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Empirical Analysis of the European Football Industry: The Role of Sports Performance, Media Visibility, and Brand Value in Revenue Generation and Talent Compensation

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EMPIRICAL ANALYSIS OF THE EUROPEAN FOOTBALL INDUSTRY: THE ROLE OF SPORTS PERFORMANCE, MEDIA VISIBILITY, AND BRAND VALUE IN REVENUE GENERATION AND TALENT COMPENSATION

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ABSTRACT

This doctoral thesis examines empirically the sport industry as part of the entertainment sector, focusing on European football, whose business competes with other leisure and sports activities in a global context. The thesis comprises four articles that analyse economic issues in the sport industry: the degree of media visibility of the most relevant sports leagues, the rationality behind decisions affecting revenues and talent investment of European football clubs, and the role of the historical brand status. The different empirical analyses are carried out with data for the period between 1996 to 2016.

The structure of this research work responds to the nature of the professional sport industry in the current time. Actually, the analysis of modern sports demands taking into account their degree of exposure in the media and the fact that entertainment activities benefit from the expanded worldwide market due to the new technologies. The analyses shown in these pages progress from a general view of the sports industry, and its evolution over time, to eventually focus on professional football, an entertainment activity where brand consolidation and development plays an essential role.

The first chapter addresses the economic dimension of the sports industry and introduces an empirical analysis between leagues' revenues and their visibility in the media. It further examines the economic contribution of the sports and entertainment sectors to total output and employment for the European Union (EU-28) and the United States. Then, the comparative status of the main team-sports leagues, both North American and European, is compared globally using two approaches: the first one, based on total annual revenues; and the second one, using the Google Trends tool. The latter procedure permits comparing the intensity with which Internet users search for contents related to each of the selected top sports leagues. An empirical analysis is carried out to explain the relationship between leagues' annual revenues and the degree of media visibility. Finally, this chapter studies the extent to which football clubs have capacity to generate revenues and to retain popularity status, regardless of their recent sport achievements. The appraisal of the potential revenues and visibility status that are not

contingent on the risk attached to poor sport achievements is captured by estimating the clubs' time-invariant fixed effects, after having filtered out their sport performance.

The second chapter deepens the analysis of the comparative status of professional team-sports leagues and empirically compares the capacity to transform the degree of visibility into both total revenues and broadcasting revenues; the analysis includes the principal North American and European leagues. The outcomes obtained from the Google Trends approach are used to compute multiplying and weight factors, and a market penetration index, which allows us to explain the extent of internationalisation of the "Big-5" European football leagues, including shifts to non-traditional markets. The empirical analysis introduces a number of econometric models to understand the prospects of the leagues concerning popularity and capacity to transform the degree of the fans' interest into total and broadcasting revenues.

The third chapter offers a comprehensive empirical analysis of the behaviour of European football clubs concerning investment in talent (and wage compensations) and the annual revenues. To this aim, we use a rich dataset that includes financial data of the clubs playing in the 1st division category of the English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1. A thoroughly regression analysis is made to estimate behavioural equations of annual revenues and annual wages in order to test hypotheses regarding the impact of current, recent past, and historical sport performance, along with the role of media visibility and brand status of the clubs. In addition to the traditional sport performance indicators, the empirical study introduces two innovative variables: the Elo Rating, as a proxy variable for the clubs' historical sporting status (or brand value); and the Media Visibility Index, obtained with the MERIT approach, to capture the clubs' ability to awake the interest of fans and the public. The econometric analysis, performed for variables expressed in levels and in deviations from the mean, involves estimations by means of Ordinary Least Squared (pooled models), Fixed Effects models; as well as some Dynamic Panel-Data analyses and several diagnostic tests. This chapter is the core of the thesis and its complexity has offered the opportunity to learn how to perform genuine applied research in economics.

The fourth chapter presents a systematic review of the literature related to the brand management of football clubs. It provides a descriptive analysis of brand equity, brand drivers, and brand strategies research in the football industry. The exhaustive revision of

the previous research on this topic lead us to identify models to assess brand value, brand drivers, and some main strategic factors to build a strong football brand. Thus, the last chapter is a natural extension to complement the understanding of how football brand may be developed and reinforce, given the crucial role it plays concerning the financial outcomes and economic perspectives of the football clubs.

RESUMEN

Esta tesis doctoral analiza la industria del deporte como parte del sector del entretenimiento, centrando el estudio al fútbol europeo. La tesis tiene cuatro artículos que examinan aspectos económicos de la industria del deporte respecto al grado de visibilidad mediática a nivel mundial de las principales ligas deportivas, la racionalidad de las decisiones de los clubs europeos que repercuten en los ingresos y la compensación del talento deportivo, y la función del historial de marca. Los diferentes análisis empíricos se realizan para el período 1996-2016.

El trabajo de investigación está estructurado acorde a la naturaleza de la industria moderna del deporte. De hecho, el negocio del deporte exige considerar el grado de exposición mediática y el beneficio que representa, para las actividades de entretenimiento, la expansión del mercado a nivel mundial como consecuencia del desarrollo de nuevas tecnologías. Los análisis presentados progresan desde el aspecto general de la industria del deporte, y su evolución, para eventualmente enfocarse en el futbol profesional, actividad de entreteniendo donde la consolidación y desarrollo de marca tienen un rol esencial.

El primer capítulo enfoca la dimensión económica de la industria del deporte e introduce un estudio de ingresos de las ligas deportivas y el nivel de visibilidad mediática. En primer lugar, se examina la contribución económica de las industrias del deporte y del entretenimiento al producto total y generación de empleo en la Unión Europea (EU-28) y en Estados Unidos. Posteriormente, se compara el estatus relativo de las principales ligas de América del Norte y Europa a nivel mundial, utilizando dos métodos: primero, en base a información financiera, y segundo, de acuerdo con el grado de visibilidad mediática. El segundo procedimiento utiliza la herramienta de Google Trends, y permite comparar la intensidad con que los usuarios buscan contenidos relacionados a cada una de las ligas deportivas seleccionadas. Además, se realiza un análisis empírico para explicar la relación que existe entre los ingresos anuales de las ligas y el grado de visibilidad mediática que generan a nivel global. Finalmente, este capítulo estudia la capacidad que

tienen los clubes de fútbol para generar ingresos y mantener su popularidad, con independencia del rendimiento deportivo reciente. La evaluación de los ingresos y el nivel de visibilidad que no dependen del riesgo asociado a un bajo rendimiento deportivo es capturado mediante la estimación de los efectos fijos (invariantes) de los clubes después de filtrar el rendimiento deportivo.

El segundo capítulo, profundiza el análisis comparativo del estatus de las ligas deportivas profesionales y su capacidad de transformar el nivel de visibilidad mediática en ingresos totales e ingresos por derechos de transmisión; este estudio incluye las principales ligas de América del Norte y Europa. Los resultados obtenidos con el método de Google Trends son utilizados para calcular pesos, factor multiplicativo, e índice de penetración de mercado, que permiten explicar el alcance de internacionalización de las cinco grandes ligas del fútbol europeo, incluyendo su incursión en mercados considerados como no tradicionales. El análisis empírico introduce varios modelos econométricos para comprender las proyecciones de popularidad y la capacidad de transformar el grado de interés de los fans en ingresos totales y derechos de transmisión.

El tercer capítulo, analiza el comportamiento de los ingresos anuales y la inversión en talento (incluido compensaciones salariales) de los clubs de fútbol europeo. Para ello, se utiliza una extensa base de datos que incluye información financiera de los clubs que juegan en primera división en cuatro de las ligas más importantes de Europa: Premier Ligue, La Liga, Serie A y Ligue 1. Se realiza un análisis exhaustivo estimando ecuaciones del comportamiento de los ingresos y salarios anuales, y formula hipótesis sobre la influencia del desempeño deportivo reciente, pasado, e histórico, y el rol de la visibilidad mediática y estatus de marca. Esta investigación, además de incluir indicadores deportivos tradicionales como factores explicativos, incorpora dos variables innovadoras: el ranking Elo como una variable proxy del estatus histórico (o valor demarca), y el índice de Visibilidad Mediática obtenida con la metodología MERIT, para captar la habilidad de los clubs en despertar interés de los fans y del público. El análisis econométrico se realiza aplicando Mínimos Cuadrados Ordinarios (*pooled models*), Efectos Fijos, así como también algunos modelos de Datos de Panel Dinámicos; para variables expresadas en niveles y desviaciones de la media, y se realizan varias pruebas de diagnóstico. Este capítulo es el núcleo de la tesis, su complejidad ha contribuido en el aprendizaje para realizar una investigación genuina en economía aplicada.

El cuarto capítulo presenta una revisión sistemática de la literatura relacionada a gerencia de marca de los clubs de fútbol. La revisión exhaustiva de investigaciones previas en este tema, permiten la identificación de modelos para la valoración de marca, impulsores, y algunos factores estratégicos para construir una marca de fútbol fuerte. Por lo tanto, el último capítulo es una extensión natural para completar la comprensión de la construcción y reforzamiento de marca, dado el papel crucial que desempeña en los resultados financieros y perspectivas económicas de los clubs de fútbol.

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INTRODUCTION

The study of the professional sports industry is of especial interest due to certain peculiarities such as the monopsony situation in the labour market, the collusion between competitors, or the participation between competitors to produce a joint product (Rottenberg, 1956; Neale, 1964), to mention some examples. Additional reasons explain the increasing interest on the modern professional sports business, including the continuous economic growth and the fact that provides entertainment at a global scale (Doherty et al., 2014, Ratten, 2011a). Indeed, this thesis argues that the modern sports business is better understood if examined as part of the entertainment industry, where sport disciplines compete in a global market against other leisure activities and a wide variety of other sports. Among professional team-sports, this work focus on European football and its global dimension, which has experienced a strong expansion, capturing a large global market share and becoming predominant in markets considered as non-traditional.

The objective of this thesis is to analyse the European football industry as part of the entertainment sector within a global context and to examine the role of clubs' sports performance, media visibility, and brand value in the determination of revenues and talent compensation. The stated objective is addressed in four chapters that comprise a general view of the sports industry and a detailed examination of the European football clubs.

The thesis begins with an assessment of the economic dimensions of the sports industry, including the economic contribution over time and its relative importance compared to other industries. Next, the status of European football is analysed, and the hierarchy of the main team-sports leagues is established, in terms of both revenues and media visibility. We also examine the empirical relationship between leagues' revenues and the degree of interest awaken from the public, as well as the role of the football clubs' brand value. Afterwards, the study concentrates on the empirical behaviour of European

football clubs' revenues and talent compensation, along with the role of brand status and media visibility. Finally, the understanding of the development of football brands is complemented with a systematic review of brand management theory. The methodologies employed are economic analysis, econometric techniques, and media visibility methods.

Some papers examined the media visibility by employing an approach based on the ability to attract the attention of journalists and public, from the number of news articles (Garcia-del-Barrio and Pujol, 2007; Garcia-del-Barrio, 2018; Garcia-del-Barrio and Tena-Horrillo, 2019) to social media records (Korzynski and Paniagua, 2016). Following the former approach, this thesis applies two complementary techniques to capture the degree of visibility generated by sports leagues, teams, and players in the media. The first method relies on the tool Google Trends, which permits comparing the search intensity of Google users. The second procedure, adopts the Media Visibility index developed by MERIT (*Methodology for the evaluation and rating of intangible talent*), whose appraisals are based on the number of news articles on the Internet related to a given individual (i.e., sportsperson). Previous studies have shown that data provided by these two methods is reliable, among other things, to predict consumption trends or to homogeneously compare media visibility between sports from different disciplines (Vosen and Schmidt, 2011; Choi et al., 2012; Garcia-del-Barrio, 2018).

Chapter 1 address the economic dimension of the sport business, as part of the entertainment sector, comprising the economic contribution to total output and employment for the European Union (EU-28) and the United States, and the examination of the comparative status of the main team-sports leagues, both North American and European. Sport, given its educational nature, is seen as a driving force procuring positive social changes (Coalter, 2007; Eime et al., 2013). Practicing sport facilitates social inclusion, improves lifestyle in an integrated system, and promotes the individuals' well-being (Cf. Statistical Office of the European Union, 2015). The significant role of sports in the countries' development has been recognized by intergovernmental organizations, like the General Assembly of the United Nations; who released a series of Resolutions to leverage sports as a means to sustainable development and promotion of peace (e.g., Resolutions 70/1 from 2015 and 71/160 from 2016). Also, the Commission of the European Communities embodies the socioeconomic impact of sports in the White Paper on Sport (2007) and other documents (e.g., Communication from the Commission:

Developing the European Dimension in Sport, from 2011), encouraging countries to provide data on the economic activity of sports. At the present, countries of the European Union (EU-28) report the economic activity of the sports industry as part of the entertainment sector in the National Income Accounts. Moreover, specialized studies were conducted to assess the economic contribution of the sports industry (e.g., Study on the Contribution of Sport to Economic Growth and Employment in the EU 2012[1]). The direct and indirect economic impact, which is complex to define, invites us to discuss its economic significance. This chapter provides some comparative analyses suggesting that the economic participation of the sports industry is relatively small, even if some European countries offer a large number of employment opportunities in the sports industry.

In addition, Chapter 1 introduces the analysis of media visibility. The development of new technologies has also encouraged a globalized access to sports and entertainment, favouring an accelerated expansion of the market size and attracting the interest of worldwide audiences. The digital transformation in the sports industry combines innovative changes at various levels (e.g., improving players training or assisting during the game), and involves different stakeholders like the sports spectators (Ratten, 2019b), who can among other things access to immediate information about teams or players, and even develop an emotional experience connection (Nicholson et al., 2018). The degree of interest that teams and players generate on sports spectators and, in general, on the public (as captured by the teams' and players' visibility in the media) will allow us to compare the status and define the hierarchy of professional sports within the sports entertainment business. The first chapter uses data obtained from the searching tool Google Trends to compare the status of professional team-sports leagues concerning media visibility. This analysis is useful to complement the usual approach for establishing the leagues' hierarchy based on their total annual revenues. The resulting rankings suggest that North American leagues dominate over European football; even if, regarding media visibility, one of the major European football competitions is also predominant.

The analysis made in Chapter 1 also look at the extent to which European football clubs have the capacity to generate revenues and to retain popularity status, regardless of

[1] SportsEconAustria (2012). Study on the Contribution of Sport to Economic Growth and Employment in the EU. Retrieved on 19/03/2017 from:http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

their recent sport achievements; the appraisal of the potential revenues and visibility status that are not contingent on the risk attached to poor sport achievements is captured by estimating the clubs' time-invariant fixed effects, after having filtered out sport performances. The empirical results provide insights about the strongest football brands among the "Big-5" European leagues and the rivalries across teams.

Chapter 2 extends the analysis of the team-sports leagues based on financial data and media visibility. First, in addition to total revenues, this chapter includes a comparative analysis of the leagues' broadcasting revenues. Second, using the Google Trends approach, the hierarchy of sports leagues is assessed according to the frequency with which Google users search for news and for all kinds of contents. Furthermore, the outcomes obtained from Google Trends are used to compute multiplying and weight factors, and a market penetration index for the European football leagues. These analyses contribute to the understanding of the industry within a global context, by addressing the extent of internationalisation of the "Big-5" European football leagues and shifts of their fan base.

Additionally, Chapter 2 empirically compares the capacity that football clubs have to transform the degree of visibility in total revenues and broadcasting revenues. The empirical analysis, which includes the principal North American and European leagues, applies econometric models to understand the prospects of the leagues concerning popularity and capacity to transform the degree of the fans' interest in economic outcomes.

Among other results, Chapter 1 and 2 show that North American team-sports leagues and European football largely dominate the global business of sports entertainment. Actually, professional football is one of the most embraced sport worldwide, as it attracts high audience levels, generates worldwide media coverage, breaks down geographical and cultural barriers, etc. Furthermore, this thesis reveals that European football attracts an increasing global attention, as it entered new international markets and gained dominance in terms of visibility and popularity; consequently, the clubs' capacity to generate revenues has expanded, mainly through sponsorship contracts and broadcasting rights.

Then, Chapter 3 offers a wide collection of regression analyses to estimate behavioural equations of annual revenues and annual wages and to test hypotheses

regarding the role of recent and past sport performance, historical (brand) status, and media visibility.

The financial performance of football clubs' has been studied for decades to a great extent, addressing topics such as whether football clubs try to maximize profits or wins (e.g.: Sloane, 1971; Késenne, 1996; Garcia-del-Barrio and Szymanski, 2009). The models describing the functioning of team sports leagues, typically assume that clubs aim to maximise profits (El-Hodiri and Quirk, 1971; Fort and Quirk, 1995; Szymanski and Késenne, 2004; Grossmann and Dietl, 2009) or wins (Zimbalist, 2003; Késenne, 2006; Vrooman, 2007). The literature actually stresses the existence of a trade-off between wins and profits (Dietl et al., 2008). More recently, some studies enhance the usual modelling by hypothesizing a mixed goal to overcome other conventional views, for instance, Dietl et al., 2011presents "utility maximisers" clubs that aim at maximizing the weighted sum of profits and wins.

This Chapter 3 contributes to enhance the empirical knowledge about annual revenues and annual wages of European football clubs, by performing estimations upon a rich dataset that comprises financial records of clubs competing in the 1st division of four of the "Big-5" European football leagues: English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1, during the seasons 1995/1996 to 2015/2016. Chapter 3 builds upon previous research, inspired in the paper by Szymanski and Smith (1997) and following the approach developed by Carmichael et al. (2011). The literature on this topic (Szymanski and Smith, 1997; Forrest and Simmons, 2002; Barajas and Rodriguez, 2010) provides strong evidence that greater investment in talent – as captured by the clubs' annual wages – entails better sport performances and achievements. Besides, previous research (Szymanski and Smith, 1997) also shows a strong empirical link between sport success and economic returns. In this chapter, different models are estimated to test a variety of hypotheses about sport (on-field) performance, along with (off-field) media talent, and its impact on the generation of revenues. The analysis of talent investment is made accounting for the capacity it may have to generate media visibility and, ultimately, revenues. Therefore, the equations include, among the different explanatory variables, a proxy variable for media visibility, obtained with the MERIT approach, and the historical sport performance as a proxy variable for brand status.

The sports achievements and predominance of a team among other contestants facilitates the development or consolidation of renowned strong sports brands (Couvelaere and Richelieu, 2005) that can easily generate sustained visibility in the media, regardless of recent performance; moreover, the reputation built on past sports achievements has helped teams during periods of low productivity (Dell'Osso and Szymanski, 1991). The introduction of variables to capture the historical sports performances provides us with approximations of the teams' consolidated brand value. To this purpose, a number of different indicators of past performance could be used, such as: points accumulated at the end of the domestic league, the goals difference of individual matches, historical participation in international competitions, etc. This thesis uses a comprehensive sport ranking obtained through the Elo system, which integrates various types of competitions at the national and international levels. In previous academic literature, Elo rating is used, for instance, as an appraisal to measure a team's ability or strength to forecast match results (Edmans et al., 2007; Leitner et al., 2010; Reade and Akie, 2013). Elo ratings have been proven to be highly accurate among different ranking techniques (Lakaser et al., 2013; Cea et al., 2020), even if some researchers argue that other procedures seem better to predict international football matches (Peeters, 2018). The procedure for computing Elo ratings is based on weighted averages of the outcomes obtained in past games, where the actual weights depend on the rival team status, on the score differential, and the importance of each particular game considered (Hvattum and Arntzen, 2010). In Chapter 3, Elo ratings are used as a proxy variable to measure the clubs' historical status derived from their past sporting results.

The empirical results permit to identify the influence of sport performance, both in national and international competitions. Moreover, this chapter provides evidence of the essential role that brand status and media visibility have on the determination of revenues and wages.

Finally, Chapter 4 identifies theoretical and empirical research on brand management of football teams to complete the understanding of the construction and leverage of a football brand. In addition to success on the pitch, clubs manage other aspects to strengthen its brand value, including the players' popularity (Chanavat and Bodet, 2009; Herm et al., 2014), the club's tradition (Abosag et al., 2012), the involvement with the community (Baena, 2018; Blumrodt et al., 2012), the use of websites and social media

(Nisar et al., 2018), to mention some examples. Moreover, the manageable factors present economic opportunities to clubs that are not at the top-tier level (Bauer et al., 2005a). The last section of the thesis contributes to the identification of brand equity models, brand drivers, and brand strategies proven to leverage the clubs' brand.

HYPOTHESES

Chapter 1

- The economic context of the sport sector is better understood if it is considered as part of the global entertainment industry.
- The direct economic relevance of the sports sector is relatively small compared to the share of GDP generated by other industries.
- The sports industry displays an increasing economic presence and relevance in both the European Union (EU-28) and the United States.
- The sports business attracts much larger amounts of investment in sponsorship compared to other leisure and entertainment sectors.
- There is a positive and statistically significant relationship between leagues annual revenues and their degree of visibility in the media.
- Regardless of their recent sport performances, the football clubs are usually able to generate revenues and to maintain a certain degree of visibility status.

Chapter 2

- The intensity with which Internet users search news and general contents related to sports teams and leagues permit to homogenously compare the relative status of sports teams.
- The North American professional team-sports leagues typically generate greater collective revenues and higher worldwide visibility than the European football leagues.
- The level of internationalisation of team-sports leagues can be accurately examined according to their corresponding degree of media visibility over time.
- In recent years, the traditional markets of European football fans have shifted to other non-traditional international markets.

- The capacity of team-sports leagues to generate both total and broadcasting revenues is largely predicted by their comparative visibility status.

Chapter 3

- The football clubs' annual revenues are better explained by recent-past sport performance, and ultimately by past investment in talent than by the current sport achievements.
- The clubs' brand value (built upon historical sport achievements) positively affects their capacity to generate revenues beyond the current sport quality of the team roster. Actually, the influence of current and recent past sport performances on club's revenues are expected to diminish when brand value is included into the regressions.
- In addition to sporting skills, the clubs' capacity to accrue revenues depends on the current and recent past off-field skills of the team roster, insofar as they attract the interest of journalists and of the general public.
- Domestic sport performances and sport achievements in European competitions work along for determining the overall compensation paid to football players.
- The stronger the historical (sporting) status of a club, the greater salaries must be paid for rewarding the talent of the teams' roster of players.
- In addition to the sporting (on-field) talent, other (off-field) personal skills (ultimately captured by the players' ability to attract media attention) are significantly rewarded in the football industry.
- The football clubs' annual wages can be modelled by a dynamic specification of the wage equation. Actually, introducing a lagged dependent variable (as a regressor) implies accounting for the potential endogenous interactions.
- The fact of playing for a team with strong (sporting) brand status implies receiving higher salaries, ceteris paribus, even when the previous season salaries are taken into account. This hypothesis will be tested through the dynamic specification of the behavioural wage equation.
- The dynamic specification of the wages equation may help testing if the football industry also rewards: (i) past luck in the competition, leading to greater sport

achievements, and (ii) past outperforming managerial skills from the staff, *ceteris paribus*.

Chapter 4

- Football brand management is a recent field of study and little is known about brand drivers.
- Most theories on brand management for football clubs do not consider the peculiarities of the industry.
- There are strategic factors beyond sport performance that should be taken into account in management decision to build a strong football brand.

OBJECTIVES

GENERAL OBJECTIVE

To analyse the European football industry as part of the entertainment sector within a global context, and to examine the role of sports performance, media visibility, and brand value in the determination of revenues and talent compensation.

SPECIFIC OBJECTIVES

Chapter 1

- Describe the economic context of the sports industry as part of the entertainment sector, while focusing the analysis on the football business.
- Examine the brand value of football clubs, applying an innovative approach to relate the clubs' media visibility status and capacity to generate revenues, regardless of their recent sport performance.
- Explore the empirical relationship between football clubs' annual revenues and their recent sport performance, to identify business opportunities attached to low-risk football brands.

Chapter 2

- Compare the relative status of North America and European global team-sports leagues by employing two complementary approaches: financial data and degree of visibility in the media.
- Evaluate the evolution over time of the European football market, relative to market shifts and level of internationalisation, on the bases of the visibility generated worldwide.
- Examine the empirical relationship between football clubs' revenues and their degree of media visibility.

Chapter 3

- Examine the empirical relationship between current, recent-past, and historical sports performance, both in domestic and international competitions, and the clubs' annual revenues.
- Examine the empirical relationship between recent-past and historical sports performance, both in national and international leagues, and the clubs' annual wages.
- Examine the empirical relationship between current wages (talent compensation) and past talent rewards, along with sports performances and off-field skills, using a dynamic model specification.
- Analyse the role of historical sporting status on the clubs' annual revenues and talent compensation.
- Determine empirically if playing for a team with a strong sporting brand status typically implies receiving higher salaries.
- Discuss whether current sport performance or historical brand reputation is more relevant to explain the annual revenues generated by football clubs.
- Analyse the role of current and recent-past media visibility on the clubs' annual revenues and talent compensation.
- Disentangle the sport (on-field) contribution and other skills (off-field) of football players and examine the statistical significance of skills other than sport performance, such as the capacity to attract media visibility, on the clubs' revenue-generation and talent reward capacity.

Chapter 4

- Review the brand management theories developed in the context of European football clubs.
- Identify the strategic drivers and factors to leverage football brands.

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Contribution to the thesis:
This paper provides the economic context of the sports industry as part of the entertainment sector, performing a comparative analysis of the direct economic contribution of the sports business in two regions, The United States and the European Union (EU-28). Also, this paper introduces the analysis of the media visibility of sports leagues and the empirical relationship with leagues' revenues. Lastly, it proposes an econometric approach, using estimated fixed effects to examine the football clubs' financial and visibility brand value. The empirical analysis of brand value based on the media visibility was not included in the published version.

Chapter 1

GLOBAL BRANDS IN SPORTS: IDENTIFYING LOW-RISK BUSINESS OPPORTUNITIES

1.1. INTRODUCTION AND RELATED LITERATURE

The entertainment industry comprises different sectors, including motion pictures, television, music, fine arts, and sports. (Sometimes, gaming and gambling are also considered part of this industry). The sport industry provides entertainment at a global scale and has become an important business in the global economy (Ratten, 2011a). The continuous growth of the sports sector (Doherty et al., 2014) generates increasing interest on part of practitioners and researchers (Coates et al., 2014; Ratten, 2011b).

Even though from an economic perspective the direct economic impact of the entertainment sector does not represent a large contribution to the national product of the countries, leisure activities play a significant role concerning economic and social development. Moreover, leisure activities and the practice of sports help improving the individuals' well-being by arising the feeling of social inclusion and improving lifestyle in an integrated system (Cf. Statistical Office of the European Union, 2015). Moreover, given its educational nature, sport is seen as a driving force procuring positive social changes (Coalter, 2007; Eime et al., 2013).

The practice of sports and the enjoyment of fans have increased over time in modern societies. Widespread sports facilities make individuals, especially young people, to benefit from wholesome entertainment, healthy lifestyle, improved habits, and shared values. All these factors play a role in improving social cohesion as well as to promote the practicing of sports among all type of people (Wicker and Breuer, 2013). Other theoretical contributions (Ratten, 2010, 2011c) develop aspects that link sport-based entrepreneurship to social entrepreneurship, stressing the relevance of embodying sport

activities with social entrepreneurial character. Besides, entrepreneurial marketing theory focused on the importance of marketing activities to innovate and create value for customers (Morris et al., 2002). Successful marketing strategies, to develop the international expansion of companies, require recognizing the changing environments that exist in many markets (Collinson and Shaw, 2001). Moreover, global international markets represent an opportunity for innovation. Previous papers (Knight, 2000) stress also the effect that globalization would have had in generating entrepreneurial-oriented firms. Entrepreneurs have the skills to identify opportunities and to transform their ideas into products. All these features also apply to the context of professional sports, where global brands reach a strong international profile.

The sports industry has a direct and indirect impact on a variety of economic activities as it involves transactions across different sectors such as education, tourism, construction, clothing, etc. This fact, however, implies that the contribution of sports to the economy is something very difficult to determine. Specialized studies have been conducted to appraise the economic status of sports (e.g. "Study on the Contribution of Sport to Economic Growth and Employment in the EU 2012"[2]). Also, some countries report the economic activity of the sport industry as part of the entertainment sector (e.g. in the "National Income Accounts" or "Sports Satellite Accounts").

In this paper, we claim there are many opportunities to venture into a variety of markets through sports. Emerging technologies facilitate the expansion of new sport-related businesses while consolidated enterprises engaged with the community through sponsoring sport events or sport heroes. These features may encourage entrepreneurship in the form of projects linked to innovation or as strategic partnership with public or private institutions. Mobile applications that allow people to join communities or to practice sports using public facilities would be examples of this.

1.2. OBJECTIVES AND METHODOLOGY

In this paper we aim to providing an economic description of the sports industry, paying special attention to professional football[3]. This analysis will help entrepreneurs and

[2] SportsEconAustria (2012). Study on the Contribution of Sport to Economic Growth and Employment in the EU. Retrieved on 19/03/2017 from:http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

[3] For consistency, in this thesis we use "football" rather than "soccer". Then, to avoid ambiguities, "American" football is always explicitly indicated as a different sport.

investors to achieve a better understanding of the sector and to judge to what extent these businesses offer promising investment opportunities.

To appraise the comparative economic status of professional football within the sports industry, we adopt two alternative approaches. Previously, to give some context, we analyse the economic contribution of the sports industry as part of the entertainment (and leisure) sector. Finally, we apply a fixed effects model to identify less risky investment opportunities in the sector, by calculating the predicted annual revenues of football clubs as if they had no recent sports attainments. We argue that this approach is a good procedure for also identifying the football clubs with high inherent risks.

To accomplish our first goal, we initially carry out a descriptive analysis of the gross domestic product (GDP) in the United States (U.S.), and the gross value added (GVA) in the European Union (EU-28). To analyse the output generated by the entertainment sector in the U.S. we rely on the "Industry Economic Accounts", released by the Bureau of Economic Analysis (BEA, 2018)[4]; while data on entertainment GVA in the EU-28 is obtained from the "National Accounts Aggregates by industry", released by the European Union Statistical Office (Eurostat, 2018)[5]. Then, we additionally compare the two geographical areas based on employment data, instead of output. This is performed with the data released by the U.S. Bureau of Labor Statistics (BLS, 2017) and Eurostat.

In a second stage, we examine financial data to appraise the relative relevance of football leagues compared to other professional team-sport competitions. We analyse the total annual revenues of the Top-5 team-sport leagues in North America and compare them to the "Big-5" domestic football leagues in Europe. The analysis is developed on data obtained from the Union of European Football Associations (UEFA), official websites of sports Leagues, and Statista.com. Moreover, in addition to this approach, another alternative analysis is carried out on data collected from the searching tool: "Google Trends". We consider the use of Google Trends a promising innovative approach that constitutes one relevant contribution of this paper.

Finally, we perform a fixed effects linear regression analysis to study the relationship between revenues and past sport performance of football clubs in the Big-5 European domestic leagues. Our aim is to estimate the expected annual revenues of clubs regardless

[4] Bureau of Economic Analysis (BEA) code 7-Arts, entertainment, recreation, accommodation, and food services; related to 2007 North American Industry Classification System (NAICS) code 71.
[5] NACE code R-Arts, entertainment and recreation.

of their recent sports performance, an approach with relevant implications in terms of entrepreneurial risks[6]. The scope of this analysis is promising given the parallels that some papers establish between social entrepreneurship and the behaviour of sports clubs that aim to increase their commercial revenues (Coates et al., 2014; Wicker et al., 2013). Moreover, we examine the importance of local and global rivalries (between European teams and across leagues)[7], which are acknowledged to be a relevant factor to determine attendance to stadiums or other forms of demand for sport spectacles.

1.3. Analysis and Discussion of the Results

This section initially examines the economic relevance of the entertainment and sport sectors. Secondly, section 1.3.2 studies the football industry and its comparative position with respect to other professional team-sport leagues that operate in North America and Europe. Finally, in section 1.3.3, we apply panel data technics to estimate the predicted annual revenues that football clubs would be able to generate had they achieve no recent sports attainments.

1.3.1. Entertainment and Sport Sectors

Individuals, regardless of their education or cultural and socioeconomic background, demand goods and services provided by the entertainment industry. Nevertheless, the economic dimension of this industry seems smaller than it is usually believed. In this section, we examine (based on national accounting data, for respectively the U.S.[8] and

[6] For a discussion on the theoretical notion of social entrepreneurship and how it is used in the field of sports: Bjärsholm (2017), who finds, by analysing peer-reviewed papers, a limited role of sports within the context of social entrepreneurship. This quote (Bjärsholm, 2017, pp. 191) further clarifies this point: "*One possibility to realize the potential of sport is through the use of social entrepreneurship, a relatively new concept albeit one that has quickly gained momentum in scientific circles and occurs today within a large number of scientific disciplines (e.g., education, sociology, and political science) (Short, Moss, and Lumpkin, 2009). Social entrepreneurship as a contemporary organizational form has come about in a time characterized by societal change, which has seen the erosion of traditional sector boundaries (Dees and Anderson, 2003; Roper and Cheney, 2005)*". Hemme et al. (2017) examine the fitness industry to look for peculiarities of entrepreneurial strategies in pursuing competitive advantages.

[7] Some papers address the issue of rivalries in professional sport leagues by analysing the number of spectators (Tyler et al., 2017) or fans animosity (Cobbs et al, 2017). European national federations and other government bodies in soccer are fighting to preserve the essences of soccer, which presumably explains its success in attracting large numbers of fans. We wonder if the increasing interest on European soccer, as compared to other sports, may be due to having preserved the essences of sport.

[8] https://www.bea.gov/. Bureau of Economic Analysis (BEA). To measure the output stemming from the Sports industry in the U.S., we used data from Gross Output (GO) taking into account the category Sporting and athletic goods manufacturing (339920) as well as: Spectator sports (711200); and part of: Promoters of performing arts and sports and agents for public figures (711A00). The industries considered part of

EU-28[9]) the contribution of the entertainment industry to the total GDP in the period 2007-2015.

The "Industry Economic Accounts" of the U.S. Bureau of Economic Analysis disaggregates the entertainment industry in 4 sub-sectors: (i) Performing arts, spectator sports, museums, and related activities; (ii), Amusements, gambling, and recreation industries; (iii) Accommodation; and (iv) Food services and drinking places. Likewise, the "National Accounts Aggregates by Industry" of Eurostat distinguishes 4 sub-sectors: (1) Creative, arts and entertainment activities; (2) Libraries, archives, museums and other cultural activities; (3) Gambling and betting activities; and (4) Sports activities and amusement and recreation activities. (In our analysis, we excluded accommodation, food services and drinking places from the U.S. entertainment sector).

Significant efforts were made to conduct an analysis in which data from the U.S. and Europe were comparable. For the U.S. economy, we aggregate total output of sporting and athletic goods manufacturing[10], spectator sports[11] and promoters of performing arts and sports and agents for public figures. For the EU-28 economy, we use the total output as reported in the "National Accounts"[12]. Table 1.1 shows the economic contribution of the Entertainment and Sports industry, in absolute values, for the period 2000 to 2015, along with the average growth rates of meaningful sub-periods.

In both the European and the North American markets, we observed a positive trend in the respective growth rates, even though significant differences between pre and post-recessionary period exist. The economic performance of sport leagues has been claimed

Entertainment include all A71 categories: Performing arts companies (711100); Spectator sports (711200); Promoters of performing arts and sports and agents for public figures (711A00); Independent artists, writers, and performers (711500); Museums, historical sites, zoos, and parks (712000); Amusement parks and arcades (713100); Gambling industries (except casino hotels) (713200); and Other amusement and recreation industries (713900). (Retrieved: October 2018). To expand on the discussion about the size of the sports industry in the U.S., see Humphreys y Ruseski (2008), who, based on a variety of data sources, analyze the U.S. sports industry in 2005 on the bases of both aggregate demand and aggregate supply

[9] https://ec.europa.eu/eurostat/data/database. Eurostat: National accounts aggregates by industry (up to NACE A*64). The disaggregated information was available for the Gross Value Added (GVA). NACE code R93 - Sports activities and amusement and recreation activities. (Retrieved: October 2018).

[10] Bureau of Economic Analysis (BEA) code 339920 - Sporting and athletic goods manufacturing; related to 2007 North American Industry Classification System (NAICS) code 33992.

[11] Bureau of Economic Analysis (BEA) code 711200 - Spectator sports; related to 2007 North American Industry Classification System (NAICS) code 7112.

[12] NACE code R93 - Sports activities and amusement and recreation activities.

of being related to the different competitive structure adopted in Europe and America (Cf.: Szymanski and Smith, 1997; Andreff, 2011).

Table 1.1. Total Output - Entertainment and Sports

	GVA EU-28 (Mill. €)		GDP U.S. (Mill. €)	
Time period	Entertainment	Sports	Entertainment	Sports
2000	102.464	34.358	149.441	41.777
2001	107.115	36.149	155.910	43.291
2002	115.169	38.946	165.173	47.265
2003	118.123	40.335	178.396	49.347
2004	125.011	42.565	189.652	49.566
2005	131.837	44.316	199.696	53.118
2006	138.196	46.686	219.804	57.897
2007	146.526	49.723	238.957	62.454
2008	149.660	51.461	246.682	64.477
2009	146.553	50.653	243.097	62.016
2010	151.534	51.856	245.236	60.498
2011	156.224	53.960	255.418	62.627
2012	160.132	56.134	269.302	64.440
2013	161.711	56.567	280.343	67.431
2014	168.262	58.733	295.570	71.147
2015	179.983	62.714	314.210	75.809
Growth Rate 2000- 2007	43.00%	44.72%	59.90%	49.49%
Growth Rate 2008-2015	20.26%	21.86%	27.37%	17.57%

Source: Eurostat (2018) | Bureau of Economic Analysis - BEA (2018)

Table 1.2 reports the share of total output of 9 representative sectors. The larger economic contribution of many other industries, both in the U.S. and EU-28, relegates the entertainment industry to the bottom part of the table. In fact, in 2014 the output generated within the entertainment industry accounted for only 1.33% in the EU-28 and 0.95% in the U.S., respectively.

Among other remarks, the information shown in this section leads us to conclude that the direct economic contribution of the entertainment industry is poor, and it is even more the case concerning the professional sports sector. Besides, even if different accounting rules may distort the actual figures, it seems that the economic involvement of the sports sector in the EU-28 is greater than the corresponding figure in the U.S., suggesting that sports-related economic activities are comparatively more noteworthy in the European economy.

Table 1.2. Total Output Share by Industry (in %)

	GVA EU-28	GDP U.S.
	2014	2014
Manufacturing	15.97	19.57
Wholesale and Retail	11.47	8.48
Construction	5.31	3.99
Transportation and Warehousing	4.94	3.45
Information	4.88	2.55
Agriculture	1.61	1.59
Mining	0.69	2.21
Entertainment	1.33	0.95
Sports	0.47	0.23
TOTAL	46.69	43.03

Source: Eurostat (2017) | Bureau of Economic Analysis - BEA (2017)

It is also informative to analyse the relative share of sports as part of the entertainment industry. Attending to the comparative growth rates in the U.S. and the EU gives us insights on the different industries. Table 1.3 and Table 1.4 report annual growth rates for the period 2007-2015 and the relative weight of the entertainment and the sports industry with respect to the total national output of, respectively, the EU-28 and the U.S.

Table 1.3. Total Output Entertainment and Sport Industry EU-28

Gross Value Added EU-28						
Time period	Growth Rate (in %)				Share (in %)	
	Total Output	Total Entertainment	Sub-sector Sports	Sub-sector Other Entertainment	Entertainment wrt Total	Sports wrt Entertainment
2007	5.95	6.03	6.50	5.78	1.26	33.78
2008	0.97	2.13	3.50	1.44	1.27	34.38
2009	-5.42	-2.07	-1.57	-2.34	1.32	34.56
2010	3.68	3.39	2.38	3.94	1.32	34.22
2011	2.67	3.09	4.06	2.59	1.32	34.54
2012	2.01	2.50	4.03	1.70	1.33	35.05
2013	0.83	0.98	0.77	1.10	1.33	34.98
2014	3.40	4.05	3.83	4.17	1.34	34.90
2015	5.33	6.96	6.78	7.07	1.36	34.84
Growth Rate Annual Average	2.16	3.01	3.36	2.82	1.32	34.60

Source: Eurostat (2018)

Besides, the sports and the entertainment industries display positive growth rates during the period 2007-2015 (with the exception of year 2009). The U.S. economy shows higher

output than the EU concerning the entertainment sector. However, the significant growth of the entertainment sector is not as large in the sports industry, whose relative significance tends to be slightly reduced.

According to Eurostat, the EU-28 sports industry experienced an average growth rate of 3.36% during the period 2007-2015, thereby accounting for around 34% of the output generated in the entertainment sector. Then, according to the data published by BEA, the U.S. sports industry, which displayed an average growth rate of 3.11% over the period, is responsible for 24.79% of the overall entertainment sector.

The sports industry showed an increase in absolute terms in both markets. However, regarding the corresponding relative share, it shows a moderate increasing trend in Europe, while in the U.S. the share decreased by 1.35 points. The last comments should not lead us to wrong conclusions, because this drop is a clear consequence of an intense growth of other sectors within the entertainment industry, whereas sports only grows significantly in the U.S. since 2013.

Table 1.4. Total Output Entertainment and Sport Industry U.S.

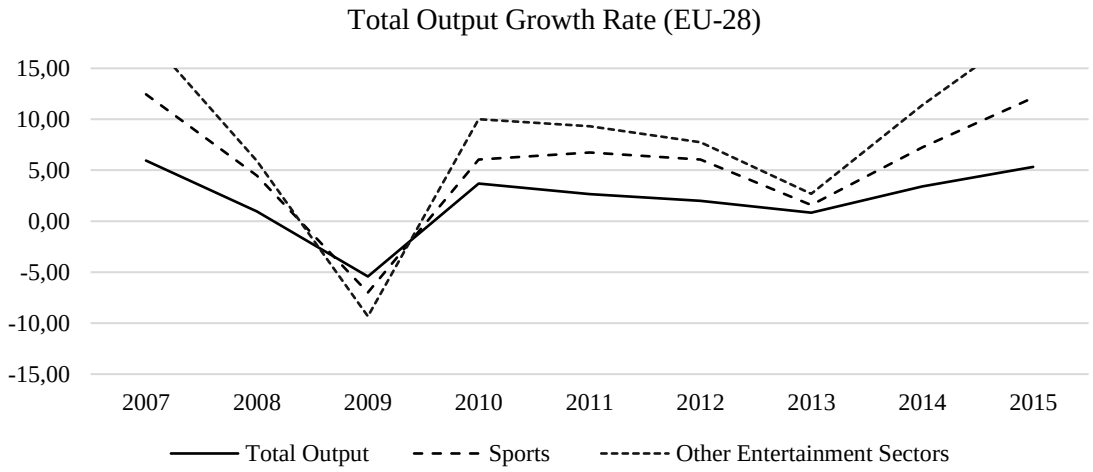
Gross Domestic Product U.S.						
Time period	Growth Rate (in %)				Share (in %)	
	Total Output	Total Entertainment	Sub-sector Sports	Sub- sector Other Entertainment	Entertainment wrt Total	Sports wrt Entertainment
2007	5.08	8.71	7.87	7.86	0.91	26.14
2008	2.58	3.23	3.24	2.93	0.92	26.14
2009	-8.08	-1.45	-3.82	-1.76	0.99	25.51
2010	5.83	0.88	-2.45	1.95	0.94	24.67
2011	5.53	4.15	3.52	4.20	0.93	24.52
2012	4.09	5.44	2.89	5.90	0.94	23.93
2013	3.27	4.10	4.64	3.86	0.95	24.05
2014	4.84	5.43	5.51	5.15	0.95	24.12
2015	1.28	6.31	6.55	6.23	1.00	24.13
Growth Rate Annual Average	2.71	4.09	3.11	4.04	0.95	24.79

Source: Bureau of Economic Analysis – BEA (2018)

Then, Figure 1.1 and Figure 1.2 illustrate the comparative evolution over time of the growth rates for some sub-sectors of the entertainment industry. A simple inspection of the graphs reveals disparities in terms of volatility. Between 2009 and 2011, the U.S.

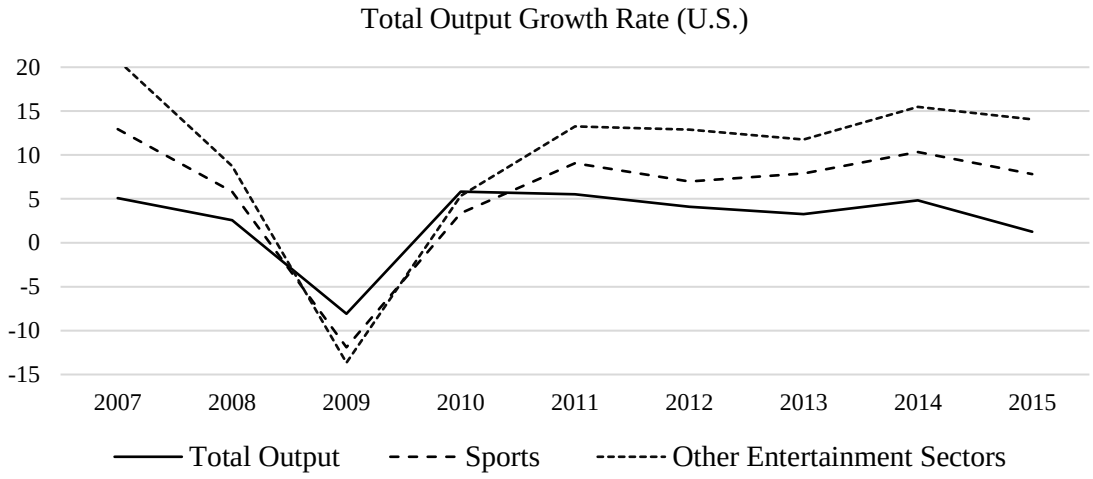
entertainment sector experienced a sharp economic boost, recovering from a negative rate of –8.08% to a growth rate of 4.15%. Unlike the EU-28, the entertainment sector has not fluctuated particularly since its recovery. Besides, the sport industry shows a similar growth trend since 2011.

Figure 1.1. Total Output Growth Rate EU-28



Source: Eurostat (2018)

Figure 1.2. Total Entertainment Output Growth Rate U.S.



Source: Bureau of Economic Analysis – BEA (2018)

We next analyse the relevance of the entertainment and sport sectors in terms of employment. Table 1.5 shows total employment in 2015 for the EU-28 and the U.S. On one hand, the number of people in 2015 employed in entertainment activities was around 13.2 million in the U.S.; a similar figure, 12.9 million people, is found for the case of the EU-28. Moreover, the distance between these two areas is much larger if considering another piece of information: The share of entertainment employment with respect to total

employment is 9.2% in the U.S. and only 6.1% of total employment in the EU-28 region. On the other hand, the sports-employment rate, as well as the corresponding share, is higher in the EU-28 than in the U.S.

Table 1.5. Employment by Sectors - Entertainment Employment (2015)

EU-28 (2015)	Employees (Mill.)	(%) wrt Total	U.S. (2015)	Employees (Mill.)	(%) wrt Total
Total employment	211.2		Total nonfarm	143.2	
Other nonfarm employment	194.6	92.1	Other nonfarm employment	127.9	89.3
Arts, entertainment recreation & other service activities	12.9	6.1	Other leisure & hospitality	13.2	9.2
Performing arts & spectator sports	1.6	0.8	***Performing arts & spectator sports***	0.5	0.3
Other entertainment	2.1	1	*Other entertainment*	1.7	1.2
Leisure & hospitality	16.6	7.9	Leisure and hospitality	15.4	10.7
Arts, entertainment, and recreation	1.6	0.8	Arts, entertainment, and recreation	2.2	1.5

Source: Bureau of Labor Statistics - BLS (2017)

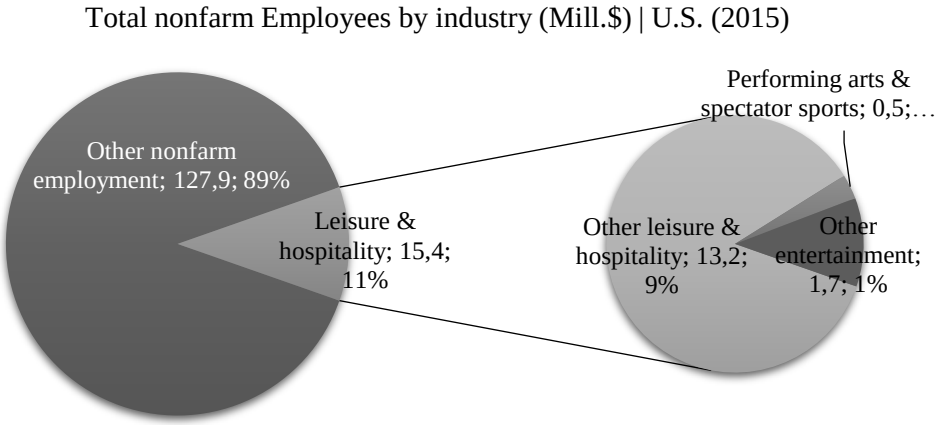
Figure 1.3 informs that U.S. employment in other leisure and hospitality sectors was more significant than in performing arts and spectator sports; whereas Figure 1.4 shows that the performing arts and spectator sports in the EU-28 region concentrates a higher share of 1.6% versus 0.5%, as compared to the U.S. Concerning employment, we find that (alike it happened when analysing the share of output) the sports industry seems to enjoy greater presence and relevance in Europe than in the U.S.

