International Journal of Performance Analysis in Sport

ISSN: 2474-8668 (Print) 1474-8185 (Online) Journal homepage: http://www.tandfonline.com/loi/rpan20

Home advantage in Portuguese football: effects of level of competition and mid-term trends

Carlos H. Almeida & Anna Volossovitch

To cite this article: Carlos H. Almeida & Anna Volossovitch (2017) Home advantage in Portuguese football: effects of level of competition and mid-term trends, International Journal of Performance Analysis in Sport, 17:3, 244-255, DOI: 10.1080/24748668.2017.1331574

To link to this article: https://doi.org/10.1080/24748668.2017.1331574

INTERNATIONAL JOURNAL OF PERFORMANCE ANALYSIS IN SPORT, 2017
VOL. 17, NO. 3, 244–255
https://doi.org/10.1080/24748668.2017.1331574

Routledge
Taylor & Francis Group

RESEARCH ARTICLE

Home advantage in Portuguese football: effects of level of competition and mid-term trends

Carlos H. Almeida[a] and Anna Volossovitch[b]

[a]CIDEF, Instituto Superior Manuel Teixeira Gomes, Portimão, Portugal; [b]SpertLab, Faculdade de Motricidade Humana, CIPER , Universidade de Lisboa, Lisboa, Portugal

ABSTRACT

This study aimed to examine the influence of level of competition (amateur, semi-professional and professional) on the magnitude of home advantage (HA) in Portuguese football, and to verify whether the HA has changed over time. Archival data from 32,400 matches contested in the three levels of competition over 11 seasons (from 2005/2006 to 2015/2016) were analysed. HA was quantified each season for each league as the number of points won at home expressed as a percentage of all points won at home and away. The mean values of HA were significantly greater than 50% in all levels of Portuguese football ($p < .001$). One-way repeated-measures ANOVA showed a significant effect of competitive level on HA ($p < .05$). In the professional league, the HA was significantly lower (58.31%) than in amateur and semi-professional competitive levels (60.36 and 60.46%, respectively). Altogether, a declining HA effect was found in Portuguese football in recent years. However, negative linear relationships between HA and time were only significant at amateur and semi-professional levels ($p < .05$), while the decline in the major professional league has already started to level off. These findings demonstrate that the advantage of playing at home is losing importance in Portugal. The declining effect of HA, previously evidenced in major professional leagues, has been mirrored by a similar decline at amateur and semi-professional levels within the country. Future research should confirm whether the trends identified in Portugal are also verified in football leagues of other countries.

ARTICLE HISTORY
Received 2 April 2017
Accepted 30 April 2017

KEYWORDS
Home advantage; match location; expertise; temporal changes; soccer

1. Introduction

The term home advantage (HA) reflects a greater success rate of teams in home versus away matches. This robust phenomenon is observed across several team sports and it is particularly evident in association football (Allen & Jones, 2014; Jamieson, 2010; Staufenbiel, Lobinger, & Strauss, 2015). The main causes of HA have been attributed to crowd effects, referee bias, territoriality, familiarity with local conditions, distance travelled, special tactics, rules, psychosocial factors and team composition (Carron, Loughhead, & Bray, 2005; Courneya & Carron, 1992; Pollard, 2008; Pollard & Gómez, 2014b). Although the interaction

CONTACT Carlos H. Almeida carlosalmeida83@hotmail.com

between these factors has been deemed crucial for the HA observed in multiple sporting scenarios, some independent effects were difficult to pinpoint (Pollard, 2006a, 2008). For instance, whereas some studies have demonstrated crowd size to be highly associated with HA in football (e.g. Armatas, Yiannakos, Seaton, & Rigas, 2013; Goumas, 2013, 2014; Pollard & Gómez, 2014a), other research claimed that this association is at least arguable, since similar HA effects have been found in games with very small attendance (Pollard, 2006a; Pollard & Pollard, 2005b). It has been consistently evidenced that the magnitude of HA displays large variations according to region, level of competition and/or over time, even within a country (Armatas & Pollard, 2014; Pollard & Gómez, 2009; Pollard & Pollard, 2005b). Nevertheless, further research is needed to extend the knowledge on how the HA is changing according to the local sport-specific and social determinants (Pollard & Gómez, 2009). This information may help anticipate game scenarios in a particular league and could be used by coaches in their match preparation and training process.

Despite being a small South-Western European country with a population of 10.3 million habitants, Portugal is one of the major football playing nations with 135 thousand male and female registered players (FPF, 2016). Recently, the National Portuguese team won the UEFA European Championship, hosted by France in 2016 and, at the end of the 2015/2016 season, Portugal was the fifth best positioned country in the UEFA association club coefficients ranking (UEFA, 2016). The studies of Pollard (2006b) and Pollard and Gómez (2014b) showed that the HA in the major Portuguese domestic league (i.e. First League) dropped from 64.79% (seasons from 1997/1998 to 2002/2003) to 58.71% (seasons from 2006/2007 to 2011/2012). Marques (2009) also found that the decline of HA in the Portuguese First League was more accentuated in the seasons from 1997/1998 to 2006/2007. This decline was followed by a decrease in the league competitive balance. The magnitude of HA in Portugal was identical to the values found for other European leagues, as well as the decreasing trend observed during recent years (Page & Page, 2007; Pollard, 2006b; Pollard & Gómez, 2009).

