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Original Article

The relative age effect: Does it also affect perceived market value? The case of the Spanish LFP (Professional Football League)

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Abstract:
Statement of the problem: The relative age effect, within the football field, means the predominance of those born in the first months of the year to the detriment of those born in later months. This effect has been exacerbated over the years, but there is no evidence that it is more beneficial from the point of view of performance for clubs in lower categories. Approach: Perceived market value, derived from web platforms (www.transfermarkt.com), can be an indirect indicator of both the performance and the real market value of the players, but among the aspects considered in evaluating the players, the relative age effect is not taken into account. Purpose: To determine if the perceived value of Spanish LFP players (n = 477) varies according to their month of birth. Results: Although a higher percentage of players born in the first two quarters of the year was found, there were no significant differences in the perceived value of professional players between the four quarters of the year, or between semesters. Conclusions: Given the lack of a study including more variables, not finding differences in the perceived value of players based on their date of birth is an indicator that this should not be a limiting factor slowing the career of players in lower categories.
Key words: economy, relative age, competition, football, market value.

Introduction

The relative age effect (RAE) concerns the lower presence, in a specific field, of those born in the last months close to the cut from which a new age category is classified. The RAE occurs in different fields, sport being one in which it is observed in a more evident way than in others. The first studies on this effect in sport were undertaken by Barnsley, Thompson, and Barnsley (1985), who discovered that 40% of youth ice hockey players in Canada were born in the first quarter of the year. In the case of football, the first published study was done by Barnsley, Thompson, and Legault (1992). Musch and Grondin (2001) combined the results of 57 studies by 35 different authors in 11 different sports, obtaining common guidelines regarding the RAE. In this line, Cobley, Baker, Wattie, and McKenna (2009) indicated that the propitious context for the appearance of the RAE is in adolescence (15–18 years) among male athletes at a competitive level and in the most popular sports.

With regard to the RAE in football, Salinero, Pérez-González, Burillo, Lesma, and Herrero (2014) conducted a study over the period 2000 to 2011 that confirms the presence of the effect in youth categories and also for defenders and midfielders in the top Spanish division. Another investigation focused on the 2009–2010 season (Lesma, Pérez-González, & Salinero, 2011), confirming the effect in the top division of Spanish football. Yet another (Salinero, Pérez-González, Burillo, & Lesma, 2013a) shows its evolution from the youth categories to the elite division. This effect is attenuated from the youth categories to the elite, but in the latter it is still present.

Updating the data to the current time gives similar results (Figure 1). In both the 2009/2010 and 2017/2018 seasons, the Spanish top league presents about 60% of births in the first half of the year and in the case of the youth, there is an increase from 75% of births in the first six months of the year to 80% (Pérez-González, 2018). The imbalance is even more appreciable if we compare the presence of children born in the first trimester with those born in the last quarter of the year. In 2009/2010, 34% of the players in the First Division League were born between January and March, while only 18% were born between October and December. In 2017/2018, the difference is 31–20%, with 19 teams out of the total 20 presenting an imbalance in favour of the first semester. In addition, the literature shows that the phenomenon also affects the other major European leagues, which without exception – for the case of the big 5: Premier, Serie A, Bundesliga, LaLiga and Ligue 1– also having a higher percentage of births in the first semester (Figure 2). Salinero, Pérez-González, Burillo, and Lesma's (2013b) study confirms the presence of the RAE in the 2009/2010 season in the Italian, Spanish and French leagues and González-Víllora, Pastor-Vicedo, and Cordente (2015) show the effect for a sample of 841 professional players in international UEFA tournaments. The effect is still being produced in the Italian league, as shown by Brustio et al. (2018).