Notice however that the precedent analysis must be taken cautiously, since diverse criteria may have been applied at the level of defining sub-sector accounts in the U.S. and in Europe. Hence, it seems advisable comparing these results with the ones obtained in other studies on this matter.

Another informative analysis to understand the different behaviour between labour markets consists of examining specific countries in the EU-28 region, to identify similarities and dissimilarities among them. Initially Figure 1.5 opposes – for each country – total employment against employment in sports. As expected, greater absolute employment is associated to higher number of employed people in the sport sector. Besides, distances from the regression line permit identifying to what extent countries deviate from the usual pattern in the European labour market. Among the EU-28 members, UK, and Germany, followed by Spain and France, have the highest

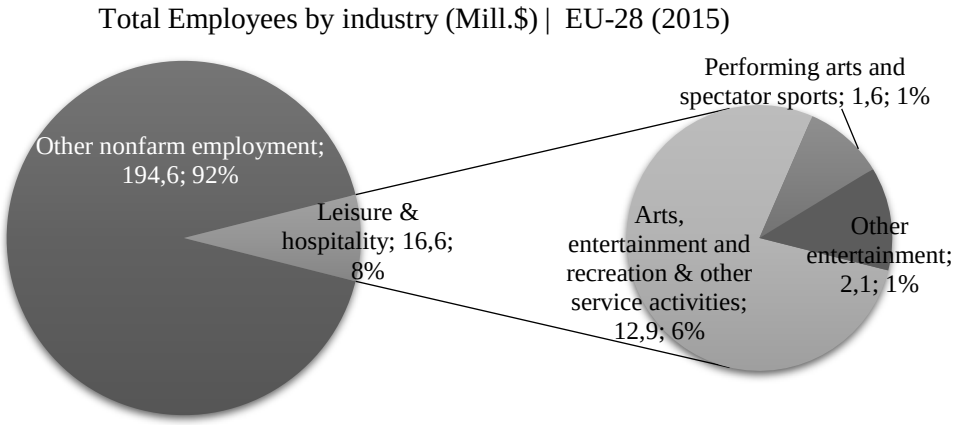
employment levels in the sport sector. Actually, most of the sport-labour force in the EU-28 is concentrated in the UK, Spain, France, and Germany, which give entrepreneurs insights on the most promising sport markets where to start investment projects.

Figure 1.3. Employees by industry- U.S. (2015)



Source: Bureau of Labor Statistics – BLS (2017)

Figure 1.4. Employees by industry- EU (2015)



Source: Eurostat (2017)

To identify markets where opportunities might be abundant, we also compare the employment concentration in sports across countries. As illustrated in Figure 1.5, it seems that Germany has a relatively small concentration of workers in the sport sector, whereas Sweden is at the top in this regard. Then, Figure 1.6 shows a complementary analysis by opposing absolute to relative figures on employment, confronting the number of

employed people (employment levels) to the relative employment concentration (employees in sports as a percentage of total employment).

Figure 1.5. EU-28 Total Employment versus Employment in Sports (2015)

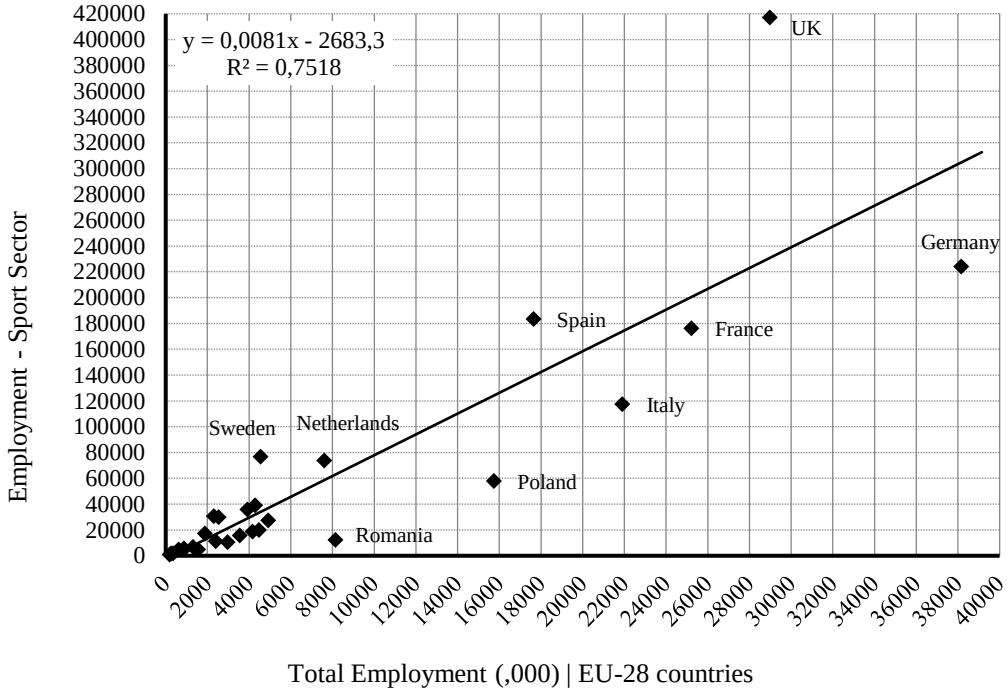
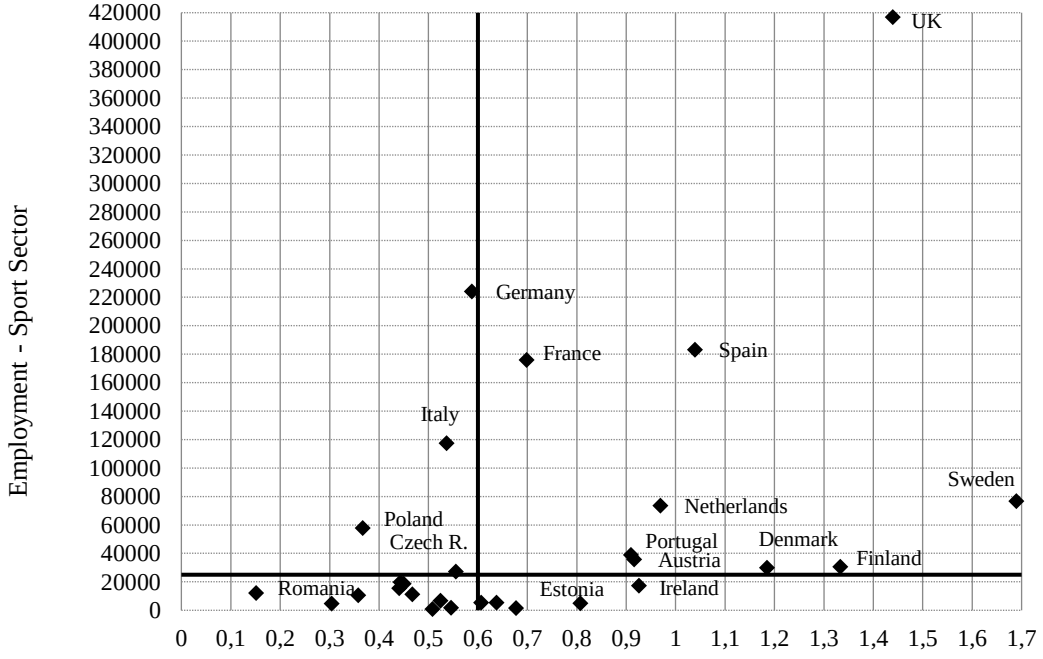


Figure 1.6. Total Employment versus Employment Concentration in Sports (2015)



The most significant sport markets as job creation is concerned are the countries located in the first quadrant, see Figure 1.6. Among them, the sports industry is highly important in UK, France, Spain, and Germany. The sports industry is also a pivotal sector in Sweden, despite its relatively small employment rate.

Before finishing this section, it is worth making an additional remark. The data from the national accounts used in our analysis leads to the conclusion that the sports industry has a relatively small significance both in the U.S. and in Europe. Nevertheless, several international studies report calculations where the relevance of the sports sector with respect to the entire economy is much higher than the figures obtained from the official statistics.

In particular, the "White Paper on Sports (2007)" released by the *Commission of the European Communities* affirms that there is a macroeconomic underestimation of sports sector. It quotes another study suggesting that "sport in a broader sense generated value-added of 407 billion euros in 2004, accounting for the 3.7% of EU GDP, and employment for 15 million people or 5.4% of the labour force". Hence, a deeper examination of this question is still needed for reaching more conclusive results, in which the indirect contribution of the sports industries should not be neglected.

1.3.2. Football Industry and Other Professional Leagues

In the previous section we assessed the relative importance of professional sports within the entertainment industry, by examining the share that both sports and entertainment represent with respect to the economy as a whole. Our analysis reveals the rather small economic dimension of the sports industry, both in terms of employment as well as concerning the share of its contribution to the national product. Nevertheless, there may be reasons to believe that the relevance of the sport businesses goes beyond the direct contribution to the economic activity.

On the one hand, previous research (Gásquez and Royuela, 2014) claims that leisure and sport activities fulfil a significant role in modern societies concerning economic development. Moreover, practicing sports is beneficial to improve health, lifestyle, constructive attitudes, and social cohesion, among other things. However, measuring the overall contribution of sports to the entire economy is difficult due to plentiful indirect transactions made between the sport industry and other economic sectors like education,

health care, clothing, tourism, etc. On the other hand, despite the economic impact of the sports industry, this sector is a cornerstone to develop diverse related businesses (Lee, 2008). Beyond entertainment, professional sports leagues are very appealing for investment and brand development. Apart from the economic interest and the implications that the sports industry may have, studying sports markets has revealed useful to other purposes. Actually, previous research work (Cf.: Kahn, 2000; Szymanski, 2003, among others) argue that the analysis of sport markets provides a natural laboratory for testing a wide array of economic hypothesis.

This section focusses on examining the comparative relevance of professional sport leagues with a global dimension. In establishing the status of the main professional team-sport leagues, we first approach the issue from a financial perspective by looking at the annual revenues of the Top-10 sports leagues worldwide. Then, we adopt an alternative approach that relies on a proxy variable that captures the interest of people (potential consumers of sports spectacle) to follow each of the leagues. In particular, the chosen variable for appraising the degree of interest of potential consumers is calculated with the searching tool: Google Trends. The procedure for gathering the data set for this analysis is described later in this section. Finally, we also address the issue by comparing sponsorship deals and broadcast contracts across the mentioned leagues, even if data on this regard is less abundant.

Table 1.6. Total Revenues (Mill. €) – American Professional Sport Leagues

Season	NFL	MLB	Season	NBA	NHL
2000	4,198	3,388	**1999/00**	2,469	1,809
2001	4,861	4,067	**2000/01**	2,832	2,163
2002	4,712	3,484	**2001/02**	2,541	1,981
2003	4,245	3,088	**2002/03**	2,167	1,668
2004	4,420	3,129	**2003/04**	2,149	1,640
2005	5,201	3,993	**2004/05**	2,693	Lockout
2006	4,954	3,870	**2005/06**	2,553	1,719
2007	4,814	3,721	**2006/07**	2,424	1,657
2008	5,370	4,128	**2007/08**	2,674	1,951
2009	5,595	4,116	**2008/09**	2,644	1,967
2010	6,300	4,633	**2009/10**	2,875	2,211
2011	6,811	4,911	**2010/11**	3,058	2,386
2012	6,937	5,152	**2011/12**	2,784	2,550
2013	6,958	5,157	**2012/13**	3,312	1,910
2014	9,123	6,466	**2013/14**	3,940	3,044
2015	11,190	7,721	**2014/15**	4,767	3,663
2016	12,599	8,645	**2015/16**	5,620	3,925
2017	11,723	7,888	**2016/17**	6,145	3,694

Sources: www.Statista.com | Kahane (2006) reports data for the NHL (1999/00 to 2003/04)

According to the aforementioned chosen approaches, we initially show the annual revenues of some very popular sport leagues in Table 1.6 and Table 1.7 The former table displays data relative to American sport leagues: The National Football League (NFL), Major League Baseball (MLB), National Basketball League (NBA) and National Hockey League (NHL). For comparison purposes, we converted into Euros the original figures given in US dollars, by applying the exchange rates reported at the Appendix 1 (see Table A.1).

Then, Table 1.7 gathers the corresponding data for the main European leagues: the UEFA Champions League, French Ligue 1, Italian Serie A; Spanish La Liga; German Bundesliga and English Premier League. The effort made to collect homogeneous financial data for all these leagues, allow us to rank team-sport leagues worldwide based on financial criteria, as well as to appraise their future financial perspectives. Given the conversion of the figures from US dollars ($) into Euros (€), necessary for the purpose of homogeneously comparing American and European leagues, the series evolve with fluctuations (ups and downs) inherited from the fluctuations observed in the official exchange rates.

Table 1.7. Total Revenues (Mill. €) – European Professional Sport Leagues

Season	UEFA Champions League	Ligue 1	Serie A	La Liga	Bundesliga	Premier League	Total Big-5
1999/00		607	1,059	683	681	1,151	4,181
2000/01	553	644	1,151	676	880	1,397	4,748
2001/02	555	643	1,127	776	1,043	1,688	5,277
2002/03	664	689	1,152	847	1,108	1,857	5,653
2003/04	651	655	1,153	953	1,058	1,976	5,795
2004/05	700	696	1,219	1,029	1,236	1,975	6,155
2005/06	606	910	1,277	1,158	1,195	1,994	6,534
2006/07	819	972	1,064	1,326	1,379	2,273	7,014
2007/08	822	989	1,421	1,438	1,438	2,441	7,727
2008/09	820	1,048	1,494	1,501	1,575	2,326	7,944
2009/10	1,099	1,072	1,532	1,644	1,664	2,479	8,391
2010/11	1,145	1,040	1,553	1,718	1,746	2,515	8,572
2011/12	1,165	1,138	1,587	1,788	1,869	2,917	9,298
2012/13	1,424	1,297	1,682	1,859	2,018	2,946	9,802
2013/14	1,446	1,498	1,700	1,933	2,275	3,897	11,303
2014/15	1,497	1,418	1,790	2,053	2,392	4,401	12,054
2015/16	2,047	1,485	1,917	2,437	2,712	4,865	13,416
2016/17	2,089	1,643	2,075	2,854	2,793	5,297	14,662

Sources: Deloitte ARFF (2005-18) | Deloitte FML (1999-18); UEFA financial reports; Clubs'accounts

There is evidence of an increasing positive trend since 2013 in the annual revenues of the four most relevant American sport leagues. This feature, however, does not hold in the case of the European football leagues.

In Table 1.7 we collect the evolution over time of annual revenues for the division category of each of the Big-5 football leagues: Premier League, La Liga, Bundesliga, Serie A and Ligue 1. The table also includes data on the UEFA Champions League.

In season 2013/14 the Premier League experienced a positive turning-point like the one affecting the American leagues at that time. It is also interesting noticing that, despite the growing revenues observed in the Big-5 European domestic leagues, football teams often face financial difficulties.

We next focus on other sources of information that may help to find out business opportunities in the football industry. The public and the supporters follow their favourite sport events through different communication channels, such as: Internet, TV, radio, social media, etc. Thus, there is a rich offer of news reports to satisfy the demand for information. In this context, and among other possibilities, we propose using the outcomes delivered by the searching tool Google Trends as a proxy variable to measure the comparative interest worldwide associated to the main team-sport leagues. To compare the degree of interest in sports, some papers employed an approach based on the number of news articles (Garcia-del-Barrio and Pujol, 2007; and Garcia-del-Barrio, 2018) or on the social media records (Korzynski and Paniagua, 2016).

In other words, another approach for identifying promising opportunities and markets where carrying out entrepreneurial projects consists of comparing the intensity with which Internet users search "news hits" related to each of the Top-10 team-sports leagues under consideration.

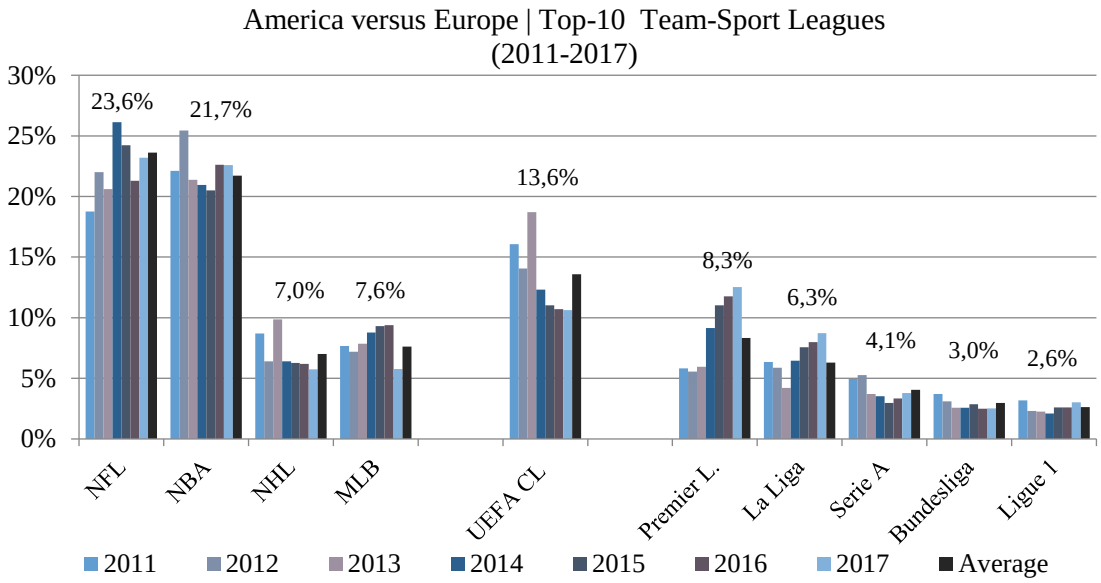
We performed this analysis over the period 2011-2017. Figure 1.7 summarizes the findings of comparing the relative interest drawn by each of the Top-10 sport leagues worldwide. Actually, professional sport leagues compete to attract the attention of fans. Our study reveals higher levels of interest for the users to follow the NFL, NBA, and the UEFA Champions League, relative to the other leagues. The numbers reported in the figure corresponds to the average for the whole period.

The examination of the results obtained with the Google Trends approach allows us recognizing the predominance of North American leagues. As far as the European market

is concerned, the Premiere League emerges as the most popular league, followed by the Spanish La Liga; both are clearly ahead of the other European football leagues.

We argue here that the comparison between the outcomes attained by the Google Trends approach and those coming from the financial records can enrich the discussion on the relative status of the Top-10 professional sport leagues. Furthermore, given the scope of sport industries as global businesses, we advocate the existence of a close empirical link between financial indicators and Google Trends records. Even if further research effort is needed, we explore hereafter the empirical relationship between these two mentioned approaches.

Figure 1.7. Google Trends Web – Professional Sports Leagues



First, in Table 1.8 we report the estimations of a simple regression model where the dependent variable is the relative share of revenues corresponding to each league and season. (The figures are calculated as the percentage of each league with respect to the total revenue accumulated by all the leagues at every season). Then, Google Trends captures the relative interest granted by the fans and the public, is the main explanatory variable (expressed in percent with respect to the total value of the Top-10 leagues).

The analysis of television (TV) and broadcasting revenues also provides information for identifying promising global sport markets where to develop entrepreneurial projects. This approach may come across the claim that the worldwide degree of interest in sport spectacles may be better captured by looking at TV revenues rather than at total revenues.

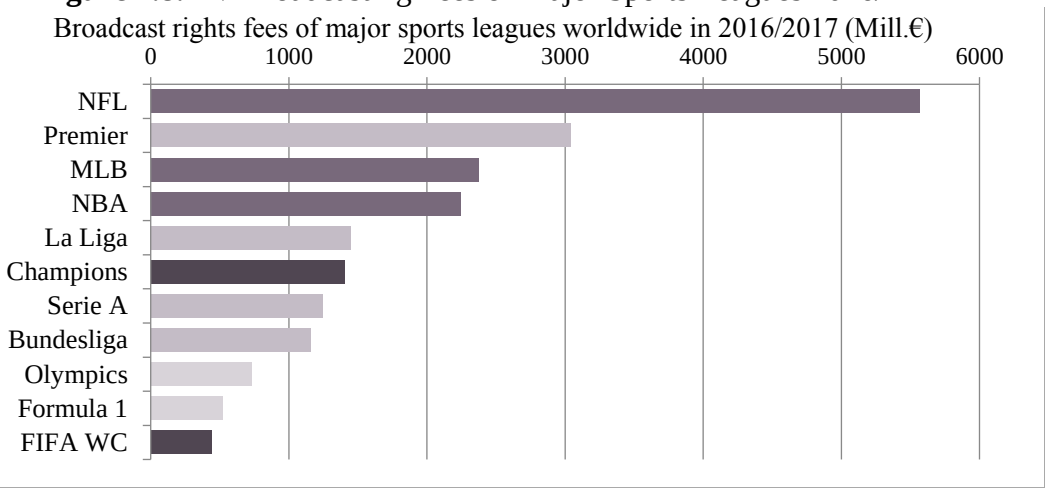
Table 1.8. Total Revenues (Mill. €). American and European Sport Leagues

Regression Analysis (Dep. Var.: Revenue percent)						
	OLS		OLS		Between	
Model	(1)		(2)		(3)	
Google Trends	0.7115***	(11.50)	0.43878**	(2.22)	0.7892***	(5.22)
NFL			14.9013***	(3.28)		
NBA			8.7335**	(2.02)		
UEFA Champions League			453.0210	(1.46)		
Premier League			5.1867***	(3.33)		
NHL			104.8940	(0.74)		
MLB			0.7565	(0.48)		
La Liga			2.8596**	(2.25)		
Serie A			4.0057***	(4.39)		
Bundesliga			5.1021***	(8.02)		
Constant	2.8868***	(4.57)			211.0390	(1.13)
Observations	80		80		80	
F-Global	0.0000		0.0008		0.0000	
R-squared	0.6889		0.9323		0.7729	

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | t-statistic in parenthesis

The information contained in Figure 1.8 suggests that the American leagues are generally ahead of the European leagues in this respect.

Figure 1.8. TV Broadcasting Fees of Major Sports Leagues 2016/17



Source: Statista.com

After having analysed a wide array of other data, we find relevant to pay attention to a topic that may motivate future research: the study of the amount of expenditure that companies dedicate to signing sponsorship contracts.

In Table 1.9 we summarize some data on North America sponsorship spending by sectors (in Billions $). The analysis is still preliminary, since we had only access to partial data, no covering a worldwide scale. Nonetheless, the figures are representative for our purpose, given that North America is the world's largest sponsorship market.

Simple inspection of the table yields interesting conclusions. First, it indicates that the sport industry plays a more than protagonist role in the context of sponsorship contracts. Moreover, despite the small numbers shown in Section 1.3.1, which apparently grant marginal importance to sports as compared to other industries (such as entertainment), the situation is completely the opposite when we look at its capacity to attract revenues from sponsorship campaigns. Moreover, the two bottom lines in the table reveal something striking: the amount spent by firms in sponsoring sport events and athletes multiplies by about seven times the size of the sponsorship contracts signed in the context of entertainment.

Table 1.9. North America - Sponsorship Spending by Sectors (Bill. $)

(Bill. $).	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016***
Sports			12.38	13.01	13.68	14.35	14.99	15.74
Entertainment			1.85	1.93	1.97	2.05	2.13	2.22
Causes			1.68	1.7	1.78	1.85	1.92	2.00
Arts			0.87	0.89	0.914	0.92	0.94	0.97
Festivals			0.80	0.83	0.839	0.85	0.86	0.88
Associate & Membership			0.53	0.55	0.568	0.57	0.59	0.61
TOTAL	**16.5**	**17.2**	**18.12**	**18.91**	**19.75**	**20.59**	**21.43**	**22.42**
% of sports wrt Total			68%	69%	69%	70%	70%	70%
Ratio sports to entertainment			6.7	6.7	6.9	7.0	7.0	7.1

Source: IEG: www.sponsorship.com | * Projected figures.

Further research is however needed to determine the extent to which such huge discrepancies may be due to differing methodological criteria or if they derive from causes still to be explored. In any case, it seems that sport superstars are empowered with the ability to draw attention and affinity from crowds, more than other individuals working in the area of art and entertainment.

1.3.3. Leading Football Brands and Low-Risk Revenues

In this section, we study the ability of football clubs to generate revenues irrespective of their recent sport performances. To this aim, we proceed to filter out the positive impact that sports achievements have to explain increases in the clubs' economic gains. This approach allows us establishing the rank of clubs as valuable assets for investors, especially concerning the finding of low-risk business opportunities. Precisely, previous

research identifies risk-taking among the factors that influence entrepreneurship (Cf.: Ratten, 2017). In this context, we believe that our analysis is enlightening as it provides insights regarding risk-taking, which in turn permits identifying promising investment opportunities by targeting the less-risky football clubs.

Applying panel data technics, we use a fixed effects linear model to estimate the annual revenues of football clubs competing in the Big-5 football leagues as a function of their recent sport performance. The model establishes a relationship between the clubs' revenues and three main explanatory variables: points obtained in the domestic league; international standings (i.e., number of rounds before the team was disqualified) in the UEFA Champions League; and international standings in the UEFA Europa League.

We gathered data for seasons running from 2009/2010 to 2015/2016. Our database collects an unbalanced panel of 583 observations. Table 1.10 shows the summary statistics of the main variables. We used dummies to control for the fluctuations of the exchange rate (Euro to British Pound). It is important mentioning that, due to lack of data availability, we only considered a few clubs competing in the Bundesliga.

Table 1.10. Summary Statistics of the Main Variables

	Sample	Mean	Std Dev.	Min	Max
Clubs' Revenues (Mill. €)	583	115.0481	120.7771	6.711	690.1
Points in Domestic Leagues	583	52.6878	16.2236	17	102
Rounds in Champions League	583	0.8970	1.9228	0	8
Rounds in Europa League	583	0.6689	1.6070	0	8

Table 1.11 displays both the estimations of the pooled OLS model as well as those stemming from the fixed effects model; we report the marginal effects at the bottom of the table to facilitate comparing the quantitative effect of the different regressors.

The empirical results confirm the expected positive relation between revenues and sport performance. In Model (1) incorporates dummy variables by leagues and achieves an explanatory power of 80%, while Model (2) explains 55.7% of the total variation of revenues across clubs; the main explanatory variables are statistically significant. Notice that when a club moves along to the next round in the UEFA Champions League, its annual revenues increase by €14.33 million (or €32.11 if teams' heterogeneity elements are not considered). Nonetheless, according to the marginal effects, points in the domestic league result to have a greater impact on the clubs' annual revenues.

Table 1.11. Total Revenues (Mill. €) "Big-5"

Regression Analysis (Dep. Var.: Revenue)				
	OLS		Fixed Effects	
Model	(1)		(2)	
Points	2.7369***	(12.01)	1.0591**	(3.30)
Rounds in Champions League	32.1183***	(13.26)	14.3348***	(4.53)
Rounds in Europa League	2.09100	(1.24)	1.9822**	(2.66)
Premier League	64.5287***	(7.09)		
La Liga	12.02940	(1.77)		
Serie A	34.1925***	(6.42)		
Bundesliga	68.3941***	(4.41)		
Season_Dummy_2010/11	5.84460	(0.73)	4.44310	(1.81)
Season_Dummy_2011/12	12.12990	(1.44)	11.8738**	(3.20)
Season_Dummy_2012/13	15.93200	(1.75)	19.1568***	(3.68)
Season_Dummy_2013/14	20.3231*	(2.22)	25.4734***	(3.47)
Season_Dummy_2014/15	24.4249**	(2.61)	29.5692***	(3.62)
Season_Dummy_2015/16	38.7100***	(3.64)	44.3038***	(4.24)
Constant	-113.1611***	(-8.47)	17.51930	(0.81)
Observations	583		583	
R-squared	0.8013		0.5570	
Prob > F	0.0000		0.0000	
	ey/ex		ey/ex	
Points	1.25340		0.4850	
Rounds in Champions League	0.2504		0.1117	
Rounds in Europa League	0.0121		0.0115	

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | t-statistic in parenthesis

We are interested to examine the estimated fixed effects, since they capture the potential revenues that clubs can generate thanks to their heterogeneity time-invariant features, after having filtered out their sport performance. Therefore, potential revenues derived from this procedure are not contingent to the risk associated to poor sport achievements in a season. To our knowledge, researchers have not computed in the past such calculations that we name here: "Low-Risk Revenue".

Furthermore, we evaluate the risk inherent to each club by comparing the low-risk revenues among them. From this analysis we identify the most attractive brands concerning for risk averse investors. In Table 1.12 we report the rank of clubs according to the low-risk revenues in Season 2015/2016. Thus, entrepreneurs may want targeting low-risk clubs for developing business activities. Appendix A collects an extended table with some 80 clubs for which enough observations were available, see Table A.2.

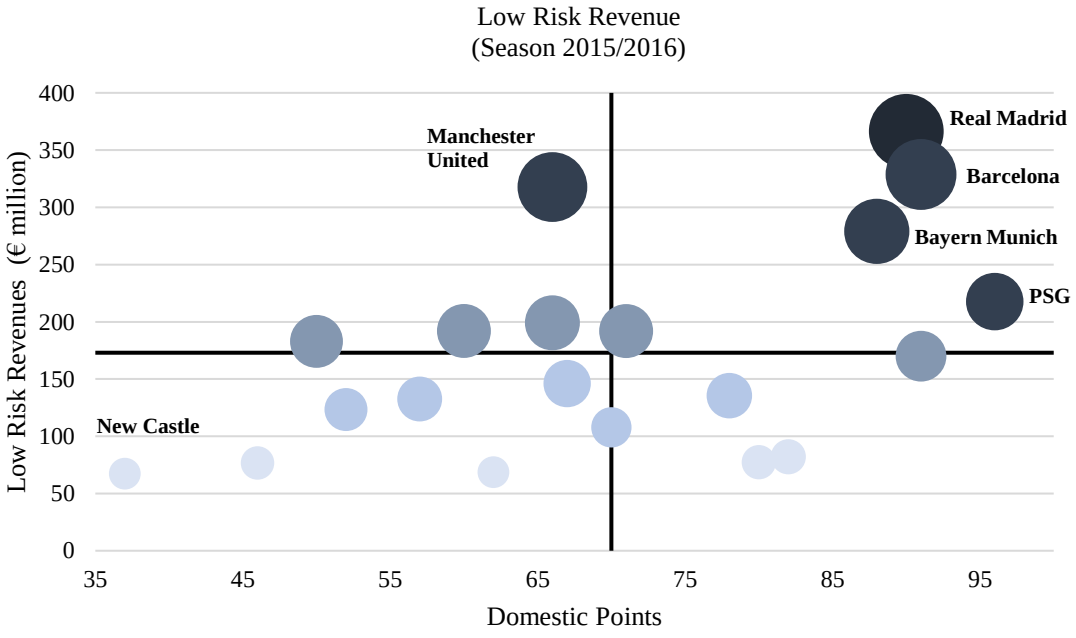
Table 1.12. Low-Risk Revenues – Top 20 (2015/2016)

Rank	Club	Low -Risk Revenues	Revenues
1	Real Madrid	366.3889	619.9390
2	Barcelona	328.7166	620.1150
3	Manchester United	317.7314	690.1000
4	Bayern Munich	279.0293	592.0000
5	Paris St. Germain	217.6447	542.4160
6	Manchester City	199.1130	526.6200
7	Liverpool	191.9963	404.6800
8	Arsenal	191.9211	469.0000
9	Chelsea	182.8950	448.9000
10	Juventus	169.9664	387.9000
11	Internazionale	146.0413	241.4000
12	Dortmund	135.4855	283.9000
13	AC Milan	132.5636	181.6700
14	Schalke	123.3548	224.5000
15	Tottenham Hotspur	107.8139	280.0600
16	Napoli	82.08083	155.3530
17	Roma	77.35326	194.2250
18	Genoa	76.68655	100.6290
19	West Ham United	68.64892	192.9600
20	Newcastle	67.34127	168.8400

Source: Authors' own calculations

For illustrative purposes, the relationship between the low-risk revenues and the points accrued in the national competition is shown in Figure 1.9.

Figure 1.9. Clubs' Capacity to Generate Low-Risk Revenue



The size of the bubbles depends on the capacity of each club for generating low-risk revenues as compared to the club that ranks first (Real Madrid).

Following this approach, we can explore the clubs' brand value in the media; the time-invariant clubs' characteristics will inform us about the clubs' capacity to capture media visibility regardless of recent sport performance. It is worth mentioning that this analysis is not included in the published version.

Table 1.13 displays the estimation results using OLS and Fixed Effects models. The media visibility has a positive relationship with points achieved in the national league and the participation in the UEFA Champions League, whereas the effect of participation in the UEFA Europa league seems to not be relevant to determine the degree of visibility. We observe from the OLS model that, compared to the Ligue 1, clubs from the Premier League and La Liga are associated with higher levels of visibility, and in a lesser extend clubs from Serie A.

Table 1.13 Media Visibility "Big-5"

Regression Analysis (Dep. Var.: Media Visibility)				
	OLS		Fixed Effects	
Model	(3)		(4)	
Points	0.5930***	(0.0695)	0.1730***	(0.0616)
Rounds in Champions League	6.8311***	(0.7347)	2.1887***	(0.6674)
Rounds in Europa League	-0.3002	(0.4897)	0.1424	(0.4002)
Premier League	22.1445***	(1.8665)		
La Liga	17.0299***	(2.4066)		
Serie A	10.6579***	(1.2710)		
Bundesliga	6.1058***	(1.5063)		
Season_Dummy_2010/11	0.8791	(2.1918)	0.5553	(1.5096)
Season_Dummy_2011/12	3.9525	(2.5021)	3.6596**	(1.6259)
Season_Dummy_2012/13	6.4104***	(2.4584)	5.6510**	(2.5054)
Season_Dummy_2013/14	-1.6092	(2.3474)	-1.8380	(1.7548)
Season_Dummy_2014/15	-4.3724*	(2.6383)	-5.2000***	(1.6308)
Season_Dummy_2015/16	-0.7425	(3.0105)	-1.1427	(2.2361)
Constant	-28.9214***	(3.8628)	7.6775**	(3.8516)
Observations	686		686	
R-squared	0.6238		0.4854	
Prob > F	0.0000		0.0000	
	ey/ex		ey/ex	
Points	1.6267		0.4745	
Rounds in Champions League	.2964		0.0949	
Rounds in Europa League	-0.0105		0.0049	

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | t-statistic in parenthesis

Again, the main interest is to examine the estimated fixed effects, which provide insights about the potential degree of visibility that are not contingent on the risk associated with poor sport achievements in a season. In Table 1.14, we report the rank of clubs according to the level of visibility generated in Season 2015/2016 that is explained beyond their sports achievements.

Table 1.14. Clubs' Media Brand Value – Top 20 (2015/2016)

Rank	Club	Media Visibility
1	Real Madrid	123.9662
2	Barcelona	123.3610
3	Manchester United	68.3191
4	Chelsea	53.8098
5	Liverpool	43.0442
6	Manchester City	36.4691
7	Arsenal	35.7264
8	Juventus	27.6572
9	AC Milan	27.1674
10	Bayern Munich	25.7629
11	Internazionale	23.7399
12	Roma	16.6774
13	Atlético de Madrid	15.7512
14	Tottenham Hotspur	15.0610
15	Everton	13.4187
16	Southampton	11.2593
17	Napoli	10.9551
18	West Ham United	10.1575
19	Newcastle	9.8107
20	Sunderland	9.7987

Source: Authors' own calculations

Regardless of the recent sports performance, the Top-5 clubs for the 2015/2016 season are Real Madrid, Barcelona FC, Manchester United, Chelsea, and Liverpool. We observe that only five clubs can accumulate all the media attention leaving little range to the rest of the teams. The degree of visibility that the first two clubs can generate is almost identical and with a great difference from the rest of the clubs, for instance, the Real Madrid can attract five times more visibility than the Bayern Munich, located in the 10th place. A comparison of the clubs' media and financial brand value suggests greater disparities between clubs', for example, the financial brand value of the Top Club (Real Madrid) is only five times bigger than the club in the last place (Newcastle), but its media brand value is twelve times greater than the Sunderland (in the 20th place).

1.4. SUMMARY AND CONCLUSIONS

This paper has accomplished several goals that may be helpful to motivate new business ventures and entrepreneurial innovations in the global sports industry. First, it analysed the economic contribution of the sports sector, and of the entire entertainment industry to the economy, in two geographical areas: the U.S. and EU-28. It also examined the relative economic contribution of the sports sector as part of the entertainment industry. Second, it developed a procedure for establishing the comparative status of team-sport leagues based on the strong empirical relationship found between total revenues and the degree of interest that fans and the public show for the different competitions (as captured through Google Trends figures). Third, we examine the relationship between football clubs' annual revenues and their recent sport performance, to identify business opportunities for entrepreneurs interested in identifying low-risk football brands.

According to the available data, the direct economic contribution of the sport sector, and that of the whole entertainment industry, is poor compared to other industries. However, our study built upon the recognition that sports have both direct and indirect effects on a variety of activities (including education, clothing, tourism, etc.), which points to a much larger impact on the overall economic activity than what the direct impact of the national accounts informs about.

Then, policymakers must encourage that more detailed information on the economic contribution of sports-related businesses should be published. Some macroeconomic analyses are useful for guiding managers to recognize the sport industry as a promising part of the entertainment sector. This paper started adopting the perspective of the GDP and then considering the share of employment in the sports and entertainment sectors.

The entertainment sector appears to be more relevant in the U.S. economy than in the EU-28, even if total output in both economies seems to be relatively negligible compared with other industries. We also payed attention comparing, over the period 2007-2015, total output growth and employment growth rates, in the U.S. and the EU-28 region. For the sports industry, it seems that greater volatility and employment losses affect the sport industry in the recessions as compared to other sectors. Besides, the comparative growth rate evolution suggests that the presence of sports in the overall economic activity is growing bigger in the EU-28, whereas it seems that the opposite happened in the U.S. economy. Managers should consider entering in markets like the UK, Spain, France, and

Germany, where the sporting-related labour force is highly concentrated. As far as the sport sector is concerned, richer data and a more careful analyses on employment figures is needed anyway to grant credibility to these results.

This paper used two alternative approaches for establishing the comparative status of professional sport leagues, which conveys valuable insights to identify entrepreneurial prospects. On the one hand, the analysis of financial data reveals the prevalence of American leagues in front of the European leagues. Data on annual revenues delivers the following rank: NFL, MLB, NBA, Premier League and NHL. (Notice that only the financially stronger European league is ahead of the financially weaker domestic league in America). On the other hand, if the ranking of team-sport leagues is based on the degree of interest of fans (as captured by Google Trends), the resulting ranking would then be commanded by NFL, NBA, and the UEFA Champions League.

The data on Sponsorship contracts signed in the entertainment and sport sector reveal that sport superstars are empowered with the ability to draw attention and affinity from crowds, more than other individuals working in art and entertainment.

Entrepreneurs are good to find out the needs to be met and to develop product with value-added for potential users. In carrying out these tasks' endeavours, they have to manage obstacles and to assume risks. We proposed an estimation procedure to help categorizing football clubs according to the risk level assumed when creating a product or service around football brands. Specifically, by filtering out sport performance, the paper estimated the fixed effects capturing the revenues that each club is able to generate thanks to its specific time-invariant heterogeneity. The potential revenues derived from this procedure are not contingent to the risk associated to poor sport achievements in a season. In summary, our results identify the football clubs that have more capacity to generate revenues irrespective of their recent sport performances; a concept that we denoted as low-risk brands. Accordingly, the low-risk revenues differ among football clubs, which facilitates identifying the sport brands that, depending on their inherent risk, present attractive business opportunities.

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Contribution to the thesis:
This paper deeps in the examination of the degree of visibility that sports leagues can generate worldwide and the empirical relationship with total annual revenues and TV broadcasting revenues; attention is given to the "Big-5" European football leagues. First, the visibility of North American leagues and Europe football leagues are compared, considered to be the most globalized professional sports leagues. Second, it centres the analysis to the visibility that the "Big-5" European leagues generate, observing markets shift and internationalization. Thirdly, an econometric analysis is performed to understand the empirical relationship between the sports leagues' degree of visibility and the generation of revenues.

Chapter 2

GLOBAL HIERARCHY OF TEAM-SPORT LEAGUES BASED ON INTERNET SEARCHES AND REVENUES: EUROPE VERSUS AMERICA

2.1. INTRODUCTION

The vertiginous development of new technologies has encouraged a globalized access to entertainment activities. In this context, the market size for leisure and sport spectacles has rapidly expanded attracting worldwide interest and audiences. Besides, European football[13] seems to draw greater global attention than other team-sport leagues, as it has entered new international markets and gained dominance in terms of visibility and popularity.

As part of the entertainment industry, the sport business has particular features, such as: capacity to attract high levels of investment (especially in the form of sponsorship and broadcasting contracts), increasing international expansion, the interaction with worldwide crowds of fans, and the high levels of audience (Ratten and Ratten, 2011; Biscaia et al., 2013; Nicholson et. al., 2018; Aguiar-Noury and Garcia-del-Barrio, 2019). Indeed, the players' media exposure helps to increase the identification and empathy feelings of fans for their sports superstars. Moreover, the degree of visibility in the media, derived from their sport achievements, often convert athletes in opinion leaders. We claim in this paper that the relative interest expressed by the public for each sport league can be used to establish a hierarchy of team-sport leagues and to examine their level of internationalisation with an entrepreneurial perspective.

In this regard, some aspects must be considered. On one hand, the international and entrepreneurial dimensions of the sports industry present new challenges for team

[13]To avoid ambiguities, "American" football is always explicitly indicated as a different sport.

management (Ratten, 2011a). Besides, online marketing strategies and new media projects have become essential in recent times to engage with the public and to strengthen the relationship with the fans (Santomier and Shuart, 2008; Phua, 2010; Meng et al., 2015; Marques et al., 2018). The technological developments provoke changes in the field of sport entrepreneurship, thereby creating opportunities for capital investment and the need for developing effective public policy (Ratten, 2019a).

The digital transformation in the sports industry combines innovative changes at various levels, involving different stakeholders, including sport spectators (Ratten, 2019b). From the fan's point of view, new technologies have altered the way of interacting, accessing to information, and their perception of sport events. For example, the use of social media applications allows sports teams creating content to engage with their followers, and at the same time enable followers to offer information and personal opinions to other fans. The use of social media as a marketing tool has caught the attention of researchers, regarding the analysis of the effectiveness of content, frequency of posting, communication of the brand image, the types of feelings expressed by the followers, level of interaction, among others (Araújo et al., 2014; Anagnostopoulos et al., 2018; Maderer et al., 2018; Corthouts et al., 2019). Sports consumers are increasingly experimenting an emotional connection with the sport through new technologies (Nicholson et al., 2018).

On the other hand, the global audiences typically attached to team sports leagues have attracted business investment; for instance, since the early 21st century, great business magnates, especially from China, Qatar, Singapore, Russia, and the United States found it attractive to invest in professional European football. This type of investment involved: the acquisition of clubs, purchasing of shares, transfer of players to the investors' home teams, and plans to increase football consumption. Moreover, some authors (Lin and Liu, 2011; Kraus et al., 2018) concluded that the change of the top management team and the leadership style of a firm directly affects the plans to increase international expansion and the degree of internationalisation. These changing patterns and strategies were beneficial to European football, since the clubs (and leagues) diversify their business by entering into new markets or increasing their presence in others, especially, in Asia and America (Hill and Vincent, 2006; Fleischmann and Fleischmann, 2019). The globalization of the sports industry represents opportunities for the venture in new business, as well as management challenges as to be responsive, think in novel and

creative directions, consider global business partners, among others (Ratten and Tajeddini, 2019).

Previous research highlights the importance of understanding the stage of internationalisation of a team (i.e., football club) to establish an effective business strategy that increases its brand value (Richelieu et al., 2008; Richelieu and Desbordes, 2009; Giroux et al., 2013). It is thus relevant examining the international expansion of the domestic leagues, which will further contribute to the analysis of the business environment and to the implementation of strategic actions (Ferreira et al., 2011).

In this paper, we support the thesis that the acknowledgment of the modern sports industry as part of the entertainment sector is better understood within a global context and from an entrepreneurial perspective. Precisely, the entrepreneurial approach leads to the comprehension of the sports industry in a broader context and open to account for the changes in social trends (Ratten, 2017; Ratten, 2019). Besides, the concepts developed around international entrepreneurship emphasizes the dynamism, recognition of opportunities, and value creation of business across international borders (Baier-Fuentes et al., 2019; Crespo and Aurélio, 2020); elements that are notably present in the international expansion of the team-sport leagues. Furthermore, some authors highlight that we find certain peculiarities in sport that are similar to entrepreneurship (Ahonen, 2019; Ratten and Tajeddini, 2019c).

The issue of entrepreneurship is approached by analysing the globalization of professional sports leagues and how these leagues have encouraged the introduction of non-traditional sports to new markets. We present an overview of the worldwide evolution of global markets and fans' acceptance and interest for the main top professional team-sport leagues.

From a social entrepreneurship perspective, the role of sports as a means to help on social issues, along with the increasing worldwide attention that sports-leagues have conquered as part of the entertainment industry, invite researchers to discuss on matters such as: the research advancements on this field, the development and implementation of sports public policy, the encouragement of social initiatives, the necessity to incorporate an entrepreneurial dimension for implementing sport policies, etc. (Bjärsholm, 2017; Miragaia et al., 2017; Peterson and Schenker, 2018; Ratten, 2020).

The rest of the paper's structure is as follows. Section 2 describes the methodology and data sources, while Section 3 discusses the main results. First, it identifies the hierarchy of team-sport leagues by using two approaches: (i) financial information; and (ii) a method based on Internet searches. Second, it extends the analysis of the internationalisation of the sports leagues while deepening in the examination of the "Big-5" European domestic football leagues. Finally, it compares the capacity that the North American and the European leagues have to transform the interest of the public into total revenues and television (TV) or broadcasting revenues. The last section summarises the conclusions and suggests future research avenues.

2.2. METHODOLOGY AND DATA SOURCES

The methodology applied in this paper combines the analysis of two sources of information: (a) annual financial data (on total and broadcasting revenues) and (b) measurements of the degree of interest that sport leagues arouse from the supporters.

First, the analysis based on financial data allows us to compare the relative status of professional leagues concerning total and broadcasting annual revenues, as a way to establish a hierarchy of team-sport leagues. Data on professional football leagues was obtained from various sources, including: (i) official websites; (ii) clubs' accounts; (iii) Deloitte Annual Review of Football Finance (Deloitte ARFF, 2005-2018); and (iv) Deloitte Football Money League (Deloitte FML, 1999-2018). The information relative to the UEFA Champions League was collected form (v) official reports published by the Union of European Football Associations (UEFA). Finally, the information on revenues for the North American Leagues was collected from the (vi) website: Statista.com.

In the second approach, our analysis focusses on the examination of the degree of interest shown by fans and the general public (potential consumers of sports spectacle), as captured by the intensity with which certain contents linked to team-sport leagues are searched in the Internet. Notice that, in addition to the immediate meaning that Internet metrics on global entertainment industries may have, these records are also potentially helpful to predict future revenues, mainly accrued through TV broadcasting rights and sponsorship deals.

To accomplish the aim described in the second approach (comparing the intensity with which Google users search for each sport league) we rely on the figures delivered

by the "Google Trends" tool. Previous studies proved that the data provided by this tool is reliable and helps to forecast consumer tendencies (Vosen and Schmidt, 2011; Choi et al., 2012). We actually use two alternative measures: "Google Trends News" to evaluate the relative frequency with which users look for news articles related to each of the Top-10 team-sport leagues; and "Google Trends Web" to get a more global view of the relative capacity that each league has to draw attention from the public taking into account all kinds of Internet contents. The study is carried out for the period January 2004 to December 2016 when using Web outcomes; whereas it is narrowed down to 9 years for "Google Trends News", due to data constraints (it was only available since 2008).

