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Alejandro Fernández-Roldán Díaz and Carlos Santiago-Caballero

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The study of competitive balance in sports has received considerable attention in the academic literature, mainly as a consequence of the effect that it could have on the interest of society in the competitions analyzed. However, most of the studies have focused on the total competitive balance, without taking into account the methodological importance of decomposing it. This paper analyzes competitive balance in the Spanish, English, Italian and German football leagues between 1975 and 2016, and the internal dynamics behind the changes experienced. Our results show a considerable decrease in the total competitive balance in recent decades, although the dynamics behind the increases in inequality are different in the four leagues. Focusing on Rawlsian principles, our analysis shows that the Spanish competition is the only league in which the promoted teams do not have a higher probability of being relegated, and therefore, the competition in which incumbent teams suffer lower entry barriers and have higher chances of survival.

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Football is a simple game. Twenty-two men chase a ball
for 90 minutes and at the end, the Germans always win.

Gary Lineker

Introduction

According to part of the literature on sports economics, there is no worse enemy for the
future of a sport than the lack of competition. In his 1964 seminal work, Neale presented
the extreme case of a heavyweight boxer in his Louis-Schmelling Paradox. The argument
was simple: In a sport in which income is derived and is an increasing function of
competition, in the absence of strong adversaries that could face him, Joe Louis would
have no fights and therefore no income (Neale, 1964: 2). Following Neal, Schmidt and
Berry (2001), showed a connection between the level of competition in a Major Baseball
League and attendance, and highlighted the importance of a fair balance between the teams
in competition to guarantee its success. More recently and focusing on football, Forrest and
Simmons (2002) and Dobson and Goddard (2011) suggested that an increase in
competitive balance in the sport would boost attendance and television audience.

Following the economic consequences of competitive balance, El-Hodiri and Quirk (1971)
argued that the maximization of success in a competition could compromise increasing
profits. For them, the uncertainty of the result is one of the most important factors that
explains the high interest of the general public in some sport competitions. A competition
in which the outcome can be easily predicted will, over the long term, result in a reduction
in the interest of the public, which could produce an economic downfall. Similarly,
Vrooman (1995) Hausman and Leonard (1997) and Késenne (2000) followed the steps of
El-Hodiri and Quirk in the development of the models to study competitive balance.

On these grounds, football should therefore be grateful to see that Gary Lineker's comment concerning the domination of Germany (or any other team) on the international battleground did not materialize, or at least, last for very long. However, the increasing economic inequalities between football teams within the major European leagues has raised concerns with respect to their impact on competitive balance. In any case, the connection between revenue sharing and competitive balance needs to be clarified. While Szymanski (2001) showed that increasing economic inequality in the Premier League did not increase inequality within the competition, Késenne (2000) showed that revenue sharing would have a positive impact on competitive balance only if the most powerful clubs are focused on profit maximization. In more recent years, the effects of different methods of revenue sharing on competitive balance have been widely studied by the literature with the works of Szymanski (2003), Budzinski (2012), Müller, Lammert and Hovemann (2012), Franck (2014), Peeters and Szymanski (2014), Preuss, Haugen and Schubert (2014) and Szymanski (2014).

But has competitive balance in European football actually decreased in recent times? Michie and Oughton (2004) suggested a decrease in competitive balance in the main football leagues in England, Italy and Germany in the recent decade, while on the other hand, others such as Goossens (2006) or Gasparetto and Barajas (2016) did not find a general increase in inequality between teams in the major European football leagues. Part of the explanation for the lack of consensus is probably the different ways in which the academic literature has estimated competitive balance. The Analysis of Competitive Balance (ACB) line of literature has focused on how competitive balance changes over time, measured as the total differences between teams in a given season, and has been defended by authors such as Fort and Maxcy (2003) as a reliable measurement.

However, analysing global changes in inequality between teams does not explain why the changes took place or propose measures that should be taken to reverse them if they are considered negative. For example, the total competitive balance could decrease because the front runners improve, because the underdogs' performance worsens, because both things happen at the same time or simply because changes take place in the middle of the distribution not affecting the tails. Analyses of different competitions in which the absolute levels of competitive balance are compared do not tell us much about the reasons behind the changes and whether or not they are similar among leagues. In fact, following the same line of reasoning, recent studies in economic inequality have highlighted the importance of going beyond an analysis of total inequality, decomposing its changes and effects between groups. For instance, van der Weide and Milanovic (2014) showed different dynamics in inequality and its effects on income if the sample of individuals analyzed is divided, showing that increasing inequality within the poorest 40 per cent was negative for the incomes of the poor, but good for the incomes of the rich. We therefore believe that competitive balance should be calculated not just as a global measure, but should also be decomposed to better understand the different dynamics of the changes over time that could be hidden by a global average. This approach is key for policy making recommendations to reverse undesirable outcomes.

In addition to the previous concerns about absolute measurements, authors such as Zimbalist (2002) have concluded that the key issue when choosing the right measurement of competitive balance is its ability to capture whether a lack of competition could have an effect on the interest of the fans. This line of literature is known as the uncertainty of outcome hypothesis (UOH). Zimbalist concluded that we cannot apply the same methodology for measuring competitive balance to all sports or competitions, as it heavily

depends on factors such as the way they are organized. He argued that in competitions like the major European football leagues, which are based on relegation systems, high inequality between teams may not be negative and could even be tolerated by smaller teams if they feel that the results are fair (Zimbalist, 2002: 119). Nalbantis, Pawlowski and Coates (2015) for instance suggested that the fans that view a football game as more suspenseful are also more willing to pay higher prices. If that is the case, then the study of the total inequality between teams may not be the best approach to estimate competitive balance. A key point to define here is what the smaller teams would understand as "fair" competition.

