mitigate against any skewness in the distribution of prices which range from a low of £9 (£25) to a high of £70 (£97) for the cheapest (most expensive) ticket. The models are estimated using linear regressions estimated by ordinary least squares (OLS) and fixed effects, with each home club-season having its own intercept term. The values of each intercept term do not vary across a home club-season and capture a set of unobserved factors that are constant within each panel.

For the two types of ticket prices, the models can be presented as

$$LogP_{ijt}^{type} = \alpha + \beta X_{ijt-1} + \varepsilon_{\mathrm{ijt}} \quad (1)$$

The subscripts *i, j,* and *t* denote home club, away club, and season respectively; *type* represents the two types of tickets being modelled. $LogP_{ijt}^{type}$ is the log of ticket price, α is a constant, and β is a vector of coefficients to be estimated with respect to X_{ijt-1}, a vector of explanatory variables. The subscript *t-1* is highly relevant as the prices of tickets for the current season are modelled on information from the previous season that just concluded. Finally, $\varepsilon_{\mathrm{ijt}}$ is the error

term, which is independent, normally distributed with a mean value of 0 and constant variance. As an additional robustness check, we also estimate the models using a fixed effect with the home club-season panel. In this instance, the intercept α is effectively replaced by α_{ijt}, a vector of intercepts representing a home club season.

Our choice of explanatory variables captures a range of categories. The first relates to the economic wealth of the clubs' locations and the labour costs faced by clubs. The second category captures a range of sporting factors, including, for example, matches involving local rivals, club brands, and sporting performances. Finally, time elements are also used, including weekends and public holidays. Each of the explanatory variables is described in more detail below:

Following Reese and Mittelstaedt (2001), we include *relative* a*verage weekly workplace earnings*, which is calculated as the average weekly workplace earnings over the previous season, as an indicator of the region's economic conditions where the home club is located. The data source is the Centre for Cities, an independent, non-partisan urban charity-registered policy research unit in England. Lower values of weekly workplace earnings may indicate lower purchasing power which could negatively affect demand (Solberg & Turner, 2010). However, the nature of supporting a team can often mean a lifelong following irrespectively of income (Cox, 2012). Fans from economically challenged, working-class regions are often considered the most loyal. To account for the impact of inflation on earnings over time, we use relative value, which is calculated as the average weekly earnings divided by the mean value for that season. As such, the mean value of this variable during any given season is 1. Additionally, we include the square of the term to capture any non-linear relationship between *relative* a*verage weekly workplace earnings* and ticket price.

In contrast to research that focuses on the influences on stadium demand, where stadium quality is a determinant (Quansah, 2022) and the stadium capacity is a limiting factor (Borland & Macdonald, 2003), *capacity utilisation from the previous season* might actually be a determinant of ticket pricing. Stadium capacity determines the maximum number of seats a club can offer, which might lead to a market shortage in the face of excess demand. As a response to the demand, clubs might raise ticket prices to manage excess demand. For this reason, the study investigates the impact of stadium capacity on ticket prices. For each match, the capacity utilisation from the equivalent match from the previous season is used. Arguably, this gives the decision-makers insights into the likely demand. The quadratic of *capacity utilisation from the previous season* is also included to capture non-linearity. One might expect prices to increase at an increasing rate. For those matches that can't be paired with the prior season's equivalent because of promotion to the league, capacity utilisation takes a value of 0, and a dummy variable, *home promoted*, is used to capture this phenomenon.

Studies by Forrest and Simmons (2002) and Forrest et al. (2004), among others, indicate that games of historical and local rivalry tend to generate higher demand, ceteris paribus. Such matches take on a special status over and above regular league matches, with teams and supporters vying for local bragging rights. To test whether derby matches significantly affect ticket prices, the data capture 19 historical rivalries among the 26 clubs, which occurred in 86 matches in the five seasons observed. The variable *derby match* takes the value of 1 for such matches and 0 otherwise.

Undoubtedly, prices for the biggest clubs in the EPL, based on revenue, reputation, and league success, are greater than their smaller counterparts. As noted above, such clubs have a stronger legacy, and their cumulative performances over past seasons are likely to afford them greater popularity which will be reflected in ticket prices. Taking the six biggest teams can be

viewed as somewhat arbitrary. We could have easily constructed a variable capturing the biggest four. However, in the following analysis, dummy variables for away clubs registered significance for the top six clubs, with the seventh biggest club not significantly different from the others. Therefore it seemed appropriate to choose the six biggest clubs and test their pricing behaviours relative to the rest. Furthermore, in a list of significant club dummies for televised matches in the EPL study by Buraimo et al. (2022), these were the top six clubs that attracted the greatest audiences. For this reason, we include a dummy variable, *Big Six at home,* for Arsenal, Chelsea, Liverpool, Manchester City, Manchester United, and Tottenham Hotspur home matches.

Sports demand research has previously used wage costs as an indicator of a squad's absolute team quality (Késenne, 2015b). Like other sports labour markets, the market for football players follows the rule of supply and demand. The best players are highly sought-after, with the consequent effects on the clubs' wage bills and the high transfer fees in many instances. Assuming efficient or quasi-efficient markets, a club's wage bill is likely to be a predictor of a team's strength and a proxy for team quality (Szymanski, 2003a). However, the contract between a club and a player is generally fixed for the length of the contract. A club may acquire a player for a high salary and transfer fee, only to realise that the player does not quite fulfil expectations. Changes in form and injuries are likely to weaken the relationship between labour costs and player quality. However, the motivation is not to test or assert the strength of the relationship between labour costs and quality but to test whether higher total labour costs lead to higher ticket prices, or in other words, to what extent do clubs pass on their player expenses to fans? Besides the club wage bill, we also considered net transfer fees deriving total labour costs. A club's wage bill will also include non-playing staff. However, the proportion of total labour costs for non-playing staff is likely to be minor, and regardless, such costs are part of the clubs' overheads. The measure used for this explanatory variable,

ln(adjusted total labour costs), is the log of clubs' inflation-adjusted total labour costs (sum of the wages and net transfer fee).

There is evidence in favour of specific positive effects on demand for games in which teams with widespread national and international following and reputation participate (Forrest et al., 2005). According to Czarnitzki and Stadtmann (2002), in a study on the determinants of match attendance in the German Bundesliga, reputation and allegiance – captured by measuring a team's performance over several years – appear to be more critical determinants of demand than the uncertainty of outcome. The EPL is characterised by a small number of teams that dominate the league concerning several indicators such as playing success, wage bills, team revenues, and market size. In a recent study by Buraimo et al. (2022), in which they explore the demand for televised audiences for football matches in the EPL, they find that audiences have strong preferences for teams in a particular order, having controlled for other factors, including player quality. We thus test for the possibility that these clubs, considered the largest clubs in the league (Arsenal, Chelsea, Everton, Liverpool, Manchester City, Manchester United, and Tottenham Hotspur), might induce positive externalities on the home team by including dummy variables, *big six (as visiting teams),* for games played against any of them.

In contrast to club brand and reputation, built over time, a team's position in the previous season is used to measure its short-term performance. Following the "basking-in-reflected-glory" phenomenon, the logic that individuals associate themselves with success (Cialdini et al., 1976), the home- and away teams' short-term success could spark demand, which might influence the home team's pricing policy (Reese & Mittelstaedt, 2001). As such, the models use the home and away teams' positions at the end of the previous season as explanatory variables denoted by the *previous season's performance*. The expectation is that

better performances in the last season may positively impact the prices charged for tickets in the coming season.

In contrast to weekends, where people tend to have more leisure time, weekday games are usually played in the evening and attract fewer attendees (Carmichael et al., 1999). To capture these effects, a dummy variable, *weekend,* was created for weekend games and is set to 1 if the match is scheduled for the weekend and 0 otherwise. Similarly, people tend to have more leisure time during Bank Holidays. A dummy variable, *public holiday*, is included and takes the value of 1 if the match is scheduled on a public holiday and 0 otherwise. The greater leisure time will induce greater demand, all things being equal. However, football clubs may respond to this expected increase in demand with increased prices. This may, in turn, depend on the stadium's structure and the available capacity levels. Descriptive statistics for the variables are presented in Table IV-2.

Table 3-2 Summary Statistics for continuous and dummy variables (n = 1,520)

Variable	mean	standard deviation	minimum	maximum
ticket price low (in £)	35.039	9.164	9.000	65.500
ticket price high (in £)	48.295	14.376	25.000	97.000
relative mean weekly workplace earnings	0.997	0.192	0.747	1.283
capacity utilisation from previous season	0.656	0.438	0	1.000
derby matches	0.057	0.231	0	1.000
adjusted total labour costs (2015 prices in millions)	162.638	100.714	39.756	490.810
previous season's home performance (league position)	11.388	6.723	1.000	25.000
previous season's away performance (league position)	10.970	6.557	1.000	25.000
away team is Manchester United	0.049			
away team is Liverpool	0.049			
away team is Arsenal	0.049			
away team is Chelsea	0.049			
away team is Manchester City	0.053			
away team is Tottenham Hotspur	0.049			
away team is Everton	0.053			
weekend	0.794			
Public holiday	0.037			

Notes: The variable "capacity utilisation from previous season" includes 0s for promoted club in which there are no matching matches from the previous seasons.

Finally, we check for collinearity by inspecting the correlation coefficient matrix. The correlation coefficient values do not cause concern, and collinearity is not an issue in the modelling.[3]

[3] Additionally, we check for multicollinearity using variance inflation factors for each of the variables. The results suggest that multicollinearity is not an issue within the models, as the highest value across the different variables of any variable is 5.49, well within the threshold value of 10. Furthermore, we use the condition index to test for multicollinearity across the variables. The condition number of 28.61 again confirms that the models perform well against this test.

Table 3-3 Correlation matrix for independent variables (n = 1,520).

		Variable number																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	relative average weekly workplace earnings	1.000																
2	capacity utilisation from previous season	0.105	1.000															
3	home promoted	-0.135	-0.689	1.000														
4	Big Six team at home	0.460	0.229	-0.311	1.000													
5	derby matches	0.130	0.118	-0.083	0.277	1.000												
6	ln(adjusted total labour costs)	0.301	0.217	-0.280	0.782	0.240	1.000											
7	away team is Manchester United	0.007	0.065	0.007	-0.023	0.076	-0.028	1.000										
8	away team is Manchester City	0.000	0.067	0.000	0.000	0.006	0.000	-0.054	1.000									
9	away team is Liverpool	0.007	0.069	0.007	-0.023	0.076	-0.019	-0.052	-0.054	1.000								
10	away team is Tottenham Hotspur	-0.022	0.059	0.007	-0.023	0.076	0.000	-0.052	-0.054	-0.052	1.000							
11	away team is Chelsea	-0.022	0.061	0.007	-0.023	0.168	-0.022	-0.052	-0.054	-0.052	-0.052	1.000						
12	away team is Arsenal	-0.022	0.060	0.007	-0.023	0.141	-0.019	-0.052	-0.054	-0.052	-0.052	-0.052	1.000					
13	away team is Everton	0.000	-0.068	0.000	0.000	-0.006	0.000	-0.054	-0.056	-0.054	-0.054	-0.054	-0.054	1.000				
14	previous season's home performance	-0.330	-0.526	-0.742	-0.713	-0.182	-0.620	-0.015	-0.000	-0.015	-0.017	-0.017	-0.017	-0.000	1.000			
15	previous season's away performance	-0.018	-0.457	-0.040	-0.038	-0.171	-0.034	-0.216	-0.315	-0.214	-0.252	-0.241	-0.240	-0.093	-0.054	1.000		
16	weekend	-0.016	-0.015	-0.016	-0.039	-0.005	-0.039	-0.011	-0.033	-0.034	-0.004	-0.034	-0.018	-0.004	-0.022	0.032	1.000	
17	public holiday	-0.011	-0.008	-0.004	-0.025	-0.041	-0.025	-0.020	-0.014	-0.020	-0.020	-0.020	-0.001	-0.014	-0.026	-0.028	-0.252	1.000

4. Results and Discussion

In this section, we present the findings of our empirical analysis, and we discuss the results by highlighting the key takeaways and their implications for the research question and the broader field of study. Table IV-4 displays the results from the models.

