

## Home Advantage and Away Disadvantage of Turkish Football Teams in European Competitions

Türk Futbol Takımlarının Avrupa Müسابakalarında Ev Sahibi Olma Avantajı ve Deplasman Dezavantajı

Research Article / Araştırma Makalesi

 Ümit KUVVETLİ<sup>1</sup>

<sup>1</sup> Bakırçay University, Faculty of Economics  
and Administrative Sciences, İZMİR

Corresponding Author / Sorumlu Yazar  
Assist. Prof. Dr. Ümit KUVVETLİ  
umit.kuvvetli@bakircay.edu.tr

Received / Geliş Tarihi : 18.10.2023  
Accepted / Kabul Tarihi : 11.03.2024  
Published / Yayın Tarihi : 29.04.2024

Ethical Statement / Etik Bilgilendirme  
This research does not require ethics  
committee approval.

DOI: 10.53434/gbesbd.1378119

### Abstract

Home advantage (HA) is used as a concept that means teams win more matches and score more goals than their opponents on their home field. Similarly, away disadvantage (AD) can be explained as teams scoring fewer points and scoring fewer goals away than their opponents. In this study, the matches played by 5 Turkish teams, played at least 30 matches in European competitions, between the 1991/1992 and 2022/2023 seasons, a total of 784 matches were analyzed and team-specific HA and AD values were estimated using Generalized Estimation Models. According to the results, all 5 Turkish teams have a significant HA in European competitions, but all teams also experience an AD and there is no difference among the teams in terms of both HA and AD. Furthermore, Belgian teams were found to be the teams where Turkish teams experienced the most home advantage and did not experience an away disadvantage. On the other hand, the teams with the lowest HA value and the highest AD value of Turkish teams were found to be Ukrainian teams. The results of the study show that playing in Türkiye is difficult for all European teams and that the AD of Turkish teams in countries with higher fan support is lower than in other countries.

**Keywords:** Football, Turkish football, Home advantage, Away disadvantage, Generalized estimated model

### Öz

Ev sahibi avantajı (HA), takımların kendi sahalarında rakiplerinden daha fazla sayıda maç kazandığı, daha fazla gol attığı anlamına gelen bir kavram olarak kullanılmaktadır. Benzer şekilde, deplasman dezavantajı (AD), takımların deplasmanda rakiplerine kıyasla daha az puan toplaması, gol atması olarak açıklanabilir. Bu çalışmada, Avrupa kupalarında en az 30 maç oynamış 5 Türk takımının, 1991/1992 ve 2022/2023 sezonları arasında oynadıkları toplam 784 maç analiz edilmiş ve takım özelinde HA ve AD değerleri Genelleştirilmiş Tahmin Modelleri kullanılarak tahmin edilmiştir. Elde edilen sonuçlara göre, beş Türk takımı da Avrupa kupalarında ev sahibi avantajına sahip olup, aynı zamanda deplasman dezavantajı yaşamaktadır. Ayrıca takımlar arasında istatistiksel bir fark bulunmamaktadır. Bununla birlikte, Belçika takımları, Türk takımlarının en fazla ev sahibi olma avantajı yaşadığı ve deplasman dezavantajı yaşamadığı takımlar olarak tespit edilmiştir. Buna karşın, Türk takımlarının en düşük HA değerine ve en yüksek AD değerine Ukrayna takımları karşısında sahip olduğu görülmüştür. Çalışma sonuçları, Türkiye deplasmanının tüm Avrupa takımları için zor olduğunu ve Türk taraftar desteğinin daha yüksek olduğu ülkelerde Türk takımlarının yaşadıkları deplasman dezavantajının diğer ülkelere kıyasla daha düşük olduğunu göstermektedir.

**Anahtar Kelimeler:** Futbol, Türk futbolu, Ev sahibi olma avantajı, Deplasman dezavantajı, Genelleştirilmiş tahmin modeli

## Introduction

It is well known that playing at home represents an advantage in professional sports. In scientific literature, this phenomenon is referred to as home advantage (HA) and consists of a higher chance to win a game for the home team compared to the away team (Pollard, 1986; Sors, Grassi, Agostini & Murgia, 2021). The HA effect is a worldwide phenomenon reflecting the tendency for sports teams and athletes to perform better playing at home than away (Gomez & Pollard, 2021). Numerous studies have examined the presence of HA in various sports, including basketball (Harris & Roebber, 2019), volleyball (Yonghui, Antonio, Kai & Tianbiao, 2020), handball (Volossovitch & Debanne, 2021), women's soccer (Leite & Pollard, 2020), hockey (Arboix-Alió, Buscà, Trabal, Aguilera-Castells, Sánchez-López, 2020), handball (Pic, 2018) and athletics (Jamieson, 2010).

