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PhD DISSERTATION

**THREE ESSAYS ON THE ECONOMICS OF
FOOTBALL**

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**İSTANBUL
2020**

T.C.
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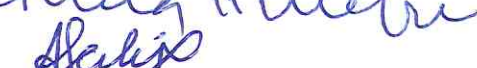
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ÖZ

FUTBOL EKONOMİSİ ÜZERİNE ÜÇ MAKALE

Selçuk Özaydın

Ocak, 2020

Bu tez, Avrupa futbol ekonomisini inceleyen üç makaleden oluşmaktadır. İlk makalede, Avrupa futbolunun 5 Büyük Ligi arasındaki gelir dağılımının nasıl değiştiği ve bunun rekabet dengesi üzerindeki etkisi incelenmektedir. Gini katsayısı ve Lorenz eğrilerinin gösterdiği üzere, son yıllarda gelir dağılımı bozulmaktadır ve bu da rekabet dengesinin İngiliz takımları lehine değişmesine sebep olmaktadır. İkinci makale, Finansal Fair-Play'in Avrupa transfer piyasası üzerindeki etkileri incelenmektedir. Bu bağlamda, farkların farkları (differences in differences) yöntemi kullanılarak regülasyonun etkisi tahmin edilmiştir. Tahmin sonuçları, FFP şartlarına uyamadıkları için yaptırımlarına maruz kalan liglerin, regülasyonlardan oldukça fazla etkilendiğini ortaya koymaktadır. Üçüncü makale ise, Türkiye Süper Lig takımlarının sosyal ve atletik verimliliklerini stokastik sınır analizi ile incelemektedir. Verimlilik liderlerinde, bazı sezonlarda sürpriz takımlar olmasına rağmen, hem sosyal hem atletik açıdan, 3 Büyüklerin diğer takımlardan daha verimli olduğu sonucuna varılmıştır.

Anahtar Kelimeler: rekabet dengesi, gelir dağılımı, finansal fair-play, DID, stokastik sınır analizi, sosyal verimlilik, atletik verimlilik

ABSTRACT

THREE ESSAYS ON THE ECONOMICS OF FOOTBALL

Selçuk Özaydın

January, 2020

This thesis consists of three essays which investigate the last two decades of European football. First essay explores the distribution of income and its influence on competitive balance between the Big 5 leagues of Europe. The Gini coefficients and Lorenz curves illustrate the distortion in the revenue sharing which is adversely influential of competitive balance in favor of the English teams. Second essay discusses the impact of Financial Fair-Play regulations on European transfer market and estimates the size of the effect using a difference-in-difference estimation. The results illustrate that, the transfer activity of the leagues, which have been sanction by UEFA due to failing to meet FFP requirements, have been severely affected. Third essay investigates the social and athletic efficiencies of Turkish Super League clubs between 2012/2013 and 2017/2018 seasons using a stochastic production frontier. In both athletic and social technical efficiencies, the Big 3 of Turkey have been performing better than the others although there are occasional surprises in some seasons.

Keywords: competitive balance, distribution of income, financial fair-play, difference-in-difference, stochastic production frontier, social efficiency, athletic efficiency

PREFACE

First of all, I would like to thank Prof. Dr. Murat Donduran for the freedom he provided me to work on a subject which has not been studied comprehensively before in Turkey. This dissertation enabled me to pursue my dream and I hope it would be the beginning of many good things. I would also like to thank Prof. Dr. Ferda Halıcıoğlu for his restless efforts in helping me and also Prof. Dr. Hüseyin Taştan for his wisdom and knowhow. Last but not least, I would like to thank the loving and caring people around me who picked me up when I fell and kept me going.

Istanbul; January, 2020

Selçuk Özaydın

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1. INTRODUCTION

The 2018 FIFA World Cup in Russia was watched by more than three and a half billion people worldwide which makes it the most watched sport event by far. The record audience of 2018 FIFA World Cup, enabled record revenues and FIFA generated more than 5 billion euros through ticket sales, advertising, broadcasting rights and other commercial revenues which was 25% higher than the 2014 World Cup (FIFA, [08.06.2019]). Football reaches even to the most remote places in earth and touches people's lives. According to Nielsen Sports World Football Report ([15.06.2019]), in 2017, 43% of the population¹ was "interested" or "very interested" in football. With the developing means of communication, football has become something more than a branch of sport, it has become popular culture. Broadcasts are available all around the world enabling the teams to have millions of overseas fans. The most popular teams from Europe organize pre-season tours in Far East just for being able to reach out to their fans. Players and teams have more followers on social media than rock-stars and actresses. The increasing globalization and popularity of football are of course translating into financial gains. In Europe, the aggregate revenue generated by football leagues exceeded 28 billion euros in the 2017/2018 season which is 11% more than the revenue in 2016/2017 season (Deloitte, [10.06.2019]).

The rapid growth enjoyed by European football, both in terms of popularity and revenues, triggered an increase in interest for football from business people, politicians and academics. Foreign club ownership has increased significantly in European football in the last two decades. Investors from US, Russia, Middle East and Far East have been acquiring football clubs due to their ability to make money as well as their popularity. Forbes Magazine releases an annual list about the most valuable football teams in the world. From 2004 to 2018, the aggregate worth of world's most valuable 10 football teams, which are all from Europe, has increased from 7 billion

¹ Nielsen Sports conducted surveys in 18 markets: Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Malaysia, Poland, Russia, Singapore, South Korea, Spain, UAE, UK and US.

USD to 26.8 billion USD which is almost an increase of 400% (Forbes Magazine, 2005; 2018).

The interest of academics on sports began with Rottenberg's (1956) seminal study which investigates the labor market in baseball. Following Rottenberg's footsteps, numerous articles have been published regarding the professional leagues in North America. The sports leagues in North America professionalized prior to the ones in Europe therefore the early sports economics literature focused on baseball, basketball, American football and hockey. For the European leagues, the literature originated with Sloane's (1969, 1971) pioneering articles. With the transition in English professional football in 1960s, both the attendances and turnovers have increased dramatically (Sloane, 1971). Both, the growing revenues and the interest in football, caused football to be treated as a produced service for the community. Today, there are tens of journals solely focusing on the management, economics and social effects of sports and furthermore numerous other journals have published articles regarding sports. Football has been the core of the sports economics literature in Europe.

Despite being one of the top 10 leagues in Europe both in terms of revenue generation and sportive performance (Deloitte, [10.06.2019], UEFA, [10.06.2019]), the sports economics literature regarding Turkish football is very limited. Starting with the 2000s, Turkish academia started showing interest in the economics of football. Akşar published five books (2005, 2006, 2008, 2010, 2013) regarding football economics in general and the economics of Turkish football. His work provides a framework for the economics of football in general, discusses the industrialization of football and investigates the problems in Turkish football clubs. Although his books provide an outline, the articles, in the literature, lack collectivity and in-depth analysis.

Most of the studies in the literature are conducted by academics from schools of physical education and sports rather than economists and further more a majority of these studies are in Turkish. However, there are several articles published in international journals about the economics of Turkish football. Halıcıoğlu (1998) explored the level of competition in Turkish professional football between the 57/58 and 97/98 seasons. Seçkin and Pollard (2008) and Seçkin (2009) investigated the home advantage phenomenon in Turkish Super League between the 94/95 and 05/06 seasons. Demir and Danış (2011) explored the relationship between the stock prices

of Galatasaray SK, Fenerbahçe SK and Beşiktaş JK and their weekly match results. Inan and Kaya (2011) examined the competitive balance in Turkish Super League and First Division between 02/03 and 09/10 seasons. Orta and Korkmaz (2012) analyzed the financial structure of Turkish Football Federation and investigated its revenues and expenditures for 08/09 and 09/10 seasons. Ekmekçi (2013) discusses how sponsorship revenues increased in Turkish football in the last two decades. Tokmak and Aksoy (2016) identified the factors that are affecting fans' brand royalty in the Turkish Super League using the results of a survey they conducted in 2014.

Although the Turkish football economics literature is limited, a more comprehensive literature regarding political and sociological roots of Turkish football is available. Akın (2004), Erturan-Öğüt and Şahin (2014), Erhart (2014), Nuhrat (2016) Demir and Talimciler (2016), Irak (2018) and several others have explored Turkish football in political and sociological contexts.

Even though the growing revenues contributed to the development of European football, some clubs grew richer than the others which created inequality issues. Unlike North American professional leagues, there are no regulations to control the competitive balance in European football. The accumulation of funds in a handful of leagues and teams caused the accumulation of talent at those leagues and teams. The leagues outside the Big 5, are desperately trying to keep up with the "big boys" however due to their inability to generate as much income as the Big 5, they are experiencing financial troubles. The clubs' troublesome and unsustainable financial structures caught UEFA's attention and they have taken steps in the hope of improving clubs' finances under the name of Financial Fair Play (FFP). FFP was introduced with aims of; improving clubs' finances, increasing transparency and credibility and maintaining the sustainability of European football (UEFA, [10.06.2019]). Although the discussions regarding the benefits of FFP are going on, FFP forced many clubs to improve their finances with a number of sanctions. As for the Turkish Super League, it is one of the lucky ones. Even though FFP has struck Turkish teams several times, Turkish Super League was the 7th highest revenue generating team in Europe (Deloitte, [10.06.2019]) in the 2017/2018 season. Turkish football is able to generate high revenue and furthermore, Turkish government has been very keen on developing football both with public reliefs and legislations. Despite the resourceful environment in Turkey, Turkish football could not achieve much notable success in the last two

decades both at club level and national level. The failure in achieving success indicates the inefficient use of resources and poor management skills. This thesis consists of three essays addressing the issues mentioned above.

The first essay, investigates the distribution of revenue, using Lorenz curves and Gini coefficients, and its influence on competitive balance in European football in the last two decades. Several methods, from the existing literature, are used to explore the competitive balance and how it has changed over the years.

The second essay, analyzes the effects of FFP on the European transfer market and furthermore proposes a matrix to classify the football leagues with respect to their performances in international competitions and transfer balances. To identify the influence of FFP on transfer market, a difference-in-difference (DID) estimation is conducted using the aggregate transfer expenditure for leagues as the dependent variable and the FFP as the treatment effect.

The third essay, estimates two-stage stochastic production frontiers for the Turkish Super League clubs in the aim of determining the most efficient teams in athletic and social performance and the factors that are influential on efficiencies. Although, the main objective for the football clubs is to achieve sportive success, football clubs produce multiple outputs. Especially with the increasing popularity and globalization of football, clubs produce social outputs measured in fans attending the games, TV viewers or social media followers. Using squad values and manager tenure as inputs and points as output and using squad values and stadium capacities as inputs and attendance as output, athletic and social technical efficiencies are estimated. In the second stage, the technical efficiencies are regressed on several variables in order to identify the factors that are influential on efficiency scores.

After this introduction this thesis is structured as follows; Chapter 2 presents the first essay, “An Empirical Study of Revenue Generation and Competitive Balance Relationship in European Football”. Chapter 3 presents the second essay, “An Empirical Analysis of Financial Fair Play and Its Impact on European Transfer Market” and Chapter 4 presents the third essay, “Efficiency in the Turkish Super League”.

1.1 – References

- Akşar, Tuğrul. 2005. **Endüstriyel Futbol**. İstanbul: Literatür Yayıncılık.
- 2008. **Futbol Yönetimi**. İstanbul: Literatür Yayıncılık.
- 2010. **Futbolun Ekonomi Politikası**. İstanbul: Literatür Yayıncılık.
- 2013. **Krizdeki Futbol**. İstanbul: Literatür Yayıncılık.
- Akşar, Tuğrul, Kutlu Merih. 2006. **Futbol Ekonomisi**. İstanbul: Literatür Yayıncılık.
- Akın, Yiğit. 2004. 6 Not Just A Game: The Kayseri vs. Sivas Football Disaster. **Soccer & Society**. v. 5. no. 2: 219-232.
- Deloitte. [10.06.2019]. Annual Review of Football Finance. 2019.
<https://www2.deloitte.com/uk/en/pages/sports-business-group/articles/annual-review-of-football-finance.html>.
- Demir, Ender, Hakan Danış. 2011. The Effect of Performance of Soccer Clubs on Their Stock Prices: Evidence from Turkey. **Emerging Markets Finance and Trade** v. 47: 58-70.
- Demir, Müge, Ahmet Talimciler. 2016. **Football in Turkey**. Brussels: Peter Lang.
- Ekmekçi, Rıdvan. 2013. New Era Sport Sponsorship in Turkey. **Journal of Business and Management Sciences**. v. 1. no. 1: 10-13.
- Erturan-Öğüt, Esin Esra, Mustafa Yaşar Şahin. 2014. Political clientelism in Turkish sports federations. **European Sport Management Quarterly** v. 14. no. 5: 556-566.
- FIFA. [08.06.2019]. 2018 FIFA World Cup Russia - Global broadcast and audience summary. <https://resources.fifa.com/image/upload/2018-fifa-world-cup-russia-global-broadcast-and-audience-executive-summary.pdf>.
- Forbes. [12.06.2019] The World's Most Valuable Soccer Teams 2018.
<https://www.forbes.com/forbes/2005/0418/138tab.html#3ecf014e7932>.
- 2005. [12.06.2019] The World's Most Valuable Soccer Teams 2005.
<https://www.forbes.com/sites/forbespr/2018/06/12/forbes-releases-15th-annual-list-of-the-worlds-most-valuable-soccer-teams/#4210ad524762>.
- Halıcıoğlu, Ferda. 1998. The Degree of Competition in the Turkish Professional Football League: 1958-1998. **Journal of Social Sciences**. v. 3. no. 3: 34-46.
- Inan, Tuğba, Ali Murat Kaya. 2011. Competitive Balance in Turkish Soccer. **Ekonomika a Management**. v. 5. no. 2:51-59.

- Irak, Dağhan. 2018. Shoot some pepper gas at me!’ football fans vs. Erdoğan: organized politicization or reactive politics?. **Soccer & Society**. v. 19. no. 3: 400-417.
- İtir, Erhart. 2014. United in Protest: From ‘Living and Dying with Our Colours’ to ‘Let All the Colours of the World Unite’. **The International Journal of the History of Sport**. v. 31. no. 14: 1724-1738.
- Nielsen Sports. [15.06.2019]. World Football Report. https://niensports.com/wp-content/uploads/2014/12/Nielsen_World-Football-2018-6.11.18.pdf.
- Nuhrat, Yağmur. 2016. The Violence Law and the Governmentalization of Football in Turkey. **The Making of Neoliberal Turkey**. ed. Cenk Özbay, Maral Erol, Ayşecan Terzioğlu, Umut Türem. Farnham: Ashgate Publishing: 73-86.
- Orta, Lale, Murat Korkmaz. 2012. An Analysis on the Incomes and Expenditures of Turkish Football Federation and the Incomes of the Four Major Clubs. **International Journal of Management Sciences and Business Research**. v. 1. no. 7: 1-14.
- Rottenberg, Simon. 1956. The Baseball Players' Labor Market. **Journal of Political Economy**. v. 64: 242-258.
- Seçkin, Aylin. 2009. Home Advantage in Association Football: Evidence from Turkish Super League. ed. Helmut Dietl, Egon Franck, Hippolyt Kempf. **Fußball - Ökonomie einer Leidenschaft (Sportökonomie 10)**. Magglingen: Hofmann-Verlag GmbH & Co: 271-288.
- Seçkin, Aylin, Richard Pollard. 2008. Home advantage in Turkish professional soccer. **Perceptual and Motor Skills**. v. 107. no. 1: 51-54.
- Sloane, Peter. 1969. The Labour Market in Professional Football. **British Journal of Industrial Relations**. v. 7. no. 2: 181-199..
- 1971. The Economics of Professional Football: The Football Club as a Utility Maximiser. **Scottish Journal of Political Economy**. v. 18. no. 2: 121-146.
- Tokmak, Gizem, Ramazan Aksoy. 2016. Factors Affecting Brand Loyalty in Football: an Application on “The Big Four” Football Clubs in Turkish Super League. **International Review of Economics and Management**. v. 4. no. 3: 84-106.
- UEFA. [10.06.2019]. Country Coefficients. <https://www.uefa.com/memberassociations/uefarankings/country/#/yr/2019>.
- [10.06.2019]. Financial Fair Play. <https://www.uefa.com/insideuefa/protecting-the-game/financial-fair-play>

2. AN EMPIRICAL STUDY OF REVENUE GENERATION AND COMPETITIVE BALANCE RELATIONSHIP IN EUROPEAN FOOTBALL

2.1 - Introduction

Income distribution has been crucially important for both academics and policy makers. Evaluating the trends in income distribution through time is as important as identifying the current distribution. In the case of sports economics literature, revenue distribution and sharing has been subject to numerous studies, due to its influence on competitive balance (Késenne, 2000, Zimbalist, 2002, Dietl, Grossmann, Lang, 2011), especially for the Northern American professional leagues where revenue sharing is controlled with regulations. In the case of European leagues, teams which are able to generate higher revenues are able to afford better players, staff and facilities hence achieve higher success. In any branch of sport, a team which generates higher revenue than the others will eventually dominate them all. This domination will lead to a decrease in the uncertainty of the games therefore it might decrease the demand for football¹ (Forrest, Simmons, 2002, Garcia, Rodriguez, 2002) which constitutes the motivation for investigating the distribution and generation of revenue in European football.

The top 5 leagues of European football, England, France, Germany, Italy and Spain both in terms of revenue generation and attendance averages, have been the major focus of sports economics literature over the past decades. The top 5 leagues generated about 15.6 billion Euro revenue in the 2016/2017 season which is about 57.6% of the total revenue generated by the European football (Deloitte, [03.03.2018]). There are 55 registered leagues in UEFA (UEFA, [22.08.2017]) and the top 5 leagues generated more than half of the total revenue.

The revenue distribution is not only an issue between the top 5 leagues and the others but also an issue among the top 5 leagues. Revenue sharing has become

¹ The influence of uncertainty of outcome on demand is a highly debated matter. A more comprehensive investigation regarding this matter could be found in “The Economics of Football” (Dobson, Goddard, 2001)

more unequal over the years, especially English and German teams have increased their revenue significantly over the past two decades whereas French and Italian teams have experienced dramatic decreases in relative terms. Deloitte releases an annual report about European football, called the Money League Report, and announces the top revenue generating clubs. In 2015/2016 season's report, there are 8 English, 4 Italian, 3 Spanish, 3 German and 1 French club in top 20, whereas in 1996/1997 season's report top 20 had 6 Italian, 5 English, 3 Spanish, 2 German and 1 French club. (Deloitte, [05.10.2017], Deloitte, [05.10.2017]). Almost half of the most revenue generating clubs are the English clubs thanks to the broadcasting and sponsorship revenues. The weakest link in the top 5 leagues in terms of revenue generation is the French league. There is only one French team, Paris Saint-Germain, in the top 20 and there is one other, Olympique Lyonnais, in the top 30 which indicates the financial weakness of French clubs when compared to the other top 5 league teams. The latest Money League Report illustrates Italian clubs' worst ever Money League performance with only three clubs in the top 20 (Deloitte, [03.03.2018]). Just like French teams, Italian teams are losing their financial power which is likely to influence Italian teams' sportive performance.

The numbers point out the unequal distribution of revenue in European football which reflects on the European trophies won by clubs hence the uneven competition. In the last 20 years the only one team, that is not from the top 5 leagues, has managed to win the Champions' League which was Porto FC in 2004. In the 12 years prior to the last 20 years, teams from 9 different countries have managed to win the Champions' League (WorldFootball, [25.08.2017]). The dramatic change in league and club finances in the last two decades have changed the competition structure of the inter-European competitions. The inequality in terms of revenue generation has reflected on success. Champions' League is no longer a league of champions' but a league where same few teams compete to win the trophy every season.

From 1996/1997 to 2015/2016 season the English Premier League have managed to increase its share in the total revenue generated by the top 5 leagues from 27,4% to 36,2%. As expected, the total transfer spending increased accordingly during the same period. In 1996/1997 season Premier League clubs spent about 185 million euros, in 2005/2006 497 million euros, in 2010/2011 689 million euros and in 2015/2016 1450 million euros (Transfermarkt, [30.08.2017]). In the last decade English

Premier League clubs increased their total transfer spending almost one billion euros whereas Spanish, German and French teams were able to increase their total spending about 200-250 million euros each (Transfermarkt, [30.08.2017]). The growing financial power of English clubs has created inequality in terms of transfers. The accumulation of talent in the Premier League results in uneven competition especially between the English clubs and the lesser clubs of Europe. Other than few clubs from the top leagues such as Barcelona, Real Madrid, Bayern Munich, Juventus etc., it became extremely difficult for clubs from other leagues to compete with English teams.

The revenue generated by European football has exceeded 25 billion euros (Deloitte, [03.03.2018]) in the end of the 2016/2017 season which is more than the GDP of countries such as Bulgaria, Croatia, Slovakia and Slovenia (Eurostat, 09.03.2017)). European football is drawing attention around the world, businessmen and companies which are all worth billions invest in European football and acquire teams. The football market is growing larger every season. The latest Premier League TV rights deal was worth about 5,6 billion euros which will run for three years starting from 2016 (BBC, [03.09.2015]) whereas the latest deal for Spanish La Liga was worth 2,65 billion euros for the same period (Total Sportek, [03.09.2017]). The difference between the most paid and least paid clubs from the TV rights deal is about 55 million euros per season in English Premier League where as it is more than 90 million euros in Spanish La Liga (BBC, [03.09.2017], Total Sportek, [03.09.2017]). Even though the top clubs in La Liga get paid as much as the top clubs in the Premier League there is a huge gap between the lesser teams. Top clubs from the top leagues have financial strength to compete with each other but lesser clubs of top leagues and clubs from other leagues are losing their chance to compete because the gap in revenue generation is widening.

Lorenz (1905) underlined the importance of knowing whether the current distribution of income is getting more equal or less and developed his famous Lorenz curve to illustrate the distribution of income. Lorenz curve has been used in several studies in the sports economic literature however it was used for measuring the level of competition not for distribution of income (Quirk, Fort, 1997, Goossens, 2006, Di Betta, Amenta, 2010). Each team's share in total points collected at the end of a season

are used to construct a Lorenz curve in order to show the distribution of points collected.

The relationship between revenue sharing and competitive balance in different sports and leagues has been investigated in the literature several times. In North American professional leagues revenue sharing is regulated however there is perfect competition in European football leagues in terms of revenue sharing. This study contributes to the literature in two ways: firstly, since European Union is a single market with free movement of capital, labor, goods and services, so is the football market, however there are no studies investigating the European football market as a whole in terms of revenue sharing. Secondly, due to the availability of more comprehensive data, the relationship between revenue generation and competitive balance is investigated more thoroughly compared to the previous studies in the literature.

This study constructs Lorenz curves to illustrate the change in revenue distribution between the top 5 leagues in the last 20 years. In addition to the construction of the Lorenz curves, the change in each league's share and the associated coefficient of variations (CV) are computed to exhibit the change in the distribution of income. Later, the change in revenue sharing is compared and contrasted with the change in the competitive balance between the clubs of top 5 leagues. All data regarding the revenue generation are collected from Deloitte's "Annual Review of Football Finance" and "Money League" reports.

The findings of the study provide empirical evidence for the correlation between revenue generation and competitive power hence the answer to the question whether money brings success or not in European football. This study aims to illustrate the worsening financial imbalance in European football and provide empirical evidence regarding its influence on competition using tools from the economics literature.

2.2 - Research Methodology and Design

Competitive balance has been subject to numerous studies in the sports economics literature. It is a significant concern for all football leagues and tournaments hence a concern for all policy makers, fans and all other stakeholders. Several methods have been suggested, in the literature, to measure the competitive balance or imbalance

in sports. The need for different methods arises from the different competition structures in different leagues and sports.

This section provides a review of the methods used in the literature for measuring the competitive balance in professional sports. In the literature, level of competition is investigated in three layers (Szymanski, 2001) Match Uncertainty, Seasonal Uncertainty and Championship Uncertainty. This study makes use of the same three-layered structure. Seasonal and championship uncertainty are the layers investigated in this study since they are associated with long-term factors hence revenue sharing.

It should be noted that the most of the existing literature attempts to evaluate the competitive balance in leagues where the same number of teams play the same number of games every year. This study attempts to assess the change in competitive balance in knockout tournaments (elimination tournaments) so the number of teams and games vary over seasons therefore some of the methods used in the literature are not appropriate. Several methods, which are applicable, are chosen from the literature along with few other suggested methods and they are all used to measure the change in competitive balance in the last two decades of European football.