This paper will try to shed some light on the issues presented above. The first part of the paper will present the methodology and data used to estimate competitive balance in European football, taking into account both the ACB and UOH literature. We will do so by explaining how the decomposition of competitive balance and the analysis of the chances of weak teams to succeed can help us to identify the leagues that are more competitive. The second section of the paper will study the evolution of competitive balance in the four major European football leagues, the Spanish "La Liga", the English "Premier League", the German "Bundesliga" and the Italian "Serie A", between 1975 and 2016. In addition to analyzing the long-term changes in inequality levels, we will also identify the reasons behind the changes and the differences between leagues by decomposing the inequality levels using the statistical properties of the generalized entropy indexes.

In an attempt to measure the possibility of success that incumbent teams have in each competition, we will estimate the probabilities that promoted teams had to be relegated in each one of the leagues using binary statistical models. In our opinion, combined with the study of the decomposition of the traditional competitiveness measurements, this

methodology will allow us to obtain a better idea of the evolution of competitive balance in European football over the last decades. The following section of the paper will discuss the results and try to offer an explanation of the different trends observed in the major European football leagues, and the final section will conclude.

Sources and Methodology

We first decided to measure competitive balance by estimating the inequality levels within the leagues, following the same empirical strategy used for its estimation in the economic literature and related to the ACB literature. Therefore, we decided to measure competitive balance by analyzing the dispersion of the percentage of points achieved by each team in each season and comparing them over time. For that purpose, we gathered information on the final classifications for all the seasons between 1975 and 2016 in the Spanish, English, German and Italian football leagues. Given that the number of teams in the different leagues and years changed, we standardized the classifications by dividing the points obtained by each team by the average for that season. This has been a common approach in the literature as Szymanski and Kuypers (1999), Goosens (2006) or Curran, Jennings and Sedgwick (2009) show.

As Owen, Ryan and Weatherston (2007) explained, we should take into account that the number of teams in a competition could have an effect on the estimation of competitive balance. However, in our case, the differences between the four leagues are small, with the number of teams always approximately twenty, with the only exception being the second half of the seventies, when the numbers were slightly lower in Italy.

To estimate the inequality levels, we relied on traditional measurements like the Gini coefficient. Although we also present information about the analysis of the percentiles, the Gini coefficient allows us to take into account the whole distribution, while percentile measures tend to omit the analysis of the values in the middle. Equation 1 shows the specification of the Gini coefficient that we used in the paper.

$$G = 1 - \sum_{K=1}^{n-1} (X_{k+1} - X_k)(Y_{k+1} - Y_k) \tag{1}$$

where Y_k represents the cumulative proportion of the points, X_k the cumulative proportion of the number of teams and n the total number of teams each year.

However, although the Gini coefficient offers us a good proxy to study the evolution of total inequality over the long term, the global results could be influenced by movements in different parts of the distribution that do not have to be common to all the competitions. For that reason, we also study the changes in the distribution by analyzing the probability density functions using Kernel estimations. We complete the study with the use of generalized entropy indexes to analyze the dynamics behind the changes and to study the results in different groups of teams that could have different objectives. Although authors like Peel and Thomas (1992), Buraimo and Simmons (2008) and Czarnitzki and Stadtmann (2002) used the Theil index to measure competitive balance, they did not take advantage of the possibilities of decomposing it. Among the different possible specifications of the Theil index, we decided to use the Theil's L index, which is the most common in the literature (Mora-Sitja, 2006). Equation 2 shows the specification of the Theil's L index that uses the mean log deviation.

$$I_O = \frac{1}{N} \sum_{i=1}^{n} ln\left(\frac{\bar{y}}{y_i}\right)$$

(2)

where N is the total number of teams each year, y_i is the number of points of each team and $\bar{y}$ is the average number of points.

As previously explained, one of the advantages of the generalized entropy indexes is the possibility of decomposing them. In our case, we divided the sample of teams in each league and season depending on the position that they occupied in the final classification. Although we used different specifications, in the paper, we present the results using three groups: those teams in the first quartile, those in the second, and finally, a third group including the teams in the third and fourth quartiles.[1] We will therefore be able to study not only the changes in total inequality, but also the changes between and within each one of the groups, which could help us to understand if teams with different goals are able to compete against their peers within their "own leagues". The Theil index can then be decomposed into within- and between-group inequality. Within-group inequality calculates the inequality within the three groups described above, while between-group inequality estimates inequality between the groups. In other words, total inequality could increase because the distance between the teams in one group increases with respect to the other groups (between) or because the differences between the teams within one specific group increase (within). Equation 3 shows the estimation of the Theil index decomposed.

$$I_0 = \sum_{k=1}^{n} \left(\frac{n_k}{N}\right) I_0^k + \sum_{k=1}^{n} \frac{n_k}{N} ln\left(\frac{\frac{n_k}{N}}{\frac{y_k}{\bar{y}}}\right)$$

(3)

where

$$I_0^k = \frac{1}{N} \sum_{i=1}^{N} \ln \left(\frac{\bar{y}}{y_i} \right) \tag{4}$$

The first term shows the estimation of within-group inequality and calculates the inequality within each one of the groups that we defined. It is calculated as the weighted average of the Theil Indexes within each group (I_0^k) estimated following the proper adaptation of equation 2. The second term, on the other hand, estimates between-group inequality.

As previously explained, the dominance of stronger teams may not have a negative impact on the interest of the fans (focus of the UOH literature) as long as the competition is seen as a fair one.[2] But what makes a competition fair? We believe that the key is making sure that all the teams have a reasonable chance of achieving their main goals, taking into account that they are not the same. While the objective of the most powerful teams could be winning the competition, the purpose for most of the teams may simply consist of not being relegated. After analyzing the evolution of competitive balance and its sources, we decided to further develop Zimbalist's argument on the fairness of a competition by taking a Rawlsian approach, studying the chance that the incumbent teams have to accomplish their goals. Buraimo and Simmons (2008) suggested that fans in the Premier League did not want the matches of their team to be more equal, but to be won. In the same way, the incumbent teams will not care much about whether the league is globally more or less equal, as their chances of winning it are rather small, but about surviving in the major league and not being relegated.