HA is a well-known and well-documented phenomenon that occurs in most professional team sports (Gómez, Pollard & Luis-Pascual, 2011; Jones, 2018; Matos, Amaro & Pollard, 2020; Nevill & Holder, 1999; Pollard, Prieto & Gómez, 2017). Also, Pollard et al. (2017) found significant differences between sports, between countries and between sexes in terms of HA by analyzing 15 sports in 65 countries worldwide. The results of study suggest that the pace of a sport and the dimensions of the playing area affect HA.

Football has emerged as the most popular sport globally, attracting billions of spectators. Consequently, a significant number of studies have examined HA in soccer, along with numerous other soccer-related investigations. Much of the research on HA in football has focused on specific leagues. For instance, Pollard and Gomez (2009) conducted a study on South-west European countries, estimating HA values of 69.9% for Spain, 66.9% for France, 65.8% for Portugal, and 65.2% for Italy. In recent years, Ramchandani, Millar & Wilson (2021) reported HA values ranging from 58% to 61% for professional soccer leagues in England. In their study, Pollard and Gomez (2014b) investigated the HA in 157 national domestic soccer leagues worldwide, analyzing matches between 2006 and 2012. They found that HA, calculated by comparing the points accrued by home teams to the total points gathered in the league, was present across all continents. However, significant differences were noted among countries, and it was determined that the league with the highest HA was in Nigeria (86.8%). That study revealed that regions such as the Andes, Balkans, West Africa, and Central America exhibited pronounced HA, while the Baltic Republics and numerous leagues on the Arabian Peninsula displayed lower levels of HA. Variables such as the FIFA ranking (indicative of crowd support), maximum geographical distance between teams, the majority of teams coming from a single city, teams playing at high altitudes, recent occurrence of civil conflicts, and the corruption perception index were found to account for 43% of the variation in HA across the leagues, after accounting for competitive balance. The remaining portion of

the variation was attributed to regional, ethnic, and cultural factors, necessitating further exploration. In another study, Pollard and Gomez (2014a) conducted a comparative analysis of HA in women's and men's soccer leagues. Spanning the years 2004 to 2010, that study, based on the analysis of matches played in 26 European leagues, revealed that in women's leagues, HA (overall average of 54.2%) was lower compared to men's leagues (overall average of 60%). Factors such as differential crowd effects on players and referees and gender disparities, among others, were identified as potential reasons for this difference. Furthermore, Pollard and Gomez (2014a) indicated that as the status of women became more akin to that of men within a country, the difference in HA between women's and men's football leagues diminished.

Although many explanations for the HA have been proposed and debated, the existing literature largely agrees that the HA is not driven by a single source but by several interrelated factors that influence each other (Fischer & Haucap, 2021; Leite, Giardina, Almeida & Pollard, 2023; Wunderlich, Furley & Memmert, 2021). The factors affecting HA mainly refer to fans and crowd support, familiarity with the stadium and ground, altitude, travel conditions and referee bias. The behavior of the spectators on the stands influences the referee's psychology, causing bias in the referee's decision (Boyko, Boyko & Boyko, 2007) and making the referee unconsciously favour the home team (Dawson, Dobson, Goddard & Wilson, 2007; Goumas, 2014; Nevill, Balmer & Mark, 2002). At the same time, the support of the fans also helps to improve the performance of the home team (Ponzo & Scoppa, 2016). Familiarity with the game environment, such as familiarity and adaptation to the field conditions, environmental features, lighting, temperature, humidity, etc., also have a positive impact on the home team (Carron, Loughhead & Bray, 2005). The long-distance travel has a negative impact on the away team, leading to poor performance in the game (Brown, Raalte, Brewer, Winter & Andersen, 2002; Goumas, 2014; Pollard, 1986). Therefore, the existence of HA can give underdogs a chance to defeat the strong team at home (Forrest, Beaumont, Goddard & Simmons, 2005; Han, Yang, Pan, Garcia-de-Alcaraz & Liu, 2022).