Seasonal Imbalance

1. Winning Percentage or Point Percentage
2. Range of Win Percentage
3. Standard Deviation of Win Percentage
4. Gini Coefficient & Lorenz Curve (Win Percentage)
5. Standard Deviation Ratio
6. Coefficient of Variation (CV)
7. National Measure of Seasonal Imbalance (NAMSI)
8. Herfindahl-Hirschman Index
9. Relative Entropy

Championship Uncertainty

1. Number of Championships per Team
2. Top K Ranking
3. Herfindahl-Hirschman Index
4. Gini Coefficient & Lorenz Curve (Percentage of League Championships)

5. G-Index

Combined

1. Competitive Balance Ratio (CBR)
2. UEFA Associations' Club Coefficients Ranking

The methods for measuring competitive balance in the literature are listed above. Some of the methods are used more frequently than the others due to their ease of applicability or due to their characteristics. Seasonal imbalance and championship uncertainty are often misleading when used solely. Teams and players tend to under or over perform from time to time since all sports are played by humans. Measures which capture the effects of both seasonal and championship imbalances are relatively more accurate than the others.

A selection of studies is presented in Table 2.1 to summarize the focus of the current literature. Revenue sharing and its influence on competitive balance have been studied several times for the North American professional leagues. There are strict regulations such as salary caps, match day revenue sharing and the drafting system in North American leagues to maintain the competitive balance. European sports leagues do not have these kinds of regulations which causes some teams to get richer than the others which eventually distorts the competitive balance. Although there are some studies investigating the distribution of broadcasting revenues (Forrest, Simmons, Szymanski, 2004, Tonazzi, 2003), the relationship between the change in competition in European sports leagues and aggregate revenues has not been investigated in detail the literature lacks empirical studies regarding this matter.

Table 2.1 - Competitive Balance and Revenue Sharing Literature

Study	Rottenberg, 1956	El-Hodiri & Quirk, 1971	Sloane, 1976	Vrooman, 1995	Horowitz, 1997	Dobson & Goddard, 1998	Depken, 1999	Szymanski, 2001	Hall, Szymanski & Zimbalist, 2002	Humphreys, 2002	Buzzacchi, Szymanski & Valletti, 2003	Schmidt & Berri, 2003	Dobson & Goddard, 2004	Palomino & Sakovics, 2004	Goossens, 2006	Késenne, 2006	Chang & Sanders, 2009	Maxcy, 2009	Vrooman, 2009
Type of Sport	Baseball	Baseball	Baseball, Basketball, Football, Ice Hockey, Soccer, Cricket	Baseball, Basketball, Football, Ice Hockey	Baseball	Soccer	Baseball	Soccer	Baseball, Soccer	Baseball	Baseball, Basketball, Ice Hockey, Soccer	Baseball	Soccer	Baseball, Basketball, Football, Ice Hockey, Soccer	Soccer	All	Baseball	Baseball	Baseball, Basketball, Football, Ice Hockey
League	North American	None	None	North American	North American	English	North American	English	North American, English	North American	North American, Italian, English, Belgian	North American	English	North American, English	Major European Leagues	None	None	North American	North American
Method	Number of Championships Won	No empirical investigation on competition	No empirical investigation on competition	Standard Deviation of Win Percentage, Standard Deviation Ratio	Relative Entropy	Performance Score (score based on the ranking in the end of the season)	Herfindahl-Hirschman Index (wins)	Standard Deviation of Win Percentage, Top K Ranking	Winning Percentage	Competitive Balance Ratio (CBR)	Top K Ranking, A Gini like dynamic coefficient based on top K rankings	Gini Coefficient and Lorenz Curve	Standard Deviation of Win Percentage, Trends in Winning Probabilities	Winning Probabilities	Winning Percentage, Top K Ranking, Lorenz curves and Gini coefficients	No empirical investigation on competition	No empirical investigation on competition	Standard Deviation of Win Percentage	Number of Championships Won per Team, Winning Percentage

2.2.1 Seasonal Imbalance

Several methods have been used in the literature to compute the seasonal imbalance as presented earlier. Some of these measures are quite easy to calculate and interpret whereas some are relatively harder. This section summarizes the methods used in the literature for measuring seasonal imbalance

Winning Percentage and *Point Percentage* are perhaps the most common measures of competitive balance due to their ease of applicability and ease of interpretation. The percentage of games won at the end of a season is easy to compute and in sports where teams can draw (like football), a draw is counted as a half win. Point percentage is the points collected by a team by the maximum number of available points. In knockout tournaments the winner qualifies for the next round and the loser gets eliminated. Playing more games means that a team has managed to qualify for the latter rounds therefore it was more successful but depending on the results a team might have a lower win percentage after getting eliminated in the next round. Even though win percentage was used in the study due to its popularity and applicability it might be misleading in knockout tournaments. In Champions' League and UEFA (Europa League) Cup games the primary focus is eliminating the opponent not collecting points. This study investigates the competitive balance between leagues rather than teams therefore teams are assessed as representatives of leagues so that leagues can be compared with each other. Due to the availability of getting draws (1 point from a game whereas a win gives 3 points) in football, the percentage of points collected is a bit problematic. A team can qualify for the next round with 2 draws (2 points) whereas a team might get eliminated by winning one game and losing one game (3 points) hence appearing more successful. *Points Collected* is used rather than *Percentage of Points* in this study since the total points collected is not conclusive in knockout tournaments. However, it should be noted that this method might be misleading in some cases just like in winning percentage.

The *Standard Deviation* and *Range of Standard Deviation of Win and Point Percentages* are also used as indicators of competition in the literature. Standard deviation, when used alone, might provide inaccurate information to evaluate the competitive balance therefore coefficient of variation is used instead.

Coefficient of Variation (CV) is a statistical measure for variability. It has been used by Sloane (1976) and many others in the literature to measure competitive balance in a season.

$$CV = \frac{\sigma}{\mu} \quad (1)$$

The ratio, of a sample's standard deviation to its mean gives the coefficient of variation. It has been used for winning percentages and points collected to measure the level of competition. The coefficient of variation is easy to interpret, as the value gets larger the level of competition decreases and vice versa. Using CV instead of winning percentages or points collected provide more credible findings due to CV's ability offsets the effects of seasonal variations in the overall winning percentages and points collected.

Gini Coefficient and *Lorenz Curve* are also used for measuring the level of competition. Percentage of points collected by each team at the end of a season is used to construct a Lorenz curve and calculate the Gini coefficient associated to it. The number of teams from each country and the number of games played between teams from different leagues change every season in Champions' League and UEFA (Europa League) Cup so constructing a Lorenz curve and calculating a Gini coefficient would be inconsistent.

The ratio of actual standard deviation to an idealized standard deviation is called the *Standard Deviation Ratio*. Quirk and Fort (1995) proposed $0.5/\sqrt{N}$ as the idealized standard deviation, where N is the number of games played in a season. Standard deviation ratio is relatively a better measure for competition than the standard deviation itself however it is not used in the study as well since *Competitive Balance Ratio (CBR)* is used, a method which makes use of the standard deviation ratio.

Goossens (2006) argue that due to the differences in the number of teams in leagues and due to the changes in the number of teams in leagues standard deviation is biased. Goossens proposes an alternative measure for measuring seasonal imbalance which is the *National Measure of Seasonal Imbalance (NAMSI)*. Similar to standard deviation ratio, NAMSI constructs a ratio using the possible minimum and maximum

standard deviations which might occur in a season instead of using a proposed idealized standard deviation. NAMSIS is not widely recognized in the literature hence it was not used in this study.

Horowitz (1997) uses *Relative-Entropy* measure from the information theory to measure the competitive balance for baseball whereas Depken (1999) computes the *Herfindahl-Hirschman Index* for the Major League Baseball using number of wins for output and market share. *Concentration Ratio* and *Herfindahl-Hirschman* index are two measures for assessing the degree of competition in an industry as illustrated by Behname (2012). are not used to assess the level of competition however concentration ratio is used to illustrate the revenue shares of the football leagues in Europe.

2.2.2 Championship Uncertainty

Measuring the imbalance within a season is important but it provides insights about the short-term competition. Even though it appears like there is competition within a season, the long-term winner might be the same all the time. Same teams competing for the title every season (as in the case of almost all European leagues) means that there is competitive imbalance even if short-term competition is fierce. Several methods have been used in the literature to measure the championship uncertainty.

Number of Championships per Team, used in this study, is an easy to calculate and straight forward measure to illustrate championship uncertainty. The number of champions from each league is used to illustrate the competitive balance in inter-European competitions.

Top K Ranking is similar to the number of different champions which investigates the number of different teams which managed to finish in top k rankings. In this study, Last 16 of Champions' League and UEFA (Europa League) Cup are used as top k rankings. The number of teams from each league which have managed to qualify for the Last 16 every season is used as an indicator of performance.

Herfindahl-Hirschman Index is used in the literature regarding the distribution of championships. In this study, concentration ratio regarding the distribution of cups won by each league is computed instead of Herfindahl-Hirschman index. Since almost of all the cups are won by teams from three or four leagues, concentration ratio is enough to emphasize the imbalance in European football.

Gini Coefficient and Lorenz Curve for the distribution of league championships are also used in the literature. As mentioned earlier championships are won by teams from only a few different leagues and the study investigates a two-decade period meaning that there are forty cups to be won hence to be distributed among the leagues. Lorenz curve and Gini coefficient were not estimated for this short period of time.

Buzzacchi and his colleagues (2003) propose an alternative measure which emphasizes between seasons competitive balance, rather than within seasons competitive balance. Authors distinguish between closed (North American) and open (European) leagues while constructing their Gini-type index making use of top k rank, which they call the *G-Index*.

2.2.3 Combined

Seasonal Imbalance (short-term) and *Championship Uncertainty* (long-term) both provide valuable insights regarding the competitive balance in sports, however it is often misleading to investigate the short-term and long-term trends separately. To overcome the ambiguity, methods are suggested which make use of both short term and long-term trends to determine the competitive balance.

Competitive Balance Ratio (CBR) is a dynamic measure of competition proposed by Humphreys (2002). Making use of the winning percentage standard deviations within seasons and between seasons, a ratio is constructed which captures the effects of both seasonal and championship uncertainty. CBR takes a value between zero and one and as its value gets closer to zero it is an indication of competitive imbalance whereas as it gets closer to one it means the competitive balance is increasing. CBR is easy to compute and interpret and it has been used in this study due to its effectiveness in capturing both between-seasons and within-seasons competition.

Within-team Standard Deviation:

$$SD_{wt,i} = \sqrt{\frac{\sum_{s=1}^S (w_{i,s} - \bar{w}_i)^2}{S}} \quad (2)$$

Within-season Standard Deviation:

$$SD_{ws,s} = \sqrt{\frac{\sum_{s=1}^S (w_{i,s} - \bar{w}_s)^2}{S}} \quad (3)$$

where $w_{i,s}$ is the winning percentage for team i in season s , $\bar{w}_i$ is the average winning percentage of team i in the investigated period and $\bar{w}_s$ is the average winning percentage of all the teams in the investigated period.

Competitive Balance Ratio is the ratio of Equation 2 to Equation 3,

$$CBR = \frac{\frac{\sum_{i=1}^n SD_{wt,i}}{n}}{\frac{\sum_{s=1}^S SD_{ws,s}}{S}} \quad (4)$$

(Goossens, 2006)

UEFA Associations' Club Coefficients is the ranking system used by UEFA, the governing body of European football. UEFA ranks each association by the number of points collected² in international competitions in the past five seasons. UEFA rankings are used to decide the number of teams from each association which will participate in European competitions. These points are calculated separately for Champions' League and UEFA (Europa League) Cup which makes it possible to investigate the competitive balance in different tournaments separately.

2.3 - Results and Findings

One of the few exceptions to the triumph of money over will is the Premier League title won by Leicester City in the 2015/2016 season. Football has become less about competition and ambition but more about power, money and domination. Billion-euro TV rights deals and sponsorship agreements have turned football clubs

2. Each team gets two points for a win and one point for a draw (points are halved for matches in the qualifying and play-off rounds). Clubs that reach the round of 16, quarter-finals, semi-finals or final of the UEFA Champions League, or the quarter-finals, semi-finals or final of the UEFA Europa League, are awarded an extra point for each round. In addition, four points are awarded for participation in the group stage of the UEFA Champions League and four points for qualifying for the round of 16.

into money making entities. Especially after the Financial Fair Play regulations, European football aggregate operating profit skyrocketed and reached 1386 million euros in the 2017 financial year (UEFA, [22.08.2017]). In 20 years, from 1996/1997 to 2015/2016, the total revenue generated by the top 5 leagues of Europe has increased from 2497 million euros to 13416 (Deloitte, [05.10.2017]).

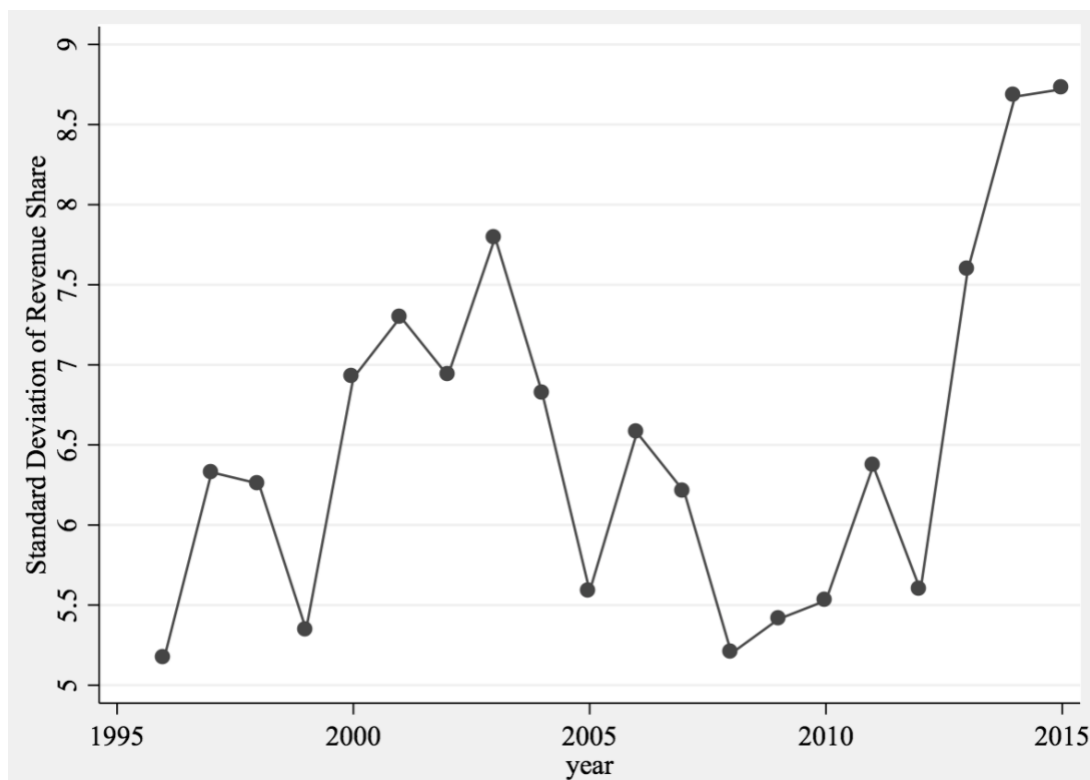


Figure 2.1 - Variation in Revenue Shares

Figure 2.1 plots the standard deviation of revenue shares between the seasons 1996/1997 and 2015/2016. The fitted values illustrate the trend in the standard deviation which is increasing hence the distribution of income is getting more uneven over the past two decades. Table 2.2 presents the revenue data for Europe's top 5 leagues over the last two decades which are later used to construct Lorenz Curves in Figure 2.2. A Lorenz Curve graphically represents the income inequality by plotting percentiles of the population and income.

Table 2. 2 - Revenue Shares for Each League

SEASON	ENGLAND	ITALY	GERMANY	SPAIN	FRANCE
1996/1997	27,43	22,07	17,78	20,99	11,73
1997/1998	30,34	22,03	19,29	17,39	10,95
1998/1999	30,84	21,51	17,38	18,43	11,84
1999/2000	29,14	22,81	16,28	17,26	14,51
2000/2001	32,55	21,47	18,39	14,13	13,46
2001/2002	33,43	19,46	19,96	14,85	12,30
2002/2003	32,81	18,76	20,30	15,52	12,62
2003/2004	34,71	18,47	18,58	16,73	11,50
2004/2005	32,09	19,81	20,08	16,72	11,31
2005/2006	30,53	19,54	18,29	17,72	13,93
2006/2007	32,41	15,17	19,66	18,91	13,86
2007/2008	31,59	18,39	18,61	18,61	12,80
2008/2009	29,28	18,81	19,83	18,89	13,19
2009/2010	29,54	18,26	19,83	19,59	12,78
2010/2011	29,34	18,12	20,37	20,04	12,13
2011/2012	31,51	16,94	20,19	19,12	12,24
2012/2013	30,04	17,10	20,58	19,05	13,23
2013/2014	34,48	15,04	20,13	17,10	13,25
2014/2015	36,52	14,85	19,84	17,03	11,76
2015/2016	36,26	14,29	20,21	18,16	11,07
AVERAGE	31,74	18,64	19,28	17,81	12,52

Table 2.2 provides valuable insights regarding the change in revenue sharing structure among the top 5 leagues of Europe. Perhaps the most striking change in the last two decades is the increase in English Premier League's share. Premier league has managed to increase its share from 27,43% to 36,26% in twenty years. Only one other league has managed to increase its share from 1996/1997 to 2015/2016 which is German Bundesliga 1. Its share has increased from 17,78% to 20,12%.

Another significant finding which can be deducted from the table is the change in the order of the leagues concerning revenue generation. English Premier League has always been at the top and French Ligue 1 has always been at the bottom in terms of revenue generation however Italian, German and Spanish leagues have changed rankings list several times. In 1996/1997 Italian Serie A was the second richest league which enjoyed its reign in the second place till the 2002/2003 season and meanwhile

Bundesliga and La Liga have kept changing rankings. Starting with the 2003/2004 season German Bundesliga became the 2nd richest league in Europe and kept this title till the 2015/2016 season with 2005/2006 season being the only exception where the 2nd place was taken by Serie A.

The average revenue shares of the twenty-year period are in the last row of the table, even though Italy averaged the third highest revenue there is almost a 4% gap between Serie A and La Liga in the recent years. It is important to draw attention to the dramatic decrease in Serie A's revenue from 2005/2006 to 2006/2007. The Italian Football Scandal in 2006 caused Juventus FC to be relegated to the lower division as well as numerous other sanctions to other major teams such as AC Milan, ACF Fiorentina and S.S. Lazio which caused the league to lose great reputation and value (BBC, [03.09.2017]). Serie A's share decreased almost 5% in a single season and was never able to recover.

Table 2.3 - Revenue Growth Rates

Average Growth Rates	ENGLAND	FRANCE	GERMANY	ITALY	SPAIN
1st Period	0,131	0,146	0,123	0,102	0,095
2nd Period	0,097	0,052	0,086	0,048	0,078

Table 2.3 provides the average revenue growth rates for periods 1 and 2 for each league. First, it should be mentioned that all of the leagues have grown much faster in the first period than the second period. The most unexpected finding presented in the table is the French Ligue 1's average growth rate in the first period, even though the French league had the lowest share in the first period it was the fastest growing one. The French league couldn't preserve the high growth rate and failed to converge to the other leagues. The highest average growth rates in the second period belong to English Premier League and German Bundesliga 1 and the lowest to Italian Serie A and French Ligue 1. Spanish La Liga had the lowest average growth rate in period 1 but the most consistent in overall since it has the lowest decrease from period 1 to period 2. The revenues generated by each of the top 5 leagues have grown significantly over the last two decades however some grew faster than the others. English and German leagues became relatively richer than the others.

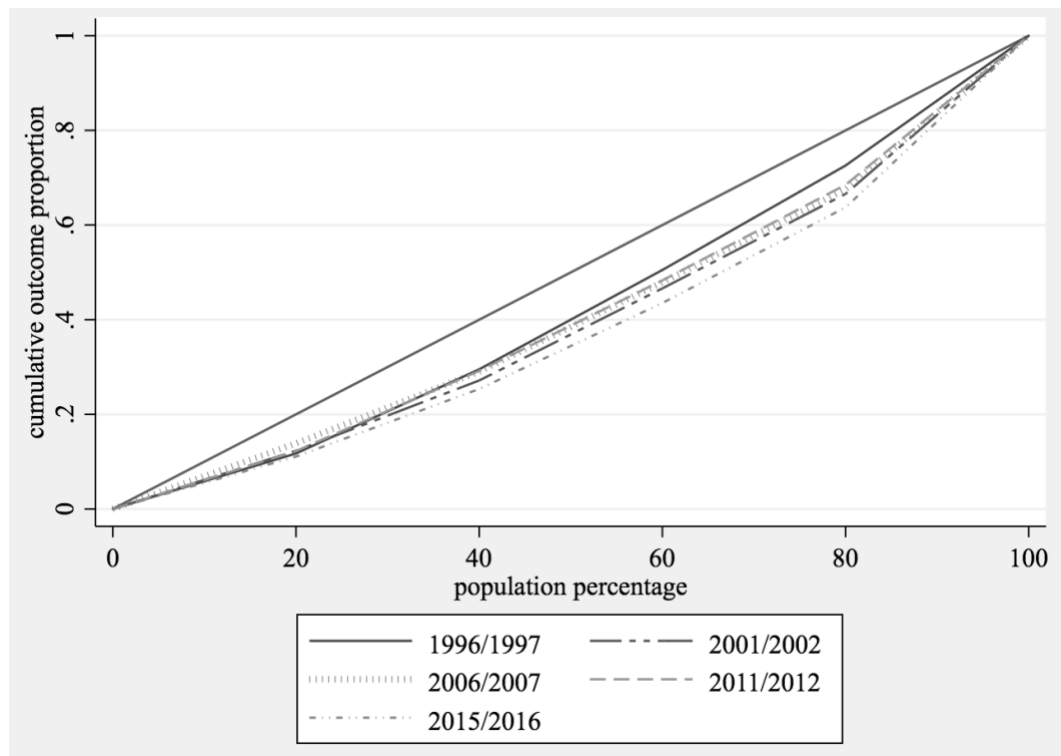


Figure 2.2 - Lorenz Curves³

Figure 2.2 illustrates the data in Table 2.2 in the form of Lorenz curves for every five years. As can be seen from the figure revenue sharing has deteriorated from 1996/1997 to 2015/2016. The sum of the lowest two leagues' share has decreased from 29,52% to 25,36% whereas the sum of the lowest three league's share has dropped to 43,52% from 50,50%. It is important to mention that the second most unequal generation of revenue was in the 2001/2002 season which is the first Lorenz Curve in the figure after the most equally distributed season. Later the revenue distribution became more equal in 2006/2007 but gradually deteriorated till 2015/2016 where it hit rock bottom. The Gini Coefficient for the 1996/1997 season is 0,142 whereas 0,225 for the 2015/2016 season which clearly indicates the deterioration in revenue distribution in European football.

Tables 2.4, 2.5, 2.7 and 2.8 present the points collected in the matches played between the clubs from the top 5 leagues⁴ and their win percentages against each other in Champions League and UEFA (Europa League) Cup including the UEFA Cup

³ Stata Lorenz Package (Jann, 2016)

⁴ Games between the clubs from the same leagues are excluded.

Winners' Cup³. The change in revenue distribution and the change in points collected will be compared and contrasted to investigate the correlation between the two.

Table 2.4 - Points Collected in Champions' League

Season	England	France	Germany	Italy	Spain
1996/1997	0	0	18	6	3
1997/1998	8	9	9	9	14
1998/1999	15	4	8	6	7
1999/2000	29	8	20	31	40
2000/2001	34	15	28	16	47
2001/2002	43	13	39	13	48
2002/2003	36	18	21	43	57
2003/2004	23	17	6	14	30
2004/2005	35	14	14	34	24
2005/2006	23	12	12	24	49
2006/2007	38	8	14	26	20
2007/2008	48	11	8	12	32
2008/2009	37	7	15	22	21
2009/2010	21	16	17	32	30
2010/2011	31	8	26	16	24
2011/2012	39	13	30	28	28
2012/2013	14	8	49	8	30
2013/2014	37	9	26	22	45
2014/2015	16	16	22	13	42
2015/2016	23	14	26	20	46
1996/1997-2005/2006	246	110	175	196	319
2006/2007-2015/2016	304	110	233	199	318
Total	550	220	408	395	637

³ UEFA Cup Winners' Cup was disbanded in the end of 1998/1999 season, domestic cup winners started qualifying for the UEFA Cup.

Table 2.5 - Winning Percentages in Champions' League

Period	England	France	Germany	Italy	Spain
1996/1997 – 2005/2006	53,47	45,21	43,75	46,73	57,11
2006/2007 – 2015/2016	63,37	35,27	53,87	47,08	56,13

In the Champions' League, most points have been collected by the Spanish teams in the last twenty years thanks to Real Madrid and FC Barcelona who have collected 380 points out of the 637 points collected by the Spanish teams. Spanish teams lead in total points collected during both periods however, in win rates, they have lost the first place to the English clubs in the second period. Even though Real Madrid and FC Barcelona have increased their aggregate winning percentages from period 1 to period 2 (from 61,6% to 64,45) the overall rates have decreased for Spanish teams. In period 1 the win rate for the rest of the Spanish teams was 52,8% whereas it is 43% in period 2 which means a decrease of almost 10%.