Table 4-1 Regression results: dependent variable is ln(ticket prices)

	(1) Cheapest		(2) Most expensive		(3) Cheapest		(4) Most expensive	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
relative average weekly workplace earnings	0.438***	(15.115)	0.393***	(15.481)				
capacity utilisation	-0.864***	(7.314)	-0.250**	(2.418)	0.047	(0.418)	0.006	(0.062)
capacity utilisation squared	0.928***	(7.946)	0.289***	(2.829)	-0.038	(0.330)	0.019	(0.179)
home promoted	0.001	(0.040)	0.165***	(6.572)				
Big Six team at home	0.032	(1.427)	0.080***	(4.108)				
derby matches	0.105***	(4.490)	0.115***	(5.649)	0.084***	(5.979)	0.108***	(8.433)
ln(adjusted total labour costs)	0.057***	(3.469)	0.158***	(11.035)				
away team is Manchester United	0.149***	(5.647)	0.146***	(6.327)	0.159***	(10.002)	0.148***	(10.173)
away team is Manchester City	0.142***	(5.118)	0.140***	(5.785)	0.147***	(8.817)	0.142***	(9.373)
away team is Liverpool	0.116***	(4.386)	0.125***	(5.425)	0.144***	(9.052)	0.133***	(9.160)
away team is Tottenham Hotspur	0.136***	(5.032)	0.120***	(5.042)	0.132***	(8.098)	0.123***	(8.248)
away team is Chelsea	0.112***	(4.121)	0.115***	(4.829)	0.143***	(8.706)	0.128***	(8.537)
away team is Arsenal	0.101***	(3.717)	0.102***	(4.299)	0.109***	(6.657)	0.100***	(6.728)
away team is Everton	0.017	(0.714)	0.017	(0.835)	0.024*	(1.690)	0.019	(1.507)
previous season's home performance	-0.003*	(1.655)	-0.012***	(8.271)				
previous season's away performance	-0.002	(1.445)	-0.001	(1.002)	-0.002**	(2.401)	-0.001	(1.493)
weekend	0.019	(1.488)	0.020*	(1.766)	0.012	(1.510)	0.016**	(2.232)
public holiday	0.029	(1.049)	0.025	(1.053)	0.026	(1.582)	0.022	(1.432)
season 2015-16	-0.036**	(2.244)	-0.066***	(4.671)				
season 2016-17	-0.088***	(5.547)	-0.104***	(7.459)				
season 2017-18	-0.102***	(6.220)	-0.100***	(6.974)				
season 2018-19	-0.112***	(6.856)	-0.059***	(4.093)				
Constant	2.033***	(6.530)	0.538**	(1.975)	3.449***	(158.715)	3.740***	(188.806)
Observations	1520		1520		1520		1520	
Adjusted r^2	0.422		0.646		0.318		0.335	
Season dummies	Yes		Yes					
Home-season fixed effects					Yes		Yes	

Notes: Models (1) and (2) use linear regression estimated using OLS whilst models (3) and (4) are fixed effects with home club-season as the panel. Absolute *t* statistics in parenthesis. * p<0.10, ** p<0.05, *** p<0.01

Models (1) and (2) are linear models estimated by ordinary least squares (OLS), whereas Models (3) and (4) are estimated using fixed effects with home club-season as the panel. In the models estimated using fixed effects, variables that are constant across home club-season panels are omitted, and the explanatory variables that remain are those that vary within the panel. Comparing the coefficients of these variables from the fixed effects models with the linear

models estimated by the OLS equivalent reveals that the coefficients are statistically similar. As such, much of the attention of this section will be on the linear models estimated by OLS. Each of the explanatory variables is discussed in turn across the two models.

The first of the explanatory variables is the *relative average weekly workplace earnings*. The quadratic for the variable was not significant and thus dropped out. The earnings variable is statistically significant and suggests that earnings over the examined period affect pricing. The constant value of the variable within the panel indicates that higher earnings positively impact the prices of both the cheapest and most expensive tickets for all clubs. This result suggests that clubs are aware of the level of wealth in their market and adjust their prices accordingly. The coefficient for the most expensive ticket is greater than that of the cheapest ticket, which is to be expected. However, the two coefficients are not substantially different at the 5% level. Still, the greater coefficient for the most expensive ticket is suggestive that the more affluent consumers are asked to pay a greater increase in ticket prices.

The results demonstrate that stadium utilisation matters and that the capacity utilisation of the same match in the previous season affects ticket prices in the following season. The quadratic value suggests that the relation with ticket prices is a U-shape. However, the turning point of the curve is below the minimum values for capacity utilisation. This result suggests that the negative portion of the curve is redundant and that as capacity increases, prices increase but at an increasing rate. This result highlights that as demand increases (measures taken from last season's match) and fewer seats remain, prices rise at an increasing rate, and the asking prices for both types of tickets are increased.

For those teams who are newly promoted to the EPL, there is no capacity utilisation since the equivalent match did not occur last season. The ticket prices for these clubs, based on the coefficient of the *home promoted* variable, is an increase of 17.9% for the most expensive

tickets. For the cheapest ticket, there is no significant impact. However, this is based on the utilisation of 0, given that there was no equivalent match from the previous season. However, for an incumbent club with mean capacity utilisation, the price increase for the most expensive ticket would be 25.4%. Thus, the price increase by promoted teams for the most expensive tickets is 7.5% less than the average incumbent team. This result suggests that newly promoted teams are looking to extract surplus from the most affluent part of their markets but do not do so to the same extent as incumbent teams (Dietl et al., 2015). Perhaps they lack the commercial confidence to increase prices to the same degree, or such increases are likely to be too high, given that the previous season's prices are for the division below.

The coefficient for the variable *Big Six at home* is significantly different from 0 for the most expensive tickets. For the cheapest tickets, the prices of the Big Six are not dissimilar to other clubs, although what is unclear is the proportion of seats available at different prices. For Big Six clubs, the most expensive tickets are 8.3% more expensive than their non-Big Six counterparts, controlling for other factors, which is expected, given their historical success, commercial might, and global strength. This result complements that of Buraimo et al. (2022), who highlight the big teams generate the bulk of the interest in televised football in the EPL.

Derby matches of local interest have a positive impact on the cheapest and most expensive tickets, which are estimated to be 10.5% and 11.5%, respectively. Clubs in the EPL are keen to charge a premium for local rivalry, and this is to be expected since such matches tend to be anticipated by fans and offer the chance to gain local bragging rights. Whilst the increase for the most expensive ticket prices is higher than that of the cheapest ticket, the difference is not statistically significant, but the magnitude indicates that the more expensive tickets experience a higher price increase because of derby matches. Furthermore, whilst the percentage increase is equivalent, the absolute increases will be higher for the most expensive tickets, given the higher mean price. This result is interesting since many studies of football

demand (e.g. Buraimo et al., 2013) show that derby matches positively influence stadium attendance. As such, there may be greater scope for increasing prices for derby matches since the price increases do not seem to diminish the additional stadium attendance. The findings also support observations made on the pricing effects of derbies in intercollegiate athletics (Sanford, 2016).

As noted earlier, labour costs are the most significant costs faced by football clubs, and these generally take the form of transfer fees needed to acquire players and their wages once recruited.[4] We note that the labour costs of clubs are associated with a change in price for the most expensive tickets and the cheapest ones. The positive and significant signs of the coefficient of *ln(adjusted total labour costs)* for both ticket types suggest that clubs look to recoup at least some of the costs they face in the labour market; much of these are passed on to those fans paying the highest prices. The magnitude of the coefficient for the most expensive tickets is nearly three times that of the cheapest ticket highlighting the extent to which the more expensive tickets are used to generate more revenue. However, we again highlight that without knowledge of how the seats are apportioned across different price points, it is impossible to explore which tickets generate greater revenue. Of important note is that most of the revenue to EPL comes from the broadcast market. For the 2019-20 season, the revenues from the broadcast market for the league made up 52% of total revenue (Deloitte, 2021). Hence, clubs are likely to pass on a more modest but significant amount of the players' labour costs to fans in the stadium, given that the broadcast market can bear most of these costs.

The next set of explanatory variables is the visiting teams. In the analysis, we find that the six clubs, Manchester United, Manchester City, Liverpool, Tottenham Hotspur, Chelsea,

[4] See Quansah, T., Frick, B., Lang, M., & Maguire, K. (2021). The Importance of Club Revenues for Player Salaries and Transfer Expenses—How Does the Coronavirus Outbreak (COVID-19) Impact the English Premier League? *Sustainability*, *13*(9), 5154. https://www.mdpi.com/2071-1050/13/9/5154 for an examination of the importance of club revenues for player salaries and transfer expenses in the EPL.

and Arsenal, as visiting teams on average elicit price increases for the most expensive tickets, and in that descending order of magnitude. However, the differences across the clubs are negligible and not statistically different. The club next on the list was Everton, however, matches in which Everton was the visiting team did not generate price increases that were any different from those other clubs in the sample. In essence, any of the Big Six clubs as the visiting team elicit price increases by the host clubs for both types of tickets. Additionally, the price increases were consistently applied across the two types of tickets indicating that clubs adopt a consistent approach to extracting surplus from the cheapest and most expensive tickets when based on the visiting Big Six clubs. However, since the coefficients can be interpreted as percentage changes, a greater absolute amount will come from the most expensive tickets. For example, the coefficients for Liverpool as the away team for the cheapest and most expensive prices are 12.3% and 13.3%, respectively. Given the mean prices of £40 and £58 charged for the cheapest and most expensive tickets, respectively, by a team hosting Liverpool in the 2018-19 season, the additional increases in prices are estimated to be £4.64 and £7.25 for the cheapest and most expensive tickets respectively and clearly a higher margin for the most expensive ticket in contrast to what the coefficients might suggest.

Furthermore, it is evident that host clubs take advantage of the positive externalities offered to them, which means that fans not only get to see well-known teams, but also high-level players, as elite clubs and superior player quality tend to go hand in hand. Furthermore, this underlines the tension between the Big Six clubs and their failed attempt to establish a European Super League. The positive externalities that arise from hosting these clubs are high. Any threat to the current setting will most likely be met with resistance from the clubs accruing these externalities, which is a relevant issue. Still, any discussions and analyses of the European Super League are outside the scope of this study.

The performances of the teams in the previous season offer some interesting results. That of the home team has no (meaningful) significant impact on the cheapest tickets but influences the most expensive ones. An improvement in home team performance of one place in the league standings from the previous season increases prices for the most expensive tickets by 1.2%. To put this into context, if we take two hypothetical identical home teams with the only difference being their finishing position last season and that difference being a one standard deviation difference (6.7 places), the home club is estimated to charge an extra £3.88 for the most expensive ticket. The impact on revenue will depend on the number of tickets available at this price. These results can be put in contrast to findings from the North American sports market, where team performance was one of the most critical drivers of primary and secondary ticket pricing (Diehl et al., 2016; Reese & Mittelstaedt, 2001; Rishe & Mondello, 2003).

The coefficient of the variable *weekend* is not significantly different from 0 for the cheapest tickets. However, there is a hint of significance for the most expensive tickets, especially in the fixed effects model. One can generally assume that the prices of tickets across the weekend, weekdays and public holidays are very similar.

Managerial Implications

There are some lessons and implications from these results for managers at clubs and similarly at the league level. From the perspective of clubs, the results from the model can be used as a benchmark when considering price increases. Whilst the prices set by firms can be determined using different approaches, as mentioned earlier in this study, the extent to which fans can bear and are willing to accept price increases is a factor. In conventional markets, firms can readily increase prices, and consumers can either accept such increases or stop consumption, presumably to seek an alternative. Football attendance, however, is not a conventional market since fans and supporters have strong affinities and such affinities spill over into ownership

even if such ownership is not legal and more psychological. As such, there are limits to price increases that consumers will find acceptable. Beyond this limit, relations between clubs and their fans and supporter can become strained. In some instances, the outcomes can be unpalatable.

For example, in a Premier League fixture in 2016 between Liverpool and Sunderland at Anfield, over 10,000 Liverpool supporters left the match in protest over proposed increases in ticket prices. The club announced that prices for the most expensive match day ticket for the following season would be increased to £77, up from £59. The supporters duly got up and walked out of the stadium in the 77th minute; this was in addition to flying black flags, rather than the usual red ones, and chants accusing the owners of greed (Press Association, 2016). The club owners apologised, and the price increase was cancelled. Arsenal and Tottenham Hotspur have also, in the past, retreated over price increases.