The calculation of HA in previous studies has typically relied on straightforward mathematical procedures. HA is commonly determined by calculating the percentage of games won by teams playing at home out of the total number of decided games. Additionally, HA can be quantified by calculating the percentage of points won by home teams out of the total points available (Pollard, 1986). However, it is important to note that this method does not take team ability into consideration, which can have an impact on the calculation of HA (Rooney & Kennedy, 2018). Pollard and Stefani (2021) have investigated various methods used to measure the HA in different sports,

leagues, and teams, as well as the contributions of various factors influencing the HA.

When examined on a team basis, the HA can be defined as the superior performance of home teams in matches played at their own venues (winning more points, scoring more goals, etc.) compared to their opponents. Numerous studies conducted worldwide at the team level (Armatas & Pollard, 2014; Goumas, 2017; Marek & Vavra, 2017; Kuvvetli 2023; Kuvvetli & Çilengiroğlu, 2023; Kuvvetli & Çilengiroğlu, 2024; Pollard & Gomez, 2009; Pollard, Silva & Medeiros, 2008; Ramchandani, Millar & Wilson, 2021) demonstrate that the vast majority of home teams benefit from this advantage. While home teams having the advantage might imply that away teams are disadvantaged, the situation is not as straightforward as it appears. Similarly to HA, it is possible to define the away disadvantage (AD) as the performance exhibited by teams in matches played away from their home venues (Goumas, 2017). In the literature, there are relatively few studies that examine AD on a team basis (Goumas, 2017, Kuvvetli 2023; Kuvvetli & Çilengiroğlu, 2023; Kuvvetli & Çilengiroğlu, 2024).

In the literature, the number of studies conducted at team level is limited, and most of them are related to home advantage. By analyzing the matches played between the season in which professional leagues started in the respective country and the 2006/2007 season, Pollard and Gomez (2009) examined HA for teams in the South-West Europe region. In their study, the HA values for teams in France ranged from 59.2% to 74.4%, in Italy from 61.0% to 71.8%, in Portugal from 61.0% to 71.3%, and in Spain from 67.1% to 72.0%. Armatas and Pollard (2014) similarly estimated HA for individual teams in Greek football to range from 49.6% to 80.5% by analyzing the matched between 1994/1995 and 2010/2011 seasons. Pollard et al. (2008) determined that different Brazilian teams had a HA ranging from 57.5% to 74.9% for the five seasons from 2003 to 2007. These studies have shown that while factors such as team quality, crowd size, stadium capacity, and other factors may vary, the majority of teams have a HA. In another study that examined HA in European leagues (Pollard & Gomez, 2014), it was found that the average HA for males was approximately 60%, with variations ranging from 52.8% to 65.2% across different countries by analyzing data from 26 different countries for 5 seasons between 2004 and 2010.

When examining studies related to the HA phenomenon in Türkiye, it has been determined that the HA for the Turkish Super League is 61.5% (Seçkin & Pollard, 2008). When considering studies conducted at the team level, in research where HA was examined through point calculation, it was found that the advantage ratio for teams ranged between 45% and 82.3% (Öndes, 2019). In another study employing a similar method, HA for teams in the Turkish 1st League was determined to be between 54.5% and 65.3% (Gürkan, Göral & Saygın, 2017). In studies that investigate HA and AD based on goals scored and conceded by teams, Kuvvetli & Çilengiroğlu (2023) found that the

HA for Turkish Super League teams ranged from 56.2% to 81.8%, while the AD ranged from 46.7% to 65.4%. Another study using the same method identified that HA for Turkish 1st League teams varied between 37.9% and 72.9%, while the AD ranged from 46.9% to 73.7% (Kuvvetli, 2023). Despite the presence of studies in the literature on Turkish teams' HA in local leagues, there is a notable absence of research on Turkish teams' HA and AD in European competitions. The main purpose of this study is to fill this gap in the literature. In addition, another objective of the study is to compare the HA and AD values of Turkish teams in domestic leagues and European competitions and also determine whether there are any differences among teams. Additionally, the study aims to investigate whether the HA and AD of Turkish teams vary when playing against teams from different countries in European competitions.