Winning percentages and points collected provide valuable evidence however what matters at the end of the day is the number of trophies and championships won. *Number of Championships per Team* and *Top K Ranking* are two key measures of competition which are often used in the literature.

Table 2.6 - Champions' League Slots and Titles⁴

CHAMPIONS' LEAGUE					
1996/1997 - 2005/2006					
	LAST 16	Q.FINALS	S.FINALS	FINAL	TITLE
ENGLAND	21	16	8	3	2
GERMANY	14	11	6	4	2
ITALY	18	15	8	5	1
FRANCE	10	6	2	1	-
SPAIN	22	17	12	6	4
2006/2007 - 2015/2016					
	LAST 16	Q.FINALS	S.FINALS	FINAL	TITLE
ENGLAND	33	23	13	6	2
GERMANY	22	12	8	4	1
ITALY	23	7	3	3	2
FRANCE	15	8	1	-	-
SPAIN	31	20	15	7	5

Table 2.6 presents the number of teams from the top 5 leagues which were able to qualify for the Last 16 and onwards in the Champions' League. First of all, it should be mentioned that teams from the top 5 leagues expanded their slot share significantly from period 1 to period 2 meaning that they have increased their supremacy over the teams from others leagues. The competitive balance between the teams of the top 5 leagues and the teams from other leagues is another subject which needs detailed investigation which and will be mentioned in the limitations and suggestions section of this study.

So far *Winning Percentage*, *Points Collected*, *Number of Championships per Team* and *Top K Ranking* have been presented to display the competitive balance and they provided valuable information regarding the change in competition in European football but there is still room for further investigation. UEFA Associations' Club Coefficients provide valuable insights regarding the competitive balance. The coefficients for each league can be used as an indicator of performance. Each association collects points from Champions' League and UEFA (Europa League) Cup separately. Figure 2.3 plots the coefficient of variations of points (used for calculating UEFA Associations' Club Coefficients), collected by the top 5 leagues in the

⁴ In 1996/1997, 1997/1998 and 1998/1999 season there was no Last 16.

Champions' League. The figure illustrates that the coefficient of variation has been increasing in the Champions' League over the last few decades meaning that the imbalance is getting worse.

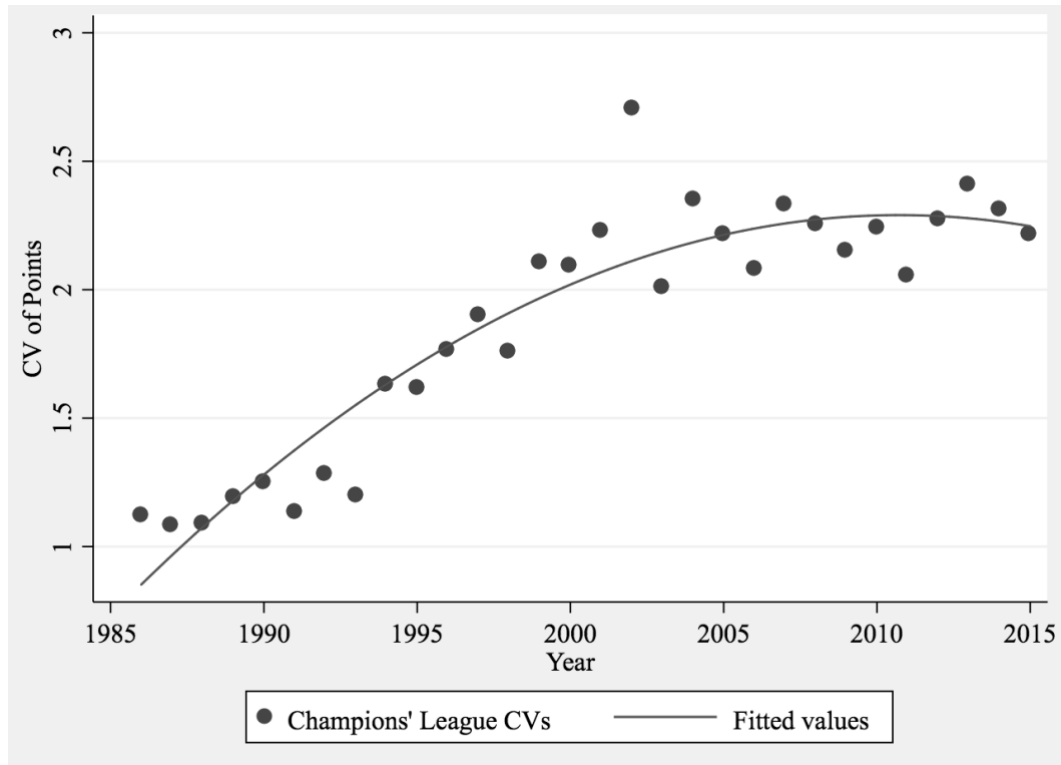


Figure 2.3 – CV of Points Collected in Champions' League

As mentioned earlier another measure for competitive balance, used in the literature, is the *Competitive Balance Ratio (CBR)* (Humphreys, 2002). CBR for the Champions' League in the first period (1996/1997 – 2005/2006) is 0,42 and in the second period (2006/2007 – 2015/2016) is 0,22 indicating that competitive balance has decreased from period 1 to period 2. Like the other methods used for measuring the competitive balance in Champions' League, CBR has also provided empirical evidence to argue that the level of competition in the Champions' League is decreasing.

The following section provides a similar analysis for the UEFA (Europa League) Cup which will investigate the change in competitive balance of the tournament.

Table 2.7 - Points Collected in UEFA Cup and UEFA Europa League

Season	England	France	Germany	Italy	Spain
1996/1997	7	22	16	13	14
1997/1998	24	10	11	21	14
1998/1999	14	9	1	27	16
1999/2000	27	18	15	14	23
2000/2001	8	4	4	18	22
2001/2002	6	11	5	10	1
2002/2003	8	3	4	0	7
2003/2004	8	18	1	3	12
2004/2005	3	3	4	9	8
2005/2006	11	22	19	9	17
2006/2007	14	9	14	16	21
2007/2008	8	0	9	4	7
2008/2009	7	3	23	10	7
2009/2010	18	9	13	13	10
2010/2011	6	8	11	4	16
2011/2012	0	4	5	7	41
2012/2013	15	11	5	18	0
2013/2014	4	4	6	10	10
2014/2015	5	3	9	14	15
2015/2016	20	7	9	6	24
1996/1997- 2005/2006	116	120	80	124	134
2006/2007- 2015/2016	97	58	104	102	151
Total	213	178	184	226	285

Table 2.8 - Win Percentages in UEFA Cup and Europa League

Period	England	France	Germany	Italy	Spain
1996/1997 – 2005/2006	53,52	52,78	34,57	51,69	53,23
2006/2007 – 2015/2016	49,33	39,81	44,89	52,82	61,67

In UEFA Cup and UEFA Europa League competitions, most points are again collected by the Spanish teams as in the case of Champions' League. English teams performed slightly worse in the second period. They have collected 19 points less in the second period however 47% of this variation can be explained by the decrease in the number of English teams competing in the UEFA Cup and Europa League. Again, the French teams are at the bottom collecting the least points. They are followed by the German teams however an increase in points collected by the German teams is present as in the case of Champions' League. Also, it should be noted that German teams managed to collect more points with fewer teams in the second period (51 in first, 41 in second) which reflected on the win rates. French and Italian^s teams have collected fewer points in the second period when compared to the first which coincides with the change in their share in total revenue from first ten years to the second. It is important to mention that in the first period there were 59 French teams competing in UEFA Europa League (including Cup Winners' Cup), and in the second period there were 43, so a decrease in points was not unexpected but their win rate has decreased drastically as well.

Spanish teams dominated the UEFA Europa League between 2006/2007 and 2015/2016 both in points collected and win percentage. They've collected almost 50% more points than the 2nd best performer Germany and their win rate is more than 60%. The domination against the other four big leagues enabled Spanish teams to win the UEFA Europa League six times out of the possible ten in this period (Sevilla FC 4 times, Atlético Madrid 2 times).

In the first period four of top 5 leagues (all except France) managed to win a UEFA Cup or UEFA Europa League whereas only English and Spanish teams managed to win in the second. Even though English teams appear to be performing worse they've managed to win a UEFA Europa League.

Figure 2.4 illustrates the change in competition in UEFA Cup and UEFA Europa League using the coefficient of variation of points as Figure 1.3 did for

^s There were 43 Italian teams competing in both periods. Draws are counted as half wins so three draws out of four games gives 3 points and 37,5% win rate where as one win out of four games gives 3 points and 25% win rate. Even though collected points decrease win rate might increase depending on the results.

Champions' League. Concerning Associations' Club Coefficient points, the competitive balance in UEFA Cup and UEFA Europa League did not deteriorate much as can be seen from the figure. However, regarding *Number of Different Champions* or in terms of *Top K Rankings* some leagues dominated the others.

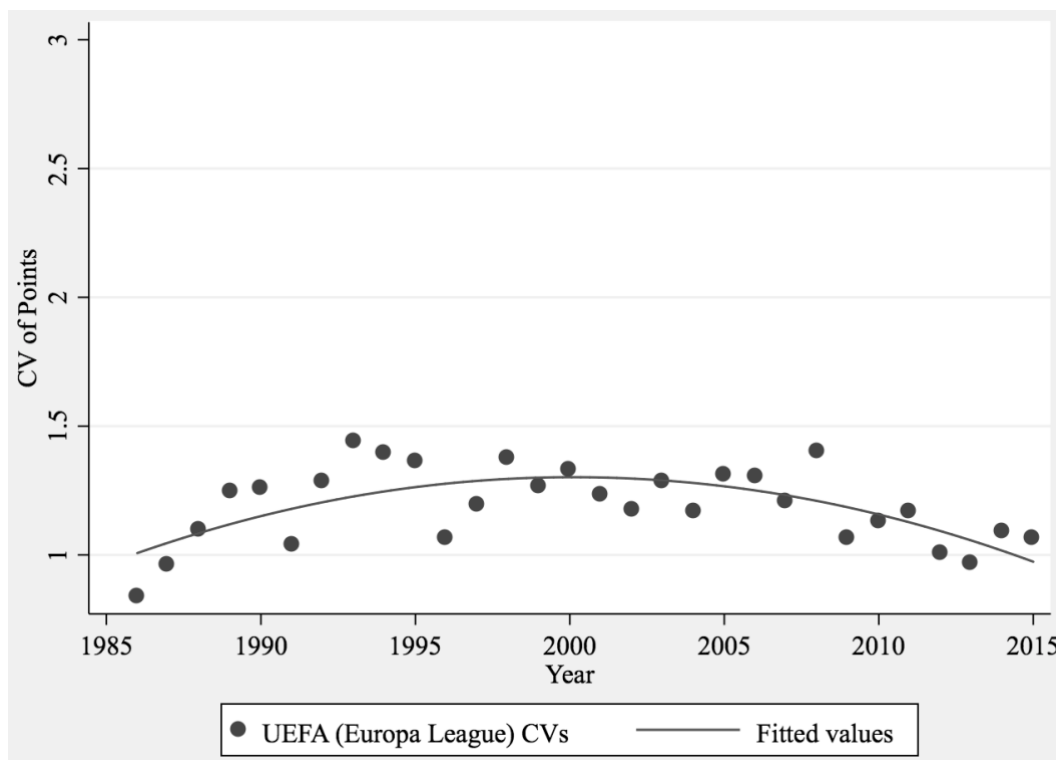


Figure 2.4 – CV of Points Collected in UEFA (Europa League) Cup

Table 2.9 - UEFA (Europa League) Cup Slots and Titles⁶

UEFA (EUROPA LEAGUE) CUP					
1996/1997 - 2005/2006					
	LAST 16	Q.FINALS	S.FINALS	FINAL	TITLE
ENGLAND	16	12	8	4	2
GERMANY	13	7	5	3	1
ITALY	24	14	12	5	3
FRANCE	26	10	5	3	-
SPAIN	29	20	10	5	2
2006/2007 - 2015/2016					
	LAST 16	Q.FINALS	S.FINALS	FINAL	TITLE
ENGLAND	20	8	4	3	1
GERMANY	18	12	5	1	-
ITALY	15	5	4	-	-
FRANCE	11	4	-	-	-
SPAIN	21	16	13	8	6

Table 2.9 is the projection of Table 2.6 for UEFA Europa League and UEFA Cup including the Cup Winners' Cup. It provides the *Number of Championships per Team* and *Top 16 Ranking*. Unlike in the Champions' League, teams from top 5 leagues failed to qualify more to the final stages in the UEFA Europa League and Cup in the second period. In the first period, top 5 league teams acquired 60,5%, 76,9% and 76,9% of the Quarter Finals, Semi Finals, and Final slots respectively whereas their shares decreased to 56,2% and 65% and 60% in the second period. Teams from other leagues have managed to compete with the teams from top 5 leagues.

Finally, *Competitive Balance Ratio (CBR)* for periods 1 and 2 is presented to inspect the change in competitive balance in UEFA Cup and UEFA Europa League. The CBR has changed from 0,43 to 0,39 from period 1 to period 2. There is a slight drop in the competitive balance ratio indicating that the competitive balance is deteriorating.

So far evidence regarding the unequal distribution of revenue in European football and its influence on competitive balance has been provided separately. Figure 2.5 plots the coefficient of variation of the Associations' Club Coefficient points of

⁶ In Period 1 Cup Winners' Cup slots and titles for 1996/1997, 1997/1998 and 1998/1999 seasons are included.

top 5 leagues and the coefficient of variation for revenue distribution between 1996/1997 and 2015/2016 seasons. The figure illustrates the relationship between revenue distribution and competitive balance graphically.

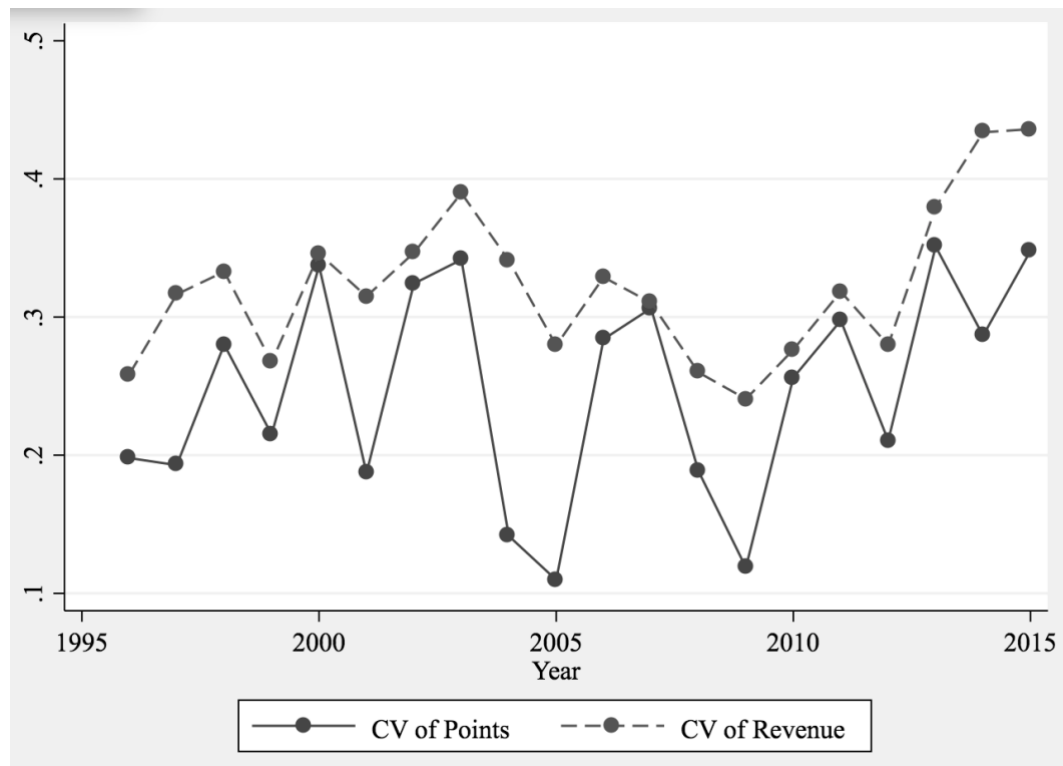


Figure 2.5 – CV of Points Against Revenue Shares

Next section will discuss the findings of the study in the light of the provided empirical evidence in this section as well as concluding the study.

2.4 - Discussion

If European football was an economy, it would have been the fastest growing economy of Europe with an average of 7% annual growth rate in the past decade (Eurostat, [09.03.2017], Deloitte, [05.10.2017]). Funds from all over the world have been flowing to European football and the market has grown enormously. More than half of this gigantic market belongs to the teams from the top 5 leagues. The top 5 leagues dominate European football both financially and competitively. The inequality is not present just among the teams from top 5 leagues and others but also present among the teams of top 5 leagues as the empirical evidence suggests.

Over the past two decades some leagues grew richer than the others and the distribution of income has deteriorated. The direction of the increasing inequality and

the decreasing competitive balance coincide with each other in favor of English and German clubs. This section discusses the distortion in the competitive balance and its correlation with the change in revenue sharing.

As Table 2.4 presents, points collected by French, Italian and Spanish teams do not differentiate significantly from first period to the second in the Champions' League. Even though their performance did not change in terms of points collected, it has changed in other measures. Regarding win rates, French teams have performed considerably worse. In the first period, French teams managed to collect the same amount of points in both periods however in the first period, they have done it with 23 and in the latter with 30 which reflected on their win rate, which has decreased almost 10% percent. Both English and German clubs have managed to increase their win rates about 10% as displayed in Table 2.5. They performed better not only in winning percentages but also in collecting points. The only two leagues which managed to increase their revenue shares over the past two decades are the only two leagues which have managed to perform better in both performance measures. In the Champions' League, as the evidence suggests, some leagues are improving their performances where as some are performing worse. The change in competition is aligned with the change in revenue distribution, which indicates that revenue generation and performance are correlated with each other.

When *Number of Championships per Team* and *Top 16 Rankings* measures are taken into consideration, it can be seen that in the first period English, Italian and Spanish teams performed similarly in terms of acquiring the Last 16 and Quarter Final slots in the Champions' League. Spanish teams performed better in Quarter Finals and managed to acquire more Semi Final slots. German teams are behind these three and they are followed by the French teams. Even though German teams' overall performance is relatively low, they have managed to qualify for the final four times and win the trophy twice in 10 seasons. Almost every two years a German team managed to proceed to the final. In the second period, French teams fell even further behind and could not even manage to qualify for a final. English and German teams have significantly performed better in terms of qualifying for the latter rounds however they have failed to convert it to more trophies. Italian teams significantly performed worse in terms of quarter and semi-finals however they have managed to qualify for the final every time they've managed to qualify for a semi-final and furthermore

they've won 2 titles. A conversion rate of 66% (2 titles out of 3 finals), in the second period, compared to a conversion rate of 20% (1 title out of 5 final), in the first, is a remarkable improvement. Even though conversion rate for the finals has improved, it should be noted that their conversion rate for the last 16 has dropped from 83,3% to 30,4%. This drastic decrease indicates a deterioration in the overall performance of Italian teams. Spanish teams have managed to proceed more into the latter rounds of the tournaments and win more titles however their conversion rate has decreased. The conversion rates for last 16 are 77,3% and 64,5% respectively for periods 1 and 2 whereas the rates for semi-finals are 50% and 46,6%. Twice, the final was played between two Spanish teams which means that at least one Spanish team was in the final five times and they have managed to win all of them which is an extraordinary performance, a 100% conversion rate for the finals. Even though the English teams have also managed to have at least one team in the final for five times they were only able to win twice meaning that they have a conversion rate of 40% for the finals.

Unlike Champions' League, the coefficient of variation of Associations' Club Coefficient points collected in UEFA Cup and Europa League did not increase over the past two decades. The competition did not get more uneven among the teams from top 5 leagues in terms of points collected however even though level of competition did not deteriorate, there has been another change which can be deducted from Table 2.8. French and English teams performed significantly worse whereas German and Spanish teams performed substantially better which indicates that the structure of competition changed even though the level did not. That is why Figure 1.4 is not as informative as Figure 1.3, such a structural change cannot be observed from the change in the CVs in the past two decades.

The expected result of increasing revenue share was to perform better against teams from other leagues however there is no evidence to support the hypothesis in the investigated period for the English clubs in UEFA Cup (Europa League). An explanation, for the decrease in English teams' performances, can be provided with the help of the "Average League Positions". Previous season's domestic league position can be used a proxy for relative team strength. The average league position of the teams competing in UEFA Cup and Europa League from each league represents the average team strength. The correlation between the previous season's domestic league position and the performance in international competitions is expected to be

negative. The average league position for the English teams has increased from 6,55 to 7,12 from Period 1 to Period 2 meaning that relatively worse teams are representing England in the second period. Better English teams compete in the Champions' League whereas French, German and Italian leagues have improved their average league positions significantly (From 6,9 to 5,9, 6,5 to 5,4 and 6,2 to 5,6 respectively). Worse English teams, started playing against better French, German and Italian teams in the second period. On the other hand, Champions' League outweighs UEFA Europa League both in terms of financial returns and reputation. Teams often rotate their squads in Europa League games since it is not a priority for them.

German and Italian teams have performed better in the second period than the first however the French teams performed worse which was expected due to the decrease in their revenue share. The Pearson Correlation Coefficient between the CV of average league position and the CV of Associations' Club Coefficient points is -0,5 for the 20-year period indicating a significant negative relationship between the two as expected. The average league position provides an explanation for the decrease in English teams' performance in UEFA Cup and Europa League.

Table 2.9 provides the *Number of Championships per Team* and *Top 16 Rankings* data for UEFA Cup and Europa League. It can be seen that the Spanish teams have dominated the UEFA Europa League. Out of the possible ten titles they have managed to win six of them (five of them won by Sevilla FC) in the second period. In the first period both final slots and trophies were evenly distributed between the teams of top 5 leagues however the only league other than Spain to win a UEFA Europa League title was England. Spanish teams did not only dominate in the number of titles but also dominated in the number of semi-finals and final slots. Their conversion rate for the last 16 is 76%, out of 21 times they have managed to qualify for the last 16, 16 times they have reached the quarter-finals. Out of the 20 English teams in the last 16 only eight of them managed to qualify for the quarter-finals which is a conversion rate of 40%. As winning percentages and points collected suggested, the only other league which performed better than the first period is the German league in UEFA Cup and Europa League. The findings summarized in Table 2.9 are aligned with the previous findings.

When Figure 2.5 is examined, the correlation between the CV of Points and CV of revenue is easy to observe. The CV curves move in the same direction over the

last two decades. As the variation in revenue of the leagues increases, so does the inequality in competition and vice versa. The Pearson Correlation Coefficient between the CV of revenue and the CV of points has been 0,72 indicating a high degree of correlation which is illustrated in the figure as well.

The distortion in revenue sharing among the top 5 leagues, presented by Figures 2.1, 2.2 and 2.5, is influential on performance. The leagues who have managed to increase their share in the total revenue from 1996/1997 to 2015/2016 have performed better in the latter seasons of the period. Also, the overall level of competition has decreased as the distribution of revenue deteriorated. The competitive imbalance between the top 5 leagues is increasing due to the change in revenue sharing. Even though the European football market is growing rapidly as a whole, in the past two decades, English and German teams have grown relatively richer. As English and German clubs increased their revenues they have also increased their competitive power.

Richest 20 clubs of Europe generated about 7,41 billion euros revenue in total in the 2015/2016 season which is more than the 30% of the total revenue generated by the top 5 leagues (Deloitte, 2017). Out of the top 20 teams eight of them and out of the top 10 five of them are English teams. Financially English teams are dominating European football and only a few other teams can compete with the English teams both on and off the pitch. Only one club, FC Porto, which was not in the top 10 has managed to win the Champions' League in the last 20 seasons. Out of possible 40 final slots, only five of them were taken by teams which are not among the richest 20 and the last was in 2003/2004 season. The richest top 10 teams have been the same teams in the past four seasons. The difference between the 10th richest and the 11th richest teams was seven million euros in the 2012/2103 season where as it is 50 million euros in the 2016/2017 season (Deloitte, [05.10.2017], [03.03.2018]). The gap between the richest 10 and the others is widening and it is influential on competitive balance.

One might argue that the rich teams are rich because they are successful but that's not the case. Even though the prize money has been increased considerably over the past years, especially for the Champions' League, the share of prize money in the total revenue is about 10% for the top 10 teams (UEFA, [22.08.2017], Deloitte, [03.03.2018]). In a few hundreds of millions revenue, few tens of millions is not decisive. The average share of prize money, for the top 20 clubs, between 2006/2007

– 2010/2011 seasons was 11,9% where as it was 10,4% between 2011/2012 and 2016/2017 seasons (UEFA, [22.08.2017], Deloitte, [03.03.2018]). The share of prize money collected from UEFA competitions is decreasing hence the reliance of teams on it.