The progressive decline of the HA effect in professional football has been argued by several researchers (Marques, 2009; Pollard & Gómez, 2014b; Pollard & Pollard, 2005b). This decline was linked to three main reasons. First, the increased professionalism and the development of a strong market culture have determined a weaker bond between football players and fans and, consequently, teams were losing their representative power of the local communities (Page & Page, 2007; Smith, 2003). Second, visiting players and referees are now better trained to cope with the adversity of acting within a hostile match environment (Pollard & Gómez, 2009). Third, the competitive conditions have become more standardised (e.g. league structure and pitch dimensions) and travelling became more comfortable and less fatiguing (Marques, 2009; Pollard & Gómez, 2015a).

In addition to the long-term and mid-term trends, the differences in the magnitude of HA were observed according to the competitive level of teams (Pollard & Gómez, 2015a; Pollard & Pollard, 2005b). Neave and Wolfson (2003) stated that the HA exists in all levels of competition; however, the current findings are incredibly contradictory. While Bray (1999), Jacklin (2005) and Allen and Jones (2014) showed greater HA in English low-ability teams (i.e. lower divisions or lower end of a league table), Bray, Law, and Foyle (2003), Pollard and Pollard (2005b), Armatas et al. (2013) and Pollard and Gómez (2015a) found opposing results for England, Greece and U.S.A. divisions, respectively. These inconclusive results

need to be assessed considering the characteristics of players performing in different levels of competition (Bray & Widmeyer, 2000; Thomas, Reeves, & Davies, 2004). Poulter (2009) demonstrated that HA effects at a team level were also observed at a player level for different performance indicators; for example, the player nationality influenced the HA effect for goals scored. A very recent study evidenced that HA tended to increase with players' age in elite youth football suggesting a learning process (Staufenbiel, Riedl, & Strauss, 2016). Whilst the characteristics of players might affect the perceptions of HA (Bray & Widmeyer, 2000), as well as their individual and team performance profiles (Poulter, 2009), the knowledge related to how expertise influences the magnitude of HA in adult football is still scarce. Armatas and colleagues (2013) compared professional and amateur leagues in Greek football, but no data were presented for an intermediate level of competition, not providing a complete standpoint of all playing levels.

Particularly in Portugal, there is no evidence regarding HA in amateur and semi-professional leagues. Does the HA depend on the competitive level of Portuguese teams? Is the declining effect of HA observed in professional leagues also verified in amateur and semi-professional leagues? Up to date, the effects of competitive level on HA in football remain unclear; the temporal fluctuations at lower playing levels are practically unknown. This study aimed to provide a comprehensive perspective on how the HA in football is evolving within a country, taking into account local sport-specific and social determinants. The analysis of different levels of competition, which reflects distinct levels of expertise and playing conditions at home, might help to untangle some of the unsolved issues and causes of HA (Pollard & Gómez, 2015a). Thus, the first purpose of this study was to examine the influence of the level of competition (amateur, semi-professional and professional) on the magnitude of HA in Portuguese football. Secondly, we aimed to explore whether the HA has changed over the recent years in Portugal. Given the aforementioned theoretical considerations, it was hypothesised that (1) the level of competition influences the HA in Portuguese football; (2) the HA has significantly declined in Portugal over the last 11 seasons (from 2005/2006 to 2015/2016), disregarding the competitive level.

2. Methods

2.1. Sample and sources of data

The sample consisted of 32,400 matches contested in the three levels (amateur, semi-professional and professional) of Portuguese football competitions over the last 11 seasons (from 2005/2006 to 2015/2016), and comprising a total of 472 club teams. Archival data of home and away final league tables were obtained from the publicly available website http://www.zerozero.pt. The official websites of each district football association (http://www.afalgarve.pt, http://www.afbeja.com, http://www.afl.pt, http://afcastelobranco.fpf.pt, http://www.afcoimbra.com, http://afevora.fpf.pt, http://www.afguarda.pt, http://www.afporto.pt and http://www.afvr.pt; amateur level), the Portuguese Football Federation website (http://www.fpf.pt; semi-professional level) and the Portuguese League of Professional Football website (http://www.ligaportugal.pt; professional level) were also consulted as secondary data sources to avoid potential errors resulting from the use of a single source. No discrepancies were found between data sources. The data were compiled in a Microsoft Excel 2013 (Microsoft® Corporation, U.S.A.) file, including the relevant information collected by

Table 1. Sample-related details (*n*) displayed by level of competition.