The relevance of the models in this study is that the prices used are actual prices borne by attendees, and therefore, the coefficients of the variables capture price increases that the market is willing to pay. Thus, the models can be used to benchmark acceptable price increases. This is not to suggest that fans and supporters will not accept price increases that are even greater but to suggest that beyond these, there is the risk of conflict. The extent of any proposed price increases will depend on the magnitude of the significant variables in the models and the initial prices at which the increases are being applied.

Furthermore, this study has implications for sports leagues regarding revenue allocation and distribution. While some leagues redistribute revenues, particularly from broadcast markets, they may struggle to find the optimal distribution mechanism. It's important to note that clubs have the ability to design their own pricing strategies, which can serve as a form of quasi-redistribution. Since all clubs host every member of the Big Six (except the Big Six, who

will have just five such occasions), the positive externality imposed by the Big Six effectively reassigns resources from the bigger, wealthier teams to the smaller ones. This type of revenue redistribution is desirable in sports leagues and can be achieved through effective pricing strategies, with success depending on the clubs' in-house management expertise. This quasi-redistribution approach to stadium revenue has the advantage of not requiring league intervention and allowing clubs to retain their own stadium revenue.

5. Conclusion

This paper examines the factors influencing ticket pricing in the English Premier League (EPL). It finds that the cheapest and most expensive ticket prices are influenced by factors such as local earnings, stadium capacity utilisation from the previous season, whether the team is a "Big Six" club, the status of the opponent and team rivalries. These variables perform as expected in the models. The study shows that clubs set prices based on the market's ability and willingness to pay higher prices. Clubs are responsive to local prosperity, which is reflected in ticket prices. Additionally, clubs take advantage of limited stadium capacity by increasing prices as capacity decreases, forcing consumers to compete on price and pay higher premiums as capacity approaches zero.

While the Big Six clubs of the league are the driving force behind the EPL's popularity in international markets and its high broadcasting income, positive externalities accrue to smaller teams who can freeride within both the broadcast and stadium markets. In response to the takeover of Newcastle United in 2021 by the sovereign wealth fund of Saudi Arabia, the remaining Premier League clubs passed a temporary ban on related party transactions, a move to restrict clubs from agreeing on sponsorship deals with companies linked to their owners. As Financial Fair Play regulations oblige clubs to balance football-related expenditures, such as transfer fees and wages, with income, the rule hinders clubs with wealthy shareholders, such as

Newcastle United, in buying the best players, building up a strong reputation through sporting success, and becoming a big club. Paradoxically, restricting or limiting clubs from transitioning from small and medium to big clubs constrains the extent to which other clubs will be able to generate additional revenue and freeride, given the findings from this study.

Clubs look to charge stadium attendees a price premium for short-run home sporting success (at least for the most expensive tickets). The study's results also suggest that clubs tend to recoup some player costs by passing these on to the cheapest and most expensive ticket prices (and possibly on all ticket prices in between). Whist the broadcast market for the EPL does an extraordinary job of providing resources to clubs to spend in the labour market, clubs are still compelled to extract resources from fans given their labour costs.

We further conclude that ticket prices and, consequently, match day revenues serve as a means of redistributing resources from larger to smaller clubs. This is because clubs adjust their prices based on the reputation and recent success of the teams they are scheduled to play against.

There are limitations and assumptions associated with this study. First, the study uses only two price points: the lowest and the highest available ticket prices of the home club in a particular game. The number of price points will differ among clubs, and this is often not publicly available. Thus, clubs can use ticket prices as a marketing tool, offering very limited seats in their cheapest advertised category. Second, the study focuses on how EPL clubs price their match day tickets. While this reveals the relationship between covariates and prices, the analysis does not provide an answer to how much fans are willing to pay. Third, the study cannot answer the question of whether price decisions by clubs are well-founded or whether clubs copy pricing methods from each other. For this reason, there is scope for combining the

research with a qualitative angle by including interviews with club managers to examine the nature of their decision-making process, objective-setting, and pricing tools.

V. CHAPTER FIVE: ESSAY ON THE IMPACT OF NON-DISCRIMINATORY TALENT SELECTION ON COMMERCIAL INCOME

Athlete Ethnicity and Sponsorship Income: Sport Sponsorship Deals in Professional European Football

Abstract

Although sponsorship and the impact of ethnical targeting in advertising have been widely researched, few studies have investigated the role of ethnicity in sport sponsorship. Given the persistence of ethnic discrimination in many areas, the ethnic match between athletes and a sponsor's target audience might influence the amount sponsors invest. The current study used panel data and a fixed-effects model to test for links between European football teams' ethnic composition and their sponsorship income. A "market test" approach served to compare clubs in an ethnically homogenous country (Germany) with those in an ethnically more-diverse country (England). Results showed strong negative associations between having a squad with a high percentage of Black or sub-Saharan African players and a club's annual front-of-shirt sponsorship income in Germany's Bundesliga but not in the English Premier League. These associations in the Bundesliga were not moderated by average player value, club reputation, or qualification for UEFA club competitions.

1. Introduction

Sponsorship occurs when an individual or organization directly supplies another individual or organization with resources (financial, human, material) in the expectation of obtaining a return on this 'investment' in terms of promotion for the sponsor's name, brand, or product(s). Sponsor-sponsee relationships, which are usually business-to-business, contract-based and require the parties to coordinate certain activities (Pope, 1998), have become a pillar of strategic marketing for companies across the globe (Meenaghan, 2001). Indeed, sponsorship accounts for between 16% and 25% of worldwide marketing spending, and 70% of this expenditure is in the form of sports sponsorship (IEG, 2018), a market estimated to be worth US $65 billion in 2021 (Gough, 2022).

Sponsorship is one of the most important sources of income for Europe's professional sports organizations (Bridgewater, 2014). For example, in recent years, clubs in the English Premier League (EPL) and in Germany's Bundesliga have obtained between 24% and 34% of their total revenues from commercial/sponsorship income (Figure V-1). According to Bühler (2006), front-of-shirt deals contribute the most to European football clubs' sponsorship income, providing up to 20% of EPL and Bundesliga clubs' total commercial income.

The growth of sponsorship and sponsorship-linked marketing has attracted the interest of numerous scholars. Cornwell and Kwon (2020) listed more than 400 academic papers focusing on sponsorship-linked marketing, while noting that most studies have used consumer responses to determine the effects of sponsorship. Similarly, Toscani and Prendergast (2018) criticized the tendency for research to focus on the sponsor's perspective and to overlook the sponsee's perspective. In addition, aspects of sponsorship such as fundamental process management and the characteristics of sponsorship deals (e.g., asset pricing, price setting) remain under-researched (Cornwell & Kwon, 2020). The influence of athlete ethnicity on sports sponsors' spending decisions is another issue that is rarely addressed in the sponsorship and advertising literature, even though elite sport is very ethnically diverse. In one exception to this

rule, Kim and Cheong (2011) found that athlete-endorsed advertising had a greater impact on purchase intentions when consumers were of the same ethnicity as the endorsing athlete. However, there have been no empirical studies on the impact of athlete ethnicity on the sums sponsors attribute to individual athletes or sports teams.

The current study helps fill this research gap by examining the effect of a top-flight football team's ethnic composition on the size of the club's sponsorship contracts. To this end, we focused on two of Europe's largest football leagues—the Bundesliga and EPL—which are in countries whose populations have different ethnic profiles: Compared with England, Germany has an ethnically more homogenous population with a substantially lower proportion of Black people. Our study covered the eleven seasons between 2008/09 and 2018/19 and included all clubs that played at least two seasons in the Bundesliga or EPL during this period. We collected data on several factors that theory suggests may influence a club's income from sponsorship. These factors include economic variables, quality of viewing, game attractiveness, and the number of Black players in the clubs' squads for each season.

Results did not show a significant link between a club's annual front-of-shirt sponsorship income and the percentage of foreign players in its squad. However, in the Bundesliga, but not in the EPL, we observed a strong negative link between a club's annual front-of-shirt sponsorship income and both the total percentage of Black players[5] in its squad and the percentage of Black players with sub-Saharan African nationality[6] in the squad. Squad average player value, club reputation, and qualifying for UEFA club competitions did not moderate these negative links.

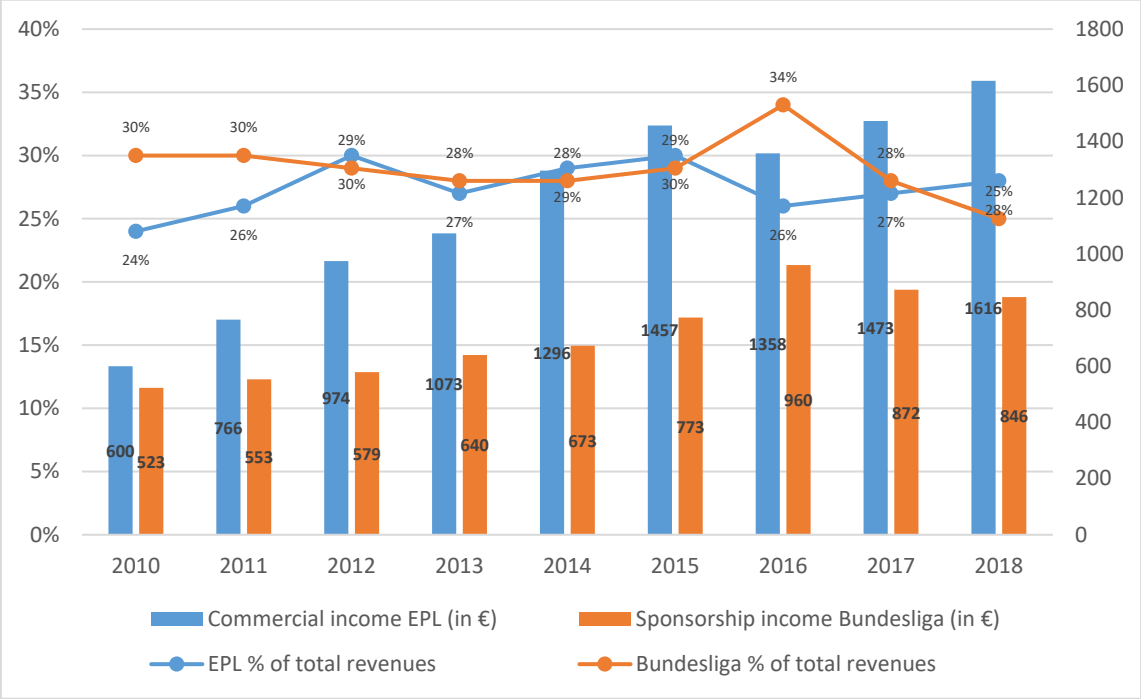
The present study extends existing research on sponsorship by examining the impact of ethnicity on sports sponsorship deals from a sponsee perspective, rather than from a consumer

[5] Includes Black players of all nationalities.
[6] Henceforth referred to as 'sub-Saharan African players.'

perspective. It also provides stakeholders in the field of professional sports with insights into factors that may impact sponsorship deals.

After reviewing the literature on sponsorship and discriminatory practices, both in general and in advertising, we describe our dataset and present the results of the tests we ran on our model and of our empirical analysis. We conclude by discussing our findings, describing the study's limitations, and suggesting avenues for future research.

Figure 1-1 Commercial/sponsorship revenues in the Bundesliga and EPL (2010-2018).



2. Theoretical Framework and Hypotheses

Sports Sponsorship

Sponsors use sponsorship to create associations between a product and consumers. These associations are direct when consumers see a demonstration of the product, consume it, or use it, and indirect when consumers attend or watch a sponsored event (Cornwell, 1995). Farrelly et al. (2006) suggested that the key objective for sponsors is to use the sponsee's image to add to or enhance their own image and to influence the perceptions and purchase behaviors of their

target customers and other stakeholders. However, sponsorship objectives can vary widely depending on the sponsor's industrial sector, size, and type of activity (Walliser (2003). According to Lough and Irwin (2001), increased sales, increased market share, and greater target market awareness, together with enhancing the sponsor's image, are the most valued sponsor objectives. The main benefits for sponsees are the substantial fees and media exposure they receive in exchange for allowing sponsors to use intellectual property rights (e.g., trademarks, logos) and to engage the rights holder's athletes in promotional activities (Farrelly et al., 2006).