Manchester United was the highest revenue generating team in the 2015/2016 season and they did not even compete in the Champions' League. The importance of UEFA competitions' revenue is decreasing every day and teams make it to the top 10 richest teams list even without collecting any prize money. Other sources of revenue such as broadcasting agreements, sponsorships and commercial revenues are far more important than prize money in today's industrialized football. Perhaps success is what brought teams into the top 10 richest but certainly it does not keep them in the list.

Between the seasons 2006/2007 and 2010/2011, three teams made it to the top 10 richest list without competing in the Champions' League however they participated in the UEFA Europa League. Their shares of prize money in total revenue were 1,5% (Bayern Munich in 2007/2008 season), 2% (AC Milan in 2008/2009 season) and 3% (Liverpool in 2010/2011 season). In the five seasons between 2011/2012 and 2016/2017 there were eight teams making it to the top 10 richest list without participating in the Champions' League and seven of them did not even participate in the UEFA Europa League hence did not collect any prize money at all.

The importance of prize money is decreasing for the richest teams which are also the teams who have been winning the Champions' League in the past decade. The 19th most revenue generating club of Europe in 2016/2017 season was Internazionale which generated 179,2 million Euros and only 4% of it was prize money collected from UEFA Europa League. Clubs do not depend on prize money anymore, even the Champions' League revenue is losing its importance for the richest clubs. When compared to the Champions' League, UEFA Europa League revenues are almost negligible. The huge gap between the competitions, in terms of revenue, is adversely affecting the effort and importance placed on Europa League games. Perhaps this is the main reason why English teams performed worse in UEFA Europa League games in the second period.

2.5 - Conclusion

There are 98 teams in total, competing every season, in the top 5 leagues. Only several of them have a chance to win the biggest honor in the European football, the Champions' League. The competitive imbalance is present not only between clubs from the top 5 leagues and the others but also between the clubs of top 5 leagues. The Asian funds flowing to European football are building new superpowers such as Paris Saint-Germain and Manchester City which are the newest members of the richest 10 list. Paris Saint-Germain, the 6th richest club of Europe in 2015/2016 season, generated 35% of the total revenue generated by the French teams whereas the 5th richest Manchester City could only generate %3 of the total revenue generated by the English teams. 35% of the French league's revenue is less than 3% of the English league revenue, that's how unequal European football has become over the last decades (Deloitte, [05.10.2017]). European football is losing its competitive balance and money has become success in European football.

Lesser teams of Europe have a very slim chance of succeeding anything significant in Champions' League. Other than few teams, no others can match the English teams and the two giants of Spain, Real Madrid and FC Barcelona which produce about the 60% of the total revenue generated by the Spanish teams. The increasing trend German teams have in revenue distribution might bring them more trophies in the following seasons. As revenue is getting more and more unequally distributed, domination of the few grows over the masses. It would be more realistic to target UEFA (Europa League) Cup for the other teams. If required financial adjustments were to be made UEFA Cup prize money could enable the transition from being an "UEFA Cup team" to a "Champions' League team". Sadly, even Sevilla FC (who had won the UEFA Europa League five times between 2005/2006 – 2015/2016) could not complete this transition and outperform itself, in the Champions' League or Spanish La Liga, during their reign in the UEFA Europa League. There is a rigid financial barrier between the richest 5-10 teams and the others unfortunately the governing bodies are not interested in demolishing these barriers. The only way a club can overcome the financial barrier is with the help of foreign funds such as the case of Manchester City and Paris Saint-Germain. Even the underdog champion of Premier League in 2015/2016, Leicester City, is owned by a foreign investor. The analysis conducted here investigated the period between 1996/1997 and 2015/2016 seasons.

The evidence suggests that, Premier League teams will be winning more trophies in the following seasons in accordance with their growing revenues. It should be noted Premier League teams have managed to qualify for the final three times in both UEFA Europa League and Champions' League in the following three seasons of the investigation period hence the expectations were met. The growing revenues of Premier League teams are enabling them to dominate international tournaments.

Revenue sharing is a critical issue in European football and there is evidence that the inequality is growing. It can be concluded that changes in revenue generation and competitive balance are correlated with one another. Attention has to be paid in revenue sharing due its adverse effects on competition which will eventually affect the demand for football. Even the super-heroes will not exist if there are no super-villains. The giant clubs need competition and strong opponents. If European football lacks competition, even the biggest clubs in Europe might lose their financial power. What needs to be changed in European football is the distribution of income so that fans witness more fairy tails such as FC Porto's in 2004 or Leicester City's in 2016.

There were some limitations for this study like there are in all studies. Main limitations this study faced were methodological limitations which prevented the extension of the analysis to the whole of European football. Due to the lack of data, regarding the other leagues of Europe, the investigation on revenue distribution was limited with the top 5 leagues and was limited with a period of 20 seasons.

The two main sources of data for this study, Deloitte's Annual Review of Football and Money League, have released their 26th and 21st editions respectively. The financial data regarding the top 5 leagues as a whole can not be found from any other sources hence the period which was investigated could not be extended. The Annual Review of Football has started releasing the data for the total revenue generated by the European football with the 2006/2007 season. The availability of data for ten seasons regarding the total revenue generated by the European football prevented the investigation of the trend in the top 5 leagues' share in the whole European football and its influence on competitive balance. If there was sufficient data, the performance of top 5 league's teams against the teams from other leagues could have been investigated and any present trends could have been identified. The revenues generated by the other major leagues such as Portugal, Ukraine, Russia, Netherlands, Turkey, Greece and Belgium were also not available for every season

therefore the analysis which was done for the top 5 leagues could not be done for the other leagues.

As more annual reports regarding the football finance in Europe are published this study could be updated to see if the trend in the competitive balance is continuous. Furthermore, if data regarding the other major leagues of Europe can be collected, an extension could be made and the competitive balance in European football could be investigated in a broader sense. Even though financial regulations have been stricter in the recent years by the regulatory bodies of European football foreign investors are injecting funds to clubs in the name of “soft loans”. The injection of funds distorts the revenue generation mechanism; which enables clubs to spend more than their revenues. The high interest shown by the billionaires from all around the world in European football is shifting the balance of power which makes it another subject that requires further attention.

2.6 - References

- BBC. [03.09.2017]. Premier League in record £5.14bn TV rights deal.
<http://www.bbc.com/news/business-31379128>.
- [03.09.2017]. Punishments cut for Italian clubs.
<http://news.bbc.co.uk/sport1/hi/football/europe/5215178.stm>.
- Behname, Mehdi. 2012. The Compare of Concentration and Efficiency in Banking Industry: Evidence from the OPEC Countries . **Eurasian Journal of Business and Economics**. v. 5. no. 10: 15-24.
- Buzzacchi, Luigi, Stefan Szymanski, Tommaso Valletti. 2003. Equality of Opportunity and Equality of Outcome: Open Leagues, Closed Leagues and Competitive Balance. **Journal of Industry, Competition and Trade**. v. 3. no. 3: 167-186.
- Deloitte. [05.10.2017]. Annual Review of Football Finance 2017.
<https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/sports-business-group/deloitte-uk-annual-review-of-football-finance-2017.pdf>.
- [05.10.2017]. Annual Review of Football Finance 2013.
<https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/sports-business-group/deloitte-uk-sbg-arff-2013-highlights-download.pdf>.
- [05.10.2017]. Annual Review of Football Finance 2015.
<https://www2.deloitte.com/us/en/pages/about-deloitte/articles/annual-review-of-football-finance.html>.

- [03.03.2018]. Deloitte Football Money League.
<https://www2.deloitte.com/uk/en/pages/sports-business-group/articles/deloitte-football-money-league.html>.
- Depken, Craig. 1999. Free-Agency and the Competitiveness of Major League Baseball. **Review of Industrial Organization**. v. 14: 205-217.
- Di Betta, Paolo, and Carlo Amenta. A Die-Hard Aristocracy: Competitive Balance in Italian Soccer, 1929-2009. **Rivista Di Diritto Ed Economia Della Sport**. v. 6. no. 2: 13-39.
- Dietl, Helmut, Martin Grossmann, Markus Lang. 2011. Competitive Balance and Revenue Sharing in Sports Leagues With Utility-Maximizing Teams. **Journal of Sports Economics**. v. 12. no. 3: 284-308.
- Eurostat. [09.03.2017]. Eurostat - GDP and main components.
http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=namq_10_gdp&lang=en.
- FIFA. [07.09.2017]. FIFA/Coca-Cola World Ranking. <http://www.fifa.com/fifa-world-ranking/ranking-table/men/index.html>.
- Forrest, David, and Robert Simmons. "Outcome uncertainty and attendance demand in sport: the case of English soccer." *Journal of the Royal Statistical Society* 51, no. 2 (June 2002): 229-241.
- Fort, Rodney, James Quirk. 1995. Cross-subsidization, Incentives, and Outcomes in Professional Team Sports Leagues. **Journal of Economic Literature**. v. 33. no. 3: 1265-1299.
- Garcia, Jaume, Placido Rodriguez. 2002. The Determinants of Football Match Attendance Revisited Empirical Evidence From the Spanish Football League. **Journal of Sports Economics**. v. 3. no. 1: 18-38.
- Goossens, Kelly. 2006. Competitive Balance in European Football: Comparison by Adapting Measures: National Measure off Seasonal Imbalance and Top 3. **Rivista Di Diritto Ed Economia Della Sport**. v. 2. no. 2: 77-122.
- Horowitz, Ira. 1997. The Increasing Competitive Balance in Major League Baseball. **Review of Industrial Organization**. v. 12. no. 3: 373-387.
- Humphreys, Brad. 2002. Alternative Measures of Competitive Balance in Sports Leagues. **Journal of Sports Economics**. v. 3. no. 2: 133-148.
- Jann, Ben. 2016. Estimating Lorenz and concentration curves. **The Stata Journal**. v. 16. no. 4: 837-866.
- Késenne, Stefan. 2000. Revenue Sharing and Competitive Balance in Professional Team Sports. **Journal of Sports Economics**. v. 1. no. 1: 56-65.
- Lorenz, Max Otto. 1905. Methods of Measuring the Concentration of Wealth. **Publications of the American Statistical Association**. v. 9. no. 70: 209-219.

- Michie, Jonathan, Christine Oughton. **Competitive Balance in Football: Trends and Effects**. Birkbeck University of London, London: Football Governance Research Centre , 2004.
- Miller, Steve. [11.09.2017] Champions League: Why English clubs have failed in Europe - and how they aim to change it. <http://www.dailystar.co.uk/sport/football/619575/Champions-League-final-Manchester-United-Man-City-Chelsea-Liverpool-Tottenham-Europe>.
- Oberstone, Joel. 2011. Comparing Team Performance of the English Premier League, Serie A, and La Liga for the 2008-2009 Season. **Journal of Quantitative Analysis in Sports**. v. 7. no. 1.
- Quirk, James, Rodney Fort. **Pay Dirt: The Business of Professional Team Sports**. New Jersey: Princeton University Press, 1997.
- Sala-Garrido, Ramon, Vicente Liern Carrion, Aurelio Martinez Esteve, Jose Bosca. 2009. Analysis and Evolution of Efficiency in the Spanish Soccer League (2000/01-2007/08). **Journal of Quantitative Analysis in Sports**. v. 5. no. 1.
- Scully, Gersan. 1974. Pay and Performance in Major League Baseball. **The American Economic Review**. v. 64. no. 6: 915-930.
- Sommers, Paul, Noel Quinton. 1982. Pay and Performance in Major League Baseball: The Case of the First Family of Free Agents. **The Journal of Human Resources**. v. 17. no. 3: 426-436.
- Szymanski, Stefan. 2001. Income Inequality, Competitive Balance and the Attractiveness of Team Sports: Some Evidence and a Natural Experiment from English Soccer. **The Economic Journal**. v. 111. no. 469: 69-84.
- Total Sportek. [03.09.2017]. Spanish La Liga New 3 Year TV Deal Worth €2.65 billion. <http://www.totalsportek.com/money/spanish-la-liga-new-3-year-tv-deal-worth-e2-65-billion/>.
- Transfermarkt. [30.08.2017]. Transfermarkt - Transfer&Rumours. <https://www.transfermarkt.com/statistik/transfertage>.
- UEFA. [22.08.2017]. Financial fair play: all you need to know. <http://www.uefa.com/community/news/newsid=2064391.html>.
- WorldFootball. [25.08.2017]. Ukraine » Premyer Liga 2011/2012 » Attendance » Home matches. <http://www.worldfootball.net/attendance/ukr-premyer-liga-2011-2012/1/>.
- [25.08.2017]. WorldFootball- Europe Winners. <http://www.worldfootball.net/winner/>
- Zimbalist, Andrew. 2002. Competitive Balance in Sports Leagues An Introduction. **Journal of Sports Economics**. v. 3. no. 2: 111-121.

3. AN EMPIRICAL ANALYSIS OF FINANCIAL FAIR PLAY AND ITS IMPACT ON EUROPEAN TRANSFER MARKET

3.1 – Introduction

Financial fair play (FFP) has been a game changer for the European football clubs. The regulations imposed by UEFA have affected all the stakeholders of the industry. UEFA ([11.02.2019]) defines the purpose of financial fair play as “improving the overall health of European club football”. Perhaps the most compelling aspect of FFP has been the break-even rule which sets up a constraint for clubs in their spending for wages and transfer fees. So far numerous clubs have been fined by UEFA for failing to meet the FFP regulations. The latest three clubs fined by UEFA were FK Vardar (MKD), PFC Levski Sofia (BUL) and Sporting Club de Portugal (POR) (UEFA, 2018). Disciplinary actions taken against a club differ depending on the offense which are introduced in the next section.

In the world of professional sports, it is not uncommon for the governing body to regulate the financial aspects of the league and teams. As Peeters and Szymanski (2014) demonstrate, strict regulations are present in the North American professional leagues in terms of roster limits, salary caps, draft rules and gate revenue sharing. These regulations make sure that the teams do not go bankrupt as well as enhancing the competitive balance in the leagues.

Even though there have been debates about the compatibility of FFP regulations with EU laws (Flanagan, 2013) the regulations are implemented and since European football clubs spend most of their revenue on wages and transfer fees, the most decisive element of the FFP has been the break-even rule. As the Annual Review of Football Finance 2018 (Deloitte, [10.02.2019]) presents, some of the major leagues outside the Big 5 such as: Portugal, Russia and Turkey have more than 70% wage / revenue ratio which is above the industry marker for club financial health, whereas the average wage / revenue ratio for the Big 5 is 60%. Due to their troublesome financial structure, the clubs from the smaller leagues, have been severely affected from the implementation of FFP and fined numerous times.

The main objective of this paper is to exhibit the effects of break-even regulation on European football leagues' transfer expenditure. To observe the effects of the regulatory changes two periods are investigated. First period is from 2008/2009 to 2012/2013 and the second from 2013/2014 – 2017/2018. 2013/2014 is the season where the sanctions were first imposed for failing to meet the break-even requirements. Furthermore, a matrix is proposed to classify the leagues by their transfer balance and UEFA competitions' performance. This matrix enables to differentiate between countries as well as tracking the change in their transfer balance and performance in UEFA competitions. Data regarding the transfer balance is collected from the website Transfermarkt which is often used in academic studies and has no credibility issues.

Financial fair play regulations have been an area of interest for both policy makers and academics over the past years. So far, the literature regarding on FFP has been focusing on its influence on competitive balance. Vöpel (2011) argues that FFP regulations will only improve the competitive balance between the leading clubs of Europe rather than creating a convergence chance for the poorer clubs. Peeters and Szymanski (2014) point out that the break-even rule will act as an anti-competition restraint since it would force clubs to increase their profitability. Drut and Raballand (2012) have an optimistic perspective and they believe FFP regulations can actually restore competitive balance, if enforced fairly, in European football.

The literature about the effects of regulatory changes on the transfer market is minimal and there are no empirical studies regarding the effects of FFP on European leagues. This study portrays the influence of regulatory changes on leagues' transfer expenditures by providing empirical evidence.

This paper proceeds as follows; Section 3.2 provides a brief explanation for the break-even rule and the probable fines the clubs face as well as a list of clubs which has been sanctioned for breaching FFP regulations. Section 3.3 presents the methodology for the conducted analysis as well as introducing the matrix proposed for the relationship between transfer balance and performance. Section 3.4 and 3.5 presents and discusses the results and Section 3.6 concludes the study.

3.2 – FFP and break-even regulation

UEFA releases a licensing and fair play regulations document each year which is publicly available⁷. The information presented in this section and more can be found in “UEFA’s financial fair play: all you need to know” webpage and UEFA Club Licensing and Fair Play Regulations document’s 2018 edition.

Even though financial fair play regulations were approved in 2010 and the first evaluations were done in 2011, the assessment for break-even requirements have begun in 2013. The break-even condition requires clubs to balance relevant income and expenses⁸ in order to prevent them from accumulating unsustainable debts. Clubs are monitored every season and their accounts for the past three seasons are investigated. For now, clubs are allowed to incur losses for the investigated periods. Table 3.1 presents the monitoring periods and allowed losses for clubs for the seasons between 2013/2014 and 2018/2019.

Table 3.1- FFP Criteria

Season	Investigation Seasons			Acceptable Loss
2013/2014	-	2011/2012	2012/2013	45 Mil. €
2014/2015	2011/2012	2012/2013	2013/2014	45 Mil. €
2015/2016	2012/2013	2013/2014	2014/2015	30 Mil. €
2016/2017	2013/2014	2014/2015	2015/2016	30 Mil. €
2017/2018	2014/2015	2015/2016	2016/2017	30 Mil. €
2018/2019	2015/2016	2016/2017	2018/2019	Less than 30 Mil. €

UEFA. [11.02.2019]. Financial fair play: all you need to know.

<https://www.uefa.com/community/news/newsid=2064391.html>

Clubs which fail to meet requirements face a number of sanctions depending on their accounts and financial status. Probable punishments clubs face are as follows:

- a) Warning
- b) Reprimand
- c) Fine

⁷ 2018 edition can be found at:

https://www.uefa.com/MultimediaFiles/Download/Tech/uefaorg/General/02/56/20/15/2562015_DOWNLOAD.pdf

⁸ See UEFA regulation document for the definition of relevant income and expenses.

- d) Deduction of points
- e) Withholding of revenues from a UEFA competition
- f) Prohibition on registering new players in UEFA competitions
- g) Restriction on the number of players that a club may register for participation in UEFA competitions, including a financial limit on the overall aggregate cost of the employee benefits expenses of players registered on the A-list for the purposes of UEFA club competitions
- h) Disqualification from competitions in progress and/or exclusion from future competitions
- i) Withdrawal of a title or award

(UEFA, [11.02.2019])

In addition to the listed measures, UEFA Club Financial Control Body (CFCB) has offered settlement agreements in some cases and gave clubs additional time as well as providing roadmaps for resolving the financial issues.

So far, a number of clubs have been fined due to their failure to FFP regulations. Table 3.2 presents a list of teams which have failed to meet the FFP requirements and have been subject to UEFA sanctions.

Table 3.2 – Clubs Sanctioned by UEFA⁹

Team	Country	Season
Bursaspor	Turkey	2014/2015
CFR 1907 Cluj	Romania	2014/2015
Ekranas	Lithuania	2014/2015
FC Astra	Romania	2014/2015
FC Dnipro	Ukraine	2014/2015
FK Crvena Zvezda	Serbia	2014/2015
ASA 2013 Targu Mureş	Romania	2015/2016
Beşiktaş JK	Turkey	2015/2016
Bursaspor	Turkey	2015/2016
CFR 1907 Cluj	Romania	2015/2016
CSKA Sofia	Bulgaria	2015/2016
FC Astra	Romania	2015/2016
FC Botoşani	Romania	2015/2016
FC Dnipro	Ukraine	2015/2016
FC Dynamo Moscow	Russia	2015/2016
FC Honka	Finland	2015/2016
FC Krasnodar	Russia	2015/2016
FC Lokomotiv Moskva	Russia	2015/2016
FC Rostov	Russia	2015/2016
Hapoel Tel-Aviv	Israel	2015/2016
Inter Baku	Azerbaijan	2015/2016
Karabükspor	Turkey	2015/2016
Panathinaikos	Greece	2015/2016
Ruch Chorzow	Poland	2015/2016
SC Braga	Portugal	2015/2016
Sporting Club de Portugal	Portugal	2015/2016
ASA 2013 Targu Mureş	Romania	2016/2017
FC Astana	Kazakhstan	2016/2017

⁹ Detailed information regarding the sanctions can be found at:
<https://www.uefa.com/insideuefa/disciplinary/club-financial-controlling-body/cases/index.html?redirectFromOrg=true>

Table 3.2 (continued)

FC Dnipro	Ukraine	2016/2017
Fenerbahçe	Turkey	2016/2017
Galatasaray AŞ	Turkey	2016/2017
GNK Dinamo Zagreb	Croatia	2016/2017
Inter Baku	Azerbaijan	2016/2017
Trabzonspor AŞ	Turkey	2016/2017
FC Porto	Portugal	2017/2018
FK Parizan	Serbia	2017/2018
Karabükspor	Turkey	2017/2018
FC Irthys	Kazakhstan	2017/2018
FC Sion	Switzerland	2017/2018
FK Vojvodina	Serbia	2017/2018
Galatasaray AŞ	Turkey	2017/2018
KF Tirana	Albania	2017/2018
Maccabi Tel-Aviv	Israel	2017/2018
Panathinaikos	Greece	2017/2018
FK Vardar	Macedonia	2018/2019
Levski Sofia	Bulgaria	2018/2019
Sporting Club de Portugal	Portugal	2018/2019

UEFA. [11.02.2019]. Disciplinary.

<https://www.uefa.com/insideuefa/disciplinary/club-financial-controlling-body/cases/index.html?redirectFromOrg=true>.

As can be seen from the table, Turkish clubs (6), Russian clubs (4), Romanian clubs (3) and Portuguese clubs (3) are the most threatened ones in terms of meeting FFP regulations. It should be mentioned that Turkish top flight, Süper Lig, is the 6th highest revenue generating football league in Europe (Deloitte, [10.02.2019]) however Turkish clubs are failing to fulfill the financial requirements which is an indication of bad use of funds hence bad management.

3.3 – Methodology

Before providing the methodology for analyzing the effects of break-even rule on the transfer market, the Balance – Performance matrix is introduced.

3.3.1 - Balance – Performance Matrix

In inter-European competitions, every year same teams compete for the trophies. The accumulation of talent in few major leagues caused the deterioration of competitive balance and changing competition structure. The need for classifying leagues arises from this unbalanced competition. Some leagues have no longer any competitive power since they cannot keep their talent at hand whereas some leagues are just harvesting talent from the others. The Balance- Performance Matrix proposes a classification for the leagues which is presented in Figure 3.1.

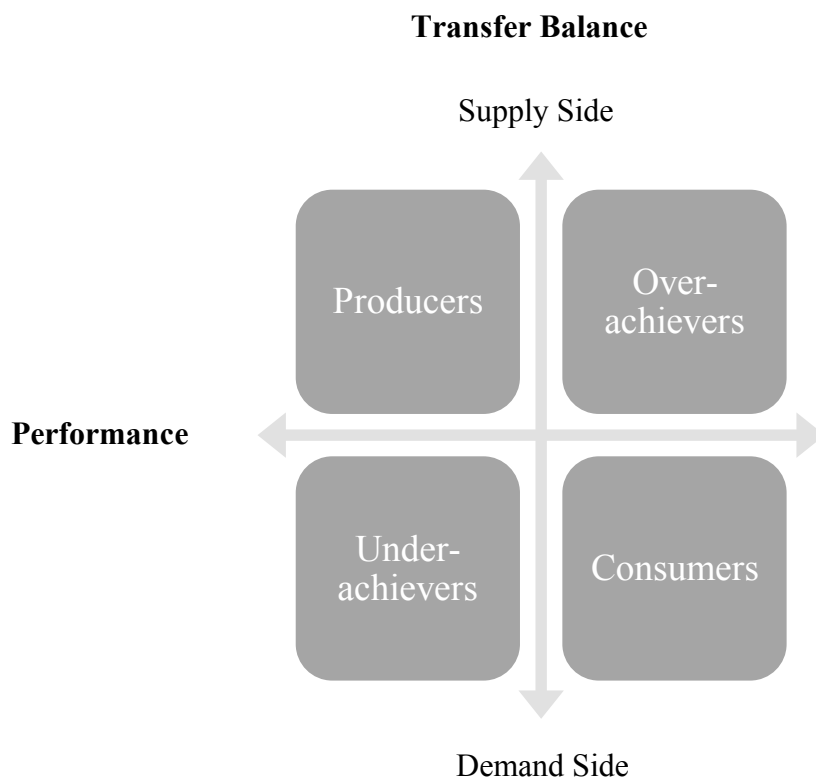


Figure 3.1 – Balance – Performance Matrix

Each league is plotted into the matrix subject to its transfer balance and its performance in UEFA competitions for a five-year period. The area consisting of quadrants 1 and 2 is the supply side due to the positive transfer balance and quadrants 3 and 4 form the demand side.