	Amateur				Semi-professional				Professional			
Season	M	HW	HD	HL	M	HW	HD	HL	M	HW	HD	HL
2005/06	1986	988	479	519	786	386	200	200	306	140	76	90
2006/07	2116	1031	481	604	728	323	208	197	240	104	66	70
2007/08	2084	988	524	572	702	335	179	188	240	107	75	58
2008/09	2112	1029	483	600	506	227	146	133	240	107	64	69
2009/10	1952	995	426	531	690	345	170	175	240	104	68	68
2010/11	1896	907	433	556	720	332	204	184	240	101	66	73
2011/12	1916	924	407	585	720	329	197	194	240	115	53	72
2012/13	1910	890	464	556	720	324	220	176	240	103	61	76
2013/14	2010	954	420	636	720	309	214	197	240	108	60	72
2014/15	1934	937	407	590	720	313	193	214	306	137	85	84
2015/16	1914	894	421	599	720	310	206	204	306	133	76	97
Total	21,830	10,537	4945	6348	7732	3533	2137	2062	2838	1259	750	829

Notes: Home wins are synonymous of away loses; home draws are synonymous of away draws; home loses are synonymous of away wins. Despite the different number of matches contested per season, the competitive formats remained similar within each level of competition. Points accumulated were always 3 for a win, 1 for a draw and 0 for a loss.
Legend: M – matches; HW – home wins; HD – home draws; HL – home loses.

season, i.e. number of matches, home wins, home draws, and home losses, in each level of competition (see Table 1).

The methodological procedures were in agreement with the ethics guidelines of the local university.

2.2. Variables

The HA was considered in the study as the dependent variable, while the competitive level and the season/time represented the independent variables. The HA was quantified for each level of competition by season as the number of points won at home expressed as a percentage of all points won at home and away. So, 50% represents no HA and the values above 50% mean that the HA exists; the higher values suggest greater HA (Lago-Peñas, Gómez-Ruano, Megias-Navarro, & Pollard, 2016; Pollard & Gómez, 2014a; Pollard & Pollard, 2005b). This is a well-established method of calculating HA when three points are awarded for a win, one for a draw and zero for a lost match (Pollard & Gómez, 2015b). Moreover, for leagues with a balanced schedule (equal number of home and away matches), this method gives an unbiased estimate of HA (Pollard, 2006b; Pollard & Gómez, 2009; Sánchez, García-Calvo, Leo, Pollard, & Gómez, 2009). As noted by Pollard and Gómez (2015a), the magnitude of HA suffers "considerable fluctuations for leagues over both short and long periods of time, and also between teams within a league caused by differences in team ability and other factors" (p. 585). This study was structured in a way to minimise the effect of potential confounding factors (e.g. team ability or competitive balance). For example, team variability was controlled by calculating HA for entire leagues and over a long period of time (more than a decade). Since the comparison of amateur, semi-professional and professional leagues was performed during the same seasons, any short-term fluctuations in HA would apply equally to each level of competition (Pollard & Gómez, 2015a).

For the variable "level of competition", we defined three classes: (1) amateur, (2) semi-professional and (3) professional. The amateur leagues corresponded to the fourth competitive level in Portugal (fifth level until 2012/2013). We randomly selected three district

football associations from each geographical area of Continental Portugal: three from the south (*AF Algarve*, *AF Beja* and *AF Évora*), three from the centre (*AF Castelo Branco*, *AF Coimbra* and *AF Lisboa*) and three from the north (*AF Guarda*, *AF Porto* and *AF Vila Real*), which corresponded to 50% of all district football associations from the country mainland. Overall, 9 major district leagues were analysed, being composed by 11–20 teams and all presenting balanced schedules. The semi-professional leagues corresponded to the third level of competition, which is now called Portugal National Championship (II Division until 2012/2013). This national competition was composed by several subgroups named *series*, in which teams were grouped by geographical location (4 series from 2005/2006 to 2008/2009, each involving from 11 to 16 teams; 3 series from 2009/2010 to 2012/2013, each involving from 15 to 16 teams; 8 series from 2013/2014 to 2015/2016, each involving 10 teams). Only the first and regular stage of the competition in each series has been analysed, since it represented a full schedule of matches between all teams initially involved in the championship (Pollard & Pollard, 2005b; Sánchez et al., 2009). The following stages of the competition were excluded from the analysis. The professional league corresponded to the first level of competition in Portugal, i.e. the Portuguese First League, involving 16 teams from 2006/2007 to 2013/2014 and 18 teams in seasons 2005/2006, 2014/2015 and 2015/2016. In cases when a team abandoned the competition in the middle of the season (two such cases were found at the amateur level), the matches of that specific team were excluded from the analysis and the final league tables were corrected, in order to maintain a schedule perfectly balanced.

The variable "season" was added to the data file as categorical. The value 1 was assigned to the first season (2005/2006) and the value 11 to the last season (2015/2016). For each season, the mean values of HA at amateur (9 leagues) and semi-professional (all series) levels were calculated. The data file with all variables coded was exported into SPSS Statistics, version 22.0 (IBM® Corp, NY, U.S.A.) for statistical analysis.

2.3. Statistical analysis

The existence of HA in each level of competition was examined through one-sample *t*-tests comparing the observed HA with a null value of 50% indicating no HA. The assumption of normality was verified in each level of competition through the Shapiro-Wilk test ($p > .05$). Then, by combining the data for the 11 seasons, we assessed the global difference in HA between levels of competition using one-way repeated-measures ANOVA. We performed the Mauchly's test to evaluate the assumption of sphericity, which was violated ($p = .032$); so, the Greenhouse-Geisser adjustment was used to check the corrected *F*-statistic. The Bonferroni method was selected as *post hoc* test to compare main effects. We also followed the method indicated by Field (2009) to calculate the effect sizes (ES) for repeated-measures ANOVA. The interpretation of ES was based on the following criteria: small, $r = .1$; medium, $r = .3$; large, $r = .5$ (Cohen, 1992). Pearson's correlation measures were used to evaluate the linear relationship between HA and seasons. The HA in each level of competition and the mean value of HA for all levels were analysed as a function of the independent variable "season". The level of significance was set at $p \leq .05$ for all statistical procedures.