Finally, we perform regression analysis techniques to study the relationship between Internet searchers and financial data of team-sport leagues worldwide. Different models are estimated by applying OLS pooled regression and random effect models to the aim of estimating the capacity these leagues have to transform degree of interest into revenues. The proposed econometric models may help entrepreneurs to achieve a better understanding of the sports industry.

2.3. FINDINGS AND DISCUSSION OF THE RESULTS

This section examines to what extent the status and hierarchy of European football leagues (both in terms of their economic dimension and popularity) has evolved in recent times as compared to North America professional team-sport leagues.

Initially, Section 2.3.1 addresses the issue from an economic perspective by examining the annual revenues of the main team-sports leagues in North America and Europe. We first identify, according to financial criteria, the Top-5 American sport leagues: National Football League (NFL), National Basketball League (NBA), Major League Baseball (MLB), National Hockey League (NHL) and Major League Soccer (MLS). Interestingly, the Top-5 competitions in Europe happen to be domestic football leagues: English Premier League, Spanish La Liga, Italian Serie A, German Bundesliga, and French Ligue 1. For comparative purposes, we add the UEFA Champions League to the exclusive group of the Top-10 worldwide sports leagues, as it is meant to be the most significant football competition in Europe.

Then, in Section 2.3.2, we adopt an approach based on measurements of the degree of attention granted by fans and the public. As a proxy variable to appraise the interest of

potential consumers of sports spectacle, for every league and period, we use the searching tool: "Google Trends". In particular, we look both at the relative intensity of searches for news articles and for general Internet contents. The procedure for gathering the data is described later on in this section.

Financial outcomes are precisely supposed to depend on the capacity that a league has to draw attention from fans and other potential consumers of sport spectacles. Therefore, we also study, through regression analysis, the empirical relationship between the two approaches. Moreover, we further examine the link between TV broadcasting contracts across the leagues, even if data in this case is less abundant.

2.3.1. FINANCIAL HIERARCHY OF FOOTBALL LEAGUES RELATIVE TO OTHER PROFESSIONAL SPORT LEAGUES

Attending to financial criteria is the obvious way for establishing the hierarchy of the most relevant sport leagues worldwide. We start this section by looking at the annual total revenues of the most relevant team-sport competitions. Table 2.1 displays data of the main North American leagues: the NFL, MLB, NBA, NHL, and MLS; the information in the table is given in U.S. dollars, covering from 2005 to 2016. Then, Table 2.2 shows the annual revenues (in Euros) of the foremost European leagues: the English Premier League, Spanish La Liga, Italian Serie A, German Bundesliga, French Ligue 1, and UEFA Champions League. In the tables, we also report, as a percent of total revenues, the share of income obtained from TV broadcasting contracts.

The task of collecting the data series altogether has been performed over the years and we consider the gathering of this database as a relevant contribution itself. In addition to rankings, these data inform us about the evolution of annual revenues and, therefore, about the future economic perspectives of each team-sport league.

To more easily interpret the data reported in Table 2.1, Figure 2.1 represents similar information, for a larger period, of the Top-5 North American leagues. To perform homogeneous comparisons between American and European competitions, annual revenues in this graph were converted from U.S. dollars ($) to Euros (€).[14]

[14] The conversion was made applying the exchange rates corresponding to the 31st of December, as reported in the Appendix. Notice that, given the mentioned conversion into Euros, the series evolve with fluctuations (ups and downs) inherited from the variations observed in the official exchange rates over the years.

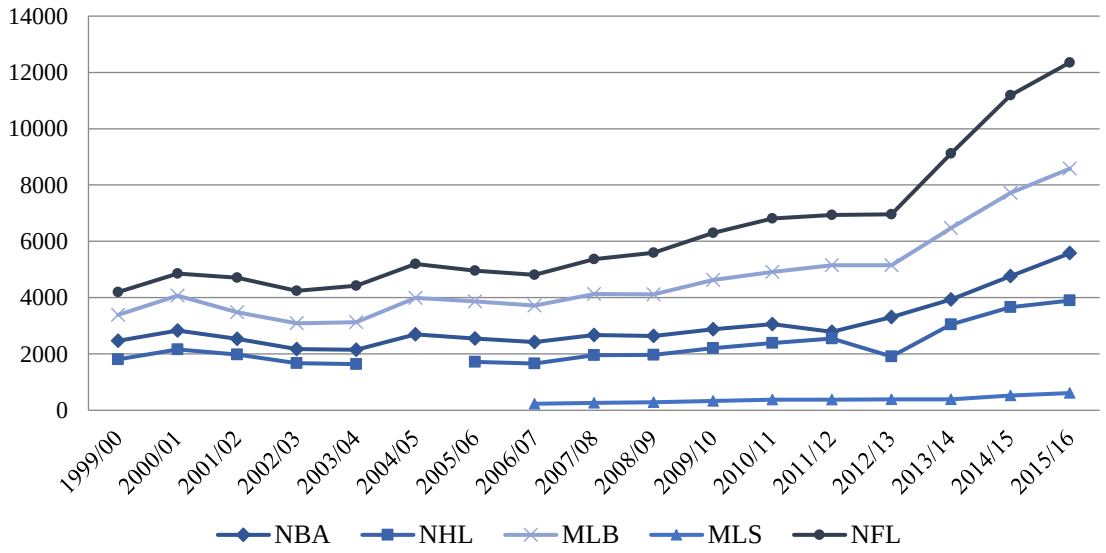
In most of the cases, especially as concerns the NFL, there is evidence of an increasing positive trend experienced since 2013. This feature affects the annual revenues of four out of the Top-5 North American sport leagues (all except the MLS). Later on, we report the dissimilar behaviour shown by most of the European professional football leagues.

Table 2.1. Total revenues (Mill. US $) – American professional sport leagues

Year	MLB		MLS		Year	NFL		NBA		NHL	
	Total (Mill.$)	TV (%)	Total (Mill.$)	TV (%)		Total (Mill.$)	TV (%)	Total (Mill.$)	TV (%)	Total (Mill.$)	TV (%)
2005	4,730	11.8			**2004/05**	6,160	35.7	3,190	24.0	lockout	-
2006	5,110	13.1			**2005/06**	6,540	47.2	3,370	22.8	2,270	3.1
2007	5,480	15.8	340	7.1	**2006/07**	7,090	43.5	3,570	26.1	2,440	2.9
2008	5,820	14.9	371	6.5	**2007/08**	7,570	40.8	3,770	24.7	2,750	2.5
2009	5,900	14.7	404	5.9	**2008/09**	8,020	38.5	3,790	24.4	2,820	2.5
2010	6,140	14.1	440	5.5	**2009/10**	8,350	36.9	3,810	24.3	2,930	2.4
2011	6,360	13.5	480	5.0	**2010/11**	8,820	35.0	3,960	23.4	3,090	2.3
2012	6,810	12.6	494	6.3	**2011/12**	9,170	33.6	3,680	25.1	3,370	5.9
2013	7,100	11.7	538	6.3	**2012/13**	9,580	32.2	4,560	20.3	2,630	7.6
2014	7,860	19.7	476	7.1	**2013/14**	11,090	44.6	4,790	19.3	3,700	11.7
2015	8,390	18.5	566	15.9	**2014/15**	12,160	40.7	5,180	17.9	3,980	10.9
2016	9,030	17.2	644	14.0	**2015/16**	13,000	38.1	5,870	15.8	4,100	10.6

Source: www.statista.com

Figure 2.1. Total annual revenues (Mill.€) - American team-sport leagues



Similarly, Table 2.2 and Figure 2.2 report and illustrate, respectively, data on annual revenues corresponding to the first division categories of the "Big-5" domestic football

leagues in Europe along with the UEFA Champions League; the information in the table is given in Euros, for the seasons 2004/2005 to 2015/2016.

Table 2.2. Total revenues (Mill.€) – European professional football leagues

	UEFA Champ. League		**French Ligue 1**		**Italian Serie A**		**Spanish La Liga**		**German Bundesliga**		**Premier League**	
Season	Total (Mill. €)	TV (%)	Total (Mill. €)	TV (%)	Total (Mill. €)	TV (%)	Total (Mill. €)	TV (%)	Total (Mill. €)	TV (%)	Total (Mill. €)	TV (%)
2004/05	700	67.1	696	49.4	1,219	54.6	1,029	39.7	1,236	26.0	1,975	43.3
2005/06	606	79.5	910	57.6	1,277	60.1	1,158	35.1	1,195	27.2	1,994	42.1
2006/07	819	76.4	972	58.1	1,064	60.9	1,326	42.0	1,379	34.8	2,273	38.7
2007/08	822	76.8	989	56.3	1,421	60.7	1,438	40.3	1,438	33.1	2,441	47.9
2008/09	820	76.5	1,048	55.0	1,494	59.7	1,501	41.4	1,575	31.0	2,326	48.8
2009/10	1,099	77.1	1,072	56.6	1,532	59.1	1,644	44.1	1,664	30.4	2,479	51.2
2010/11	1,145	77.3	1,040	58.4	1,553	60.4	1,718	44.9	1,746	29.7	2,515	51.9
2011/12	1,165	76.6	1,138	53.9	1,587	58.7	1,788	44.1	1,869	29.2	2,917	50.4
2012/13	1,424	77.0	1,297	48.7	1,682	59.0	1,859	48.4	2,018	30.7	2,946	47.2
2013/14	1,446	77.2	1,498	40.4	1,700	58.9	1,933	49.1	2,275	31.5	3,897	54.0
2014/15	1,497	77.6	1,418	44.3	1,790	61.4	2,053	47.5	2,392	30.6	4,401	53.1
2015/16	2,047	80.4	1,485	44.2	1,917	62.1	2,437	50.6	2,712	34.4	4,865	53.0

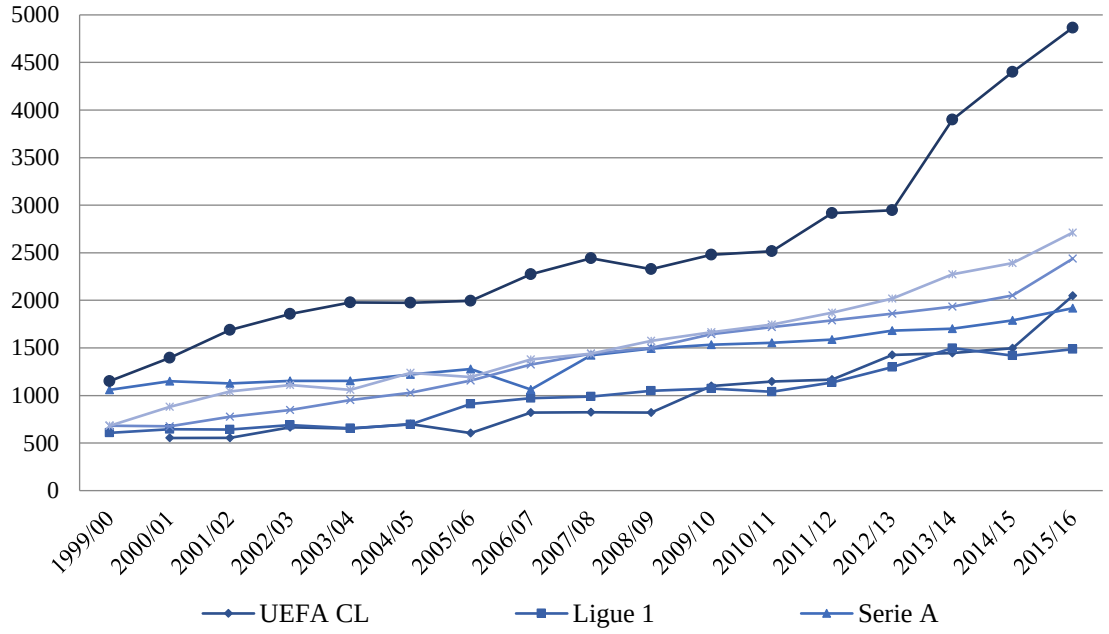
Sources: Deloitte ARFF (2005-17) | Deloitte FML (1999-17) | UEFA financial reports | Clubs' accounts

The comparison of data series leads to interesting conclusions. For instance, starting in season 2012/13, the Premier League experienced a sharp increase in the amount of revenues, similar to the increase affecting the American leagues at that time. The European market has been traditionally dominated by the domestic football leagues hosted in England, France, Germany, Italy, and Spain.

Nonetheless, despite the growing revenues generated by the "Big-5" European domestic leagues, football clubs hardly make profits. This result may be the consequence of clubs aiming at maximizing sport achievements rather than profits, one aspect that has been extensively examined (Cf.: Sloane, 1971; Késenne, 1996; Szymanski and Smith, 1997; or Garcia-del-Barrio and Szymanski 2009, among others).

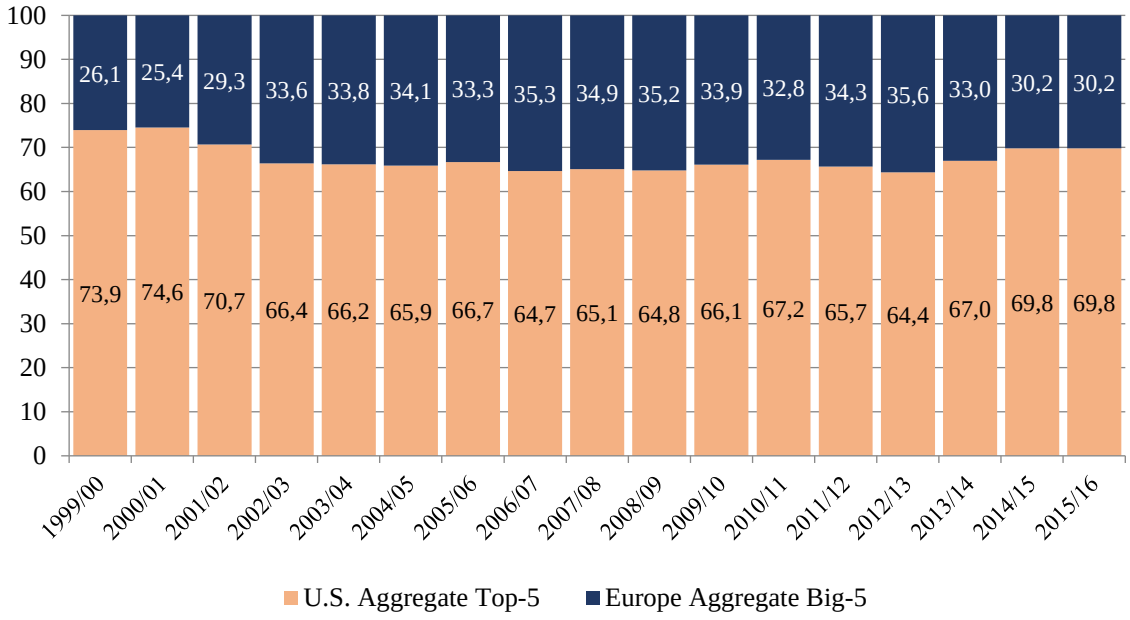
In summary, the goal of ranking team-sport leagues according to financial criteria seems to have been successfully accomplished by examining data on total revenues.

Figure 2.2. Total annual revenues (Mill.€) - European football leagues



The previous analysis might not be considered fully finished until paying attention to another relevant variable: the population of the country that hosts each of the team-sport professional leagues. In fact, additional conclusions may be obtained from examining Figure 2.3, which represents the proportion of revenues accumulated by the Top-5 North American leagues as opposed to the percentage of the "Big-5" European leagues.

Figure 2.3. Big-5 European leagues vs. Top-5 U.S. leagues comparative status (% wrt total aggregate revenues)



The comparison is meaningful, given that the aggregate population, over the years, of the 5 European countries hosting the domestic football leagues is almost identical to the U.S. population. (Cf.: data on the countries' population is reported in Table 2.3).

A simple inspection of Table 2.3 gives support to the accuracy of the comparison analysis performed so far. The last two columns of the table display two meaningful comparisons. One of them reports the ratio between the population of the U.S. and the aggregate population of the five European countries hosting the "Big-5" football Leagues, making clear that both markets have the same size in terms of population levels. The last column of the table, for comparative purposes, collects the ratios of the U.S. population and the aggregate population of the 28 member states of the European Union.

Table 2.3. Total U.S. population vs. "Big-5" aggregate population (in Mill.)

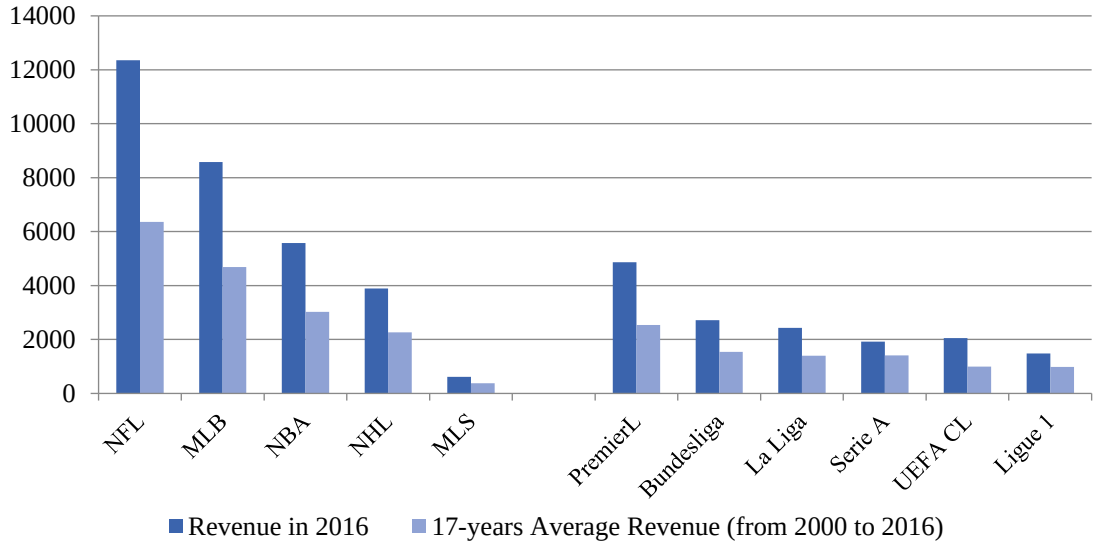
	U.K. (Mill.)	**France** (Mill.)	**Italy** (Mill.)	**Spain** (Mill.)	**Germ.** (Mill.)	**U.S.** (1)	**Big-5** (2)	**EU(28)** (3)	(1) / (2)	(1) / (3)
2005	60.40	63.18	57.97	43.65	82.47	295.52	307.67	494.70	0.96	0.60
2006	60.85	63.62	58.14	44.40	82.38	298.38	309.39	496.54	0.96	0.60
2007	61.32	64.02	58.44	45.23	82.27	301.23	311.27	498.41	0.97	0.60
2008	61.81	64.37	58.83	45.95	82.11	304.09	313.07	500.42	0.97	0.61
2009	62.28	64.71	59.10	46.36	81.90	306.77	314.34	502.19	0.98	0.61
2010	62.77	65.03	59.28	46.58	81.78	309.35	315.43	503.23	0.98	0.61
2011	63.26	65.34	59.38	46.74	80.27	311.66	315.00	504.49	0.99	0.62
2012	63.70	65.66	59.54	46.77	80.43	314.00	316.10	504.06	0.99	0.62
2013	64.13	66.00	60.23	46.62	80.65	316.20	317.63	505.11	1.00	0.63
2014	64.61	66.33	60.79	46.48	80.98	318.56	319.20	506.82	1.00	0.63
2015	65.13	66.62	60.73	46.45	81.69	320.90	320.62	508.20	1.00	0.63
2016	65.64	66.90	60.60	46.44	82.67	323.13	322.25	510.10	1.00	0.63

Source : https://data.worldbank.org

Figure 2.4 depicts the ranking of sport leagues in terms of annual revenues for the year 2016, along with the ranking obtained from computing the average revenues corresponding to the 17 years under analysis.

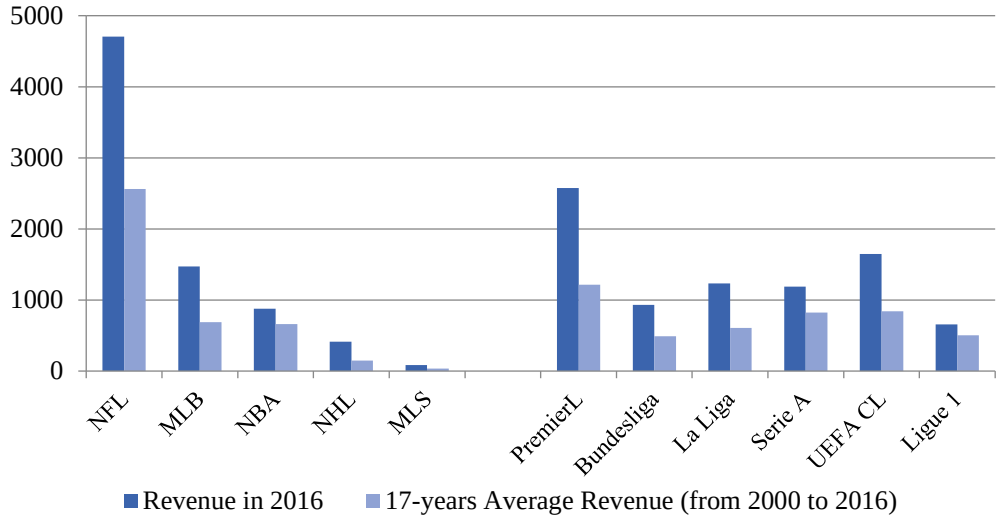
The figure indicates the prevalence of North American leagues, as their financial records are far beyond the levels of the European leagues. This conclusion will be confronted later in this section with the data on the degree of global interest that each league draws from the supporters and the public. But, before we move into this, some additional comments may be helpful.

Figure 2.4. Total revenues (Mill.€) - American and European sport leagues



Some studies intended to explain TV broadcasting revenues for domestic markets in the framework of the pay-per-view business (Cf., for the Spanish league, Pérez et al., 2015; and, for the Norwegian league, Hammervold et al., 2006). Regarding the TV broadcasting revenues, the results are very different, even if the NFL and the Premier League still appears as the leader competitions in, respectively, the North America and Europe markets. Figure 2.5 also shows that European football has been more efficient overall to generate annual revenues from TV rights, especially in recent times.

Figure 2.5. TV revenues (Mill.€) – Professional sport leagues



There is still needed to find the reasons that might explain these financial outcomes. For instance, Szymanski (2003) describes the crucial differences in the competition structure

characterizing the American leagues as compared to the prevailing league structure in Europe. Andreff (2011) provides more general insights on the role of regulations, by comparing the European and American sport leagues. Also, Hoehn and Szymanski (1999) and Rohde and Breuer (2017) tackle the issue of the football market in Europe. Anyway, the way how sport leagues are designed may certainly affect the degree of interest raised from fans and in the media is something deserving additional research effort.

2.3.2. Google Trends Approach – Appraisals based on news and web searches

The development and implementation of new media technologies have contributed to the globalization process of the sports business, since one of the main characteristics of these technologies is the use of the Internet to deliver content (Santomier and Shuart, 2008). Indeed, the Internet has proved to be a close ally of the sports business by achieving competitive advantage (Evans and Smith, 2004). Thus, there is a rich offer of online news reports and content to satisfy the demand for information.

The next analysis examines the degree of the attention attracted by the Top-10 Leagues among sport fans and spectacle consumers. As previously mention, for establishing the hierarchy of team-sport leagues, we rely on the results delivered by the searching tool "Google Trends" as a proxy variable to measure worldwide comparative interest across the leagues. In doing so, we use normalized data of the relative volume of searches in Google, using the name of each league as a keyword for the queries (Choi et al., 2012).

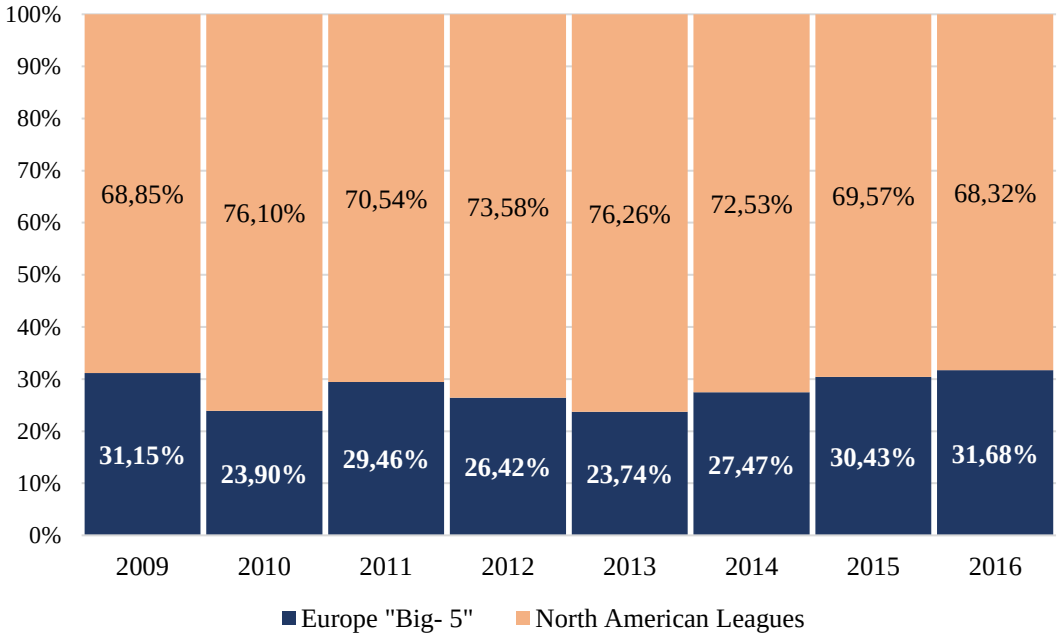
The evaluation compares the relative status of the leagues and the attention granted by followers from different markets. We used the outcomes for news searches articles across leagues and computed the average share of interest for each league during the season.

Figure 2.6 shows the aggregate share of attention for the Top-10 leagues according to its region; for instance, in 2009, the North American leagues had an aggregate share of 68.85% while the European leagues 31.15%. Overall, North American leagues seem to have predominance over the European "Big-5" leagues in the last years.

An interesting insight comes from the analysis of the U.S. population and the aggregate population of the countries hosting the "Big-5" football leagues. The total

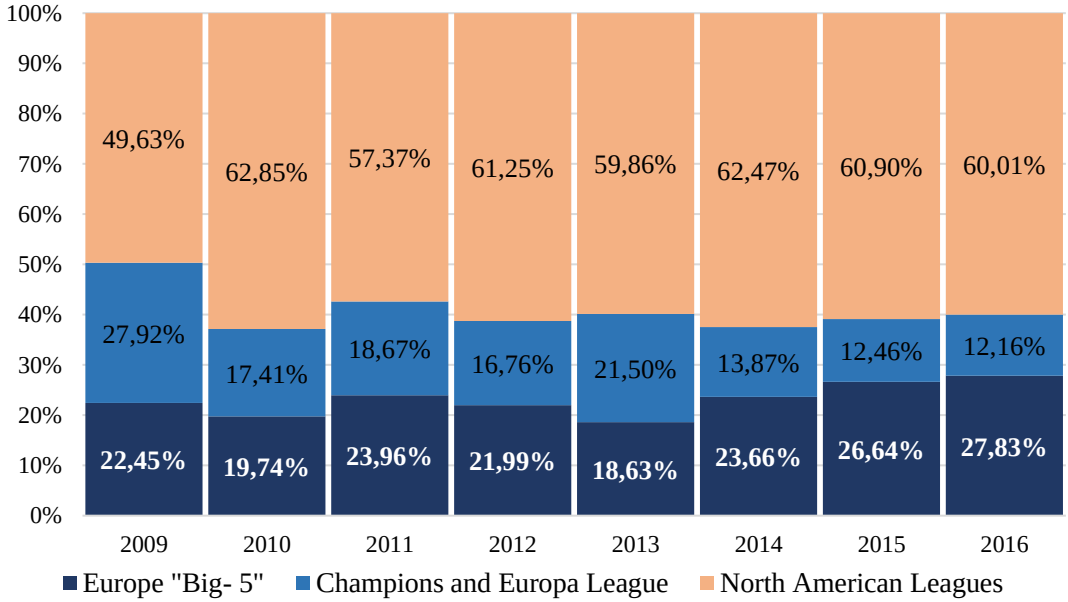
population of the mentioned five countries is almost identical to that of the U.S. implying that comparisons between the two groups can be homogeneously performed.

Figure 2.6. Google Trends News. North American leagues vs. European football leagues



In the following two figures, we incorporate into the analysis two other relevant European football tournaments: the UEFA Champions League and the UEFA Europa League.

Figure 2.7. Google Trends News. North American team-sport leagues vs. European football leagues (and UEFA Champions League and Europa League)

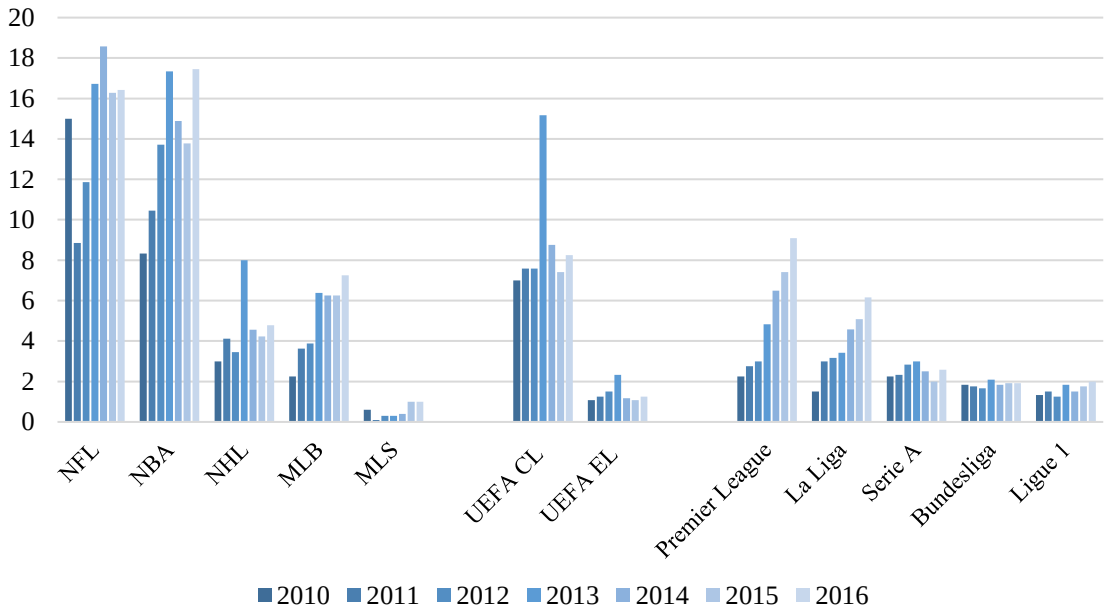


According to the information in Figure 2.7, the conclusions reached regarding the North America predominance concerning worldwide interest are still valid, although the gap between the two regions becomes smaller if the new countries which participate in the tournaments and fan crowds are considered in the analysis.

Notice that by including these two European leagues, we have distorted the homogeneous comparison carried out so far due to a couple of reasons. First, we are now comparing five American leagues against seven European competitions. Second, and more importantly, since the two UEFA competitions involved many other countries, the analysis is then affected by the unbalance populations that are concerned in each case.

Figure 2.8 summarizes the relative interest shown for each of the Top-12 leagues over the 2008-2016 period. Among the leagues that compete to gain public attention, the NFL, NBA, and, to a lesser extent, the UEFA Champions League are those attracting the highest degree of interest.

Figure 2.8. Google Trends News – Professional sports leagues



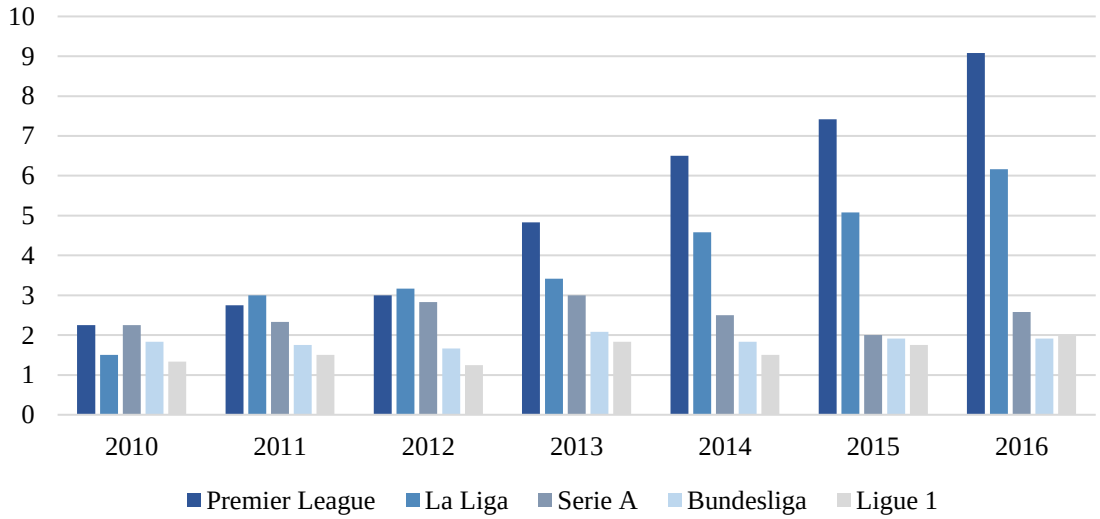
Moreover, the current analysis suggests a different hierarchy rank for team-sport leagues than the one derived from the financial data, even though the North American leagues are again the leaders of the global market.

To appreciate the relative position of the main European domestic football leagues in the same period, Figure 2.9 replicates the previous analysis, removing the data of American leagues and the UEFA competitions. While the Premier League is again

identified as the top league in Europe, some relevant changes are found regarding the comparative status according to the total revenues of other domestic football leagues: La Liga (the Spanish competition) replaces the German Bundesliga on the second place, while the Italian Serie A reaches a better position than the Bundesliga in terms of the degree of interest worldwide.

Among other findings, the distances between competitor leagues increase over time. This feature is presumably related to a distinctive trait affecting professional sports and other entertainment industries: the fact that tiny differences in performance result in larger disparities in rewards, which becomes more evident in the upper values of the talent distribution. This is the "winner-take-all" phenomenon, whose growing influence is well documented in Frank and Cook (1995).

Figure 2.9. Google Trends News – European football leagues



For an in-depth analysis of the internationalisation of the European leagues, we next decompose the degree of interest to follow each football league by continents: America, Europe, Asia, and Australia. (Data on Africa were neglected in the analysis due to lack of trustful information for this continent). The analysis is carried out using annual figures from both Google Trends "news" and "web" searches.

Previously, we established a hierarchy of football leagues according to their relative position in terms of internet exposure overtime. Now, we propose using precisely that measure (the share of interest drawn by each football league) to obtain the weight factor associated with each league and year. In this way, annual data on Google Trends can be

homogeneously compared as integrated outcomes. Tables 2.4 and 2.5 show the different weights that have been calculated for each league and season. The first one presents the weights obtained from searches of news articles; and the second one, the weights derived from users' searches for general Internet contents.

Table 2.4. Leagues weight factor - Google Trends News

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Premier	21.3	21.3	24.5	24.3	25.2	31.9	38.4	40.8	41.8
La Liga	16.0	16.0	16.4	26.5	26.6	22.5	27.1	28.0	28.4
Bundesliga	12.9	12.9	20.0	15.4	14.0	13.7	10.8	10.6	8.8
Serie A	29.9	29.9	24.5	20.6	23.8	19.8	14.8	11.0	11.9
Ligue 1	19.8	19.8	14.5	13.2	10.5	12.1	8.9	9.6	9.2
Total	100	100	100	100	100	100	100	100	100

Table 2.5. Leagues weight factor - Google Trends Web

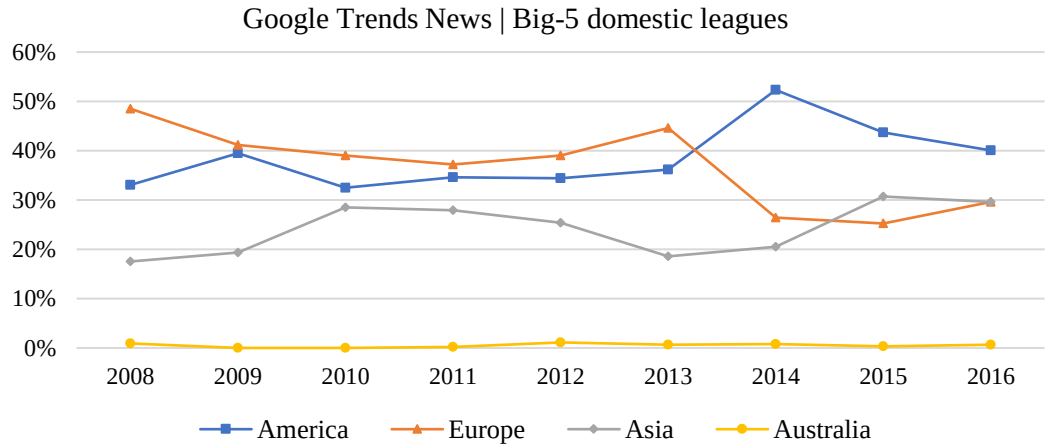
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Premier	35.9	35.9	36.5	36.4	38.1	36.4	36.2	35.9	35.1	37.4	42.4	39.9	40.3
La Liga	21.2	21.2	21.5	20.8	20.2	18.3	19.5	21.0	24.7	23.6	25.2	25.5	26.7
Bundesliga	18.0	18.0	18.2	18.8	16.5	17.8	16.7	17.4	14.3	14.5	11.5	13.6	10.9
Serie A	14.7	14.7	14.6	15.0	15.1	16.6	18.0	17.0	17.7	16.6	14.4	14.3	16.4
Ligue 1	10.2	10.2	9.1	9.0	10.1	10.8	9.6	8.7	8.1	7.9	6.5	6.8	5.8
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

For the calculation of the worldwide trend of European Leagues, we measured the searches carried out for each league, and then applied the corresponding weight. The total participation rate was obtained by aggregating the relative "news" and "web" searches worldwide for the period: 2008 to 2016, and 2004 to 2016, respectively.

Based on this approach, Figures 2.10 and 2.11 show the historic comparative relevance of news and web trends, respectively, by continent of the "Big-5" domestic leagues as a whole.

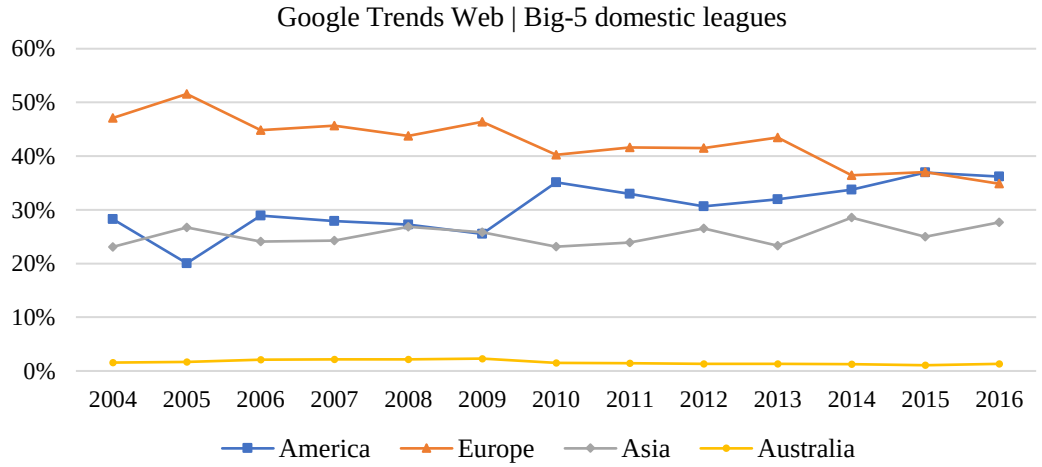
According to data on the amount of search for "news" articles until 2013, the European football generated most of the attention in their homegrown continent. The turning point shift from the traditional European market to the American seems to occur in 2014 when the former exceeds the European share of total news. Also, in 2014, for a non-traditional market, Asia shows high levels of attention for the "Big-5", especially compared to Europe.

Figure 2.10. Evolution Google Trends News by continent



Regarding the number of searches for web content, the outcome reveals that followers are primarily based in Europe. Nonetheless, the American market shows high levels of interest for these leagues; a changing pattern since 2009 indicates that the "Big-5" started increasing attention, and in 2015 they had a greater engage in America than in Europe. Again, the Asian continent presents significant levels of followers, showing that the leagues have accomplish certain level of internationalisation. However, positioning the European leagues in the Australian market seems to be a challenge, considering that the proportion of interest is insignificant and the trend over the last 14-years is decreasing.

Figure 2.11. Evolution Google Trends Web by continent



These changes over time, lead us to examine the trend variation for different periods. In particular, we have established the reference timing after the examination of various precedent analyses. Regarding Google Trends web searches, it seems that a structural

break may have occurred around 2009. While concerning Google Trends news, the changing patterns may have happened in the years 2010 and 2014.

The analysis of the average trends by continents, summarized in Table 2.6, suggests that major changes in football markets may have been driven in two waves: the first one, a shift from Europe to Asia during the period 2008 to 2010; and the second, from Europe to America between 2010 and 2014.

Table 2.6. Google Trends variation

	Google Trends News Variation (%)				Google Trends Web Variation (%)		
	Period				Period		
	2010 vs. 2008	2014 vs. 2010	2016 vs. 2014	9-year period	2009 vs. 2004	2016 vs. 2009	13-year period
America	-0.57	19.83	-12.26	6.99	-2.76	10.68	7.93
Europe	-9.49	-12.61	3.21	-18.89	-0.73	-11.51	-12.24
Asia	10.94	-7.97	9.13	12.10	2.72	1.82	4.54
Australia	-0.88	0.76	-0.08	-0.20	0.77	-1.00	-0.23

The analysis, reached from the approach based on Google Trends news, also reveals that this evolving trend seems to have stopped recently. Instead, if the evaluation is carried out based on Google Trends web searches, the results are overall similar, at least for which regard the whole period analysis.

Table 2.7. Google Trends multiplying factor

	Average Google Trends News						Average Google Trends Web		
	Period			Multiplying Factor			Period		Multiplying Factor
	2010 vs. 2008	2014 vs. 2010	2016 vs 2014	Period	Period	Period	2009 vs 2004	2016 vs 2009	Period
	(1)	(2)	(3)	(2)/(1)	(3)/(2)	(3)/(1)	(1)	(2)	(2)/(1)
America	35.01%	38.01%	45.36%	1.09	1.19	1.30	26.32%	32.89%	1.25
Europe	42.91%	37.27%	27.10%	0.87	0.73	0.63	46.55%	40.19%	0.86
Asia	21.78%	24.18%	26.95%	1.11	1.11	1.24	25.14%	25.48%	1.01
Australia	0.29%	0.55%	0.59%	1.86	1.08	2.01	1.99%	1.44%	0.73

Then, Table 2.7 gives additional information by computing average figures and the multiplying factor between periods. The comparison of the share of interest across

continents directly informs about possible market shifts. Additionally, multiplying factors can be examined to evaluate the intensity of these shifts.

Multiplying factors below 1 for certain periods indicates that a diminishing share of followers affects that region, and the opposite applies to factors greater than 1. Hence, based on the variation of the relative share of "news" and "web" searches, our multiplier factors lead to conclude that relevant shifts in terms of market dominance exist across continents.

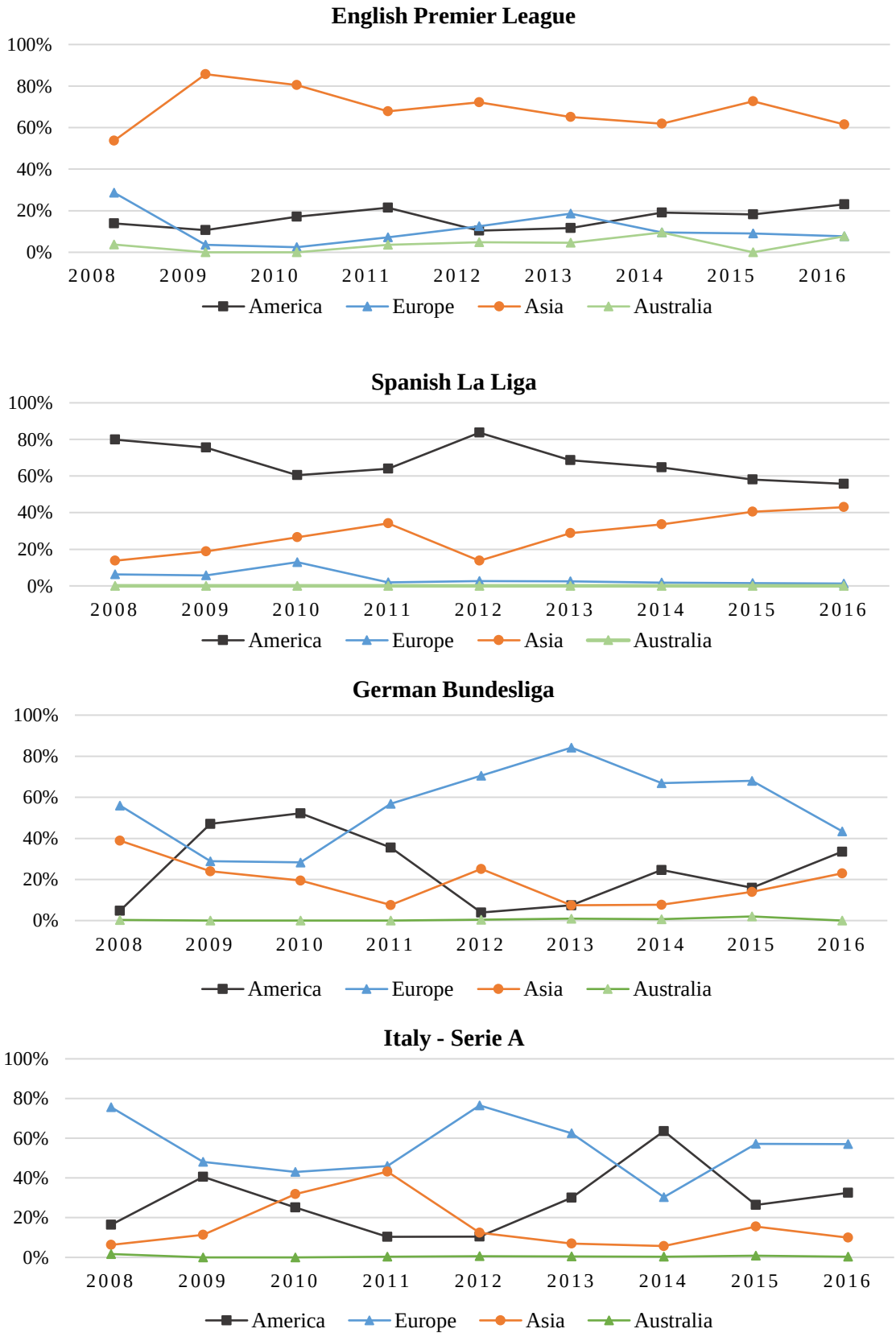
The multiplying factors reveal that the degree of interest of followers in the European continent has relatively decreased over time. Note that this piece of evidence is of course compatible with a growing number of football fans and business size in Europe, since the present analysis is simply focused on the comparative share of interest.

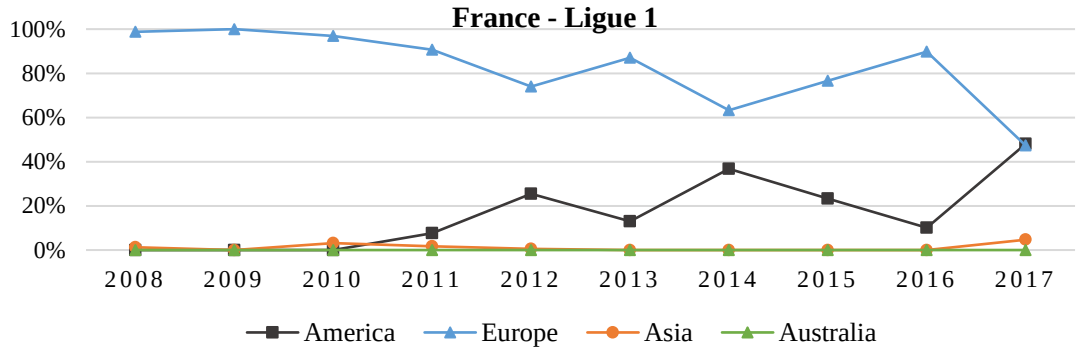
Another important finding is the fact that the "Big-5" European domestic leagues generate increasing interest in America. For instance, the share of overall interest that these leagues represent in America, as captured by Google Trends Web, increased by 25% (1.25 times according to the multiplying factor) in the 2009-2016 period as compared to the precedent 2004-2009 period.