The Sponsorship Selection Process

Sponsorship deals tend to be overarching and to include aspects such as duration, relationship type, and contract fee (Woisetschläger et al., 2017). The contract fee, generally agreed upon following negotiations between sponsor and sponsee (Roth et al., 2006), is an important element in the sponsorship decision-making process (Schönberner et al., 2022). Cornwell and Kwon (2020) noted a lack of research on how sponsors and rights holders manage the sponsorship process and on how initial sponsorship decisions are made. Many early studies of sponsorship (e.g. Arthur et al., 1997) assumed that rights holders initiate the sponsorship selection process and approach potential sponsors by sending them sponsorship proposals, However, the process may also operate in the opposite direction, with sponsors actively seeking and approaching potential rights holders who match their corporate marketing strategy (Schönberner et al. (2022).

Schönberner et al. (2022) combined findings reported by Arthur et al. (1997) and Aguilar-Manjarrez et al. (1997) with a qualitative Delphi analysis of interviews with industry experts to produce a model of sports-sponsorship decision-making. They found that sponsors' buying centers comprise eight roles carried out by a small number of individuals. Professional intermediaries, including sport marketing agencies, market research institutes, and consultants,

provide support in the sponsee selection process, acting as brokers and evaluators of the fit between sponsor and rights holders, coordinators, and negotiators. Negotiation processes vary according to the corporate-political or strategic importance of a sponsorship deal and the size of the sponsorship investment (Johar & Pham, 1999; Schönberner et al., 2022), but the sponsor's senior managers retain responsibility for final approval and signing. Numerous organizational and environmental factors influence the decision-making process and sponsorship budget, notably the buying context, company size, industry, and procurement infrastructure (Schönberner et al., 2022).

Discrimination and Discriminatory Practices

Discrimination, that is the unequal treatment of individuals or groups of individuals (Lang & Lehmann, 2012), has no single cause. Moreover, the emergence of more subtle and covert forms of discrimination over the last half century has made the phenomenon more difficult to conceptualize and measure (Pager & Shepherd, 2008). Discrimination may be the result of prejudice (attitudes), stereotypes (beliefs), or ideologies, or even driven simply by economic reasons. But, whatever the reason underlying discrimination, its key feature is the observable discriminatory behavior (Quillian, 2006).

Economists differentiate between taste-based discrimination and statistical discrimination (Neilson & Ying, 2016). Taste-based discrimination is underpinned by prejudice or racial animus (Rivera & Tilcsik, 2016) and involves individuals or firms discriminating on the basis of their personal preferences or beliefs (Pager & Quillian, 2005). According to Becker (1971), discriminatory employment practices based on factors such as ethnicity reduce a company's pool of potential workers and can negatively impact its financial performance. (Lang & Lehmann, 2012) postulated that the impacts of discriminatory practices, especially reduced profitability and increased competition from non-discriminating players in the market, will ultimately lead to the elimination of taste-based discrimination.

Statistical discrimination describes a seemingly rational form of discrimination based on purported differences in productivity between different groups of individuals. This kind of discrimination can occur even in the absence of explicit bias. It arises when employers base decisions concerning an individual on incomplete information about that individual's productivity, notably (supposed) means for a group to which the individual belongs (Lundberg & Startz, 1983). Employers find this approach attractive because it enables them to simplify decision-making while circumventing the information asymmetries that frequently arise in labor market transactions (Rissing & Castilla, 2014). Economists have used the concept of statistical discrimination to model the dynamics of labor market inequalities (Aigner & Cain, 1977; Arrow, 1974).

These two types of discrimination can be difficult to distinguish in practice, as employers may use group characteristics as a proxy for individual characteristics but also have underlying prejudices or stereotypes that influence their decisions. Statistical discrimination can be just as harmful as taste-based discrimination because it perpetuates inequality, reinforces existing ethnic hierarchies, and fails to address the structural inequalities that lead to differential outcomes for ethnic groups (Desmond & Emirbayer, 2010; Pager & Shepherd, 2008; Tilcsik, 2021).

Ethnicity Effects in Advertising

Research into the effects of ethnicity in advertising began in the 1960s, when US firms first started including Afro-American and European-American models in ads (Humphrey & Schuman, 1984). Many authors have since reported links between the ethnicity of the models used in ads and viewers' evaluations of the information presented (e.g. Qualls & Moore, 1990). In line with confirmation bias theory (Nickerson, 1998), some studies have found that consumers react more favorably to ads featuring actors of their ethnicity (Whittler, 1989; Whittler & DiMeo, 1991). Whittler (1991) reported higher degrees of purchase intentions by

European-American participants when European-American rather than African-American models endorse a product. Similarly, Kim and Cheong (2011) showed that athlete endorsers added to the persuasive impact of advertising to Anglo-American and Asian-American undergraduates when the athlete's and target audience's ethnicities match.

In contrast, Appiah (2001) examined the extent to which Black and White adolescents identify with Black and White character ads as a function of the strength of the participants' ethnic identity. Compared with Black adolescents with a weaker ethnic identity, those with a stronger ethnic identity perceived themselves as more similar to Black characters and identified more strongly with Black character ads. White adolescents found Black character ads with varying degrees of Black cultural cues as appealing as similar White character ads. In Asia, where Western models are widely employed in advertising, Chang (2014) found that Taiwanese university students responded more favorably, in terms of advert credibility, diagnostic, and brand attitudes, to ads featuring Western models than to those featuring Asians models. Chang attributed this result to the tendency for Taiwanese consumers to adopt Western cultural values and attitudes, which they associate with progress and prosperity. More recently, Gan (2022) reported that young Chinese female consumers preferred ads with European-type models versus East Asian models. Thus, studies of the effects of ethnicity in advertising have produced inconsistent results, possibly due to changes in ethnic prejudice over time, differences in the cultural contexts in which studies were conducted, and/or differences in the meaning of ethnic cues to the research subjects.

Hypotheses

Discrimination results in Black individuals facing disadvantages compared with their White counterparts (Quillian et al., 2017). Numerous studies have documented the 'economic value' of Blackness in different business contexts, including recruitment processes, where there is substantial empirical evidence of ethnic bias. For example, job applicants with 'Black-

sounding' names are likely to receive fewer callbacks from potential employers than those with 'White-sounding' names, even when they have identical qualifications Bertrand and Mullainathan (2004). More generally, estimates of White preference range from 50% to 240% (Pager & Shepherd, 2008). According to Pager and Shepherd, in the realm of housing, Blacks encounter discriminatory behavior in roughly 20% of their search endeavors, while Hispanics face a similar predicament in 25% of housing pursuits in the USA. When it comes to obtaining credit, individuals of African and Hispanic descent are more likely than their White counterparts to have their mortgage applications rejected or to be given less favorable conditions Yinger (2018). In general, individuals from ethnic minorities more frequently receive inferior customer service or get charged more than their White peers (Pager & Shepherd, 2008).

In the case of sports sponsorship, statistical discrimination may occur when sponsors lack information about the 'productivity' of athletes or sports teams. Productivity in this case depends on the athletes'/team's sporting performance and attractiveness as an advertising model. Sports sponsors may compensate for the difficulty in quantifying these two parameters by following economic explanations for labor market inequalities (Aigner & Cain, 1977; Arrow, 1974). Sponsors may base their decisions concerning sponsees and sponsorship fees on supposed group productivity averages. Another possibility is that sports sponsors follow the predictions of confirmation bias theory and therefore expect their main target group to favor athletes of their own ethnicity. Both types of reasoning would impact a sponsor's choice of sponsee(s) and the amount they spend on sponsoring the sponsee(s) they select. Hence, we hypothesized that:

H1: A club's sponsorship income will differ according to whether its team/squad has predominately Black athletes or predominately non-Black athletes.

Ethnicity has different impacts in different contexts. Contrary to the predictions of confirmation bias theory, stereotypes become less differentiated as societies become more

ethnically diverse (Bai et al., 2020), and taste-based discrimination appears to be lower in ethnically diverse societies than it is in ethnically homogeneous societies. This might also be true for the behavior of sponsors in ethnically diverse countries compared to those in ethnically homogeneous countries. If this is the case, differences in anti-Black discrimination between countries might result in substantial differences in sponsorship prices. Consequently, sports teams with a high percentage of Black athletes might receive less sponsorship income when they are in ethnically homogeneous countries with small Black populations than when they are in ethnically more-diverse countries with larger Black populations.

H2: A sports team with a high share of black athletes will generate less sponsorship income when the team is in an ethnically homogeneous, non-black context than when it is in a less ethnically homogeneous context.

3. Method

Research Setting

Two of Europe's most popular football leagues are in England and Germany, two countries that differ substantially in terms of the size and ethnic composition of their populations. These two leagues, also show marked differences in the national and ethnic make-ups of their player pools. This heterogeneity allowed us to compare the impact of a team's ethnic composition on sponsorship income depending on whether it is in a country with a relatively small Black population (such as Germany) or in a country with a larger Black population (such as England).

Germany is an ethnically rather homogenous country whose image, both at home and abroad, is as a bastion of White traditions that has preserved its unique culture (Faymonville, 2003). There are no official statistics on the size of Germany's Black population, but one estimate, based on a 2021 micro-census, put it at 650,665 people (just 0.7% of the total population). This figure is undoubtedly an underestimate, as it includes only first-generation immigrants from Africa and their children and excludes third- or higher-generation immigrants

and black people who emigrated to Germany from other European countries. According to the *Initiative Schwarzer Deutscher* ('Black German Initiative'), the true number of Black people living in Germany is approximately 1 million, that is 1.2% of Germany's population of 83 million people (Focus, 2020).

England has a more ethnically diverse population than Germany, mostly due to a series of migrations of communities from different parts of the former British Empire and Commonwealth, unintentionally expedited by successive government immigration policies (Spencer, 2002, pp. 129-147). According to the most recent official census, in 2021 England and Wales's total population of 59.3 million people included 2.4 million Black people (4.2%), 1.7 million people of mixed ethnicity (3.0%), and 5.4 million Asian and Asian British people (9.6%).

Neither the Bundesliga nor the EPL provides statistics on the ethnic composition of stadium goers or television viewers. The only data available on these issues is a rather dated estimate published by Populus Consulting in 2010, at which time approximately 8% of EPL stadium visitors were Black or members of other ethnic minority groups (BBC, 2010). Given the EPL's popularity throughout the world, especially in Asia and Africa (Millward, 2017; Quansah, 2022), it is safe to assume that the EPL attracts many more TV viewers of African and Asian heritage than the Bundesliga.

Variables

The dependent variable in our empirical analysis was the annual value of each club's front-of-shirt sponsorship deal. We measured the relationship between a team's ethnic make-up and sponsorship income via three ethnic/nationality-related independent variables: percentage of foreigners in a squad, percentage of Black players of all nationalities in a squad, and percentage of sub-Saharan African players in a squad. Most front-of-shirt deals cover periods of two or three years and stipulate when and how contracts can be re-negotiated and/or adjusted (Livesey,

2022). Player contracts are typically for periods of three or four years and include mechanisms for renegotiating their terms within the contract period (Frick, 2007). Therefore, although sponsors cannot predict a squad's composition with certainty, the fact that player contracts tend to be longer than sponsorship contracts means that squads are unlikely to change substantially during a sponsorship contract. The relatively small within-club standard deviations for the percentages of foreign and Black players in a squad support this observation (Table V-2).

Other variables likely to impact the value of sponsorship deals include the mean number of spectators per game, because sponsors want to advertise their products to large numbers of potential consumers in a highly emotional environment (Biscaia, 2015), and a club's reputation (Crompton, 1993), because sponsors want to benefit from reputational spill-over effects (Andersson et al., 2013). The quality of the sponsored asset is one of the most important factors for sponsors (Ruekert & Rao, 1994). Variables indicating the quality of top-flight football clubs include the average value of the players in the squad (henceforth abbreviated to 'average player value'), league position at the end of the previous season, qualification for UEFA club competitions, and being promoted from a lower division (Quansah, Buraimo, et al., 2023). Table V-1 summarizes the independent variables used in this study.

Table 3-1 Independent Variables.

