
Global hierarchy of team-sport leagues based on internet searches and revenues: Europe vs. America

Alice Aguiar-Noury and
Pedro Garcia-del-Barrio

Universitat Internacional de Catalunya,
Carrer de la Immaculada, 22,
Barcelona 08017, España
Email: aaguiar@uic.es
Email: pgarcia@uic.es
*Corresponding author

AQ1: Please specify the corresponding author's name.

Abstract: This paper contributes to the understanding of the modern sports industry in an international context. Two alternative approaches are adopted for establishing the hierarchy of team-sport leagues globally and for researching to what extent professional European football might have gained dominance relative to the major North American sports leagues. We first study the evolving economic situation of the main European and American sport leagues, in terms of both total revenues and broadcasting revenues. Then, we adopt an approach based on “Google Trends” records to rank team-sport leagues according to the relative interest shown by the fans. We interpret the evolution over time as changes in the degree of support given to the Top-10 professional sports leagues worldwide. Finally, we estimate pooled OLS and GLS random effects models to examine the empirical relationship between leagues’ revenues and internet searches to understand the prospects of the leagues concerning their popularity and potential revenues.

Keywords: hierarchy of sport leagues; annual revenues; internet searches; media visibility; internationalisation of European football.

Reference to this paper should be made as follows: Aguiar-Noury, A. and Garcia-del-Barrio, P. (XXXX) ‘Global hierarchy of team-sport leagues based on internet searches and revenues: Europe vs. America’, *European J. of International Management*, Vol. X, No. Y, pp.xxx-xxx.

Biographical notes: Alice Aguiar-Noury is a PhD Candidate at Universitat Internacional de Catalunya. She received her MSc degree in Economics from Florida Atlantic University, in 2013. Her teaching and research focus on the field of marketing and applied economics.

Pedro Garcia-del-Barrio is Senior Lecturer of Economics at Universitat Internacional de Catalunya. He completed his MSc in Economics (University of Southampton, 2000) and was awarded PhD with distinction (Universidad de Navarra, 2002). His teaching and research focus on the field of Macroeconomics, Microeconomics, Labour Economics and Sports Economics. He has published papers in assorted journals like: *Economic Modelling*, *Applied Economics*, *Managerial and Decision Economics*, *Journal of Sports Economics*, *Journal of Economics*, *Journal of Productivity Analysis*, *Review of Industrial Organisation*, *International Journal of Sport Management and Marketing*, *Economics of Governance*, etc. He is academic director of “MERIT social value” and has authored more than 30 reports on media value in sports.

AQ2: If a previous version of your paper has originally been presented at a conference, please complete the statement to this effect or delete if not applicable.

1 Introduction

The vertiginous development of new technologies has encouraged a globalised 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 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 taken into account. On one hand, the international and entrepreneurial dimensions of the sports industry present new challenges for team management (Ratten, 2011). 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 also 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

Global hierarchy of team-sport leagues based on internet searches and revenues

business magnates, especially from China, Qatar, Singapore, Russia, and the USA 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 globalisation 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, 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, 2019a, 2019b). Besides, the concepts developed around international entrepreneurship emphasises 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, 2019).

In this paper, the issue of entrepreneurship is approached by analysing the globalisation of professional sports leagues and how these leagues have encouraged the introduction of non-traditional sports to new markets. We actually 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 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 from (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 focuses 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 and Varian, 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.

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, Sub-section 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 Sub-section 3.2, we adopt an approach based on measurements of the degree of attention granted by fans and the general 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 aforementioned approaches. Moreover, we further examine the link between TV broadcasting contracts across the leagues, even if data in this case is less abundant.

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 1 displays data of the main North American leagues: the NFL, MLB, NBA, NHL, and MLS; the information in the table is given in US dollars, covering from 2005 to 2016. Then, Table 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 per cent 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 1, Figure 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 US dollars (\$) to Euros (€).

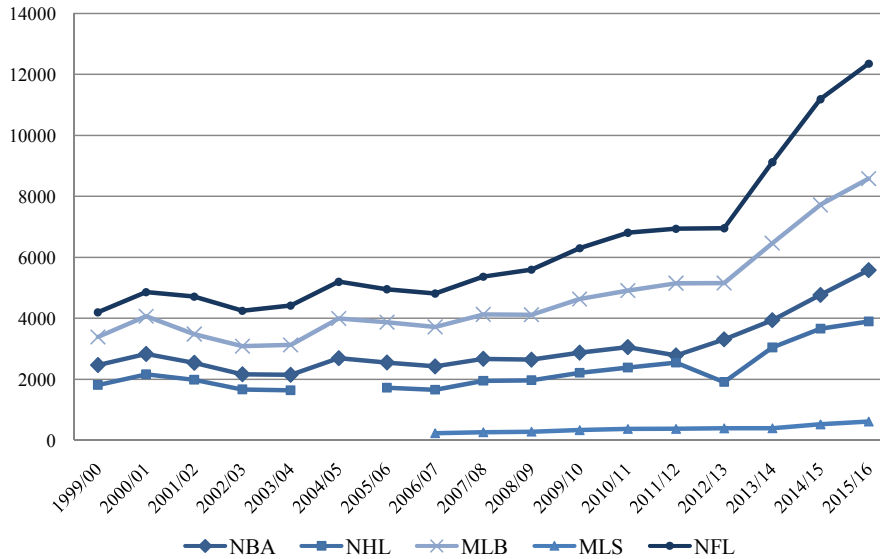
Table 1 Total revenues (Mill. US \$) – American professional sport leagues

| Year | MLB | | MLS | | Season | NFL | | NBA | | NHL | |
|------|---------------|-------------|---------------|-------------|---------|---------------|-------------|---------------|-------------|---------------|-------------|
| | Rev. Mill. \$ | TV Rev. (%) | Rev. Mill. \$ | TV Rev. (%) | | Rev. Mill. \$ | TV Rev. (%) | Rev. Mill. \$ | TV Rev. (%) | Rev. Mill. \$ | TV Rev. (%) |
| 2005 | 4730 | 11.8 | | | 2004/05 | 6160 | 35.7 | 3190 | 24.0 | lockout | – |
| 2006 | 5110 | 13.1 | | | 2005/06 | 6540 | 47.2 | 3370 | 22.8 | 2270 | 3.1 |
| 2007 | 5480 | 15.8 | 340 | 7.1 | 2006/07 | 7090 | 43.5 | 3570 | 26.1 | 2440 | 2.9 |
| 2008 | 5820 | 14.9 | 371 | 6.5 | 2007/08 | 7570 | 40.8 | 3770 | 24.7 | 2750 | 2.5 |
| 2009 | 5900 | 14.7 | 404 | 5.9 | 2008/09 | 8020 | 38.5 | 3790 | 24.4 | 2820 | 2.5 |
| 2010 | 6140 | 14.1 | 440 | 5.5 | 2009/10 | 8350 | 36.9 | 3810 | 24.3 | 2930 | 2.4 |
| 2011 | 6360 | 13.5 | 480 | 5.0 | 2010/11 | 8820 | 35.0 | 3960 | 23.4 | 3090 | 2.3 |
| 2012 | 6810 | 12.6 | 494 | 6.3 | 2011/12 | 9170 | 33.6 | 3680 | 25.1 | 3370 | 5.9 |
| 2013 | 7100 | 11.7 | 538 | 6.3 | 2012/13 | 9580 | 32.2 | 4560 | 20.3 | 2630 | 7.6 |
| 2014 | 7860 | 19.7 | 476 | 7.1 | 2013/14 | 11,090 | 44.6 | 4790 | 19.3 | 3700 | 11.7 |
| 2015 | 8390 | 18.5 | 566 | 15.9 | 2014/15 | 12,160 | 40.7 | 5180 | 17.9 | 3980 | 10.9 |
| 2016 | 9030 | 17.2 | 644 | 14.0 | 2015/16 | 13,000 | 38.1 | 5870 | 15.8 | 4100 | 10.6 |

Source: www.statista.com

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.