Producers are mostly the leagues which supply the other leagues. They supply talent for the Big 5 or the larger leagues outside the Big 5, because they sell all the best talent their competitive edge is decreasing. Over-achievers are the leagues which also supply players to larger leagues but they are still able to keep their competitive edge.

Under-achievers are leagues which spend but fail to achieve success, they fail to manage their funds effectively. Consumers are the leagues which spend for increasing their competitive power.

Transfer balance and performance indices are computed as follows:

$$B_{it} = Exp_{it} - Inc_{it} \quad (1)$$

$$TB_i = \sum_{t=1}^5 B_{it} \quad (2)$$

where Exp_{it} and Inc_{it} are transfer expenditure and income for country (i) at time (t) and TB_i is the transfer balance for country (i) for a period of five seasons.

Performance Index is computed using UEFA country coefficients. Country coefficient is the total points collected in UEFA competitions by a league divided by the number of teams from that league competing in UEFA competitions¹⁰.

$$\Delta CC_{it} = CC_{it} - CC_{it-1} \quad (3)$$

$$PI_i = \sum_{t=1}^5 \Delta CC_{it} \quad (4)$$

where CC_{it} is the UEFA country coefficient for country (i) at time (t) and PI_i is the performance index for country (i) for a period of five seasons.

3.3.2 – Treatment Effect

For analyzing the effects of FFP regulations on European leagues' transfer markets, a treatment effect estimation method is used. The regulatory change in European football is a naturally occurring event external to clubs and leagues hence creates a natural experiment. Where there are two groups of leagues (the ones which were sanctioned by UEFA and the ones which were not), and two time periods (before and after the regulatory change). Due to the homogeneity of the control and treatment

¹⁰ For detailed information about country coefficients see:
<https://www.uefa.com/memberassociations/uefarankings/country/about/>

groups and due to the exogeneity of the treatment, a difference-in-differences model is appropriate for estimating the treatment effect.

Break-even regulation is the treatment effect which came into practice in the 2013/2014 season. Leagues which have teams sanctioned by UEFA due to FFP regulations are the treatment group and the rest of the leagues are the control group. To estimate the effects of the treatment, a transfer expenditure model is constructed. The pre and post treatment effects are investigated on the treatment group relative to the control group. The effects of FFP sanctions are estimated using a difference-in-differences model. Difference-in-differences models have been used widely in the literature after the pioneering study conducted by Ashenfelter and Card (1985).

The group of interest is the treatment group after the break-even rule came into practice since the main objective is to estimate the impact of the regulatory change on transfer expenditure. This impact on the control group can be estimated by the interaction term provided in equation 5 where *Time* and *Treatment* are binary variables taking the value 1 for post treatment seasons and treatment group leagues and 0 otherwise.

$$Time \times Treatment = FFP \quad (5)$$

The estimation of the following model enables the implementation of this methodology:

$$TE_{tl} = \beta_1 Rev_{gt-1} + \beta_2 PctofCT_{rt} + \beta_3 PpC_{lt} + \beta_4 FpC_{lt} + \beta_5 W + \beta_6 FFP_{lt} + \varepsilon_{lt} \quad (6)$$

where dependent variable TE_{tl} , is the transfer expenditure for league (l) at time (t). Additional covariates are added to the model to address the differences. Rev_{gt-1} is the total revenue generated by group (g) at time (t-1), there are two groups of teams; the Big 5 and the rest of the leagues in Europe. Revenue variable has been used with a lag since most of the transfer spending (83.6% for the investigated period) is done in the beginning of the season. Even though clubs tend to spend some of their future income, the major source of transfer funds is the previous season's income hence

revenue. $PctofCT_{rt}$ is the percentage of club trained players¹¹ for region (r) at time (t). There are seven regions defined by CIES Football Observatory (2018) and data regarding the percentage of club trained players is gathered from their database. PpC_{lt} and FpC_{lt} are the average number of players and foreign players per team in league (l) at time (t). W is a dummy variable for winter transfer window. FFP_{lt} is the treatment variable which takes the value of 1 for the leagues which have been affected by FFP sanctions in the post treatment period and 0 otherwise.

Croatia, Greece, Poland, Portugal, Romania, Russia, Serbia, Switzerland, Turkey and Ukraine top divisions are in the treatment group. Teams from these 10 leagues have been fined by UEFA due to failing to meet the FFP requirements. The remaining 15 leagues in the data set are: Austria, Belgium, Cyprus, Czechia, Denmark, England, France, Germany, Hungary, Italy, Netherlands, Norway, Scotland, Spain and Sweden.

3.4 – Results and Findings

First, the plots of leagues in the Balance – Performance matrix are presented in Figures 2 and 3. Figures 2 illustrates the smaller leagues for periods 1 and 2 and Figures 3 for the BIG 5. Transfer balance is on the Y-axis and performance is on the X-axis.

It is observed from Figures 2, where twenty smaller leagues of Europe are plotted on the matrix for periods 1 and 2, respectively, after the implication of break-even regulation all leagues with negative transfer balances have improved their transfer balances. Also, there is evidence that for some leagues have performed worse in period 2 when compared to period 1, which will be discussed in the next section.

Figures 3 illustrates the position of the Big 5 in terms of transfer balance and UEFA competitions performance for periods 1 and 2, respectively. Even though Italy and Spain have improved their balances, all of the Big 5 have negative transfer balance and they are all on the demand side as expected.

The growing revenues in European football have influenced the transfer market in the last decade especially in the Big 5. According to the Transfermarkt data, the

¹¹ UEFA defines club trained players as players who have spent at least three seasons between the ages of 15 and 21 in the employer club.

total transfer expenditure for the twenty-five leagues in the data set (Big 5 and the other twenty) increased from 13,859m Euros to 21,768m Euros from 2008/2009 – 2012/2013 period to 2013/2014 – 2017/2018 period which is an increase of more than 50%.

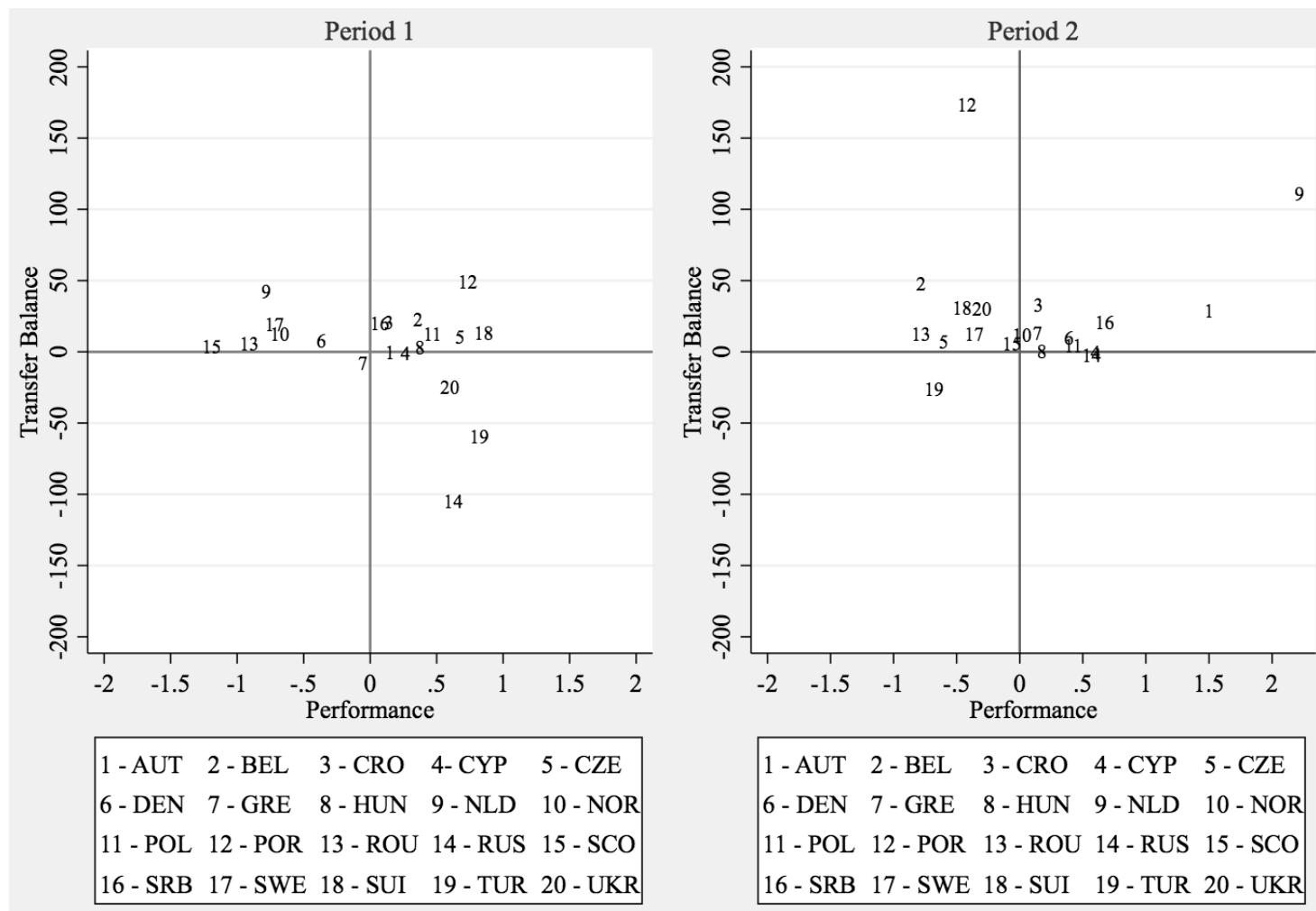


Figure 3.2 - Smaller Leagues' Balance – Performance Matrices

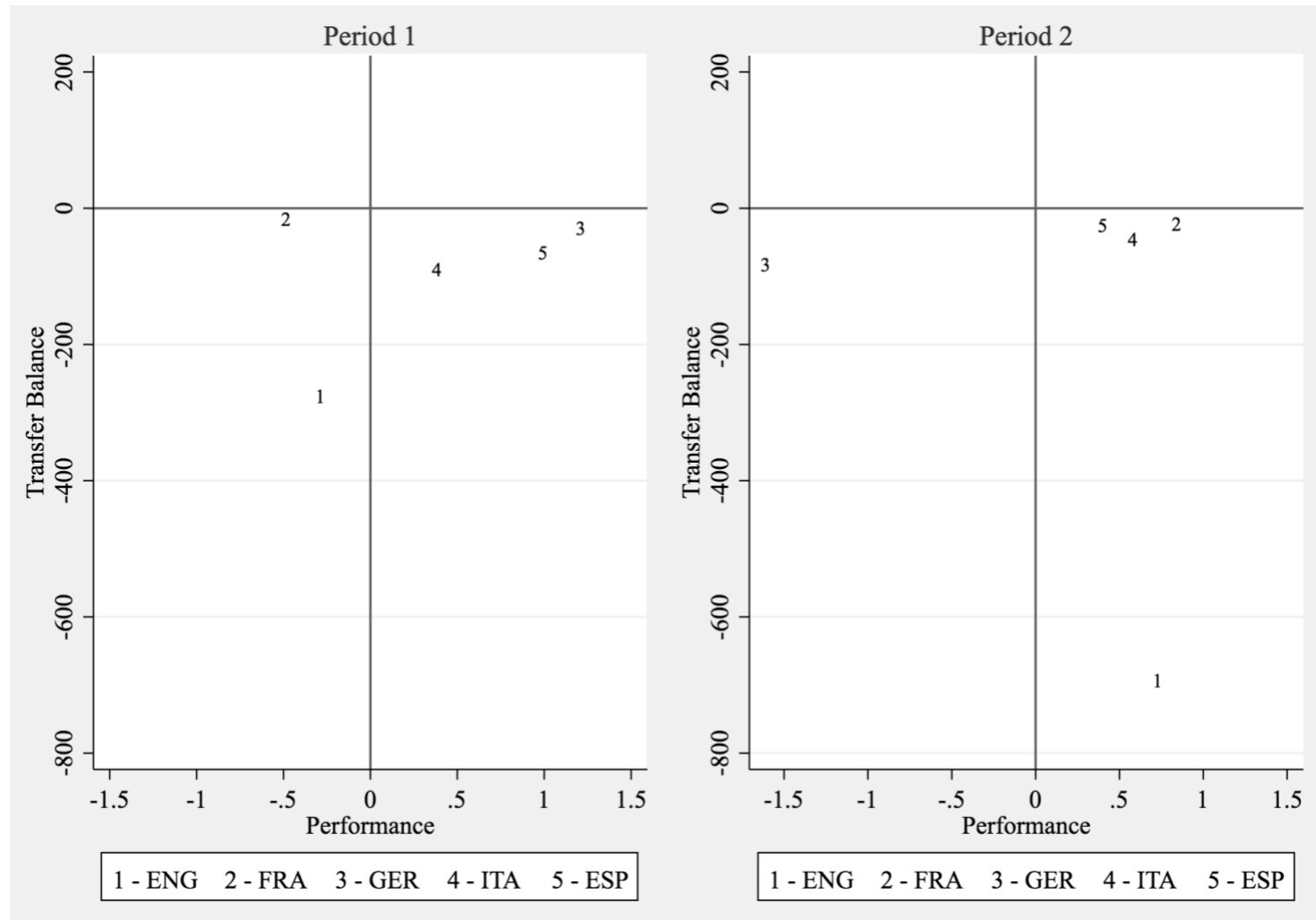


Figure 3.3 – Big 5's Balance – Performance Matrices

Table 3.3 - Effects of FFP on Transfer Expenditure

VARIABLES	(Linear Model)	(Log-Log Model)
	<i>TransferExpenditure</i>	<i>lnTransferExpenditure</i>
Rev_{gt-1}	0.028*** (0.005)	
$lnRev_{gt-1}$		0.228 (0.358)
$PctofCT_{rt}$	259.382 (282.166)	-7.914*** (2.262)
PpC_{lt}	-4.316* (2.265)	
FpC_{lt}	4.545 (3.768)	
$lnPpC_{lt}$		-2.079*** (0.664)
$lnFpC_{lt}$		0.923*** (0.341)
W	-94.847*** (9.982)	-1.342*** (0.079)
FFP_{lt}	-47.189*** (18.348)	-0.245* (0.143)
<i>Constant</i>	-107.073 (118.458)	7.61** (3.637)
Observations	500	500
R-squared		
within:	0.232	0.416
between:	0.265	0.345
overall:	0.221	0.349

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3.3 presents the results from the estimation of equation (6) using robust standard errors to account for autocorrelation between pre and post treatment transfer expenditures in the same leagues. The treatment effect (break-even regulation) on the transfer expenditure of major European leagues can be seen from the table.

Figures 3.4 and 3.5 present the trend in transfer expenditure in major European leagues. Figure 3.4 illustrates the trend in the aggregate transfer expenditure for the 25 leagues whereas Figure 3.5 distinguishes between leagues as control and treatment groups. Over the years the aggregate transfer expenditure has increased dramatically. For the control group the increase is even higher however there is a downward trend in transfer expenditure for the treatment group in the investigated decade.

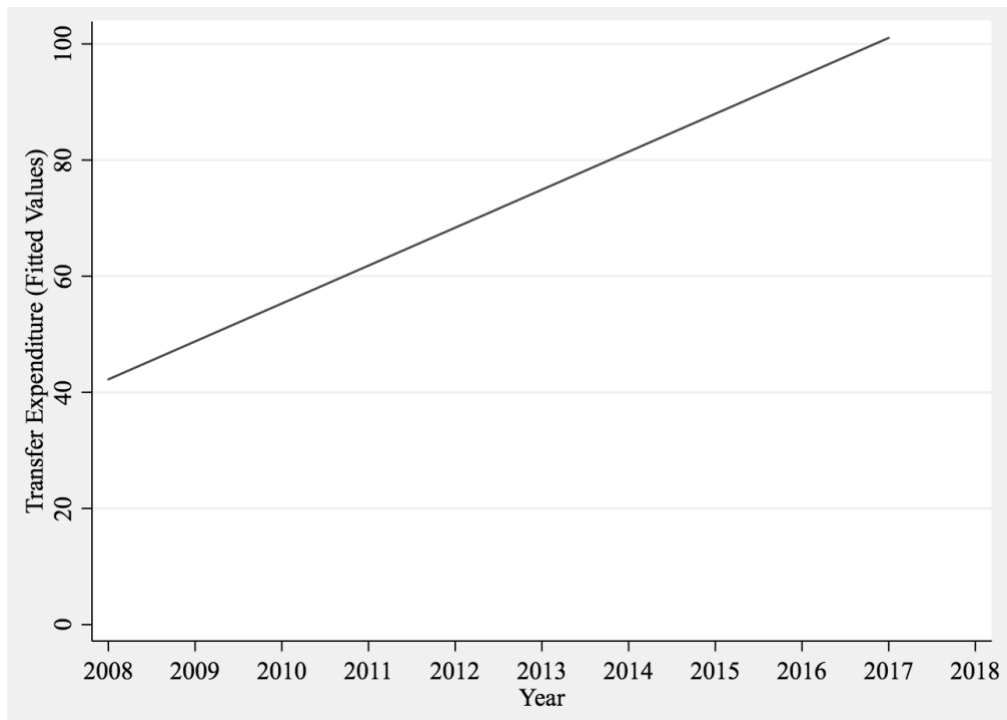


Figure 3.4 - Trend in European Transfer Market

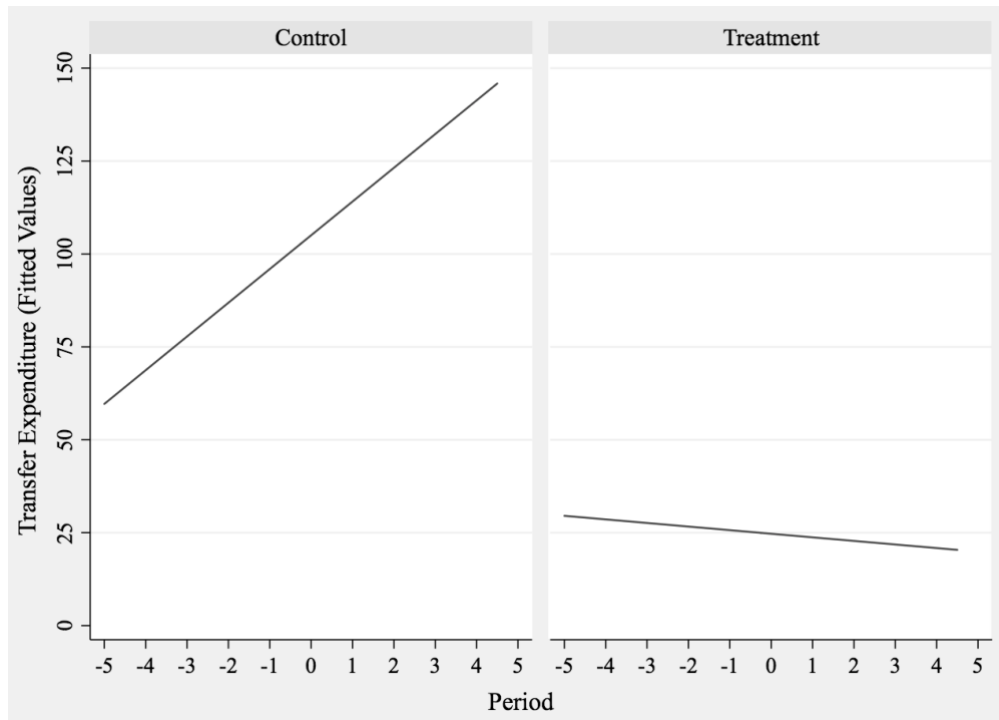


Figure 3.5 – Trends in Control and Treatment Groups

Figure 3.6 illustrates the treatment effect graphically. Even though the aggregate transfer expenditure increases over the years in European football, as presented in Figure 3.4, it can be seen that the FFP sanctions have been influential on transfer spending. The control group's expenditure has continued to increase after the break-even regulation whereas the treatment groups expenditure has declined. The downward trend for the treatment group in Figure 3.5 is due to the five years after the break-even rule came into practice.

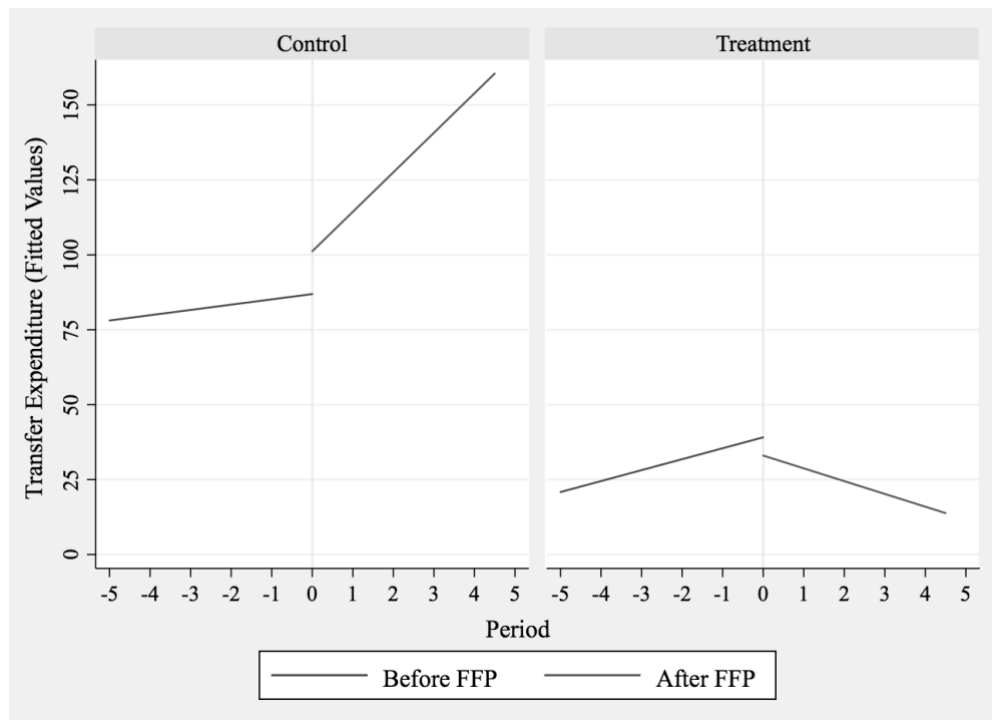


Figure 3.6 – Effect of FFP on European Transfer Market

3.5 - Discussion

The Balance – Performance matrix introduced here, enables the classification of leagues as well as tracking their performances with respect to their transfer balance over the two periods. In the first period, there are four leagues with negative transfer balance which are Russia (103.7m Euros), Turkey (57.7m Euros), Ukraine (23.2m Euros) and Greece (6m Euros) as can be seen from Figure 3.2. The two leagues with highest deficits are also the two leagues with the highest number of teams which had issues with UEFA regarding financial fair play. Six Turkish and four Russian teams had issues with meeting the FFP requirements as presented in Table 3.2.

In the first period, out of the twenty leagues, thirteen were able to score positive on performance index whereas in the second period eleven of them were able to do so. In financial performance, the improvement in transfer balances cannot be disregarded. Ukrainian and Greek teams have managed to provide positive transfer balances, Russian teams have managed to improve their balance from -103.7m to -0.97m and Turkish teams from -57.7m to -24.5m. Turkish league has the worst transfer balance in the second period which is no surprise when the number of teams with issues with FFP are taken into consideration. The improvement in financial status came with a cost, Ukrainian and Turkish, Turkish teams have performed significantly worse in the

second period in UEFA competitions than in first. Russians teams have also performed worse in the second period however their performance did not deteriorate as much as Ukrainian and Turkish teams. The leagues which have performed better in both indicators in period 2 are: Austria, Cyprus, Denmark, Greece, Netherlands, Romania and Scotland whereas; Czechia, Croatia, Hungary and Poland have performed worse in both indicators in the second period.

Out of the twenty leagues ten of them did not switch places on the matrix from period 1 to period 2. Russian league is a consumer in both periods meaning that Russian teams are spending money and get success in return. Austria, Croatia, Cyprus, Hungary, Poland and Serbia are all over-achievers which manage to perform well both on and off the field. Romania, Scotland and Sweden are suppliers which means that even though they provide positive transfer balance they lose their competitive edge and perform worse in UEFA competitions in the last ten years. The rest of the leagues have switched places over the two periods.

In the case of Big 5 all of the leagues are on the demand side as expected. From period 1 to period 2, transfer balance has improved for Italy and Spain and deteriorated for England, Germany and France. The transfer deficit for the Premier League has increased more than 400m Euro after the break-even rule came into practice.

The revenue generated by the Big 5 has increased radically over the last decade, it increased from 7944m Euros in 2008/2009 to 14662m Euros in 2016/2017 (Deloitte, [10.02.2019]). Thanks to the increasing revenues, Big 5 teams are able to spend more on transfer which causes the deterioration of their transfer balances. Unlike smaller league teams, Big 5 teams can afford to spend money on transfers even with no transfer income, thanks to their broadcasting agreements, sponsorships and etc. Premier League has managed to increase its total revenue by 120% from 2008/2009 to 2016/2017 with a total of 5297m Euros, whereas the rest of the Big 5 are all below 3000m Euros. Since English teams have much higher revenues when compared to the teams from the other leagues, they are able to spend more on transfers.