Percentage of Black players in the squad	Includes players from sub-Saharan Africa or of sub-Saharan African descent, plus players of mixed race with African heritage
Percentage of sub-Saharan African players in the squad	Includes only those players born in sub-Saharan Africa.
Percentage of foreign players in the squad	We categorized a player as foreign if he was not eligible to play for the national team of the country he plays in.
Mean attendance per game	Mean number of spectators attending the team's matches across a season

Squad average player value	A player's market value is a theoretical construct aimed at approximating the market price for releasing a player from an existing contract, irrespective of the remaining length of the contract or its status (Quansah et al., 2021). This value reflects factors such as a player's past performance, club performance, player's age, and playing position (Swanepoel & Swanepoel, 2016), as well as prevailing market conditions (Quansah et al., 2021). Assuming efficient or quasi-efficient markets, a squad's total player value is likely to predict the team's strength and quality (Szymanski, 2003b). We used the transfermarkt.com database to determine the market values of the players on the teams in our sample. A squad's average player value is the sum of the players individual values divided by the number of players in the squad.
Club's reputation	Czarnitzki and Stadtmann (2002) found brand reputation to be an important determinant of sports demand. These authors' reputation rank model captures a team's reputation and goodwill by measuring its performance over several years: REP = $\sum_{t=1}^{T} \frac{n}{X_t \sqrt{t}}$ with T = 20, where Xt is the team's final league position t seasons ago and n is the number of teams competing in the league each season. By weighing the ranking by the square root of the elapsed time, the reputation ranking depreciates the team's success over time. As reputation is an enduring phenomenon, √t is used. Consistently successful teams have high reputation scores, whereas teams that perform poorly have low reputation scores (Czarnitzki & Stadtmann 2002).
Final league position in the previous season	In contrast to reputation rankings, which provide a measure of a team's reputation based on its medium- to long-term performance, the team's final league position in the previous season provides a short-term measure of performance. Because people tend to associate themselves with success (Cialdini et al., 1976) and disassociate themselves from failure, a team's short-

	term performance may impact (positively or negatively) its sports sponsorship opportunities.
Promotion	Dummy variable for teams whose performance in the previous season earned them promotion to their country's top division.
Qualification for UEFA club competitions	Dummy variable for teams that qualified to play in the following season's UEFA club competitions (UEFA Champions League, UEFA Europa League, or the qualification rounds of either of these competitions).

Sample

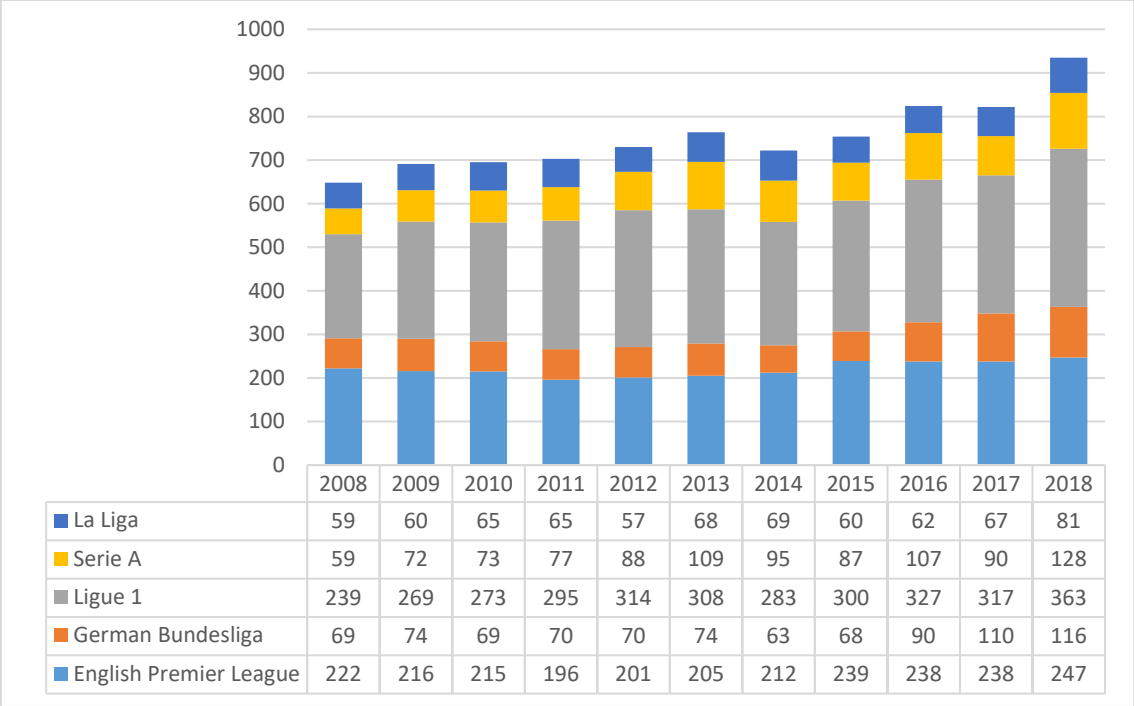
The study sample comprised the 24 German clubs and 33 English clubs that played in the Bundesliga or EPL, respectively, for at least two of the eleven seasons between 2008 and 2018. Table V-2 provides descriptive statistics for these clubs. The mean number of seasons a club played in these leagues was 9.6 for the Bundesliga and 8.3 for the EPL. The mean number of spectators per game over the study period was 44,326 for the Bundesliga and 36,938 for the EPL. Mean club-reputation indices were 186.92 for Bundesliga clubs and 178.27 for EPL clubs, with 36% of Bundesliga clubs and 32% of EPL clubs qualifying to play in UEFA club competitions during the study period. Approximately 9% of Bundesliga clubs and 14% of EPL clubs won promotion from the second division during the 11 seasons.

Table 3-2 Summary statistics - Club's characteristics.

Baseline sample: German Bundesliga and English Premier League clubs who played at least two seasons between 2008-2018									
	Obs.	Mean	Std. dev.	Std. dev. (within-indiv.)	Min	5th percentile	Median	95th percentile	Max
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
German Bundesliga									
No. of seasons	186	9.62	2.24	0	2	3	10	11	11
Average spectators per game	186	44,326	16,198	2,109	14,601	23,850	44,686	77,268	81,226
Reputation of club	186	186.92	195.60	27.54	0	3.02	123.25	745.61	892.67
End position in previous season	186	9.32	5.46	4.27	1	1	9	19	21
Promotion top-tier division	186	0.09	0.29	0.26	0	0	0	1	1
UEFA Club Competitions qualification	186	0.36	0.48	0.39	0	0	0	1	1
Average player value of squad (€ million)*	186	3.86	3.53	1.55	0.62	1.21	2.67	10.79	24.31
Share of foreigners in squad	186	0.52	0.08	0.07	0.26	0.39	0.52	0.65	0.74
Share of Black player in squad	186	0.14	0.07	0.06	0	0.03	0.13	0.28	0.43
Share of Sub-Saharan African player in squad	186	0.08	0.07	0.06	0	0	0.07	0.19	0.40
Annual front-of-the-shirt sponsorship (€ million)*	186	8.50	7.35	2.14	0.96	2.37	5.59	27.93	32.58
English Premier League									
No. of seasons	204	8.3	2.9	0	2	3	9	11	11
Average spectators per game	204	36,938	15,095	3,704	10,532	19,131	34,165	74,498	75,530
Reputation of club	204	178.27	233.14	33.37	0	1.82	82.43	779.93	976.45
End position in previous season	204	10.65	6.49	3.72	1	1	10	22	25
Promotion top-tier division	204	0.14	0.34	0.28	0	0	0	1	1
UEFA Club Competitions qualification	204	0.32	0.47	0.27	0	0	0	1	1
Average player value of squad (€ million)*	204	5.93	4.31	2.15	0.74	1.82	4.22	13.99	21.42
Share of foreigners in squad	204	0.64	0.12	0.07	0.37	0.45	0.62	0.84	0.92
Share of Black player in squad	204	0.30	0.10	0.06	0.08	0.14	0.3	0.47	0.58
Share of Sub-Saharan African player in squad	204	0.15	0.07	0.05	0	0.05	0.14	0.26	0.36
Annual front-of-the-shirt sponsorship (€ million)*	204	10.26	12.54	7.19	0.44	0.93	5.02	40.17	57.87
*Values are in constant 2010 prices (deflated using yearly consumer price indices (CPI) from the World Bank).									

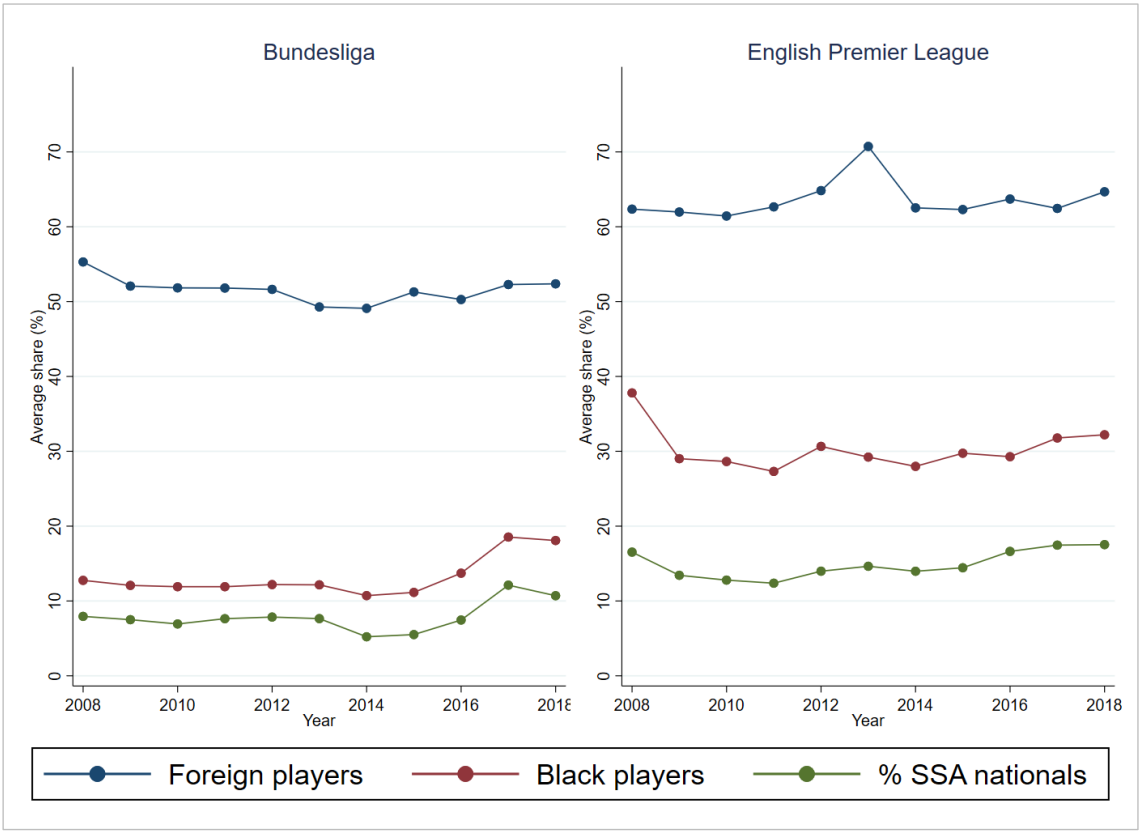
Foreign players outnumbered homegrown players in both leagues. Foreign nationals accounted for 52% of players in the Bundesliga and for 64% of players in the EPL. However, only a minority of these players were Black or from sub-Saharan Africa. In the Bundesliga, 14% of players were Black and 8% of players were from sub-Saharan Africa. In the EPL, these percentages were 30% and 15%, respectively (Figure V-2). Figure V-3 shows changes in the number of Black players in each league between the 2008/09 and 2018/19 seasons.

Figure 3-1 Number of Black players in the Big 5 leagues (2008-2018).



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
La Liga	59	60	65	65	57	68	69	60	62	67	81
Serie A	59	72	73	77	88	109	95	87	107	90	128
Ligue 1	239	269	273	295	314	308	283	300	327	317	363
German Bundesliga	69	74	69	70	70	74	63	68	90	110	116
English Premier League	222	216	215	196	201	205	212	239	238	238	247

Figure 3-2 Mean percentages of foreign, Black, and sub-Saharan players in the Bundesliga and EPL (2008-2018).



Average player values over the study period were €3.86 million in the Bundesliga and £4.99 million in the EPL. Mean annual values of front-of-shirt sponsorship deals were €8.50 million in the Bundesliga and £7.13 million in the EPL.