Regarding Asia, and this time relying on media coverage as measured by Google Trends News, the share of interest for the "Big-5" European leagues increased consistently over the whole period, accumulating a 24% increase between period (3) and (1): the result of the two multiplying factors 1.11 obtained in each of the considered sub-periods. This outcome may be the result of market penetration strategies, like friendly matches schedule in 2009 (e.g. Manchester United), or broadcasting deals since 2013 (e.g. Premier League).

Our approach permits conducting more disaggregated studies by exploring the existence of shifts in the share of interest affecting each domestic football league. Figure 2.12 shows in relative values the evolution over time of the: Premier League, La Liga, Bundesliga, Serie A, and Ligue 1. The Figure allows making comparisons of the globalization trend and the positioning of the leagues in international markets. For instance, the Premier League and La Liga have a remarkable presence in Asia and America, respectively, as compared to the Bundesliga and Ligue 1, whose primary market is concentrated in Europe.

Figure 2.12. Google Trends News by leagues





Finally, we analyse the attention that the Leagues generate in their home country and in close competitor's markets. Table 2.8 presents the Global League Ranking, which is the average of the weight factor according to "news" and the market Penetration Index, computed comparing the relative share across the five countries. As expected, the data suggests that each league generates a higher degree of interest in the country that hosts the respective league than in the other countries. Moreover, we have computed a penetration Index that leads us to infer that some leagues are more globalized than others.

Table 2.8. Domestic football leagues ranking - Google Trends News

		Penetration Index 2008-2016	
	Global League Ranking	Hometown Market	Close Competitor's Markets
Premier	31.02	73.3	26.7
La Liga	23.92	90.7	9.3
Bundesliga	13.29	91.3	8.7
Serie A	19.54	93.9	6.1
Ligue 1	12.23	99.4	0.6
Total	100	-	-

The Premier League and La Liga can be considered as the most global leagues as they attract a large number of followers from international markets, followed by the German Bundesliga and the Italian Serie A. On the contrary, the French Ligue 1 can be considered as the less global among the "Big-5" domestic football leagues.

2.3.3. Empirical relationship between the financial and Google Trends approaches

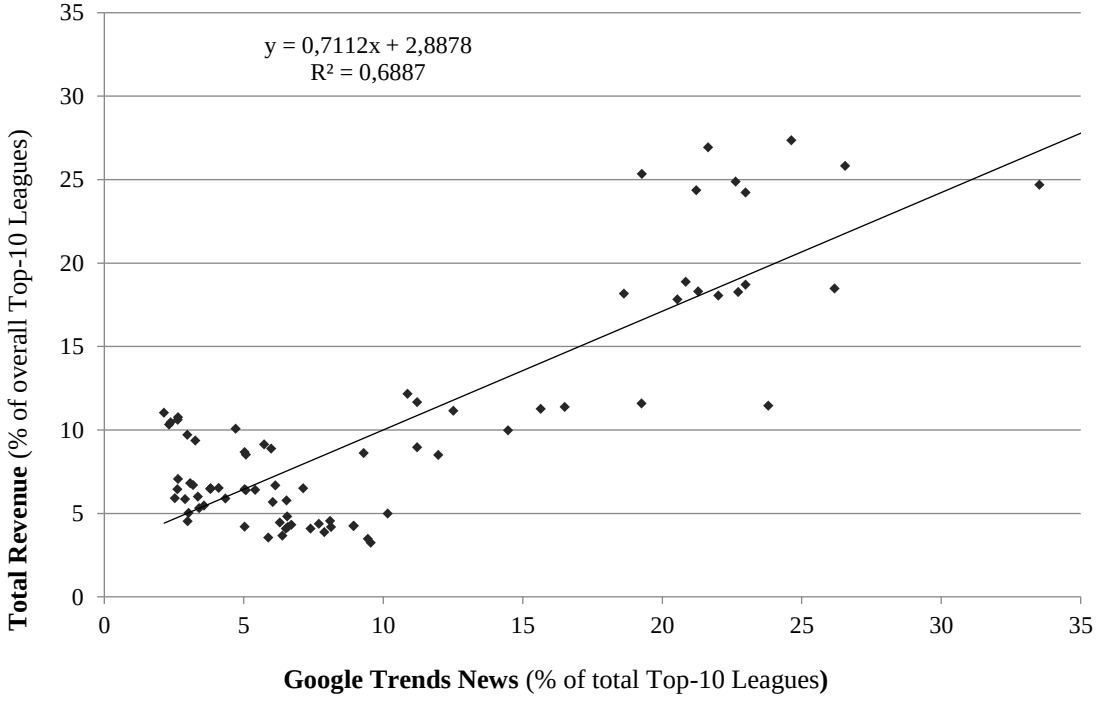
Even if further research is needed, we explore hereafter the possible empirical relationship between the two aforementioned approaches. Nufer et al. (2016) examines the key features of sports marketing for building integral brand status and for managerial

purposes. Karanfil (2017) examines teams' rivalries in European football and finds that they seem the result of factors other than sport performance. Korzynski and Paniagua (2016) argue that the market value of sport stars is determined by sporting talent along with their media exposure and social recognition. The paper by Garcia-del-Barrio and Pujol (2007) is possibly among the first studies that use Google as a proxy variable for capturing the degree of interest of fans and the general public.

Our analysis permits enriching the discussion on the comparative status of the Top-11 professional team-sport leagues worldwide. Given the scope of the sport industries as global businesses, we venture that the existence of a close relationship between financial records and "Google Trends" appraisals may contribute to a better understanding of the functioning of the sports industry and to develop forecasting analyses in the future.

For illustrative purposes and before developing a proper formal analysis, Figure 2.13 illustrates the basic relationship between total revenues and "Google Trends News" using a simple regression model, with just the constant term and without controlling by specificities of the leagues. The dependent variable is the relative share of revenues corresponding to each league at every season, and the explanatory variable is the relative interest granted by fans and the public.

Figure 2.13. Google Trends versus total revenues for professional sport leagues



More detailed models are estimated following in this section; Table 2.9 summarizes the descriptive statistics of the variables on which the regressions will be run, which are organized into two groups to distinguish between the dependent and the explanatory variables introduced into the models.

The analysis is developed upon the relationship between Internet searchers and financial data of the sports industry. (Cf.: Boyle and Haynes, 2009), who examined the role of sports in the media). As dependent variables we use either total annual revenues or TV broadcasting annual revenues. In both cases, we use three different versions of the variable: (i) in levels; (ii) as a percent with respect to aggregate revenues of all the considered leagues; and (iii) in per capita terms. Regarding the set of explanatory variables, the principal ones are "Google Trends News" searches (% with respect to the aggregate figure for all the leagues for each considered year) and "Google Trends Web" searches (% with respect to the aggregate figure for all the leagues for each considered year). Control variables are also included to characterize relevant sub-groups, such as the dummies "Europe" (base group), "America", "UEFA Champions League" to account for the leagues of those regions, and "winner-take-all" to control by the two leaders of the leagues in their respective continent.

Table 2.9. Descriptive statistics of the main explanatory variables

Dependent Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Total revenues (Mill. €)	129	2.63	2.16	0.23	12.35
% Total revenues	129	9.30	6.76	1.10	27.75
Revenues per capita	129	19.30	14.30	0.77	74.12
TV revenues (Mill. €)	129	0.88	0.80	0.02	4.70
% TV revenues	129	9.30	7.46	0.21	34.35
TV revenues per capita	129	7.98	7.84	0.05	39.26
Explanatory Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
% Google Trends News	88	9.09	7.79	0.22	33.08
% Google Trends Web	132	8.97	7.93	0.47	28.97
American	132	0.05	0.05	0.00	1.00
European	132	0.05	0.05	0.00	1.00
Winner-take-all	132	0.02	0.04	0.00	1.00
Population	132	209.39	141.73	43.65	502.19

Table 2.10 displays the estimations of pooled OLS regression models and the Marginal effects, respectively. The results strongly support the theoretical hypothesis: the existence

of a positive relationship between financial records and the capacity that a league has to attract the attention of fans in the form of Internet searches. In particular, it appears to be the case that North American leagues are generally ahead of the European leagues regarding their capacity to transform the degree of interest into revenues.

Table 2.10. Pooled OLS Models (1) – (6)

Dependent variable	**Total Revenue**	**Total Revenue**	**% Total Revenue**	**% Total Revenue**	**Revenue per capita**	**Revenue per capita**
Model	(1)	(2)	(3)	(4)	(5)	(6)
% Google Trends News	0.1229***		0.3624***		0.3327***	
	(3.84)		(4.00)		(3.05)	
% Google Trends Web		0.1262***		0.4650***		0.3902***
		(4.82)		(6.01)		(4.68)
American Leagues dummy	1.2137***	0.7426**	3.7660***	2.4047**	-21.9494***	-21.3196***
	(2.77)	(2.08)	(2.95)	(2.32)	(-10.45)	(-12.42)
Champions League dummy	-1.5639***	-0.8129***	-4.7358***	-3.1578***	-30.1710***	-25.4931***
	(-3.87)	(-3.80)	(-3.93)	(-6.73)	(-13.39)	(-14.31)
Leader (NBA&PL) dummy	2.1944***	1.5872***	6.8033***	5.1966***	16.6132***	13.5786***
	(4.90)	(4.21)	(6.25)	(5.39)	(7.06)	(6.95)
Season dummies	Yes	Yes	No	No	Yes	Yes
Constant	0.1983	0.4435	3.2775***	3.3209***	23.0078***	22.3848***
	(0.51)	(1.43)	(7.71)	(11.52)	(10.73)	(12.80)
Observations	88	129	88	129	88	129
R-squared	0.6801	0.6968	0.6901	0.7456	0.8075	0.7985
	ey/ex	**ey/ex**	**ey/ex**	**ey/ex**	**ey/ex**	**ey/ex**
% Google Trends News	0.3822		0.3624		0.1439	
% Google Trends Web		0.4375		0.4564		0.1846
American Leagues dummy	0.1887	0.1245	0.1883	0.1142	-0.4748	-0.4880
Champions League dummy	-0.0486	-0.0287	-0.0473	0.0315	-0.1305	-0.1228
Leader (NBA&PL) dummy	0.1364	0.1120	0.1360	0.1039	0.1437	0.1308

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | t-statistic in parenthesis

Some analysts argue that the worldwide degree of interest in sports spectacle might be better captured by looking at the TV broadcasting revenues rather than to total revenues. Thus, we extend the analysis by including the TV revenues as the dependent variable.

The new estimation results, shown in Table 2.11, suggest that the European leagues have higher capacity to transform the degree of interest into TV broadcasting revenues than the American leagues. For instance, if we compare the two leader leagues, the Premier League is ahead of the NBA in this respect.

Table 2.11. Pooled OLS Models (7) – (12)

Dependent variable	**TV Revenue**	**TV Revenue**	**% TV Revenue**	**% TV Revenue**	**TV Revenue per capita**	**TV Revenue per capita**
Model	(7)	(8)	(9)	(10)	(11)	(12)
% Google Trends News	0.0440***		0.4150 ***		0.1138**	
	(4.37)		(5.97)		(2.32)	
% Google Trends Web		0.0476***		0.5076***		0.1446***
		(6.70)		(8.32)		(3.54)
American Leagues dummy	-0.3015***	-0.4115***	-3.1295***	-4.3363***	-13.4890***	-12.6237***
	(-3.11)	(-5.48)	(-4.32)	(-7.73)	(-13.11)	(-14.79)
Champions League dummy	-1.228	0.0726	-1.4209	0.4336	-12.9604***	-10.9084***
	(-0.87)	(1.21)	(-1.30)	(0.79)	(-10.92)	(-11.93)
Leader (NBA&PL) dummy	1.3799***	1.088***	12.2950***	10.9783	9.8062***	7.9544***
	(6.46)	(6.40)	(8.37)	(8.36)***	(6.64)	(6.31)
Season dummies	Yes	Yes	No	No	Yes	Yes
Constant	0.2051	0.2651**	4.6336***	4.5012***	11.2258***	10.7252***
	(1.38)	(2.26)	(9.56)	(10.54)	(9.58)	(11.31)
Observations	88	129	88	129	88	129
R-squared	0.7542	0.7479	0.8085	0.8046	0.8175	0.7963
	ey/ex	**ey/ex**	**ey/ex**	**ey/ex**	**ey/ex**	**ey/ex**
% Google Trends News	0.4087		0.4150		0.1180	
% Google Trends Web		0.4923		0.4981		0.1655
American Leagues dummy	-0.1398	-0.2058	-0.1564	-0.2059	-0.6990	-0.6993
Champions League dummy	-0.0113	0.0076	-0.0142	0.0043	-0.1343	-0.1272
Leader (NBA&PL) dummy	0.2559	0.2292	0.24590	0.2195	0.2032	0.1855

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | t-statistic in parenthesis

We also estimate the models using panel data techniques to allow for individual league's characteristics that may not be captured by the other explanatory variables. In deciding whether the fixed effects or the random effects models should be preferred, the latter is

the chosen for two reasons. First, as it is the preferred model according to the Hausman test. Second, since it permits introducing relevant control groups (like the fact of being a European or American league) along with the individual heterogeneity elements.

The Hausman test permits comparing the random effects and the fixed effects models. To compute the tests, identical regressors were included into the models. The results are reported in Table 2.12 and suggest that the random effects model must be preferred since their estimators are more efficient and consistent. (With the exception of the Model (3), for whom the probability of mistake if rejecting the null hypothesis is too little).

Table 2.12. Hausman test – fixed effects (FE) versus random effects (RE) models

RE vs FE model for % Google Trends News	**Model**	**Chi-square**	**P-value** Prob>chi2	**Preferred Model** (consistent vs inconsistent)
Total Revenues	Model (1)	3.69	[0.0548]	RE: consistent estimators
% Total Revenues	Model (3)	6.40	[0.0114]	*RE: inconsistent estimators*
Revenues per capita	Model (5)	1.59	[0.2071]	RE: consistent estimators
TV Revenues	Model (7)	2.47	[0.1163]	RE: consistent estimators
% TV Revenues	Model (9)	3.73	[0.0536]	RE: consistent estimators
TV Revenues per capita	Model (11)	2.20	[0.1376]	RE: consistent estimators

Besides, there are strong theoretical reasons that lead to identical conclusions that the mentioned statistical tests. First, random effects, rather than the fixed effects model, are prescribed if we suspect that the difference across groups may exert some influence on the dependent variable, as it is the case here. Second, adopting random effects allow us to incorporate invariant variables, such as the groups of leagues according to the continent at which they belong as well as the league's leader status. These variables, which we consider relevant for carrying out our analysis, would be absorbed by the intercept if we use a fixed effects model instead.

Table 2.13 shows the estimated coefficients for the random effects models; the first three columns account for the total revenues and the last three for TV revenues. We focus the analysis on the outcomes of "Google Trends News" and use control dummies as explanatory variables. Again, we find that the North American leagues have a higher capacity to transform the degree of interest into total revenues while the European leagues do it better regarding the TV revenues.

Table 2.13. Random effects GLS regression

Dependent variable	**Total Revenue**	**% Total Revenue**	**Revenue per capita**	**TV Revenue**	**% TV Revenue**	**TV Revenue per capita**
Model	(1)	(3)	(5)	(7)	(9)	(11)
% Google Trends News	0.0483	0.0008	0.6016***	0.0266**	0.1401**	0.3334***
	(1.47)	(0.03)	(3.71)	(2.00)	(2.26)	(3.35)
American Leagues dummy	1.7672*	6.4514**	-23.9454***	-0.1722	-1.0883	-15.1194***
	(1.74)	(2.09)	(-4.58)	(-0.60)	(-0.44)	(-5.61)
Champions League dummy	-0.6327	-0.2181	-33.5289***	0.0946	2.0136	-15.7032***
	(-0.36)	(-0.04)	(-3.67)	(0.19)	(0.46)	(-3.34)
Leader (NBA&PL) dummy	2.8672**	10.0673***	14.1871**	1.5370***	14.7760***	7.8245***
	(2.26)	(2.61)	(2.17)	(4.31)	(4.76)	(2.33)
Season dummies	Yes	No	Yes	Yes	No	Yes
Constant	0.4174	4.3405*	22.2177***	0.2562	5.4416***	10.5805***
	(0.54)	(1.88)	(5.58)	(1.13)	(2.95)	(5.11)
Observations	88	88	88	88	88	88
Overall R^2	0.6496	0.5976	0.7986	0.7423	0.7642	0.7984
Chi-square	91.88	12.42	150.30	81.85	32.68	101.45
P-value	[0.0000]	[0.0145]	[0.0000]	[0.0000]	[0.0000]	[0.0000]

Statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10 | z-statistic in parenthesis

2.4. CONCLUSIONS AND IMPLICATIONS

As part of the entertainment industry, professional sports leagues compete with other leisure activities in a global market. Certain features make presumably more attractive the consumption of sport events than other entertainment alternatives; for example, the advancement of new technologies allows team-sport leagues offering an extensive amount of contents and maintaining permanent interaction with their followers. Besides, certain features help to increase the popularity of non-traditional sports in some areas, like it seems to have happened in the Asian market with North American leagues and European football. In this way, leading team-sport competitions have conquered new markets and extended their competition to an international context.

2.4.1. THEORETICAL IMPLICATIONS

Our study may help to reach a better understanding of the sports industry by comparing the pre-eminence of team-sport leagues and the international market expansion over time.

In this paper, we evaluate the relative dominance of North American team-sport leagues with the status of the main European football competitions. Two alternative approaches are applied to develop rankings and establish the hierarchy of team-sport leagues; we also examine to what extent European football is gaining economic and visibility standings in non-traditional international markets. First, we examine the evolving financial status of European and North American team-sport leagues. Second, we use an alternative methodology based on the "Google Trends" tool to evaluate the degree of interest raised by the Top-10 professional sports leagues worldwide and to compare their level of internationalisation.

Our first approach required collecting a very rich financial data set for the Top-11 professional sport leagues worldwide; a task that we consider a valuable achievement itself. The examination of the evolution over time of financial data deepens into the understanding of the capacity that sport-leagues have to attract revenues in a global market. On one hand, data on total revenues provides evidence of the dominance that North American leagues have: the NFL, MLB, and NBA are at the top, followed by the English Premier League. On the other hand, according to TV revenues, the NFL leads the ranking; even if, in this case, two European leagues – the Premier and the UEFA Champions League – are placed second and third, respectively. We were also able to identify the European leagues that stand out among the "Big-5" leagues.

2.4.2. MANAGERIAL IMPLICATIONS

The findings of this paper are potentially relevant to identify new business ventures in international markets and to understand the consumer's behaviour in the long run. We conducted several analyses using "Google Trends" outcomes, to appraise the degree of attention granted by the consumers of sports spectacles. First, we observed the evolution of interest generated by North American leagues and European football, concluding that in recent years the former leagues seem to produce more global attention worldwide than the European "Big-5" leagues. In order to examine the level of internationalisation and to identify the shifts of market (fans-base) support, we calculated worldwide trends for the European leagues applying an approach based on "Google Trends News".

Examination of the evolution across the different trends suggests that major changes have been driven into two waves: First, from Europe to Asia during the period 2008 to

2010; and second, from Europe to America between 2010 and 2014. The analysis conducted by leagues suggests that the Premier League and La Liga are the competitions leading the shift to the non-traditional international markets. Our analysis also reveals that this evolving trend seems having stopped lately.

An in-depth analysis of the global markets of the "Big-5" European leagues point out an increase of interest in America and Asia relative to Europe. For the case of America, and based on the Google Trends web approach, the interest share increased by 1.25 times (that is the multiplying factor calculated for the 2009-2016 period as compared to the 2004-2009 period). Regarding Asia and relying this time on the "Google Trends News" figures, the share of interest increased consistently over the whole period, as the value 1.11 of (aggregate) multiplying factor indicates.

We also computed the market penetration index to compare the level of globalization across the "Big-5" domestic football leagues. We found that Premier League and La Liga are the most globalized leagues; follow by Bundesliga and Serie A with a similar level of globalization, and finally by Ligue 1, which appears to be a less open competition.

Further analysis was then conducted to examine the relationship between Internet searches outcomes and variations of the dependent variable: the leagues' annual total and broadcasting TV revenues, in levels, as a percentage, and in per capita terms. We run pooled OLS regressions and GLS random effects, defining various models using Google Trends (both for news articles and web contents) as the explanatory variables. The empirical results reveal that team-sport leagues in North America outperform the European competitions to transform the degree of interest into total revenues; but the opposite result emerges concerning the TV broadcasting revenues. Random effects GLS models were also estimated to account for the time-invariant omitted variables, which permitted reaching even more solid and robust conclusions.

2.4.3. POLICY IMPLICATIONS

Several prospective implications stem from our work. First, it offers several analyses explaining the importance that, in recent years, sport-team leagues have gained in, as part of the entertainment industry and competing in a global market. The international expansion of sport leagues and the growing recognition and acceptance of non-traditional sports in new markets opens an opportunity to achieve social goals. Several desirable

objectives can actually be encouraged through social entrepreneurship, by providing innovative solutions and projects that impact on the society, or by establishing collaborations between the public and private sectors.

2.4.4. LIMITATIONS AND FUTURE RESEARCH

The main limitation of our study concerns data constraints. In one of the approaches used, we rely on information about the intensity of searches made by Google users to look for news related to the sports leagues; however, data was not available for years before 2008, which forced us narrowing some of the comparisons we carried out to a shorter period; also data on the African continent were omitted due to lack of trustful information. This paper raises several issues for future research: First, it is of the greatest interest comparing the ranking of team-sport leagues by applying a different methodology that captures media visibility; and also, to expand the analysis to teams. Second, the proposed econometric models intended to explain the leagues' capacity of transforming the degree of interest into revenues; future research efforts may examine further the suggested empirical relation involving additional explanatory variables, such as brand status. Third, it may also be relevant to address how sport public policies may promote entrepreneurship in the leagues' home country as well as in non-traditional markets. Also, the study of this issue may be extended by analysing the evolution of business and social entrepreneurship in the sports industry. Finally, in this paper, we have proposed the use of internet searches as a tool to analyse the globalization of sports leagues, the availability of massive amounts of information and data provided by the use of new technologies is a relevant subject for future research. Some aspects in this regard may include the implementation of new digital tools for market research and its impact on the sports business, the role of social media platforms as opposed to traditional media, the impact of the player's media exposure to the perception of the team, or the development of new technologies as a commercial tool for teams.

Aguiar-Noury, A. and Garcia-del-Barrio, P. Unpublished article

Contribution to the thesis:

This paper comprises the core empirical study of the thesis, which offers a comprehensive econometric analysis of the behaviour of European football clubs' total annual revenues and wages, using a rich dataset that includes financial data for football clubs' playing in the 1st division of the English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1, covering the season between 1995/1996 to 2015/2016. Based on three main behavioural equations for production, revenues, and wages, several hypotheses and models examine the relationship between sports performance (current and recent-past), historical status, and clubs' revenues and investment in talent. Also, the role of clubs' visibility, both recent and past, in revenue generation capacity and talent compensation.

Chapter 3

EMPIRICAL ANALYSIS OF PROFESSIONAL FOOTBALL: REVENUE AND WAGE BEHAVIOURAL EQUATIONS

3.1. INTRODUCTION

The ability that professional football clubs have to generate revenues, in a context of constraints and regulations, is a crucial topic in sports economics. Previous studies (e.g., Szymanski and Smith, 1997) show the strong empirical link between sport success and economic returns, a piece of evidence to support that the teams' payroll is a determinant of their performance. More recent literature on this topic (Forrest and Simmons, 2002; Gerrard, 2006, Barajas and Rodriguez, 2010) provides strong evidence that greater investment in talent – as captured by the clubs' annual wages – entails better sport performances and achievements. Besides, the reputation built on past achievements seems to help clubs during periods of low productivity (Dell'Osso and Szymanski, 1991).

This paper contributes to enhancing the empirical knowledge of the revenue-generating capacity, and the relationship between investment in talent and sport performance in professional European football. To this aim, we estimate a variety of models to deepen into the comprehension of a global sport industry, and to test relevant hypotheses regarding the impact of recent and past sport performance, historical (brand) status, and media visibility on annual revenues and annual wages. In this paper, we actually estimate behavioural wage and revenue equations for football clubs, which allow us to test relevant hypotheses regarding this increasingly important entertainment industry

Nevertheless, we do not aim addressing other related topics, such as whether football clubs try to maximize profits or wins. This issue is being discussed for decades both theoretical and empirically (Sloane, 1971; Késenne, 1996; Garcia-del-Barrio and

Szymanski, 2009, among others). The models describing the functioning of team sports leagues, typically assume either that clubs aim to maximise profits (El-Hodiri and Quirk, 1971; Fort and Quirk, 1995; Szymanski and Késenne, 2004; Grossmann and Dietl, 2009) or wins (Zimbalist, 2003; Késenne, 2006; Vrooman, 2007). Actually, the literature stresses the existence of a trade-off between wins and profits (Dietl et al., 2008). More recently, some studies enhance the usual modelling by hypothesizing a mixed goal to overcome other conventional views (Dietl et al., 2011, for instance, who present "utility maximisers" clubs that aim at maximizing the weighted sum of profits and wins).

The analyses conducted here involve financial and sport performance data for clubs playing in the 1st division of four of the "Big-five" European domestic football leagues: English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1. (Unfortunately, financial data for individual teams playing in the Bundesliga are not available). We gathered over the years an extended dataset for 157 clubs, covering the seasons 1995/1996 to 2015/2016.

The theoretical framework for this work is built upon previous research, inspired in the paper by Szymanski and Smith (1997) and following the approach developed by Carmichael et al. (2011). Our work initially explores if the expected empirical relationship between variables capturing (current and past) sport performances and clubs' revenues hold true in a rich and comprehensive dataset. Furthermore, we also benefit from the possibility of taking into account the role that the media visibility and historical status of football teams may play in this context.

The empirical evidence suggests that the club's revenues, derived from three main sources, sponsorship, attendance, and broadcasting rights, are strongly associated with sports achievements and, in the biggest football leagues, present a large disparity between top teams and the rest. To extend the examination of the fact that outstanding sport performance leads to higher revenues, we analyse football performance over time, guided by the following hypotheses:

Hypothesis 1: Football clubs' annual revenues are **better explained by recent-past sport performance**, and ultimately by past investment in talent, **than by the current sport achievements**.

Hypothesis 2: The **clubs' brand value** (built upon historical sport achievements) **positively affects** their capacity to generate **revenues** beyond the current sport

quality of the team roster. Actually, the influence of current and recent-past sport performances on club's revenues are expected to diminish when brand value is included into the regressions.

Our empirical results allow comparing the impact on wages and revenues of sport performance depending on the type of competition – domestic or international — and to the time proximity – current or recent. The analysis corroborates the positive and statistically significant effect of sport performance and show that current performance has a relatively higher effect than recent-past on revenues. The magnitude of this impact varies across the leagues; for instance, clubs' revenues of the Premier League, Serie A, and Ligue 1 are mainly affected by current points obtained in the national league, while for Spanish clubs, both types of sport achievements appear to be influential. Nevertheless, it seems that the historical sporting status is empirically significant beyond the explanatory capacity of sport performances both in domestic and European competitions, a factor that is particularly important for clubs of La Liga and Serie A.

In addition to the success on the pitch, the financial performance of clubs is also influenced by off-field factors such as the managerial skills, the corporate image, the population size, or the club's popularity. Some of these factors enable conducting a market analysis of competitors such as other football clubs, sports, and leisure activities (Karpavicius and Jucevicius, 2009), including the examination of the revenue-generation capacity. For example, the degree of interest that professional sports awake on the general public and followers is a valid approach to examine the market growth and potential revenues (Aguiar-Noury and Garcia-del-Barrio, 2019). Previous studies (Garcia-del-Barrio, 2018) used the Media Visibility index developed by the MERIT approach to compare, homogenously, media value ratings across different sport disciplines. The MERIT method is based on the degree of interest that players, teams, or leagues awake from journalists and the general public; we employ these media value ratings to test the following additional hypotheses:

Hypothesis 3: In addition to sporting skills, the clubs' capacity to accrue revenues depends on the current and recent past off-field skills of the team roster, insofar **as they attract the interest of journalists and of the general public.**

We corroborate that the club's ability to generate revenues is directly related to the capacity of the team's roster to attract media attention. The examination of the clubs' rewards provides insights about the current and recent-past media visibility of the leagues and the financial impact, a matter of great relevance considering the role that new media rights is gaining as a revenue source, especially for some of the big leagues (Carmichael et al., 2017).

The capacity to attract higher revenues allow clubs to invest in more expensive talent (Barajas et al., 2005). The clubs' annual wage bills can be considered as a "proxy" variable of the intensity with which clubs invest in new skills. Of course, the new investment decisions for hiring talent in the football industry aim at increasing the future economic perspectives. Previous literature (Cf.: Pawlowski and Anders, 2012) highlight that the public generally prefers renown sport brands; and that the clubs' brand value determine their economic achievements, which stem from their sport performances and ultimately from the size of their investments (Cf.: Rohde and Breuer, 2016). Besides, in the context of sport competitions, several papers (Cf.: Dietl et al., 2008; Dietl et al., 2011; Franck, 2014; Aguiar-Noury and Garcia-del-Barrio, 2019, among others) refer to the risk of overinvesting in talent. Another issue that is worth noting in this context refers to the existence of winner-take-all effects in sports (Frank and Cook, 1995) and specifically in football (Garcia-del-Barrio and Pujol, 2007). The winner-take-all phenomenon implies that individuals or teams that are marginally better than other rivals receive more than proportional returns in terms of sport and economic rewards. We then test the empirical relationship between clubs' recent-past and historical sport performance and current wage spending, the following hypotheses are formulated:

> *Hypothesis 4*: **Domestic sport performances** work along with sport achievements **in European competitions** for determining the overall **compensation paid to football players**.
>
> *Hypothesis 5*: The **stronger the historical** (sporting) **status** of a club, the **greater salaries** must be paid for rewarding the talent of the teams' roster of players.

Our scrutiny confirms the positive and significant relationship between total wages and sports performance. The way how clubs reward talent is consistent in each of the four leagues, even if minor discrepancies can be observed. Among the sport regressors, we

evidence that points obtain in the domestic league and the clubs' historical sport achievements have the highest impact on the Leagues' wage determination; the magnitude of the effect is higher for Ligue 1 and La Liga, and smaller for the Premier League and Serie A Furthermore, it appears that clubs with a strong brand status are expected to pay a premium for hiring talent. Also, our model enables identifying the behaviour of recent-past participation in the UEFA competitions; the performance in the Champions League is a crucial element for wage determination, a more decisive factor for Serie A and Ligue 1, while for Premier League and La Liga the impact decreases due to the clubs' time- invariant characteristics.

In a global entertainment market, there is an indisputable success and acceptance of European football compared to other major sports leagues (Szymanski, 2006), especially in non-traditional markets where the introduction of European football has turned the sports culture. The increasing popularity of European leagues, among other aspects, is reflected in the ability to attract high TV broadcasting revenues and audience levels. However, despite the high quality of the European domestic leagues, the spectacle worldwide is to see the big clubs competing at the European level (Hoehn and Szymanski, 1999; Késenne, 2007). Driven by the introduction of new media technologies, the consumption of sports is constantly changing and creating highly informed consumers, who demand high-quality competitions (Szymanski, 2006), and are willing to pay increasing amounts to see the best players. In this context, we proposed the following hypothesis:

> *Hypothesis 6*: In addition to the **sporting (on-field) talent**, other **(off-field) personal skills** (ultimately captured by the players' ability to attract media attention) that are significantly rewarded in the football industry.

Indeed, there are off-field skills, particularly the ability to attract attention from the media, that are rewarded along with sport skills. The results evidence that recent-past records on media exposure are highly valued; this result is robust for the combined four Leagues, and the individual evaluation (by leagues).

We recognized that there is a dynamic effect on wage behaviour, where wages are established to reward past sports performance, and at the same time, sports performance depends on the investment in talent. Thus, we proposed the following hypotheses:

Hypothesis 7: The assumption that : (i) wages are set to reward (past) sport performance, along with other off-field skills, and that (ii) sport performance depends on the hiring of sport talent, (the latter measured −and encouraged− by wages), can be modelled by a dynamic specification of the wage function. Actually, introducing a lagged of the dependent variable as a regressor implies accounting for the potential endogenous interactions.

Hypothesis 8: The fact of playing for a team **with strong (sporting) brand status** implies receiving **higher salaries**, ceteris paribus, even when the previous season salaries are taken into account.

Hypothesis 9: The dynamic specification of the wages may help testing if the football industry also **rewards**: (i) **past luck** in the competition, leading to greater sport achievements, and (ii) **past outperforming managerial skills** from the staff, *ceteris paribus*.

We include in the regression model variables for sport performance treated to avoid collinearity with the lagged dependent variable. Our dynamic specification appears to be an adequate representation of the players' reward in the football industry, where, last year's wages and historical sport status are the main explanatory factors; the results for the historical sport status are consistent; that is, we verify that clubs with strong brand status receive greater salaries. Moreover, our innovative approach concludes that off-field skills are also rewarded in the domestic European football leagues.

The rest of the paper's structure is as follows. Section 2 describes the theoretical models, data sources, and the descriptive statistics of the main variables; also, a detailed explanation of the variables Elo Rating and Media Visibility Index is included. The methodology applied is presented in Section 3. In Section 4, we discuss the empirical analysis and the results following the estimation of three behavioural equations: (i) production function, (ii) revenues function, and (iii) wages function. The core of the analysis is conducted by testing different hypotheses and comparing econometric models. The last section summarizes the conclusions and suggests future research avenues.

3.2. THEORETICAL MODELS

Our empirical analysis is initially inspired by the approach of Carmichael et al. (2011), even if we deviate from it in several ways. First, the authors of the referenced paper pay

special attention to investigate implications for competitive balance, employing log-linear models. On the contrary, we test different hypotheses regarding the relationship between the clubs' sport performance: current, recent-past, and historical, with the revenue-generating capacity and talent investment, using linear models. Secondly, Carmichael et al. (2011) employed a different set of explanatory variables such as individual playing performance, including skills and abilities, managerial contributions, and other inputs; also, using dependent variables measured in relative terms (league success, revenues, and wages). In contrast, we use fundamental factors like clubs' total output, historical status, and media visibility, described later in this section; additionally, in our paper the econometric analysis is conducted for variables expressed in levels and relative terms (for both dependent and independent variables). Lastly, Carmichael et al. (2011) study solely the English Premier League over 6 seasons. Instead, we use an extended dataset that comprises data from the English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1, analysing a full sample that covers twenty seasons, and a subsample with seventeen seasons.

In this context, the proposed models to be estimated are described by the following behavioural equations:

$$DSP_{it} = DSP\ (TW_{it}, DY_t, DL_i) \quad (1)$$

$$TR_{it} = TR\ (DSP_{it}, DSP_{it-1}, ELO_{it-2}, CLP_{it}, CLP_{it-1}, EUP_{it}, EUP_{it-1}, f\_MVI_{it}, f\_MVI_{it-1}, DY_t, DL_i) \quad (2)$$

$$TW_{it} = TW\ (DSP_{it-1}, ELO_{it-2}, CLP_{it-1}, EUP_{it-1}\ ES_{it-1}, f\_MVI_{it-1}, DY_t, DL_i) \quad (3)$$

Where DSP_{it} is the i^{th} club domestic sport performance in the t^{th} season, measure in total points. TW_{it} is the club total annual wages in season *t*, express in millions of euros. TR_{it} is the club total annual revenues in season *t*, express in millions of euros. ELO_{it} is a proxy variable for the club historical sport status in the t^{th} season, measure as a ranking. CLP_{it} and EUP_{it} are a measure of the club number of qualifying rounds in the UEFA Champions League and Europa League in season *t*, respectively. f_MVI_{it} is the club filtered media visibility index in the t^{th} season, filtered from sport performance (a detailed explanation on the measure and treat of this variable follows in the next sections). DY_t is a dummy variable for season *t*, and DL_i is a dummy variable for league *i*.

The statistical analysis of a league production function helps to achieve a better understanding of the football industry (Carmichael et al., 2017). Even if the core of this

study is not based on the production function, Equation (1) is useful to corroborate the expected outcome: a positive relationship between league position and wage expenditure. In this case, the production function is explained by a simple linear regression, where the clubs' domestic sport performances (i.e., total output) depend on the total annual wages (Szymanski and Smith, 1997).

Next, we establish that total revenue is a function of the clubs' sport performance and its media visibility, Equation (2). Additionally, to the variables that capture the domestic and international sport performance, we consider that the revenues are also explained by the level of attention that a club can generate. The t^{th} seasons are defined as current (t) season, recent-past or precedent (t-*1*) season, and historical or past (t-*2)* season. The variables that capture: the domestic sport performance, the achievements in the European competitions, the UEFA Champions League and Europa League, and the media visibility are included for the current season (DSP_{it}, CLP_{it}, EUP_{it}, f_MVI_{it},) and the precedent season (DSP_{it-1}, CLP_{it-1}, EUP_{it-1}, f_MVI_{it-1}). To avoid multicollinearity while accounting for the past sporting brand status of football clubs, the proxy variable for the historical sports performance has been lagged two periods (ELO_{it-2}).

Lastly, Equation (3) states that teams' total wages in the t^{th} season is a lag function of the sport performance, in the recent past (DSP_{it-1}, CLP_{it-1}, EUP_{it-1}) and historical sport performance (ELO_{it-2}), and the media visibility index (f_MVI_{it-1}). The lagged variables are introduced to consider the effects of treating investment in players as a proxy variable of the quality of the team in the t^{th} season.

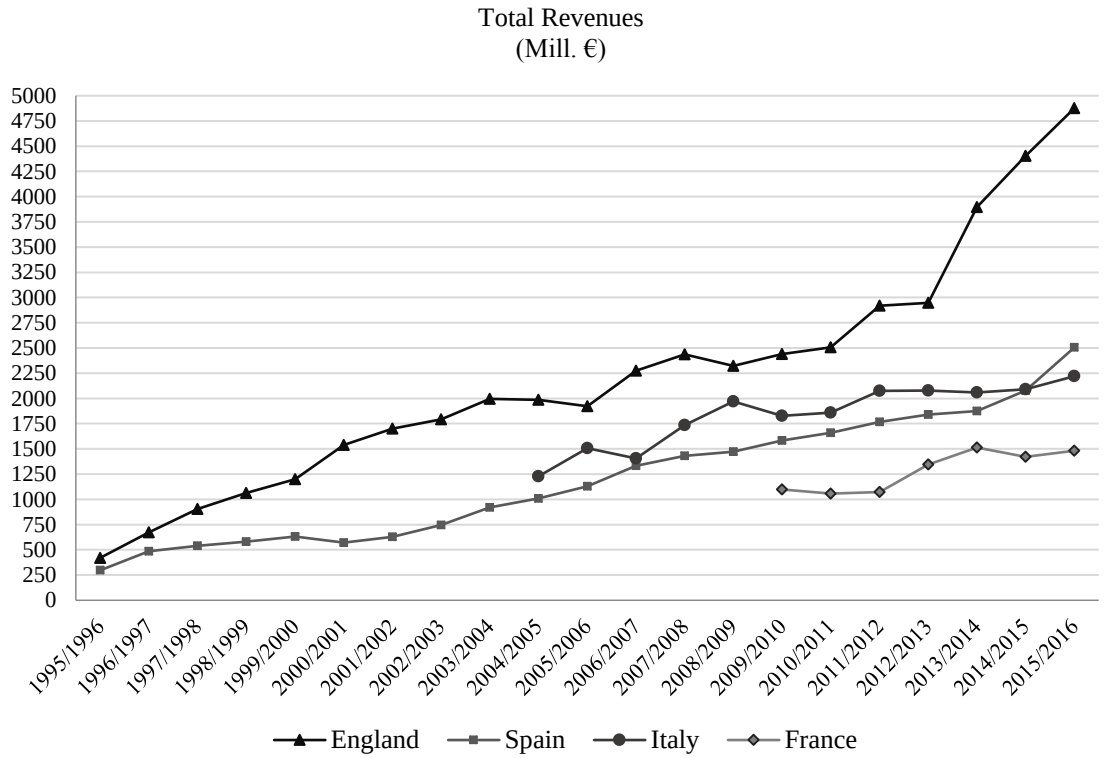
3.3. Data Sources and Measurement

Among other aspects, we want to call attention to the rich dataset on which the empirical analyses are carried out. We managed to gather a large dataset that includes data for the English Premier League and Spanish La Liga from the seasons 1995/1996 to 2015/2016, for the Italian Serie from the seasons 2004/2005 to 2015/2016, and for the French Ligue 1 from the seasons 2009/2010 to 2015/2016.

The financial variables were collected from different sources: (i) Deloitte Annual Review of Football Finance (ARFF, 2005-2018), (ii) Deloitte Football Money League (FML, 1999-2018), (iii) Official clubs' account for some clubs of the French Ligue 1, Italian Serie A, and Spanish La Liga, and (iv) public records for some seasons of La Liga;

always trying to get figures that follow homogeneous criteria across the four leagues. Data on wages and revenues was almost complete for all the teams playing in the first division leagues at the considered seasons, except for La Liga, in which some years we count 19 or fewer observations. A more detailed information on this issue is relegated to the Appendix 1 (see Table A.1). The evolution of total annual revenues and wages by leagues are displayed in Figure 3.1 and Figure 3.2, respectively.

Figure 3.1. Total Annual Revenues by League and Season

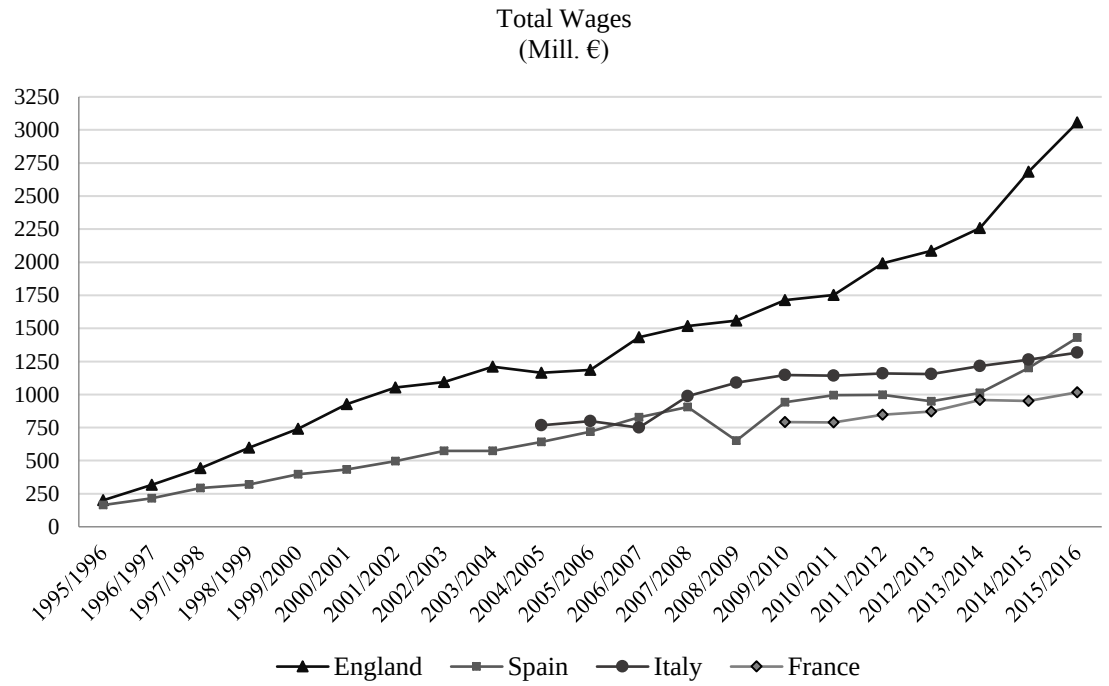


Among other conclusions, Figure 3.1 and Figure 3.2 exhibit a strong growth experienced by the football industry (at least in terms of revenues) and sharp wage inflation. In the last decade, the Leagues' combined revenues have increased by 60% approximately, €4.1 billion increase from 2009/2010 to 2015/2016 season; the Premier League has the highest growth rate (99,98%), followed by La Liga (58,38%), Serie A (21,51%), and Ligue 1 (34,96%).

Regarding wages, the combined wages have increased by 48.44% (€2.2 billion) within the decade; the average annual growth rate is 8%. At the end of the 2015/2016 season, the combined revenue for the four leagues exceeded €11 billion, an 11% increase

on the previous season; the highest wage/revenue ratio has the Ligue 1 (69%), followed by Premier League (63%), Serie A (59%), and La Liga (57%).

Figure 3.2. Total Annual Wages by League and Season



The data for domestic points (DSP) were obtained from the official websites of sports Leagues. Considering that the leagues under analysis are an open competition, the DSP variable is a direct measure of the points obtained in the domestic league (Barajas et al., 2005). The data for the European competitions CLP and EUP were obtained from the official website of the Union of European Football Associations (UEFA). Based on the number of qualifying rounds, we develop a ranking where the highest value was assigned to the season's winner.

Equations (2) and (3) introduced two explanatory variables −the Elo Rating and the Media Visibility Index (MVI)−, which are presumably less well-known than the others. The Elo Rating became popular in 1970, when the Fédération Internationale des Échecs adopted this methodology to rank chess players. Nowadays, different sports and disciplines employ this ranking system; in which regards professional football, in June 2018, the Fédération Internationale de Football Association (FIFA) proposed this classification method for ranking national football teams.

In previous papers, the Elo rating is used as an appraisal to measure a team's ability or strength, for instance, to forecast match results (Leitner et al., 2010; Reade and Akie, 2013). Elo Ratings have shown to be highly accurate among different ranking techniques (Lakaser et al., 2013; Cea et al., 2020); moreover, the effectiveness of Elo, like the reduction of the measurement bias, improves within econometric models (Reade and Akkie, 2013). Some researchers, however, argue that, to predict international football matches outcomes, other procedures seem better than the Elo Rating system (Peeters, 2018).

The procedure for computing Elo ratings is based on weighted averages of the outcomes obtained in past games, where the actual weights depend on the rival team status, on the score differential, and the importance of each particular game considered (Hvattum and Arntzen, 2010). Therefore, higher Elo scores are the result of better sport performance in the past. In our analysis, we use the Elo rating as a "proxy" variable to measure the clubs' historical status and strength derived from their past sporting results. The proxy variable is measured as a ranking, considering that insofar as sport competitions are typically a zero-sum contest, a football team can only improve its Elo score if other teams decline theirs.

Before FIFA adopted the Elo system, there was not an official Elo ranking for professional football. However, in the academic literature, data provided by the World Football Elo Ratings (WFER) has been widely used (see, for example, Edmans et al., 2007; Reade and Akie,2013; Leitner et al., 2010; Lasek et al., 2016; Cea et al., 2020). Another data source for Elo Ratings is the Football Club Elo Ratings (Schiefler, 2017),[15] which performs computations based on the WFER methodology,[16] providing Elo points at the club level; we decided to rely on this data source, available at http://clubelo.com/.

[15] Data from the website clubelo.com are also employed in recent research projects, see for example Steffen et al., 2019; Csató, 2019; Globan and Jägers, 2019.

[16] The Football Club Elo Ratings (Club Elo) employs the win expectancy (WE) and points exchange (R) equation from the World Football Elo Rating, with a variation in the weight for the tournaments, which is fixed rather than variable according to the type of match.

$$WE_a = 1/(10^{-(\frac{E_a + 100_{HP} - E_b}{400})} + 1)$$

$$R_t = R_{(a,t-1)} + K \times (Result - Result\ Expected)$$

Club Elo also incorporates an additional measure for offensiveness, and adjustments for weight goal difference, two-leg matches, and inter-league (see Football Club Elo Ratings http://clubelo.com/ and The World Football Elo Rating System http://www.eloratings.net/).

We choose to obtain clubs' yearly Elo Rating computed on June 30th. The large number of observations that comprise our dataset allows us capturing the strength accrued by the teams over time, taking into account their historical performance in the domestic competitions and in the UEFA Champions League and Europa League; the Elo variable is lagged two periods in the models to avoid collinearity with sport performances in the current season and the recent past (t-1) season.