## Data and Methods

### Data

Since 1956, the first-year Turkish football teams have participated in European competitions; 30 different Turkish teams have taken part in European competitions. The majority of these teams have very limited European competition experience. 25 of the 30 teams have less than 30 matches (15 home and 15 away matches) of total experience in European competitions. In order to increase the statistical reliability of the results obtained in the study, teams with a limited number of matches played in European competitions were excluded from the analysis and the data of the other 5 teams (Galatasaray, Fenerbahce, Besiktas, Trabzonspor and Basaksehir) were used. Furthermore, the study used data from matches played between the 1991/1992 and 2022/2023 seasons, spanning 32 seasons. The reason why the 1991/1992 season was preferred as the starting date is that the Champions League format has been implemented since that season. A total of 784 matches meeting both of these criteria were used in the study. This number constitutes 83% of the 946 matches played by all Turkish teams after 1991/1992 season. All match data were taken from the Union of European Football Associations (UEFA) official website ([www.uefa.com/insideuefa/documentlibrary/competitions/](http://www.uefa.com/insideuefa/documentlibrary/competitions/)).

### Statistical Analysis

This study estimated the HA and AD for each team based on the percentage of goals scored and conceded at their home and away matches, respectively. To calculate HA, the number of goals scored by a team in their home matches was divided by the total number of goals scored and conceded in those matches. For example, if a team scored 60 goals and conceded 20 goals in their home matches, their unadjusted HA would be calculated as  $60/(60 + 20) \times 100\% = 75\%$ . A HA value greater than 50% indicates superior performance in home matches.

Similarly, the AD was estimated as the percentage of goals conceded by a team in their away matches. If a team scored 30 goals and conceded 50 goals in their away matches, the unadjusted AD would be calculated as  $50/(30 + 50) \times 100\% = 62.5\%$ . A higher AD value represents inferior performance in away matches. It should be noted that an HA or AD value of 50% for any team indicates no HA or AD (Kuvvetli & Çilengiroğlu, 2024).

This study employed a multivariate regression analysis to account for the confounding effect of team ability on the HA and AD calculations. Crude calculations of HA and AD are influenced by differences in team ability; thus, controlling this factor is essential to obtain more accurate results. A paired design was used in the analysis, where each match contributed two observations: one for the home team and one for the away team. Generalized Estimated Equations (GEE) in IBM SPSS Version 26 (IBM, 2019) were used for the repeated measures regression analysis. Repeated measures analysis is suitable when observations occur in pairs, and the outcome of interest is likely to be correlated within each pair. This study treated the individual matches as the "groups," and the number of goals scored by each of the two opposing teams constituted the "observations." Since, the outcome of interest, namely the number of goals scored is a discrete count, Poisson errors were specified for the regression model. Robust estimation of variance was employed, which ensures valid standard errors even if the within-group correlations deviate from the correlation structure specified in the model. Robust variance estimation also prevents underestimation of standard errors when count data exhibit over-dispersion, a phenomenon where observed variation exceeds what would be expected from a Poisson distribution. The modeling strategy used in this study has been previously employed to investigate HA in terms of goals scored and disciplinary sanctions issued by referees in football (Goumas, 2013, Goumas, 2017; Kuvvetli & Cilengiroglu, 2024).

The strengths and abilities of the teams in European competitions vary according to the organization (Champions League, Europa League, Confederations Cup, etc.) and the progress in the tournament. This makes it difficult to make comparisons between the Turk teams. In this study, with the aim of mitigating the mentioned ability gap between teams, the UEFA club rankings, which are annually generated by UEFA based on the performance of all teams participating in European competitions, were added to the model and controlled for. In the study, for each season, the positions of the teams in the UEFA club rankings in the relevant season are accepted as the ability of the teams in the relevant season. With this method, each team has a different team ability value for each season and thus, the differences in strength and quality of the teams varying according to the seasons and the organizations they participate in are taken into account. In addition, the location variable (0: away, 1: home), which indicates whether the teams play home or away, was also added to the model. The regression coefficients

obtained from the model are interpreted as HA or AD on a logarithmic scale according to the reference. This method was previously used in Goumas (2017) and Kuvvetli & Çilengiroğlu (2024) for the estimation of HA and AD for the teams in the Champions League, Turkish Super League (Kuvvetli & Çilengiroğlu, 2023) and Turkish 1st league teams (Kuvvetli, 2023).