Data Collection

To determine player ethnicity, we manually examined the photographs of players on the transfermarkt.de website. The 67 clubs that played in the Bundesliga and EPL for at least two of the eleven seasons between 2008–2009 and 2018–2019 named 390 squads, containing a total of 14,515 players. We first classified the photographs into two categories: Black or non-Black. Players with North African, Berber, or Arab ancestry were categorized as non-Black. We then sub-divided the category of Black players into players from Sub-Saharan Africa and their descendants and players with African or mixed heritage but born on other continents.

Data on sponsorship amounts and the other independent variables were obtained through football websites such as sponsors.de, offthepitch.com, sportingintelligence.com, and worldfootball.net. A comparison with information available from other industry sources and clubs' press releases served to assure the robustness and validity of these data.

Data Analysis

The panel structure of the sample allowed us to exploit within-club variations in sponsorship income and ethnic composition over time to detect links between a squad's ethnic composition and the club's annual front-of-shirt sponsorship income. We estimated the link between this income and the percentages of foreign, Black, and sub-Saharan African players in its squad. Estimations without a panel structure can yield biased coefficients due to unobserved club-specific factors (e.g., motivation, negotiation skills, management approach) and season-specific factors. If the unobserved club-specific heterogeneity is constant across football seasons, a fixed-effects model can be used to eliminate these potential sources of bias. Thus, we used the following general fixed-effects multivariate specification to estimate the baseline for each of

the two leagues:

$$\log(Y_{it}) = \beta.S_{it} + X'_{it}\Gamma + \alpha_i + \lambda_t + \epsilon_{it} \qquad (1)$$

$\mathrm{Log}(Y_{it})$ is the log of club i's annual front-of-shirt sponsorship income in season t; S_{it} is the percentage of foreign, Black, or sub-Saharan African players at club i in season t, and X_{it} is a vector of observed club characteristics (Table V-2) that vary across clubs and time periods. α_i captures all the unobserved club-specific factors affecting annual front-of-shirt sponsorship income. These factors vary across clubs but are fixed over time. λ_t is a year effect (e.g., a pandemic or financial crisis) modeled as a set of season dummies that affects all clubs in the same way, and ϵ_{it} is the error term. Assuming that unobserved heterogeneity is time-constant, the fixed-effects model in equation (1) produces a consistent estimator for β, the association between the percentage of foreign, Black, and sub-Saharan African players and annual front-of-shirt sponsorship income.

A major challenge when calculating the log of the annual front-of-shirt sponsorship income function expressed in equation (1) is to ascertain that a squad's ethnic composition has a causal effect on this income. Despite the use of club-fixed and season-fixed effects to account for club-specific unobserved heterogeneity and other season-specific factors, there may still be some endogeneity. Equation (1) estimates a club's annual front-of-shirt sponsorship income function, with the squad's ethnic composition and the clubs' other observed characteristics as inputs. As in any production function, the inputs must be considered potentially endogenous because they are choices the clubs' managers make to maximize their sponsorship income. Hence, both sponsorship income and ethnic composition might respond to any time-varying unobservable shock that fixed effects might not be able to fully capture, causing the ethnic composition to still be endogenous. That is, any remaining unobservable shock not fully captured by the club and season fixed effects but correlated with the ethnic composition of the club's squad will be absorbed by the error term, thereby making ethnic composition endogenous

even after controlling for the fixed effects. If this is the case, the results of an ordinary least squares (OLS) linear regression analysis, as expressed in equation (1), should be viewed as upper-bound estimates of any causal effects.

The data available did not allow us to perfectly address the issue of endogeneity because there is no quasi-experimental variation available in the sample to exploit and because it is impossible to detect from the sample an instrumental variable that correlates with a squad's ethnic composition but does not correlate with the error term in the sponsorship income equation. Consequently, the reported estimates cannot be interpreted as causal effects, but rather as partial associations between a squad's ethnic composition and the club's annual front-of-shirt sponsorship income.

4. Results

Table V-3 presents the baseline estimation results for annual front-of-shirt sponsorship incomes. The estimated coefficients for the percentages of foreign, Black, and sub-Saharan African players suggest that a club's annual front-of-shirt sponsorship income is linked to its squad's ethnic composition in the Bundesliga but not in the EPL. This result supports H1 for Germany.

Table 4-1 Baseline regression results: Partial link between squad composition and annual front-of-shirt sponsorship income.

	(1)	(2)	(3)	(4)	(5)	(6)
	Bundesliga			English Premier League		
% Foreign players	-0.0017			-0.0076		
	(0.002)			(0.005)		
% Black players		-0.0052**			-0.0059	
		(0.002)			(0.005)	
% sub-Saharan African players			-0.0086***			-0.0069
			(0.002)			(0.006)
Log(mean match attendance)	-0.2966	-0.2770	-0.2974	0.2165	0.1748	0.1513
	(0.296)	(0.291)	(0.283)	(0.385)	(0.384)	(0.383)
Log(average player value)	0.3419***	0.3471***	0.3479***	0.4005***	0.3366***	0.3531***
	(0.071)	(0.070)	(0.068)	(0.160)	(0.155)	(0.156)
Club's reputation (standardized)	-0.0204	0.0138	0.0253	0.1859	0.1228	0.1407
	(0.110)	(0.107)	(0.104)	(0.209)	(0.208)	(0.208)
Final position, previous season	-0.0009	-0.0011	-0.0006	-0.0144	-0.0111	-0.0124
	(0.007)	(0.007)	(0.007)	(0.014)	(0.014)	(0.014)
Promotion from 2nd division	0.0164	0.0314	0.0321	-0.0835	-0.1203	-0.1033
	(0.081)	(0.079)	(0.077)	(0.163)	(0.165)	(0.164)
Qualification for UEFA club competitions	-0.0144	-0.0162	-0.0157	-0.1910	-0.1711	-0.1804
	(0.058)	(0.057)	(0.056)	(0.123)	(0.124)	(0.124)
Observations	186	186	186	204	204	204
No. of clubs	24	24	24	33	33	33
R^2	0.9484	0.9498	0.9522	0.9237	0.9232	0.9230
Club fixed effects	YES	YES	YES	YES	YES	YES
League season fixed effects	YES	YES	YES	YES	YES	YES

Notes: Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1. Table V-3 reports coefficients from the baseline model (1) using OLS. The outcome variable is the log of annual front-of-shirt sponsorship income in 2010 constant prices (deflated using yearly consumer price indices calculated by the World Bank). The means of the outcome variable were €8.50 million (Bundesliga) and €10.26 million (EPL) in the baseline sample. In addition to the covariates shown in the table, the estimation includes individual-club fixed effects and year/season fixed effects.

Results did not show a significant link between a club's annual front-of-shirt sponsorship income and the presence of foreign players in its squad in either the Bundesliga or the EPL. However, in the case of Bundesliga clubs there was a strong negative link between annual front-

of-shirt sponsorship income and the presence both of Black players, whatever their nationality, and of sub-Saharan African players. Bundesliga clubs whose squads had a relatively large percentage of Black players received significantly less front-of-shirt sponsorship income compared with similar clubs with fewer or no Black players. For Bundesliga clubs, a 1 percentage-point increase in the percentage of Black players in a squad (from a mean of 14%) was associated with a significant decrease of 0.52 percentage points in annual front-of-shirt sponsorship income. Similarly, a 1 percentage-point increase in the percentage of sub-Saharan African players (from a mean of 8%) was associated with a 0.86 percentage-point decrease in the club's annual front-of-shirt sponsorship income. The relationship between the percentage of Black players and annual front-of-shirt sponsorship income was not significant in the case of EPL clubs.

As expected, the log of annual front-of-shirt sponsorship income increased with the log of average player value and with the club's reputation ranking in both the Bundesliga and the EPL, although the coefficient for reputation ranking was not significant. The coefficient for the log of average player value shows that a 1 percentage-point increase in average player value was associated with a 0.34 percentage-point increase in annual front-of-shirt sponsorship income in the Bundesliga (column 1) and with a 0.40 percentage-point increase in the EPL (column 4), all other factors remaining the same. Annual front-of-shirt sponsorship income was not significantly linked to any of the other independent variables.

To determine whether other club-specific characteristics moderated the negative link between the percentages of Black and sub-Saharan African players and a Bundesliga club's annual front-of-shirt sponsorship income, we related percentages of Black and sub-Saharan African players to average player value, club reputation, and qualification for UEFA club competitions. Separate regressions for each club-specific variable and their interaction terms (Tables V-4 to V-6) produced significant negative coefficients for the percentages of Black and

sub-Saharan African players. However, none of the variables tested (average player value, club reputation, qualification for UEFA club competitions) moderated the negative link between a club's annual front-of-shirt sponsorship income and the presence either of Black players in general or of sub-Saharan African players.

Table 4-2 Partial link between squad composition and annual front-of-shirt sponsorship income: Does player value play a role?

	(1) Bundesliga	(2)
Log(average player value)	0.3191***	0.3287***
	(0.092)	(0.075)
% Black players	-0.0073	
	(0.005)	
Log(average player value) x % Black players	0.0019	
	(0.004)	
% Sub-Saharan African players (SSA)		-0.0115**
		(0.005)
Log(average player value) x % SSA		0.0028
		(0.005)
Log(mean match attendance)	-0.2815	-0.2929
	(0.292)	(0.284)
Club's reputation (standardized)	0.0059	0.0231
	(0.109)	(0.105)
Final position previous season	-0.0010	-0.0005
	(0.007)	(0.007)
Promotion from 2nd division	0.0317	0.0381
	(0.079)	(0.078)
Qualification for UEFA club competitions	-0.0159	-0.0148
	(0.058)	(0.056)
Observations	186	186
No. of clubs	24	24
R^2	0.9499	0.9523
Club fixed effects	YES	YES
League season fixed effects	YES	YES

Notes: Standard errors are in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 4-3 Partial link between squad composition and annual front-of-shirt sponsorship income: Does club reputation play a role?

	(1)	(2)
	German Bundesliga	
Club's reputation (standardized)	0.0152	0.0410
	(0.122)	(0.109)
% Black players	-0.0052**	
	(0.003)	
Reputation rank x % Black players	-0.0001	
	(0.003)	
% Sub-Saharan African players (SSA)		-0.0096***
		(0.003)
Reputation x % SAA		-0.0029
		(0.005)
Log(average player value)	0.3469***	0.3418***
	(0.070)	(0.069)
Log(mean match attendance)	-0.2765	-0.3014
	(0.292)	(0.284)
End position of previous season	-0.0011	-0.0009
	(0.007)	(0.007)
Promotion from 2nd division	0.0314	0.0314
	(0.079)	(0.077)
Qualification for UEFA club competitions	-0.0163	-0.0171
	(0.058)	(0.056)
Observations	186	186
No. of clubs	24	24
R^2	0.9498	0.9523
Club fixed effects	YES	YES
League season fixed effects	YES	YES

Notes: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 4-4 Partial link between squad composition and annual front-of-shirt sponsorship income: Does qualification for UEFA club competitions play a role?

	(1)	(2)
	German Bundesliga	
Qualification for UEFA club competitions	-0.0271	0.0102
	(0.083)	(0.069)
% Black players	-0.0055*	
	(0.003)	
UEFA x % Black players	0.0008	
	(0.004)	
% Sub-Saharan African players (SSA)		-0.0077***
		(0.003)
UEFA x % SAA		-0.0031
		(0.005)
Log(average player value)	0.3454***	0.3498***
	(0.070)	(0.068)
Log(mean match attendance)	-0.2762	-0.2946
	(0.292)	(0.283)
Club's reputation (standardized)	0.0138	0.0242
	(0.107)	(0.105)
Final position previous season	-0.0011	-0.0005
	(0.007)	(0.007)
Promotion from 2nd division	0.0318	0.0275
	(0.079)	(0.077)
Observations	186	186
No. of clubs	24	24
R^2	0.9498	0.9524
Club fixed effects	YES	YES
League season fixed effects	YES	YES

Notes: Standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p <0.1.

These results support H2, as they suggest that a club's annual front-of-shirt sponsorship income is linked to its squad's ethnic composition in countries with ethnically homogeneous populations but not in countries with ethnically more diverse populations. Sports teams in predominantly white, ethnically homogeneous countries are likely to attract less sponsorship income if they have a high percentage of Black athletes.