Figure 3.6 and Table 3.3 present the effects of break-even regulation on the transfer market. The treatment effect can be observed both statistically and visually. For the linear model the treatment variable *FFP* is statistically significant at 99% confidence and has a negative coefficient. The transfer expenditure for the leagues in

the treatment group has declined dramatically after UEFA started sanctioning clubs for failing to meet FFP requirements.

$PctofCT_{rt}$ and FpC_{lt} are statistically insignificant at all acceptable confidence intervals. Clubs which grow more players would transfer less players therefore $PctofCT_{rt}$ was expected to be negatively influential on transfer expenditure however there is no empirical evidence to support this claim. FpC_{lt} was expected to be positively related to transfer expenditure however the linear model fails to provide any evidence in favor of this variable. PpC_{lt} is statistically significant at 90% confidence with a negative coefficient. As the number of players in a team increases the transfer expenditure decreases since teams can register a limited number of players therefore cannot transfer more players unless they let go some of the registered ones. Rev_{gt-1} is statistically significant with a positive coefficient as expected, which indicates that the leagues with higher revenues spend more on transfers. W is also significant, clubs tend to spend more on summer transfer windows rather than on winter windows.

The log-log model also provides evidence for the expected treatment effect. The significance of the explanatory variables slightly differs from the linear model. Unlike in the linear model, $PctofCT_{rt}$ and FpC_{lt} are significant at 99% confidence interval with negative and positive coefficients as expected. Teams which are able to grow more players hence use more homegrown players spend less on transfers. Teams which have more foreigners, transfer more players therefore spend more on transfers. Another difference between the level and log-log model is the insignificance of Rev_{gt-1} . FFP caused a decrease about 25% in the leagues in the treatment group in the post-treatment period. The impact of break-even on the treatment group leagues is gigantic.

As Figure 3.4 illustrates, there is an upward trend in the aggregate transfer expenditure for the 25 leagues in the data set over the investigated period. Revenue generated by the European football leagues has grown dramatically over the last decade and as revenue grew so did the transfer expenditure. Figure 3.5 illustrates the trends in transfer expenditure for the treatment and control groups separately. There is an upward trend for the control group whereas the trend for the treatment group is downward. Transfer spending has decreased for the leagues in the treatment group.

Figure 3.6 provides insights about the decrease in the treatment group's transfer expenditure. In the five seasons before the treatment, the growth rate of treatment group's transfer expenditure was higher than the control group. The slope of the fitted values was higher for the treatment group, however after the break-even regulation came into practice the transfer expenditure decreased drastically for the treatment group.

Figure 3.6 illustrates the effect of the treatment graphically on the control group. It can be seen that FFP sanctions have been considerably effective on the penalized clubs and on the leagues. Especially in smaller leagues, fewer number of teams do most of the expenditure and they are also the teams which participate in UEFA competitions hence investigated by UEFA. The decrease in these teams' transfer expenditure affects the whole league for two reasons; first, most of the transfer spending is done by these teams and when they don't spend, the total expenditure decreases and second, the other teams' transfer income decreases therefore they have less funds to spend on transfers. The transfer markets in the smaller leagues show resemblances to a monopsony since the market collapses as a whole when few large buyers stop buying.

Next section concludes the study, briefs about the limitations and provides suggestions for future studies.

3.6 - Conclusion

This study provides empirical evidence regarding the influence of FFP regulations on the transfer expenditures of 25 major European leagues. FFP, especially the break-even condition, has forced clubs to improve their finances. The threat of sanctions which are influential on a team's competitive power such as restricting the number of players which can be registered to UEFA competition, deduction of points and withdrawal of a titles and awards have been quite effective. The competition in European football is already extremely fierce and unbalanced hence nobody wants additional handicaps.

A number of clubs, which failed to meet the financial regulations, has been sanctioned by UEFA and as a result they had to cut their costs which reflected on their transfer expenditures. The leagues in the treatment group have experienced a significant decrease in their aggregate transfer expenditures.

Even though none of the Big 5 are in the treatment group, it should be kept in mind that the financial health of the clubs from other leagues also matters for European football as a whole. In 2018/2019 season, more than half of the all registered players in both the English Premier League and German Bundesliga are foreigners (Transfermarkt, [11.02.2019]) and most of these players come from the smaller leagues of Europe. Financial health of the clubs from smaller leagues is crucial for the sustainability of European football. As smaller league clubs improve their finances they will be able to compete with the giants of Europe hence increasing the competitive balance. In this sense, Portuguese, Dutch, Russian and Turkish clubs are the first candidates in achieving something big in UEFA competitions. These leagues have higher competitive power both on and off the field compared to the other small leagues.

Although empirical evidence is provided regarding the effects of financial play regulations on clubs' finances however there is room for improvement. As mentioned earlier wage / revenue ratio is an important aspect of financial health and currently its above 70% for some of the major leagues in Europe. Surely FFP regulations have been influential on clubs' wage budgets as well as their transfer expenditures, however due to the lack of public data regarding wages, the influence of regulatory changes on wages could not be investigated which was a limitation this study faced. Not only wage data but also revenue data for the smaller leagues are not available, hence the revenue explanatory variable had to be binary variable in the model which takes two different values for the Big 5 and the rest of the leagues.

Aggregate transfer expenditures are used for each league, scholars who are interested in the effects of FFP regulations on club finances could investigate teams individually. A more sophisticated analysis could be conducted using clubs' financial reports however for smaller leagues, the availability of data is an issue. Unlike the clubs from Big 5, most of the clubs from smaller leagues do not issue public reports regarding their finances.

European football clubs are going through a transition period and the ones who successfully complete their financial transition would eventually complete their competitive transition.

3.7 - References

- Ashenfelter, Orley, and David Card. 1985. Using the Longitudinal Structure of Earnings to Estimate the Effect of Training Programs. **The Review of Economics and Statistics**. v. 67. no. 4: 648-660.
- Deloitte. [10.02.2019]. Annual Review of Football Finance 2010. <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/sports-business-group/uk-sbg-arff-2010-highlights.pdf>.
- [10.02.2019]. Annual Review of Football Finance 2018. https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/consumer-business/cz_annual_review_of_football_finance_2018.pdf.
- Drut, Bastien, Gael Raballand. 2012. Why does financial regulation matter for European professional football clubs? **International Journal of Sports Management and Marketing**. v. 11: 73-88.
- Flanagan, Christopher. 2013. A tricky European fixture: an assessment of UEFA's Financial Fair Play regulations and their compatibility with EU law. **International Sports Law Journal**. no. 13: 148-167.
- Peeters, Thomas, Stefan Szymanski. 2014. European football. **Economic Policy** v. 29. no. 78: 343-390.
- Poli, Raffaele, Loïc Ravenel, Roger Besson. 2018. Ten years of demographic analysis of the football players' labour market in Europe. Neuchâtel: CIES Football Observatory.
- Radoman, Mihailo. 2015. Labor Market Implications of Institutional Changes in European Football: The Bosman Ruling and Its Effect on Productivity and Career Duration of Players. **Journal of Sports Economics**. v. 18. no. 7: 1-22.
- Transfermarkt. [11.02.2019]. Bundesliga. <https://www.transfermarkt.com/1-bundesliga/startseite/wettbewerb/L1>.
- [11.02.2019]. Premier League. <https://www.transfermarkt.com/premier-league/startseite/wettbewerb/GB1>.
- UEFA. [11.02.2019]. Disciplinary. <https://www.uefa.com/insideuefa/disciplinary/club-financial-controlling-body/cases/index.html?redirectFromOrg=true>.
- [11.02.2019]. Financial fair play: all you need to know. <https://www.uefa.com/community/news/newsid=2064391.html>.
- Vöpel, Henning. 2011. Do We Really Need Financial Fair Play in European Club Football? An Economic Analysis . **CESifo DICE Report**. v. 9. no. 3: 54-59.

4. INVESTIGATION OF TURKISH SUPER LEAGUE CLUBS' ATHLETIC AND SOCIAL EFFICIENCY

4.1 - Introduction

The revenue generated by European football has exceeded 28 billion euros in the 2017/2018 season (Deloitte, [05.06.2019]). The Big 5 is outperforming the rest of the European leagues both commercially and athletically. The highest revenue generating leagues in Europe, outside the Big 5, are: the Turkish Super League and the Russian Premier League. In the 2016/2017 season the revenue generated by the Turkish Super League was 734 million euros whereas the revenue for the Russian Premier League was 701 million euros (Deloitte, [05.06.2019]). Thanks to the broadcasting (352 million euros) and sponsorship/commercial revenues (242 million euros) Turkish Super League has managed to outperform Russian Premier League and take the sixth position. In 2017/2018, due to the depreciation of Turkish Lira and the new Russian Premier League broadcasting agreement Russian league took back the 6th place with a revenue of 813 million euros whereas the revenue of Turkish Super League decreased to 731 million euros (Deloitte, [05.06.2019]). Despite the growing revenues in Turkish football Turkish clubs have failed to achieve any success in the international competitions since the UEFA Europa League (UEFA Cup) title won by Galatasaray in 99/00 season. On the other hand, the interest in domestic football has been declining over the past several years. From 10/11 to 16/17 the average attendance in stadiums has decreased 12.6% (EPFL, [05.03.2019]) although there has been some serious investment in sporting facilities.

The match day revenue for the Turkish league in 17/18 was 74 million euros which is about 10% of the total revenue generated whereas the match day revenue for Dutch clubs was 120 million euros which is about 25% of the total revenue generated. Even the Scottish Premier League, with 6 teams less, generates more matchday revenue (105 million euros) in aggregate than the Turkish Super League (Deloitte, [05.06.2019]). Higher attendance would mean additional income for clubs as well as contributing to their home advantage.

In 2012, Turkish Ministry of Youth and Sports has announced a countrywide rally for the construction of new football stadiums. Over the past years many new stadiums have been built and there are few more to be completed in the following years. Detailed information regarding the infrastructural transition in Turkish football is provided in Section 3. Attendance in Turkish football has been an area of concern for the government as well as the other stakeholders in the industry.

The main output produced by football clubs is of course the athletic output measured in points, wins and trophies however especially in the recent years the importance of social output has increased. Socially, clubs produce multiple outputs such as the fans on the stands, TV viewers or social media followers. Stadium attendance is perhaps the essential one for two main reasons. First, people attending the games are a direct source of income for clubs, and secondly, fans contribute to the home- court advantage both by affecting referee decisions (Nevill, Balmer, Williams, 2002) and influencing athletes' performances (Greer, 1983).

The number of fans a club has managed to attract and to bring to the stadium is the most important social output it produces. Some clubs are more effective than others in terms of filling the stands, García-Sánchez (2007) and Haas and his colleagues (2004) investigated this phenomenon for Spanish and German clubs using data envelopment analysis (DEA). On the other hand, athletic output has been an area of interest in numerous studies with both parametric and non-parametric approaches.

This paper tries to determine the most efficient teams in Turkish football in terms of athletic and social outputs, measured in points collected and attendance, between the 12/13 and 17/18 seasons using a two-stage stochastic production frontier analysis (SFA). SFA has been used numerous times in the sports economics literature however the literature on European football did not pay enough attention on, neither the heterogeneity among the teams nor the heteroscedasticity in the technical efficiency. Following Greene's (2004) methodology; in the estimation of the production frontier, the heterogeneity among teams is distinguished from technical inefficiency and additional factors, influential on the inefficiency distribution, are included in the model. In the first stage the production frontier is estimated and efficiency scores are predicted and in the second stage factors influential on technical efficiency scores are identified.

For estimating the athletic technical efficiency, points collected in each season, Transfermarkt's player market values and manager tenure are used as output and inputs. Market values have been used a few times in the efficiency literature as in the cases of Kern et al. (2012), Bell et al. (2013) and Zamboni-Ferraresi et al. (2017). Attendance is often used as an input, in the literature, for the estimation of athletic efficiency however it should be kept in mind that teams play only half of the games at their home ground hence attendance is influential on only half of the games. In the investigated period, Turkish Super League clubs have collected 58% of the points at home and 42% at away games hence attendance was left out of the production frontier.

The social technical efficiency is estimated using market values and stadium capacities as inputs and attendance as output. Using market values for measuring the quality of the players on the field is quite common and furthermore Serrano and his colleagues (2015) provide empirical evidence about the relationship between market value and attendance.

Productive efficiency has been an area of interest in the sports economics literature starting with the investigation of efficiency in North American professional leagues. For European football leagues, a number of studies have been conducted using data envelopment analysis and stochastic production/cost frontiers. A brief review of the literature is presented in the next section about the existing studies in the literature. There have been no productive efficiency studies regarding the Turkish Super League in the literature.

The paper proceeds as follows; Section 4.2 provides a brief review of the productive efficiency in European football literature, Section 4.3 briefs the reader about the infrastructural investments in Turkish football and policy changes over the past decade, Section 4.4 presents the methodology of the study as well as introducing the models, the outputs and the inputs. Section 4.5 presents the most efficient teams in the Turkish Super League in terms of athletic and social outputs, Section 4.6 discusses the findings presented in Section 4.5 and conclusions of the study are presented in Section 4.7.

4.2 – Literature Review

Technical efficiency has been a quite popular subject over the last few decades in the sports economics literature. Table 4.1 presents a selection of papers, in

chronological order, about technical efficiency in major European competitions. Similar approaches and similar inputs/outputs have been used for estimating the athletic, commercial and social efficiencies of clubs. The athletic output is measured mostly in terms of points and wins, commercial output is measured in terms of turnover and social output in terms of attendance and capacity utilization. Although there is awareness for social efficiency in the literature, there are no comprehensive studies regarding the determinants or the disturbances of social effectiveness.

Table 4.1 – Efficiency Analysis in the Literature

Author & Year	Method	Competition	Inputs	Outputs
Dawson, Dobson & Gerrard (2000)	Stochastic Production Frontier	Premier League	Playing Talent, Wages	Win % , Points
Dawson, Dobson & Gerrard (2000)	Stochastic Production Frontier	Premier League	Player Traits	Win %
Haas (2003)	Data Envelopment Analysis	Premier League	Wages, Hometown Population, Revenue, Attendance	Turnover, Points
Haas, Kocher & Sutter (2004)	Data Envelopment Analysis	Bundesliga	Wages	Points, Attendance, Turnover
Kern & Süßmuth (2005)	Stochastic Production Frontier	Bundesliga	Wages, Transfer Expenditure, Fan Base	Turnover, Points
Barros & Leach (2006)	Stochastic Cost Frontier	Premier League	Operational Costs, Wages	Points, Attendance, Turnover
Guzmán (2006)	Data Envelopment Analysis	La Liga	Operational Costs, Wages	Turnover
Frick & Simmons (2008)	Stochastic Production Frontier	Bundesliga	Wages, Manager Career Points, Manager Experience	Technical Efficiency Score
Espitia-Escuer & Garcia-Cebrián (2010)	Data Envelopment Analysis	Champions' League	Number of Players, In-game Statistics	Technical Efficiency Score
Ribeiro & Lima (2012)	Data Envelopment Analysis	Liga Nos	Wages	Position
Kern, Schwarzmann & Wiedenegger (2012)	Two-Stage Data Envelopment Analysis	Premier League	Wages, Transfer Expenditure, Market Value	Points, Attendance, Turnover
Barros & Rossi (2014)	Bayesian Stochastic Random Frontier	Serie A	Operational Costs, Wages, Revenue, Capital	Number of Wins
Carmichael, Thomas & Rossi (2014)	Stochastic Production Frontier	Serie A	In-game Team Statistics	Points %, Goal Difference
Ghio, Ruberti & Verona (2018)	Stochastic Cost Frontier	Serie A	Wages, Transfer Expenditure	Points, Attendance, Turnover

The efficiency in the English Premier league has been investigated by Dawson and his colleagues (2000) which is one of the first efficiency analysis conducted for European football. The study estimates the efficiency of managers in the English Premier League between 1992 and 1998, using playing talent as input and win percentage as output. Haas (2003) investigated teams' efficiency in terms of athletic and commercial outputs using wages, hometown population, revenue and attendance as inputs and points and turnover as outputs. He conducted a data envelopment analysis for the English Premier League teams for the 00/01 season. Barros and Leach (2006) used a stochastic cost frontier to estimate the most efficient teams in the English Premier League using operational costs and wages as inputs to estimate athletic, commercial and social outputs measured in, points, turnover and attendance between 98/99 and 02/03 seasons. Barros and Garcia-del-Barrio (2008), Kern et al. (2012),

Zambom-Ferraresi et al. (2017) and many others have conducted efficiency analysis for the English Premier League teams using similar inputs, outputs and methodologies.

Premier League has been the most popular league of interest in efficiency studies. However, there are studies regarding the other major leagues of Europe, such as: Haas et al. (2004), Kern and Süßmuth (2005), Guzmán (2006), García-Sánchez (2007), Barros and Rossi (2014), Ghio, Ruberti and Verona (2018) and numerous others, investigated the efficiency of football teams in German Bundesliga, Spanish La Liga, French Ligue 1 and Italian Serie A. Similar inputs and methodologies have been used in the estimation of athletic, commercial and social outputs.

Espitia-Escuer and Garcia-Cebrian (2010) conducted a data envelopment analysis for the teams participating in the Champions' League between 03/04 and 06/07 seasons. The authors used in-game statistics such as possession and goal attempts as inputs and number of games played and elimination round as outputs.

Most common techniques for estimating efficiency are stochastic frontier analyses and data envelopment analyses. It should be underlined that there are no studies in the literature regarding the efficiency of teams in the Turkish Super League however there are a few studies investigating the other aspects. Halıcıoğlu (1998) investigated the competitive balance in the Turkish professional football in the 1958-1998 period. Seçkin and Pollard (2008) explored the home advantage phenomena in the Turkish Super League and the Turkish First Division between the 94/95 and 05/06 seasons.

4.3 – Infrastructural and Regulatory Changes in Turkish Football

At the end of 2012, Turkish Ministry of Youth and Sports has announced the undertaking of a gigantic infrastructural project, worth 3.5 billion Turkish Liras (1.5 billion euros at the time), for building more than 400 sport facilities including 24 football stadiums (TMYS, [04.04.19]). As of 2018, the 14 stadiums in Afyon, Antalya, Bursa, Eskişehir, Gaziantep, Kocaeli, Konya, Malatya, Manisa, Mersin, Sakarya, Samsun, Sivas and Trabzon are completed and are in use. The remaining 10 and additional six new stadiums are in construction which will make a total of 30 new stadiums constructed in the last decade. In addition to these 30 stadiums, Beşiktaş's Vodafone Park and Başakşehir's Fatih Terim Stadium have been completed in 2016 and 2014, in İstanbul.

Even though there have been debates going on about the necessity of these new stadiums, the projects are continuing at full speed. Better and bigger stadiums rose all over Turkey with the hope of more spectators and more income for clubs. Sadly, the average capacity utilization for the six-year period has been 35,4%; however, there is an upward trend after the 15/16 season, where the utilization rate hit rock bottom with 27,1%.

On April 2014, Turkish Football Federation announced that a new identification system came into force, Passolig, in alignment with the new law no. 6222 –Prevention of Violence and Disorder in Football. For being able to buy match tickets, fans are obliged to buy Passolig cards. The Passolig card, holds a fan's personal information such as name, surname and ID and these cards have to be renewed every season with a fee. Fans opposed to the new regulations for two reasons; first is that they were unhappy due to oversurveillance and second the revenue generated from hundreds of thousands Passolig cards created a rent seeking opportunity which was acquired by a company close to the government with no notable experience, knowhow and whatsoever. Passolig cards are also required for the Turkish First Division as well and as of 2018, there 4,1 million Passolig cards have been issued to fans (Aktifbank, [10.05.2019]). For the 17/18 season, the Passolig card fees varied between 48,5 and 27,5 (Milliyet, [10.07.2019]) Turkish liras and 53% of the generated revenue was taken by Aktifbank, the company issuing the cards (T24, [10.07.2019]).

The fans' reaction to Passolig was harsh. Out of the 15 teams which played in Turkish Super League in both 13/14 and 14/15 seasons, the average attendance for 14 of them decreased dramatically. Especially the three giants of Turkish football Galatasaray, Fenerbahçe and Beşiktaş were severely affected. The average attendance fell from; 33.288 to 23.806 for Galatasaray, from 34.605 to 20029 for Fenerbahçe and from 18.682 to 12.585 for Beşiktaş. The league's average attendance fell from 12.880 in 13/14 to 7.859 in 14/15 a decrease of almost 40% in just a single season.

One other major debate in Turkish football, was about foreign player regulations in the past decade. From 07/08 to 15/16, the foreign player regulations in Turkey have changed six times. Starting by the 15/16 season, the restrictions were eliminated with a few minor rules such as to have at least seven domestic players out of the 18 players in the match roster and have at least 14 domestic players out of the 28 players registered in the team squad. The debate restarted as of 2018 and there is a

possibility that new regulations will be imposed to limit the number of foreign players allowed in the near future. The effects of foreign player regulations are yet to be investigated for the Turkish Super League.

4.4 – Methodology and Data Collection

As presented in Table 4.1 different inputs and outputs have been used in the literature to investigate the technical efficiencies of clubs. Following a classical type of Cobb-Douglas production function, there is need for inputs to produce an output. First the models are presented and then the inputs, outputs and heterogeneity factors used in the production frontiers as well as the heteroscedasticity components in the distribution of the inefficiencies are introduced.

4.4.1 Models

The stochastic frontier models are estimated following Greene's (2004) true-random effects methodology with time varying inefficiency for panel data following this set of equations:

$$y_{it} = (\alpha + w_i) + x'_{it}\beta + v_{it} - u_{it} \quad (1)$$

In Equation 1; y_{it} denotes the output, x'_{it} is a vector of inputs, v_{it} and u_{it} are two-sided and one-sided error terms where u_{it} is the technical inefficiency, α is the intercept and w_i is the heterogeneity factor. Heterogeneity is modeled as:

$$w_i = z'_i\theta + \omega_i \quad (2)$$

where heterogeneity consists of a vector z'_i and an error term ω_i . Here heterogeneity enters the production function, an alternative approach is to include the heterogeneity in the distribution of technical inefficiency, u_{it} . In the cases of social and athletic efficiency, it is reasonable to assume that the heterogeneity among the teams shifts the production function hence they are included in the frontier model.

Finally, team specific technical efficiencies are estimated using the Battese and Coelli (1988) formulation:

$$TE_{it} = E[\exp(-(u_{it})|e)] \quad (3)$$

and

$$u_{it} = q'_{it}\delta + \varphi_{it} \quad (4)$$

The technical inefficiency term consists of two parts, as heterogeneity, a vector of explanatory variables q'_{it} , and an error term φ_{it} .

4.4.2 Inputs and Outputs

Player market values are used in the estimation of both athletic and social efficiencies. The market values are used in aggregate for the teams and they have been acquired from the German website Transfermarkt which has been used numerous times in academic research and has no credibility issues.

Market value is a good proxy for both cost related inputs, such as wage and transfer expenditure, and talent related inputs. Zambom-Ferraresi and her colleagues (2019) present the high correlation between market value & wages and market value & points collected. High quality players are worth more in the market and cost more both in terms of wages and transfer expenditure, therefore market value captures all these factors.

For the athletic output, the second input in the production frontier is the manager tenure measured in career appearances in the Turkish Super League. For teams which have appointed more than one manager in a season, the manager with the highest number of appearances is used in the model. Managers' career appearance data is also acquired from Transfermarkt.

The other input used in the estimation of social technical efficiency is stadium capacity. Data regarding the stadia is collected from club websites and Turkish Football Federation database.

Points collected in each season are used as the athletic output. The league tables for the Turkish Super League are available at Turkish Football Federation's website.

The number of fans, a club manages to attract to games is used as a measure for the social contribution to the host city hence the social output. The attendance figures are gathered from Transfermarkt. All input and output variables are logarithmically transformed in order to facilitate the interpretation of the results. Table 4.2 provides the summary statistics for input and output variables. The output variables, *lnPts* and *lnAtt* are the points collected and average attendance for each season respectively. The input variables are: the aggregate market value of a team's players', *lnMV*, manager career appearances, *lnManApp* and stadium capacity *lnStadCap*.