Figure 1 Total annual revenues (Mill. €) – American team-sport leagues



Global hierarchy of team-sport leagues based on internet searches and revenues

Similarly, Table 2 and Figure 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.

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 maximising 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 Total annual revenues (Mill. €) – European football leagues

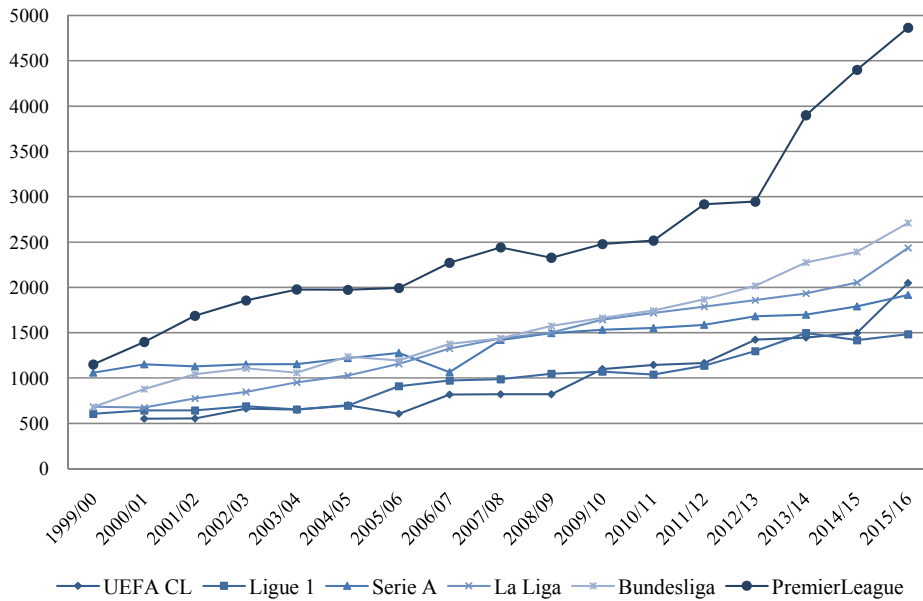


Table 2 Total revenues (Mill. €) – European professional football leagues

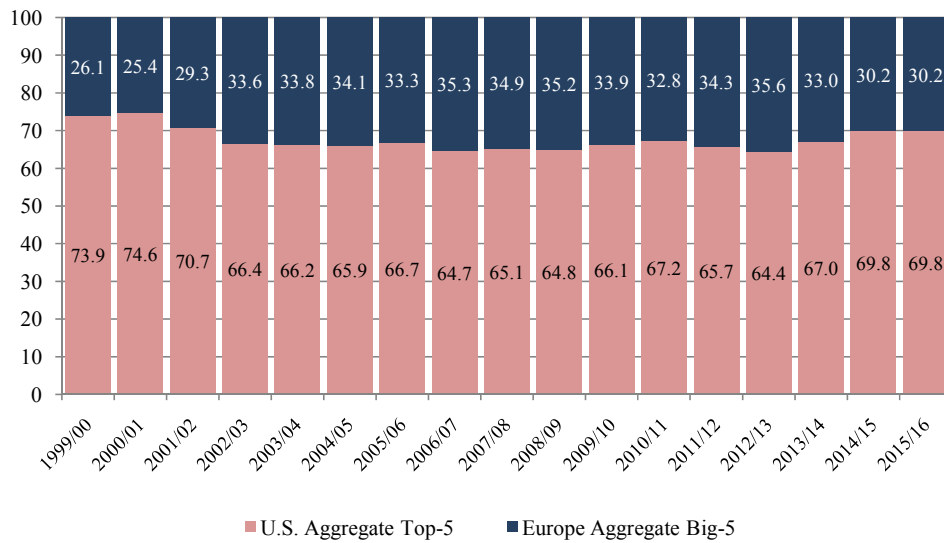
| Season | UEFA Champ. League | | French Ligue 1 | | Italian Serie A | | Spanish La Liga | | German Bundesliga | | English Premier League | |
|---------|--------------------|-------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|-------------------|-------------|------------------------|-------------|
| | Revenue Mill. € | TV Rev. (%) | Revenue Mill. € | TV Rev. (%) | Revenue Mill. € | TV Rev. (%) | Revenue Mill. € | TV Rev. (%) | Revenue Mill. € | TV Rev. (%) | Revenue Mill. € | TV Rev. (%) |
| 2004/05 | 700 | 67.1 | 696 | 49.4 | 1219 | 54.6 | 1029 | 39.7 | 1236 | 26.0 | 1975 | 43.3 |
| 2005/06 | 606 | 79.5 | 910 | 57.6 | 1277 | 60.1 | 1158 | 35.1 | 1195 | 27.2 | 1994 | 42.1 |
| 2006/07 | 819 | 76.4 | 972 | 58.1 | 1064 | 60.9 | 1326 | 42.0 | 1379 | 34.8 | 2273 | 38.7 |
| 2007/08 | 822 | 76.8 | 989 | 56.3 | 1421 | 60.7 | 1438 | 40.3 | 1438 | 33.1 | 2441 | 47.9 |
| 2008/09 | 820 | 76.5 | 1048 | 55.0 | 1494 | 59.7 | 1501 | 41.4 | 1575 | 31.0 | 2326 | 48.8 |
| 2009/10 | 1099 | 77.1 | 1072 | 56.6 | 1532 | 59.1 | 1644 | 44.1 | 1664 | 30.4 | 2479 | 51.2 |
| 2010/11 | 1145 | 77.3 | 1040 | 58.4 | 1553 | 60.4 | 1718 | 44.9 | 1746 | 29.7 | 2515 | 51.9 |
| 2011/12 | 1165 | 76.6 | 1138 | 53.9 | 1587 | 58.7 | 1788 | 44.1 | 1869 | 29.2 | 2917 | 50.4 |
| 2012/13 | 1424 | 77.0 | 1297 | 48.7 | 1682 | 59.0 | 1859 | 48.4 | 2018 | 30.7 | 2946 | 47.2 |
| 2013/14 | 1446 | 77.2 | 1498 | 40.4 | 1700 | 58.9 | 1933 | 49.1 | 2275 | 31.5 | 3897 | 54.0 |
| 2014/15 | 1497 | 77.6 | 1418 | 44.3 | 1790 | 61.4 | 2053 | 47.5 | 2392 | 30.6 | 4401 | 53.1 |
| 2015/16 | 2047 | 80.4 | 1485 | 44.2 | 1917 | 62.1 | 2437 | 50.6 | 2712 | 34.4 | 4865 | 53.0 |

Sources: Deloitte ARFF (2005–17) | Deloitte ARFF (1999–17) | UEFA financial reports | Football clubs' accounts

Global hierarchy of team-sport leagues based on internet searches and revenues

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 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. 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 US population. (Cf.: data on the countries’ population is reported in Table 3).