For that reason, we decided to estimate how hard it was for promoted teams to maintain their position avoiding being relegated, in an attempt to measure the most important issue for the fans of a large number of teams, and at the same time, the chances to compete of

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the weakest teams. Our approach to measure the chances of the weakest teams in the competition will be the estimation of upper mobility of teams from the lower league. The organization of the major football leagues in Europe is based on a system where a number of teams are relegated and substituted by teams promoted from the lower league. Following principles of industrial economics, every season the football market in the major league suffers the arrival of new incumbents who fight with the established teams in order to survive. The ability of the incumbents to compete and the capacity of established firms to impose entry barriers is a well-studied issue in industrial economics since the seminal work by Caves & Porter (1977), and in the case of the major football leagues would also determine the outcome of the relegation system. If established teams are able to exert a dominant position, incumbents will not be able to compete, will suffer relegation, and the market will be characterized by a low mobility.

Although there could be some exceptions, in general, the average position of recently promoted teams is weaker than that enjoyed by established teams in the major league. First, on average, recently promoted teams arrive to the new competition in a weaker economic position, given that they still have not benefited from the income derived from their new status. Secondly, they are also penalized when they have to hire, as teams with a long record of permanence are more attractive to players and also have more time to negotiate with the security of remaining in the top league, while many of the teams that will promote are still competing in the lower leagues in order to do so. Finally, there are also unobservable variables that cannot be measured, but that can be proxied by the status of recently promoted, for instance, influence in the media, sport institutions, etc. that require a long and sustained permanence in the top league in order to be consolidated. The

intensity of these advantages that established teams enjoy over incumbents will determine the level of entry barriers and the mobility of the market. [3]

We decided to study all the seasons of the 2010s, as they are the ones that we identified as the years of the great divergence in European football between the strong and weak teams and when we should observe more clearly the existence of entry barriers. Because the variable that we are trying to explain is binary (relegated or not), we used binary econometric estimations such as the probit and logit models for our specification strategy. Equation 4 defines the probit model, where we estimate the probability of being relegated (Y=1) when the team has been promoted that same year (X=1). The model estimates the parameter β using a normal distribution of errors as shown in equation 5.

$$\Pr(Y = 1 \mid x) = \ \phi(x\beta) \tag{5}$$

Apart from the coefficients estimated by both models, which give us information about whether the independent variables affect the dependent variable, we also calculated the marginal effects in order to estimate the changes in the probability of being relegated when the team had been recently promoted. Because the independent variable is also binary (promoted or not), the interpretation of the marginal effects will show us the increase in the probability of being relegated if the team has been promoted that year and an estimation of the entry barriers faced by promoted teams.

Results

The Evolution of Competitive Balance 1975-2016

High inequality in a football league reveals a lack of competitiveness and also, as explained above, a more hostile environment for smaller teams. Figure 1 shows the evolution of inequality measured by the Gini coefficient in the share of points within the four major European football leagues between 1975 and 2015. The results show that the Spanish league has always been the most egalitarian competition, while the Italian Series A has maintained inequality levels that are considerably higher than any of the other three competitions during the whole period. The German and English leagues remained in the middle, although while the Bundesliga was more unequal during the first years, the Premier League increased in inequality very rapidly to become the most unequal competition at the turn of the century. We also observe a common increase in inequality in Spain, Germany and England which took place beginning around 1995, and quickly converged and even surpassed the high levels already present in Italy by 2005.
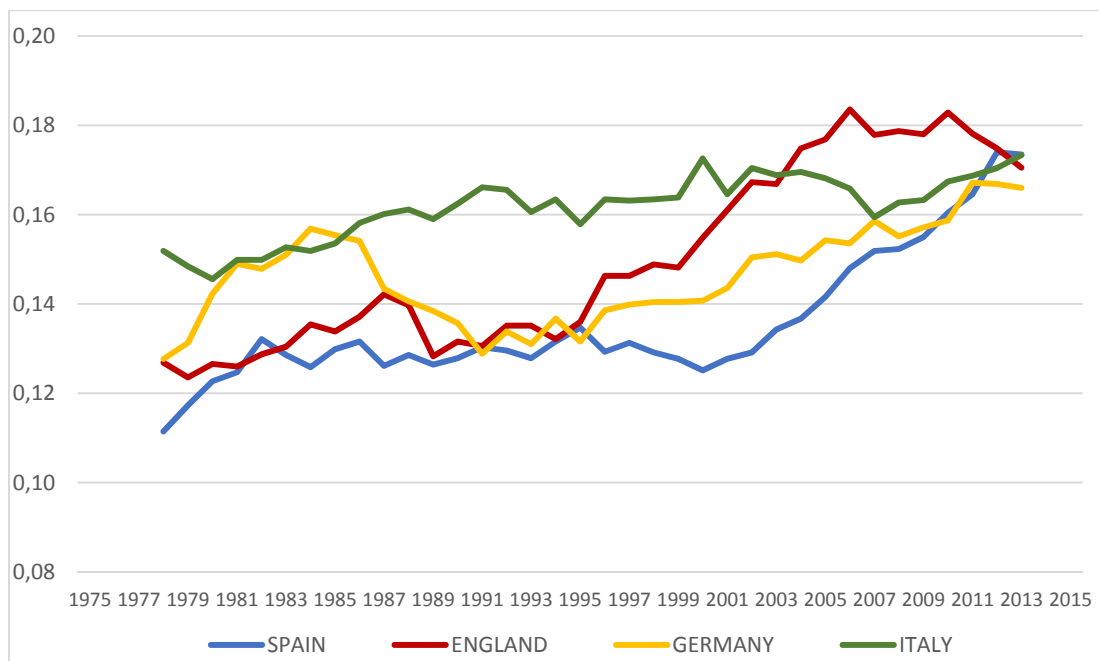

Figure 1. Gini coefficient in the four major European leagues, 1975-2015 (7 years moving average); own estimations.