Table 4.2 – Descriptive Statistics of Inputs and Outputs

	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
<i>lnPts</i>	108	3.771	0.391	1.386	4.369
<i>lnAtt</i>	108	8.889	0.825	7.233	10.651
<i>lnMV</i>	108	3.907	0.608	2.481	5.275
<i>lnManApp</i>	108	5.02	0.953	2.398	6.265
<i>lnStadCap</i>	108	10.075	0.539	9.223	11.321

4.4.3 Heterogeneity

One important issue which is often disregarded in the sports economics literature is the heterogeneity between the teams. In theory, the team with higher resources (better players, better coaches, better facilities etc.) should achieve higher success yet in practice that is often not the case. In every league there are some teams which are regular title contestants, some mid-table teams and some relegations combatants. In the case of Turkish Super League, the 34 of the last 35 league titles were won by three teams, Galatasaray, Fenerbahçe and Beşiktaş which are called the Big 3. These three teams are often in the top three and the rest of the teams are battling for the lower ranks. In the case of athletic output, for distinguishing among teams, a dummy variable is added to the production function, *Big3* takes the value 1 for Galatasaray, Fenerbahçe and Beşiktaş and 0 for the other teams.

Turkey has a highly heterogenic population and income structure among its cities. Teams from 20 different cities have competed in the Turkish Super League between 2012/2013 and 2017/2018 seasons. To deal with the heterogeneity in a team's home town, two variables are added to the social output production function. The first is the hometown's population and the second is hometown's GDP per capita which

are both expected to be highly influential on attendance. Data regarding GDPPC and population have been gathered from the Turkish Statistical Institute (TUIK). The average for the seven-year period is taken for both variables and they are logarithmically transformed before being included in the model. The summary statistics for the heterogeneity factors are presented in Table 4.3.

Table 4.3 – Descriptive Statistics of Factors of Heterogeneity

	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Athletic					
<i>Big3</i>	108	0.167	0.374	0	1
Social					
<i>lnGDPPC</i>	108	9.457	0.342	8.688	9.918
<i>lnPop</i>	108	14.196	1.416	12.007	16.488

4.4.4 Heteroscedasticity

The technical efficiency estimates obtained from the production frontiers are based on the residuals. As argued by Caudill and his colleagues (1995), residuals are affected from misspecification, especially in frontier models and these specification errors might be conducted to inefficiency estimates. The authors also illustrate that, neglecting heteroscedasticity in frontier estimation causes over and under estimation of technical efficiency. Four variables are added to each model to address the heteroscedasticity issue which are also used in the second stage of the stochastic frontier analysis.

For athletic efficiency; *NumofPlyrs*, *PlyrAge*, *ForLimit* and *ForMan* are included in the model. *NumofPlyrs* is the number of players used by each team in a season, *PlyrAge* is the average age of used players, *ForLimit* is the number of foreign players allowed in the match roster and *ForMan* is a dummy variable which takes the value 1 for teams with foreign managers and 0 for teams with Turkish managers.

For social efficiency; *StadAge*, *ForLimit*, *Passolig* and *Relegation* are included in the model. *StadAge* is the age of the stadium a team plays its matches, *ForLimit* is the number of foreign players allowed in the match roster, *Passolig* is a dummy variable taking the value 0 for the seasons before the introduction of *Passolig* identification system and 1 for seasons prior and *Relegation* is another dummy variable taking the value 1 for teams which are relegated at the end of the season and 0 for the others.

Table 4.4 provides the summary statistics for the heteroscedastic components of the one-sided error term used in the model.

Table 4.4 – Descriptive Statistics for Heteroscedasticity Components

	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Athletic					
<i>NumofPlyrs</i>	108	29.046	3.775	22	39
<i>PlyrAge</i>	108	27.461	1.178	24.8	29.9
<i>ForLimit</i>	108	8.833	2.044	6	12
<i>ForMan</i>	108	0.222	0.418	0	1
Social					
<i>StadAge</i>	108	21.185	24.527	0	81
<i>ForLimit</i>	108	8.833	2.044	6	12
<i>Passolig</i>	108	0.667	0.474	0	1
<i>Relegation</i>	108	0.167	0.374	0	1

The following stochastic frontier models¹² are used in the estimation of athletic and social technical efficiencies;

$$\ln Pts_{it} = \alpha + \beta_1 \ln MV_{it} + \beta_2 \ln ManApp_{it} + \beta_3 Big3_i + v_{it} - u_{it} \quad (5)$$

$$\ln Att_{it} = \alpha + \beta_1 \ln MV_{it} + \beta_2 \ln StadCap_{it} + \beta_3 \ln GDP_{PC_i} + \beta_4 \ln Pop_i + v_{it} - u_{it} \quad (6)$$

Equations 5 and 6 assume there is no heterogeneity and the distribution of the inefficiency term u_{it} is homoscedastic which are tested against the alternatives where there is heterogeneity among teams and heteroscedasticity in the distribution of the inefficiency.

¹² The translog function for market value and stadium capacity has also been estimated but the results for statistically insignificant.

The heteroscedastic standard deviations for u_{it} are as follows:

$$\sigma_{uit}^{atl} = \gamma_0 + \gamma_1 NumofPlyrs_{it} + \gamma_2 PlyrAge_{it} + \gamma_3 ForLimit_{it} + \gamma_4 ForMan_{it} \quad (7)$$

$$\sigma_{uit}^{soc} = \tau_0 + \tau_1 StadAge_{it} + \tau_2 ForLimit_{it} + \tau_3 Passolig_{it} + \tau_4 Relegation_{it} \quad (8)$$

and for the second stage following equations are estimated to determine the influential factors on athletic and social efficiencies;

$$U_{it}^{atl} = \rho + \theta_1 NumofPlyrs_{it} + \theta_2 PlyrAge_{it} + \theta_3 ForLimit_{it} + \theta_4 ForMan_{it} + W_{it} \quad (9)$$

$$U_{it}^{soc} = \rho + \theta_1 StadAge_{it} + \theta_2 ForLimit_{it} + \theta_3 Passolig_{it} + \theta_4 Relegation_{it} + W_{it} \quad (10)$$

U_{it} s are the efficiency scores of the individual teams i in year t , in Equation 7; $NumofPlyrs_{it}$ is the number of players played in a season in each team, $PlyrAge_{it}$ is the average age of the players played in a season and $ForLimit_{it}$ is the number of foreign players allowed in the Turkish Super League $ForMan_{it}$ is a dummy variable, the teams with foreign managers take the value 1 and 0 otherwise.

In Equation 8; $StadAge_{it}$ is the age of a team's stadium, $ForLimit_{it}$ is the number of foreign players allowed as in Equation 7, $Relegation_{it}$ is a dummy variables which takes the value 1 if a team is relegated in the end of the season and 0 otherwise and finally, $Passolig_{it}$ is also a dummy variable which is equal to 1 in the seasons after the implementation of law no: 6222 and equals to 0 in the season before.

Although having a squad depth is beneficial, teams try to limit the number of players in their squad for consistency, therefore the number of players used is included in the model. Player age is also included in the athletic production model to investigate whether younger or older players are more efficient in the Turkish Super League.

Foreign player regulations are barriers to free trade and the elimination of these barriers should increase the overall player quality hence the athletic efficiency. As mentioned earlier, foreign player regulations have been changed numerous times in the last decade. To investigate foreign players' contribution to efficiency, foreign player limit is also included in the model. Another matter of discussion in Turkish football is the performance of foreign managers. Foreign managers are fiercely criticized of not being able to comprehend the dynamics of Turkish Super League. The foreign manager dummy enables to test these claims.

Stadium age is included to proxy the conditions of the stadia since newer stadia have better facilities, higher accessibility etc. therefore it is expected to be negatively influential on social technical efficiency. Serrano et al. (2015) and Buraimo and Simmons (2015) illustrate, playing talent influence the demand for football positively. As the foreign player regulations are loosened the accumulation of foreign talent increases. Fans might be eager to watch better players therefore the foreign limit is expected to be negatively influential on social efficiency. Relegation dummy is included in the model to investigate whether fans unite in times of need when their team is fighting relegations. Lastly, Passolig is included in the model as well to determine whether it causes inefficiency or not.

4.5 – Results and Findings

The estimation results of the Equations 5 and 6 are presented in Tables 4.5 and 4.6. With the help of the production frontier estimation results, technical efficiencies are predicted which are later used to determine the factors causing inefficiency.

Table 4.5 - Estimated Stochastic Athletic Production Frontiers

<i>lnPts</i>	<i>Model 1</i> <i>Homogenous</i> <i>Model</i>	<i>Model 2</i> <i>Heterogenous</i> <i>Model</i>	<i>Model 3</i> <i>Heterogenous Model</i> <i>with</i> <i>Heteroscedasticity in</i> <i>u</i>
<i>lnMV</i>	0.251*** (0.041)	0.154*** (0.049)	0.171*** (0.043)
<i>lnManApp</i>	0.058*** (0.018)	0.060*** (0.018)	0.056*** (0.019)
<i>Big3</i>		0.251*** (0.090)	0.198*** (0.068)
<i>Constant</i>	2.741 (0.202)	3.041*** (0.209)	2.955*** (0.187)
			σ_u
<i>NumofPlyrs</i>			0.359*** (0.095)
<i>PlyrAge</i>			-0.483* (0.262)
<i>ForLimit</i>			-0.049 (0.149)
<i>ForMan</i>			-0.491 (0.867)
<i>Constant</i>			-1.062 (6.999)
	χ^2 value	prob > χ^2	
<i>Likelihood Test M1-M2</i>	8.87	0.0029	
<i>Likelihood Test M2-M3</i>	27.85	0.0000	

Notes: Numbers in the parentheses are the standard errors, *** p<0.01, ** p<0.05, * p<0.1

Table 4.6 - Estimated Stochastic Social Production Frontiers

<i>lnAtt</i>	<i>Model 1</i> <i>Homogenous</i> <i>Model</i>	<i>Model 2</i> <i>Heterogenous</i> <i>Model</i>	<i>Model 3</i> <i>Heterogenous Model</i> <i>with</i> <i>Heteroscedasticity in</i> <i>u</i>
<i>lnMV</i>	0.323** (0.130)	0.385** (0.162)	0.373*** (0.121)
<i>lnStadCap</i>	0.616*** (0.148)	0.548*** (0.153)	0.528*** (0.133)
<i>lnGDPPC</i>		-0.565** (0.244)	-0.610*** (0.191)
<i>lnPop</i>		0.184*** (0.068)	0.217*** (0.057)
<i>Constant</i>	1.559 (1.404)	4.723** (2.088)	5.038*** (1.747)
			σ_u
<i>StadAge</i>			0.036** (0.015)
<i>ForLimit</i>			-0.185 (0.154)
<i>Passolig</i>			2.864** (1.373)
<i>Relegation</i>			1.976** (0.823)
<i>Constant</i>			-4.816** (2.273)
	χ^2 value	prob > χ^2	
<i>Likelihood Test M1-M2</i>	10.35	0.0057	
<i>Likelihood Test M2-M3</i>	22.52	0.0002	

Notes: Numbers in the parentheses are the standard errors, *** p<0.01, ** p<0.05, * p<0.1

For both, social and athletic production, three frontiers are estimated. Model 1 assumes there is no heterogeneity among teams and no heteroscedasticity in the distribution of the one-sided error term. Model 2 assumes there is heterogeneity but no heteroscedasticity and Model 3 assumes there is both heterogeneity and heteroscedasticity. The likelihood tests reject Models 1 and 2 in favor of Model 3 for both athletic and social production frontiers.

The signs of the inputs are as expected and they are highly significant. Market value is affecting on both types of efficiency and it is more influential than manager appearances for the athletic efficiency. For the social technical efficiency, the coefficient for $\ln\text{StadCap}$ is higher so a team's stadium capacity is more influential on attendance than its market value. Factors of heterogeneity among teams and hometowns are also significant for both athletic and social production frontiers. To check if the production functions exhibit constant returns to scale, a Wald tests are imposed. The null hypothesis is rejected with a χ^2 value 282 for athletic production whereas for social production the χ^2 value is 0.31 therefore the null hypothesis cannot be rejected.

Table 4.7 – Athletic Efficiency Scores for Each Season

Most Efficient				Least Efficient			
Team	Season	Score	Pos	Team	Season	Score	Pos
Akhisarspor	12/13	0.974	14	M. Idmanyurdu↓	12/13	0.471	18
Kayserispor	12/13	0.959	5	Orduspor↓	12/13	0.755	17
Kasımpaşa SK	12/13	0.953	6	Fenerbahçe SK	12/13	0.863	2
Akhisarspor	13/14	0.961	10	Antalyaspor↓	13/14	0.663	17
Fenerbahçe SK↑	13/14	0.957	1	Kayserispor↓	13/14	0.709	18
Kasımpaşa SK	13/14	0.956	6	Kayseri Erciyesspor	13/14	0.815	14
Fenerbahçe SK	14/15	0.979	2	Kayseri Erciyesspor↓	14/15	0.611	16
Başakşehir FK	14/15	0.971	3	Karabükspor↓	14/15	0.644	17
Galatasaray SK↑	14/15	0.961	1	Balıkesirspor↓	14/15	0.657	18
Başakşehir FK	15/16	0.976	4	M. İdmanyurdu↓	15/16	0.529	18
Konyaspor	15/16	0.969	3	Eskişehirspor↓	15/16	0.659	17
Fenerbahçe SK	15/16	0.968	2	Sivasspor↓	15/16	0.723	16
Galatasaray SK	16/17	0.981	4	Gaziantepspor↓	16/17	0.599	17
Başakşehir FK	16/17	0.974	2	Adanaspor↓	16/17	0.799	18
Fenerbahçe SK	16/17	0.969	3	Rizespor↓	16/17	0.829	16
Başakşehir FK	17/18	0.977	3	Karabükspor↓	17/18	0.294	18
Galatasaray SK↑	17/18	0.972	1	Osmanlıspor↓	17/18	0.749	16
Beşiktaş JK	17/18	0.970	4	Gençlerbirliği SK↓	17/18	0.801	17

↑ indicates champions, ↓ indicates relegated teams

Table 4.8 – Social Efficiency Scores for Each Season

Most Efficient			Least Efficient		
Team	Season	Score	Team	Season	Score
Elazığspor	12/13	0.965	Mersin Idmanyurdu↓	12/13	0.644
Galatasaray SK↑	12/13	0.964	Orduspor↓	12/13	0.725
Kayserispor	12/13	0.963	Başakşehirspor↓	12/13	0.726
Rizespor	13/14	0.965	Antalyaspor↓	13/14	0.770
Galatasaray SK	13/14	0.962	Kayserispor↓	13/14	0.875
Kasımpaşa SK	13/14	0.961	Gençlerbirliği SK	13/14	0.893
Konyaspor	14/15	0.900	Kayseri Erciyesspor↓	14/15	0.326
Galatasaray SK↑	14/15	0.846	Gençlerbirliği SK	14/15	0.432
Mersin Idmanyurdu	14/15	0.843	Gaziantepspor	14/15	0.534
Konyaspor	15/16	0.893	Gençlerbirliği SK	15/16	0.341
Fenerbahçe SK	15/16	0.875	Gaziantepspor	15/16	0.494
Beşiktaş JK↑	15/16	0.863	Akhisarspor	15/16	0.640
Beşiktaş JK↑	16/17	0.914	Gençlerbirliği SK	16/17	0.379
Alanyaspor	16/17	0.909	Gaziantepspor↓	16/17	0.420
Antalyaspor	16/17	0.908	Osmanlıspor	16/17	0.564
Akhisarspor	17/18	0.932	Osmanlıspor↓	17/18	0.226
Galatasaray SK↑	17/18	0.930	Gençlerbirliği SK↓	17/18	0.459
Trabzonspor	17/18	0.925	Kardemir Karabükspor↓	17/18	0.786

↑ indicates champions, ↓ indicates relegated teams

Using the estimation results from the stochastic frontier production functions, athletic and social technical efficiencies are predicted for the teams. The most and least efficient three teams for each season are presented in Table 4.7 and Table 4.8.

Only three out of the six champions were among the most efficient teams, athletically in the investigated period. The most efficient top three teams of the 12/13 season, have all finished the season in positions lower than four with Akhisarspor being the most notable one. Although the champion was among the most efficient teams in 13/14 the other two clubs were ranked 6th and 10th. In the last four seasons there are no efficiency leaders out of the top four positions. In the case of least efficient teams, the relegated teams are on the list with two exceptions. The most striking one is Fenerbahçe SK's performance in the 12/13 season. Although Fenerbahçe SK finished the league in the 2nd position their efficiency was among the lowest. The other

exception is Kayseri Erciyesspor who finished the league 14th which is understandable and furthermore they got relegated in the next season.

In terms of social efficiency, champions in the league are performing better relative to athletic efficiency. There are five champions in the social efficiency leaders with one exception being the 13/14 season. As introduced in Section III, in April 2014, Turkish Football Federation has implemented a new identification system, Passolig. The last couple of home games were played with Passolig in practice. The efficiency scores have decreased after the 2013/2014 season and never have been able to recover. Out of the least efficient 18 teams, 10 of them are relegated teams which is perhaps an indication of fans turning their backs to their teams due to their bad performance on the field.

Tables 4.9 and 4.10 present the highest and lowest scores in the period in terms of athletic and social efficiency respectively.

Table 4.9 – Athletic Efficiency Scores

All-time Most Efficient				All-time Least Efficient			
Team	Season	Score	Pos	Team	Season	Score	Pos
Galatasaray SK	16/17	0.981	4	Karabükspor↓	17/18	0.294	18
Fenerbahçe SK	14/15	0.979	2	M. Idmanyurdu↓	12/13	0.471	18
Başakşehir FK	17/18	0.977	3	M. Idmanyurdu↓	15/16	0.529	18
Başakşehir FK	15/16	0.976	4	Gaziantepspor↓	16/17	0.599	17
Akhisarspor	12/13	0.974	14	Kayseri Erciyesspor↓	14/15	0.611	16

↑ indicates champions, ↓ indicates relegated teams

Table 4.10 – Social Efficiency Scores

All-time Most Efficient			All-time Least Efficient		
Team	Season	Score	Team	Season	Score
Elazığspor	12/13	0.965	Osmanlıspor↓	17/18	0.226
Rizespor	13/14	0.965	Kayseri Erciyesspor↓	14/15	0.326
Galatasaray SK↑	12/13	0.964	Gençlerbirliği SK	15/16	0.341
Kayserispor	12/13	0.963	Gençlerbirliği SK	16/17	0.379
Fenerbahçe SK	12/13	0.963	Gaziantepspor↓	16/17	0.420

↑ indicates champions, ↓ indicates relegated teams

None of the athletically most efficient teams have managed to win the title yet all of the least efficient teams got relegated. Akhisarspor's 12/13 performance is again among the most efficient teams despite their 14th position league finish. In the case of all-time least efficient teams there are no surprises and they are all relegated teams.

As can be seen from Table 4.10, all of the social efficiency leaders are from 12/13 and 13/14 seasons. The efficiency scores have decreased dramatically after the 13/14 season and never have been able to recover. The prime suspect is of course Passolig. Table 4.11 provides the average attendance figures as well as the average athletic and social technical efficiency scores for the seasons between 12/13 and 17/18.

Table 4.11 - Average Attendance and Efficiency Scores

Season	Attendance	Athletic	Social
12/13	11,362	0.888	0.881
13/14	12,064	0.882	0.928
14/15	7,860	0.862	0.723
15/16	8,407	0.865	0.725
16/17	8,958	0.896	0.758
17/18	12,822	0.887	0.840

Although the average attendance level managed to exceed the 13/14 season in 17/18, the social efficiency is still lower however there is an upward trend. There are no significant fluctuations in athletic efficiency over the six-year period.

Between 12/13 and 17/18 seasons eight teams competed in the Super League in all of the seasons. Table 4.12 provides the average efficiency scores for these eight teams in alphabetic order.

Table 4.12 – Average Athletic and Social Efficiency Scores

Team	Athletic	Social
Akhisarspor	0.941	0.810
Beşiktaş JK	0.942	0.865
Bursaspor	0.887	0.867
Fenerbahçe SK	0.95	0.894
Galatasaray SK	0.946	0.902
Gençlerbirliği SK	0.89	0.553
Kasımpaşa SK	0.935	0.836
Trabzonspor	0.896	0.895

In the investigated period, three teams have won the title, Galatasaray SK (3), Beşiktaş JK (2) and Fenerbahçe SK (1) which are the Big 3 of Turkish football. These three teams have also the highest average athletic efficiency scores in the period.

For social efficiency scores, the highest averages belong to Galatasaray SK, Trabzonspor and Fenerbahçe SK in the period followed by Bursaspor and Beşiktaş JK. These five teams are the only five teams which are able to win the title in Turkish Super League.

Table 4.13 presents the estimation results of Equations 9 and 10. The factors effecting the efficiency scores are identified using the information provided in the table.

Table 4.13- Estimation Results of Inefficiency Frontiers

<i>Athletic Technical Efficiency</i>	<i>FE</i>	<i>RE</i>	<i>Social Technical Efficiency</i>	<i>FE</i>	<i>RE</i>
<i>NumofPlyrs</i>	-0.019*** (0.002)	-0.019*** (0.002)	<i>StadiumAge</i>	-0.002*** (0.001)	-0.003*** (0.001)
<i>PlyrAge</i>	0.020* (0.012)	0.021** (0.009)	<i>ForLimit</i>	0.012*** (0.005)	0.012*** (0.004)
<i>ForLimit</i>	-0.004 (0.005)	-0.002 (0.004)	<i>Passolig</i>	-0.175*** (0.019)	-0.179*** (0.018)
<i>ForMan</i>	0.045* (0.025)	0.035 (0.021)	<i>Relegation</i>	-0.161*** (0.026)	-0.157*** (0.024)
<i>Constant</i>	0.929*** (0.318)	0.870*** (0.243)	<i>Constant</i>	0.893*** (0.047)	0.909*** (0.043)
χ^2 value		prob > χ^2	χ^2 value		prob > χ^2
Hausman Test FE-RE		8.41	0.0776	0.99	0.9120

Notes: Numbers in the parentheses are the standard errors, *** p<0.01, ** p<0.05, * p<0.1

The efficiency models are estimated using fixed (FE) and random effects (RE) OLS estimation. The Hausman tests results in favor of FE estimation in 95% confidence for both athletic and social efficiency therefore the results of fixed effects regressions are taken into consideration. For athletic technical efficiency, number of players used is statistically significant at 99%. The number of players has a negative coefficient indicating that as the number of players used increases the athletic efficiency decreases. Player age and foreign manager dummy are significant at 90% indicating that and the player age is positively influential on efficiency older and more experienced squads perform more effectively and foreign managers are more efficient in the Turkish Super League.

For social technical efficiency all the variables are statistically significant at 99% confidence. Number of foreign players allowed is positively and the rest of the variables are adversely influential on social technical efficiency.

4.6 – Discussion

4.6.1 - Athletic Technical Efficiency

In athletic performance one of the major issues in Turkey is the lack of consistency. Often, a new promoted team performs well for a couple of seasons and then it gets relegated. For the title, the three giants, Galatasaray SK, Fenerbahçe SK and Beşiktaş JK are always in the race with occasional surprises. Especially in the recent years Başakşehir FK has managed to become a regular title contender. Other than few teams in the league, the rest are all potential relegation candidates every season.

The last column of Table 4.5 presents the estimation results of the heterogenous and production frontier with a heteroscedastic distribution in the one-sided error term. As the likelihood-ratio tests suggest, Model 3 has the best goodness of fit hence was used to predict efficiency scores. One percent increase in a team's players' aggregate market value increases the points collected by about 0.17 percent whereas a one percent increase in manager tenure increases points collected about 0.05 percent. Team market value is more than three times influential than managerial experience. Furthermore, the heterogeneity dummy *Big 3* is also statistically significant and highly influential on points collected. As discussed earlier, Galatasaray SK, Fenerbahçe SK and Beşiktaş JK are always competing for the title and collect more points than other teams in the league similar to Barcelona, Real Madrid and Atletico Madrid in Spanish La Liga.

As can be seen from Table 4.7, Başakşehir FK has been among the most efficient top three teams in the last four seasons of the period and also it should be noted that Başakşehir was relegated in the 12/13 season and after they managed to comeback in 14/15 they have been the most efficient team athletically in the Turkish Super League. Their average efficiency in the last four seasons is 97.4% followed by Fenerbahçe SK with 97% and Beşiktaş JK with 96.2%. Although Galatasaray is not among the top three most efficient teams on average, they have managed to win two titles in four years. The other two titles were won by Beşiktaş JK. In 12/13, Akhisarspor, Kayserispor and Kasımpaşa SK were the most efficient teams in the league yet Kayserispor got relegated the following season. The consistency issue struck Kayserispor however they were lucky enough to get promoted in the following season and they were back in the Super League in 15/16. The surprise efficiency

leaders of 13/14, Akhisarspor and Kasımpaşa SK were ranked 12th and 13th the next season with one points difference with each other and barely stayed in the league. From time to time, a group of players and a manager hits it off and have a good spell but sadly this success does not last long for most of the smaller teams.