The second variable requiring careful description is the media visibility index (MVI) of football clubs provided by the MERIT methodology (Cf.: www.meritsocialvalue.com). The MERIT approach applies a methodology – for calculating media visibility indexes of players, teams, or leagues – based on the degree of interest each of them awakes from journalists and the general public. Specifically, the amount of news articles on the Internet related to a given individual (a football player, in the current context). Thus, the individual indexes are expressed with respect to the average amount of news articles generated by the 2,500 players with the greatest exposure in the media. In other words, the individual MERIT visibility index (MVI) is the factor by which the number of news articles related to a player multiplies the number dedicated to the representative (average) player in our sample of around 7,000 players. Finally, from records on individual appraisals of the fifteen players with the highest media profile in the squad, we apply a simple aggregation procedure to obtain the clubs' media visibility indexes. Homogeneous appraisals of the clubs' media visibility are only available since 2010, implying a drastic reduction in the number of observations for the models where MVI is included.

Since the media visibility of the clubs may largely be explained by their sport performance, it is presumed that the MVI variable implicitly captures also the effect of the sport performance. Therefore, to avoid multicollinearity and to obtain the direct effect of the variable, we estimate equations (b) and (b').

$$MVI_{it} = \alpha_0 + \alpha_1 \cdot DSP_{it} + \alpha_2 \cdot CLP_{it} + \alpha_3 \cdot EUP_{it} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + u_{it} \quad \text{(b)}$$

$$\Rightarrow MVI_{it-1} = \alpha_0 + \alpha_1 \cdot DSP_{it-1} + \alpha_2 \cdot CLP_{it-1} + \alpha_3 \cdot EUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + u_{it-1} \quad \text{(b')}$$

Where the media visibility index depends on the domestic sport performance (DSP_{it}) and achievements in the UEFA Champions League (CLP_{it}) and UEFA Europa League (EUP_{it}). Equations (2) and (3) are modelling with the residual of the pooled OLS

estimation, name as the *filtered media visibility index* (f_MVI_{it}). The estimation results for Model (b) are presented in Appendix B.

Table 3.1. Summary Statistics of the Main Variables by League

	Full Sample 1995/1996 to 2015/2016					Subsample 2009/2010 to 2015/2016				
Variable	N	Mean	Std. Dev.	Min	Max	N	Mean	Std. Dev.	Min	Max
Premier L.										
Annual Revenues	417	110.8264	98.4745	7.1634	690.1	139	172.5475	125.1867	53.936	690.1
Annual Wages	418	69.3357	57.3197	2.3463	322.94	140	111.0188	68.5738	27.244	322.94
Domestic Points	420	52.0023	15.8762	11	95	140	52.0357	16.6186	17	89
Elo Rating	420	1696.864	106.5834	1478	2025	140	1706.9000	108.4392	1506	1955
Rounds Champ.L.	420	0.8190	1.8972	0	8	140	0.8643	1.8200	0	8
Rounds Europa L.	420	0.6071	1.5154	0	8	140	0.6857	1.6451	0	8
Media Visibility	-	-	-	-	-	140	30.4247	28.3541	2.31	140.33
La Liga										
Annual Revenues	401	62.5070	102.4289	1.5215	620.115	139	95.6991	145.3155	16.716	620.115
Annual Wages	404	36.4943	51.3748	1.6775	371.735	139	54.1510	72.0279	8.916	371.735
Domestic Points	424	52.7453	14.9078	13	100	140	52.5643	17.8016	20	100
Elo Rating	424	1742.4410	101.8526	1493	2087	140	1750.329	122.1454	1545	2087
Rounds Champ.L.	424	0.8467	1.9840	0	8	140	1.05	2.21611	0	8
Rounds Europa L.	424	0.8278	1.8946	0	8	140	0.8571	2.0482	0	8
Media Visibility	-	-	-	-	-	140	26.8408	44.9898	0.13	223.68
Serie A										
Annual Revenues	235	93.8448	73.5722	6.711	387.9	139	102.2125	73.0731	6.711	387.9
Annual Wages	236	54.1943	49.5489	5.454	234.02	140	60.0020	50.0577	5.454	234.02
Domestic Points	240	51.0625	15.8056	19	102	140	51.7357	16.0774	19	102
Elo Rating	240	1650.1750	100.7824	1414	1946	140	1634.3	98.2510	1414	1930
Rounds Champ.L.	240	0.6792	1.6546	0	8	140	0.6429	1.5689	0	8
Rounds Europa L.	240	0.5917	1.3782	0	6	140	0.6786	1.4655	0	6
Media Visibility	-	-	-	-	-	140	17.2498	17.8090	1.16	88.84
Ligue 1										
Annual Revenues	140	64.1903	79.3627	8.439	542.416	140	64.1903	79.3627	8.439	542.416
Annual Wages	140	44.4752	43.7429	6.206	292.394	140	44.4752	43.7429	6.206	292.394
Domestic Points	140	51.6500	14.1660	18	96	140	51.65	14.1659	18	96
Elo Rating	140	1620.4790	91.4222	1376	1888	140	1620.479	91.4222	1376	1888
Rounds Champ.L.	140	0.5714	1.4401	0	6	140	0.57143	1.4401	0	6
Rounds Europa L.	140	0.4143	1.0387	0	5	140	0.41429	1.0387	0	5
Media Visibility	-	-	-	-	-	140	6.13243	8.4277	0.47	70
Total										
Annual Revenues	1,193	85.7671	95.7667	1.5215	690.1	557	108.5825	116.6257	6.711	690.1
Annual Wages	1,198	52.3726	54.1380	1.6775	371.735	559	67.4355	64.9765	5.454	371.735
Domestic Points	1,224	52.0351	15.3371	11	102	560	51.9964	16.1795	17	102
Elo Rating	1,224	1694.7610	110.5724	1376	2087	560	1678.0020	118.0628	1376	2087
Rounds Champ.L.	1,224	0.7729	1.8369	0	8	560	0.7821	1.7912	0	8
Rounds Europa L.	1,224	0.6585	1.5940	0	8	560	0.6589	1.5949	0	8
Media Visibility	-	-	-	-	-	560	20.1619	29.8112	0.13	223.68

The summary statistics of the main variables used in our econometric models are provided in Table 3.1. The table conveys information for the total sample and every domestic league. Since some of the models involve the media visibility index variable, of which reliable homogeneous data is available starting at season 2009/2010, the statistics are computed for the full sample (from 1995/96 to 2015/16) and the subsample (from 2009/10 to 2015/16). Notice that, even if there are almost no missing observations in our dataset, some are missing due to lack of data availability –as was already explained– or, in some models, as a result of including lagged variables, which reduces the number of observations by the same number of teams in the corresponding season.

For the sake of robustness, we run the regressions for the variables expressed in levels and deviations from the mean. The latter (deviations from the mean) for variables: TR, TW, ELO, CLP, and EUP, are calculated as the difference between the value of club "i" in season "t" and the mean of all the teams in the t*th* season, regardless of the domestic league where they play. This is sensible because, concerning financial outcomes (and also their media visibility), teams compete with each other in a global market, without being constrained to a particular league. The opposite situation applies to domestic league points and, hence, mean deviations of DSP are calculated with respect to the average value of the teams that are competing in the same national league of the considered team.

3.4. METHODOLOGY

Several different models and hypotheses will be examined based on the behavioural Equation (2) and Equation (3). Nonetheless, even it is not part of our main interest, the production model of Equation (1) is also estimated. The latter estimation results are helpful for testing with a new and rich dataset the extent to which findings of earlier papers apply across football leagues. We estimate the models following the behavioural equations (1) – (3) using Ordinary Last Squared (OLS) and Fixed Effects Models. The literature suggests the use of OLS estimation as a suitable approach for the analysis of team sports (Borland, 2006), and consistently panel data estimations, recognizing the nature of the data.

The analysis of the OLS estimations allows identifying the impact of certain variables that, with the introduction of club-specific fixed effects, may not be detected (i.e., the fixed effect may capture the impact of other variables). In particular, our estimated

equations do not compromise the relationship between quality (wage) and performance (points), and between performance and revenues, which operates from year to year. Moreover, the comparison of the estimates from both regression techniques, pooled OLS and panel data, is also relevant for our hypothesis testing. Regarding panel data analysis, the fixed effects model is preferred for all the regressions, mainly for two reasons. First, football clubs have invariant idiosyncratic characteristics over time. Secondly, based on the Hausman specification test, the empirical evidence indicates that the random effects estimators converge to some other value that is not the value of the true parameters.

In the final analysis, we performed dynamic estimations using the Arellano and Bond (1991) generalized method of moments (GMM); the application of the dynamic panel-data regression induces testing the hypotheses H7 to H9, linked to the behavioural Equation (3). The estimation is specified for one lag of the dependent variable and use the instruments suggested by the Arellano-Bond method.

Throughout the regression analysis, for the pooled OLS, Fixed Effects, and Dynamic Panel-Data models, the variables were expressed either in levels or in deviations from their mean. The duplicity in the analysis assist to the robustness, to double-check the results, to get a deeper understanding of the behaviour of football clubs in segmented markets (as they compete simultaneously at the domestic and European level), and to follow similar approaches as those chosen by the related literature. Besides, the latter choice (deviations from the mean) is meaningful, as the relative strengths among rivals are the crucial factor to determine sport success (Cf.: Sanderson 2002). Accordingly, behavioural wage equations (relationship between salaries and performances) are very often estimated, rather than in absolute values, with the explanatory variables expressed in relative terms with respect to the competitors. (Cf.: Torgler and Schmidt, 2007; Peeters and Szymanski, 2014; Caporale and Collier, 2015; and Garcia-del-Barrio and Tena-Horrillo, 2019).

Lastly, the regression models were tested for multicollinearity, heteroskedasticity, and model selection; the results are satisfying, supporting the validity of all the proposed models. A detailed description of the diagnostic tests (Hill et al., 2011, pp.71,105,163; Verbeek, 2008, pp.238,358,419; Wooldridge, 2010, pp.288), applied is provided in the corresponding section of the empirical analysis.

3.5. EMPIRICAL ANALYSIS

Our analysis begins with the estimation of productivity equations of the football clubs, as shown in Expression (1). Then, we investigate the relationship between clubs' total revenues and sport performance, like in Equation (2). Finally, we estimate wages equations of the form indicated in Equation (3). In the last case, in addition to the static version of the model, we explore the implications of the dynamic specification. After briefly presenting the main results of the first analysis in Section 3.5.1, in sections 3.5.2 and 3.5.3, we test a number of relevant hypotheses.

The results of the different estimations are always displayed in the same way: first the results of the pooled OLS estimations and then, the Fixed Effects models, both in levels and deviations from the mean (DM).

3.5.1. PRODUCTION EQUATION MODELS

The study of production functions in the context of European football has been widely developed, even though one of the main difficulties is to separate the individual contribution of players and teams (Carmichael et al., 2000). We employ a general form of a production function, where domestic sport performance depends on the team's quality:

$$DSP_{it} = \beta_0 + \beta_1 \cdot TW_{it} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \mu_{it} \quad (1)$$

$$\Rightarrow DSP_{it-1} = \beta_0 + \beta_1 \cdot TW_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \mu_{it-1} \quad (1')$$

$$DSP_{it} = \beta_0 + \beta_1 \cdot TW_{it} + \lambda_1 \cdot DCLP_{it} + \lambda_2 \cdot DEUP_{it} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \mu_{it} \quad (1.c)$$

$$\Rightarrow DSP_{it-1} = \beta_0 + \beta_1 \cdot TW_{it-1} + \lambda_1 \cdot DCLP_{it-1} + \lambda_2 \cdot DEUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \mu_{it-1} \quad (1.c')$$

We decided to measure sports performance in terms of total domestic points (output), and total annual wages as the usual "proxy" variable to capture the quality of the football squad (input); the total output is expected to have a positive relationship with the inputs.

In the following analysis, we estimate Equation (1) and an alternative model that includes additional regressors like participation in European competitions. Thus, Model

(1.c) includes as dummy variables the participation in the Champions League and in the Europa League, regardless the number of rounds before the team was disqualified.

Table 3.2. Domestic Sport Performance – Pooled OLS Models

	Levels	
Model	**(1)**	**(1.c)**
Total Wages	0.230***	0.181***
	(0.009)	(0.011)
D Rounds in Champions League		8.382***
		(1.281)
D Rounds in Europa League		5.019***
		(0.831)
Premier	-11.802***	-9.719***
	(1.130)	(1.158)
Serie A	-4.649***	-4.019***
	(1.149)	(1.135)
La Liga	-3.096***	-2.816***
	(1.073)	(1.053)
Constant	61.285***	59.333***
	(2.417)	(2.388)
Observations	1,198	1,198
Adjusted R^2	0.4992	0.5336
F-global	36.05	45.08
BP test ($\chi 2$)	[0.000]	[0.000]
AIC	9143.724	9060.27
RESET test	[0.000]	[0.000]
	Deviation from Mean	
Model	**(1)**	**(1.c)**
Total Wages	0.226***	0.177***
	(0.009)	(0.011)
D Rounds in Champions League		8.402***
		(1.301)
D Rounds in Europa League		5.067***
		(0.829)
Premier	-10.090***	-8.103***
	(1.046)	(1.079)
Serie A	-3.500***	-2.958***
	(1.076)	(1.072)
La Liga	-2.268**	-2.079**
	(0.974)	(0.962)
Constant	5.178***	1.970**
	(0.8569)	(0.958)
Observations	1,198	1,198
Adjusted R^2	0.4962	0.5314
F-global	167.21	167.01
BP test ($\chi 2$)	[0.000]	[0.000]
AIC	9118.587	9033.963
Reset Test	[0.000]	[0.000]

Note: Robust standard errors are reported in parentheses and P-values in brackets.
Statistical significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3.2 presents the results of the pooled OLS estimations and Table 3.3 the estimations for the Fixed Effects models, with the variables measured in levels and in deviations from the mean; the dummy variables controlling for season were included in the pooled models. We also show the estimation results of the models controlling for leagues' fixed effects, where the French Ligue 1 is taken as the reference group.

Despite that the production model is not a central part of our regression analysis, we performed the usual regression diagnostic to evaluate the models. We first examined the existence of multicollinearity, by means of the variance inflation factor (VIF). The mean VIF was below 2.50 and the variables VIF below 4; therefore, multicollinearity does not seem to be a concerning issue.

Then, we also tested the functional form of the models employing the RESET tests: Ramsey for pooled OLS and F-test for Fixed Effects Models; the results suggest that the models may suffer from an omitted-variable bias. This issue is one of the main challenges in the study of sporting competitions; in our case, Model (1) seems to be lacking some relevant inputs, which leads to a misspecification of the production function. Nevertheless, our estimations results present an accurate relationship between sport performance and teams' quality.

Next, we included an additional test to compare how the models fit our dataset: the Akaike Information Criterion (AIC) According to the criterium of looking for the lowest AIC, the models including participation in the UEFA competitions, and expressed in deviations from the mean, performed better. Lastly, we tested the assumption of homoskedasticity in the residuals using the Breusch–Pagan/Cook–Weisberg test for pooled OLS and the modified Wald statistic for Fixed Effects models. The p-values reported in the tables suggest evidence of heteroskedasticity in the data; to alleviate distortions, we estimated the regressions using robust standard errors.

The explanatory power (the Adjusted-R^2) for the pooled OLS models is high (it ranges from 0.49 to 0.53), indicating that the models fit the data well. We observe that the Adjusted-R^2 increases by a small magnitude when the variables capturing participation in the Champions League and Europa League are added. The value of the Adjusted-R^2 for the Fixed Effects models is smaller (0.11) regardless of whether we introduce or not the explanatory variables of the EUFA competitions. (This is not

surprising, as there are now as many additional regressors as the number of Fixed Effects, and because the Adjusted-R^2 diminishes along with the number of explanatory variables).

Table 3.3. Domestic Sport Performance – Fixed Effects Models

	Levels	
Model	**(1)**	**(1.c)**
Total Wages	0.134***	0.126***
	(0.023)	(0.025)
D Rounds in Champions League		2.238
		(1.650)
D Rounds in Europa League		0.909
		(1.092)
Constant	55.771***	55.563***
	(1.916)	(1.971)
Observations	1,198	1,198
Adjusted R^2	0.1147	0.1173
F-global	2.80	3.42
Wald (χ2)	[0.000]	[0.000]
Hausman Test	[0.000]	[0.000]
AIC	9143.724	8634.8
Reset Test	[0.000]	[0.000]
	Deviation from Mean	
Model	**(1)**	**(1.c)**
Total Wages	0.124***	0.116***
	(0.026)	(0.027)
D Rounds in Champions League		2.119
		(1.623)
D Rounds in Europa League		0.919
		(1.063)
Constant	0.203***	-0.324
	(0.000)	(0.342)
Observations	1,198	1,198
Adjusted R^2	0.1127	0.1150
F-global	23.49	12.46
Wald (χ2)	[0.000]	[0.000]
Hausman Test	[0.000]	[0.000]
AIC	8597.704	8596.525
Reset Test	[0.000]	[0.000]

Note: Robust standard errors are reported in parentheses and P-values in brackets.
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

We find a strong and significant positive relationship between spending in players' talent and sport attainments, which is in line with previous studies (Szymanski and Smith, 1997; Forrest and Simmons, 2002; and Barajas and Rodriguez, 2010, among others). The estimation results, for both pooled OLS and Fixed Effects models, show that current wages (*Lag1 Total Wages*) is positive and statistically significant at one percent level. Besides, according to the Margins statistics, presented in Aappendix B, this variable presents the relatively highest impact on domestic performance compared with the other explanatory variables (see Table B.4.3.1. and B.4.3.2.). If the variables measuring

participation in the UEFA competitions are included, like in Model (1.c), there is a small decrease in the coefficient of current wages; still, an increase in total wages is associated with high domestic performance.

The pooled OLS regression results show a high statistical significance of the control variables for UEFA competitions, which contrasts with the results obtained in the Fixed Effects estimations. The measure of these variables, introduced in Model (1) as a dummy variable, allows a direct comparison between them; as expected, participation in the Champions League relates to higher domestic points than the Europa League. Regarding the average effect of the variables controlling for Leagues, observed in the pooled models, the impact on the clubs' domestic performance is negative and statistically significant compared to the Ligue 1; suggesting that current wages affect in small magnitude to the Premier League than the rest of the leagues, followed by Serie A, and then La Liga.

With the inclusion of the time-invariant characteristics (fixed effects), current wages reduce in a small magnitude its impact on domestic performance (see Margins Table B.4.3.1). Besides a relevant change occurs to the control variables of the UEFA competition: no longer influence the current *Domestic Points*. The loss of statistical significance may indicate that clubs' fixed effects already capture the link between the teams' participation in UEFA competitions and the current national league performance. The explanation for a performance skew like that may be that teams with stronger sport results (higher domestic points) participate in the Champions League and Europa League.

To sum up, regarding the main European football Leagues, the empirical analysis corroborates that the performance in the national league is directly related to current investment in talent; an effect whose magnitude varies across the different domestic leagues.

3.5.2. Revenue Equation Models

We take for granted that, in predicting the clubs' economic outcomes (annual revenues), the usual expected results hold: the coefficients of current sport performance (DSP_{it}, CLP_{it}, and EUP_{it}), as well as those for past sport performances (both in the precedent season DSP_{it-1}, CLP_{it-1}, EUP_{it-1}, and in the past of ELO_{it-2}) are positive and statistically significant. We proposed exploring the following hypotheses using our rich dataset:

H1. Football clubs' annual revenues are **better explained by recent-past sport performance**, and ultimately by past investment in talent **than by the current sport achievements**.

H2. The **clubs' brand value** (built upon historical sport achievements) **positively affects** their capacity to generate **revenues** beyond the current sport quality of the team roster. Actually, the influence of current and recent past sport performances on club's revenues are expected to diminish when brand value is included into the regressions.

H3. In addition to sporting skills, the clubs' capacity to accrue revenues depends on the current and recent past off-field skills of the team roster, insofar **as they attract also the interest of journalists and of the general public.**

To test the hypotheses, concerning the revenue Equation (2), we introduce different characterizations of the model suitable to the analysis. Four types of (similar) models are prescribed in this section:

$$TR_{it} = \delta_0 + \delta_2 \cdot DSP_{it} + \delta_3 \cdot DSP_{it-1} + \delta_4 \cdot CLP_{it} + \delta_5 \cdot CLP_{it-1} + \delta_6 \cdot EUP_{it} + \delta_7 \cdot EUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \vartheta_{it} \quad (2.A)$$

$$TR_{it} = \delta_0 + \delta_1 \cdot ELO_{it-2} + \delta_2 \cdot DSP_{it} + \delta_3 \cdot DSP_{it-1} + \delta_4 \cdot CLP_{it} + \delta_5 \cdot CLP_{it-1} + \delta_6 \cdot EUP_{it} + \delta_7 \cdot EUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \vartheta_{it} \quad (2.a)$$

$$TR_{it} = \delta_0 + \delta_2 \cdot DSP_{it} + \delta_3 \cdot DSP_{it-1} + \delta_4 \cdot CLP_{it} + \delta_5 \cdot CLP_{it-1} + \delta_6 \cdot EUP_{it} + \delta_7 \cdot EUP_{it-1} + \delta_8 \cdot f\_MVI_{it} + \delta_9 \cdot f\_MVI_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \vartheta_{it} \quad (2.B)$$

$$TR_{it} = \delta_0 + \delta_1 \cdot ELO_{it-2} + \delta_2 \cdot DSP_{it} + \delta_3 \cdot DSP_{it-1} + \delta_4 \cdot CLP_{it} + \delta_5 \cdot CLP_{it-1} + \delta_6 \cdot EUP_{it} + \delta_7 \cdot EUP_{it-1} + \delta_8 \cdot f\_MVI_{it} + \delta_9 \cdot f\_MVI_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \vartheta_{it} \quad (2.b)$$

To organize the regression analysis and to comment on the main estimation results, we proceed to label with lower-case characters the models that include the *Elo Rating* variable (a crucial regressor in our estimations), and with capital letters the models where *Elo Rating* was excluded from the estimation. Additionally, the *Filtered Media Visibility Index* (*MVI*) variable is incorporate for exploring to what extent the degree of exposure in the media is relevant to football clubs concerning the interaction between sport performance and revenues. The models designed with characters "A" and "a" are

estimated without the variable of media visibility, while "B" and "b" are used when that variable is included. This distinction is important for two reasons: (i) models without the variable *filtered media visibility* benefit from a much larger data sample than otherwise and (ii) models that include *MVI* allow us to test some of the proposed hypotheses.

The estimation results for the pooled OLS models are presented in Table 3.4. We included the fixed effects to account for potential elements of individual heterogeneity associated with football clubs, even if not explicitly indicated in the above equations; Table 3.5 shows the computed estimations. Remind that the models are estimated for both the variables in levels and deviations from the mean.

The Adjusted-R^2 scores of the pooled OLS revenue equations were high (ranging from 0.74 to 0.89), indicating that the models fit the data quite well. The addition of the variables *Filtered Media Visibility* and *Elo Rating* improved the goodness of fit; in terms of the Akaike Information Criterion (AIC), the scores indicate that Models (2.a) and (2.b) are the most appropriate representation and that the models computed on deviations from the mean appear to be better as compared to the models on levels. The variables employed may inform potential multicollinearity; thus, we tested using the Variance Inflation Factor (VIF), which never went beyond value 4, far below the threshold of 10.

The VIF test suggests that our analysis may discard empirical concerns regarding multicollinearity issues in the estimated models. However, the distorted value observed in the regressor *Rounds in Europa League* when *Lag2 Elo Rating* is included in the model, alerts of multicollinearity between the historical sport status (*Lag2 Elo Rating*) and recent past sport performances.

The assumption of homoskedasticity in the residuals was tested by the Breusch–Pagan/Cook–Weisberg test and the modified Wald statistic, the p-values are reported in the tables. According to the results, we may conclude that there are signs of heteroskedasticity; thus, it seems appropriate to estimate the models using robust standard errors.

Concerning panel data analysis, as we have mentioned, theoretical reasons and empirical procedures (Hausman test) recommend relying on the Fixed Effects rather than on the Random Effects model estimations, since the heterogeneity elements are meant to be associated with unvarying peculiarities of a football club, rather than displaying a stochastic character.

Table 3.4. Revenues Equations – Pooled OLS Models

	Levels			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.174***		0.144***
		(0.026)		(0.0437)
Domestic Points	1.900***	1.568***	2.178***	2.057***
	(0.143)	(0.147)	(0.236)	(0.239)
Lag1 Domestic Points	0.654***	0.735***	1.241***	0.921***
	(0.107)	(0.109)	(0.286)	(0.297)
Rounds in Champions League	14.887***	12.896***	22.745***	22.862***
	(1.871)	(1.800)	(3.244)	(3.292)
Lag1 Rounds in Champions League	11.131***	7.070***	9.334***	5.491*
	(1.872)	(1.949)	(2.689)	(3.120)
Rounds in Europa League	0.054	-0.994	-0.702	-0.636
	(1.152)	(1.086)	(1.702)	(1.641)
Lag1 Rounds in Europa League	-0.916	-2.996***	-0.548	-2.043
	(0.995)	(1.078)	(1.221)	(1.369)
Filtered Media Visibility			1.619***	1.600***
			(0.238)	(0.230)
Lag1 Filtered Media Visibility			0.637**	0.562**
			(0.275)	(0.273)
Premier League	83.359***	73.984***	106.476***	96.023***
	(6.562)	(6.060)	(7.000)	(6.403)
Serie A	47.717***	46.460***	36.334***	36.460***
	(5.687)	(5.639)	(5.430)	(5.384)
La Liga	31.764***	17.118***	13.094**	-0.0681
	(6.597)	(6.362)	(5.634)	(6.943)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-187.331***	-446.607***	-158.520***	-369.614***
	(13.938)	(46.113)	(13.147)	(67.013)
Observations	1,125	1,125	431	431
Adjusted R^2	0.7472	0.7601	0.8879	0.8910
F-global	57.64	58.62	41.71	134.84
BP test	[0.000]	[0.000]	[0.000]	[0.000]
AIC	11982.42	11924.25	4455.67	4444.54
RESET test	[0.000]	[0.000]	[0.000]	[0.000]
	Deviation from Mean			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.127***		0.121***
		(0.027)		(0.038)
Domestic Points	1.699***	1.589***	2.190***	2.086***
	(0.169)	(0.169)	(0.236)	(0.240)
Lag1 Domestic Points	1.236***	0.912***	1.221***	0.956***
	(0.208)	(0.214)	(0.286)	(0.296)
Rounds in Champions League	12.721***	12.717***	22.837***	22.861***
	(2.095)	(2.053)	(3.244)	(3.314)
Lag1 Rounds in Champions League	10.623***	7.921***	9.283***	6.105**
	(1.910)	(2.021)	(2.687)	(2.972)
Rounds in Europa League	-1.403	-1.356	-0.706	-0.670
	(1.276)	(1.248)	(1.702)	(1.658)
Lag1 Rounds in Europa League	-1.190	-2.620**	-0.550	-1.789
	(1.006)	(1.086)	(1.217)	(1.337)
Filtered Media Visibility			1.628***	1.604***
			(0.239)	(0.232)
Lag1 Filtered Media Visibility			0.627**	0.572**
			(0.278)	(0.275)
Premier League	76.847***	70.594***	107.994***	99.050***
	(5.739)	(5.573)	(6.999)	(6.487)
Serie A	41.217***	42.666***	36.569***	36.556***
	(5.436)	(5.470)	(5.371)	(5.348)
La Liga	23.446***	12.432**	16.416***	5.035
	(5.740)	(6.091)	(5.576)	(6.634)
Season Dummies	No	No	No	No
Constant	-44.699	-45.084	-41.846	-42.496
	(4.958)	(4.998)	(4.540)	(4.572)
Observations	1,038	1,038	431	431
Adjusted R^2	0.7235	0.7314	0.8869	0.8894
F-global	139.30	137.50	180.37	179.62
BP test ($\chi 2$)	[0.000]	[0.000]	[0.000]	[0.000]
AIC	11088.54	11059.59	4447.28	4438.41
RESET test	[0.000]	[0.000]	[0.000]	[0.000]

Note: Robust standard errors are reported in parentheses and P-values in brackets. Hausman Test perform with the sigmamore option.
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table 3.5. Revenues Equations - Fixed Effects Models

	Levels			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.189***		0.139**
		(0.054)		(0.055)
Domestic Points	1.212***	1.170***	1.354***	1.388***
	(0.286)	(0.260)	(0.272)	(0.281)
Lag1 Domestic Points	0.502***	0.581***	0.864***	0.879***
	(0.188)	(0.195)	(0.310)	(0.312)
Rounds in Champions League	8.915***	7.362***	15.725***	14.419***
	(1.880)	(1.797)	(2.985)	(2.771)
Lag1 Rounds in Champions League	5.093***	1.505	3.475	0.195
	(2.210)	(2.372)	(3.015)	(2.987)
Rounds in Europa League	0.637	0.035	-1.714	-1.814
	(1.101)	(1.090)	(1.457)	(1.447)
Lag1 Rounds in Europa League	-0.794	-2.521**	-0.509	-1.655
	(0.941)	(1.161)	(1.111)	(1.367)
Filtered Media Visibility			1.038***	1.024***
			(0.279)	(0.277)
Lag1 Filtered Media Visibility			0.134	0.0985
			(0.161)	(0.174)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-93.603	-400.052	17.243	-280.531
	(27.914)	(112.610)	(29.366)	(105.877)
Observations	1,125	1,125	431	431
Adjusted R^2	0.5275	0.5542	0.4883	0.5039
F-global	12.53	18.51	11.51	9.08
Wald (χ2)	[0.000]	[0.000]	[0.000]	[0.000]
Hausman test	[0.000]	[0.000]	[0.000]	[0.000]
AIC	11485.57	11421.13	4095.60	4083.27
RESET test	[0.000]	[0.000]	[0.007]	[0.018]
	Deviation from Mean			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.143***		0.107**
		(0.038)		(0.042)
Domestic Points	1.080***	1.071***	1.303***	1.331***
	(0.306)	(0.289)	(0.269)	(0.271)
Lag1 Domestic Points	1.156***	0.948***	0.820***	0.845***
	(0.364)	(0.309)	(0.301)	(0.301)
Rounds in Champions League	6.202***	5.895***	15.856***	14.747***
	(2.254)	(2.205)	(3.106)	(2.948)
Lag1 Rounds in Champions League	4.939**	2.282	3.310	0.849
	(2.341)	(2.359)	(3.128)	(3.077)
Rounds in Europa League	-0.643	-0.738	-1.719	-1.800
	(1.317)	(1.297)	(1.510)	(1.496)
Lag1 Rounds in Europa League	-0.424	-1.837*	-0.493	-1.339
	(0.927)	(1.091)	(1.095)	(1.258)
Filtered Media Visibility			1.034***	1.015***
			(0.286)	(0.282)
Lag1 Filtered Media Visibility			0.102	0.080
			(0.172)	(0.180)
Season Dummies	No	No	No	No
Constant	0.215	-7.117	1.234	-4.556
	(0.844)	(2.620)	(1.149)	(2.629)
Observations	1,038	1,038	431	431
Adjusted R^2	0.2395	0.2718	0.3523	0.3669
F-global	10.11	9.24	8.54	7.48
Wald (χ2)	[0.000]	[0.000]	[0.000]	[0.000]
Hausman test	[0.000]	[0.000]	[0.000]	[0.000]
AIC	10654.55	10645.07	4093.99	4085.17
RESET test	[0.030]	[0.000]	[0.297]	[0.282]

Note: Robust standard errors are reported in parentheses and P-values in brackets. Hausman Test perform with the sigmamore option. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

The Fixed Effect regression models present Adjusted-R^2 scores ranged from 0.48 to 0.55, indicating that the models fit the data reasonably well; the preferred models should be (2.a) and (2.b), specified on deviations from the mean, according to the lowest AIC. The

results of the specification test, Ramsey RESET and F-test, confirms that the revenue model improves with the heterogeneity fixed effect, and the introduction of the variables *Elo* ranking and f*iltered media visibility*. The results indicate that Model (2.b), with the variables expressed in deviations from the mean, is correctly specified at a five percent level of significance.

The estimated parameters for the revenue models show that current and past sport performance in the domestic league, capture by the variable *Domestic Points*, is positive and highly significant for pooled OLS and Fixed Effects Model. The international achievements are also relevant, in particular the participation in the Champions League, although the significance of the variable differs between the pooled OLS and the FE models. For instance, current and past performance in the Champions League (*Rounds Champions League* and *Lag1 Rounds Champions League*) are positive and statistically significant for all the OLS models; yet, when Fixed Effects are accounted, only current *Rounds Champions League* impact on total revenues. The variable for participation in the UEFA Europa League (*Rounds Europa League*) presents an unexpected behaviour and, in general, is not statistically significant. Regarding the historical sport status, capture in the variable *Elo Rating*, all the estimation results present a positive and significant impact. Lastly, the variable *filtered media visibility* is also a relevant revenue source, especially for media exposure in the current season, yet the variable in the precedent season is only significant when the heterogeneity elements of the clubs are not considered.

The models in Table 3.4 shows the leagues that are systematically associated with greater annual revenues (respect to the reference league: the French Ligue 1). The results allow determining the financial ranking of domestic leagues, which seems to be led by the English Premier League, followed by the Italian Serie A, and the Spanish La Liga, respectively. This result is robust and can only be observed in the pooled models, both using the variables in levels and deviations from the mean. Moreover, this hierarchy still holds and is statistically significant once we include the historical status of clubs (*Lag2 Elo Rating*) in the regression analysis.

We may wonder if the fact that some models were estimated using the subsample and the others with the large dataset might somehow influence some main results. To illustrate that this is not the case, and to facilitate comparisons across models estimated with similar sample data (using the same T for the four leagues), we have replicated the

estimations of the models "A" and "a" using the reduce (instead of large) sample. These estimations are shown in Appendix B, see Table B.3.1, revealing that our findings are not affected by the data sample size.

Hypothesis 1 postulates that the clubs' revenues are more closely explained by recent-past sport performance, and ultimately past investment in talent, than current sport achievements. This hypothesis is tested through the comparison of the estimation results for Model (2.A) against Model (2.a) and also, in the case of the models that include the media visibility index, by comparing the results of Model (2.B) against Model (2.b). Initially, it is worth noting the positive coefficients and the significance levels of both *Domestic Points* and *Lag1 Domestic Points*. Concerning the validity of *H1*, our empirical analysis provides contrasting evidence. On one hand, from comparison of the coefficient sizes for just current domestic sport performance (*Domestic Points*) and recent-past domestic performance (points in the precedent season: *Lag1 Domestic Points*), we reach the opposite conclusion that current sport outcomes appears to be more relevant than recent-past performances. Notice that direct comparison of the coefficients is valid since these two regressors are measured by an identical scale: points in the domestic league. A similar conclusion is obtained from comparing the actual and lagged variables for sport performances in European leagues, the *Rounds Champions League* and *Rounds Europa League* variables, but this issue requires a more careful examination.

The effect on revenues of current and recent-past sport performances achieved in the UEFA Champions League is positive for all the models, although the coefficient of the lagged variable becomes statistically non-significant for models that account for heterogeneity elements (fixed effect estimations of Table 3.5). Besides, when the *Elo Rating* variable is introduced in the models, the variable capturing the games in the Europa League has an odd behaviour, presumably caused by a correlation between the two variables, suggesting perhaps that the Elo ranking has a bias reward for the number of rounds in the Europa League. We present at the end of this subsection an analysis by Leagues, suggesting that the impact of *Rounds Europa League* in La Liga and Ligue 1 may be affecting the outcome of this variable. However, such an estrange result in one of the models (the fact that teams going through additional rounds in the UEFA Europa League – its lagged variable – appears to have a negative statistically significant impact

on the clubs' annual revenues) disappears as soon as the filtered media visibility is accounted for, *Rounds Europa League* is not statistically significant.[17]

To evaluate the relative importance of the explanatory variables as compared to current and recent sport performances, we need to rely on the marginal effects. Indeed, in this way, we avoid the distortions derived from the diverse scales of the different variables that measure sport performances. The marginal effects, presented in Appendix B.4, also corroborate the pre-eminence of current sport performance over past achievements, both domestic and international, but not over historical sport performance. *Hypothesis 2* refer to the influence on annual revenues of the sport attainments in the *no-recent* past. In this regard, *Lag2 Elo Rating* is introduced in the models to capture the clubs' historical sport performances. This variable seems appropriate, as it tracks back the teams' sport achievements over many decades. The clubs' historical sporting status (*Lag2 Elo Rating*) has a significant effect on the clubs' capacity to generate revenues. According to the marginal effects (see Appendix B.4), the *Elo Rating* variable has the greatest impact on the total revenues compared to the other fundamental variables. Hypothesis 2 is also corroborated by the positive and statistically significant coefficients of the Elo variable in the pooled OLS and the fixed effects estimated models, either when the variables are expressed in levels or in deviations from the mean. However, when accounting for the role of the historical sport status, the expected positive and significant empirical relationship between clubs' revenues and the current and recent past sport performance only becomes smaller in some cases; generally for models where the variables are defined in relative terms (both in the pooled and FE models). In the level models , the expected outcome slightly fails concerning the lagged variable that measures past domestic performance : the statistically significant estimated coefficients increase when *Lag2 Elo Rating* is incorporated to the regression (Model 2.a), its size grows bigger from 0.654 up to 0.735 in the pooled model; and from 0.502 up to 0.581 in the FE model. Likewise, in the fixed effects Model (2.b), the domestic sport performance, current and past, increase in a small magnitude while the international sport performance variables decrease.

The role played by the clubs' degree of visibility in the media is another crucial analysis, despite implying a shorter dataset (as the *MVI* variable is only available for

[17] As we have already explained, *Elo Rating* is a proxy variable that has been lagged two periods to avoid multicollinearity while accounting for the past sporting brand status of football clubs.

seasons 2009/10 to 2015/16), this examination increases the robustness of previous results and allow contrasting additional hypotheses. In this case, the findings support *Hypothesis 3*, given that the coefficients of the filtered media visibility indexes are positive and statistically significant in the Models (2.B) and (2.b). Moreover, in pooled models, this effect also applies to the precedent season (*Lag1 Filtered Media Visibility*), which indicates that fans and the general public retain the memory of teams that accumulated media exposure in the recent past.

Calculation of marginal effects are relevant to carry out comparisons across the different regressors capturing sport performances: margins allow us to compare the relative relevance of domestic sport performances versus sport achievements in the European competitions. A more detailed information on the marginal effects is reported in Table B.4.2.1 and Table B.4.2.2 of the Appendix. Here we sum up some main conclusions obtained from comparing the estimated margins of the relevant models. On one side, historical sport achievements appears to be more relevant than current and recent-past sport performances, even if we take these two variables altogether. To be more specific, the margins estimated for *Lag2 Elo Rating* multiply the margins of domestic sport performance by values that range between 2.2 and 4.2 times in magnitude, depending on the models; and even a greater distance is found for *Lag2 Elo Rating* with respect to *Lag1 Domestic Points*, whose factors are between 3 and 7 times greater. There is still an important remark to be made: the mentioned results must be interpreted considering that the *Elo Rating* variable involves many years, whereas the other two variables measure the sporting achievements of just one season each. This remark does not anyway prevent us to conclude that, concerning the question about the historical consolidated sport status of the teams, our findings give support to the idea that this feature is more important that the current and recent-past performances of the clubs altogether.

The analysis of behavioural revenue equation was further refined by running separate regressions for each of the four domestic football leagues under study. Tables 3.6 to 3.9 reports the estimation results for models using variables in levels; the results for deviations from the mean were not very different in general. The explanatory power of the models, according to the Adjusted-R^2, is greater in all the cases −except Models (2.A) and (2.a) for the French Ligue 1− than the estimations made for the whole dataset,

including teams from all the leagues altogether. Basically, most of the main results hold for the analysis constrained the different national leagues; however, there are deviations specific to each league that deserve further comments.

On one hand, the English Premier League and the French Ligue 1 appear to be the domestic leagues that deviate the most from the usual patterns; the former displays discrepancies mainly in the FE estimation models, while the latter does it in the other models. Instead, the Spanish and Italian football clubs follow more closely in line with the revenue regression outcomes obtained for the full sample. The following lines summarize the aspects in which each league deviates from the abovementioned general results concerning the main explanatory variables.

First, regarding the positive impact on revenues of the clubs' brand status (as captured by *Lag2 Elo Rating*), it is statistically significant in all the four models for La Liga and three out of four in the case of Serie A; it means that the brand value and reputation works particularly well to sustain annual revenues of the clubs in the context of Spanish and Italian football. This important conclusion is thus more dubious in the other two leagues; at least when the (filtered) media visibility regressors are included. The concern on multicollinearity issues here was already discussed in the general model, but it seems anyway that some distortions occur when *Lag2 Elo Rating* is introduced in the regressions along with the media visibility variables.

Second, we compare the estimation results of the overall model to the ones obtained at each of the domestic leagues regarding the two variables capturing sport performances: *Domestic Points* and *Lag1 Domestic Points*. Remind that the results were extremely solid to conclude that both recent-past and current sport performances (in the domestic competition) are strongly positive and significant, corroborating the usual results of previous papers. There are however relevant discrepancies across the domestic leagues. In the Premier League, for instance, the estimators for current *Domestic Points* are not significant in two out of the eight models; these are the models including teams' fixed effect while omitting the filtered media visibility variables, both with and without *Lag2 Elo Rating* namely, Models (2.A) and (2.a). The other three leagues (La Liga, Serie A, and Ligue1) display a very consistent results in respect to *Domestic Points*, as the estimators for this variable are found to be in all the eight models positive and statistically significant.

Table 3.6. Revenues Equations - Premier League

	Pooled OLS Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.236***		0.127
		(0.040)		(0.094)
Domestic Points	1.446***	1.033***	1.824***	1.827***
	(0.224)	(0.212)	(0.468)	(0.452)
Lag1 Domestic Points	0.515***	0.717***	1.718***	1.225
	(0.125)	(0.142)	(0.628)	(0.768)
Rounds in Champions League	14.751***	11.122***	29.126***	29.026***
	(3.576)	(3.284)	(7.277)	(7.473)
Lag1 Rounds in Champions League	9.905***	4.209	7.164	4.177
	(3.553)	(3.519)	(5.321)	(5.768)
Rounds in Europa League	5.147**	2.785	7.678*	7.508*
	(2.549)	(2.327)	(4.369)	(4.421)
Lag1 Rounds in Europa League	2.212	-1.474	2.138	0.301
	(1.916)	(2.064)	(3.033)	(3.327)
Filtered Media Visibility			2.302***	2.227***
			(0.526)	(0.533)
Lag1 Filtered Media Visibility			0.462	0.349
			(0.515)	(0.529)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-95.540***	-478.397***	-83.407***	-299.881**
	(15.533)	(72.159)	(27.357)	(141.606)
Observations	402	402	107	107
Adjusted R^2	0.7912	0.8161	0.8936	0.8947
F-global	44.13	45.66	68.29	67.73
	Fixed Effects Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.122*		0.099
		(0.069)		(0.111)
Domestic Points	0.496	0.506	0.872**	0.930***
	(0.324)	(0.310)	(0.340)	(0.323)
Lag1 Domestic Points	0.466***	0.544***	0.577	0.427
	(0.165)	(0.191)	(0.472)	(0.428)
Rounds in Champions League	9.497***	8.313***	17.747**	16.950***
	(3.167)	(2.703)	(6.533)	(5.549)
Lag1 Rounds in Champions League	4.694	2.483	-2.674	-5.107
	(3.477)	(3.602)	(10.917)	(10.154)
Rounds in Europa League	2.806*	2.173	4.533	4.544
	(1.577)	(1.493)	(3.180)	(3.294)
Lag1 Rounds in Europa League	0.645	-0.781	-0.835	-1.840
	(1.266)	(1.255)	(1.492)	(1.539)
Filtered Media Visibility			1.155***	1.143***
			(0.156)	(0.164)
Lag1 Filtered Media Visibility			-0.291**	-0.349***
			(0.122)	(0.114)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-48.393*	-254.247*	24.7982	-138.562
	(24.792)	(135.395)	(47.2550)	(210.769)
Observations	402	402	107	107
Adjusted R^2	0.7241	0.7309	0.7411	0.7420
F-global	99.69	90.45	153.78	205.59

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p <0.01

Table 3.7. Revenues Equations – La Liga

	Pooled OLS Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.200***		0.116*
		(0.048)		(0.063)
Domestic Points	2.013***	1.541***	2.081***	1.948***
	(0.278)	(0.280)	(0.302)	(0.292)
Lag1 Domestic Points	1.216***	1.387***	1.806***	1.660***
	(0.267)	(0.277)	(0.499)	(0.471)
Rounds in Champions League	13.903***	11.702***	20.699***	19.910***
	(2.968)	(2.922)	(4.220)	(3.923)
Lag1 Rounds in Champions League	14.130***	10.147***	14.411***	11.717***
	(2.963)	(3.003)	(3.134)	(3.456)
Rounds in Europa League	-2.580**	-3.385***	-1.051	-1.231
	(1.207)	(1.244)	(1.447)	(1.423)
Lag1 Rounds in Europa League	-1.987	-3.839***	-2.240**	-2.864***
	(1.184)	(1.312)	(0.960)	(1.022)
Filtered Media Visibility			1.473***	1.454***
			(0.232)	(0.213)
Lag1 Filtered Media Visibility			1.220***	1.159***
			(0.238)	(0.251)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-148.308***	-446.501***	-153.720***	-304.703***
	(21.330)	(80.077)	(22.442)	(104.621)
Observations	387	387	109	109
Adjusted R^2	0.7561	0.7687	0.9838	0.9825
F-global	13.45	13.55	243.17	218.12
	Fixed Effects Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.275**		0.087*
		(0.125)		(0.047)
Domestic Points	1.548**	1.281**	1.314***	1.340***
	(0.654)	(0.505)	(0.165)	(0.212)
Lag1 Domestic Points	1.177**	1.263**	0.457*	0.545**
	(0.582)	(0.551)	(0.225)	(0.218)
Rounds in Champions League	5.836**	3.633	15.344***	14.726***
	(2.619)	(3.135)	(1.259)	(1.235)
Lag1 Rounds in Champions League	6.009	0.979	5.263**	3.769
	(4.037)	(4.550)	(1.932)	(2.478)
Rounds in Europa League	-0.313	-0.926	0.588	0.425
	(1.334)	(1.309)	(0.674)	(0.895)
Lag1 Rounds in Europa League	-0.127	-2.386	0.943	0.616
	(1.177)	(1.621)	(0.746)	(0.823)
Filtered Media Visibility			0.821***	0.848***
			(0.111)	(0.140)
Lag1 Filtered Media Visibility			0.148	0.141
			(0.136)	(0.129)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-113.377*	-543.542**	9.720	-179.729**
	(63.807)	(249.083)	(18.892)	(87.195)
Observations	387	387	109	109
Adjusted R^2	0.4515	0.5028	0.7688	0.8093
F-global	164.16	352.75	410.32	1145.42

Note: Robust standard errors in parentheses. Statistical significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3.8. Revenues Equations – Serie A

	Pooled OLS Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.184***		0.088
		(0.036)		(0.072)
Domestic Points	1.979***	1.687***	1.891***	1.836***
	(0.224)	(0.219)	(0.282)	(0.292)
Lag1 Domestic Points	0.465**	0.375**	1.246***	0.997**
	(0.192)	(0.174)	(0.414)	(0.4529)
Rounds in Champions League	13.188***	12.198***	10.358**	11.528***
	(2.699)	(2.560)	(4.281)	(4.374)
Lag1 Rounds in Champions League	10.817***	5.675**	7.963***	5.279
	(2.716)	(2.603)	(2.756)	(3.612)
Rounds in Europa League	-0.207	-0.857	-4.719	-4.002
	(2.189)	(2.045)	(3.044)	(3.095)
Lag1 Rounds in Europa League	-0.063	-2.578	1.554	0.093
	(2.096)	(2.084)	(2.504)	(2.920)
Filtered Media Visibility			1.335***	1.301***
			(0.438)	(0.426)
Lag1 Filtered Media Visibility			0.777*	0.716*
			(0.425)	(0.408)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-82.541***	-365.302***	-58.204***	-182.747*
	(14.070)	(58.822)	(16.426)	(104.696)
Observations	225	225	108	108
Adjusted R^2	0.8069	0.8268	0.8344	0.8355
F-global	54.57	57.14	36.81	34.74
	Fixed Effects Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.056*		0.145*
		(0.028)		(0.074)
Domestic Points	0.906***	0.926***	1.404***	1.488***
	(0.131)	(0.127)	(0.225)	(0.245)
Lag1 Domestic Points	0.063	0.069	0.902***	0.807***
	(0.149)	(0.147)	(0.238)	(0.275)
Rounds in Champions League	8.828***	8.615***	8.679***	8.832***
	(1.378)	(1.287)	(1.860)	(1.930)
Lag1 Rounds in Champions League	3.050	1.895	2.025	-1.717
	(1.969)	(2.127)	(1.195)	(2.114)
Rounds in Europa League	1.072	0.901	-2.061*	-1.966
	(1.075)	(1.006)	(1.123)	(1.158)
Lag1 Rounds in Europa League	-0.194	-0.789	0.479	-1.920
	(0.714)	(0.685)	(1.881)	(2.627)
Filtered Media Visibility			0.664**	0.617**
			(0.263)	(0.229)
Lag1 Filtered Media Visibility			0.027	0.054
			(0.376)	(0.334)
Season Dummies	Yes	Yes	Yes	Yes
Constant	57.907***	-83.648*	-36.059	-241.328*
	(12.265)	(44.725)	(21.236)	(119.477)
Observations	225	225	108	108
Adjusted R^2	0.4555	0.4612	0.6177	0.6419
F-global	36.67	31.36	75.78	142.13

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table 3.9. Revenues Equations – Ligue 1

	Pooled OLS Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		-0.048		-0.006
		(0.100)		(0.048)
Domestic Points	2.492***	2.569***	1.654***	1.662***
	(0.597)	(0.613)	(0.230)	(0.238)
Lag1 Domestic Points	0.197	0.246	1.543***	1.551***
	(0.630)	(0.638)	(0.556)	(0.560)
Rounds in Champions League	24.896***	25.038***	16.491***	16.485***
	(7.279)	(7.325)	(4.073)	(4.093)
Lag1 Rounds in Champions League	7.905	9.181	9.367**	9.532**
	(5.656)	(6.364)	(3.989)	(4.147)
Rounds in Europa League	-0.809	-0.612	0.611	0.643
	(4.727)	(4.815)	(2.653)	(2.731)
Lag1 Rounds in Europa League	-0.384	-0.037	-2.910	-2.856
	(4.659)	(4.761)	(3.086)	(3.119)
Filtered Media Visibility			5.652***	5.648***
			(0.505)	(0.505)
Lag1 Filtered Media Visibility			5.661***	5.668***
			(1.468)	(1.474)
Season Dummies				
Constant	-156.575***	-34.077	-129.1722***	-116.126
	(57.078)	(155.877)	(25.1086)	(78.394)
Observations	111	111	107	107
Adjusted R^2	0.6672	0.6646	0.9018	0.9007
F-global	7.85	7.44	99.49	93.57
	Fixed Effects Models			
Model	**(2.A)**	**(2.a)**	**(2.B)**	**(2.b)**
Lag2 Elo Rating		0.235*		0.100
		(0.122)		(0.080)
Domestic Points	2.186***	2.104***	1.623***	1.604***
	(0.567)	(0.521)	(0.251)	(0.241)
Lag1 Domestic Points	1.057	1.361	1.822***	1.898***
	(0.717)	(0.867)	(0.586)	(0.669)
Rounds in Champions League	15.560***	11.947**	11.345***	10.092**
	(5.012)	(5.777)	(3.213)	(3.742)
Lag1 Rounds in Champions League	7.075	1.394	7.320*	4.604
	(4.515)	(4.663)	(3.781)	(3.358)
Rounds in Europa League	-3.190	-4.476	-4.425*	-5.289*
	(5.737)	(6.163)	(2.259)	(2.821)
Lag1 Rounds in Europa League	-4.612	-6.227*	-4.122*	-5.084**
	(2.774)	(3.079)	(2.133)	(2.436)
Filtered Media Visibility			4.080***	3.910***
			(0.509)	(0.511)
Lag1 Filtered Media Visibility			4.247***	3.951***
			(1.232)	(1.211)
Season Dummies				
Constant	-113.394*	-522.910*	-107.921***	-269.701
	(63.629)	(260.158)	(37.202)	(164.156)
Observations	111	111	107	107
Adjusted R^2	0.6713	0.6938	0.7845	0.8158
F-global	22.54	11.13	63.66	76.75

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Thus, there is strong evidence that current domestic sport performance is a crucial driven force to ensure the annual revenues, both in the aggregate analysis and for each single domestic league considered here. Instead, the result is more dubious when we account for the estimated coefficients of recent-past performance (variable *Lag1 Domestic Points*). In the case of the Premier League, the corresponding estimators result to be not statistically significant in three out of the eight models: basically, the FE models including the filtered media visibility variables. Such a lack of consistency across domestic leagues, concerning the recent past domestic performance, does not hold in the Spanish football; but it affects Italy (two models out of eight) and specially France (four of the models), as they deliver non-significant coefficients mainly in the FE estimations when the filtered media visibility variables were not included into the regressions.