Linear combinations of equations (generalized linear models) were used to estimate adjusted HA and AD regarding to the percentage of goals scored in home matches by each team (HA) and the percentage of goals conceded in away matches by each team (AD). To test for variation in HA and AD between teams, a chi-square test was performed and p values less than 0.05 were interpreted to be significant. HA and AD were taken from the Poisson regression coefficient ( $\beta$ ) for match location (0 = Away, 1 = Home) for each team using the following equation (Goumas, 2017):

$$HA \text{ and } AD = \frac{\exp(\beta)}{\exp(\beta) + 1} \times 100\%$$

The standard error (SE) for HA and AD can be calculated as follows, where se represents the standard error of beta (Goumas, 2013):

$$SE(HA \text{ and } AD) = HA - \left( \frac{\exp(\beta - se)}{\exp(\beta - se) + 1} \times 100 \right)$$

In these equations, the exponential function  $\exp(\beta)$  is applied to the regression coefficient for match location, and the results are transformed into percentages. The HA represents the estimated percentage of goals scored by the home team, while the AD represents the estimated percentage of goals conceded by the away team. Using this approach, the study aimed to obtain adjusted estimates of HA and AD that consider the impact of match location on goal scoring and conceding, providing a more accurate assessment of the influence of HA and AD in football matches. To test for variation in HA and AD between teams, a chi-square test was carried out. p values less than 0.05 were significant.

## Results

### Home Advantages by Teams

There are only 5 Turkish teams that played at least 30 matches in UEFA competitions between 1991/1992 and 2022/2023 seasons. The number of home matches played by these teams in UEFA competitions, the number of goals scored and conceded, the crude and adjusted HA values, and the p values showing the statistical significance of the adjusted HA value are summarized in Table 1. The teams in Table 1 are ranked in descending order according to the adjusted HA value adjusted for team ability and the season effect.

**Table 1.** Home advantage (%) for Turkish teams in European Competitions in 1991/1992 to 2022/2023 seasons

Teams	Home matches	Goals for	Goals against	Home Advantage (%)		
				Crude	Adj (SE)	p
Besiktas	98	160	104	60.6	73.4 (2.2)	<0.001*
Basaksehir	25	35	28	55.5	72.5 (6.0)	0.001*
Trabzonspor	57	47	67	56.5	70.9 (3.4)	<0.001*
Fenerbahce	96	149	105	58.7	67.5 (2.5)	<0.001*
Galatasaray	115	181	130	58.2	66.3 (2.2)	<0.001*

The adjusted HA values in Table 1 indicate the superiority of the relevant team in home matches against an opponent of equal ability in the European competitions. It is seen that all teams in Table 1 have statistically HA in home matches in European competitions. However, despite the HA of the teams ranging between 66.3% and 73.4%, there is no statistical difference ( $\chi^2_4 = 1.28; p = 0.17$ ) between the teams in terms of HA.

### Away Disadvantages by Teams

The number of matches played by teams in UEFA competitions, the number of goals they scored and conceded, as well as the crude and adjusted AD, along with the p-values indicating their statistical significance, are summarized in Table 2. The teams listed in Table 2 are arranged in ascending order based on their adjusted AD values.

**Table 2.** Away disadvantage (%) for Turkish teams in European Competitions in 1991/1992 to 2022/2023 seasons

Teams	Away matches	Goals for	Goals against	Away Disadvantage (%)		
				Crude	Adj (SE)	p
Fenerbahçe	96	117	141	54.7	54.6 (3.1)	0.143
Galatasaray	116	140	196	58.3	58.7 (3.0)	0.005*
Trabzonspor	58	59	84	58.7	58.9 (3.4)	0.013*
Besiktas	98	116	179	60.7	59.7 (3.1)	0.002*
Basaksehir	25	32	47	59.5	59.8 (5.2)	0.071*

In Table 2, the adjusted AD values indicate the disadvantage of the relevant team in away matches against an opponent of equal ability in European competitions. Although all of the teams included in the analysis have a statistical HA, Table 2 shows that the AD values for all of our teams are more than 50% and they have an AD.

However, for all our teams except Fenerbahçe, the AD values are statistically significant. Additionally, it has been determined that there is no statistically significant difference between teams in terms of the AD ( $\chi^2_4 = 1.60; p = 0.81$ ).

### Home Advantages of Turkish Teams over Opponent Countries

After estimating the HA and AD values for the Turkish teams with sufficient experience and data for the analysis in European competitions, the same analysis was conducted for opponent countries as well. Table 3 summarizes the HA values of Turkish teams when playing at home against teams from rival countries. Within the scope of the analysis, to ensure the statistical reliability of the results obtained, a total of 11 countries, which were met at least 13 times, have been included in the analysis.