Figure 3 Big-5 European leagues vs. Top-5 US leagues comparative status (% w.r.t. total aggregate revenues)



A simple inspection of Table 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 USA 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 US population and the aggregate population of the 28 member states of the European Union.

Table 3 Total US population vs. “Big-5” aggregate population (in Mill.)

| | <i>UK</i> | <i>France</i> | <i>Italy</i> | <i>Spain</i> | <i>Germany</i> | <i>USA</i> | <i>Big-5</i> | <i>EU (28)</i> | | |
|------|----------------|----------------|----------------|----------------|----------------|------------|--------------|----------------|------------------|------------------|
| | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(1)</i> | <i>(2)</i> | <i>(3)</i> | <i>(1) / (2)</i> | <i>(1) / (3)</i> |
| 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 |

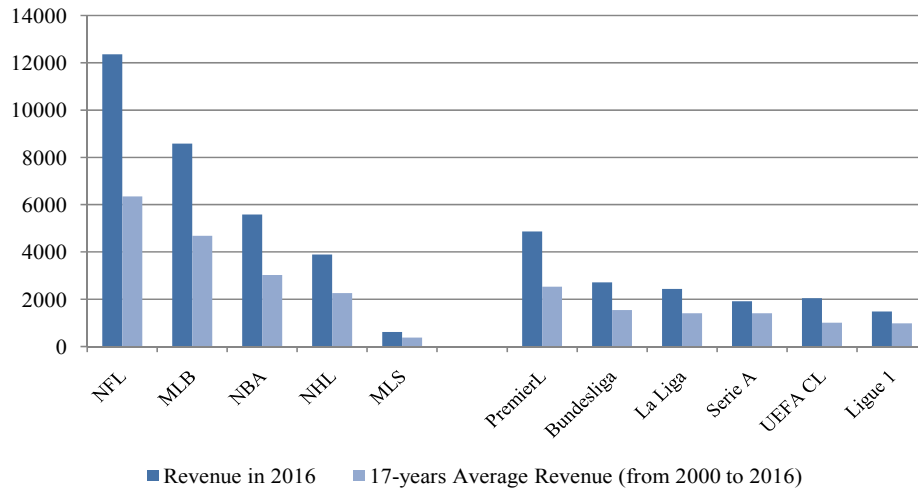
Table 3 Total US population vs. “Big-5” aggregate population (in Mill.) (continued)

| | <i>UK</i> | <i>France</i> | <i>Italy</i> | <i>Spain</i> | <i>Germany</i> | <i>USA</i> | <i>Big-5</i> | <i>EU (28)</i> | | |
|------|----------------|----------------|----------------|----------------|----------------|------------|--------------|----------------|------------------|------------------|
| | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(Mill.)</i> | <i>(1)</i> | <i>(2)</i> | <i>(3)</i> | <i>(1) / (2)</i> | <i>(1) / (3)</i> |
| 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 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.

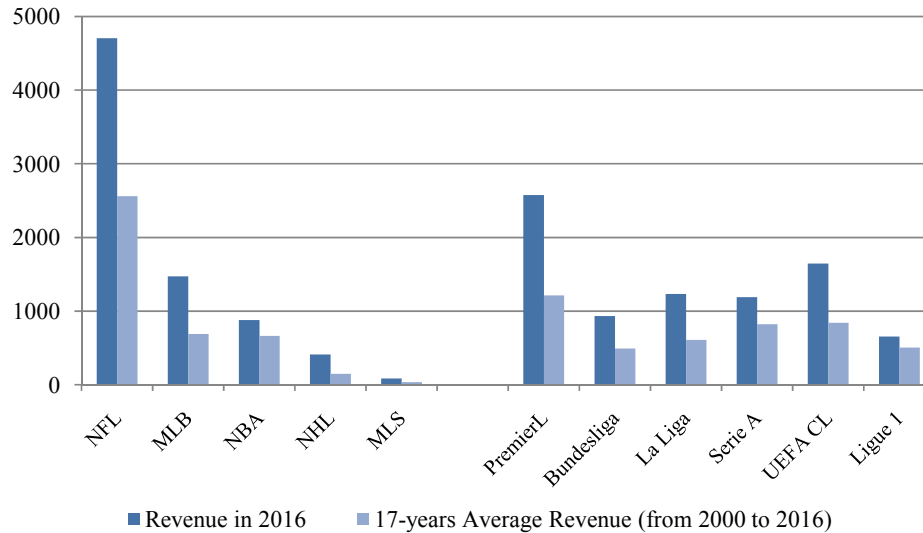
Figure 4 Total revenues (Mill. €) – American and European sport leagues



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.

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 and Solberg, 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 5 also shows that European football has been more efficient overall to generate annual revenues from TV rights, especially in recent times.

Figure 5 TV revenues (Mill. €) – professional sport leagues



There is still need to find the reasons that might explain these financial outcomes. For instance, Szymanski (2003) described the crucial differences in the competition structure characterising the American leagues as compared to the prevailing league structure in Europe. Andreff (2011) provided 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.

3.2 Google Trends Approach – Appraisals based on news and web searches

The development and implementation of new media technologies have contributed to the globalisation 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.

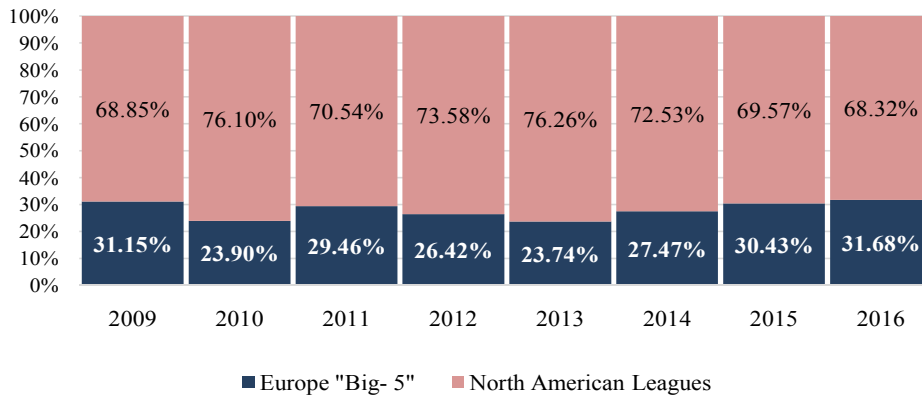
The next analysis examines the degree of the attention attracted by the Top-10 Leagues among sport fans and spectacle consumers. As previously mention, for establishing the hierarchy of team-sport leagues, we rely on the results delivered by the searching tool “Google Trends” as a proxy variable to measure worldwide comparative interest across the leagues. In doing so, we use normalised data of the relative volume of searches in Google, using the name of each league as a keyword for the queries (Choi and Varian, 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 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 US 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 USA implying that comparisons between the two groups can be homogeneously performed.