Comparing patterns deviations of the variables measuring sport performances in European competitions (*Rounds in Champions League; Lag1 Rounds in Champions League; Rounds in Europa League*; and *Lag1 Rounds in Europa League*) is more complex. There is a statistically significant positive effect of the number of *Rounds in Champions League* on annual revenues in all the models of the domestic leagues considered; a feature that is consistent with the general results for the aggregate analysis. Nevertheless, the conclusions from the comparative analysis of the other three variables are not so clear. Actually, given the type of competitive structure of these UEFA tournaments, significant performance disparities across leagues, as the ones revealed by the corresponding estimators, are not surprising. The most relevant aspect in this regard is perhaps the origin of the unexpected negative and significant coefficient obtained for *Lag1 Rounds in Europa League* in Model (2.a) of the overall sample, both for the pooled and FE estimations. Separate analyses by leagues allow us concluding that the mentioned surprising result is due to the patterns obtained in the pooled models for Spanish football, and the FE models for the French teams. Anyway, the reasons behind these unexpected outcomes observed for La Liga and Ligue 1 are unclear, although we venture that they may be related to complex effects on middle-teams that overperform in Europe when they come to compete also in the domestic leagues.

Finally, we focus now on the results dealing with current and recent-past visibility in the media of football teams across the four considered domestic leagues. Notice that there is a sharp drop in the number of available observations as soon as we include these

variables, although it seems not to have provoked serious distortions or drastic changes in the main behavioural revenue equations. Regarding the variable measuring the current exposure, the estimated coefficients of *Filtered Media Visibility* for all four models are extremely consistent in each of the four leagues. Moreover, it is completely in accord with the positive and significant results obtained in the estimations for the overall sample. As was already explained, this result supports the hypothesis that, beyond sporting performances, the clubs' ability to generate revenues increases along with the reputation of the teams' roster in front of the media, as their off-field abilities attract the attention of the journalists and the public.

Nevertheless, the strength of this source of revenues appears to be less relevant concerning recent-past records on media exposure if teams fixed effects are accounted for. Again, the disaggregated analysis by leagues is enlightening. On one hand, the Spanish and Italian teams deliver similar results than the ones reported in the regression analysis performed for the full sample. On the other hand, we also learn that the surprising lack of statistical significance attached to *Lag1 Filtered Media Visibility* stems exclusively from the contrasting outcomes found in the Premier League, where the corresponding regressor is negative in the FE models. Instead, in each of the other three domestic leagues, positive and statistically significant coefficients are found for all the estimations of the pooled models; moreover, in the case of French football, the expected positive effect holds even in the FE model estimations.

3.5.3. WAGE EQUATION MODELS

Next, we study the behavioural wage equation by examining the empirical relationship between football clubs' performance (their aggregate contribution) and how on-field and off-field skills are rewarded (wages spending). This relationship is reflected in the following set of hypotheses:

H4. **Domestic sport performances** and sport achievements **in European competitions** work along for determining the overall **compensation paid to football players**.

H5. The **stronger the historical** (sporting) **status** of a club, the **greater salaries** must be paid for rewarding the talent of the teams' roster of players.

H6. In addition to the **sporting (on-field) talent**, other **(off-field) personal skills** (ultimately captured by the players' ability to attract media attention) that are significantly rewarded in the football industry.

The specification forms chosen here to estimate wage equations account for the fact that contracts to hire the football players' services are typically established on the bases of their past performances. In accordance, all the different types of explanatory variables used to measure sport (on-field) achievements are lagged before we introduce them in the models: *Lag1 Domestic Points, Lag1 Rounds in Champions League*, and *Lag1 Rounds in Europa League*. Moreover, as the players' contribution to their team often involves other (off-field) skills besides their playing talent in the pitch, some models also include an additional lagged variable: *Lag1 Filtered Media Visibility Index*.[18] In this way, we avoid neglecting the capacity of the players to attract interest from the media and the general public beyond their mere sporting contribution. If the latter argument is correct, the total aggregated teams' wage bills must depend on:

$$TW_{it} = \gamma_0 + \gamma_2 \cdot DSP_{it-1} + \gamma_3 \cdot CLP_{it-1} + \gamma_4 \cdot EUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \varepsilon_{it} \quad (3.A)$$

$$TW_{it} = \gamma_0 + \gamma_1 \cdot ELO_{it-2} + \gamma_2 \cdot DSP_{it-1} + \gamma_3 \cdot CLP_{it-1} + \gamma_4 \cdot EUP_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \varepsilon_{it} \quad (3.a)$$

$$TW_{it} = \gamma_0 + \gamma_2 \cdot DSP_{it-1} + \gamma_3 \cdot CLP_{it-1} + \gamma_4 \cdot EUP_{it-1} + \gamma_5 \cdot f\_MVI_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \varepsilon_{it} \quad (3.B)$$

$$TW_{it} = \gamma_0 + \gamma_1 \cdot ELO_{it-2} + \gamma_2 \cdot DSP_{it-1} + \gamma_3 \cdot CLP_{it-1} + \gamma_4 \cdot EUP_{it-1} + \gamma_5 \cdot f\_MVI_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \varepsilon_{it} \quad (3.b)$$

Again, some models are named with the "B" or "b" characters, to indicate that they also involve the media visibility index (*MVI*) along with the other set of regressors. Thus, the inclusion of this variable in estimating wage equation will permit exploring the impact of non-sport related skills to attract media attention and, ultimately, to generate economic returns. As we already mentioned, the main explanatory variable (namely, the clubs'

[18] We tried also models involving more than one lag in the explanatory variables, which seems sensible to attempt insofar as the players' contracts typically last for more than one year. These alternative models, however, provoked unnecessary losses in the number of observations while procuring very little improvements in the results.

annual wages) are expressed in levels in some models or as deviations from the respective league mean in other models.

The regression analysis is carried out initially without considering the impact associated with teams' media exposure. Thus, the validity of most of our hypotheses can be tested while we benefit from richer information attached to a larger dataset. Then, given our interest in examining the role played by media skills in the context of wage equations, we also introduce in the models the media visibility index (lagged and once we have filtered out sport-related content associated with it). The inclusions of the media visibility variable imply limiting the analysis as it covers just the period 2009/2010 to 2015/2016. Table B.3.1, presented in Appendix B, displays the results of replicating the analysis of Models type "A" and "a" using the subsample (instead of full) data sample. This may be useful for comparison purposes, and to prove that our main results are not contingent on changes in the sample size that, unfortunately, were imposed by lack of data on the media visibility index.

The results are organized in tables adopting the same structure as in the previous section. Table 3.10 reports the estimations of pooled regression models, for both the variables expressed in levels and deviations from the mean. Similarly, Table 3.11 presents the main results of applying panel data techniques, and more specifically of the fixed effects model estimations.[19]

The Adjusted-R^2 scores of the pooled models were relatively high, ranging from 0.65 to 0.83. The introduction of the clubs' fixed effects, the goodness of fit decreases, presenting an Adjusted-R^2 that ranges from 0.19 to 0.50. However, the Adjusted-R^2 are reasonable, considering the nature of the microdata. In addition to the adjusted coefficient of determination, the lowest AIC leads us to choose Models (3.a) and (3.b) as the most appropriate representation. Moreover, the specification tests, Ramsey Reset and F-test indicate that the introduction of the variable media variable index helps to improve the models; the tests were not able to detect any misspecification for the model (3.b), with variables in deviations from the mean for both pooled OLS and Fixed Effects. An inspection of the VIF does not alert of multicollinearity among the regressors, the VIF of the explanatory variables never went over 5, and the mean VIF ranges from 1.60 to 2.58.

[19] Random effects coefficients are not reported, since once again the Hausman tests advise against their validity and given that, form a theoretical viewpoint, football clubs are expected to have invariant characteristics that are of fixed rather than random nature.

Table 3.10. Wage Equations - Pooled OLS Models

	Levels			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.189***		0.130***
		(0.015)		(0.029)
Lag1 Domestic Points	0.873***	0.765***	2.006***	1.665***
	(0.090)	(0.074)	(0.138)	(0.150)
Lag1 Rounds in Champions League	14.956***	7.912***	14.405***	10.654***
	(0.906)	(1.007)	(1.250)	(1.499)
Lag1 Rounds in Europa League	3.315***	-0.125	1.192	-0.305
	(0.603)	(0.650)	(0.886)	(1.005)
Lag1 Filtered Media Visibility			0.952***	0.863***
			(0.144)	(0.138)
Premier	45.528***	35.886***	66.814***	57.485***
	(4.166)	(3.814)	(4.286)	(4.532)
Serie A	19.324***	17.730***	12.339***	12.498***
	(3.891)	(3.611)	(3.704)	(3.590)
La Liga	11.707***	-4.175	0.458	-11.280**
	(4.098)	(3.929)	(3.642)	(4.419)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-73.567	-365.06	-82.112	-276.332
	(8.623)	(26.804)	(7.586)	(44.192)
Observations	1,130	1,130	432	432
Adjusted R^2	0.6504	0.7092	0.8255	0.8344
F-global	45.26	49.81	83.08	80.54
BP test ($\chi 2$)	[0.000]	[0.000]	[0.000]	[0.000]
AIC	11105.69	10898.50	4137.18	4115.56
RESET test	[0.000]	[0.000]	[0.000]	[0.000]
	Deviation from Mean			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.094***		0.115***
		(0.015)		(0.026)
Lag1 Domestic Points	1.626***	1.337***	1.995***	1.692***
	(0.106)	(0.105)	(0.138)	(0.153)
Lag1 Rounds in Champions League	10.435***	8.243***	14.451***	11.140***
	(0.944)	(0.990)	(1.261)	1.446
Lag1 Rounds in Europa League	1.086*	-0.054	1.166	-0.130
	(0.602)	(0.637)	(0.892)	(0.958)
Lag1 Filtered Media Visibility			0.947***	0.871***
			(0.145)	(0.139)
Premier	45.552***	40.911***	67.723***	59.355***
	(3.448)	(3.356)	(4.299)	(4.456)
Serie A	16.087***	17.179***	12.422***	12.466***
	(3.511)	(3.444)	(3.659)	(3.563)
La Liga	8.981***	0.849	2.392	-8.235*
	(3.313)	(3.407)	(3.562)	(4.222)
Season Dummies	No	No	No	No
Constant	-23.204	-23.521	-21.699	-22.426
	(2.929)	(2.889)	(2.682)	(2.644)
Observations	1,043	1,043	432	432
Adjusted R^2	0.6681	0.6827	0.8233	0.8314
F-global	157.58	142.12	139.40	125.56
BP test ($\chi 2$)	[0.000]	[0.000]	[0.000]	[0.000]
AIC	10097.55	10051.56	4130.94	4111.56
RESET test	[0.000]	[0.000]	[0.682]	[0.498]

Note: Robust standard errors in parentheses and P-values in brackets. Statistical significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table 3.11. Wage Equations - Fixed Effect Models

	Levels			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.134***		0.079***
		(0.026)		(0.022)
Lag1 Domestic Points	0.433***	0.447***	0.731***	0.685***
	(0.063)	(0.109)	(0.224)	(0.214)
Lag1 Rounds in Champions League	5.596***	2.724**	3.382*	1.439
	(0.626)	(1.353)	(1.910)	(1.660)
Lag1 Rounds in Europa League	0.982*	-0.394	0.259	-0.355
	(0.521)	(0.576)	(0.573)	(0.607)
Lag1 Filtered Media Visibility			0.106	0.0793
			(0.090)	(0.085)
Season Dummies	Yes	Yes	Yes	Yes
Constant	-27.100	-244.469	48.837	-112.450
	(11.955)	(51.302)	(13.291)	(44.534)
Observations	1,130	1,130	432	432
Adjusted R^2	0.5045	0.5469	0.2964	0.3308
F-global	9.07	7.86	6.73	6.97
Wald (χ2)	[0.000]	0.000]	0.000]	0.000]
Hausman test	[0.000]	[0.000]	[0.000]	[0.000]
AIC	10337.46	10237.23	3685.37	3674.80
RESET test	[0.000]	[0.000]	[0.000]	[0.000]
	Deviation from Mean			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.087***		0.066***
		(0.017)		(0.018)
Lag1 Domestic Points	0.993***	0.851***	0.707***	0.675***
	(0.222)	(0.184)	(0.221)	(0.215)
Lag1 Rounds in Champions League	4.472***	2.821*	3.293*	1.703
	(1.537)	(1.490)	(1.911)	(1.727)
Lag1 Rounds in Europa League	0.778	-0.093	0.234	-0.250
	(0.568)	(0.523)	(0.573)	(0.581)
Lag1 Filtered Media Visibility			0.091	0.071
			(0.089)	(0.086)
Season Dummies	No	No	No	No
Constant	0.527	-3.951	2.208	-1.295
	(.444)	(1.204)	(.615)	(1.262)
Observations	1,043	1,043	432	432
Adjusted R^2	0.1950	0.2355	0.1169	0.1376
F-global	6.81	7.84	2.92	4.95
Wald (χ2)	[0.000]	[0.000]	[0.000]	[0.000]
Hausman test	[0.000]	[0.000]	[0.000]	[0.000]
AIC	9503.66	9450.78	3679.79	3670.53
RESET test	[0.006]	[0.000]	[0.516]	[0.633]

Note: Robust standard errors in parentheses and P-values in brackets. Hausman Test perform with the sigmamore option. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

According to the test for homoskedasticity in the residuals, the tables report the p-values Breusch–Pagan/Cook–Weisberg test for the OLS models and the modified Wald statistic for the FE models; we may conclude that there are signs of heteroskedasticity, and consider appropriate to estimate the models using robust standard errors. The estimation results show that the domestic points (*Lag1 Domestic Points*) and the number of

qualifying rounds in the UEFA Champions League (*Lag1 Rounds in Champions League*) in the precedent season, as well as the historical sport status (*Lag2 Elo Rating*) have a significant impact on the estimated wages; the coefficients are positive and significant at the 10 percent level or higher for pooled and FE models. However, the participation in the UEFA Europa League (*Lag1 Rounds in Europa League*) in the recent past is only significant in some of the models, mainly when the variables *Elo Rating* and *Filtered Media Visibility* are not introduced in the regressions. Respect to the regressor media visibility (*Lag1 Filtered Media Visibility*), it has a positive and significant impact on wage determination, but only for the pooled OLS models; the addition of the clubs' FE decreases its statistical significance.

The leagues that are associated with a higher annual wage, with respect to the reference league French Ligue 1, are the English Premier League, followed by the Italian Serie A, and the Spanish La Liga (see models in Table 3.10). However, this hierarchy varies when the historical status of the clubs (*Lag2 Elo Rating*) and the filtered media visibility index (*Lag1 Filtered Media Visibility*) for the previous season are included in the models, positioning the French Ligue 1 before the Spanish La Liga.

The sizes of the coefficients notably decrease when are included the team's heterogeneity elements, but the statistical significance of the regressors remains the same except for Rounds in Champions League, losing some significance level.

As expected, the overall reward paid to players in the team roster is explained by the domestic sport performance and sport achievements in European competitions (*Hypothesis 4*); this is strongly corroborated by the coefficients of the domestic points (*Lag1 Domestic Points*), the number of games in the UEFA Champions League (*Lag1 Rounds in Champions League*), and the historical sport status (*Lag2 Elo Rating*). Though, it is rather dubious concerning the games in the UEFA Europa League (*Lag1 Europa League*)*;* the coefficient estimated is statistically significant only in the models using the full sample and without the Elo variable.[20]

To evaluate the impact across the regressors, we calculated the average marginal effects for models (3.a) and (3.b), presented in Appendix 4 (see Table B.4.3.1 and Table B.4.3.2). The margins statistics indicate that the proxy variable of historical sports

[20] The analysis of the revenue equations already alerted us about the distortion in the EUP_{it-1} coefficient provoked by the presence of *Lag 2 Elo Rating*, meaning presumably that the actual calculation of the Elo rating system over-rates the relevance of this particular European competition.

performance (*Lag2 Elo Rating*) and the variable of domestic sports performance (*Lag1 Domestic Points*) have relatively the highest impact on the clubs' total wages.

The introduction of the clubs' brand status increases the explanatory power of the wage model, Model (3.a) for pooled OLS and FE estimations, and Model (3.b) just for fixed effects. It means that historical teams must pay a "premium" for hiring talent: the stronger brand value, as captured by *Lag2 Elo Rating*, the greater salaries to be paid for the fact that they are consolidated brands, expected to be more capable to generate revenues. Thus, *Hypothesis 5* is positively back up by our far-reaching empirical analysis, a finding that is among the most important results of this study. The empirical evidence in this regard is very reliable; first, it is confirmed by the size and statistical significance of the estimated coefficient of *Lag2 Elo Rating*, the proxy variable employed to capture the historical brand status of football clubs based on past sporting achievements. This result holds for all the considered models, both pooled and fixed effects estimations, regardless of the sample size involved and no matter if the variables were expressed in levels or deviations from the mean. Second, the inclusion of the Elo variable implied in most of the cases (7 out of 8 models) that the size of the estimated coefficients of variables measuring recent-past sport performances became smaller; in the fixed effects models, it is also remarkable how the variables of Champions and Europa League competitions decrease its significance. To sum up, it appears that lagged sporting skills and performances reduce relevance as the clubs' status increases.[21]

The last hypothesis for the wage equation proposes that in addition to on-field talent, there are off-field skills that are significantly rewarded (*Hypothesis 6*); this statement is corroborated to some extent by the empirical results. In this study, off-field skills are referred to as the ability to attract the attention of the media, captured by the variable *filtered media visibility index*. The estimation results give positive and statistically significant coefficients in the pooled Models (3.B) and (3.b); still, when the heterogeneity effects are considered, the for variable media visibility loses significance. It can be inferred that media status is captured by the heterogeneity elements of the clubs. We can observe that the addition of filtered media visibility index impacts the leagues' coefficient: the size of the Premier League considerably increases, while the Serie A and

[21] Remind that *Elo Rating* is lagged two periods to avoid multicollinearity while accounting for the past sporting brand status of football clubs.

La Liga decrease, compared to the Ligue 1. This also hints of a clubs' hierarchy for rewarding off-field talent.

Alike in the case of the revenues, enlightening conclusions are also achieved for behavioural wage equations when we carry out a disaggregated analysis by looking separately to regression outcomes of each domestic league. The results of the estimations for models in levels are reported in Tables 3.12 to 3.15. It is worth noting that, in the case of wage equations, the separate estimations for leagues yield general results that are closer to the aggregate estimations than in the case of behavioural revenue equations; thereby suggesting smaller discrepancies across leagues affecting the way how clubs reward talent in the football industry. Thus, the main conclusions obtained when running regressions for the overall sample are likely to be found in each and every domestic league. Nonetheless, some comments follow for highlighting the most significant deviations from the usual patterns.

Before performing a separate analysis by leagues, remember that only lagged variables are included as regressors in the wage equations. This is a reasonable theoretical assumption because the contracts (agreeing, among other things, the annual salary) are usually signed at front for a number of years; and hence, these rewards are set depending on the players' manifested quality and skills until the current period.

Starting with the analysis of the variable capturing the clubs' brand value, namely Lag2 Elo Rating, in the aggregate estimations it was positive and statistically significant in all the cases: Models (3.a) and (3.b) both in the pooled and FE estimations. However, the strong empirical evidence supporting that rewards in football are also agreed based on the historical brand status of the clubs, happens to be a weaker result for the case of the Premier League and Ligue 1, at least in models including the variable Lag1 Filtered Media Visibility; and even in La Liga and Serie A when we rely on the Model (3.b), with the aforementioned variable, and teams fixed effects. Nevertheless, we venture that these deviations are not enough to put under question the general result.

Then, concerning the variable *Lag1 Domestic Points* the estimations are in all cases and leagues (except in Models (3.b) and (3.B), FE estimations of the Premier League) as expected, and consistent with those of the aggregate regression for the full sample. Concerning the impact of *Lag1 Rounds in Champions League*, the results change one way or another in FE model estimations; actually, they seem to be slightly worse for the

Premier League and La Liga, but they appear to be better in the case of both the Italian Serie A and the French Ligue 1.

Table 3.12. Wage Equations - Premier League

	Pooled OLS Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.202***		0.027
		(0.024)		(0.071)
Lag1 Domestic Points	0.476***	0.508***	2.321***	2.218***
	(0.120)	(0.103)	(0.309)	(0.430)
Lag1 Rounds in Champions League	14.363***	5.573***	13.830***	13.172***
	(1.260)	(1.639)	(2.608)	(3.037)
Lag1 Rounds in Europa League	5.929***	1.136	5.245**	4.845*
	(1.207)	(1.421)	(2.035)	(2.565)
Lag1 Filtered Media Visibility			0.816**	0.787**
			(0.325)	(0.352)
Constant	-25.402***	-362.495***	-36.961**	-41.915
	(8.258)	(42.981)	(14.396)	(101.123)
Observations	403	403	107	107
Adjusted R^2	0.7099	0.7775	0.8223	0.8208
F-global	38.16	41.17	49.97	44.58
	Fixed Effects Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.112***		-0.036
		(0.038)		(0.050)
Lag1 Domestic Points	0.329**	0.378**	0.624	0.687
	(0.151)	(0.154)	(0.414)	(0.450)
Lag1 Rounds in Champions League	6.385**	3.972	-1.540	-0.682
	(2.940)	(2.596)	(4.015)	(4.494)
Lag1 Rounds in Europa League	2.328	0.912	1.295	1.619
	(1.469)	(1.226)	(1.690)	(1.727)
Lag1 Filtered Media Visibility			0.002	0.024
			(0.150)	(0.170)
Constant	-20.508	-206.833***	129.148***	166.771**
	(15.385)	(75.160)	(27.048)	(78.332)
Observations	403	403	107	107
Adjusted R^2	0.7309	0.7469	0.6694	0.6680
F-global	67.00	93.88	13.52	13.34

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

The less predictable statistical link is found again concerning past performances in the UEFA Europa League, according to the comparison of the coefficients for *Lag1 Rounds in Europa League* with the full sample model and across leagues. In the estimation of the combined Leagues, the variable has a positive and significant coefficient when Elo and

media visibility are excluded (Model 3.A). While the variable is relevant in three of the models for the Premier League, it has no significant power for Serie A and Ligue 1, and presents different behaviours for La Liga. In this aspect, we must accept that not an easy answer can be given, apart from the mentioned correlation with other variables.

Table 3.13. Wage Equations – La Liga

	Pooled OLS Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.190***		0.145*
		(0.026)		(0.077)
Lag1 Domestic Points	1.200***	1.091***	2.207***	1.830***
	(0.161)	(0.132)	(0.174)	(0.167)
Lag1 Rounds in Champions League	14.828***	8.433***	14.935***	10.921***
	(1.496)	(1.549)	(1.806)	(2.821)
Lag1 Rounds in Europa League	1.522***	-1.362**	-1.352*	-2.306**
	(0.521)	(0.662)	(0.721)	(1.021)
Lag1 Filtered Media Visibility			1.297***	1.165***
			(0.193)	(0.172)
Constant	-39.178***	-337.606***	-78.674***	-291.047**
	(6.401)	(43.488)	(9.700)	(128.759)
Observations	390	390	109	109
Adjusted R^2	0.6661	0.7277	0.9062	0.9128
F-global	14.77	16.11	53.08	59.06
	Fixed Effects Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.158***		0.061
		(0.050)		(0.093)
Lag1 Domestic Points	0.769**	0.726***	0.529*	0.533*
	(0.311)	(0.246)	(0.298)	(0.289)
Lag1 Rounds in Champions League	5.132**	1.949	2.441	1.464
	(2.205)	(2.081)	(2.424)	(1.404)
Lag1 Rounds in Europa League	0.748*	-0.781	-0.602	-0.805
	(0.385)	(0.589)	(0.822)	(0.870)
Lag1 Filtered Media Visibility			0.202	0.196
			(0.182)	(0.159)
Constant	-16.303	-268.507***	35.291	-84.494
	(14.554)	(91.261)	(22.715)	(170.321)
Observations	390	390	109	109
Adjusted R^2	0.4059	0.4745	0.1711	0.1730
F-global	11.63	18.34	12.18	14.85

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table 3.14. Wage Equations – Serie A

	Pooled OLS Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.226***		0.170***
		(0.029)		(0.064)
Lag1 Domestic Points	1.191***	0.850***	1.431***	1.112***
	(0.187)	(0.156)	(0.218)	(0.259)
Lag1 Rounds in Champions League	16.579***	8.684***	14.102***	8.934***
	(1.579)	(1.755)	(2.085)	(2.928)
Lag1 Rounds in Europa League	2.557	-1.369	1.272	-1.526
	(1.790)	(1.691)	(1.868)	(2.218)
Lag1 Filtered Media Visibility			1.619***	1.484***
			(0.338)	(0.313)
Constant	-43.732***	-347.890***	-14.744	-276.587***
	(12.445)	(43.716)	(12.170)	(96.318)
Observations	226	226	109	109
Adjusted R^2	0.6674	0.7429	0.7528	0.7752
F-global	35.45	42.61	30.45	34.62
	Fixed Effects Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.058*		0.043
		(0.031)		(0.029)
Lag1 Domestic Points	0.368**	0.366**	0.523***	0.509***
	(0.143)	(0.135)	(0.168)	(0.164)
Lag1 Rounds in Champions League	3.378*	2.110	4.718***	3.607**
	(1.801)	(1.481)	(1.609)	(1.748)
Lag1 Rounds in Europa League	0.766	0.118	0.825	0.136
	(0.904)	(1.014)	(0.607)	(0.710)
Lag1 Filtered Media Visibility			0.205	0.215
			(0.160)	(0.162)
Constant	44.534***	-48.318	27.714**	-29.908
	(9.203)	(55.468)	(10.674)	(46.720)
Observations	226	226	109	109
Adjusted R^2	0.3200	0.3464	0.4036	0.4096
F-global	9.16	8.76	4.73	7.02

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table 3.15. Wage Equations – Ligue 1

	Pooled OLS Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.106*		0.044
		(0.060)		(0.047)
Lag1 Domestic Points	1.966***	1.738***	1.935***	1.844***
	(0.410)	(0.414)	(0.293)	(0.297)
Lag1 Rounds in Champions League	11.242***	8.037**	14.051***	12.691***
	(3.327)	(3.523)	(2.374)	(1.889)
Lag1 Rounds in Europa League	2.594	1.416	2.316	1.677
	(2.614)	(2.868)	(2.280)	(2.694)
Lag1 Filtered Media Visibility		4.949***	4.865***	
			(0.770)	(0.759)
Constant	-67.141***	-229.573**	-65.593***	-130.830*
	(17.886)	(98.013)	(12.893)	(76.725)
Observations	111	111	107	107
Adjusted R^2	0.5820	0.5915	0.7667	0.7665
F-global	8.71	8.44	18.36	16.58
	Fixed Effects Models			
Model	**(3.A)**	**(3.a)**	**(3.B)**	**(3.b)**
Lag2 Elo Rating		0.189**		0.101
		(0.077)		(0.070)
Lag1 Domestic Points	1.336**	1.310**	1.288**	1.273***
	(0.624)	(0.559)	(0.466)	(0.455)
Lag1 Rounds in Champions League	6.656*	1.860	8.007***	5.168***
	(3.254)	(2.373)	(2.323)	(1.643)
Lag1 Rounds in Europa League	-2.100	-2.881	0.067	-0.757
	(2.060)	(1.846)	(1.030)	(1.200)
Lag1 Filtered Media Visibility			2.129***	1.813***
			(0.526)	(0.519)
Constant	-27.528	-336.065**	-36.215	-190.955
	(34.856)	(153.137)	(30.620)	(137.515)
Observations	111	111	107	107
Adjusted R^2	0.4549	0.5332	0.5174	0.5412
F-global	5.18	2.03	13.17	10.44

Note: Robust standard errors in parentheses. Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Finally, the sign and statistically significant levels of the variable capturing the last year media exposure (the Lag1 Filtered Media Visibility variable) deliver the same results than in the aggregate analysis: this variable appears to be clearly relevant in all the pooled models, but once we account for the teams' fixed effects, the relationship is no longer

statistically significant (except for the French Ligue 1, that still holds true). Notice however that, insofar as renowned football brands are associated to high levels of media exposure, the last empirical evidence does not weaken the conclusion claim in this paper; it is simply the case that such a media status is presumably captured by the fixed heterogeneity element attach to each football team.

3.6. DYNAMIC SPECIFICATION OF THE WAGE EQUATION

In this section, we take a step forward to get a deeper understanding of the behaviour of football clubs as far as rewarding talent is concerned, captured by the annual wage bill. The assumption that: (i) wages are established to reward (past) sport performance, along with other off-field skills, and that (ii) sport performance depends on the hiring of sport talent, the latter measured (and encouraged) by wages, lead us to formulate the following hypotheses.

H7. Total wages can be modelled by a dynamic specification of the wage function. Actually, introducing a lagged dependent variable (as a regressor) implies accounting for the potential endogenous interactions.

H8. The fact of playing for a team **with strong (sporting) brand status** implies receiving **higher salaries**, ceteris paribus, even when the previous season salaries are taken into account. This hypothesis will be tested through the dynamic specification of the behavioural wage equation.

H9. The dynamic specification of the wage equation may help testing if the football industry also **rewards**: (i) **past luck** in the competition, leading to greater sport achievements, and (ii) **past outperforming managerial skills** from the staff, *ceteris paribus*.

The following auxiliary regressions, relative to sport performances in the different competitions, were employed to model the dynamic specification:

$$DSP_{it-1} = \beta_0 + \beta_1 \cdot TW_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \mu_{it-1} \quad (1')$$

$$CLP_{it-1} = \sigma_0 + \sigma_1 \cdot TW_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + v_{it-1} \quad (ii')$$

$$EUP_{it-1} = \varphi_0 + \varphi_1 \cdot TW_{it-1} + \sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j + \omega_{it-1} \quad (iii')$$

Then, substitution of (1') (ii') and (iii') into (3.A) leads to:

$$TW_{it} = (\gamma_0 + \gamma_2 \cdot \beta_0 + \gamma_3 \cdot \sigma_0 + \gamma_4 \cdot \varphi_0) + (\gamma_2 \cdot \beta_1 + \gamma_3 \cdot \sigma_1 + \gamma_4 \cdot \varphi_1) \cdot TW_{it-1} + \gamma_2 \cdot f\_DSP_{it-1} + \gamma_3 \cdot f\_CLP_{it-1} + \gamma_4 \cdot f\_EUP_{it-1} + (1 + \gamma_2 + \gamma_3 + \gamma_4) \cdot \left(\sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j\right) + \varepsilon_{it} \quad (3.A')$$

Similarly, substitution of (1') (ii') and (iii') into (3.a) leads to:

$$TW_{it} = (\gamma_0 + \gamma_2 \cdot \beta_0 + \gamma_3 \cdot \sigma_0 + \gamma_4 \cdot \varphi_0) + \gamma_1 \cdot ELO_{it-2} + (\gamma_2 \cdot \beta_1 + \gamma_3 \cdot \sigma_1 + \gamma_4 \cdot \varphi_1) \cdot TW_{it-1} + \gamma_2 \cdot f\_DSP_{it-1} + \gamma_3 \cdot f\_CLP_{it-1} + \gamma_4 \cdot f\_EUP_{it-1} + (1 + \gamma_2 + \gamma_3 + \gamma_4) \cdot \left(\sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j\right) + \varepsilon_{it} \quad (3.a')$$

And the same procedures applied to models that include the filtered media visibility index lead respectively, by substitution of (1') (ii') and (iii') into (3.B) and into (3.b), to:

$$TW_{it} = (\gamma_0 + \gamma_2 \cdot \beta_0 + \gamma_3 \cdot \sigma_0 + \gamma_4 \cdot \varphi_0) + (\gamma_2 \cdot \beta_1 + \gamma_3 \cdot \sigma_1 + \gamma_4 \cdot \varphi_1) \cdot TW_{it-1} + \gamma_2 \cdot f\_DSP_{it-1} + \gamma_3 \cdot f\_CLP_{it-1} + \gamma_4 \cdot f\_EUP_{it-1} + \gamma_5 \cdot f\_MVI_{it-1} + (1 + \gamma_2 + \gamma_3 + \gamma_4) \cdot \left(\sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j\right) + \varepsilon_{it} \quad (3.B')$$

$$TW_{it} = (\gamma_0 + \gamma_2 \cdot \beta_0 + \gamma_3 \cdot \sigma_0 + \gamma_4 \cdot \varphi_0) + \gamma_1 \cdot ELO_{it-2} + (\gamma_2 \cdot \beta_1 + \gamma_3 \cdot \sigma_1 + \gamma_4 \cdot \varphi_1) \cdot TW_{it-1} + \gamma_2 \cdot f\_DSP_{it-1} + \gamma_3 \cdot f\_CLP_{it-1} + \gamma_4 \cdot f\_EUP_{it-1} + \gamma_5 \cdot f\_MVI_{it-1} + (1 + \gamma_2 + \gamma_3 + \gamma_4) \cdot \left(\sum_{t=1}^{T} \gamma_t \cdot DY_t + \sum_{j=1}^{J} \gamma_j \cdot DL_j\right) + \varepsilon_{it} \quad (3.b')$$

These specifications, developed upon the theoretical model, points towards the conclusion that experimenting with dynamic specifications of the model is appropriate. Table 3.16 displays the estimation results.

The model was estimated using the Arellano–Bond (1991) generalized methods of moments (GMM) for dynamic panel-data,[22] employing the full sample data (1995/1996 to 2015/2016). The model specification may suggest some problems of overidentification; according to the Sargan test, there is evidence to reject the null hypothesis that overidentifying restrictions are valid. However, the tests for serial correlation Arellano-Bond assumptions are satisfied since we reject the no autocorrelation AR(1) and fails to reject no autocorrelation AR(2) in the differenced residuals, suggesting that the instruments used in the regression are correct. Therefore, we may attribute the results of the Sargan test due to heteroskedasticity, which we approach using robust standard errors in the estimation. The examination of the VIF suggested that

[22] The results reported corresponds to the one-step Arellano-Bond estimator. This approach implies that the Wald X^2 text is typically used instead of F-global, and Sargan test as the corresponding procedure to evaluate overidentifying restrictions. The models were also regress with Arellano-Bond two-step estimator to account for the presence of heteroskedasticity; however, the results for the post estimation diagnostic tests do not suggest any statistical improvement in the models.

multicollinearity was not present in the models, with a VIF always below 5, and the mean ranged between 2.35 to 2.59. Notice that the dynamic specification of the model does not allow introducing league dummies due to collinearity. Moreover, the introduction of a lagged dependent variable, as a regressor, implies accounting for the potential endogenous interactions.

The regression results show that recent-past wages (*Lag1 Total Wages*), domestic points (named as *filtered domestic sport performance*), and brand status (*Lag2 Elo Rating*) have a positive and statistically significant impact on estimated wages. The marginal effects (see Table B.4.3.3 in Appendix B.4) show that past wages appear to be more relevant than recent-past and historical sport performance. The margins statistic for *Lag1 Total Wages* multiply the margins of *Lag2 Elo Rating* by 1.2 in the model with variables in levels, and by 4.03 in the model with relative values. Compared to domestic performance, the magnitude is even bigger. However, the outcome for Champions League competition (named as *Lag1* Filtered *Rounds in Champions League)* present an indirect relation with wages but apparently without relevance according to the marginal effects. Similarly, participation in Europa League (*Lag1 Filtered Rounds in Europa League*) has no impact on total wages.

In *Hypothesis 7* we maintain that total wages can be modelled by a dynamic specification of the wage equation; indeed, the dynamic model appears to be adequate to explain the rewarding system of the football industry, supported by the positive and significant coefficients of last year's annual wages (Lag1 Total Wages), established to reward (past) sport performance. Moreover, the introduction of filtered variables enables to identify the effect of other variables, like domestic performance and historical sporting status, avoiding collinearity with current wages.

Our results suggest, once more, that teams with strong brand status receive greater salaries, even when accounting for the salary received in the previous season. The hypothesis (*H8*) that playing for clubs with strong brand status implies receiving higher salaries, even when the last year's salaries are considered, is corroborated. The analysis of the marginal effects indicates that, after *Lag1 Total Wages*, the most relevant and significant factor on wage determination is *Lag2 Elo Rating*.

Table 3.16 Wage Equation - GMM Dynamic Specification

	Levels	
Model	**(3.A')**	**(3.a')**
Lag1 Total Wages	0.924***	0.902***
	(0.048)	(0.045)
Lag2 Elo Rating		0.023*
		(0.013)
Lag1 Filtered Domestic Points	0.179***	0.186***
	(0.049)	(0.048)
Lag1 Filtered Rounds in Champions League	-1.330***	-1.602***
	(0.465)	(0.543)
Lag1 Filtered Rounds in Europa League	-0.017	-0.150
	(0.326)	(0.369)
Season Dummies	Yes	Yes
Constant	7.447	-30.997
	(1.718)	(22.054)
Observations	767	765
Wald $\chi 2$	4264.78	4060.27
Sargan statistic	438.190 [0.000]	442.779 [0.000]
AR (1)	[0.000]	[0.000]
AR (2)	[0.576]	[0.649]
	Deviations from Mean	
Model	**(3.A')**	**(3.a')**
Lag1 Total Wages	0.978***	0.959***
	(0.039)	(0.038)
Lag2 Elo Rating		0.017**
		(0.007)
Lag1 Filtered Domestic Points	0.200***	0.201***
	(0.054)	(0.054)
Lag1 Filtered Rounds in Champions League	-1.437***	-1.627***
	(0.481)	(0.490)
Lag1 Filtered Rounds in Europa League	-0.039	-0.142
	(0.292)	(0.304)
Season Dummies	No	No
Constant	0.632	-0.376
	(0.716)	(0.857)
Observations	767	765
Wald $\chi 2$	842.57	802.51
Sargan statistic	395.447 [0.000]	397.816 [0.000]
AR (1)	[0.001]	[0.001]
AR (2)	[0.675]	[0.781]

Note: Robust standard errors in parentheses and P-values in brackets. Statistical significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Lastly, there is evidence that past outperforming managerial skills and/or past luck are rewarded, confirming to some extend our assumption of *Hypothesis 9*. In the dynamic model, we account for participation in the domestic league and in the UEFA competitions captured by last year's wages (*Lag1 Total Wages*). Therefore, we suggest that the coefficients of the filtered variable (*Lag1 Filtered Domestic Points, Lag1 Rounds in Champions League, and Lag1 Rounds in Europa League*) capture the managerial skills of the club or luck. In both cases, it seems that managerial performance and/or luck are rewarded in the domestic league, beyond sport achievements. On the contrary, these factors are under-valued and associated with lower wages on the European competitions; the negative impact is higher for the Champions League than the Europa League.

3.7. CONCLUSIONS

This work has focused on the study of the revenue-generating capacity, and the relationship between investment in talent and sport performance in European professional football. To this aim, we modelled three behavioural equations relating sport performances with the clubs' annual revenues and wages. To capture sport performance, we employed well-known explanatory variables as: (i) points obtained in the domestic league and (ii) number of qualifying rounds in UEFA Champions and Europa League; besides, we included innovative variables as: (iii) Elo ranking, to appraise the clubs' historical sport performance; and (iv) media visibility index, to capture off-field skills of teams' roster.

The empirical analysis involved hypotheses testing and econometric estimations, by using a rich panel-data that includes financial data for clubs playing in the 1st division of four top leagues: Premier League, La Liga, Serie A, and Ligue 1. We present several regression models estimated with pooled OLS and Fixed Effects Model, working with variables expressed in levels and deviations from the mean; also, further analysis of the wage equation required the application of Dynamic panel-data techniques. The principal investigation is conducted for the four combined leagues, but we then carry out a disaggregated analysis by leagues.

Hypotheses H1 to H3 test the relationship between clubs' revenues and sports performance both recent and past, at the national and international levels, and also the capacity to generate revenues from off-field skills as the degree of visibility. Our results

corroborate the direct and statistically significant relationship between revenues and points in the domestic competition; the estimations for the combined leagues show that current and recent-past domestic sport achievements are crucial in determining the clubs' annual revenues; yet, current domestic performance has a relatively higher impact than recent-past performance. The national performance in the current season presents similar behaviour in each of the four leagues: positive and significant at the 1 percent level, while recent-past domestic performance shows smaller significance levels in some of leagues. The results suggest that clubs' revenues of the Premier League, Serie A, and Ligue 1 are mainly explained by current points obtained in the league, while for Spanish clubs, both sport performances (current and past) seem equally important.

Regarding the performance in international competitions, the current performance in the UEFA Champions League has a positive and higher effect on the clubs' revenues than UEFA Europa League; this result is consistent for the aggregate analysis as well as for each of the leagues. However, the performance of the previous season (*Lag1 Rounds in Champions League*) is statistically non-significant, especially when the clubs' fixed effects are taking into account along with the historical sporting status and clubs' media visibility. The last two variables were included to explore the role of clubs' brand status (captured with the proxy variable *Elo Rating*)and the ability to generate revenues from off-field skills like the degree of visibility in the media (captured with the variable *Filtered Media Value Index*).The estimations for the historical sporting status reveals that it is a crucial factor, a result that is empirically significant beyond the explanatory capacity of sport performances, both in domestic and European competitions. The brand value and reputation work particularly well to sustain clubs' annual revenues in La Liga and Serie A, and also in the estimations for the combined four leagues. Our results show also that the degree of visibility has a positive and statistically significant impact on the clubs' revenues; for some leagues, the recent-past records on media exposure (*Lag1 Filtered Media Value*) is a critical source of revenues. These results proved that off-field skills (as the ability to attract media attention) are significantly rewarded in the football industry.

Next, we focus on the relationship between investment in talent (as captured by annual wages) and sport performance; thus, hypotheses H4 to H6 test the clubs' wage behaviour and the effect of recent-past sport performance on this regard. In general, the outcomes obtained in the regression for the combined leagues are consistent with the

individual analysis; we concluded that smaller discrepancies across leagues affect the way how clubs reward talent in the football industry.

Our results confirm the positive and strong relationship between spending in football players' talent and domestic performance (*Lag1 Domestic Points*), a robust result that holds for the combined leagues as well as for the individual national leagues. However, the impact on current wage bills varies across domestic leagues; compared to the Ligue 1, the magnitude of the effect is smaller for the Premier League, followed by Serie A, and La Liga. Also, the performance in the UEFA Champions League (*Lag1 Rounds in Champions League*) is, as expected, a crucial element in talent compensation, which seems to be more significant for clubs of Serie A and Ligue 1, while clubs in the Premier League and La Liga display an impact that becomes smaller due to the clubs' time-invariant characteristics. A different conclusion is reached concerning participation in Europa League (*Lag1 Round in Europa League*); in general, the results suggest that it has a minor and not significant effect on total annual wages. Concerning the historical status (*Lag2 Elo Rating*), the marginal effects indicate that this proxy variable has the strongest relative effect, followed by the domestic sport performance. The introduction of *Lag2 Elo Rating* decreases the impact of performance in the national league and in the UEFA Champions League; both types of performances (*Lag1 Domestic Points and Lag1 Rounds in Champions League*) diminishes their relevance as the club's status increases. Moreover, we find that the clubs' historical status is an essential driven force element to determine annual wages; the brand status influence the clubs' wage-determination in such a way that clubs with higher status are expected to pay a premium for hiring talent. We also confirmed that off-field skills (*Lag1 Filtered Media Value*) are rewarded, mainly, when clubs' heterogeneity fixed effect is not taken into account, for the combined leagues, and the individual domestic leagues. The only exception is for clubs of the French Ligue 1, in which media value has always a significant impact on wages, even if it is accounted for the clubs' heterogeneity element.

Finally, we further the analysis of the clubs' talent compensation by testing additional hypotheses, H7 to H9; for this aim, we introduced a dynamic specification model for total wages. The results support the validity of taking into account the potential endogenous interactions, where current annual wages (t) is a function of last year's talent compensation (*Lag1Total Wages*), recent sport performance, and off-field skills. Notice

that, to avoid collinearity, sport performance variables (*Domestic Points, Rounds in Champions League, Rounds in Europa League, and Media Value*) were introduced in the model having been filtered from the effect of current wage. The models estimations also confirmed the significant relevance of the historical sport status (*Elo Rating*) to determine current wages, even when we account for previous year's wage. Moreover, the dynamic specification proved that clubs with strong brand status receive greater salaries, as well as teams with some off-field skills; actually, we concluded that the national leagues eventually rewarded the clubs for managerial skills and/or luck factors, whereas for the European competitions, these factors have a negative impact on wages.