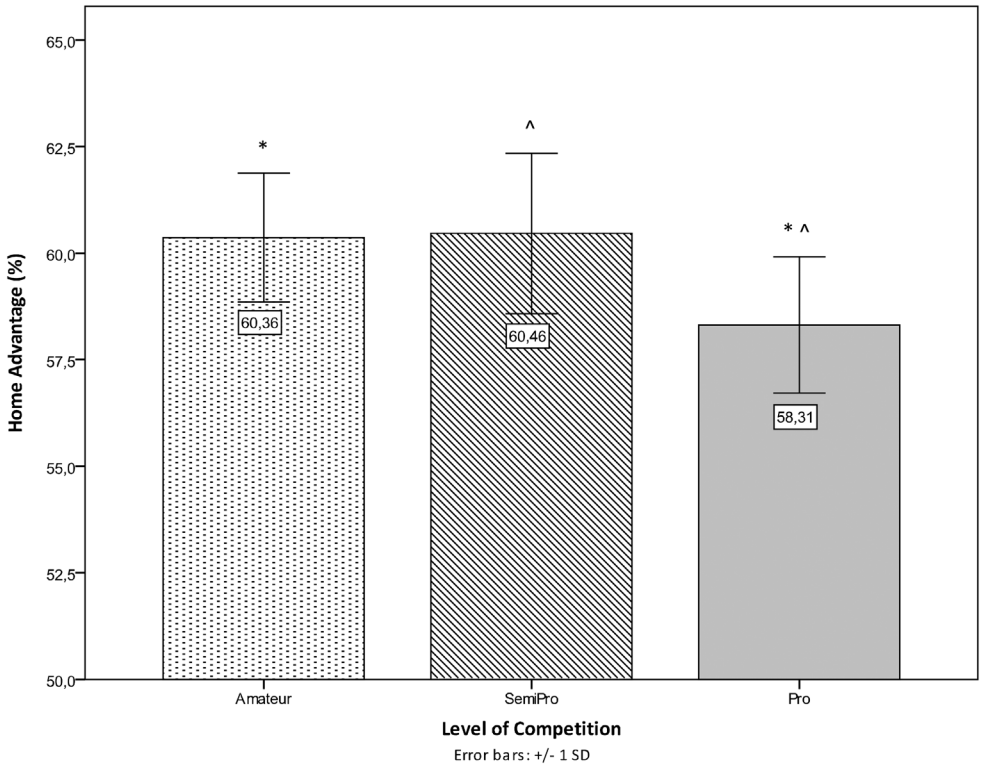

Figure 1. HA (Mean ± SD) in Portuguese soccer displayed by level of competition.
Notes: Mean values significantly different ($p < 0.05$) between amateur and professional levels (*), and between semi-professional and professional levels (^).

3. Results

The mean values of HA were significantly greater than 50% in all levels of competition, thereby confirming a significant HA effect (amateur: $t(10) = 22.729$; $p < .001$; semi-professional: $t(10) = 18.377$; $p < .001$; professional: $t(10) = 17.253$; $p < .001$). The comparison of mean values of HA between levels of competition is shown in Figure 1.

The magnitude of HA in Portuguese football varied significantly according to the level of competition, $F(1.303) = 9.307$, $p = .006$. The HA was significantly lower at the professional level ($M = 58.31$, standard deviation (SD) = 1.6) compared both to amateur ($M = 60.36$, SD = 1.51; $p = .012$) and semi-professional ($M = 60.46$, SD = 1.89; $p = .042$) levels. The ES were small ($r = .09$) for the difference between amateur and semi-professional levels and large ($r = .68$) for the difference between semi-professional and professional levels (Cohen, 1992). The most recent mid-term fluctuations of HA in each level of Portuguese football competitions are displayed in Figure 2.

The HA at the amateur level reached its maximum value in the season 2005/2006 (62.84%) and its minimum value in 2015/2016 (58.32%). There was a significant negative relationship between HA and season/time at the lower competitive level of the sample ($r = -.82$, $p = .001$). At the semi-professional level, the maximum value of HA was verified in the season 2009/2010 (63.42%) and the minimum value in 2014/2015 (57.55%). Again, it was found a significant declining effect of HA in semi-professional leagues ($r = -.658$,