We can therefore identify a period of lower inequality between 1975 and 1995 and a period of high inequality between 2005 and 2015 in the case of Spain, England and Germany, while in the case of Italy, inequality was high during the whole period, with the lowest values reached between 1975 and 1985. Table 1 shows a summary of the indicators of competitive balance between the period of low inequality (1975-1985) and the period of high inequality (2005-2015). The Gini coefficient shows the average Gini for the period in each league. Average points front estimates the ratio between the average points achieved by the teams that occupied the first four positions and the average. Average points back shows the same calculation, but for the teams that occupied the last four positions. Finally, we also show the ratio between both.

Table 1. Gini coefficient and front/back ratios in the four major European leagues, 1975-2015 (7 years moving average); own estimations.

	Spain		England	
	1975-85	2005-15	1975-85	2005-15
Gini coefficient	0.12	0.16	0.13	0.18
Average points front	1.30	1.50	1.35	1.51
Average points back	0.73	0.68	0.69	0.62
Ratio front/back	1.79	2.22	1.95	2.43

	Germany		Italy	
	1975-85	2005-15	1975-85	2005-15
Gini coefficient	0.14	0.16	0.15	0.17
Average points front	1.36	1.45	1.37	1.46
Average points back	0.68	0.66	0.69	0.65
Ratio front/back	1.99	2.19	2.00	2.23

Competitive balance was higher in the Spanish league during the period of low inequality, being only lower than Germany by a small margin during the period of high inequality. The other major leagues show relatively similar levels of competitive balance in the period of low inequality, while in England, the levels increased rapidly to become the most unequal competition in the 2010s. We also observe that the Spanish league was the one in

which the average points obtained by the bottom part of the distribution are higher in both

periods, four percentage points higher than England and Italy c.1970 and six points higher

c.2010.

Figure 2 presents the Kernel density distributions in both periods, also revealing interesting

results. In the case of Spain, the distribution shows a shift to the left of the whole

distribution that is compensated by the appearance of some teams in the upper part. The

dynamics in the English Premier League were different, where the distribution tends to

become more bimodal, with a large number of teams around the lower middle part, but

also an increasing percentage of teams joining the upper part. The German league reduced

the number of teams in the upper middle part of the distribution, increasing the share of

teams in the lower middle part, while in the case of Italy, the distribution was practically
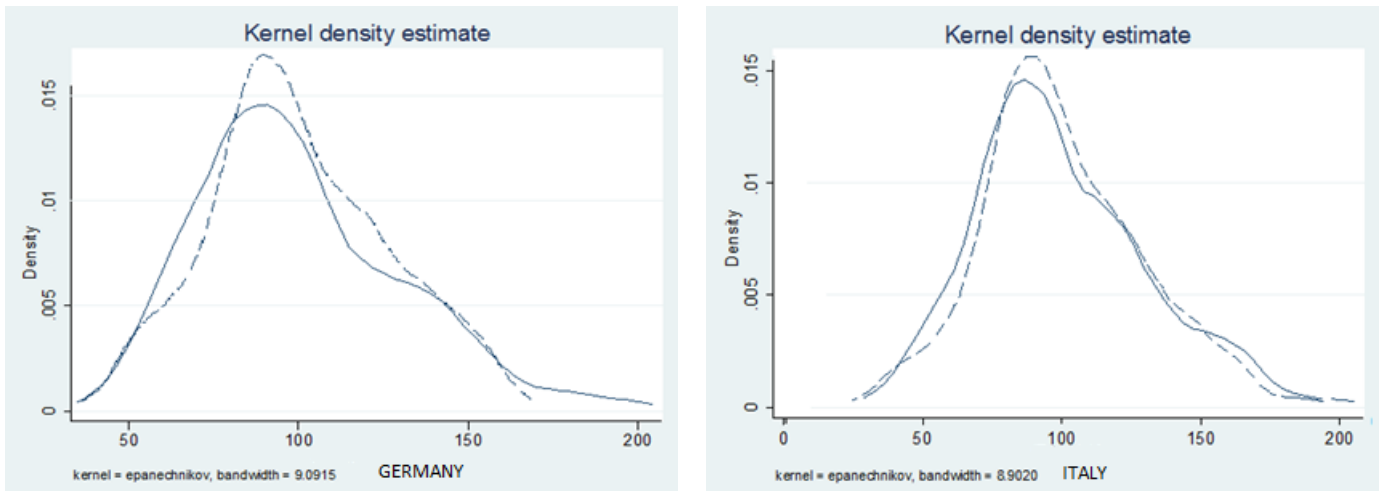
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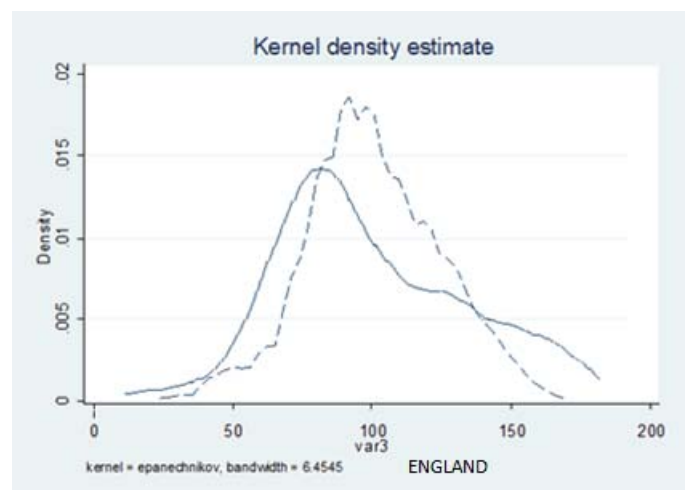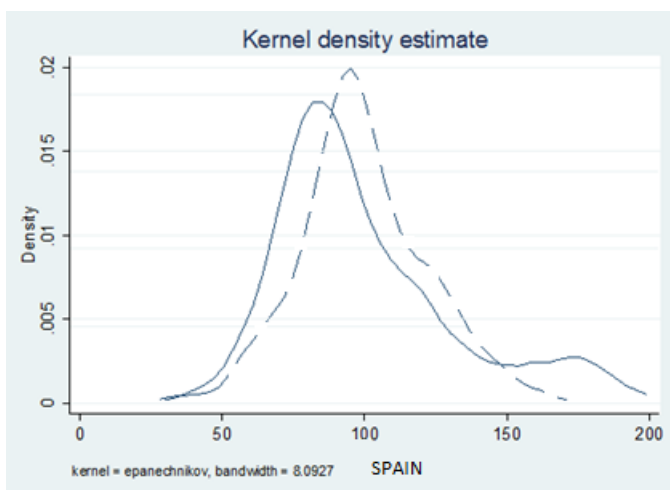
Figure 2. Kernel curves. Solid lines show the distribution in the 2010s, and dashed lines present the distribution in the 1970s; own estimations.