In conclusion, the presented regression analysis and hypotheses testing contribute to a better understanding of the revenue-generating capacity and investment in talent in the football industry. Our empirical results are in line with previous studies: we strongly corroborate the behaviour of domestic sport performance, which indicates that current and recent-past achievements are determinants for both wages and revenues. The football clubs' historical sport status is a crucial factor for revenue generation and talent compensation. Moreover, it seems that its explanatory capacity is even higher than current and recent sport achievements. Besides, clubs with strong brand status have to pay higher salaries, for the fact that they are consolidated brands, which will be actually better able to generate revenues. Also, we present a remarkable outcome for the club's ability to attract media attention (off-field skills) as crucial factors for financial performance. The capacity of the team's roster to attract media attention has a positive and statistically significant impact on clubs' annual revenues and wages. The results evidence that media visibility is also a significant revenue source, especially concerning the media exposure generated in the current season, whereas recent-past records on media exposure are more highly valued in the estimated models for talent compensation.

Aguiar-Noury, A. Unpublished article

Contribution to the thesis:

This paper presents a descriptive analysis of brand management theories developed for professional football by conducting a systematic literature review. The review comprises research published during the years 2000 to 2018 on brand equity, brand drivers, and brand strategies of European football clubs. A summary of the manageable factors that may assist clubs to build a strong brand beyond the sport performance is thus provided

Chapter 4

BRAND MANAGEMENT IN PROFESSIONAL FOOTBALL: A SYSTEMATIC REVIEW OF THE LITERATURE

4.1. INTRODUCTION

The brand-oriented administration of professional football clubs rises in the late 20th century. One of the most remarkable cases is the management style of the Manchester United F.C., which employed a pioneer commercialization of its brand, involving alliances with diverse companies far from the club's core business (e.g., financial services); this strategy allowed the club to enter into new markets and reach a certain brand positioning (Hill and Vincent, 2006). The brand-oriented management, along with football's mediatic success, attain large amounts of sponsorship and broadcasting rights within the entertainment industry. The global presence of football, leading by European football clubs, has been used by many companies and organizations as a marketing tool providing multiple benefits; consequently, it has been of great interest to researchers and practitioners deepening the knowledge of topics as sponsorship strategies (Buhler et al., 2007; Breuer and Rumpf, 2011; Chanavat et al., 2009b; Vale et al., 2009), the impact of football events in the promotion of a commercial brand (Wilcox et al., 2001; Yoshida and Gordon, 2012), the use of sports brand communities (Popp and Woratschek, 2016), among others.

In the modern sport business, teams are considered more than marketing means: they are referred to as brands (Costa et al., 2018), built on their sport performance (Couvelaere and Richelieu, 2005). This fundamental product-related attribute, based on the supremacy achieved over other competitors, enables teams to have a strong brand. Once a team has

leveraged its brand, this asset (Papadimitriou et al., 2004) allows some independence of the on-field sport performance (Bauer et al., 2005b), for instance in professional football, there is evidence that the reputation built on past achievements has helped teams during periods of low productivity (Dell'Osso and Szymanski, 1991). Moreover, the success of a brand also depends on the emotional benefit deliver to customers, which is considered as relevant as the product-related attribute (Kotler, 2003, p.10), confirming the fact that teams with remarkable sport achievements can easily leverage their brands as they offer a very attractive promise: to be the best team.

However, generating a constant sporting success is not always possible, and not even desirable for the good of the game. Therefore, clubs concentrate on managing other aspects to increase its brand value, including the players' popularity (Chanavat and Bodet, 2009; Herm et al., 2014), the team's tradition (Abosag et al., 2012), the involvement with the community (Baena, 2018; Blumrodt et al., 2012), and the use of new technologies as websites or social media (Nisar et al., 2018). The strategic aspects required an accurate examination, for instance, a brand driver for certain sport may be less relevant for another; thus, the study of brand drivers for the football clubs should be specific, as well as the associated dimensions. The early research on sports brand management benefited from the theoretical framework developed for consumer goods, with the limitation of disregarding the particularities of the industry; during the last decade, the field has been enriched with the introduction of sports specificities to the study of brand equity, brand drivers, and brand strategies.

Among professional sports, North American leagues and European football leagues comprised the strongest brands in terms of revenues generation (Aguiar and Garcia-del-Barrio, 2019). Concerning professional football, most of the brands are concentrated in the "Big-5" European leagues; even though European leagues are highly competitive, explaining the high audience levels, the clubs employ different strategies to strengthen their brand. The study of European football has mainly centred on the effectiveness as a marketing means, in other words, the results that a company has reached by its alliance with teams, leagues, or tournaments; for example, the increase of brand awareness (Wilcox and Andrews, 2001), the recall of the sponsor (Breuer and Rumpf, 2011), the evaluation of a brand consolidation (Wilcox et al., 2001), to mention some examples. The

study of football clubs as brands is emerging and delivers valuable insights to position a team by the knowledge of the manageable aspects.

The present work reviews the research done in brand management of European professional football clubs, with three objectives. First, to systematically review the existing literature of sports brand management, focusing on European professional football, and identify theories, models, and constructs. Second, to provide a state-of-the-art resource to address future investigations. Third, to advice practitioners on the aspects that have contributed to leverage a football brand by providing some strategies applied by football clubs.

The paper is structured as follows. First, the methodology and the descriptive analysis of the literature are presented in sections two and three, respectively. Then, section four synthesizes the findings, followed by a discussion and conclusions in sections five and six.

4.2. METHODOLOGY

The literature was evaluated through a systematic review, performed in three stages: (i) planning, (ii) conducting, and (iii) reporting and dissemination (Tranfield et al., 2003). The first stage includes the delimitation of the subject area and the research strategy. The scope of the study, presented in subsection 4.2.1, is based on an overview of conceptual models and theories surrounding the field, a method used to evaluate the relevance of the literature and to define the timeframe for the review (Cassell et al., 2006). Regarding the search strategy, subsection 4.2.2 presents the databases selected, keywords, and the extraction process of the articles. The second stage, concerning the collection procedure and paper selection, was done manually, and the removal of duplicate works using the software R. Finally, the reporting and dissemination of the reviewed literature are achieved with the descriptive analysis and individual outline of the papers, provided in sections 4.3 and 4.4, respectively. Furthermore, to fulfil the objectives of this research, a compilation of the principal findings is provided in the discussion section.

4.2.1. SCOPE OF THE STUDY

In addition to the paper's objective, two viewpoints were considered to determine the extent of the study: the evolution of the academic literature and possible changes in sports consumer behaviour.

The models and theories surrounding the field indicate the works of Aaker and Keller (1990) and Aaker (1991) as the earliest contributions in the research of brand management (Bauer et al., 2005b; Ross et al., 2006; Guenzi and Nocco, 2006; Abosag et al., 2012; Biscaia et al., 2013); these frameworks, addressing brand extension and brand equity of consumer goods, have been the stepping stone for several studies in sports branding (Guenzi and Nocco, 2006; Maderer, 2016; Gladden and Funk, 2001). Years later, Ross (2006) presented a seminal work to the sports brand research, which in his view was the first time the "unique characteristics of spectators sports" were considered; Ross's customer-based brand equity model, built upon Aaker's framework (1990), has been used in several scientific works (see Table 4.2 for some examples). Without discarding the existence of prior contributions to the sports branding, we can infer that research in this field is relatively recent, between late 90s and early 2000s; moreover, some authors have suggested that brand research in the context of European sports is still in the early stages of development (Abosag et al., 2012; Blumrodt et al., 2012; Wetzel et al., 2018).

Another important factor for delimiting the scope of the study is sports consumer behaviour and possible changes in customer engagement with their favourite sports team, therefore, influencing several aspects of brand management in the modern football industry, including the development of new strategies or the relative significance of certain brand drivers. A time period that diverges sport consumption is the twenty-first century, characterized by massive technological developments that have transformed consumption patterns of sports goods and services (Filo et al., 2015), and managerial decisions in the sports industry (Papadimitriou et al., 2004).

In this context, the review is conducted for the period between the years 2000 to 2018; using the year 2000 as the lower threshold allows focusing on research that captures changes in the trend of consumer behaviour and managerial practices caused by the increase of technology innovation. Furthermore, the eighteen-year period permits a detailed evaluation of the research in the area.

Finally, regarding the extent of the topics, the objective of the present review is to understand the aspects that help a football club to strengthen its brand; therefore, we cover theory on (i) brand strategies, (ii) brand equity, and (iii) brand drivers.

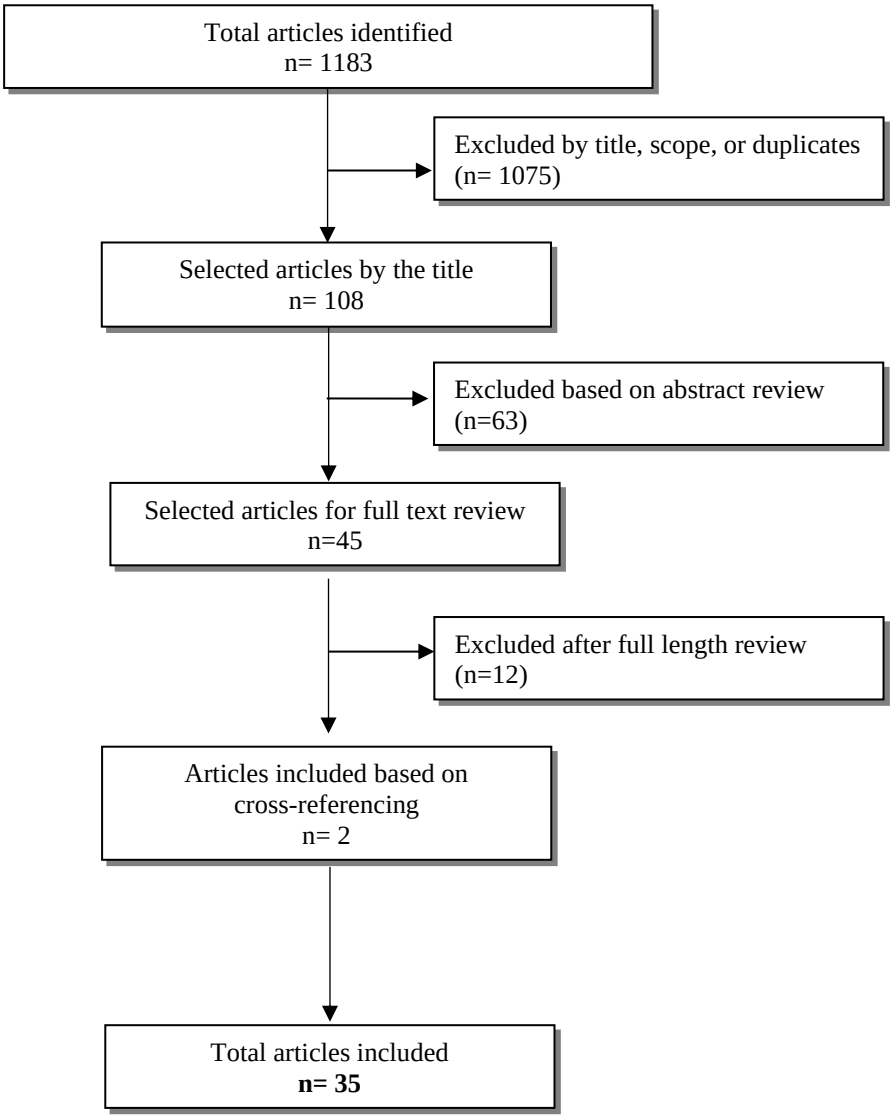
4.2.2. SEARCH STRATEGY

The inclusion and exclusion criteria applied is presented in Table 4.1. The research terms were defined according to brand management theory (Kapferer, 2012, p.103; Keller et al., 2012, p.149; Kotler and Armstrong, 2012, p.267), and associated with football by including the words AND "soccer" OR "football.

Table 4.1. Inclusion criteria

Keywords: "brand"; "brand strategies"; "brand equity"; "marketing strategies"	
Inclusion	**Exclusion**
Brand management of European football	Brand management of other professional sports
Indexed articles	Books, conference contributions
Research articles	Case studies, briefing papers
English language	Non- English articles

Figure 4.1. Selection of articles



The searches were carried out in the following databases: Ebsco, Emerald, ProQuest, ScienceDirect, and Web of Science, covering research publications in the English language and the management field.

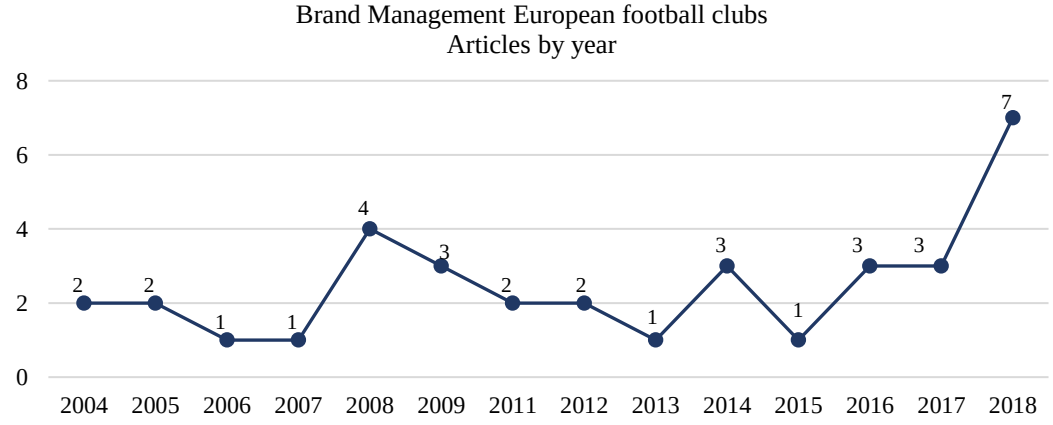
Figure 4.1 displays the selection process. The data collection followed a four-step approach. First, to identify the articles, from the databases above-mentioned, that have the research terms in the title, abstract, or keywords. Second, to pre-select the articles according to the title (108). Third, to remove the articles that were not related to the scope of the study, based on the abstract (63) and, in some cases, after having been revised in full length (12); these articles were excluded due to one of the following reasons: address brand management of other professional sport, were not related to the business field, or focus on other business strategies as sponsorship. Finally, to include articles based on cross-reference (2). A final dataset of 35 articles was use for the analysis.

4.3. DESCRIPTIVE ANALYSIS OF THE LITERATURE

This section provides a global view of the existing literature; the following descriptions constitute a valuable source for future research. First, Figure 4.2 displays the number of articles published in the field of brand management of European football.

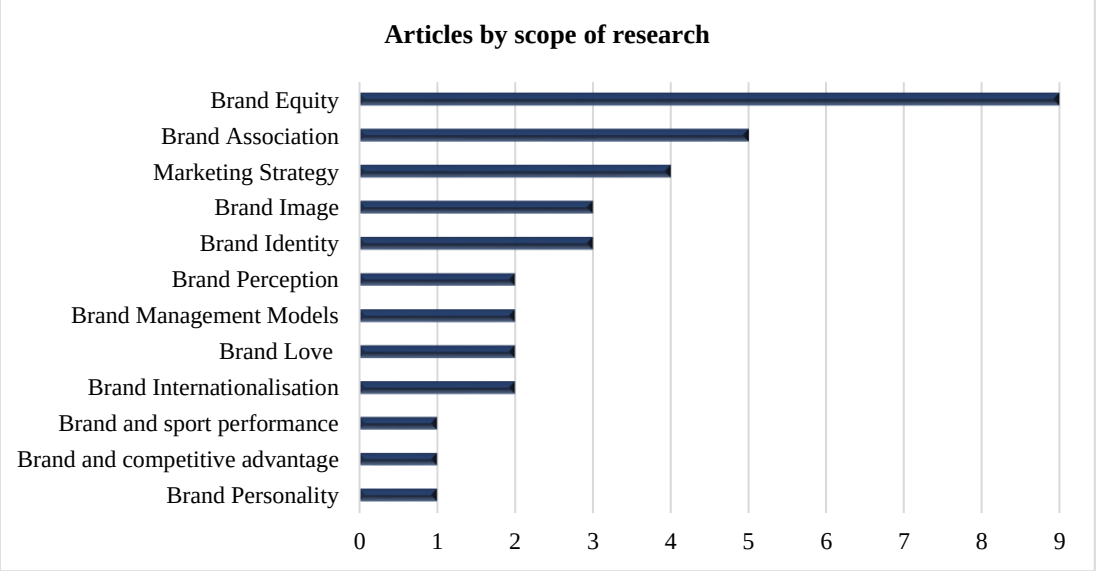
Since 2000, the number of papers maintained a trend between 1 and 3 publications per year, showing a significant change in 2018. Compared to research in other management areas, the number of articles is relatively low; however, European football is still one of the most studied team-sports due to the commercial success of the brands, as well in other disciplines.

Figure 4.2. Number of articles by year



Then, the number of articles according to the research topic is displayed in Figure 4.3; the main area of study is brand equity, including theoretical models and empirical methods to assessed financial brand value. The second most recurrent issue is brand drivers, that is, individual studies on brand constructs such as brand association, brand image, brand perception. Following is research on marketing strategies, addressing different actions implemented by the teams, covering online marketing, corporate social responsibility, communication strategies, among other topics. Lastly, we want to emphasize the work of brand effect on sports performance and competitive advantage, published in 2018, which may suggest a shortcoming of research focusing on the reverse effect: sports performance and competitive advantage on the brand, an issue that perhaps is well addressed in a different research area.

Figure 4.3. Field of research



Next, Table 4.2 presents a list comprising the reviewed papers, with a description of the field of research, field, brand theories on which the paper is built upon, and the methodology used. Most of the articles concentrate on brand equity and brand drivers, built upon, primarily, on the frameworks of Keller (1993), Gladden and Funk (2001), and Ross (2006). Regarding the methodology, most of the articles (58%) applied a quantitative method, including factor analysis, structural equation modeling, and regression analysis; 42% of the articles applied qualitative methods, primarily based on questionnaires and content analysis.

Table 4.2. Reviewed Articles by field, theories, and methodology

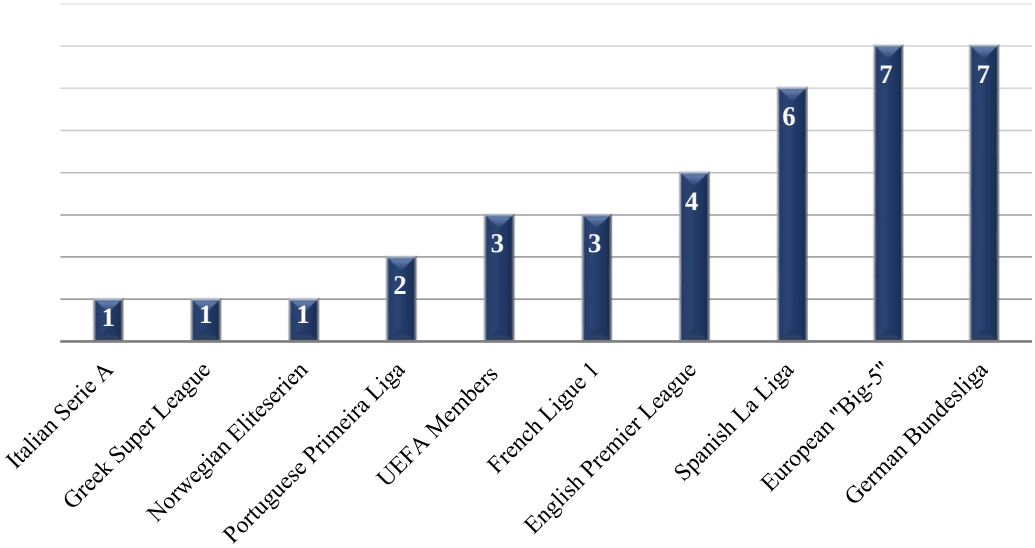
N	Citation author(s) and date	Field and theories	Methodology
1	Miles, L. (2004)	Customer-focused brand, marketing strategies and fan loyalty	Survey
2	Papadimitriou, D., Apostolopoulou, A., and Loukas, I. (2004)	Brand extension, perceived fit with parent brand	Correlation analysis
3	Bauer, H. H., Sauer, N. E., and Exler, S. (2005)	Brand image, team association - Gladden and Funk (2001;2002)	Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM)
4	Bauer, H. H., Sauer, N. E., and Schmitt, P. (2005)	Brand equity - Keller (1993), Brand association in team sports - Gladden and Funk (2001)	Factor analysis
5	Guenzi, P., and Nocco, M. (2006)	Brand equity - Aakers (1991), brand association and behavioral intentions	Factor analysis
6	Kase, K., De Hoyos, I., Sanchís, C., and Bretón, M. (2007)	Brand as product, brand as organization, brand as person, brand as symbol	Theoretical and case analysis
7	Bauer, H. H., Stokburger-Sauer, N. E., and Exler, S. (2008)	Brand image and fan loyalty	SEM
8	Richelieu, A., Lopez S., Desbordes M. (2008)	Internationalisation process - Anderson et al., (1998), Cheng et al. (2005) Brand equity pipeline - Couvelaere, V. and Richelieu A., (2005)	Theoretical and case analysis
9	Schilhaneck, M. (2008)	Brand management -Meffert and Burmann (1996, 2002)	Interviews
10	Xifra, J. (2008)	Public relations to the study of civil religion	Theoretical and case analysis
11	Chanavat, N., and Bodet, G. (2009)	Brand perception in international markets	Interview
12	Richelieu, A., and Desbordes, M. (2009)	Internationalization process - Richelieu, Lopez and Desbordes (2008)	Theoretical and case analysis
13	Bodet, G., and Chanavat, N. (2010)	Brand equity - Keller (1993)	Interviews
14	Nicolau, J. (2011)	Brand awareness and brand equity	Regression analysis
15	Richelieu, A., Pawlowski, T., and Breuer, C. (2011).	Brand identity	Interviews
16	Abosag, I., Roper, S., and Hind, D. (2012)	Brand perception	In-depth interviews
17	Blumrodt J., Bryson D., and Flanagan J. (2012)	Brand equity - Keller (1993), corporate social responsibility and brand image	Factor analysis
18	Biscaia, R., Correia, A., Ross, S., Rosado, A., and Maroco, J. (2013)	Brand Equity - Ross (2006), spectator-base brand equity model with internalization as a first-order construct and brand association as second-order construct	Factor analysis

19	Araújo, N., de Carlos, P., and Antonio Fraiz, J. (2014)	Product attributes, social media, and fan interaction	Content analysis and ANOVA
20	Blumrodt, J. (2014)	Brand image, purchase intention	Exploratory factor analysis
21	Richelieu, A., and Lessard, S. (2014)	Brand identity	Questionnaire
22	Parganas, P., Anagnostopoulos, C., and Chadwick, S. (2015)	Product attributes and social media - Gladden and Flunk (2002) and Bauer et al. (2008)	Content analysis
23	Baena, V. (2016)	Brand love, online and mobile marketing	Principal Component Analysis
24	Biscaia, R., Ross, S., Yoshida, M., Correia, A., Rosado, A., and Marôco, J. (2016)	Brand equity - difference in team brand equity perceptions, predictive role of brand equity dimensions on behavioral intentions	Factor analysis - multi-group CFA and SEM
25	Maderer, D., Holtbruegge, D., and Woodland, R. (2016)	Brand Equity - Keller (1993), attitudinal and behavioral loyalty, difference between fans of the two markets	Factor analysis
26	Blumrodt, J., and Huang-Horowitz, N. C. (2017)	Brand identity image - Keller (1993), Web-based communication and communication identity	Website analysis and interviews
27	Dum, T. (2017)	Brand management	Longitudinal case study
28	Giroux, M., Pons, F., and Maltese, L. (2017)	Brand personality - Aaker (1997), Braunstein and Ross (2010), evaluation of promotional activities - Speed and Thompson (2000), Brand awareness and brand loyalty - Yoo and Donthu (2001), Brand trust, brand attachment and brand performance - Lassar et al., (1995)	SEM and path analysis
29	Costa, M., Costa, C., Angelo, C., and Moraes, W. (2018)	Brand as a factor of competitive advantage, resource-based view model	Multiple regression
30	Hattula, S. (2018)	Consumer-based brand equity - Aakers (1991), empirical evidence of the effect of brand equity in on-field sport performance	Regression analyses
31	Maderer, D., Parganas, P., and Anagnostopoulos, C. (2018)	Brand attributes and brand association, customer-based brand equity model, social media	Content analysis
32	Nisar, T., Prabhakar, G., and Patil, P. (2018)	Brand engagement	One-way variance analysis ANOVA
33	Wetzel, H. A., Hattula, S., Hammerschmidt, M., and van Heerde, H. J. (2018)	Value drivers on sales-based brand equity, antecedents, and consequences of SBBE, SBBE translated into attendance	Regression analyses
34	Baena, V. (2018)	Brand love	PCA, CFA, SEM and OLS regression analysis
35	Puente-Díaz, R., and Cavazos-Arroyo, J. (2018)	Brand image, Inclusion/Exclusion model of Bless and Schwarz 2010	One-way variance analysis ANOVA

According to Google Scholar, in 2018 the five most cited articles were Bauer et al., 2008 (477), Bauer et al., 2005b (275); Bauer et al., 2005a (105); Hill and Vincent, 2006 (97); and Abosag et al., 2012 (81).

The articles focus on the study of football clubs from a single league, or multiple clubs from different leagues, specifically from the "Big-5" European Leagues or clubs that have outstanding because of their participation in competitions of the Union of European Football Associations (UEFA). Figure 4.4 displays the number of articles according to the leagues under study.

Figure 4.4. Number of articles by football leagues or groups



It is not surprising that researchers choose to study clubs from the "Big-5" European League (English Premier League, Spanish La Liga, Italian Serie A, German Bundesliga, and French Ligue 1); however, it is worth noticing the existence of articles related to leagues that are not considered to be on a top-tier level as the Norwegian and Greek football leagues.

4.4. FINDINGS

The findings of the systematic review are grouped into two main themes: (i) general branding and (ii) brand equity; the first, synthesized global analysis of brand management theory, while the second covers the studies related to the brand equity of football clubs, including a sub-group of brand dimensions or constructs.

Branding in professional football

Eight articles concentrate on general issues related to branding in professional football, particularly on developing brand models, the internationalization process of the brand, the role of the brand in creating competitive advantage, and brand strategies.

Kase et al. (2007) and Schilhaneck (2008) introduce different brand models. The first study proposed a theoretical framework, namely, Proto-Image of the Firm to understand the business strategy of a football club, during a six-year period. The authors corroborate that the team's roster is an essential component of the brand. In a different line, Schilhaneck (2008) suggested a brand management model for building and maintaining strong brands. The author takes into account the characteristics of professional sports and extended some of the basic brand concepts. Based on selected clubs, Schilhaneck proposed a model with a three-level process; the first one, the Basic level, that includes the decisions related to brand goals, brand positioning, brand philosophy, and brand strategy. The second, the Operative Level, includes the central component of the brand called the *Essence of the Club Brand*, and the instruments to build and maintain the brand. The last level, called Yield Level, presents the strength of the club's brand. In addition, this model considers that some factors may affect the management process, mainly the environmental conditions, the heterogeneity of the customers, the market and customer information, and the organizational constraints.

Another significant topic is the internalization of a brand, conceptualized and explained by Richelieu et al. (2008) and Richelieu and Desbordes (2009). The authors presented the process of internationalization of a sports team brand, build on the "brand equity pipeline" framework. The model defines four steps to leverage a brand: (i) Local, (ii) Regional, (iii) National, and (iv) International Global. The framework was applied to analyze the stage of internationalization of three clubs from the "Big-5" European leagues. Furthermore, the authors present determinants to build a global brand, linked with four main strategies: (i) Brand reputation, (ii) Brand affinity, (iii) Brand Challenger, and (iv) Brand Conquistador. According to the stage of internalization, the club should develop different actions, framed on the mentioned strategies, to reach a new level. Also, the authors analyzed the brand strategy and marketing actions of each team and proposed new strategies based on the internalization level of the clubs.

Costa et al. (2018), studied the club brand as a factor to explain competitive advantage. The analysis was carried out on football teams from different leagues, including the Premier League, Serie A and Ligue 1. Their findings suggest that the brand factor explains a high level of variance in competitive advantage. Another relevant outcome was the identification of the principal brand constructs according to the loading contribution to the brand factor.

Regarding brand strategies, the articles focus on specific actions and their effect. The first strategy is brand extension, addressed by Papadimitriou et al. (2004); the authors studied the perceived fit of brand extension and its implications for brand evaluation and the effect on purchase intention. The analysis was conducted with fans of the Greek Super League, who evaluate the quality, attractiveness, and originality of different products (i.e., brand extensions) of the club. The results suggest that products compatible with the parent brand have a higher perception of fit, leading to a higher evaluation of the products and a stronger purchase intention. The second strategy identified is the improvement of fan satisfaction to generate greater loyalty and the recruitment of new fans, studied by Miles (2004) through the analysis of some marketing actions implemented by the football clubs. Lastly, brand management in the context of new media technologies and the role of social media platforms to enhance brand awareness and brand image, address by Araújo et al. (2014) and Parganas et al. (2015). In the first work, the authors studied the communication strategy of the brand product-related attributes using social media, including the content posted, design of the page, and the level of activity, associated with the fans' interaction. In the same line, Parganas et al. (2015) examined the response of online followers to both product and non-product related attributes. The authors, to study the use of Twitter as a brand management tool, analysed the follower's actions such as responding, favourite, or retweet. Using the theoretical framework of Gladden and Flunk (2002) and Bauer et al. (2008), the authors determined the product and non-product related attributes to be identified on the tweets posted during the season and off-season; the results show that followers' response is higher to product-related content than non-product related attributes, in both periods. Also, the authors analysed fan engagement through Twitter options: selecting a tweet as a *favorite* seems to be the easiest response, then the *retweet* feature, which is more applied for product-related attributes, and the less use the *reply* option.

Brand equity

The papers identified in this review address brand equity using the Customer-Based model (Aaker, 1991; Keller, 1993) and the Spectator- Based framework (Ross, 2006). Nevertheless, inspired by more recent brand equity models for consumer goods, some studies introduced new frameworks taking into account the sport context (e.g., Sale-Based by Wetzel et al., 2018).

To begin with, Bauer et al. (2005b) studied the Customer-Based Brand Equity (CBBE) applied to the German Bundesliga. The authors modified the model by integrating four factors -brand awareness, product-related brand attributes, non-product-related brand attributes, and brand benefits- with fourteen indicators. The new theoretical framework demonstrated the positive effect of brand equity on the economic success, measured by expected attendance. Also, the empirical results suggested that the positive effect of brand equity on both purchase intention and loyalty is higher than the effect of sport success. Next, Bodet and Chanavat (2010) address the perceived brand equity of four football clubs playing in the English Premier League in a non-traditional market. The study of the CBBE lead to the identification of the factors that influence four brand equity dimensions; the first one, brand perception, affected by six main aspects: sport achievements, on-field performance, current members of the club, history and traditions, marketing programs, and team kits. The second brand awareness, best measured by the ability to recall the clubs' symbols, badges, nicknames, colours, and sponsors. The third brand association, essentially affected by the on-field performance, including historical achievements and quality of the play, the history, traditions, star members of the club, and the management style. Finally, brand loyalty, mainly defined by the first football brand the followers are aware of and considered as the less strong brand dimension due to the increasing awareness of brand competitors.

Continuing, the CBBE model was also applied to the French Ligue 1 (Blumrodt et al., 2012). This time, the model incorporates Corporate Social Responsibility as part of the brand image factor, and tested consumer behavior concerning the purchase of merchandise, season tickets, and frequency of attendance at games; the results corroborate the positive link between brand image and consumer behavior. From a different approach, Hattula (2018) uses the CBBE as an explanatory variable for on-field performance. The theoretical models proposed in his work, both linear and nonlinear,

establish the relationship between on-field performance (dependent variable) and CBBE (independent variables), among other not-brand related variables. The empirical analysis proved a positive but diminishing effect between brand equity and on-field sports performance.

Next, we cluster studies focusing on the effect of brand equity according to the type of fans and supporters. Biscaia et al. (2013) examined the Spectator-Based Brand Equity model considering cultural differences, which are essential to understand the effect of brand drivers. The results lead to the development of a new theoretical model with the introduction of *internalization* as a single first-order construct and *brand association* as a second-order construct; the last construct was evaluated by ten different items: brand mark, concessions, social interactions, commitment, team history, organizational attributes, team success, head coach, management, and stadium; excluding the item *rivalry* which differences this model form others. In the same line, Maderer et al. (2016) compared CBBE of football fans from two different markets. The first group, fans located in five developed countries (corresponding to the countries hosting the Big-5 European Leagues), and the second, fans placed in five emerging countries. The proposed framework allowed the authors to identify two main factors, particularly, brand association and brand loyalty, revealing the difference across markets. In the authors view, the study was the first to show a negative impact between brand attributes and attitudinal loyalty. The Spectator-Based Brand Equity model also permits the comparisons of club's brand equity perception between fan club members and non-members, and the predictive effect of brand equity dimensions on behavioral outcomes (Biscaia et al., 2016). The former work evaluates thirty items for brand association and three items for behavioral intentions; the findings prove that the perception and the significance of brand dimensions differ across groups.

Continuing, Wetzel et al. (2018) proposed a Sale-Based Brand Equity (SBBE), establish a relationship between brand equity and value drivers, particularly recruitment, winning, and publicity. The empirical analysis, applied to the German Bundesliga, comprises the effect of drivers and brand age on the attendance level. The results show a growing effect of SBBE as the brand age increases.

Lastly, from a different perspective, Guenzi and Nocco (2006) tested the effect of brand-equity drivers on behavioral purchase intentions, namely, on the club's new brand

merchandise. The brand association driver was divided into two sub-variables: associations with the team and associations with the territory; the last one, proves to be a better explanatory variable of consumer behavior. Their results show that brand loyalty and perceived value have a significant impact on consumer purchase intentions.

Brand dimensions

Following the understanding of brand equity and the factors involved in leverage a brand, this section presents the works that concentrate on brand dimensions. The articles are grouped into four dimensions: (i) Brand association, (ii) Brand perception, (iii) Brand personality, and (iv) Brand love.

Brand association

Previous authors have suggested that brand association is used interchangeably with the dimension of brand image, which is also related to brand identity (Maderer et al., 2018); thus, this section compiles the articles linked to the brand association or image.

The evaluation of brand association is mainly appraised by the attributes, benefits, and attitudes, following the theory of Keller (1993). In a sports team, the most important product-related attribute is sports performance, which is crucial for building a strong brand. Besides, there is evidence that sports achievements positively impact brand awareness and the firm's value (Nicolau, 2011). For example, the works of Richelieu et al. (2011) and Richelieu and Lessard (2014) present catalyzing factors of successful teams that have impacted the development of brand identity, corroborating that sports performance is essential to create an emotional connection with the fans. Also, Richelieu et al. (2011) identified different internal and external catalyst according to the team's division, that is, upper and lower division. For instance, sport performance seems to have a higher impact on brand identity of top clubs', whereas the sport infrastructure is more relevant for lower division teams. Furthermore, several catalysts referred to non-product related attributes, which are also relevant for leveraging a team's brand; Bauer et al. (2005a) suggested that they deliver value to the fans and influence the perception of the brand's benefit. As well, Blumrodt (2014) identified three non-product related factors which are determinants for consumer behavior: corporate social engagement, youth training, and other services. In the same line, Bauer et al. (2008) examined the role of brand image and reinforce the fact that other factors such as the club's history, tradition,

management, stadium, among other non-product related attributes, have a strong impact on psychological commitment and behavioral loyalty.

The individual evaluation of the players can also affect the general assessment of the club's brand; this approach was used by Puente-Díaz and Cavazos-Arroyo (2018), who analyzed individual players' scores, provided by the fans, and the relationship with the overall clubs' evaluation, which results statistically relevant. The supporters provided a player analysis for dimensions as football quality, style of playing, and level of enjoyment to watch the game. In addition, the results indicate that a club receives a more positive evaluation when the players' membership is mention to the fans. Nevertheless, it is possible that brand association change through time, affected by elements as the management structure and the life cycle of the brand (Dum, 2017).

The use of social media platforms is an excellent marketing tool to communicate the desired brand image and to interact with followers worldwide. Through these applications, researchers have access to data that facilitates the analysis of communication strategies, followers' perceptions, target markets, among other things. Blumrodt and Huang-Horowitz (2017) evaluate the brand identity of the sports club and the perception of match spectators, through their official websites. The authors compared the Web-based communication strategy with the communication identity of the team and the fans' perception identity; employing correlation analysis, it was possible to determine the alignment between the perceived identity and the communicated identity. It is also suggested that communication of product-related attributes, non-product related attributes, and brand benefits shows a consistent identity. Also, clubs need to analyze the communication strategy that produces a higher interaction with the fans. Among the most used social media platforms, research on brand attributes and the interaction of fans on Facebook and Twitter, suggest that product-related attributes create a high interaction with fans (Maderer et al., 2018).

The brand communication identity of a club is associated with specific characteristics as the team's budget or the fan base. For example, clubs with larger budgets manage to communicate extra non-sporting activities than clubs with tight budgets, or clubs with an international fan base focus on sports achievement rather than community activities. Furthermore, some authors may argue that the club's communication actions, including

the use of symbols, the transmission of rituals, and devotions, can generate a fan's community identity that resembles a religion (Xifra, 2008).

Brand perception

This brand dimension is studied by Abosag et al. (2012) and Chanavat and Bodet (2009). The first study focuses on the perception of the club as a commercial brand, observing that a stronger emotional attachment produces a more powerful brand perception, which in turn affects the acceptance of marketing strategies. Besides, fans are more likely to approve the commercialization of the brand if they acknowledge the club's needs and goals; for instance, there is evidence that brand extensions are better accepted when fans discern the financial situation of the club and the need of a revenue source. The second work, Chanavat and Bodet (2009), The second work analyzed the perception of the fans from international markets; the authors examined the opinion of football supporters regarding the club's history, actual and emblematic players, fans, quality of the display, and the chairman.

Brand personality

The authors Giroux, Pons, and Maltese (2017), studied the impact of the perceived brand personality and value of promotional activities, on the club's brand equity. The authors focus on two major factors: the fan knowledge of the team's financial situation and the club's involvement with the community. According to the fans' evaluation, the congruence between the brand personality and the marketing strategy (e.g., promotional activities) increases the perceived value; particularly, fans value higher the congruence between a community-oriented brand personality with social promotional activities than financial activities. However, fans are more likely to care less about this congruency when they are aware that the marketing strategy is implemented as a response of a difficult financial situation.

Brand love

Brand love is considered as the new brand driver to understand the customers' emotional connection with the brand (Pitta and Franzak, 2008; Marquetto et al., 2017). Baena 2016 and 2018 addresses the love for football brands by analyzing both the club's online marketing strategies and Corporate Social Responsibility actions. The results suggest that the club's online activity and mobile marketing have a significant effect on the love for

the brand. As well, the corporate social responsibility actions implemented by the club, particularly those enabling the involvement of fans.

4.5. DISCUSSION

The previous analysis allows identifying factors and strategies that have benefit football clubs to develop a strong brand. This section presents practical and theoretical contributions to the brand management of European professional football clubs.

The experience of positive emotions has an impact on the brand loyalty of a customer (Pitta, 2008). When following a sports team, a positive experience is not always easy to achieve or to endure over time (e.g., permanent success on the pitch). However, other aspects are valuable for fans, which can improve brand development with an adequate managerial direction. According to the analysis of the previous section, the principal strategies to strengthen a brand are (i) brand extensions, (ii) communication of product and non-product attributes, (iii) involvement with the community, and (iv) a strong corporate identification with the brand.

Brand extension is a strategy that enables clubs to generate revenues, and that allows fans to improve the club's consumption experience (Papadimitriou et al., 2004). Yet, it is important to understand the fans' perception of a brand extension before applying this strategy; the acceptance of a brand extension differs among followers, not all supporters would consider that the new product or service represents the club's brand identity. On the contrary, other fans could agree that a brand extension is necessary for the accomplishment of organizational goals (e.g., increase revenues). Furthermore, some supporters are more responsive than others, for example, fans from small markets (i.e., small geographical locations) shown positive reactions to a brand extension (Abosag et al., 2012). Another relevant factor to be considered is the sports performance; for teams without a remarkable sporting success, a more strategic action should be to introduce a new brand instead of a brand extension (Guenzi et al., 2006).

The brand image of a club is managed through the communication strategy of the product attributes, non-product attributes, and brand benefits, that the club chooses to communicate. However, there is not a general strategy of the factors that a club should advertise, even if clubs have in common an outstanding sport performance, each team should act based on their specific characteristics (Blumrodt and Huang-Horowitz, 2017).

Nowadays, online marketing has become an essential tool for strengthening the relationship with fans and reaching followers worldwide. The use of social media (i.e., websites and applications) is a great opportunity for clubs to create engaging content, encourage fans involvement, and obtain valuable insights. Two aspects to be considered in the development of the communication plan are (i) the frequency of publishing or posting information and (ii) the target market. The research findings suggest that the quality of the content generates more interaction with fans than the frequency of posting (Araújo et al., 2014); regarding the target, the fans' reaction also differs, for instance, international fans have a higher interaction with content of product-related attributes than non-product attributes (Parganas et al., 2015; Maderer et al., 2018).

The perception of a brand is also affected by the relationship that a club has with the stakeholders. The involvement with the community, through corporate social responsibility, has proved to increase fans' commitment to the brand (Baena, 2018). This aspect impacts differently on local fans than international fans, which highly value the projects that a club develops towards contributing to the social-economic development of the region.

A last remarkable aspect that strong football brands have in common is personnel that understands the brand's identity, defined as a corporate brand culture. The employees are the first to communicate the brand image of the club, mainly through their daily activities. The personnel that understands the club's values, attitudes, and specific features that makes it different, is expected to transmit them through their work, and therefore, to help in the process of building a strong brand.

One of the main challenges for the clubs is the diversity of their supporters. The motivations, needs, and brand perceptions differ among fans and target markets (Marquetto et al., 2017; Abosag et al., 2012). For instance, foreign and local fans have a different attachment to the club: local supporters have a unique bond that foreigners do not (Chanavat and Bodet, 2009). Moreover, supporters respond in different ways to brand drivers or have a different perception of brand equity, which might vary according to the ownership structure of the club (Biscaia et al., 2016). Also, some fans may reject commercial strategies that may represent a new revenue source for the club. Therefore, clubs should permanently study their followers' behavior towards identifying the most relevant brand constructs.

4.6. CONCLUSIONS AND FUTURE RESEARCH

This paper may help researchers and practitioners in several ways; first, it provides a state-of-the-art resource. Second, it offers individual reports of the identified articles, including general issues of branding in professional football, the evaluation of clubs' brand equity, and specific brand dimension in the context of European football. Finally, some brand strategies that have contributed to leverage football brands is discussed.

For a sports team, on-field success is an essential attribute to build a strong brand; thus, it is not surprising that many of the reviewed studies focus on clubs with recognized brands, especially teams with outstanding sporting success and international exposure. Nevertheless, some studies focus on non-sport factors that can be controlled and convert into essential differentiators to establish a competitive advantage. Regarding the methodologies, the most often employed are Factor Analysis, Structural Equation Modeling, and Analysis of Variance (ANOVA). The section presenting the descriptive analysis of the reviewed literature includes a detailed report of the frameworks and methodologies used in each work, thereby contributing also to the identification of future research opportunities.

Regarding general issues of branding in professional football, the reviewed articles focus on brand models and brand strategies. A model can be developed following the club's business strategy or by combining different brand issues into the process. On the one hand, brand models build upon the club's strategy, allows to identify the principal components, for instance, the brand model of a football club with a remarkable sports success is likely to determine that the team's roaster is the principal element of the brand. On the other hand, brand models developing a process allow taking into account additional aspects to improve the business strategy. In this regard, some models pointed to the factors that affect the management process, namely, the environmental conditions, the heterogeneity of the customers, the market and customer information, and the organizational constraints (Schilhaneck, 2008); while other models, addressed the internationalization process of the brand. The former models suggest different stages and strategies for reaching the status of global brands, in particular, ranking the clubs according to four stages of globalization, associated to the geographical markets: Local, regional, national, and international global (Richelieu et al., 2008; Richelieu and Desbordes, 2009). Concerning brand strategies, researchers have focused on: brand

extensions and its effect on consumer behavior and brand equity, the improvement of fans satisfaction to generate greater loyalty, and the effect of communication strategies. In the discussion section, the analysis of brand strategies is extended, including the implications of brand extensions, the implementation of corporate social responsibility actions to improve fans' satisfaction and loyalty, the implementation of communication strategies through new technologies to increase fan's interactions, and the importance of the employee engagement and brand identity.

About brand equity research, the reviewed work employed mainly the Customer-Based or Spectator-Based approach. The studies cover a variety of brand dimensions and items, leading to several conclusions. First, the direct relationship between purchase intention and the four brand dimensions (brand image, brand association, brand perception, and brand loyalty) is confirmed. Second, the fans' response to a brand driver varies according to their culture, geographical market, and affiliation with the club (i.e., club members and non-members). Third, consumer behavior can be explained by the brand association with the territory. Four, brand equity has a diminishing effect on on-field performance. Fifth, the effect of brand equity on purchase intention and brand loyalty is stronger than the influence of recent sport success.

Finally, the study of brand dimensions is addressed based on product attributes and benefits. The main product-related attributes are sport performance and the team roaster; there is a positive relationship between sport achievements and brand association. Furthermore, sport performance influences several brand dimensions, including brand identity, brand love, and brand perception. The fans' valuation of the team roaster is also an essential element to the brand association since the followers' opinion about a single player can affect the whole perception of the club's brand, both in a positive or negative way. The sport performance is crucial to create an emotional connection with the fans; nevertheless, this feeling is also awakened by the players and their interaction with the followers. Moreover, the brand love dimension can be increased by the club's engagement with the community, through corporate social responsibility actions, and by procuring an interaction with the fans by online marketing. As previously mentioned, the product-related attributes are less controllable for brand management. On the contrary, non-sport attributes are manageable factors that can leverage the clubs' brand since they have a direct impact on some brand dimensions, including brand perception and brand

loyalty. These factors differ across teams; as for example, the club's history, tradition, team management, stadium, corporate social responsibility actions, youth training, and other services provided by the club. It is important to consider that the factors and strategies should be analyzed in the context of each league and market, since the results might absorb a league effect (i.e., the peculiarities of each league); and also depending on the target market and the characteristics of each club.

Branding in the football industry is an innovative area for developing new theories, examining the success of the brands, and studying fans' behavior. Some avenues for future research are the implication of generalizing strategies across teams; the development of strategies for positioning small brands in local markets; the analysis of brand equity models using new dimensions and factors that consider the peculiarities of the industry; and the impact of new brand drivers like brand love; a feature that has not been studied to a great extent and involves multidisciplinary areas. Finally, regarding the methodologies and techniques, implementing new procedures to study brand equity is another promising research avenue.

DISCUSSION

This thesis studies the European football business as part of the entertainment industry within a global context, concentrating on the role of media visibility and brand status. The descriptive and empirical research, covering the period between 1996 to 2016, bears a number of contributions, including an overview of the evolution of the entertainment and sports industries over time, a comparative analysis of the pre-eminence of the most global professional team-sports leagues worldwide, the identification of business opportunities in the football sector, and an extensive investigation of revenue-generation and talent compensation in the European professional football industry.

The economic context of the entertainment and sports industries is initially examined by comparing the total output and the employment creation in two regions, the United States and the European Union (EU-28). This approach conveys valuable insights to recognize to what extent professional sports, and particularly European football, are gaining economic and media visibility standings in different markets. On the one hand, the entertainment sector appears not to be a large contributor to the national product of countries, even though it comprises several leisure activities that are essential to the economic and social development. In 2015, this industry directly contributed an estimated €314.210 million to the United States national GDP, while the corresponding figure in the European Union (EU-28) was €179.983 million to the GVA (Euros at 2015 prices and exchange rate). The relative share suggests a minor contribution compared to other industries, although there is a positive trend in the respective growth rates. On the other hand, in the same year 2015, the sports industry contributed an estimated €75.809 million to the United States national GDP, and €62.714 million to the EU-28 GVA. The comparative evolution of growth rate suggests that the presence of sports is growing in the EU-28, whereas it seems that the opposite happened in the U.S. economy; still, the growth rate is not as large as in the entertainment sector.

Regarding job opportunities, both industries present a relatively low employment generation; in the entertainment industry, the employment rate was 9.2% in the U.S. and only 6.1% in the EU-28 region; whereas in the sports sector, the two regions had an employment rate below 2%. The sports-related economic activities are comparatively more noteworthy in the European economy; among the EU-28 members, the United Kingdom and Germany, followed by Spain and France, have the highest employment rate.