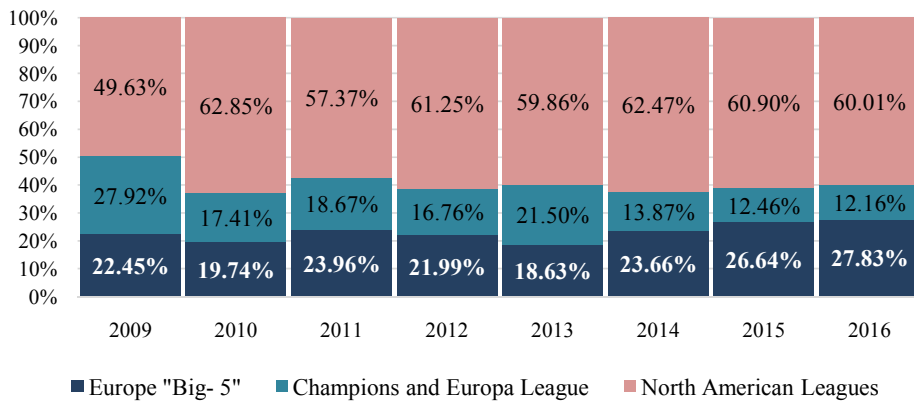
Figure 6 Google Trends News: North American leagues vs. European football leagues



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.

According to the information in Figure 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.

Figure 7 Google Trends News: North American team-sport leagues vs. European football leagues (and UEFA champions league and Europa league)

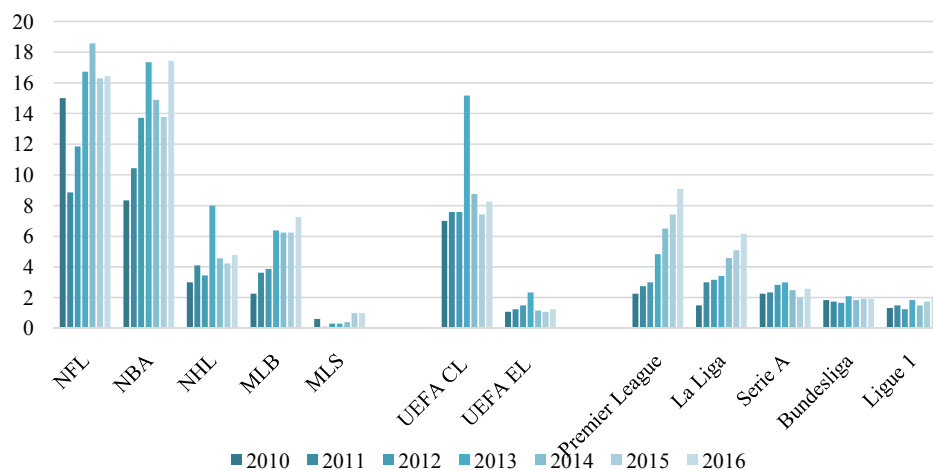


Global hierarchy of team-sport leagues based on internet searches and revenues

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 8 summarises 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 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 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).

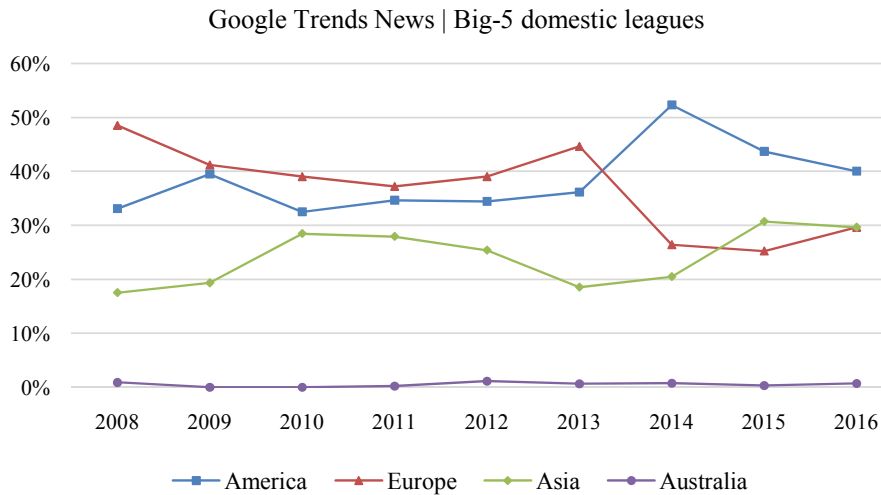
Global hierarchy of team-sport leagues based on internet searches and revenues

Table 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 |

Based on this approach, Figures 10 and 11 show the historic comparative relevance of news and web trends, respectively, by continent of the “Big-5” domestic leagues as a whole.

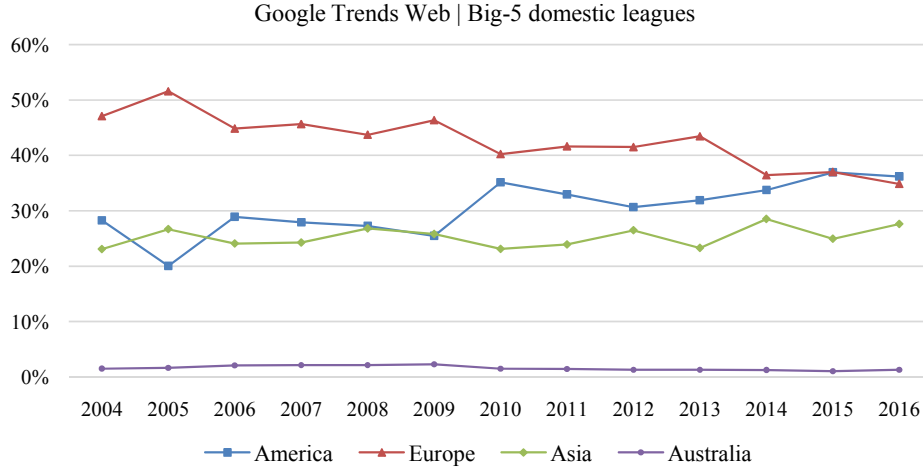
Figure 10 Evolution Google Trends News by continent



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.

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 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, summarised in Table 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 6 Google Trends variation

| | <i>Google Trends News variation (%)</i> | | | | <i>Google Trends Web variation (%)</i> | | |
|-----------|---|----------------------|----------------------|----------------------|--|----------------------|-----------------------|
| | <i>Period</i> | | <i>Period</i> | | <i>Period</i> | | <i>Period</i> |
| | <i>2010 vs. 2008</i> | <i>2014 vs. 2010</i> | <i>2016 vs. 2014</i> | <i>9-year period</i> | <i>2009 vs. 2004</i> | <i>2016 vs. 2009</i> | <i>13-year period</i> |
| 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.

Global hierarchy of team-sport leagues based on internet searches and revenues

Then, Table 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.