Analyzing the Internal Dynamics of Inequality

As explained above, the decomposition of competitive balance can reveal significant differences between the four leagues. Changes in inequality can take place for many different reasons. The Theil index allows us not only to measure inequality, but also to decompose the changes observed. We divided the teams in each competition into three groups: those that at the end of the season occupied the top quartile in each classification (top), those that occupied the second quartile (medium) and those that occupied the lowest half (bottom). [4]

Figure 3 shows the changes in the Theil index between the period of low inequality (1975-1985) and the period of high inequality (2005-2015) and how much was a consequence of within- and between-group inequality. As in the case of the Gini coefficient, we observe that Spain was the most egalitarian competition in the first period and that although inequality increased rapidly, it remained comparatively low, just slightly higher than in Germany, which currently appears to be the most equal league.
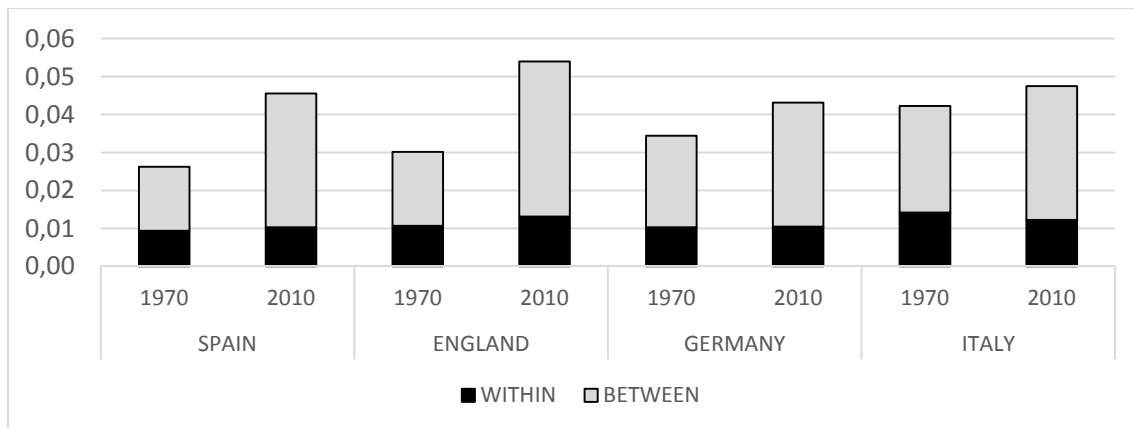
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Figure 3. Theil index decomposition for the four major European football leagues; own estimations; own estimations.

The results show that most of the increase in inequality in all the leagues was a consequence of an increase of between-group inequality, while within-group inequality also increased, but did it so more slowly. Therefore, the competitions became more unequal because those teams at the top increased their distance from their followers. There are, however, differences between the four leagues. The increase in inequality was more intense in England, where it grew by 79 per cent, with between-group inequality representing 90 per cent of the rise. Spain presents the second highest increase of 74 per cent, with between-group inequality representing 95 per cent of the growth. The German league increased in inequality by only 25 per cent, and most of it (98 per cent) was a consequence of an increase in between-group inequality. Finally, from an already high starting point, Italy presents the smallest increase of 12 per cent, in which within-group inequality actually decreased by 37 per cent, partially compensating for the growth of between-group inequality.

But, what are the internal dynamics within the different groups? Figure 4 shows the changes in inequality within the top quartile in both periods. Once again, we can observe significant differences between the four competitions. The Spanish league shows an

exponential increase of 200 per cent, while the increases in the other leagues were more modest.
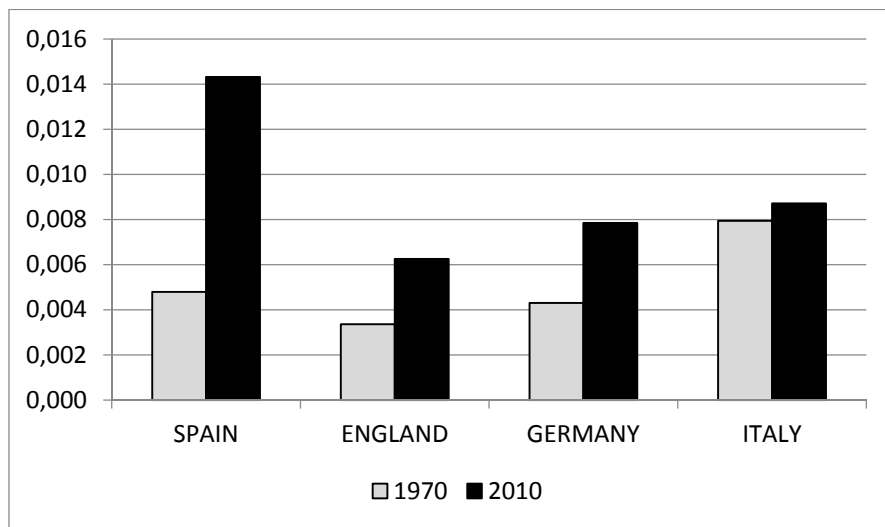

Figure 4. Changes in inequality within the first quartile; own estimations.