5. Discussion and Conclusion

The current paper describes the first empirical study to examine the impact of athlete ethnicity on club sponsorship income. To this end, we investigated possible relationships between theoretically justified antecedent variables and annual front-of-shirt sponsorship incomes in a sample of professional football clubs in top-flight leagues in two European countries with different ethnic compositions. The percentages of foreign players, Black players, and sub-Saharan African players in a squad served to analyze the effect of ethnicity dissimilarity on a club's sponsorship income.

After controlling for club and football season fixed effects, the only variables significantly linked to a club's sponsorship income were average player value, which has been shown to be significantly correlated with player salaries (e.g., Bryson et al., 2013; Prockl & Frick, 2018), percentage of Black players, and percentage of sub-Saharan African players. Average player value was positively associated with a club's sponsorship income, whereas high percentages of Black players and of sub-Saharan African players were negatively associated with sponsorship income. Country-specific factors moderated the impact of a squad's ethnic composition on annual front-of-shirt sponsorship income: Having high percentages of Black and sub-Saharan African players was associated with lower front-of-shirt sponsorship incomes in the case of German clubs, but this was not the case for English clubs.

These findings contribute to research on sports sponsorship in several ways. First, in contrast to previous studies' focus on how sponsorship decisions affect consumers' perceptions, attitudes, or behaviors (Cornwell & Kwon, 2020), the current study looked at the impact of sponsors' decisions on sponsees. It also provides insights into the criteria sponsors consider when making sponsorship decisions.

Viewed from a statistical discrimination perspective (Aigner & Cain, 1977; Arrow, 1974), the results for the Bundesliga could be interpreted as evidence that sponsors in Germany use incomplete information on clubs' and players' productivity when making decisions about

how much to invest in sponsorship deals. This incomplete information concerns player and team quality and the attractiveness of players of different ethnicities to the sponsor's target audience. Sports marketing agencies and consultants can provide information on player and team quality, but information about the attractiveness of individual players and teams to a specific target group may be harder and more expensive to obtain. At the same time, sponsors actively approach potential sponsees (Schönberner et al. (2022) and therefore very likely gather information about clubs they are considering sponsoring. Thus, sponsors will be aware of the quality of many Black players, although they may still have incomplete information about the marketability of Black players to a predominately White audience.

The different impacts of squad ethnicity in England and Germany could also be due to sponsors seeking sponsees whose ethnic make-up matches the sponsor's marketing strategy (Choi, 2010; Schönberner et al., 2022). Most of the EPL's sponsors are international corporations, such as Samsung, Yokohama, Chevrolet, Emirates, Etihad, and AIA, which have a worldwide customer base and globally standardized brand visuals. Moreover, they are accustomed to multi-ethnic advertising (Strebinger et al., 2018) and are therefore less prone to ethnic discrimination. In contrast, many Bundesliga sponsors are domestic or internationally less active companies such as REWE (supermarket chain), Schwarzwaldmilch (dairy company), Vonovia, and Aroundtown (real estate companies), whose market focus is on Germany. Because Germany had very few colonies with predominantly Black populations, many parts of Germany have very small Black populations, and these populations remained largely unnoticed by the White majority until recently. This greater ethnic homogeneity is probably why multi-ethnic advertising strategies are less common in Germany than they are in England. Sponsors in Germany may adapt the sponsor fees contained in contracts with Bundesliga clubs according to the fit between the ethnic composition of the team they are sponsoring and the ethnicity of their target audience.

Taste-based ethnic discrimination is another possible explanation for the lower front-of-shirt sponsorship income in Bundesliga clubs with high percentages of Black players. England is a more multi-ethnic society than Germany, as 7.2% of English people categorize themselves as Black or of mixed ethnicity, and 9.6% categorize themselves as Asian or Asian British. In contrast, estimates suggest that Black people make up only 1.2% of Germany's population, which remains overwhelmingly White (Faymonville, 2003), and most Germans did not have day-to-day contact with people from a different ethnic group until recently. Consequently, the fact that clubs with large numbers of Black players receive less sponsorship income than equivalent clubs with mostly White players in Germany, but not in England, may be due to there being greater anti-Black racism (or anti-Blackness) in Germany than in England. The recent increased resistance to accepting refugees from Arab countries highlights the high level of taste-based ethnic discrimination shown by a large proportion of the German population (Wigger, 2019).

Given the relational nature of analyses, the results do not allow us to determine which of the potential explanations best matches the findings. However, they are probably the result of a combination of the criteria underlying sponsorship fee decisions. When sponsors have insufficient information about whether their target customers find a team attractive as an advertising model, they may (possibly subconsciously) allow statistical and taste-based discrimination to impact their sponsorship decisions. Additionally, decision-makers may use the lack of fit between models and target customers as an argument to support their discriminatory sponsorship behavior.

Finally, an important finding for sports club executives is that selecting players solely on their sporting ability could negatively impact a clubs' ability to attract sponsorship income, especially if the club is in a country with high levels of ethnic discrimination and hopes to attract domestic, rather than globalized, sponsors.

6. Limitations

The present study analyzed possible links between the ethnic composition of a club's squad and its annual front-of-shirt sponsorship income. Although the analyses included club- and season-fixed effects in order to account for unobserved club-specific heterogeneity and time-invariant factors, endogeneity issues may still have affected the results.

Because the size of a club's television audience is a particularly important criterion for sponsors, including TV viewership as a control variable would have increased the study's scope and might have impacted the findings. However, TV viewership could not be included because the only figures available are for the EPL's domestic television audience. There are no figures for the number of international viewers the EPL attracts or for either domestic or international television audiences for Bundesliga matches. A future study should control for the impact of TV viewership on sponsor behavior by collecting data on the size of a club's TV audience, notably the number of viewers it attracts in Africa and Asia.

Despite these limitations, the present study provides a valuable initial exploration of the links between a football team's ethnic composition and its annual front-of-shirt sponsorship income. The findings have important implications for football sponsorship management in Europe. Future research should extend the study by including other minority groups, such as North Africans, Asians, or Latinos, and by examining the situation both in other professional team sports (e.g., basketball, ice hockey) and in individual sports (e.g., tennis, golf).

VI. CHAPTER SIX: CONCLUSION

1. Discussion and conclusion

This chapter provides a summing-up of the findings pinpointed in the dissertation articles, which are elaborated on to answer the research objectives. Hereafter, the contribution of this study is discussed in terms of theory-development and managerial implications. Finally, the evaluation of the research quality and limitations will be provided, and directions for future research will be discussed.

The dissertation's first objective was to answer the question of whether the increased funding of major football clubs affects the distribution of talent and the competitive imbalance of local leagues over an extended period of time. To empirically approach this question, Article A analyzed the talent distribution and competitive imbalance in professional soccer leagues across twelve Western European countries. While the Primeira Liga in Portugal and La Liga in Spain have the most unequal talent distribution, and the Swiss Super League the most equal distribution, the findings show that the differences in talent concentration among the top-tier leagues are relatively small. Furthermore, the research shows that second and third-division teams tend to have a more equal talent distribution than their respective first divisions. The concentration of talent has increased in Ligue 1 and the German Bundesliga (but in an inverted U shape) over time, while it has remained relatively stable in the English Premier League. The Italian Serie A shows a U-shaped development in talent concentration.

In contrast to select prior studies, including Avila-Cano and Triguero-Ruiz (2023), which have observed a significant rise in the competitive disparity across numerous European football leagues, the current study did not yield comparable findings. In terms of top-tier competitive balance, the Portuguese league is the least balanced, while the French Ligue 1 is the most balanced. The lower divisions generally exhibit more balance compared to their higher divisions. Regression analysis confirms that talent concentration has a significant impact on

points concentration in the absence of other controls. However, this effect disappears when division dummies are included, indicating that the impact of talent on points concentration is weaker in lower divisions. The present study's results stand in stark opposition to prior research (Peeters, 2011; Rappai & Fűrész, 2022), wherein a positive association between player value concentration and competitive balance was indeed identified.

Broadcasting and commercial rights, as well as prize monies allocated to the participating teams of the UEFA Champions League (UCL) have significantly increased over the observation period, as has the number of professional investors in professional football. However, the study deductively[7] challenges the notion that UCL participation and the increased funding of major football clubs has led to major changes in the competitive landscape or to imbalances within domestic leagues. Other factors such as revenue-sharing mechanism and the promotion and relegation system seem to play a more critical role in determining competitive balance.

In terms of theoretical contribution, Article A adds to the literature on competitive balance in sports that so far has primarily assessed the impact of competitive balance on sports attendance, while only limited empirical research explored the determinants of competitive balance. In terms of managerial implications, the article points to the effectiveness of the current system and the absence of perverse incentives present in closed leagues highlights the importance of the promotion and relegation system in ensuring competitive balance in European soccer leagues. The article suggests that relatively few additional regulatory interventions are needed to maintain competitive balance. Overall, the research provides valuable insights into the relationship between talent distribution and competitive (im)balance, given the heightened

[7] The applied model itself does not test the correlation between UCL revenues and the Gini concentration of talent or points

commercialization, the inflow of capital from beyond traditional sports boundaries, and the increased UEFA Champions League (UCL) prize monies within European soccer leagues. These findings offer important considerations for policymakers, league governing bodies, clubs, and fans.

The dissertation's second objective was to answer the question of whether revenue fluctuations within the football industry, including those caused by external shocks like the Covid-19 pandemic, impact prices for acquiring playing talent in a league. Article B therefore aimed to shed light on the anticipated effects of the pandemic on professional football. By analyzing data from the English Premier League (EPL), a regression model was developed to accomplish two objectives. Firstly, to investigate the correlation between various revenue sources (TV revenues, match revenues, and commercial revenues) and the primary cost drivers of professional football clubs (player salaries and transfer expenses). Secondly, to forecast the probable impact of a major market downturn, such as the COVID-19 pandemic, on the EPL.

The findings provide evidence that salaries, transfer fees, and market values are interconnected with the level of club revenues and adapt to emerging market conditions. Thus, revenue fluctuations within the football industry do impact the prices for acquiring playing talent in a league. Nevertheless, market contractions lead to short-term losses because clubs face challenges in swiftly adjusting expenditures due to long-term contractual obligations. Additionally, driven by intense competition, clubs do not typically accumulate reserves during favorable market conditions. Consequently, clubs rely on external funding sources during unfavorable situations, and the existing model cannot be deemed self-sustainable. However, since football clubs are often regarded as valuable assets, external funding possibilities frequently arise.

The article's main scholarly contribution was the determination of the relative impact of the three main revenue sources (TV revenues, match revenues, and commercial revenues) on the remarkable escalation of player salaries, market values, and net transfer expenses in professional football over the course of the past three decades. Furthermore, it imparted new insights to professionals in sports management regarding the anticipated trends in the evolution of football labor markets during times of crises. The study serves as a valuable point of reference for future research endeavors focusing on sports labor markets, as well as for managers overseeing football leagues and clubs.

Comparing the actual figures obtained with the forecasted data from 2019, the accuracy of the predictions varied. The forecast performed admirably in anticipating the impact of the pandemic on revenues but exhibited suboptimal precision in predicting cost effects. Notably, revenues in the English Premier League (EPL) experienced a 13% decrease, dropping from £5.15 billion in the 2018/19 season to £4.49 billion in the 2019/20 season. This decline closely mirrored the envisaged revenue drop in the best-case scenario.

However, the projection of a 9% decrease in salaries did not align with the actual outcomes. Potential factors contributing to this discrepancy include contractual terms that might have precluded salary reductions due to natural causes. Instead of the anticipated decline, EPL wages increased from £3.15 billion in the 2018/19 season to £3.28 billion in the 2019/20 season, further rising to £3.46 billion in the subsequent 2020/21 season. Remarkably, despite the challenges posed by the pandemic, EPL revenues rebounded in the same year, reaching £4.87 billion.

The dissertation's third objective was to answer the question of whether the costs associated with acquiring playing talent impact the pricing policies of tickets for stadium

visitors. In answering this question, Article C explored the factors that influence ticket pricing in the English Premier League and the implications for clubs and sports leagues.

In contrast to clubs in the North American major leagues, EPL clubs do not use advanced dynamic pricing strategies, but instead apply price discrimination policies such as price banding and price bundling. The study finds that ticket prices are influenced by various factors, including local earnings, stadium capacity utilization, the status of the team as a 'Big Six' club, the opponent's status, and team rivalries. Clubs set prices based on the market's ability and willingness to pay, taking into account local prosperity, limited stadium capacity and short-term home sporting success.