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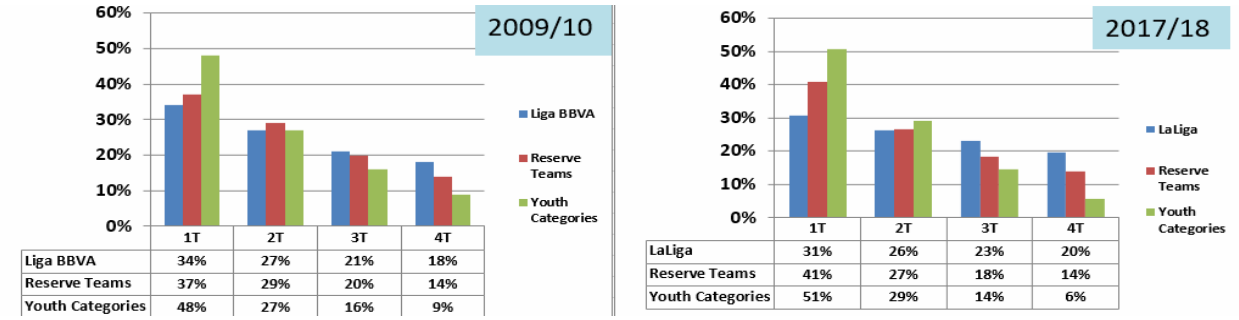

Fig.1. Evolution of the relative age effect (RAE) between the 2009/2010 and 2017/2018 seasons

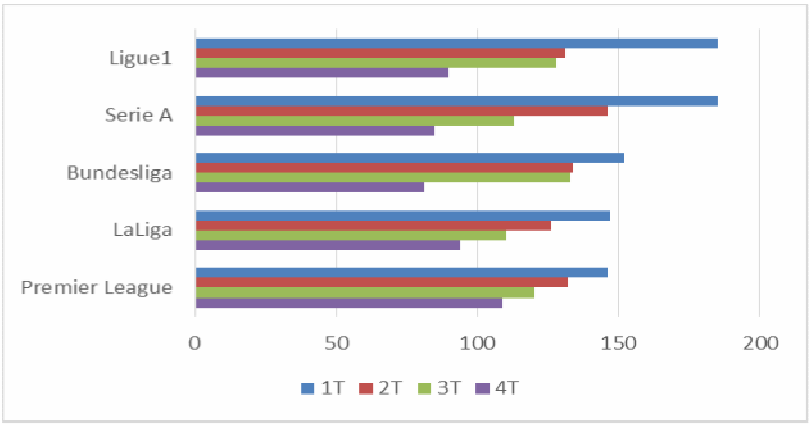

Fig. 2. Percentage of players by trimester of birth in European leagues in 2017/2018

Doyle and Bottomley (2018) analyse two data sets of elite football players (the best 1000 professionals and the UEFA Youth League U-19) using data related to the date of birth and also to value – this being the first study to use data on perceived economic valuation. In both cases, the RAE is observed for frequency, but not for value. That is, although there are more players born at the beginning of the year, their transfer values are not higher, nor are they given more playing time. They also confirm that there are no clubs or countries immune to the RAE; that is, clubs and countries do not systematically differ in terms of the RAE they experience.

In line with the above, the Transfermarkt portal, which establishes the market value of players based on registered users, has been used in other recent research (Peeters, 2018) as a reliable indicator related to game performance and as a good predictor of the real value of players (Herm, Callsen-Bracker, & Kreis (2014). However, there is little literature that has taken into account if the RAE may have an impact on perceived market value, except for Doyle and Bottomley's (2018) study, which employs data from 2014. Therefore, the objective of the study was to compare the market value of the first division soccer players in Spain – LaLiga – in the 2017/18 season based on their trimester of birth, obtaining the market value of each player in the www.transfermarkt.es portal.

Material and methods

Participants

This research used the market value of the 477 players (€ million) in Spanish football's first division (La Liga), obtained from the Transfermarkt portal. The main inclusion criteria were that they were professional players with a card and included in the Transfermarkt database. The average age of the players was 27,2±1,01 years.

Process

An exhaustive search of the market value of the players in the first football division was undertaken. To avoid biases, the analysis was carried out in the middle of the season, once the summer and winter markets for the 2017/2018 season had ended. The exact date of data collection was 31/01/2018. The official pages of the clubs were used to obtain the players' quarter of birth.

Statistical analysis

In the first term, we used a non-parametric Kolmogorov–Smirnov (K-S) test ($p < 0.01$). To compare between groups (trimesters), a non-parametric Kruskal–Wallis test was used with a Bonferroni–Dunn post-hoc

test. For the semesters, the non-parametric Mann–Whitney U statistic was used, considering a significance level of $p < 0.05$. All these tests were carried out in the statistical package SPSS version 19.0.

Results

Table 1 shows the differences in the estimated market value according to the trimester and semester of birth of the first division footballers.