As Figure 5 shows, inequality within the second quartile also increased in the case of Spain and England, although in this case, it did so more quickly in the Premier League. Germany and Italy, on the other hand, experienced a small decrease in inequality in the second quartile, in which the competition became slightly more egalitarian.
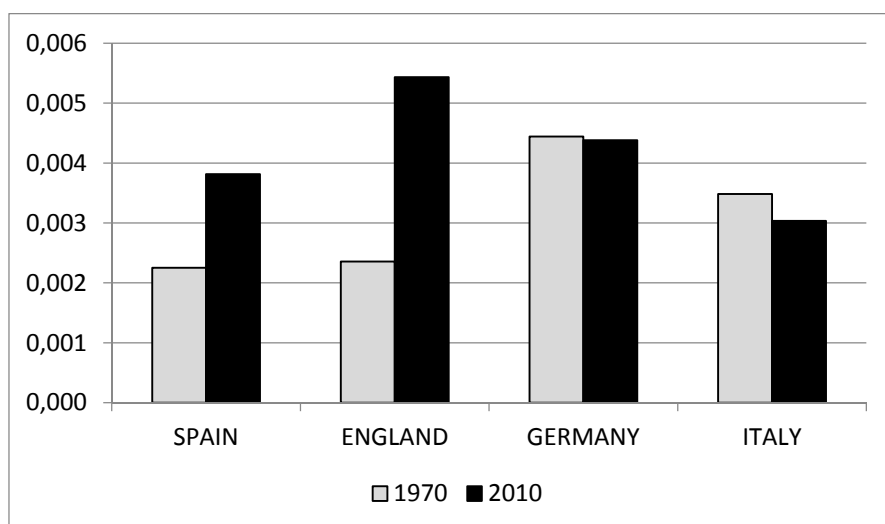

Figure 5. Changes in inequality within the second quartile; own estimations.

Finally, Figure 6 presents the changes in inequality within the lowest two quartiles of the classification. The results show a ten per cent increase in the Premier League, with the lowest part of the distribution becoming the most unequal. Italy and Germany presented reductions (18 and 8 per cent, respectively), showing that the competition among the lowest half of the classification became more egalitarian, although in the case of Italy, from a high starting point. Spain, on the other hand, presented the most competitive league in the bottom half and also showed the most intense reduction between both periods (25 per cent), becoming even more egalitarian.
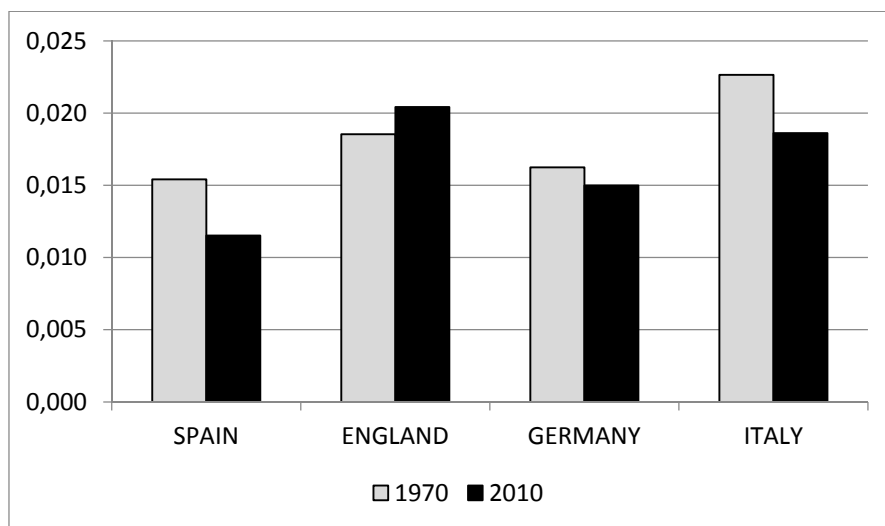
Figure 6. Changes in inequality within the bottom half; own estimations.

We can therefore conclude that although inequality increased in all the competitions, it did not do so at the same levels and also that the internal dynamics behind the changes were very different. The Premier League became more unequal within all the groups, a dynamic that reinforced the increase in between-group inequality and explains why it increased to become the most unequal major league in Europe. Italy started from already high inequality levels that increased mainly as a consequence of increases in between-group inequality, while within-group inequality decreased, mainly as a consequence of the competition becoming more egalitarian within the lowest quartiles. The rise of inequality

in Germany was mainly a result of rising between-group inequality, which was reinforced by a rise in inequality in the top quartile. Finally, Spain appears to be a very particular case, where increasing total inequality derived from rising between-group inequality was mostly explained by rising within-group inequality in the top quartile, while on the other hand, the competition became more egalitarian in the lowest quartiles, in which the inequality levels remained considerably lower than in any other major league.

Examining the Intensity of Entry Barriers

After analyzing the changes in total inequality and the internal dynamics that explain them, we observed that the Spanish league was the most egalitarian in the lowest part of the distribution and also the competition where, as presented in Table 2, the teams in the lowest quartile were able to achieve more points at the end of the year. However, the most important goal for those teams in the lowest part of the classification table is not maximizing the total number of points that they obtain, but obtaining enough to remain in the league and not being relegated. For that reason, we decided to study the chance that promoted teams had to be relegated in each one of the leagues as an estimation of the mobility in the football market.