**Table 3.** Home advantage (%) for Turkish teams according to opponent team countries

Countries	Home matches	Goals for	Goals against	Home Advantage (%)		
				Crude	Adj (SE)	p
Belgium	14	21	17	55.3	75.2 (9.0)	0.011*
France	26	46	41	52.9	71.1 (4.2)	<0.001*
Russia	17	25	14	64.1	70.7 (7.0)	0.006*
Netherlands	16	22	23	48.9	69.9 (5.8)	0.001*
Czechia	13	26	11	70.3	67.3 (8.3)	0.044*
England	30	30	37	44.8	66.4 (5.4)	0.004*
Italy	31	38	39	49.4	65.4 (4.3)	0.001*
Spain	34	41	56	42.3	63.2 (6.4)	0.041*
Portugal	19	25	30	45.5	62.1 (8.1)	0.140
Germany	26	30	42	41.7	61.8 (6.4)	0.070*
Ukraine	16	20	18	52.6	57.6 (9.1)	0.403



When the values in Table 3 are examined, it is seen that, among the 11 countries included in the analysis, Turkish teams statistically have a HA against teams from all countries except Portugal and Ukraine. Although the number of goals scored by our teams against the teams of England, Spain, Italy, Germany and the Netherlands is lower than the number of goals conceded, since the teams of these countries are more talented than the Turkish teams and the model eliminates this ability difference, it is seen that our teams have a HA against the teams of these countries. There is a statistical difference ( $\chi^2_{10} = 14.69; p = 0.04$ ) between the rival team countries in terms of the HA of our teams.

### Away Disadvantages of Turkish Teams over Opponent Countries

Table 4 shows that the crude AD values of Turkish teams against teams from all countries except Belgium are more than 50%. When examined in terms of adjusted AD, Turkish teams have a statistical AD against teams from countries other than Belgium, Russia and Spain and adjusted AD values of our teams are above 60%. However, the AD values of our teams differ statistically ( $\chi^2_{10} = 80.58; p < 0.001$ ) according to the rival countries. This difference ( $\chi^2_9 = 7.33; p < 0.001$ ) is also valid for countries other than Belgium where we have the lowest AD.

**Table 4.** Away disadvantage (%) for Turkish teams according to opponent team countries

Countries	Away matches	Goals for	Goals against	Away Disadvantage (%)		
				Crude	Adj (SE)	p
Belgium	13	18	16	47.1	47.3 (7.8)	0.726
Germany	27	32	56	63.6	60.9 (5.7)	0.072*
Portugal	20	20	38	65.5	62.5 (5.9)	0.051*
Russia	16	14	23	62.2	62.5 (7.4)	0.123
Czechia	13	14	25	64.1	65.0 (7.1)	0.060*
Spain	36	21	74	77.9	65.2 (8.3)	0.109
Italy	31	25	58	69.9	67.0 (4.5)	0.001*
France	27	26	59	69.4	67.3 (4.2)	<0.001*
Netherlands	16	11	28	71.8	68.3 (6.1)	0.011*
England	29	19	66	77.6	71.7 (5.3)	<0.001*
Ukraine	15	10	28	73.7	73.6 (7.3)	0.015*

## Discussion

The purpose of this study is to calculate the advantage of being a home team and the disadvantage of being an away team for Turkish football teams with a certain number of matches played in the UEFA competitions. To achieve this goal, the study employs the Generalized Estimating Equations and Poisson Regression methods previously used by Goumas (2017) and Kuvvetli and Çilengiroğlu (2024). One advantage of this method is that it provides individualized home advantage estimates for each team, thereby avoiding the influence of other teams' results. Additionally, unlike other methods, it incorporates team abilities into the model. Previous methods tended to "regress" each team's home advantage towards the mean home advantage for all teams combined, which reduced the ability to detect differences between teams.

The traditional HA calculation method (Pollard, 1986) has been utilized in numerous competitions where each team plays an equal number of matches against one another (Armatas & Pollard, 2014; Pollard et al., 2008; Pollard & Gomez, 2009; Pollard & Gomez, 2014). Also, the amount of competitive balance among the teams in a league has been shown to influence HA when quantified as the percentage of points won by the home team in the study of Pollard & Gómez (2014). However, using the traditional method in competitions where teams do not

play an equal number of matches and compete against teams of varying strengths can be misleading when comparing teams based on these results (Kuvvetli & Cilengiroğlu, 2024).