Table 7 Google Trends multiplying factor

| | <i>Average Google Trends News</i> | | | | | | <i>Average Google Trends Web</i> | | |
|-----------|-----------------------------------|--------------------------|--------------------------|---------------------------|-----------------------|-----------------------|----------------------------------|--------------------------|---------------------------|
| | <i>Period</i> | | | <i>Multiplying factor</i> | | | <i>Period</i> | | <i>Multiplying factor</i> |
| | <i>2010 vs. 2008 (1)</i> | <i>2014 vs. 2010 (2)</i> | <i>2016 vs. 2014 (3)</i> | <i>Period (2)/(1)</i> | <i>Period (3)/(2)</i> | <i>Period (3)/(1)</i> | <i>2009 vs. 2004 (1)</i> | <i>2016 vs. 2009 (2)</i> | <i>Period (2)/(1)</i> |
| 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 |

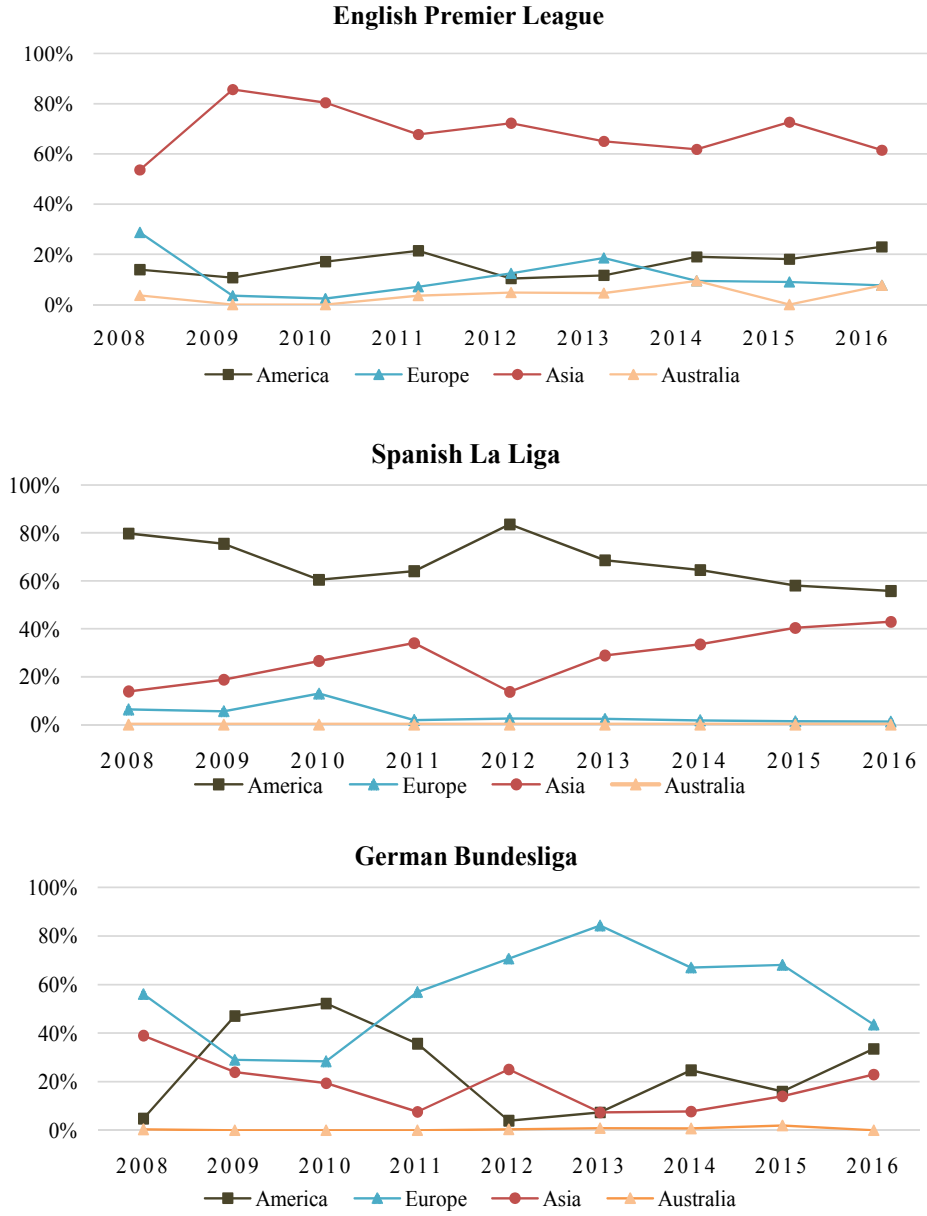
The multiplying factors reveal that the degree of interest of followers in the European continent has relatively decreased over time. Note that this piece of evidence is of course compatible with a growing number of football fans and business size in Europe, since the present analysis is simply focused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

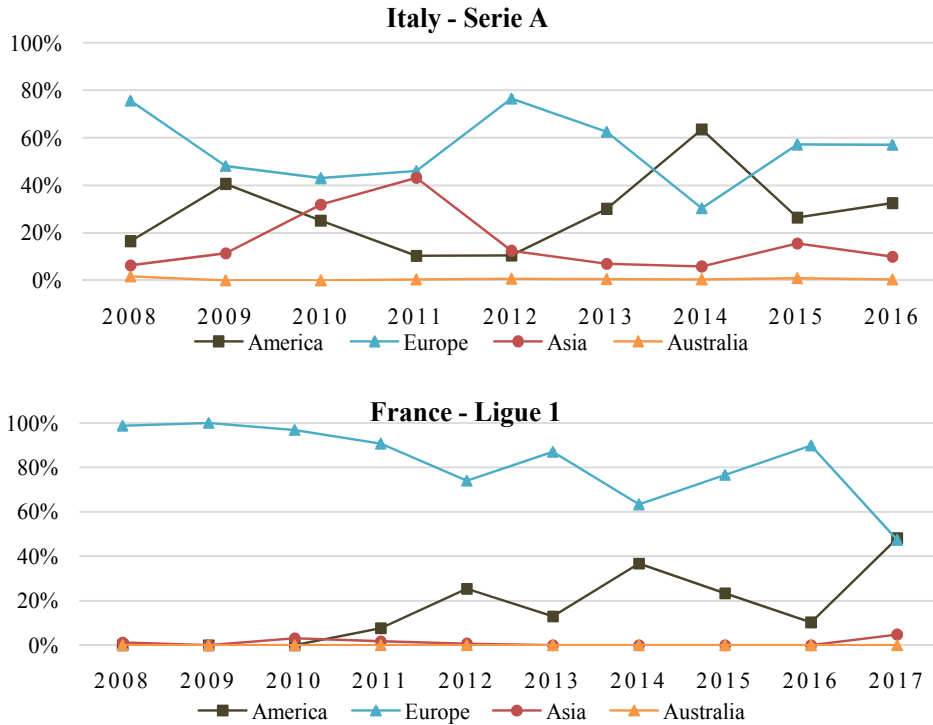
Our approach permits conducting more disaggregated studies by exploring the existence of shifts in the share of interest affecting each domestic football league. Figure 12 shows in relative values the evolution over time of the: Premier League, La Liga, Bundesliga, Serie A, and Ligue 1. The Figure allows making comparisons of the globalisation 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 12 Google Trends News by leagues



Global hierarchy of team-sport leagues based on internet searches and revenues

Figure 12 Google Trends News by leagues (continued)



Finally, we analyse the attention that the Leagues generate in their home country and in close competitor's markets. Table 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 globalised than others.

Table 8 Domestic football leagues ranking

| | <i>Google Trends News</i> | | |
|------------|------------------------------------|------------------------|-----------------------------------|
| | <i>Penetration index 2008–2016</i> | | |
| | <i>Global league ranking</i> | <i>Hometown market</i> | <i>Close competitor's markets</i> |
| 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.