As explained before, we used a binary econometric model in which the dependent variable will be being relegated, while the independent variable will take into account whether the team has been promoted that same year. As robustness checks, we used both probit and logit models. We also considered that a team that was recently promoted could be relegated, not that very same year, but the following season. For that reason, we repeated the exercise, also including in our independent variable the teams that had been promoted

the previous season to allow a one year lag between promotion and relegation. Model 1 shows the probit estimation using only the teams promoted in the same season, and Model 2 the same specification, but with a logit approach. Model 3 presents the results for the probit estimation, also including the teams promoted the previous season, and Model 4 the logit estimation. We present the beta coefficients estimated by the model, the marginal effects and their correspondent standard errors. In order to obtain enough statistical variance, we included information for all the seasons between 2010 and 2016, which were also the years when inequality in the four leagues reached its peak and when we expected the promoted teams to be in a more weakened position.

Table 2. Estimation of entry barriers in the four major European football leagues. 2010-2016. Probit and logit estimations.

	Model 1		Model 2		Model 3		Model 4	
	Beta	ME	Beta	ME	Beta	ME	Beta	ME
Spain	0.32	0.08	0.58	0.08	0.27	0.07	0.48	0.07
	(0.36)	(0.41)	(0.36)	(0.41)	(0.38)	(0.41)	(0.38)	(0.41)
England	**0.66***	**0.19***	**1.15****	0.19	**0.63****	**0.16***	**1.13****	**0.17***
	(0.07)	**(0.08)**	**(0.06)**	(0.12)	**(0.04)**	**(0.06)**	**(0.03)**	**(0.06)**
Germany	**0.88****	**0.27****	**1.51*****	**0.26****	**0.58***	**0.16***	**1.03***	**0.16***
	(0.01)	**(0.03)**	**(0.00)**	**(0.03)**	**(0.06)**	**(0.08)**	**(0.06)**	**(0.08)**
Italy	**1.02*****	**0.30****	**1.77*****	**0.30****	**1.08*****	**0.29*****	**1.93*****	**0.29*****
	(0.00)	**(0.01)**	**(0.00)**	**(0.01)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**

a Dependent variable: relegated= 1, not-relegated=0. Independent variable: promoted=1, established=0
b Standard errors are robust.
c Likelihood ratio chi-square shows that models are significant for all the cases except Spain, and therefore, that they fit significantly better than a model with no predictors.
d * significant at 90 per cent ** significant at 95 per cent *** significant at 99 per cent.

The results show that Spain was the only country where being a recently promoted team does not have any impact on the probability of being relegated for any of the specifications. In all the other leagues, having been recently promoted increases the probability of being relegated. In the case of England, depending on the specification used,

the marginal effects show that being recently promoted increased the probability of being relegated by between 16 and 19 per cent. In the German league, the probability increases to a range between 16 and 27 per cent. Finally, Italy is the country where promoted teams have worse prospects, as the probability that they have of being relegated increases by around 30 per cent compared to the rest of the competitors.

Discussion

Our results show that a considerable decrease in the total competitive balance took place in the major European football leagues at the turn of the century. However, although the level of total inequality between the teams in the four leagues is similar today, a detailed analysis of its sources shows significant differences. First, the reasons behind the changes are not the same in all the leagues. In Spain, a small increase of teams in the upper tail switched the rest of the distribution to the left, without experiencing other significant changes. In England, the results were similar, but more accentuated, with a larger number of teams moving forward in the upper tail. The most significant change in the distribution in Germany was a decrease in the number of teams in the upper-middle part that engrossed the lower-middle, while the Italian league shows very small changes, as the initial inequality levels were already high.

The decomposition of the changes by groups is also enlightening. When we compare the four competitions and the changes between the 1970s and the 2010s, we observe that inequality within the three groups is relatively similar in the four leagues with the only exception being Spain. In the Spanish case, inequality within the first quartile in the 2010s is significantly higher than in the other three leagues, while it is considerably lower within

the bottom half. The high inequality that La Liga presents in the first quartile is a consequence of the large difference in points between the two Spanish giants, Real Madrid and Barcelona, and the rest of the teams. This, however, does not mean that their dominance of the competition was higher than their counterparts in the other leagues, as Table 3 shows. Both in c.1970 and c.2010, the dominance of the two most successful teams in Spain was at similar levels (if not lower) as in England, Germany and Italy.

Table 3. Number of titles obtained by the two top teams.

1975-1985 (11 seasons)							
SPAIN		**ENGLAND**		**GERMANY**		**ITALY**	
R. MADRID	5	LIVERPOOL	8	B. MUNICH	4	JUVENTUS	6
AT. BILBAO	1	EVERTON	1	HAMBURG	3	TORINO	1
Total	**6**	**Total**	**9**	**Total**	**7**	**Total**	**7**
	54%		**81%**		**63%**		**63%**

2005-1015 (11 seasons)							
SPAIN		**ENGLAND**		**GERMANY**		**ITALY**	
BARCELONA	7	M. UNITED	7	B.MUNICH	7	JUVENTUS	5
R. MADRID	3	CHELSEA	3	B. DORTMUND	2	INTER	5
Total	**10**	**Total**	**10**	**Total**	**9**	**Total**	**10**
	91%		**91%**		**81%**		**91%**

The increase of total inequality in Spain which was a consequence of the rise within the first quartile was partially compensated by the decrease that took place within the bottom half. The differences between the teams in the lower part of the distribution were significantly lower in Spain than in the other three leagues. Table 1 actually shows how the teams that occupied the last four positions in La Liga obtained better results than their European counterparts. These results are supported by the fact that the Spanish league was the only competition in which recently promoted teams did not have a higher probability of relegation. Consequently, if we use the possibilities that they have to compete within their "own league" and the chances of maintaining their status in the major league after being promoted (upper mobility) as a proxy for successfully accomplishing their goals, we could

conclude that the Spanish league provides better opportunities to smaller teams than the other three competitions, followed by Germany, England and Italy.