Table 1. Estimated average value (€ million) of football players of La Liga (2017/2018) according to their trimester/semester of birth

	Trimest 1	Trimest 2	Trimest 3	Trimest 4	Semest 1	Semest 2
Value	10,97	10,16	6,73	7,78	10,59	7,22
SD	19,16	20,92	12,46	12,15	19,96	12,30

Table 2. Significance level based on the Bonferroni–Dunn post-hoc test

	Trimest 1	Trimest 2	Trimest 3	Trimest 4
Trimest 1	1,000	1,000	0,336	1,000
Trimest 2		1,000	0,108	1,000
Trimest 3			1,000	1,000
Trimest 4				1,000

According to the results, there is a higher valuation of the players perceived by the members of Transfermarkt for those born in the first and second trimesters of the year. However, the results of the Bonferroni–Dunn post-hoc test (Table 2) indicate that there are no significant differences between trimesters, so the differences in the perceived value could be caused by chance. Comparing by semester, players born in the first half of the year have a significantly higher perceived value ($p = 0.045$) than those born in the second half. However, eliminating from the calculation the two "Superstar" players of the League, whose perceived values exceed €100 million (and both of whom were born in the first half of the year), the significant differences disappear, as happens with the trimesters ($p = 0.074$).

Discussion

The 2017 winner of the Nobel Prize for Economics, Richard Thaler (Pérez González, 2017), one of the main representatives in the field of behavioural economics, focuses his studies on detecting the errors and biases that lead us to make bad decisions with economic consequences. The RAE is produced by an assessment bias and its analysis falls within the field of study of the biases and heuristics of authors such as the aforementioned Kahneman, Knetsch, & Thaler (1991), Kahneman (2003) and Gigerenzer and Gaissmaier (2011), among others.

As a striking example of the effect of relative age in football, in addition to the examples observed in the introduction to this article, we can cite a case observed in the 2017/2018 season (Pérez-González, 2018), in which teams from the lower categories of the three highest income clubs in Spain (Deloitte, 2018) – Real Madrid, FC Barcelona and Atlético de Madrid – were found to have a total of 346 players born between January and March and only 43 players born between October and December.

The reason for this effect is essentially due to the fact that at the age of recruitment, there are significant differences in weight, height and maturation between those born in the first months of the year and those in the last. Recruitment is a critical point that significantly influences the futures of those selected and those not selected at that time. We see from our results that professional football is affected by selection in the youth categories and does not present a balance of births in the different months of the year, as should occur, based on the law of large numbers in a wide series of random distribution.

There is a wide literature that has addressed the importance of websites such as Transfermarkt when it comes to establishing the real market value for professional football players (Herm et al., 2014; Peeters, 2018). As the main conclusion of these studies, Transfermarkt is quite reliable, but it could be optimized by elaborating a prediction model to estimate more accurately the value of players based on their performance and including more variables. In particular, no study has so far taken into account the influence of the RAE on this value, with the exception of that by Doyle and Bottomley (2018), which in addition to using data from four seasons ago (the football market has changed drastically since 2014), includes professional players worldwide. Therefore, we can say that this is the first study to analyse whether there is a difference in the value of players in a specific competition, as well as taking into account all the players included in it. Regarding the results obtained in both cases, date of birth is not found to affect market value (although in Doyle and Bottomley's study a Poisson regression was carried out and we conducted an analysis of the variance based on trimesters).

As the main limitation of the study, we do not know exactly if the players suffered "discrimination" in terms of the number of minutes played and matches played based on their trimester of birth. Knowing, for example, the number of minutes played throughout the players' career (especially in the early stages) would allow us to demonstrate our hypothesis more effectively. Including this variable, as well as expanding our

sample to other competitions and leagues, would allow us to obtain a more complete view of the influence of relative age at the global level.

Conclusion

Not finding differences in the value perceived by Transfermarkt according to the trimester of birth indicates that players who have reached the first division are considered similarly, without taking into account this factor, which reinforces the idea that the date of birth should not imply a limitation that hinders the evolution of players in youth categories. One possible solution would be to apply the decimal age, or to propose a long-term management model for youth teams taking into account this assessment bias.

Conflicts of interest – The authors have no conflicts of interest to declare.

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