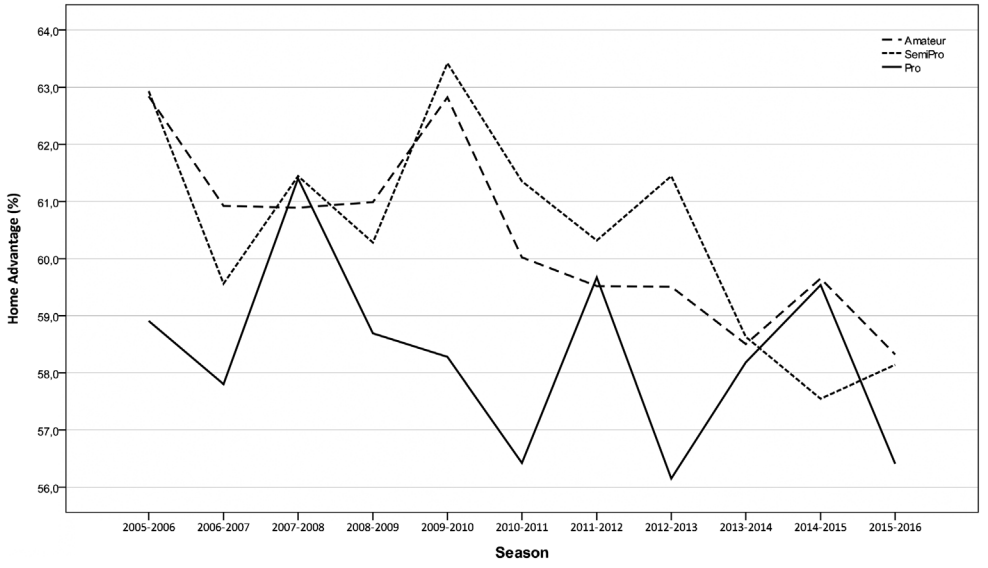

Figure 2. HA in Portuguese soccer displayed by level of competition over time.

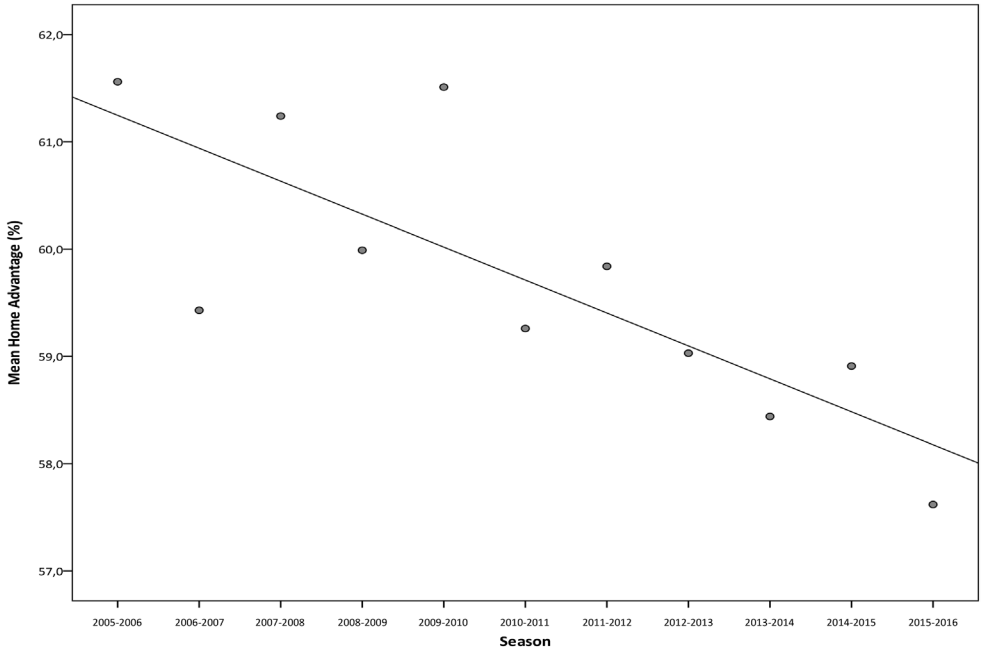

Figure 3. HA in Portuguese soccer over the last 11 seasons.

$p = .014$). In the Portuguese First League, the highest value of HA was obtained in the season 2007/2008 (61.4%) and the lowest value in 2012/2013 (56.15%). We did not found a significant relationship between HA and season at the professional level ($r = -.356$, $p = .141$). Figure 3 shows the mean value of HA for all levels of competition displayed as a function of time (i.e. season).

Overall, a significant negative relationship between HA and time has been found in recent years of Portuguese football ($r = -.794$, $p = .002$).

4. Discussion

The purpose of the present study was twofold: first, to examine the influence of the level of competition (amateur, semi-professional and professional) on the magnitude of HA in Portuguese football, and second, to verify whether the HA has changed over the recent years in Portugal.

As expected, we found a significant HA effect on all levels of Portuguese football competitions. This robust phenomenon has been consistently reported not only for different competitive levels in football (Allen & Jones, 2014; Armatas et al., 2013; Pollard & Pollard, 2005b), but also across several team sports (Carron et al., 2005; Jamieson, 2010; Pollard & Gómez, 2015a). The mean value of HA was 59.71%, which is in accordance with the findings of latest research focused on the HA in European national leagues (Lago-Peñas et al., 2016; Pollard & Gómez, 2014a). Additionally, the current results demonstrated that the level of competition influenced the magnitude of HA in Portuguese football, which confirmed our first hypothesis. The HA was greater in amateur and semi-professional leagues (60.36% and 60.46%, respectively) in comparison to the professional level (58.31%). The observed trend both support some and contradict other previous findings. On the one hand, several studies reported greater HA in low-ability teams; that is, teams playing in lower divisions and/or standing in the lower end of a league table in England (Allen & Jones, 2014; Bray, 1999; Jacklin, 2005) and Brazil (Almeida, Oliveira, & Silva, 2011). On the other hand, other research found greater values of HA at higher competitive levels in England (Bray et al., 2003; Pollard & Pollard, 2005b), Greece (Armatas et al., 2013) and U.S.A. (Pollard & Gómez, 2015a). Since these conflicting findings could be explained by methodological differences between studies (sample, periods of time, levels of competition, statistical procedures, etc.), future research should examine the HA in identical competitive levels of different national leagues over the same period of time.