On the other hand, it is still not clear if this situation is desirable in the long term, as smaller teams would have to accept the fact that they will never be able to compete for goals higher than their mere survival. Improving revenue sharing could be seen as a possible solution, although competitions like the Premier League, in which the budget differences between teams are smaller than in competitions like La Liga, do not present more diversification in the number of teams winning the competition. It is also not clear that it creates more competitive teams. Figure 7 shows that there are no signs of Spanish teams in recent years being less successful internationally than their English competitors where revenue sharing is more equal. Real Madrid and Barcelona clearly dominated European football, conquering more than half of all the Champion Leagues since 2005. However, the success of Spanish football was also transmitted to smaller teams like Atletico de Madrid or Villarreal, which reached several finals and semi-finals. If we analyze the results in the Europe League for the competitions in which weaker teams participated, the results for Spanish football are even better, obtaining 7 out of 11 championships and representing more than 30 per cent of all the participants in the semifinals, way ahead of the rest of the major leagues, although they suffered a considerable handicap in terms of economic strength, particularly face-to-face with their English counterparts. [5] The results for the participants in La Liga are even better if we take into account only the most recent years, showing that the trend, far from being reversed, is intensified.
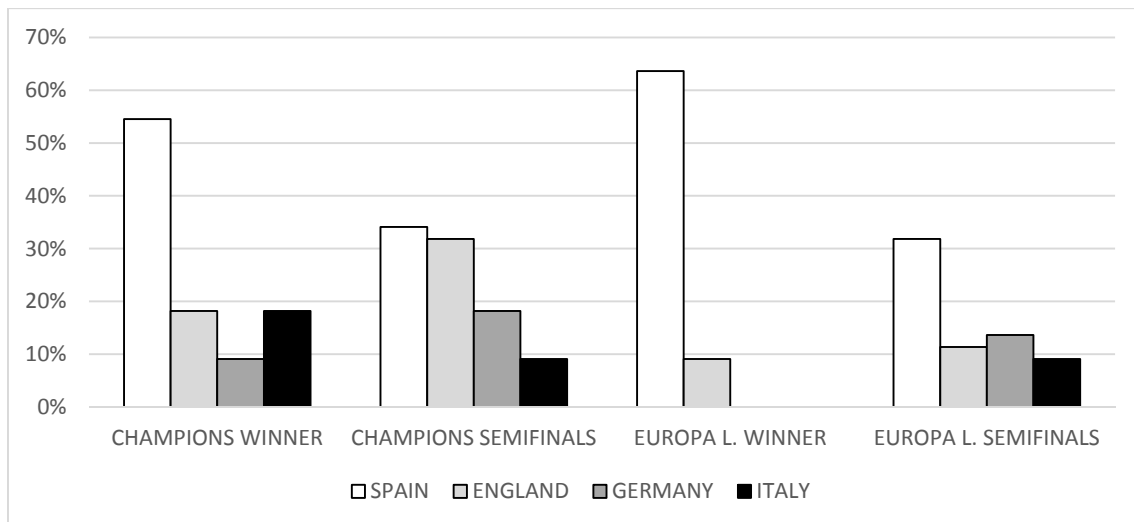
Figure 7. Winners and teams reaching the semifinals in the Champions League and the Europe League, 2005-2016 (11 seasons); own estimations.

The international dominance of Spanish clubs in recent years is also more diversified than in the rest of the leagues. Five different Spanish teams reached the semifinals of the Champions League, compared to three in Germany and Italy, with only England showing a slightly higher number, with six clubs. If we study the Europe League, where the revenue differences between the Spanish clubs and the rest are higher, the results are more striking, with seven different Spanish clubs reaching the semifinals, compared to four in England and Germany and three in Italy. The fact that revenue sharing in La Liga was more unequal than in England and that average revenues for teams other than Real Madrid and Barcelona were considerably lower was not translated into a league in which the rest of the teams were not competitive internationally.

Conclusions

Measuring competitive balance in sports is a hard issue that has to take into account both the study of the total differences between teams, as well as other factors, such as the idiosyncrasies of each sport and competition. We therefore believe that there should be room

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for the advocates of the ACB and UOH lines of literature, as the combined analysis of both provides the best explanatory power. This paper has shown how although inequality within the four major European leagues has increased during the last decades to reach similar levels, the dynamics behind the changes are very different. While in Spain and England, the divergence between the upper tail and the rest of the distribution is to blame for the reduction in competitive balance experienced recently, in Germany, it is responsible for the relative "impoverishment" of teams in the middle part of the distribution. Our analysis of the entry barriers show that incumbent teams have a better chance to succeed in the Spanish league than in the rest. This is a consequence of lower inequality within the bottom half of the distribution in La Liga, which also improves the chances for recently promoted teams to maintain their recently acquired status, at the same time, sending a promising signal to the teams competing in the lower leagues.

The success of Spanish teams in international competitions is surprising, given their economic weakness compared to some of their European competitors. A possible explanation could be the fact that La Liga is a competition that is more equal, not only in the bottom half of the distribution, but also, as can be seen in the kernel distributions, in practically every other decile. A more intense competition in the national league could therefore produce teams that are also more competitive abroad, and lower entry barriers would increase competition and improve efficiency. If this is the case, then the best way to guarantee international success is to ensure a high level of mobility that would encourage competition. We believe that this interesting hypothesis could open a new line of investigation, which would, however, require further and more detailed research.

Notes

1. We do not observe significant changes when we vary the number of groups.
2. Zimbalist showed how the supremacy of Manchester United in the Premier League in the 1990s coincided with growth in the popularity of the sport.
3. On average, the relative market value of promoted compared to established teams is 72% lower in Spain, 67% lower in England and 65% lower in Germany and Italy. Information retrieved from www.transfermarkt.com.
4. As a robustness check, we also repeated the estimations using different specifications, such as dividing the teams in four quartiles. The results were robust with those presented in the paper and are not included for reasons of space.
5. Out of the 30 European teams with higher revenues, during the 2010s, there were, on average, 12 English teams, 5 German, 5 Italian and 4 Spanish (Deloitte Football Money League, 2012-2017).

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