In the literature, there are numerous studies on HA and AD, most of which focus on specific leagues. The number of studies conducted at team level is limited, and most of them are related to home advantage. Pollard and Gomez (2009) examined HA for teams in the South-West Europe region. In their study, the HA values for teams in France ranged from 59.2% to 74.4%, in Italy from 61.0% to 71.8%, in Portugal from 61.0% to 71.3%, and in Spain from 67.1% to 72.0%. Armatas and Pollard (2014) similarly estimated home advantage for individual teams in Greek football to range from 49.6% to 80.5%. Pollard et al. (2008) determined that different Brazilian teams had a HA ranging from 57.5% to 74.9%. These studies have shown that while factors such as team quality, crowd size, stadium capacity, and other factors may vary, the majority of teams have a HA. In another study that examined HA in European leagues (Pollard & Gomez, 2014), it was found that the average HA for males was approximately 60%, with variations ranging from 52.8% to 65.2% across different countries. For the Turkish Super League, Öndes (2019) conducted a study using a point-based calculation to explore the team-specific HA, and it was found to range from

45% to 82.3%. In another study using a similar method, Gürkan et al. (2017) found that teams in Turkish 1<sup>st</sup> League have a HA ranging from 48.9% to 85.7%. In the studies using the same method used in this study, it was determined that the HA ranged between 56.2% and 81.8% for the individual teams in the Turkish Super League and between 37.9% and 72.9% for the individual teams in the Turkish 1st League, while the AD ranged between 46.7% and 65.4% for the teams in the Turkish Super League and between 46.9% and 73.7% for the teams in the Turkish 1st League (Kuvvetli & Cilengiroglu, 2023, Kuvvetli, 2023). In terms of the Turkish Super League, HA is calculated as 61.5% (Seckin & Pollard, 2008). The HA values obtained in this study for Turkish teams in the European competitions are in line with the literature.

Studies on European competitions are quite limited. Goumas (2017) modelled HA and AD for 13 teams with a certain number of matches in the Champions League. As a result of the study, it was found that the HA of the teams ranged between 58% and 73% and there was no significant difference between the teams. According to the analysis of the same study results show 4 teams of 13 teams had significant AD. Contrary to the interest in studying the HA that teams possess, the literature on the AD that teams face is scarce (Goumas, 2017).

Kuvvetli and Çilengiroğlu (2023) calculated the HA and AD of the teams by using the same method used in this study for the teams in the Turkish Super League. When the results obtained on a team basis in the aforementioned study were compared with the results obtained in this study, it was investigated with the related Wilcoxon signed-rank test to see whether there was a statistical difference between the HA values of the teams in the Turkish Super League and European competitions and it was concluded that there was no difference ( $p=0.279$ ). This result indicates that the factors mentioned in the literature as reasons for the HA, such as psychological factors, fan support, field familiarity, exerting pressure on referees, etc. (Boyko et al., 2007; Nevill et al., 2002; Wunderlich et al., 2021), affect Turkish teams in the Turkish Super League and European competitions in the same way.

Turkish teams' AD values in the Turkish Super League and European competitions were compared using the related Wilcoxon signed-rank test, and it was concluded that there is a statistically significant difference ( $p=0.043$ ). There could be several reasons why Turkish teams do not have an AD in the Turkish Super League but experience it in European matches. Four of these teams, namely Fenerbahçe, Galatasaray, Beşiktaş, and Trabzonspor, have supporters in nearly every city in Türkiye and often have more fan support than the home teams in many matches played away within Türkiye. However, this support is relatively limited in European competitions, which can be considered one of the primary reasons for the difference. Additionally, factors such as longer journeys in European matches (Brown et al., 2002; Goumas, 2014), climate differences (Carron

et al., 2005), and field conditions (e.g., artificial grass) can contribute to the increased AD in European competitions. In addition to these reasons, the referee controversies in Türkiye can be shown as another factor explaining the difference in the AD of Turkish teams between the two organizations.

When the countries of the teams that Turkish clubs face in European competitions are evaluated, it is observed that Turkish team's HA varies depending on the countries involved. Factors such as inter-country distance, travel conditions, climatic differences, and more can be cited as the reasons for this situation. The statistical absence of a HA for Turkish teams against Ukrainian and Portuguese teams may be attributable to factors such as specific match tactics employed in those encounters or other strategic considerations.

Furthermore, it is notable that Turkish teams experience varying levels of AD when facing teams from different countries. For instance, one possible explanation for this disparity in AD against England could be the considerable geographical distance, whereas climatic differences may play a role when facing Ukrainian teams. Moreover, the relatively lower AD against countries like Belgium and Germany could be explained by the substantial Turkish population residing in these countries and the strong fan support that Turkish teams receive during away matches there. These multifaceted factors collectively contribute to the fluctuations in our HA and AD experienced by Turkish teams in European competitions against teams from different countries.