The literature suggests crowd support, referee bias, territoriality, familiarity with local conditions, travel effects, special tactics, rules, psychosocial factors and team composition as the main causes of HA in sports (Carron et al., 2005; Pollard, 2008; Pollard & Gómez, 2014b). Our data showed that lower level football leagues (amateur and semi-professional levels), where the matches are played in smaller stadiums and with small average crowds, presented higher HA than the major Portuguese professional league with attendances ranging from a few thousand to over 60,000 spectators. Unlike previous research (e.g. Goumas, 2013, 2014; Pollard, 2006a), this study raised some doubts about the existence of a positive relationship between crowd size and HA, at least when different competitive levels are considered for the analysis (Pollard & Pollard, 2005a). Also indirectly, our findings suggest a negative relationship between distance travelled and the magnitude of HA in Portugal. In this country, amateur teams only played in their district, semi-professional teams were grouped by geographical location (e.g. south, centre and north), and professional teams played across the whole country, including the islands. Hence, professional teams travelled greater distances than amateur and semi-professional teams in away matches, yet the HA was significantly lower. Goumas (2013) evidenced a relative increase of 6.4% in HA per 1000 km increase in distance travelled during three seasons of UEFA Europa League. Perhaps the travel effects

on HA only become apparent in domestic competitions that require longer and fatiguing trips (Armatas & Pollard, 2014; Neave & Wolfson, 2003; Staufenbiel et al., 2016), such as Brazilian or Australian national leagues (Almeida et al., 2011; Goumas, 2014).

In the present era of free agency, the professional players usually represent a specific club team during short-term periods, becoming less familiarised with the "home ground" and club identity, and establishing a weaker bond with the local community and/or team supporters/fans (Smith, 2003; Page & Page, 2007; Pollard & Gómez, 2014b). This loss of representativeness of the local club and community may result in a diminished sense of home territorial protection in professional players when compared to their amateur and semi-professional counterparts (Armatas & Pollard, 2014; Jacklin, 2005; Pollard & Gómez, 2009). Regarding the referee bias, Pollard and Gómez (2009, 2015a) have reasoned that referees in professional sport are now better trained to cope with the hostile pressure of home crowds, and thus, less susceptible of making biased decisions in favour of the home team. The same applies to visiting players and teams, especially at higher levels of competition. Each match is prepared to the smallest detail, including a profound knowledge of the opposing team qualities and the adversities expected in an away match environment. The improved tactical and psychological training possibly also contributed to the lower values of HA found for professional teams (Pollard & Gómez, 2009, 2015a; Staufenbiel et al., 2015). Another probable contributor to the HA differences could be the players' level of expertise. Pollard and Gómez (2015a) have suggested the possibility of players less able to cope with the additional pressure involved in away matches being weeded out in the selection process, never reaching the professional status.

According to Jacklin (2005), "research into the temporal trends in HA is interesting in its own right but might (…) shed light on determinants of the HA phenomenon" (p. 669). From a historical perspective, little is known about HA in Portuguese football. One of the few exceptions was the long-term analysis conducted in the Portuguese First League by Marques (2009). The author reported a HA declining after the beginning of 1990s, nevertheless, the rhythm of this trend increased over the last 10 analysed seasons (from 1997/1998 to 2006/2007). The mean values of HA reported in the studies of Pollard (2006b) and Pollard and Gómez (2014b) for the Portuguese First League (64.79 and 58.71%, respectively) also evidenced a clear decline between two short-term periods (from 1997/1998 to 2002/2003 and from 2006/2007 to 2011/2012). A similar declining trend was observed in the major national leagues of England, Spain, Italy and France as well (Pollard & Gómez, 2009; Pollard & Pollard, 2005b; Sánchez et al., 2009; Thomas et al., 2004). As it has been previously hypothesised, when the results of all competitive levels were pooled, there was a significant declining effect of HA in Portuguese football over the last 11 seasons (from 2005/2006 to 2015/2016). However, when the competitive levels were separately analysed, the mid-term declining effect only reached statistical significance at amateur and semi-professional levels. The data suggest that the decline in the major professional league in Portugal has already started to level off, which is in line with the overwhelming findings of Allen and Jones (2014). Basically, these authors showed that the HA in the English Premier League did not continue to decline during the modern era (from 1992/1993 to 2011/2012). Further research is needed to examine to what extent other European or non-European countries are experiencing a similar pattern of HA stabilization over the recent years in their domestic football leagues.