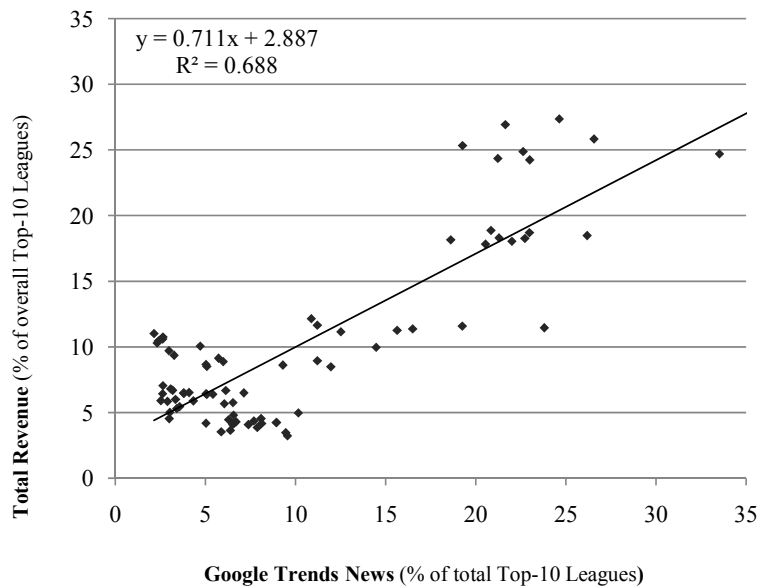
3.3 Empirical relationship between the financial and Google Trends approach

Even if further research is needed, we explore hereafter the possible empirical relationship between the two aforementioned approaches. Nufer et al. (2016) examined the key features of sports marketing for building integral brand status and for managerial purposes. Karanfil (2017) examined teams’ rivalries in European football and finds that they seem the result of factors other than sport performance. Korzynski and Paniagua (2016) argued 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 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 13 Google Trends vs. total revenues for professional sport leagues



Global hierarchy of team-sport leagues based on internet searches and revenues

More detailed models are estimated following in this section; Table 9 summarises the descriptive statistics of the variables on which the regressions will be run, which are organised into two groups to distinguish between the dependent and the explanatory variables introduced into the models.

Table 9 Descriptive statistics of the main explanatory variables

| <i>Dependent variables</i> | <i>Obs.</i> | <i>Mean</i> | <i>Std. Dev.</i> | <i>Min</i> | <i>Max</i> |
|------------------------------|-------------|-------------|------------------|------------|------------|
| 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 |
| <i>Explanatory variables</i> | <i>Obs.</i> | <i>Mean</i> | <i>Std. Dev.</i> | <i>Min</i> | <i>Max</i> |
| % 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 |

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 per cent 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 characterise 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 10 reports the estimations of pooled OLS regression models. 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.

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 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 10 OLS pooled models

| Dependent variable | Total revenue (1) | Total revenue (2) | % Total revenue (3) | % Total revenue (4) | Revenue per capita (5) | Revenue per capita (6) |
|------------------------|----------------------|-----------------------|----------------------|----------------------|------------------------|------------------------|
| Model | | | | | | |
| % Google Trends News | 0.122943 (3.84)*** | | 0.362467 (4.00)*** | | 0.3327988 (3.05)*** | |
| % Google Trends Web | | 0.1262756 (4.82)*** | | 0.4650741 (6.01)*** | | 0.3902879 (4.68)*** |
| American leagues dummy | 1.213773 (2.77)*** | 0.7426203 (2.08)** | 3.766003 (2.95)*** | 2.404751 (2.32)** | -21.94943 (-10.45)*** | -21.31962 (-12.42)*** |
| Champions league dummy | -1.563951 (-3.87)*** | -0.8129739 (-3.80)*** | -4.735861 (-3.93)*** | -3.157887 (-6.73)*** | -30.17103 (-13.39)*** | -25.49315 (-14.31)*** |
| Leader (NBA&PL) dummy | 2.194446 (4.90)*** | 1.587238 (4.21)*** | 6.803316 (6.25)*** | 5.196619 (5.39)*** | 16.61327 (7.06)*** | 13.57869 (6.95)*** |
| Season dummies | yes | yes | no | no | yes | yes |
| Constant | 0.198308 (0.51) | 0.4435329 (1.43) | 3.277501 (7.71)*** | 3.320969 (11.52)*** | 23.00789 (10.73)*** | 22.38489 (12.80)*** |
| R-squared | 0.6801 | 0.6968 | 0.6901 | 0.7456 | 0.8075 | 0.7985 |
| No.Obs. | 88 | 129 | 88 | 129 | 88 | 129 |
| | ey/ex | ey/ex | ey/ex | ey/ex | ey/ex | ey/ex |
| % Google Trends News | 0.382299 | | 0.362466 | | 0.143991 | |
| % Google Trends Web | | 0.437559 | | 0.456416 | | 0.184601 |
| American leagues dummy | 0.188715 | 0.124548 | 0.188300 | 0.114225 | -0.474840 | -0.488071 |
| Champions league dummy | -0.048632 | -0.028704 | -0.047358 | 0.031578 | -0.130540 | -0.122866 |
| Leader (NBA&PL) dummy | 0.136475 | 0.112085 | 0.136066 | 0.103932 | 0.143760 | 0.130887 |

Note: (t-statistic) in parenthesis | statistical significance: *** p-value < 0.01, ** p-value < 0.05, * p-value < 0.10.

Global hierarchy of team-sport leagues based on internet searches and revenues

Table 11 OLS pooled models

| Dependent variable | TV revenue (7) | TV revenue (8) | % TV revenue (9) | % TV revenue (10) | TV revenue per capita (11) | TV revenue per capita (12) |
|------------------------|-----------------------|-----------------------|----------------------|----------------------|-------------------------------|-------------------------------|
| Model | | | | | | |
| % Google Trends News | 0.0440797 (4.37)*** | | 0.4150835 (5.97)*** | | 0.1138665 (2.32)** | |
| % Google Trends Web | | 0.0476435 (6.70)*** | | 0.5076429 (8.32)*** | | 0.1446063 (3.54)*** |
| American leagues dummy | -0.3015601 (-3.11)*** | -0.4115089 (-5.48)*** | -3.129577 (-4.32)*** | -4.336314 (-7.73)*** | -13.48909 (-13.11)*** | -12.62374 (-14.79)*** |
| Champions league dummy | -0.1228704 (-0.87) | 0.0726441 (1.21) | -1.420297 (-1.30) | 0.433659 (0.79) | -12.96041 (-10.92)*** | -10.9084 (-11.93)*** |
| Leader (NBA&PL) dummy | 1.379904 (6.46)*** | 1.088657 (6.40)*** | 12.29501 (8.37)*** | 10.9783 (8.36)*** | 9.806224 (6.64)*** | 7.954496 (6.31)*** |
| Season dummies | yes | yes | no | no | yes | yes |
| Constant | 0.2051025 (1.38) | 0.2651159 (2.26)** | 4.633621 (9.56)*** | 4.501205 (10.54)*** | 11.22589 (9.58)*** | 10.72525 (11.31)*** |
| R-squared | 0.7542 | 0.7479 | 0.8085 | 0.8046 | 0.8175 | 0.7963 |
| No. Obs. | 88 | 129 | 88 | 129 | 88 | 129 |
| | ey/ex | ey/ex | ey/ex | ey/ex | ey/ex | ey/ex |
| % Google Trends News | 0.408751 | | 0.415083 | | 0.118013 | |
| % Google Trends Web | | 0.492372 | | 0.498192 | | 0.165516 |
| American leagues dummy | -0.139818 | -0.205836 | -0.156478 | -0.205974 | -0.699019 | -0.699351 |
| Champions league dummy | -0.011393 | 0.007649 | -0.014203 | 0.004336 | -0.134324 | -0.127225 |
| Leader (NBA&PL) dummy | 0.255917 | 0.229282 | 0.245900 | 0.219566 | 0.203267 | 0.185548 |

Note: (t-statistic) in parenthesis | statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10.