In relation to the third research question, Article C suggests that the labor costs incurred by football clubs – their most prominent financial outlays, primarily in the form of transfer fees required to secure players and their subsequent wages - influence the pricing of both the highest-priced and the most affordable tickets. The positive and statistically significant coefficients indicate that clubs endeavor to recoup a portion of their labor market expenditures, with a considerable portion of these costs being passed on to fans purchasing the most expensive tickets. Notably, the coefficient magnitude for the most expensive tickets is nearly three times greater than that of the cheapest tickets. The study represents the first study that looked into the determinants of ticket prices in European sports. The results can be put in contrast to findings from the North American sports market, where team performance was one of the most critical drivers of primary and secondary ticket pricing (Diehl et al., 2016; Reese & Mittelstaedt, 2001; Rishe & Mondello, 2003), and talent or labor costs have not been tested as an influencing factor[8].

[8] In their exploratory study, Reese and Mittelstaedt (2001) looked at the influence of star players on NFL ticket prices, however

The findings further suggest that smaller clubs benefit from positive externalities generated by the popularity, the high broadcasting income, as well as the top playing talent of the Big Six clubs and their labor costs. Ticket prices and match day revenues serve as a means of resource redistribution from larger to smaller clubs, as prices are adjusted based on the reputation and the success of opponents.

For club managers, the study provides insights into setting prices and benchmarking acceptable price increases, considering fans' willingness to bear such increases. Effective pricing strategies can serve as a form of quasi-redistribution, allowing clubs to retain their own stadium revenue. At the league level, revenue allocation and distribution mechanisms can benefit from clubs' pricing strategies and the positive externalities generated by popular clubs.

To answer the dissertation's fourth and final objective, whether and to what extent non-discriminatory talent acquisition policies within sports clubs affect revenue streams that are not directly linked to the club's on-field performance, Article D presents the first empirical study exploring the influence of athlete ethnicity on club sponsorship income in sports. The study focuses on top-flight leagues in two European countries with different ethnic compositions and analyzes the impact of ethnicity dissimilarity, represented by the percentages of foreign players, Black players, and sub-Saharan African players in a squad, on a club's front-of-shirt sponsorship income.

After controlling for club and football season fixed effects, the study finds that average player value, percentage of Black players, and percentage of sub-Saharan African players are significantly associated with sponsorship income. Higher average player value positively influences sponsorship income, while higher percentages of Black players and sub-Saharan African players have a negative association with sponsorship income. Notably, the impact of squad ethnicity on sponsorship income is moderated by country-specific factors. German clubs

with higher percentages of Black and sub-Saharan African players experience lower front-of-shirt sponsorship incomes, whereas this effect is not observed for English clubs.

These findings contribute to sports sponsorship research by shifting the focus from the impact of sponsorship decisions on consumers to understanding the criteria sponsors consider when making sponsorship decisions. The study suggests that incomplete information and potential taste-based discrimination may influence sponsors' decisions regarding sponsorship investments. It also highlights the role of sponsor preferences aligned with their marketing strategies and target audience. The different impacts of squad ethnicity in England and Germany could be attributed to the international nature of English Premier League sponsors, their familiarity with multi-ethnic advertising, and a more diverse society. In contrast, many Bundesliga sponsors are domestically oriented and may adjust sponsor fees based on the ethnic composition of the team and the ethnicity of their target audience. The study further suggests that taste-based ethnic discrimination may be a factor influencing lower sponsorship income for Bundesliga clubs with higher percentages of Black players, potentially reflecting greater anti-Black racism in Germany compared to England.

Past research (Szymanski, 2000) has demonstrated the historical existence of employer-based discrimination in sports. However, over time, this discrimination has diminished, as noted by Goff et al. (2002). This decline aligns with Becker's (1971) proposition that artificially restricting the talent pool results in higher labor costs, reduced profitability, and heightened competition from non-discriminatory market participants. Such factors contribute to the eventual elimination of taste-based discrimination in the long term. However, the findings of the dissertation caution sports club executives against solely selecting players based on their sporting ability, as this may negatively affect sponsorship income, especially when targeting domestic sponsors in countries with high levels of ethnic discrimination.

Overall, the results of Article D indicate that sponsorship fee decisions are influenced by a combination of factors, such as incomplete information, taste-based discrimination, and fit between advertising models and target customers. The findings have implications for understanding sponsor behavior and the impact of ethnicity on sponsorship income for sports clubs, particularly in relation to attracting domestic sponsors in countries with varying levels of ethnic discrimination.

The overachieving aim of the dissertation was to unveil some of the less apparent relationships between playing talent acquisition, club revenues, costs, and league competition in the realm of European professional league football. These interdependencies have received limited or no attention in the sports economics literature to date. By focusing on four specific research questions, the dissertation hereby provides empirical evidence for the close interconnection between said variables and emphasizes the significance of considering the overall context of management decisions in sports management.

The outcomes of this dissertation extend their relevance to two key beneficiaries: sport managers and regulatory bodies overseeing sports organizations.

Sport managers, particularly those at club and league levels, stand to gain valuable insights and practical applications from the findings presented in this dissertation. Chapters 4 and 5, in particular, offer a robust foundation for benchmarking in negotiations related to sponsorships and ticket pricing. The models developed herein serve as valuable tools for determining acceptable pricing levels, providing managers with a strategic advantage in decision-making processes.

Beyond the realm of sports management, professionals in related fields such as in media, and entertainment can extract valuable takeaways from the dissertation's insights into ticket prices and sponsorships. The parallels shared between these industries and the sports sector make the lessons learned here transferable and applicable to a broader managerial context.

For regulatory bodies overseeing sports leagues, the implications are profound. The dissertation highlights the effectiveness of the promotion and relegation system in maintaining league balance with minimal regulatory interventions. Unlike closed leagues with reverse-order drafts, as observed in North American major leagues, the open European sports leagues' system discourages the perverse incentives associated with "losing to win." Additionally, this study sheds light on revenue allocation and distribution within sports leagues, emphasizing the challenges faced by leagues in determining optimal distribution mechanisms. Notably, the dissertation underscores the role of clubs in designing pricing strategies as a form of quasi-redistribution, an approach that is both effective and advantageous. Unlike traditional revenue redistribution methods, this strategy allows clubs to manage their own stadium revenue without necessitating league intervention, thereby capitalizing on their in-house management expertise for successful implementation.

Figure 1-1. Findings of the Dissertation

I.	**Overview of Dissertation**

Playing talent in the context of league structure

Essay on the impact of talent concentration	**Essay on the market price for talent**
II. **Manuscript A** *Talent concentration and competitive imbalance in European soccer*	III. **Manuscript B** *The importance of club revenues for player salaries and transfer expenses*
Methodology: Quantitative analysis of 12 European professional soccer leagues from 2005/06 thru 2020/21 **Result:** • Talent concentration significantly and positively impacts points concentration • However, controlling for year, country, and division, impact is only weakly significant or insignificant • Relationship between talent and points concentration does not vary across European leagues or over time	**Methodology:** Regression model to examine relationship between revenue and player expenses, and to predict impact of a market downturn on the labor market prices **Result:** • TV revenues are most important source of income for player salaries and market values, followed by match revenues and commercial revenues • Player salaries, market values, and transfer expenses are expected decrease in a market downturn

Playing talent in the context of club revenue and expenses

Essay on the impact of player costs on ticket prices	**Essay on the impact of non-discriminatory talent selection on commercial income**
IV. **Manuscript C** *Determining the price of football: an analysis of matchday ticket prices in the English Premier League*	V. **Manuscript D** *Athlete ethnicity and sponsorship income - Sport sponsorship deals in professional European football*
Methodology: Regression models for cheapest and most expensive tickets of EPL clubs between 2014/15 and 2018/19 **Result:** • Total labor cost (Salaries, Net transfer payments) impact prices of cheapest and most expensive types of tickets, as do variables such as workplace earnings, capacity utilization, derbies, and top teams • Team performance is asymmetric affecting only the most expensive tickets	**Methodology:** FE regression model to compare clubs' sponsor income in an ethnically homogenous (Germany) with an ethnically more-diverse country (England) **Result:** Strong negative associations between having a squad with a high percentage of Black or sub-Saharan African players and a club's annual front-of-shirt sponsorship income in Germany's Bundesliga but not in the English Premier League

Source: Own table

2. Limitations and outlook

Although the results have significant implications and provide valuable insights for research and practice, this section will address some limitations.

First, one might question the suitability of the datasets used in the studies. Article A in chapter 3.1, relied on teams' market values at the commencement of their respective seasons to calculate talent Ginis. However, in certain countries, the transfer window extends beyond the official commencement of the season, permitting clubs to make further player acquisitions during this timeframe. Additionally, mid-season recruitments can transpire within the winter transfer window, leading to divergent market values for clubs actively involved in the transfer market.

The squad- and player market values used in Articles A, B and D, in chapter 3.1, 3.2, and 3.4 respectively, assume an efficient market for player pricing, which is a simplification, as the player labor market is prone to certain biases, as noted by several authors like (Campa, 2022).

Similarly, the ticket pricing data used in Chapter 3.3 is based on only two price points: the lowest and highest available ticket prices offered by the home club for a specific game. The number of price points varies across clubs, while the number of tickets available for each price category is often not publicly accessible. Consequently, clubs have the flexibility to utilize ticket prices as a marketing strategy by offering a limited number of seats within their lowest advertised category. The publicly available data is insufficient for properly testing a monopolist price discrimination strategy by the clubs.

Chapter 3.4 (Article D) would have benefited from further and more detailed data. Sponsors assign considerable importance to the magnitude of a club's television viewership,

making it a critical criterion. Including television viewership as a control variable would have expanded the scope of the study and potentially influenced the findings. Unfortunately, data on TV viewership was unavailable for international audiences of the English Premier League (EPL) or for both domestic and international viewers of Bundesliga matches. In future research, it would be advisable to collect data on a club's TV audience, particularly the number of viewers from Africa and Asia, to better control for the impact of television viewership on sponsor behavior. Also, given the significant disparities in the demographic composition of various cities within the same country, conducting an analysis on a city-level basis rather than a country-level basis would have been beneficial. However, data pertaining to this aspect were only available for England and limited to the years 2011 and 2021.

Moreover, it is important to acknowledge that some front-of-the-shirt sponsorships in the EPL involve related-party transactions. There exist well-documented claims suggesting that specific club owners strategically employed related entities to navigate Financial Fair Play Regulations, thereby artificially inflating sponsorship income and subsequently increasing overall club revenues. Unfortunately, this potential influence was not factored into our analysis, highlighting a notable limitation. A more robust approach could involve the incorporation of an additional dummy variable designed to capture sponsorship contracts characterized as related-party transactions.

Moreover, the seemingly arbitrary methodology for predicting the revenue trajectories of EPL clubs in the post-COVID-19 era in Chapter 3.2 can be criticized, but provides other researchers with an opportunity to develop their own alternative perspectives.

Another noteworthy limitation is the study design used, with multiple regression analysis employed in each of the four studies, which makes it difficult to infer causality between the selected variables. The relationships that have been found to be significant are associative

and correlational, but may not be causal. For example, the reported relationship between capacity utilization in the previous season and ticket price in Article C might have been spurious due to contextual factors that influence both variables.

The identified limitations provide promising directions for further research. Taking all aspects together, it seems most promising to examine the situation in other professional team sports (e.g., basketball, ice hockey) and individual sports (e.g., tennis, golf). Furthermore, the dissertation deliberately focused on leagues within Western European countries. Nonetheless, it would be valuable to perform similar analyses for leagues outside Europe as well, which would provide a more comprehensive understanding of the subject matter.

In a similar vein, the combination of various complementary methodological approaches should be encouraged. This includes econometric case studies, field data, surveys, and laboratory experiments. As an example, Article C in Chapter 3.3 does not address whether price decisions made by clubs are well-founded or if clubs tend to adopt pricing methods from one another. Therefore, there is an opportunity to supplement this research with a qualitative approach, involving expert interviews that would explore the decision-making processes, objectives, and pricing tools utilized by clubs, providing a deeper understanding of their pricing strategies.

In conclusion, while this dissertation offers valuable insights, the above factors emphasize the need for ongoing research that explores additional influential factors, refines the analysis by incorporating further data, and applying further empirical techniques such as qualitative interviews to enhance the understanding of the obscured dynamics at play and the covert interconnections between the war for playing talent, financial inflows and outflows, as well as league rivalry within the realm of European sports.

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