The declining effect of HA is for many researchers a consequence of the increased professionalism and market culture in modern football (Page & Page, 2007; Pollard & Gómez,

2009; Smith, 2003). For instance, Jacklin (2005) and Pollard and Gómez (2009) argued that the technological development (e.g. television coverage, video recordings, etc.) negatively influenced the HA in football by (1) reducing referee bias, (2) expanding the supporter/fan base of teams beyond their home community and (3) allowing coaches/scouts to better analyse opposing teams and improve the preparation for upcoming matches. The declining effect of HA might also be explained by the reduction of the physiological impact of playing and travelling. It is assumed that travelling creates physiological disadvantage for the away team by causing fatigue and interruption of training (Clarke & Norman, 1995; Goumas, 2014; Oberhofer, Philippovich, & Winner, 2010). However, over the last decade, not only trips have became more comfortable and less fatiguing, but also the football recovery strategies, such as hydration, diet, supplementation, sleep, cold water immersion and compression garments, have been improved (Rey, Padrón-Cabo, Barcala-Furelos, Casamichana, & Romo-Pérez, 2016; Samuels, 2012). Even without providing any direct evidence to support this, we suppose that these two factors may also contribute to the decreasing trend of HA across time, especially in professional football.

Interestingly, our findings suggest that the HA in Portugal is converging over time between different levels of competition. A similar trend was verified by Jacklin (2005) in English first and second football divisions. On the contrary, Pollard and Gómez (2015a) have not found a similar declining pattern in several professional and college team sports. Based on our findings and on those from previous research, it seems that the psychological factor of playing at home is losing importance, perhaps due to decreasing competitive balance in Portuguese football leagues (Marques, 2009; Pollard & Gómez, 2014a, 2014b). Moreover, besides the professional level, the declining effect of HA is also affecting other levels of competition. The significant decrease of HA in Portuguese professional football reported in previous studies, found by both Marques (2009) and Pollard and Gómez (2009), has been mirrored by a similar decline at amateur and semi-professional levels within the country. Despite the growing body of evidence on HA, the sport-specific determinants and the psychological, physiological and sociological mechanisms underlying the present findings are not sufficiently understood yet.

Since the results of this study were fully based on archival data from three levels of competition in Portugal, the extent to which these findings may be generalised beyond the current data is limited (Sánchez et al., 2009). Furthermore, the competitive balance (i.e. the variability of quality between teams) in each level of competition was not directly controlled. Although this study was structured to minimise the effect of confounding factors, such as competitive balance, it is unequivocal that this specific factor may vary between leagues of different competitive level. Therefore, accordingly to Staufenbiel and colleagues (2016), "the competitive balance of leagues needs to be considered as an alternative explanation for deviations of HA magnitude" (p. 6).

5. Conclusion

This paper provides new insights into the possible causes and mid-term trends of HA in Portuguese football. Firstly, it was confirmed that the level of competition influenced the magnitude of HA. The mean values of HA were higher at the amateur and semi-professional levels when compared to the major professional league. Secondly, a significant declining effect of HA in Portuguese football was observed over the last decade irrespective of the

competitive level. On the one hand, it was suggested that the psychological factor of playing at home is losing importance. On the other hand, it seems that the declining effect of HA previously evidenced in several major national leagues (Portugal, Spain, Italy, France and England) has been mirrored by a similar decline at lower competitive levels in Portugal. Despite being a robust and well-documented phenomenon, the HA presents a great variability, changing in accordance to sport-specific determinants, geographical particularities, social backgrounds, psychological factors and temporal dispositions. Thus, further research should confer the findings of this study for other European and/or non-European football leagues, aiming the analysis of different competitive levels over identical periods of time.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Allen, M. S., & Jones, M. V. (2014). The home advantage over the first 20 seasons of the English premier league: Effects of shirt colour, team ability and time trends. *International Journal of Sport and Exercise Psychology, 12*, 10–18.

Almeida, L. G., Oliveira, M. L., & Silva, C. D. (2011). Uma análise da vantagem de jogar em casa nas duas principais divisões do futebol profissional brasileiro. *Revista Brasileira de Educação Física e Esporte, 25*, 49–54.

Armatas, V., & Pollard, R. (2014). Home advantage in Greek football. *European Journal of Sport Science, 14*, 116–122.

Armatas, V., Yiannakos, A., Seaton, M., & Rigas, G. (2013). Home advantage: Comparison between professional and amateur Greek football leagues. *Journal of Sport and Health Research, 5*, 95–106.

Bray, S. R. (1999). The home advantage from an individual team perspective. *Journal of Applied Sport Psychology, 11*, 116–125.

Bray, S. R., Law, J., & Foyle, J. (2003). Team quality and game location effects in English professional soccer. *Journal of Sport Behavior, 26*, 319–334.

Bray, S. R., & Widmeyer, W. N. (2000). Athletes' perceptions of the home advantage: An investigation of perceived causal factors. *Journal of Sport Behavior, 23*(1), 1–10.

Carron, A. V., Loughhead, T. M., & Bray, S. R. (2005). The home advantage in sport competitions: Courneya and Carron's (1992) conceptual framework a decade later. *Journal of Sports Sciences, 23*, 395–407.

Clarke, S., & Norman, J. (1995). Home ground advantage of individual clubs in English soccer. *The Statistician, 44*, 509–421.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155–159.

Courneya, K. S., & Carron, A. V. (1992). The home advantage in sport competitions: A literature review. *Journal of Sport and Exercise Psychology, 14*, 28–39.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: Sage.

FPF. (2016, April 6). *FPF: mais federados, mais saúde*. Retrieved from http://org.fpf.pt/pt-pt/Noticias/Noticia/Id/31117/Cat/787/highlight/0/caller/56/FPF-mais-federados-mais-saude

Goumas, C. (2013). Modelling home advantage in sports: A new approach. *International Journal of Performance Analysis in Sport, 13*, 428–439.