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 12 and suggest that the random effects model must be preferred since their estimators are more efficient and also consistent. (With the exception of the Model (3), for whom the probability of mistake if rejecting the null hypothesis is too little).

Table 12 Hausman test – fixed effects (FE) vs. random effects (RE) models

| <i>RE vs. FE model for % Google Trends News</i> | <i>Model</i> | <i>Chi-square</i> | <i>P-value Prob>chi2</i> | <i>Preferred model (consistent vs. inconsistent)</i> |
|---|--------------|-------------------|---------------------------------|--|
| 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 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.

Global hierarchy of team-sport leagues based on internet searches and revenues

Table 13 Random effects GLS regression

| Dependent variable | Total revenue (1) | % Total revenue (3) | Revenue per capita (5) | TV revenue (7) | % TV revenue (9) | TV revenue per capita (11) |
|------------------------|----------------------|------------------------|---------------------------|--------------------|---------------------|-------------------------------|
| Model | | | | | | |
| % Google Trends News | 0.048396 (1.47) | 0.000802 (0.03) | 0.601618 (3.71)*** | 0.026669 (2.00)** | 0.140180 (2.26)** | 0.333439 (3.35)*** |
| American leagues dummy | 1.767291 (1.74)* | 6.451412 (2.09)** | -23.945450 (-4.58)*** | -0.172286 (-0.60) | -1.088386 (-0.44) | -15.119450 (-5.61)*** |
| Champions league dummy | -0.632753 (-0.36) | -0.218129 (-0.04) | -33.528980 (-3.67)*** | 0.094609 (0.19) | 2.013651 (0.46) | -15.703200 (-3.34)*** |
| Leader (NBA&PL) dummy | 2.867239 (2.26)** | 10.067390 (2.61)*** | 14.187140 (2.17)** | 1.537034 (4.31)*** | 14.776050 (4.76)*** | 7.824548 (2.33)*** |
| Season dummies | yes | no | yes | yes | no | yes |
| Constant | 0.417424 (0.54) | 4.340547 (1.88)* | 22.217740 (5.58)*** | 0.256276 (1.13) | 5.441648 (2.95)*** | 10.580500 (5.11)*** |
| 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] |
| No. Obs. | 88 | 88 | 88 | 88 | 88 | 88 |

Note: (z-statistic) in parenthesis | statistical significance: *** p-value < 0.01; ** p-value < 0.05; * p-value < 0.10.

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.

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.

4.2 Managerial implications

The findings of this paper are potentially relevant to identify new business ventures in international markets and also 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”.

Global hierarchy of team-sport leagues based on internet searches and revenues

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 globalisation across the “Big-5” domestic football leagues. We found that Premier League and La Liga are the most globalised leagues; follow by Bundesliga and Serie A with a similar level of globalisation, 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.

4.3 Policy implications


A number of 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.

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 globalisation 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.

References

- Aguiar-Noury, A. and Garcia-del-Barrio, P. (2019) 'Global brands in soccer: identifying low-risk projects and business opportunities', *Journal of Entrepreneurship and Public Policy*, Vol. 8, No. 1, pp.62–83.
- Ahonen, A. (2019) 'Entrepreneurial growth in elite team sport SME's in Finland', *Journal of Entrepreneurship and Public Policy*, Vol.8, No. 1, pp.22–39.
- Anagnostopoulos, C., Parganas, P., Chadwick, S. and Fenton, A. (2018) 'Branding in pictures: using Instagram as a brand management tool in professional team sport organisations' *European Sport Management Quarterly*, Vol. 18, No. 4, pp.413–438.
- Andreff, W. (2011) 'Some comparative economics of the organization of sports: competition and regulation in North American vs. European professional team sports leagues', *European Journal of Comparative Economics*, Vol. 8, pp.3–27.
- Araújo, N., de Carlos, P. and Fraiz, J.A. (2014) 'Top European football clubs and social networks: a true 2.0 relationship?', *Sport, Business and Management: An International Journal*, Vol. 4, No. 3, pp.250–264.
- Baier-Fuentes, H., Hormiga, E., Miravittles, P. and Blanco-Mesa, F. (2019) 'International entrepreneurship: a critical review of the research field', *European Journal of International Management*, Vol.13, No. 3, pp.381–412.
- Barajas, A. and Rodriguez, P. (2014) 'Spanish football in need of financial therapy: cut expenses and inject capital', *International Journal of Sport Finance*, Vol. 9, No. 1. Available online at: <https://ssrn.com/abstract=2389293> (accessed on October 2017). [AQ3] 
- Biscaia, R., Correia, A., Rosado, A.F., Ross, S.D. and Maroco, J. (2013) 'Sport sponsorship: the relationship between team loyalty, sponsorship awareness, attitude toward the sponsor, and purchase intentions', *Journal of Sport Management*, Vol. 27, No. 4, pp.288–302.
- Bjärsholm, D. (2017) 'Sport and social entrepreneurship: a review of a concept in progress', *Journal of Sport Management*, Vol. 31, No. 2, pp.191–206.
- Boyle, R. and Haynes, R. (2009) *Power Play: Sport, the Media and Popular Culture*, Edinburgh University Press, Edinburgh.
- Choi, H. and Varian, H. (2012) 'Predicting the present with Google trends', *Economic Record*, Vol. 88, pp.2–9.

AQ3: References flagged with AQ3 are not cited in the text. Please provide citation in the text or delete the publication details from the reference list if not required.