The development of new technologies has benefited the entertainment and sports businesses by rapidly expanding their market and attracting worldwide interest and audiences. Technological innovations have encouraged sport fans and supporters to be more intensively engaged with their teams and players in several ways, such as: access to massive information, influence the public with their opinions, be a key participant in the evaluation of players and teams. Nevertheless, technology presents new challenges for team management, especially regarding the role and impact of media visibility and brand status in the generation of revenues and talent compensation.

The sports business, as part of the entertainment industry, presents particular features, including the capacity to attract high levels of investment - especially in the form of sponsorship and broadcasting contracts -, the increasing international expansion, the interaction with worldwide crowds of fans, and the high levels of audience (Ratten and Ratten, 2011; Biscaia et al., 2013; Nicholson et. al., 2018; Aguiar-Noury and Garcia-del-Barrio, 2019). Among professional team-sport leagues, the European football seems to draw increasing global attention as it has entered new international markets and gained dominance in terms of media visibility and popularity. The status and relevance of professional sport leagues in North America and Europe, are compared employing two alternative approaches. First from a financial perspective by looking at the annual revenues (both total and broadcasting revenues) of the top sports leagues: The National Football League (NFL), National Basketball League (NBA), Major League Baseball (MLB), National Hockey League (NHL), Major League Soccer (MLS), English Premier League, Spanish La Liga, Italian Serie A, German Bundesliga, and French Ligue 1. For comparative purposes, the UEFA Champions League was added to the exclusive group of the Top-10 worldwide sports leagues, as it is expectedly the most significant football competition in Europe. The second approach relies on the analysis of the degree of

support given to each of the Top-10 professional sports leagues worldwide. It is noteworthy that, over the period under analysis, the population of the U.S. is almost identical to the aggregate population of the countries hosting the European Leagues, implying that comparisons between the two groups can be homogeneously performed.

According to the financial criterion, American leagues prevail over the European; according to data on annual revenues, the following ranking is found: NFL, MLB, NBA, Premier League, and NHL. Note that only the financially stronger football league in Europe is ahead of the financially weaker domestic team-sport league in North America. There is evidence of an increasingly positive trend since 2013 in the annual revenues of five out of ten sports leagues: NBA, NFL, NHL, MLB, and English Premier League; while the growth trend is less intense for the MLS, Bundesliga, La Liga, Ligue 1, and Serie A. It is also interesting pointing out that, despite the growing revenues observed in the "Big-5" European domestic leagues, football teams often face financial difficulties. This result may be the consequence of clubs aiming at maximizing sport achievements rather than profits, one aspect that has been extensively examined (see, for example, Sloane, 1971; Késenne 1996; Szymanski and Smith, 1997; or Garcia-del-Barrio and Szymanski 2009). The results are very different when looking at the broadcasting revenues, European football appears to be more efficient overall to generate annual revenues from TV rights, especially in recent times. The NFL and the Premier League appears as the leader competitions in the North American and European markets, respectively. Information about television and broadcasting revenues is also relevant to assess the identification of promising global sports markets to develop business projects.

Next, the relative status of the Top-10 professional sport leagues is evaluated according to an alternative approach, using a proxy variable that captures the degree of interest of people (potential consumers of sports spectacle) for each of the leagues worldwide. In Chapters 1 and 2, this proxy variable is calculated by employing the searching tool Google Trends, which appraises the degree of interest of potential consumers based on the relative intensity of searches for news articles and general Internet contents. The outcomes obtained from Google Trends are actually employed to compute four indicators: (i) the average share of interest for the North American and European leagues during the season to establish a hierarchy rank, (ii) the *weight factors* for evaluating the European Leagues' worldwide trend, (iii) the *multiplier factors* to

examine the European football market shifts and dominance across continents, and (iv) the market *penetration index* for comparing the internationalization of the football leagues.

The results obtained with the Google Trends approach demonstrate the predominance of North American leagues during the last years (2009-2016), reaching an aggregate share of attention higher than the European leagues. The hierarchy rank for the leagues is different from the one derived from the financial data; the comparative interest with which Internet users search information related to the top leagues reveals higher levels attached to the NFL, NBA, and, to a lesser extent, the UEFA Champions League. Regarding the European leagues, the Premier League appears as the most popular, followed by the Spanish La Liga, then the Italian Serie A, the German Bundesliga, and lastly the French Ligue 1. Among other findings, the divergence across the European competitors increases along over time, presumably due to the "winner-take-all" phenomenon, a distinctive trait affecting professional sports and other entertainment industries.

Then, the media visibility of the "Big-5" European leagues is further examined. The comparison of the share of interest across continents informs about the level of internationalisation and market shifts; the share of interest drawn by each football league is used to obtain the weight factors associated with each league and year. With this method, annual data on Google Trends is compared, homogeneously, as integrated outcomes. The weight and multiplying factors reveal a significant shift in terms of market dominance across continents, driven in two waves: the first one, from Europe to Asia during the period 2008 to 2010; and the second, from Europe to America between 2010 and 2014; showing that the degree of interest of followers in the European continent has relatively decreased over time, as the leagues accomplished a certain level of internationalisation. Although, in the Australian continent, positioning the European leagues seems to be a challenge, considering that their share of interest is not significant and that they display a decreasing trend during the period under analysis.

The degree of interest generated over time suggests that the Premier League and La Liga have a stronger position in the Asian and American markets in comparison to the Bundesliga and Ligue 1, which concentrate their primary market in Europe. The relative share of media visibility in the five European countries is compared using a market Penetration Index, which permits to define the extent of the attention that the leagues

generate in their home country and close competitor's markets, inferring that some leagues are more globalized than others. The Premier League and La Liga can be considered as the most international leagues as they attract the larger numbers of followers worldwide; then the German Bundesliga and the Italian Serie A, lastly the French Ligue 1, which appear to be the less global among the "Big-5".

The ability to attract visibility in the media has a direct impact on the club's capacity to generate revenues. In the first two Chapters, we explore the empirical relationship between financial indicators and the relative share of interest granted by the fans and the public as captured by the Google Trends approach, along with other sports performance and control variables. The econometric models include either total annual revenues or broadcasting revenues as dependent variables, which is explained by Google Trends (percentage with respect to the aggregate figure for all the leagues for each considered year), points in the respective domestic league, and control variables for the region, league leaders, and participation in the UEFA Champions League. The empirical analysis and estimations are made by means of Ordinary Least Square (OLS) and panel-data techniques. According to the results, the European football leagues seem to have a higher capacity to transform the fans' interest in broadcasting revenues than the American Leagues; while North American leagues have a higher capacity to transform the degree of interest in total revenues.

Additional analysis is conducted adopting an innovative empirical approach to identify the most attractive football clubs concerning financial and media brand value. The proposed method employs the estimated fixed effect of clubs, after having filtered out sport performance, as the instruments for capturing the potential revenues and media visibility that clubs can generate thanks to heterogeneity time-invariant features. Therefore, potential revenues and visibility derived from this procedure are not contingent on the risk associated with poor sport achievements in a season. For instance, in season 2015/2016, the Top-5 football clubs with low-risk investment opportunities to accrue revenues were found to be: Real Madrid, Barcelona FC, Manchester United, Bayern Munich, and Paris St. Germain. The results present wide differences across football clubs; investing in Real Madrid implies 1.5 times more revenues (less risk) than investing in Paris St. Germain, and more than 5 times compared to Newcastle, ranked in the 20th place. Regarding media visibility, regardless of the recent sports performance, the Top-5 clubs

in the same season were found: Real Madrid, Barcelona FC, Manchester United, Chelsea, and Liverpool; the degree of visibility that the first two clubs are able to generate is very similar; and there is a big gap with respect to the rest of the clubs. Moreover, we observe that the differences across clubs' media brand values are bigger than discrepancies across financial brand values; in fact, only five clubs accumulate all the media attention leaving little range to the rest of the teams.

The analysis presented so far invite us to extend the investigation of the football clubs' annual revenues, talent compensation, and explanatory factors for sports performance, media visibility, and historical brand status. Chapter 3 offers a detailed econometric analysis using a rich panel-data, which includes financial data for individual clubs playing in the 1st division of the English Premier League, Spanish La Liga, Italian Serie A, and French Ligue 1, over the seasons 1995/1996 to 2015/2016. The theoretical framework is built upon previous research, inspired in Szymanski and Smith (1997) and following the approach developed by Carmichael et al. (2011). Nevertheless, the analysis deviates from them in several ways, which are explained in the corresponding section. The focus is place on three behavioural equations, namely, production, revenues, and wages. Then, a variety of models are estimated for the combined four leagues; although, the analysis is extended by running disaggregate regression models for each national leagues. The investigation is guided by hypotheses about the relationships between the clubs' revenue-generating capacity and talent compensation decisions with the following explanatory variables: (i) points obtained in the domestic league, (ii) the number of qualifying rounds in UEFA Champions and Europa League, (iii) Elo Ranking as a proxy variable to capture the club's brand status derived from their past historical sporting performance, and (iv) a Media Visibility Index (MVI), capturing the degree of interest awaken from journalists and the public, obtained by adopting the MERIT approach. The variables are introduced in the models according to the hypothesis; hence, they are sometimes lagged or filtered from the effect of sports performance, as it is the case of media visibility. The models are estimated using pooled OLS, Fixed Effects, and Dynamic Panel-Data for variables in levels and deviations from the mean, providing a complete analysis of football clubs in segmented markets as they compete simultaneously at the domestic and European level. The hypotheses are tested in two samples, a full sample that covers twenty seasons (1995/1996 to 2015/2016) in which the media visibility

variable was not available and is not included, and a subsample with seventeen seasons (2009/2010 to 2015/2016) that includes the MVI variable.

The econometric analysis begins with the estimation of a general form of a production function. Although it is not the core of the study, it allowed us corroborating, with a comprehensive dataset, that higher investment in talent entails better sport performance (Szymanski and Smith, 1997; Forrest and Simmons, 2002; Barajas and Rodriguez, 2010) Moreover, the estimations support that sport performance in the domestic league is related to current wages, an effect whose magnitude varies across the different leagues. For instance, the results suggest that current wages affect in smaller magnitude the Premier League than the rest of the leagues.

The examination of the revenue models enables identifying the impact of sports performance according to the type of competition and time of occurrence. The empirical results corroborate the expected positive and statistical significance of current (*Domestic Points*) and past domestic performance (*Lag1Domestic Points*), historical status (*Lag2 Elo Rating*), and current participation in the UEFA Champions League. The disaggregated analysis by leagues indicates that the significance of sports achievements, and the magnitude of their impact, varies across the leagues; for example, the historical status works well to sustain annual revenues of clubs in the Spanish La Liga and Italian Serie A, while this conclusion does seem to apply to the English Premier League and French Ligue 1. There is also evidence of the pre-eminence of current sport performance over past achievements, both domestic and international, but not over historical sport performance. Also, the introduction of the potential elements of individual heterogeneity, associated with football clubs, affects the significance of past participation in the Champions League (*Lag1 Rounds Champions League*), Europa League (current and one lag), and past media visibility (*Lag1 Media Visibility*). The last regressor is also essential, as the ability to generate revenues increases along with the reputation of the teams' roster in front of the media. Moreover, the comparative analysis by leagues reveals that the significance of sport performance varies in models that introduce the historical status or media visibility along with the heterogeneity league effect; for instance, the recent-past domestic performance appears to be not significant, especially in the case of the Ligue 1 and the Premier League, while this regressor is highly significant in estimations combining the four leagues.

In examining talent investment, we account for the fact that contracts to hire the football players' services are typically established on the bases of their past performances; in accordance with this, lagged explanatory variables are introduced in the models. There is evidence that points achieved in the domestic league (*Lag1 Domestic Points*), the participation in the UEFA Champions League (*Lag1 Rounds Champions Leagues*), and the clubs' historical sport achievements (*Lag2 Elo Rating*) are influential to talent compensation; again, domestic performance and historical status display the relative highest impacts. Furthermore, it appears that lagged sporting skills and performances reduce their relevance as the clubs' status improves, which may be due to the fact that clubs with a strong brand status are expected to pay a premium for hiring talent. Regarding the participation in the UEFA competition, some interesting conclusions are achieved, to mention one example, the relative pre-eminence of participating in the UEFA Champions League seems to be a more decisive factor for wage determination in the Serie A and Ligue 1 than in the Premier League and La Liga. Lastly, the ability to attract attention from the media is significantly rewarded; however, it can be inferred that the clubs' heterogeneity elements capture the media status and, consequently, the other variable loses some significance in this regard. The separate estimations for leagues, in the case of wage equations, yield general results that are closer to the estimations of the four combined leagues than in the case of the revenues models.

The econometric analysis leads to the conclusion that a dynamic specification for the wage equation is appropriate, considering that wages are set to reward past sport performance, along with other off-field skills, and that sport performance depends on the hiring of sport talent. The proposed model introduces fundamental variables after having filtered out the sport performance and with one lag. The results corroborate the positive and significant impact of past wages (*Lag1 Total Wages*), domestic performance, and brand status (*Lag2 Elo Rating*) on wage determination. Once again, the results show that clubs with strong brand status receive greater salaries, even when the last year's salaries are considered. Finally, we suggest that the coefficients of the filtered variables (*Lag1 Filtered Domestic Points, Lag1 Rounds in Champions League, and Lag1 Rounds in Europa League*) capture off-field skills that are rewarded beyond sport achievements.

Finally, to complete the understanding of the construction and leverage of a football brand, we review the theoretical and empirical research on brand management. The

exhaustive revision of the previous research on this topic leads us to the identification of brand equity models, brand drivers, and some main brand strategies to build a strong football brand.

A brand model can be defined by the club's business strategy or by combining different brand issues to develop a process. On the one hand, brand models build upon the club's strategy, allows identifying the principal components, for example, the brand model of a football club with a remarkable sports success is likely to recognize the team's roaster as the principal element of the brand. On the other hand, brand models creating a process allow taking into account additional aspects to improve the business strategy. In this regard, some models pointed to factors that affect the management process, namely, the environmental conditions, the heterogeneity of the customers, the market and customer information, and the organizational constraints (Schilhaneck, 2008), while other models addressed the process of internationalization. The former models suggest different stages and strategies for reaching the status of global brands, in particular, ranking the clubs according to four stages of globalization, associated to the geographical markets: local, regional, national, and international global (Richelieu et al., 2008; Richelieu and Desbordes, 2009).

One of the most important factors to understand brand construction is the attributes, divided into two categories: product-related and non-product-related. The main product-related attributes are sport performance and team roaster. There is a positive relationship between sport achievements and several brand dimensions, including, association, identity, love, and perception. The fans' valuation of the team roaster is also essential, for instance, to the brand association since the followers' opinion about a single player can affect the whole perception of the club's brand, both in a positive or negative way. The sport performance is crucial to create an emotional connection with the fans; nevertheless, this feeling can be awakened also by the players and their interaction with the followers. The product-related attributes are less controllable for brand management. On the contrary, non-sport attributes are manageable factors that can leverage the clubs' brand since they have also a direct impact on brand association, brand perception, brand personality, brand love, and brand loyalty. These factors differ across teams; as for example the club's history, tradition, team management, stadium, corporate social responsibility actions, youth training, and other services provided by the club.

Regarding brand strategies, four main strategies help a football club to strengthen its brand: (i) brand extensions, (ii) communication of product and non-product attributes, (iii) involvement with the community, and (iv) a strong corporate identification with the brand. First, brand extension is a strategy that enables clubs to generate revenues, and that allows fans to improve the club's consumption experience (Papadimitriou et al., 2004); however, they are not always accepted by the fans. This strategy is sensitive to the type of fans and target market, for instance, fans from small markets (i.e., small geographical locations) react in a positive way to brand extensions (Abosag et al., 2012). Another relevant factor to be considered is the team's sports performance, that is, if a club does not has a remarkable sporting success, other actions have proven to be more strategic, as the introduction of a new brand instead of a brand extension (Guenzi et al., 2006).

Second, the communication strategy of the product attributes, non-product attributes, and brand benefits have a direct impact on the club's brand image. However, we cannot comprise all the aspects that clubs should advertise; even if clubs have in common an outstanding sport performance, each team should implement a communication strategy based on their specific characteristics (Blumrodt and Huang-Horowitz, 2017). Nowadays, online marketing has become an essential tool for strengthening the relationship with fans and reaching followers worldwide. The use of social media (i.e., websites and applications) is a great opportunity for clubs to create engaging content, encourage fans involvement, and obtain valuable insights. Two aspects to be considered in the development of the communication plan are (i) the frequency of publishing or posting information and (ii) the target market. The research findings suggest that the quality of the content generates more interaction with fans than the frequency of posting (Araújo et al., 2014); regarding the target, the fans' reaction also differs, for instance, international fans have a higher interaction with the content of product-related attributes than non-product attributes (Maderer et al., 2018).

Third, the clubs' brand perception is influenced by their relationship with the stakeholders. In this matter, a very important aspect is the involvement with the community through corporate social responsibility, proven to increase fans' commitment to the brand (Baena, 2018). Again, the success of this strategy depends on the target market, that is, local fans tend to highly value the club's projects to improve the

development of the region, whereas international fans may consider more important the recent sport performance of the club.

A last remarkable aspect that strong football brands have in common is personnel that understands the brand's identity, defined as a corporate brand culture. The employees are the first to communicate the brand image of the club, mainly through their daily activities. The personnel that understands the club's values, attitudes, and specific features that makes it different, is expected to transmit them through their work, and therefore, to help in the process of building a strong brand.

One of the main challenges for brand management is the diversity of supporters. The motivations, needs, and brand perceptions differ among fans and target markets (Marquetto et al., 2017; Abosag et al., 2012). For example, foreign and local fans have a different attachment to the club: local supporters have a unique bond that foreigners do not (Chanavat and Bodet, 2009). Moreover, supporters respond in different ways to brand drivers or have a different perception of brand equity, which might vary according to the ownership structure of the club (Biscaia et al., 2016). Also, some fans may reject commercial strategies that may represent a new revenue source for the club. Therefore, clubs should permanently study their followers' behavior towards identifying the most relevant brand constructs.

CONCLUSIONS

1. The direct economic impact of the sports industry, as part of the entertainment sector, appears to be not very large compared to other economic activities. However, the sport industry impacts on a variety of sectors, directly and indirectly, as it involves transactions with many industries; thus, it is difficult to define the direct economic contribution and its impact on the overall economic activity.
2. The economic comparison between the United States and the European Union (EU-28) contributes to a better understanding of the functioning of the sports industry, allowing us to identify the trend of the sports industry and new market opportunities. Across the European countries (EU-28), the sport-labour force is concentrated in the UK, Spain, France, and Germany, which are among the most promising sport markets to start investment projects.
3. The examination of financial data offers a straightforward approach to determine the comparative status of professional team-sport competitions. The hierarchy of leagues based on economic figures reveals the pre-eminence of the North American leagues over the European football leagues.
4. The degree of visibility that the sports teams awake in the public, spectators, and fans, is a relevant indicator of the level of globalization of the leagues. Moreover, it allows us to rank sports leagues, to identify market shifts, and to analyse the club's brand value.
5. The football clubs' (time-invariant) fixed effects, estimated by filtering out sport performance, provide a valuable assessment to examine the capacity that they have to generate revenues and media visibility, regardless of recent sport achievements. This procedure allows categorizing teams according to their financial brand value and media brand value, which facilitates identifying the sport brands that, depending on their inherent risk, present attractive business opportunities.
6. The European football leagues have increasing presence, along with the shifted from traditional markets, in the non-traditional international markets, positioning their

brands in America and Asia. In recent years, European football leagues have entered new international markets, thereby generating greater interest worldwide.

7. There is a strong empirical relationship between total revenues and the degree of attention that fans and the public pay to the different sport leagues.
8. The North American leagues have a higher capacity to transform visibility into revenues, while the European football leagues have greater capacity to transform visibility into broadcasting revenues.
9. There is a strong and positive relationship between spending in football players' talent and domestic sport performance. The impact on current wage bills varies across domestic leagues; compared to the Ligue 1, the magnitude of the effect is smaller for the Premier League, followed by Serie A, and La Liga.
10. The empirical analysis corroborates the positive and statistical significance between football clubs' annual revenues and domestic current and recent-past sports performance. Current national performance is relatively more significant than recent-past performance; a feature that holds in the estimations of the whole data set as well as in the disaggregated analysis by leagues.
11. Sport achievements in the UEFA Champions League are relevant for the clubs' revenue generation; the results support the pre-eminence of current performance over recent-past, in special, when the clubs' time-invariant characteristics are considered.
12. In determining talent compensation, both football clubs' historical achievements and recent sport performances (as captured by (i) points obtained in the national league and (ii) participation in the UEFA Champions League) are statistically significant. The estimation of margins permits concluding that the proxy of historical sports performance and points obtained in the national league have relatively the highest impact on the clubs' total wages.
13. The fact of participating in the UEFA Champions League appears to be more relevant for explaining talent compensation in the Italian Serie A and French Ligue 1; while clubs in the English Premier League and Spanish La Liga display an impact that decreases due to the clubs' time-invariant characteristics.
14. The football clubs' historical sport status is a crucial factor for revenue generation and talent compensation. Moreover, it seems that its explanatory capacity is even higher than current and recent sport achievements. Clubs with strong brand status have to

pay higher salaries, for the fact that they are consolidated brands, which will be actually better able to generate revenues.

15. The historical status and reputation work particularly well to sustain clubs' annual revenues in La Liga and Serie A competitions.
16. The capacity of the team's roster to attract media attention has a positive and statistically significant impact on clubs' annual revenues and wages. The results evidence that media visibility is also a significant revenue source, especially concerning the media exposure generated in the current season, whereas recent-past records on media exposure are more highly valued in the estimated models for talent compensation.
17. The off-field skills, as the ability to attract media attention, are rewarded along with sport on-field skills in the football industry.
18. The football clubs' annual wages can be model with a dynamic specification, where current wages are explained by last year's wage bill, recent sport performance, and off-field skills.
19. The Elo Rating may be adequate as a proxy variable to capture the historical sport status, which enables comparing the clubs' historical achievements and its role in revenue-generation and wage determination.
20. The introduction of individual heterogeneity elements associated with football clubs -fixed effects-, in both the revenue and wage models, distorts the impact of participation in the UEFA Champions League and also the media visibility from the precedent season. The corresponding explanatory variables experience decrease their coefficient sizes and even lose statistical significance, although this effect varies across leagues and, in some models, for the four combined leagues.
21. In addition to sport success, football clubs can build a strong brand based on non-product-related attributes, such as: the club's traditions, stadium, services, involvement with the community, interaction with the fans, etc.
22. The diversity among supporters is one of the main challenges for football clubs. The motivations, needs, and perceptions differ among fans and target markets, which are influenced by aspects like the culture, geographical region, affiliation to the club, and the level of engagement.

23. Online marketing has become an essential tool for strengthening the relationship with fans and reaching followers worldwide. The use of social media gives a great opportunity for clubs to create engaging content, encourage fans involvement, and obtain valuable insights.
24. Brand extension enables clubs to generate revenues and allows to improve the fans' consumption experience. Football clubs with strong sport performance can easily introduce brand extension; however, teams without a remarkable sporting success should consider alternative strategies like, for example, the introduction of a new brand.

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APPENDIX

Appendix A

Table A.1. Exchange Rates to convert US Dollar ($) into Euros (€)

2001	2002	2003	2004	2005	2006	2007	2008
1.13470	0.95393	0.79637	0.73292	0.84427	0.75742	0.67896	0.70935
2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
0.69768	0.75455	0.77220	0.75654	0.72633	0.82262	0.92026	0.95034

Table A.2. Top 80 – Low-Risk Revenue (2015/2016)

Rank	Club	Low-Risk Revenue (€ million)	Revenues (€ million)	Rank	Club	Low-Risk Revenue (€ million)	Revenues (€ million)
1	Real Madrid	366.3889	619.9390				
2	Barcelona	328.7166	620.1150	40	Monaco	27.6054	77.2180
3	Manchester United	317.7314	690.1000	41	Valencia	27.3987	114.7300
4	Bayern Munich	279.0293	592.0000	42	Athletic de Bilbao	25.9365	112.9511
5	Paris St. Germain	217.6447	542.4160	43	Girondins Bordeaux	25.4811	67.6480
6	Manchester City	199.1130	526.6200	44	Swansea	23.9931	128.6400
7	Liverpool	191.9963	404.6800	45	Sevilla	22.3392	120.5150
8	Arsenal	191.9211	469.0000	46	Espanyol	22.0064	67.7224
9	Chelsea	182.8950	448.9000	47	Hellas Verona	19.7572	56.5470
10	Juventus	169.9664	387.9000	48	Real Betis	18.3796	52.1617
11	Internazionale	146.0413	241.4000	49	Rennes	17.6000	46.6370
12	Dortmund	135.4855	283.9000	50	Sporting	17.2661	41.4034
13	AC Milan	132.5636	181.6700	51	Deportivo Coruña	16.0912	41.3650
14	Schalke	123.3548	224.5000	52	Udinese	14.7821	60.4530
15	Tottenham Hotspur	107.8139	280.0600	53	Saint Etienne	14.4152	66.9120
16	Napoli	82.0808	155.3530	54	Crystal Palace	13.4597	135.3400
17	Roma	77.3532	194.2250	55	Leicester	11.8764	172.8600
18	Genoa	76.6865	100.6290	56	Villarreal	11.0899	75.9337
19	West Ham United	68.6489	192.9600	57	Toulouse	9.60519	29.6870
20	Newcastle	67.3412	168.8400	58	Granada	8.11741	43.0837
21	Aston Vila	65.8699	142.0400	59	Lille	6.43601	57.3230
22	Fiorentina	56.6125	131.9450	60	Empoli	6.33111	51.5070
23	Palermo	54.8543	56.4000	61	Caen	5.95738	35.0620
24	Sunderland	54.6034	144.7200	62	Nizza	5.89585	43.8410
25	Olympique Marseille	51.6939	110.7600	63	Lorient	5.40567	28.5640
26	Everton	51.1156	163.4800	64	Montpellier	5.18960	40.1560
27	Olympique Lyon	48.0077	160.0040	65	Málaga	5.06194	54.1715
28	Atlético de Madrid	46.4196	233.3353	66	Troyes	4.77374	20.8870
29	Lazio	46.3636	82.7140	67	Real Sociedad	4.34906	61.9278
30	Bologna	43.8720	54.1040	68	Getafe	3.60516	38.9595
31	Norwich City	41.1118	131.3200	69	Levante	0.89422	40.4640
32	Sassuolo	40.6796	87.3080	70	Ajaccio	-1.15750	8.4390
33	Stoke City	38.9544	139.3600	71	Celta de Vigo	-1.54700	47.7970
34	Atalanta Bergamo	36.7448	74.3400	73	Reims	-1.84640	27.5910
35	Sampdoria	35.6226	85.2390	75	Nantes	-2.53410	34.5680
36	Turin	34.8615	84.5310	76	Rayo Vallecano	-3.84740	41.4764
37	West Bromwich Albion	34.1577	131.3200	78	Guingamp	-7.53660	28.0410
38	Chievo Verona	31.1227	68.5270	79	Eibar	-8.48870	32.0411
39	Southampton	28.4538	166.1600	80	Bastia	-9.88720	25.8490

Source: Authors' own calculations

Appendix B

Appendix 1

Table B.1. Data on Clubs' Annual Revenues and Wages – Premier League by Seasons

	Revenues				Wages			
Season	N	Total (Mill.€)	Mean	Std. Dev.	N	Total (Mill.€)	mean	Std. Dev.
1995/1996	20	420,0231	21,00	13,26	20	200,5531	10,03	4,22
1996/1997	20	672,7873	33,64	25,52	20	316,2675	15,81	6,44
1997/1998	20	905,2239	45,26	33,65	20	442,6493	22,13	11,16
1998/1999	20	1063,2350	53,16	38,25	20	596,8884	29,84	12,34
1999/2000	20	1199,0350	59,95	41,77	20	741,9502	37,10	19,33
2000/2001	20	1540,1290	77,01	47,34	20	926,8813	46,34	21,25
2001/2002	19	1701,1300	89,53	49,01	19	1051,7630	55,36	23,81
2002/2003	20	1793,1610	89,66	51,41	20	1094,0320	54,70	23,50
2003/2004	20	1995,0750	99,75	57,11	20	1210,2860	60,51	35,57
2004/2005	20	1984,9020	99,25	58,99	20	1163,1030	58,16	34,19
2005/2006	19	1922,9060	101,21	61,12	19	1186,6950	62,46	37,75
2006/2007	20	2274,0680	113,70	84,21	20	1432,8560	71,64	42,37
2007/2008	20	2435,4030	121,77	80,07	20	1516,5940	75,83	46,42
2008/2009	20	2323,4470	116,17	79,64	20	1559,1800	77,96	41,89
2009/2010	19	2438,3240	128,33	88,04	20	1714,2560	85,71	51,75
2010/2011	20	2505,9750	125,30	84,54	20	1752,0990	87,60	54,90
2011/2012	20	2920,2740	146,01	101,14	20	1992,2640	99,61	59,26
2012/2013	20	2945,7320	147,29	105,68	20	2085,4700	104,27	64,89
2013/2014	20	3895,3100	194,77	127,70	20	2257,5630	112,88	68,29
2014/2015	20	4402,2220	220,11	139,30	20	2684,4430	134,22	75,41
2015/2016	20	4876,2600	243,81	168,11	20	3056,5400	152,83	82,39
Total	417	46214,6223	110,83	98,47	418	28982,3338	69,34	57,32

Table B.2. Data on Clubs' Annual Revenues and Wages – Serie A by Seasons

	Revenues				Wages			
Season	N	Total (Mill.€)	Mean	Std. Dev.	N	Total (Mill.€)	mean	Std. Dev.
2004/2005	16	1228,6540	76,79	74,22	16	766,5680	47,91	47,14
2005/2006	20	1507,3100	75,37	81,75	20	797,7270	39,89	43,19
2006/2007	20	1404,0720	70,20	71,67	20	749,3730	37,47	44,49
2007/2008	20	1735,1920	86,76	61,50	20	987,4250	49,37	50,95
2008/2009	20	1970,7520	98,54	78,42	20	1088,4860	54,42	54,98
2009/2010	20	1826,9230	91,35	80,34	20	1147,1030	57,36	60,62
2010/2011	20	1857,8700	92,89	65,38	20	1143,6310	57,18	55,95
2011/2012	20	2074,4470	103,72	71,00	20	1158,8190	57,94	49,70
2012/2013	20	2078,4890	103,92	67,07	20	1154,3590	57,72	42,22
2013/2014	20	2059,0580	102,95	75,23	20	1215,9900	60,80	45,57
2014/2015	19	2090,9050	110,05	72,93	20	1264,0560	63,20	50,12
2015/2016	20	2219,8480	110,99	86,32	20	1316,3190	65,82	51,10
Total	235	22053,5200	93,84	73,57	236	12789,8560	54,19	49,55

Table B.3. Data on Clubs' Annual Revenues and Wages - La Liga by Seasons

	Revenues				Wages			
Season	N	Total (Mill.€)	Mean	Std. Dev.	N	Total (Mill.€)	mean	Std. Dev.
1995/1996	19	296,7830	15,62	15,25	19	164,3751	8,65	7,38
1996/1997	20	485,2790	24,26	22,59	20	216,7961	10,84	9,87
1997/1998	19	538,0314	28,32	25,63	19	293,3943	15,44	14,71
1998/1999	19	579,8713	30,52	27,76	19	320,5372	16,87	16,28
1999/2000	19	631,0696	33,21	41,82	20	398,1863	19,91	19,07
2000/2001	16	570,6506	35,67	37,75	17	433,8093	25,52	28,83
2001/2002	15	626,5907	41,77	43,30	16	496,7493	31,05	34,92
2002/2003	16	744,6322	46,54	49,07	19	574,3578	30,23	34,36
2003/2004	20	919,0844	45,95	56,48	20	572,7962	28,64	29,34
2004/2005	20	1007,8280	50,39	68,55	20	642,1298	32,11	35,47
2005/2006	19	1128,3520	59,39	78,05	20	718,1369	35,91	39,63
2006/2007	20	1332,1960	66,61	90,45	20	828,4247	41,42	43,83
2007/2008	20	1430,0540	71,50	94,96	20	906,0246	45,30	46,38
2008/2009	20	1472,6980	73,63	108,64	16	650,9706	40,69	44,21
2009/2010	20	1581,5890	79,08	116,48	20	942,1496	47,11	57,96
2010/2011	19	1658,4760	87,29	135,99	19	994,6850	52,35	62,60
2011/2012	20	1765,8760	88,29	142,81	20	996,7820	49,84	60,89
2012/2013	20	1839,1520	91,96	142,58	20	949,3574	47,47	62,91
2013/2014	20	1875,5800	93,78	149,16	20	1012,7080	50,64	69,12
2014/2015	20	2076,5410	103,83	164,56	20	1201,4650	60,07	90,79
2015/2016	20	2504,9640	125,25	175,52	20	1429,8460	71,49	97,14
Total	401	25065,2982	62,51	102,43	404	14743,6812	36,49	51,37

Table B.4. Data on Clubs' Annual Revenues and Wages – Ligue 1 by Seasons

	Revenues				Wages			
Season	N	Total (Mill.€)	Mean	Std. Dev.	N	Total (Mill.€)	mean	Std. Dev.
2009/2010	20	1096,9770	54,85	39,50	20	790,5970	39,53	25,02
2010/2011	20	1056,9060	52,85	35,69	20	789,0060	39,45	24,94
2011/2012	20	1071,3440	53,57	38,03	20	846,8180	42,34	31,72
2012/2013	20	1345,9840	67,30	84,32	20	871,2780	43,56	46,27
2013/2014	20	1513,0450	75,65	102,51	20	959,3440	47,97	51,19
2014/2015	20	1421,8990	71,09	100,77	20	952,4000	47,62	54,19
2015/2016	20	1480,4910	74,02	115,66	20	1017,0870	50,85	62,63
Total	140	8986,6460	64,19	79,36	140	6226,5300	44,48	43,74

Appendix 2

Table B.2 Estimation Filtered Media Visibility Index

Dependent variable:	Media Visibility Index
Domestic Points	0.592***
	(0.077)
Rounds in Champions League	8.029***
	(0.910)
Rounds in Europa League	-0.371
	(0.568)
Premier	21.813***
	(1.945)
La Liga	16.489***
	(2.354)
Serie A	10.591***
	(1.402)
Season Dummies	Yes
Constant	-29.405***
	(4.338)
Observations	560
Adjusted R^2	0.6333

Note: Robust standard errors are reported in parentheses
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Appendix 3

Table B.3.1 Revenues Equations and Sport Performance - Models subsample

Levels	**OLS Pooled**	**OLS Pooled**	**Fixed Effects**	**Fixed Effects**
Model	**(2.A)**	**(2.a)**	**(2.A)**	**(2.a)**
Lag2 Elo Rating		0.261***		0.150***
		(0.071)		(0.054)
Domestic Points	2.077***	1.825***	0.820***	0.866***
	(0.260)	(0.260)	(0.281)	(0.292)
Lag1 Domestic Points	1.381***	0.832*	0.755**	0.792**
	(0.395)	(0.429)	(0.314)	(0.303)
Rounds in Champions League	19.436***	19.274***	9.559***	8.192***
	(4.632)	(4.499)	(2.808)	(2.562)
Lag1 Rounds in Champions League	14.449***	7.676*	3.742	0.419
	(3.580)	(4.281)	(2.973)	(2.815)
Rounds in Europa League	-1.476	-1.297	-1.313	-1.436
	(2.667)	(2.489)	(1.615)	(1.546)
Lag1 Rounds in Europa League	-2.799	-5.445**	-1.118	-2.353
	(1.848)	(2.114)	(1.408)	(1.683)
Premier	107.905***	88.742***		
	(8.200)	(7.301)		
Serie A	38.278***	38.210***		
	(6.288)	(6.256)		
La Liga	16.012**	-8.200		
	(7.689)	(10.314)		
Season Dummies	Yes	Yes	Yes	Yes
Constant	-162.529***	-546.976***	56.538*	-210.689**
	(20.451)	(107.0762)	(30.035)	(99.349)
Observations	431	431	431	431
Adjusted R^2	0.8055	0.8166	0.4140	0.4321
F-global	76.10	78.67	10.65	9.06
Mean VIF	2.09	2.48	2.09	2.48
BP test ($\chi 2$)	324.48	309.98	-	-
Wald ($\chi 2$)	-	-	[0.000]	[0.000]
AIC	4691.244	4666.834	4152.117	4139.594
Deviations from mean	**OLS Pooled**	**OLS Pooled**	**Fixed Effects**	**Fixed Effects**
Model	**(2.A)**	**(2.a)**	**(2.A)**	**(2.a)**
Lag2 Elo Rating		0.226***		0.120***
		(0.063)		(0.040)
Domestic Points	2.087***	1.871***	0.778***	0.820***
	(0.261)	(0.258)	(0.287)	(0.291)
Lag1 Domestic Points	1.343***	0.869**	0.702**	0.744**
	(0.368)	(0.424)	(0.306)	(0.294)
Rounds in Champions League	19.588***	19.413***	9.806***	8.664***
	(2.787)	(4.530)	(2.895)	(2.688)
Lag1 Rounds in Champions League	14.479***	8.630**	3.763	1.132
	(2.094)	(4.142)	(3.042)	(2.913)
Rounds in Europa League	-1.429	-1.308	-1.261	-1.367
	(1.911)	(2.498)	(1.666)	(1.589)
Lag1 Rounds in Europa League	-2.782	-5.018**	-1.106	-2.046
	(1.782)	(2.038)	(1.360)	(1.553)
Premier	109.457***	92.625***		
	(7.618)	(7.373)		
Serie A	38.475***	38.217***		
	(7.512)	(6.193)		
La Liga	19.337**	-2.151		
	(7.836)	(10.101)		
Season Dummies	No	No	No	No
Constant	-44.183***	-45.201***	2.550**	-3.971
	(5.502)	(5.313)	(1.223)	(2.604)
Observations	431	431	431	431
Adjusted R^2	0.8038	0.8179	0.2614	0.2915
F-global	111.22	111.73	8.34	7.72
Mean VIF	2.29	2.73	2.29	2.73
BP test ($\chi 2$)	308.85	305.90	-	-
Wald ($\chi 2$)	-	-	[0.000]	[0.000]
AIC	4682.661	4661.796	4148.674	4138.811

Note: Robust standard errors are reported in parentheses and P-values in brackets.
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table B.3.2 Wages Equations and Sport Performance - Models subsample

Levels	**OLS Pooled**	**OLS Pooled**	**Fixed Effects**	**Fixed Effects**
Model	**(3.A)**	**(3.a)**	**(3.A)**	**(3.a)**
Lag2 Elo Rating		0.194***		0.081***
		(0.038)		(0.023)
Lag1 Domestic Points	2.129***	1.604***	0.686***	0.650***
	(0.173)	(0.176)	(0.205)	(0.196)
Lag1 Rounds in Champions League	13.318***	7.888***	2.763*	0.933
	(1.651)	(2.022)	(1.594)	(1.350)
Lag1 Rounds in Europa League	1.085	-1.128	0.284	-0.352
	(0.999)	(1.152)	(0.595)	(0.619)
Premier	68.108***	54.050***		
	(4.681)	(4.819)		
Serie A	14.292***	14.258***		
	(4.099)	(3.934)		
La Liga	3.021	-14.797***		
	(4.442)	(5.264)		
Season Dummies	Yes	Yes	Yes	Yes
Constant	-89.483***	-377.381***	51.663***	-113.351**
	(9.778)	(59.139)	(12.047)	(44.929)
Observations	432	432	432	432
Adjusted R^2	0.7697	0.7966	0.2954	0.3294
F-global	90.18	85.73	7.83	7.67
Mean VIF	1.64	2.17	1.64	2.17
BP test ($\chi 2$)	173.62	166.28	-	-
Wald ($\chi 2$)	-	-	[0.000]	[0.000]
AIC	4255.9726	4215.4438	3684.9948	3673.7279
Model	**(3.A)**	**(3.a)**	**(3.A)**	**(3.a)**
Deviations from mean	**Pooled OLS**	**Pooled OLS**	**Fixed Effects**	**Fixed Effects**
Lag2 Elo Rating		0.169***		0.067***
		(0.034)		(0.018)
Lag1 Domestic Points	2.122***	1.664***	0.669***	0.645***
	(0.173)	(0.178)	(0.204)	(0.199)
Lag1 Rounds in Champions League	13.342***	8.618***	2.765*	1.2608
	(1.660)	(1.952)	(1.601)	(1.421)
Lag1 Rounds in Europa League	1.058	-0.829	0.258	-0.240
	(0.992)	(1.090)	(0.593)	(0.593)
Premier	69.078***	56.652***		
	(4.688)	(4.720)		
Serie A	14.373***	14.208***		
	(4.055)	(3.912)		
La Liga	5.073	-10.821**		
	(4.385)	(5.059)		
Season Dummies	No	No	No	No
Constant	-24.062***	-24.850***	2.276***	-1.304
	(2.933)	(2.917)	(0.587)	(1.266)
Observations	432	432	432	432
Adjusted R^2	0.7678	0.7864	0.1165	0.1461Re
F-global	160.21	140.53	3.79	5.66
Mean VIF	1.58	2.32	1.58	2.32
BP test ($\chi 2$)	167.08	169.70	-	-
Wald ($\chi 2$)	-	-	[0.000]	[0.000]
AIC	4247.863	4212.842	3678.973	3669.282

Note: Robust standard errors are reported in parentheses and P-values in brackets
Statistical significance: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Appendix 4

Table B.4.1.1. Marginal Effects of Domestic Sport Performance Equation – Pooled OLS Models

Variable	**Levels**	
Model	(1)	(1.c)
Total Wages	0.208***	0.164***
	(0.007)	(0.010)
D Rounds in Champions League		0.020***
		(0.003)
D Rounds in Europa League		0.016***
		(0.002)
Premier	-0.082***	-0.068***
	(0.008)	(0.008)
Serie A	-0.019***	-0.016***
	(0.005)	(0.005)
La Liga	-0.020***	-0.019***
	(0.007)	(0.007)
Observations	1,198	1,198

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses. Statistical significance: * p < 0.1; **p < 0.05; *** p < 0.01

Table B.4.1.2. Marginal Effects of Domestic Sport Performance Equation – Fixed Effects Models

Variable	**Levels**	
Model	(1)	(1.c)
Total Wages	0.123***	0.116***
	(0.020)	(0.022)
D Rounds in Champions League		0.006
		(0.005)
D Rounds in Europa League		0.003
		(0.004)
Observations	1,198	1,198

Note: Margins ey/ex at means. Robust standard errors are reported In parentheses. Statistical significance: * p < 0.1; **p < 0.05; *** p < 0.01

Table B.4.2.1. Marginal Effects of Revenue Equation – Pooled OLS Models

Variable	Levels	Deviations from mean	Levels	Deviations from mean
Model	**(2a)**	**(2a)**	**(2b)**	**(2b)**
Lag2 Elo Rating	3.308***	1.764***	2.042***	1.081**
	(0.490)	(0.678)	(0.614)	(0.436)
Domestic Points	0.930***	0.417***	0.926***	0.476***
	(0.086)	(0.158)	(0.105)	(0.147)
Lag1 Domestic Points	0.470***	0.369**	0.421***	0.349**
	(0.068)	(0.160)	(0.136)	(0.153)
Rounds in Champions League	0.121***	0.233***	0.166***	0.320***
	(0.017)	(0.089)	(0.023)	(0.095)
Lag1 Rounds in Champions League	0.064***	0.152**	0.040*	0.086
	(0.018)	(0.069)	(0.023)	(0.055)
Rounds in Europa League	-0.008	-0.019	-0.004	-0.008
	(0.008)	(0.020)	(0.010)	(0.019)
Lag1 Rounds in Europa League	-0.022***	-0.029**	-0.003**	-0.020
	(0.008)	(0.014)	(0.008)	(0.015)
Filtered Media Visibility			-0.002***	-0.019***
			(0.000)	(0.006)
Lag1 Filtered Media Visibility			-0.003**	-0.063*
			(0.002)	(0.037)
Premier	0.297***	6.212**	0.201***	3.897***
	(0.025)	2.471	(0.014)	1.246
Serie A	0.105***	2.098**	0.077***	1.444***
	(0.013)	(0.891)	(0.012)	(0.547)
La Liga	0.066***	1.085	0.000	0.204
	(0.025)	(0.713)	(0.015)	(0.297)
Observations	1,125	1,038	431	431

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table B.4.2.2. Marginal Effects of Revenue Equation – Fixed Effects Models

Variable	Levels	Deviations from mean	Levels	Deviations from mean
Model	**(2a)**	**(2a)**	**(2b)**	**(2b)**
Lag2 Elo Rating	3.595***	1.995***	1.983**	0.959**
	-1.035	(0.539)	(0.777)	(0.378)
Domestic Points	0.694***	0.281***	0.625***	0.304***
	(0.154)	(0.076)	(0.126)	(0.062)
Lag1 Domestic Points	0.372***	0.384***	0.402***	0.308***
	(0.125)	(0.125)	(0.143)	(0.109)
Rounds in Champions League	0.069***	0.108***	0.105***	0.207***
	(0.017)	(0.040)	(0.020)	(0.041)
Lag1 Rounds in Champions League	0.014	0.044	0.001	0.012
	(0.022)	(0.045)	(0.022)	(0.043)
Rounds in Europa League	0.000	-0.011	-0.011	-0.020
	(0.008)	(0.019)	(0.009)	(0.017)
Lag1 Rounds in Europa League	-0.019**	-0.020*	-0.010	-0.015
	(0.009)	(0.012)	(0.008)	(0.014)
Filtered Media Visibility			-0.001***	-0.012***
			(0.000)	(0.003)
Lag1 Filtered Media Visibility			-0.001	-0.009
			(0.001)	(0.020)
Observations	1,125	1,038	431	431

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table B.4.3.1. Marginal Effects of Wage Equation – Pooled OLS Models

Variable	Levels	Deviations from mean	Levels	Deviations from mean
Model	**(3a)**	**(3a)**	**(3b)**	**(3b)**
Lag2 Elo Rating	5.893***	2.117***	2.998***	1.592***
	(0.448)	(0.778)	(0.662)	(0.602)
Lag1 Domestic Points	0.803***	0.876***	1.232***	0.957***
	(0.074)	(0.312)	(0.105)	(0.296)
Lag1 Rounds in Champions League	0.117***	0.222***	0.127***	0.237***
	(0.015)	(0.082)	(0.018)	(0.080)
Lag1 Rounds in Europa League	-0.002	-0.001	-0.003	-0.002
	(0.008)	(0.013)	(0.010)	(0.017)
Lag1 Filtered Media Visibility			-0.008***	-0.151***
			(0.001)	(0.050)
Premier	0.236***	5.787***	0.194***	3.606***
	(0.025)	2.207	(0.016)	1.200
Serie A	0.065***	1.361**	0.043***	0.771**
	(0.013)	(0.588)	(0.013)	(0.358)
La Liga	-0.027	0.120	-0.039**	-0.510*
	(0.025)	(0.489)	(0.015)	(0.281)
Observations	1,130	1,043	432	432

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table B.4.3.2. Marginal Effects of Wage Equation – Fixed Effect Models

Variable	Levels	Deviations from mean	Levels	Deviations from mean
Model	**(3.a)**	**(3.a)**	**(3.b)**	**(3.b)**
Lag2 Elo Rating	4.187***	2.117***	1.827***	0.917***
	(0.819)	(0.778)	(0.512)	(0.246)
Lag1 Domestic Points	0.469***	0.876***	0.507***	0.382***
	(0.114)	(0.312)	(0.159)	(0.122)
Lag1 Rounds in Champions League	0.040**	0.222***	0.017	0.0362
	(0.020)	(0.082)	(0.020)	(0.037)
Lag1 Rounds in Europa League	-0.005	-0.001	-0.003	-0.004
		(0.013)	(0.006)	(0.010)
Lag1 Filtered Media Visibility			0.000	-0.012
			(0.000)	(0.015)
Observations	1,130	1,043	432	432

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses
Statistical significance: * p < 0.1; ** p < 0.05; *** p < 0.01

Table B.4.3.3. Marginal Effects of Wage Equation – GMM Dynamic Specification

Variable	Levels	Deviations from mean
Model	**(3.a')**	**(3.a')**
Lag1 Total Wages	0.828***	0.790***
	(0.045)	(0.100)
Lag2 Elo Rating	0.652*	0.196**
	(0.377)	(0.085)
Lag1 Filtered Domestic Points	0.007***	0.087***
	(0.002)	(0.023)
Lag1 Filtered Rounds in Champions League	0.000***	-0.004***
	(0.00)	(0.001)
Lag1 Filtered Rounds in Europa League	0.000	-0.002
	(0.001)	(0.004)
Observations	936	936

Note: Margins ey/ex at means. Robust standard errors are reported in parentheses. Statistical significance: * p < 0.1; ** p < 0.05;*** p < 0.01