In the first two seasons of the period, five out of the six athletically most efficient teams, were overperforming small scale clubs. In the last four years of the investigated period, title contenders are more efficient relatively to the first two. Coefficient of variation (CV) is often used in the literature to measure the degree of competition in a league. When the coefficient of variation of points is investigated for the title contestants it can be seen the lowest CV value is in the 17/18 season. The CV for top three teams is 0.02 indicating a high level of competition. The champion, Galatasaray, collected 75 points where as 2nd and 3rd placed teams Fenerbahçe and Başakşehir have managed to collect 72 points each. Furthermore, the highest CV values are for the 12/13 and 13/14 seasons, 0.11 and 0.09 respectively indicating that the title race was not close. In 12/13 and 13/14 the champion was 10 and 9 points ahead of the runner-up respectively. These two seasons are the only two seasons, in the investigate period, with efficiency leaders positioned 5th or lower. It can be concluded that in seasons where competitive balance is higher title contestant teams' efficiencies are higher.

In the case of least efficient teams there two teams that are salient. The first is Fenerbahçe SK in 12/13, although Fenerbahçe SK finished the league in 2nd position they are among the least efficient teams in that seasons. Fenerbahçe SK had the highest market value and 3rd highest manager tenure in that season yet they were able to collect 61 points which was 10 points behind the champion Galatasaray SK. With high inputs, Fenerbahçe SK failed to produce high output therefore they were among the least efficient teams in the 12/13 season. The other noticeable efficiency score is Karabükspor's 17/18 season performance. Karabükspor had an efficiency of 29.4%, a record low performance. In the second half of the 17/18 season, Karabükspor was able to collect only three points. Due to financial problems, Karabükspor was unable to pay the salaries which resulted in most of the players terminating their contracts and Karabükspor had to play its games with their U-21 team players. Karabükspor could not fix their finances and failed to pay its debts. They started the 18/19 season with -3 points in the 1st division and they got relegated again to the 2nd division. They are were

able to score 10 goals and conceded 112 in 34 games. Sadly, stories like Karabükspor's are quite common in Turkish football. The 17th of 16/17 season, Gaziantepspor, has a similar story. After the relegation, Gaziantep was not able to pay their debts due to the dramatic decrease in their income. They started the 17/18 season with -9 points and got relegated to the 2nd division as in the case of Karabükspor. Gaziantepspor scored 18 goals and conceded 100 in 34 games in the 17/18 season in the 1st division. Gaziantepspor started the 18/19 season with -45 points in the 2nd division and got relegated again, they will compete in the 3rd division in the 19/20 season. There are many others like Karabükspor and Gaziantepspor, such as Kocaelispor, Sakaryaspor, Orduspor and Göztepe SK. Sometimes these teams manage to get back on their feet and get back to the Super League again but that is a very long and rough journey.

The estimation results in Table 4.13 provides valuable insights about athletic efficiency. As the results illustrate, the number of players used and player age are quite influential. Each extra player used almost causes a 2% decrease in technical efficiency and every one-year increase in average player age increases efficiency by 2%. The negative coefficient *NumofPlyrs* has, highlights the importance of squad consistency. Teams which use a high number of players are less efficient than the teams which have squad stability. According to CIES's February 2018 report, Turkish Super League is the 3rd oldest league in average age of champions in 2009-2017 period after Cyprus and Italy. Wisdom comes with age in the Turkish Super League.

Results also illustrate that foreign managers are quite efficient in comparison with their Turkish colleagues. Teams with foreign managers are almost 5% more efficient than the ones with domestic managers. The average athletic efficiency for the teams with foreign managers is 88.9% whereas the average efficiency is 87.5% for the teams with Turkish managers. Although foreign managers did not win any championships, only five out of the 18 relegated teams had foreign managers in the investigated six-year period.

4.6.2 - Social Technical Efficiency

Low attendance has been a major issue for the Turkish football in the last decade. Even with the newly constructed stadia, most of the clubs fail to fill the stands. Even though there has been some recovery in attendance figures, Turkish Super League is still very far behind the Big 5 both in terms of average attendance and capacity utilization.

As in the case of athletic efficiency, likelihood-ratio tests suggest to use Model 3 with heteroscedasticity and heterogeneity to predict the efficiency scores. Table 4.6 provides the estimation results for the production frontier where it can be seen that market value and stadium capacity are highly correlated with attendance. A one-percent increase in market value and stadium capacity increases average attendance by 0.37 and 0.53 percent respectively. Stadium capacity is more influential than market value on attendance. The two factors of heterogeneity, population and GDP per capita, regarding teams' hometowns are also significant and highly effective on attendance. The income per person, *lnGDPPC* has a negative sign indicating that as the level of income in a club's hometown increases the social efficiency of the club decreases. Two different explanations for the negative coefficient can be provided. First, as Kuper and Szymanski (2009) argue over the success of teams from cities like Nottingham and Dortmund, cities which are socioeconomically more developed have interests other than football. This could be simply the case in Turkey as well. People in the cities with higher income might be preferring other activities over attending football games in general therefore their teams are socially less efficient. Second, due to the "unpleasant" atmosphere among the fans and hooliganism, people with higher socioeconomic status might be avoiding attending games. Nonetheless, it can be said that football is still not a "rich man's game" in Turkey, on the contrary, it is a "poor man's game." *lnGDPPC* has the highest coefficient, therefore, it is the most influential variable on social technical efficiency. *lnPop* has a positive coefficient as expected, cities with higher population have a higher number of potential fans and match attendees.

The efficiency rankings provided in Table 4.10 and 4.12 are quite surprising since Kayserispor, Elazığspor, Rizespor and Kasımpaşa SK are among the socially most efficient teams together with the Big 3. Kayseri is a city in central Turkey with a population over one million with a moderately strong culture of football fandom. Kayseri is where the most tragic incident in Turkish football occurred which was a clash between Kayserispor and Sivasspor fans in the 1967 which resulted in the death of 40 people (Akın, 2004). The city has always been behind their team and especially after the completion of their new stadium in 2009 average attendance has been high relative to their neighboring cities. Elazığ is a small city in the eastern part of Turkey with a population about 0,6 million in 2013 according to TUIK's statistics. Out of the

18 teams in the Turkish Super League, Elazığspor was ranked 17th in market value and 16th in stadium capacity in the 2012/2013 seasons and furthermore Elazığ is the city with the lowest GDPPC in the dataset. In 2013/2014, Rizespor had a humble squad and stadium (ranked in last five in both parameters). Rize is a small town in the Blacksea region with a low income per person. Rizespor has the lowest attendance among the efficiency leaders, although their output was low their inputs were relatively much lower. Kasımpaşa is a neighborhood in İstanbul, with a strong football culture. The current president of the Turkish Republic, Recep Tayyip Erdoğan, is from Kasımpaşa, and he puts great emphasis on the well-being of the team. The stadium which Kasımpaşa SK plays their home games is named after the president. The stadium was built in 2005 as Erdoğan's political power grew and the capacity was expanded in 2010 as Kasımpaşa SK got promoted to the Super League in the 09/10 season. Kasımpaşa SK got relegated to the 1st Division same season however they promoted again the next year thanks to the transfer funds supplied by their new owner. In October 2011, Kasımpaşa SK was bought by a well-known businessman who in close relations with the government as in the case of Passolig. Kasımpaşa SK is one of the many deep-rooted neighborhood teams such as Sarıyer SK, Vefaspor and Karagümrük SK in İstanbul. Luckily, Erdoğan never forgot his roots and looked after them.

After the initial blow by the Passolig is softened, the efficiency scores started to recover. The average attendance in 17/18 managed to exceed the average attendance in 13/14 as can be seen from Table 4.11; however, it should be underlined that the social efficiency is lower. With increasing revenues in Turkish football clubs are able to afford better/more valuable players and thanks to the infrastructural investments discussed in Section III, clubs have more of both inputs. The aggregate stadium capacity rose from 493,719 in 13/14 to 508,614 in 17/18 whereas the aggregate market value rose to 750 million euros from 710 million euros. Teams are still not as efficient as they were in 13/14 even though the aggregate social output increased.

For 15/16 and 16/17 seasons, Antalyaspor's social efficiency is remarkable. In the 13/14 seasons, Antalyaspor got relegated and their average attendance was 4,368. On their return season to Super League, they have averaged 9,288 spectators per game which is an increase more than 100%. Getting relegated and being promoted back might be influential on the attendance, yet there is definitely a "star-player effect"

(Buraimo & Simmons, 2015) for Antalyaspor. Samuel Eto'o, former Barcelona, Internazionale and Chelsea star, was transferred to Antalyaspor in 2015 July with few other former Big 5 league players such as Jean Makoun, Ondrej Celustka and Dejan Lazarevic. Eto'o and his teammates contributed to Antalyaspor both socially and athletically. The team outperformed itself and managed to take the 5th spot and had the highest 7th average attendance in 16/17 season. Another interesting social performance was Alanyaspor's in 16/17 season. Alanya is a municipality in the city of Antalya, Antalyaspor's performance and stars could have influenced Alanyaspor fans as well, perhaps their high social performance is a spillover effect of Antalyaspor's.

To determine the factors that are influential on social technical efficiency, Equation 10 is estimated and the results are presented in Table 4.13. Equation 10 assumes that the set of variables in the model affects efficiency or causes inefficiency.

The first variable, *StadAge* is statistically significant and has a negative coefficient. The stadium age proxies the physical conditions of the stadiums assuming that older stadiums have worse conditions; therefore, the negative coefficient was expected. Although the variable is statistically significant the coefficient is quite small, a one-year increase in stadium age decreases the technical efficiency by 0.002.

ForLim is the only variable with a positive influence on social efficiency. As the number of the foreign players allowed on the field increases so does a team's social efficiency. Over the past several seasons some foreign players with high reputation have played in Turkey. Galatasaray, Fenerbahçe and Beşiktaş have always been attractive to foreigners. Numerous stars such as Didier Drogba, Wesley Sneijder, Nicolas Anelka and Roberto Carlos played for the three giants but smaller- scale clubs have also managed to attract some reputable players in the recent past. Just in 2017/2018 season, a number of worldwide known football players have arrived in Turkey. Trabzonspor have signed the ex-Bayern München star José Sosa from AC Milan, Sivasspor have managed to bring ex-Real Madrid star Robinho to Turkey and Antalyaspor brought ex-Arsenal star Samir Nasri. As Buraimo and Simmons (2015) illustrate, the positive effects of star players on attendance cannot be disregarded hence on social efficiency. The extra right to transfer more foreign players enabled clubs to transfer such ex-stars which increased teams' social output efficiency. As the number of allowed foreign players increases by one, the social efficiency increases about 1%.

Relegation dummy has a negative sign which could be interpreted as the disloyalty of fans. One might expect that fans of a team, which is battling to stay in the league, would be more enthusiastic and supportive but sadly that is not the case in Turkey. Perhaps fans of the relegated teams in Turkey, are not very attached to their teams emotionally. In an economic perspective, this makes sense since no one would spend time and money to watch a sequel movie that they did not enjoy before. Relegated teams are 16% less efficient on average than the ones who did not get relegated.

Passolig dummy has also the expected sign and it should be noted that it has the highest coefficient. The empirical evidence suggests that the largest source of social inefficiency has been the Passolig. As discussed in Section III, the implementation of Passolig has been opposed by many fans for social, political and economic reasons. The immediate adverse effect of Passolig is easily observed from Table 4.11 both in terms of average attendance and average efficiency; however, it should be mentioned that there is an upward trend in the last two seasons. Despite the strident reaction to Passolig, Turkish football fans acted absentmindedly and the attendance numbers recovered in a couple of seasons back to thirteen thousand. Although the average attendance rose, there is still a question to be answered whether the fans stopped protesting or different fans started attending games. Perhaps less politicized fans or pro-government fans started attending games. It is an issue which needs further investigation and as a further research project.

This section discussed the findings presented in Section V and identified the variables influential on athletic and social technical efficiencies. The Big 3 are athletically the most efficient teams in the investigated period however in terms of social efficiency there are some unexpected outperformers. In terms of athletic efficiency, the averages fluctuate with no significant trend but in social efficiency there is an upward trend. After Passolig has been introduced, both average attendance and social technical efficiency were severely affected. Even though the average attendance managed to exceed the pre-Passolig levels the social efficiency is still recovering.

4.7 – Conclusion

Efficiency analysis has been an important area of research in the sports economics literature in the recent past. Although the Turkish Super League is one of

major leagues outside the Top 5 both in terms of revenue generation and sportive performance the literature on Turkish football is very limited. Both private and public funds have been accumulating to Turkish football however Turkish clubs have failed to achieve anything noteworthy. The inefficient use of resources in Turkish football is a crucial issue both athletically and socially. This study determined the most effective teams in terms of athletic and social outputs between the 12/13 and 17/18 seasons.

Even though the athletic efficiency leaders change, clubs' performance do not vary much on average for the investigated period. Other than the Big 3, Başakşehir FK's and Akhisarspor's performances are impressive. Başakşehir FK has been in the title race in the last few seasons yet they failed to win so far. Akhisarspor has been doing remarkable things the league with a modest squad and they have managed to win the Turkish Cup in the 17/18 season. Only three of the six champions are among the most efficient teams but 16 of the relegated 18 teams in six seasons are among the least efficient teams.

Attendance has been a major source of concern in the Turkish football for all the stakeholders in the last decade therefore the importance of social efficiency is momentous. Despite the phenomenal infrastructural investments and rapidly growing revenues, Turkish clubs failed to fill the stands. There were some unexpected efficiency leaders such as Elazığspor and Kayserispor but when the average social efficiency scores are taken into consideration are no surprises. The four giants of Turkish football; Galatasaray, Fenerbahçe, Beşiktaş and Trabzonspor are top ranked.

It should also be underlined that the implementation of Passolig system has caused severe disturbance in the effectiveness of clubs in terms of social output despite the recovery in the last two seasons. One of the most debated issues in Turkish football has been the foreign player regulations in the Turkish Super League. There have been numerous changes in the number of maximum foreign players allowed in a team roster in the last decade. Foreign player regulations effect the labor market both in terms of wages and transfer fees as well as the social efficiency. There is evidence that as the number of foreign players increase, the social technical efficiency increases hence the attendance.

The lack reliable data regarding attendance in Turkish Super League games has narrowed the period of investigation into six seasons. The accumulation of accurate attendance data, with the help of Passolig, would enable to extend this study's

scope in the following years. The probable change in fan profile after the imposition of Passolig is worth investigating.

4.8 - References

- Akın, Yiğit. 2004. 6 Not Just A Game: The Kayseri vs. Sivas Football Disaster. **Soccer & Society**. v. 5. no. 2: 219-232.
- Aktifbank. [10.05.2019]. Futbol Ekonomisi Raporu.
<https://www.aktifbank.com.tr/tr/Documents/2016-2017%202017-2018%20Sezonu%20Futbol%20Ekonomisi%20Raporu-3%20%20.pdf>.
- Barros, Carlos Pestana, Stephanie Leach. 2006. Analyzing the Performance of the English F.A. Premier League With an Econometric Frontier Model. **Journal of Sports Economics**. v. 7. no. 4: 391-407.
- Barros, Carlos, Giambattista Rossi. 2014. A Bayesian stochastic frontier of Italian football. **Applied Economics**. v. 46. no. 20: 2398-2407.
- Barros, Carlos, Pedro Garcia-del-Barrio. 2008. Efficiency measurement of the English football Premier League with a random frontier model. **Economic Modelling**. v. 25. no. 5: 994-1002.
- Battese, George, Timothy Coelli. 1995. A Model for Technical Inefficiency Effects in a Stochastic Frontier Production Function for Panel Data. **Empirical Economics**. v. 20: 325-332.
- Bell, Adrian, Chris Brooks, Tom Markham. 2013. The performance of football club managers: skill or luck?. **Economics & Finance Research**. v. 1. no. 1: 19-30.
- Buraimo, Babatunde, Rob Simmons. 2015. Uncertainty of Outcome or Star Quality? Television Audience Demand for English Premier League Football. **International Journal of Economics of Business**. v. 22. no. 3: 449-469.
- Dawson, Peter, Stephen Dobson, Bill Gerrard. 2000. Estimating Coaching Efficiency in Professional Team Sports: Evidence From English Association Football. **Scottish Journal of Political Economy**. v. 47. no. 4: 399-421.
- Deloitte. [05.06.2019]. Annual Review of Football Finance 2019.
<https://www2.deloitte.com/uk/en/pages/sports-business-group/articles/annual-review-of-football-finance.html>.
- [05.06.2019]. Annual Review of Football Finance 2018.
<https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/sports-business-group/deloitte-uk-sbg-annual-review-of-football-finance-2018.pdf>.
- Espitia-Escuer, Manuel, Lucia Isabel Garcia-Cebrian. 2010. Measurement of the Efficiency of Football Teams in the Champions League. **Managerial and Decision Economics**. v. 31: 373-386.

- EPFL. [05.03.2019]. Fan Attendance Report 2018. https://europeanleagues.com/wp-content/uploads/final-epfl_fa_18-version-2018.01.12.pdf.
- García-Sánchez, Isabel Maria. 2007. Efficiency and effectiveness of Spanish football teams: A three-stage-DEA approach. **Central European Journal of Operations Research**. v. 15. no. 1: 21-45.
- Ghio, Alessandro, Ruberti Massimo, Verona Roberto. 2018. Financial constraints on sport organizations' cost efficiency: the impact of financial fair play on Italian soccer clubs. **Applied Economics**. v. 51. no. 24: 2623-2638.
- Greer, Donald. 1983. Spectator Booing and the Home Advantage: A Study of Social Influence in the Basketball Arena. **Social Psychology Quarterly**. v. 46 no. 3: 252-261.
- Guzmán, Isidoro. 2006. Measuring Efficiency and Sustainable Growth in Spanish Football Teams. **Sport Management Quarterly**. v. 6. no. 3: 267-287.
- Haas, Dieter. 2003. Productive Efficiency of English Football Teams A Data Envelopment Analysis Approach. **Managerial and Decision Economics**. v. 24. no. 5: 403-410.
- Haas, Dieter, Martin Kocher, Matthias Sutter. 2004. Measuring Efficiency of German Football Teams by Data Envelopment Analysis. **Central European Journal of Operations Research**. v. 12. no. 3: 251-268.
- Halicioğlu, Ferda. 1998. The Degree of Competition in the Turkish Professional Football League: 1958-1998. **Journal of Social Sciences**. v. 3. no. 3: 34-46.
- Kern, Alexander, Schwarzmann Michael, Armin Wiedenegger. Measuring the efficiency of English Premier League football: A two-stage data envelopment analysis approach. **Sport, Business and Management: An International Journal**. v. 2, no. 3: 177-195.
- Kern, Markus, Bernd Süßmuth. Managerial Efficiency in German Top League Soccer: An Econometric Analysis of Club Performances On and Off the Pitch. **German Economic Review**. v. 6. no. 4: 485-506.
- Kuper, Simon, Stefan Szymanski. **Soccernomics: Why England Loses, Why Germany and Brazil Win, and Why the U.S., Japan, Australia, Turkey--and Even Iraq--are Destined to Become the Kings of the World's Most Popular Sport**. 1st Edition. New York: Nation Books, 2009.
- Milliyet. [10.07.2019]. Passolig nedir nasıl kullanılır? Passolig fiyatı. <http://www.milliyet.com.tr/passolig-nedir-nasil-kullanilir--passolig-fiyati-molatik-8405/>.
- Nevill, A. Michael, Nigel Balmer, Andrew M. Williams. 2002. The influence of crowd noise and experience upon refereeing decisions in football. **Psychology of Sport and Exercise**. v. 3. no. 4: 261-272.
- Seçkin, Aylin, Richard Pollard. 2008. Home advantage in Turkish professional soccer. **Perceptual and Motor Skills**. v. 107. no. 1: 51-54.

- Serrano, Raúl, Javier García-Bernal, Marta Fernández-Olmos, Manuel Espitia-Escuer. 2015. Expected quality in European football attendance: market value and uncertainty reconsidered. **Applied Economics Letters**. v. 22. no. 13: 1051-1054.
- T24. [10.07.2019]. Yeni Şafak: Passolig uygulaması büyük bir soyguna dönüştü. <https://t24.com.tr/haber/yeni-safak-passolig-uygulamasi-buyuk-bir-soygunadonustu,807667>.
- TMYS. [04.04.2019]. Sporda Dev Hamle. <http://www.gsb.gov.tr/HaberDetaylari/3/2736/sporda-dev-hamle.aspx>.
- Zambom-Ferraresi, Fabíola, Belén Iráizoz, Fernando Lera-López. 2019. Are football managers as efficient as coaches? Performance analysis with ex ante and ex post inputs in the Premier league. **Applied Economics**. v. 51. no. 3: 303-314.
- Zambom-Ferraresi, Fabíola, Fernando Lera-López, Belén Iráizoz. 2017. And if the ball does not cross the line? A comprehensive analysis of football clubs' performance. **Applied Economics Letters**. v. 24. no. 17: 1259-1262.

5. CONCLUSION

European football has experienced a tremendous amount of growth both in terms of revenues and popularity over the last two decades. The increasing commercialization and globalization of football have been extremely beneficial for the sector as a whole. However, the increase in the aggregate revenue has not been equally shared among the leagues and clubs. Some clubs grew richer than the others which led to an increase in the gap between teams economically. The economic strength of few leagues and several teams caused the talent to accumulate in these leagues and teams. It should be noted that the gap is not only present between the teams from the Big 5 and those from the other leagues, but also amongst the teams of Big 5. The increasing gap among the Big 5 leagues in terms of revenue generation caused deterioration in the competitive balance between the teams of Big 5 as illustrated in Chapter 2. The empirical evidence suggests that English and German teams are likely to be more successful against the teams from the other leagues in inter-European competitions due to their increasing economic power. The lack of comprehensive data regarding other leagues' finances prevents the extension of this investigation to the whole of Europe.

The lack of regulatory controls towards preserving the competitiveness, similar to the ones in the North American professional leagues, resulted in unequal distribution of revenues and caused the accumulation of highly talented players in a few leagues and a handful of big clubs. As an outcome, many leagues became talent suppliers for the Big 5 leagues and lost their competitive power. The few other leagues, which have the potential to compete with the Big 5, such as Russia, Turkey and Portugal have been struggling with financial troubles due to poor management and the urge to keep up with the giants. Overspending and surging debts have become serious concerns for the policymakers in the last decade which led to the implementation of Financial Fair-Play (FFP) regulations by UEFA. The impact of FFP, especially on the leagues out of the Big 5, have been severe and clubs had to make significant cuts from their transfer expenditures as demonstrated in Chapter 3. Since the clubs from the Big 5 have higher revenues they can afford to have negative transfer balances and therefore are able to

spend more on transfers. For the clubs from other leagues, the regulatory control on club finances forced them to make sacrifices from their transfer expenditure. Although the FFP regulations forced clubs to improve their finances, with the threat of sanctions for the violators, the issue of competitive balance still remains unsolved. FFP might even cause widening of the gap, between teams from lesser leagues and the Big 5, since teams from lesser leagues will not be able to spend as much as they used to do on transfers. The true effects of FFP is yet to be observed, meanwhile some lucky few such as AFC Ajax or FC Porto, might be able to make better use of their internal resources and keep up with the giants.

Despite failing to achieve any notable success lately, Turkish Super League is among the lucky ones due to its high ability to generate revenue and strong public and private incentives and interest on football. Especially since the professionalization of Turkish football in 1959, football has been a major area of interest for millions. Although the history of Turkish football is scarce in notable achievements, both the national team and the clubs have been embraced by the public. Early 2000s have been the golden age for Turkish football but sadly it has failed to keep up the positive trend. The interest was not just among the common people but also among politicians and businesspeople which causes Turkish football to have strong sociologic, economic and political roots. As in many other cases in the world, football has often been used to influence people, socially and politically, in Turkey. However, in the recent past as the fans got politicized, the stadiums became grounds for political protests which chronologically coincides with the change in the political atmosphere in Turkey. The over-politicization of stadiums was countered by a fan identification scheme called the Passolig which has been a major cause of low attendance and low social efficiency as Chapter 4 identifies. Despite being the most efficient teams on average, both athletically and socially, the 3 Big teams of Turkey have been struggling both on and off the field in the recent years.

Before the implementation of Passolig, Turkish football lacked reliable data which was a huge setback for the academics who were interested in the economics of Turkish football. Reliable information regarding attendance, ticket prices and club revenues were hardly available. After the implementation of Passolig, because tickets can only be bought with a Passolig card, vast amount of data is being collected. The company in charge of Passolig, started publishing public reports on the economics of Turkish Super League. Perhaps the only positive impact of Passolig is that it increased

the availability of data. Every season more data is piling up which creates the perfect environment for new studies as well as expanding the existing ones.

As mentioned earlier, academic literature on the economics of Turkish sports is extremely limited which is also a serious obstacle for efforts towards improvement in its management. A proper diagnose is required before proposing cures for the problems in Turkish football. The availability of data would enable more academics to be able to work on Turkish sports and hopefully new studies will be conducted in the following years.

RESUME

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- “Organisational Culture as a Tool for Managing a Multigenerational Workforce in Project Management”, Research Journal of Business and Management, Vol: 6(3), p.

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- Regular problem sessions for economics and calculus courses.
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- Organised the Bootcamp event for the 2018 Sports Innovation Accelerator Turkey in cooperation with 1907 Fenerbahçe Fan Association and HYPE.
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