Goumas, C. (2014). Home advantage in Australian soccer. *Journal of Science and Medicine in Sport, 17*, 119–123.

Jacklin, P. B. (2005). Temporal changes in home advantage in English football since the second world war: What explains improved away performance? *Journal of Sports Sciences, 23*, 669–679.

Jamieson, J. P. (2010). The home field advantage in athletics: A meta-analysis. *Journal of Applied Social Psychology, 40*, 1819–1848.

Lago-Peñas, C., Gómez-Ruano, M., Megias-Navarro, D., & Pollard, R. (2016). Home advantage in football: Examining the effect of scoring first on match outcome in the five major European leagues. *International Journal of Performance Analysis in Sport, 16*, 411–421.
Marques, A. C. (2009). Estimating quality in home advantage and competitive balance in the Portuguese football league. *Journal of Quantitative Analysis in Sports, 5*, 3. doi: 10.2202/1559-0410.1139
Neave, N., & Wolfson, S. (2003). Testosterone, territoriality, and the 'home advantage'. *Physiology & Behavior, 78*, 269–275.
Oberhofer, H., Philippovich, T., & Winner, H. (2010). Distance matters in away games: Evidence from the German football league. *Journal of Economic Psychology, 31*, 200–211.
Page, L., & Page, K. (2007). The second leg home advantage: Evidence from European football cup competitions. *Journal of Sports Sciences, 25*, 1547–1556.
Pollard, R. (2006a). Home advantage in soccer: Variations in its magnitude and a literature review of the inter-related factors associated with its existence. *Journal of Sport Behavior, 29*, 169–189.
Pollard, R. (2006b). Worldwide regional variations in home advantage in association football. *Journal of Sports Sciences, 24*, 231–240.
Pollard, R. (2008). Home advantage in football: A current review of an unsolved puzzle. *The Open Sports Sciences Journal, 1*, 12–14.
Pollard, R., & Gómez, M. Á. (2009). Home advantage in football in South-West Europe: Long-term trends, regional variation, and team differences. *European Journal of Sport Science, 9*, 341–352.
Pollard, R., & Gómez, M. Á. (2014a). Comparison of home advantage in men's and women's football leagues in Europe. *European Journal of Sport Science, 14*, S77–S83.
Pollard, R., & Gómez, M. Á. (2014b). Components of home advantage in 157 national soccer leagues worldwide. *International Journal of Sport and Exercise Psychology, 12*, 218–233.
Pollard, R., & Gómez, M. Á. (2015a). Comparison of home advantage in college and professional team sports in the United States. *Collegium Antropologicum, 39*, 583–589.
Pollard, R., & Gómez, M. Á. (2015b). Validity of the established method of quantifying home advantage in soccer. *Journal of Human Kinetics, 45*, 7–8.
Pollard, R., & Pollard, G. (2005a). Home advantage in soccer: A review of its existence and causes. *International Journal of Soccer and Science, 3*, 28–38.
Pollard, R., & Pollard, G. (2005b). Long-term trends in home advantage in professional team sports in North America and England (1876–2003). *Journal of Sports Sciences, 23*, 337–350.
Poulter, D. R. (2009). Home advantage and player nationality in international club football. *Journal of Sports Sciences, 27*, 797–805.
Rey, E., Padrón-Cabo, A., Barcala-Furelos, R., Casamichana, D., & Romo-Pérez, V. (2016). Practical active and passive recovery strategies for soccer players. *Strength and Conditioning Journal,* doi: 10.1519/SSC.0000000000000247. Retrieved from http://journals.lww.com/nsca-scj/pages/results.aspx?txtkeywords=Practical+active+and+passive+recovery+strategies+for+soccer+players
Samuels, C. H. (2012). Jet lag and travel fatigue: A comprehensive management plan for sport medicine physicians and high-performance support teams. *Clinical Journal of Sport Medicine, 22*, 268–273.
Sánchez, P. A., García-Calvo, T., Leo, F. M., Pollard, R., & Gómez, M. A. (2009). An analysis of home advantage in the top two Spanish professional football leagues. *Perceptual and Motor Skills, 108*, 789–797.
Smith, D. R. (2003). The home advantage revisited: Winning and crowd support in an era of national publics. *Journal of Sport & Social Issues, 27*, 346–371.
Staufenbiel, K., Lobinger, B., & Strauss, B. (2015). Home advantage in soccer – A matter of expectations, goal setting and tactical decisions of coaches? *Journal of Sports Sciences, 33*, 1932–1941.
Staufenbiel, K., Riedl, D., & Strauss, B. (2016). Learning to be advantaged: The development of home advantage in high-level youth soccer. *International Journal of Sport and Exercise Psychology,* 1–15. doi: 10.1080/1612197X.2016.1142463
Thomas, S., Reeves, C., & Davies, S. (2004). An analysis of home advantage in the English football premiership. *Perceptual and Motor Skills, 99*, 1212–1216.
UEFA. (2016, June 1). *UEFA rankings for club competitions*. Retrieved from http://www.uefa.com/memberassociations/uefarankings/country/season=2016/index.html