Global hierarchy of team-sport leagues based on internet searches and revenues

- Corthouts, J., Denys, A., Thibaut, E. and Scheerder, J. (2019) 'Like it or not? The differences between and success factors of sports providers' use of social networking sites', *International Journal of Sport Management and Marketing*, Vol.19 Nos.1/2, pp.56–79.
- Crespo, N.F. and Aurélio, D. (2020) 'Between domestic and international new ventures: the relevance of entrepreneurs' and firms' characteristics', *European Journal of International Management*, Vol.14, No. 1, pp.28–54.
- Deloitte ARFF (2005–2017) *Deloitte annual review of football finance*, Deloitte's Sports Business Group.
- Deloitte FML (1999–2017) *Football money league*, Deloitte's Sports Business Group.
- Evans, D.M. and Smith, A.C.T. (2004) 'The Internet and competitive advantage: a study of Australia's four premier professional sporting leagues', *Sport Management Review*, Vol. 7, No. 1, pp.27–56.
- Ferreira, M.P., Serra, F.A.R. and Reis, N.R. (2011) 'On the adaptation of the firm's strategies to the international business environment: a knowledge-based and evolutionary perspective', *European Journal of International Management*, Vol. 5, No. 6, pp.633–655.
- Fleischmann, A.C. and Fleischmann, M. (2019) 'International orientation of professional football beyond Europe: a digital perspective on the global reach of English, German and Spanish clubs', *Sport, Business and Management: An International Journal*, Vol. 9, No. 1, pp.97–114.
- Frank, R. and Cook, P. (1995) *The Winner-Take-All Society: How More and More Americans Compete for Ever Fewer and Bigger Prizes, Encouraging Economic Waste, Income Inequality, and an Impoverished Cultural Life*, Free Press, New York.
- Garcia-del-Barrio, P. and Pujol, F. (2007) 'Hidden monopsony rents in winner-take-all markets', *Managerial and Decision Economics*, Vol. 28, pp.57–70.
- Garcia-del-Barrio, P. and Szymanski, S. (2009) 'Goal! Profit maximization and win maximization in football leagues', *Review of Industrial Organization*, Vol. 34, No. 1, pp.45–68.
- Giroux, M., Pons, F. and Richelieu, A. (2013) 'Internationalisation of sports teams brands: the consumers' perspective', *International Journal of Business and Globalisation*, Vol. 11, No. 1, pp.1–18.
- Hammervold, R. and Solberg, H.A. (2006) 'TV sports programs – Who is willing to pay to watch?', *Journal of Media Economics*, Vol. 19, No. 3, pp.147–162.
- Hill, J.S. and Vincent, J. (2006) 'Globalisation and sports branding: the case of Manchester United', *International Journal of Sports Marketing and Sponsorship*, Vol. 7, No. 3, pp.61–78.
- Hoehn, T. and Szymanski, S. (1999) 'The Americanization of European football', *Economic Policy*, Vol. 14, No. 28, pp.204–240.
- Kahane, L.H. (2006) 'The economics of the National Hockey League: the 2004–05 lockout and the beginning of a new era', in Rodríguez, P. et al. (Eds): *Sports Economics after Fifty Years: Essays in Honour of Simon Rottenberg*, Ediciones de la Universidad de Oviedo, Oviedo, pp.107–124. [AQ3]
- Karanfil, F. (2017) 'An empirical analysis of European football rivalries based on on-field performances', *Sport Management Review*, Vol. 20, No. 5, pp.468–482.
- Késenne, S. (1996) 'League management in professional team sports with win maximizing clubs', *European Journal for Sport Management*, Vol. 2, No. 2, pp.14–22.
- Korzynski, P. and Paniagua, J. (2016) 'Score a tweet and post a goal: social media recipes for sports stars', *Business Horizons*, Vol. 59, No. 2, pp.185–192.
- Kraus, S., Niemand, T., Besler, M., Stieg, P. and Martinez-Ciment, C. (2018) 'The influence of leadership styles on the internationalisation of 'born-global' firms and traditionally globalexpanding firms', *European Journal of International Management*, Vol. 12, Nos.5/6, pp.554–575.

- Lin, W.T. and Liu, Y. (2011) 'The impact of CEO succession on top management teams and the degree of firm internationalisation', *European Journal of International Management*, Vol. 5, No. 3, pp.253–270.
- Maderer, D., Parganas, P. and Anagnostopoulos, C. (2018) 'Brand-image communication through social media: the case of European professional football clubs', *International Journal of Sport Communication*, Vol. 11, No. 3, pp.319–338.
- Marques, T., Nobre, H. and Gordon, D. (2018) 'Sports fan relationships with soccer teams', *International Journal of Digital Culture and Electronic Tourism*, Vol. 2, No. 3, pp.213–223.
- Meng, M.D., Stavros, C. and Westberg, K. (2015) 'Engaging fans through social media: implications for team identification' *Sport, Business and Management: an international journal*, Vol. 5, No. 3, pp.199–217.
- Miragaia, D., Ferreira, J. and Ratten, V. (2017) 'Sport event sponsorship and policy: a social entrepreneurship and corporate social responsibility perspective', *International Journal of Sport Policy and Politics*, Vol. 29, No. 4, pp.613–623.
- Nicholson, M., Smith, A.C., Stewart, B. and Hoye, R. (2018) *Sport Management: Principles and Applications*, 5th ed., Routledge.
- Nufer, G., Bühler, A. and Chadwick, S. (2016) 'Branding in sports', in Dall'Olmo, F. et al. (Eds): *The Routledge Companion to Contemporary Brand Management*, Routledge, London, pp.536–551.
- Pérez, L., Puente, V. and Rodríguez, P. (2015) 'Are broadcast sporting events of "general interest"? A regional panel data analysis of TV ratings for Spain's La Liga', *Journal of Media Economics*, Vol. 28, No. 1, pp.7–19.
- Peterson, T. and Schenker, K. (2018) 'Social entrepreneurship in a sport policy context', *Sport in Society*, Vol. 21, No. 3, pp.452–467.
- Phua, J.J. (2010) 'Sports fans and media use: Influence on sports fan identification and collective self-esteem', *International Journal of Sport Communication*, Vol. 3, No. 2, pp.190–206.
- Ratten, V. (2011) 'Practical implications and future research directions for international sports management', *Thunderbird International Business Review*, Vol. 53, No. 6, pp.763–770.
- Ratten, V. (2017) 'Entrepreneurial sport policy', *International Journal of Sport Policy and Politics*, Vol. 9, No. 4, pp.641–648.
- Ratten, V. (2019a) 'Sport entrepreneurship and public policy: future trends and research developments', *Journal of Entrepreneurship and Public Policy*. Doi: 10.1108/JEPP-D-18-00099.
- Ratten, V. (2019b) *Sports Technology and Innovation. Assessing Cultural and Social Factors*, Palgrave Macmillan. Doi: 10.1007/978-3-319-75046-0.
- Ratten, V. (2020) 'Entrepreneurship in sport policy: a new approach', in Ratten, V. (Ed.): *Sport Entrepreneurship and Public Policy Contributions to Management Science*, Springer, Cham. Doi: 10.1007/978-3-030-29458-8.
- Ratten, V. and Ratten, H. (2011) 'International sport marketing: practical and future research implications', *Journal of Business and Industrial Marketing*, Vol. 26, No. 8, pp.614–620.
- Ratten, V. and Tajeddini, K. (2019) 'Entrepreneurship and sport business research: synthesis and lessons: introduction to the special journal issue', *International Journal of Sport Management and Marketing*, Vol. 19, Nos.1/2, pp.1–7.
- Richelieu, A. (2008) 'The internationalisation of a sports team brand: the case of European soccer teams', *International Journal of Sports Marketing and Sponsorship*, Vol. 10, No. 1, pp.23–38.
- Richelieu, A. and Desbordes, M. (2009) 'Football teams going international – the strategic leverage of branding', *Journal of sponsorship*, Vol. 3, No. 1, pp.10–22.
- Rohde, M. and Breuer, C. (2017) 'The market for football club investors: a review of theory and empirical evidence from professional European football', *European Sport Management Quarterly*, Vol. 17, No. 3, pp.265–289.

Global hierarchy of team-sport leagues based on internet searches and revenues

- Santomier, J. and Shuart, J. (2008) ‘Sports new media’, *International Journal of Sport Management and Marketing*, Vol. 4, No. 1, pp.85–101.
- Sloane, P. (1971) ‘The economics of professional football: the football club as utility maximiser’, *Scottish Journal of Political Economy*, Vol. 17, pp.121–146.
- Szymanski, S. (2003) ‘The economic design of sporting contests’, *Journal of Economic Literature*, Vol. 41, pp.1137–1187.
- Szymanski, S. and Smith, R. (1997) ‘The English football industry: profit, performance and industrial structure’, *International Review of Applied Economics*, Vol. 11, No. 1, pp.135–153.
- Vosen, S. and Schmidt, T. (2011) ‘Forecasting private consumption: survey-based indicators vs. Google trends’, *Journal of Forecasting*, Vol. 30, No. 6, pp.565–578.

AQ4: Please check this notes, there is no any footnote link in this paper.

Notes AQ4

- 1 For consistency, in this article we use “football” rather than “soccer”. Then, to avoid ambiguities, “American” football is always explicitly indicated as a different sport.
- 2 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.

Appendix

Appendix: Exchange rates used 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 |