The results obtained on a team basis in the study have some limitations as some teams have relatively little data, especially Basaksehir in teams and Belgium and Czechia in countries. This situation ensures that the standard error values of the teams and countries with little data are high and affects the reliability of the results obtained from these teams and countries. However, in the preferred method of the study, each team and country were analyzed separately. In this method, in which the effect of team ability is controlled, analyzing the teams separately has increased the statistical power in determining the difference between the teams and countries. Obtaining more data from a larger number of teams and countries would allow for more reliable results to be obtained.

This study is based on the European competitions match data of only 5 Turkish teams. All other teams were excluded from the analysis due to insufficient number of matches. Including these teams in the analysis may change the results about the countries. In addition, although this study found that the HA and AD values of Turkish teams differ across countries, the possible reasons for this difference (distance, cultural differences, number of fans, seasonal conditions, etc.) may be the subject of future studies.

## Conclusion

This study focuses on analyzing the home advantage (HA) and away disadvantage (AD) of Turkish football teams in the European competitions. The findings of the study indicate that five Turkish football teams have a significant HA and AD in European competitions despite having a significant HA and not facing a significant AD in Turkish Super League. Furthermore, it is concluded that the HA and AD values of Turkish football teams in European competitions vary according to the country of the opponent and the reasons for these results are discussed. The results of the study show that Turkish teams in European competitions have a significant advantage in home matches, whereas the away disadvantage varies from country to country in away matches. The main reason for this difference is thought to be the factor of fan support in the away countries. In addition, the reason why the AD of the teams analyzed in the study in the domestic league is lower than the AD in the European competitions may be that the teams do not experience fan pressure in many away matches in Türkiye.

## Financial Resources

No financial support was received from institutions and/or institutions during the preparation and writing of this study.

## References

- Arboix-Alió, J., Buscà, B., Trabal, G., Aguilera-Castells, & Sánchez-López, M. J. (2020). Comparison of home advantage in men's and women's Portuguese roller hockey league. *Cuadernos de Psicología del Deporte*, 20(1), 181–189.
- Armatas V., & Pollard, R. (2014). Home advantage in Greek football. *European Journal of Sport Science*, 14(2), 116-122.
- Boyko R. H., Boyko, A. R., & Boyko, M. G. (2007). Referee bias contributes to home advantage in English premiership football. *Journal of Sports Sciences*, 25(11), 1185-1194.
- Brown, T. D., Raalte J. L. V., Brewer, B. W., Winter, A. E. C., & Andersen, M. B. (2002). World Cup soccer home advantage. *Journal of Sport Behavior*, 25(2), 134–144.
- 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.
- Dawson, P., Dobson, S., Goddard, J., & Wilson, J. (2007). Are football referees really biased and inconsistent? evidence on the incidence of disciplinary sanction in the English premier league. *Journal of the Royal Statistical Society: Series A - Statistics in Society*, 170(1), 231-250.
- Fischer, K., & Haucap, J. (2021). Does crowd support drive the home advantage in professional football? evidence from German ghost games during the COVID-19 pandemic. *Journal of Sports Economics*, 22(8), 982–1008.
- Forrest, D., Beaumont, J., Goddard, J., & Simmons, R. (2005). Home advantage and the debate about competitive balance in professional sports leagues, *Journal of Sports Sciences*, 23(4), 439-445.
- Gómez-Ruano, M. A., & Pollard, R. (2021). The home advantage phenomenon in sport: history and development. In M. A. Gómez-Ruano, R. Pollard, & C. Lago-Peñas (Eds.), *Home advantage in sports: Causes and the effect on performance* (pp. 3–12). Routledge.
- Gómez, M. A., Pollard, R., & Luis-Pascual, J. C. (2011). Comparison of home advantage in nine different professional team sports in Spain. *Perceptual and Motor Skills*, 113(1), 150-156.
- Goumas, C. (2013). Modelling home advantage in sport: a new approach. *International Journal of Performance Analysis in Sport*, 13, 428–439.
- Goumas, C. (2014) Tyranny of distance: home advantage and travel in international club football. *International Journal of Performance Analysis in Sport*, 14, 1-13.
- Goumas, C. (2017). Modelling home advantage for individual teams in UEFA Champions League football. *Journal of Sport and Health Science*, 6, 321–326.
- Gürkan, O., Göral, K., & Saygın, Ö. (2017). Home advantage in professional soccer: analysis of Turkey 1. League [Profesyonel futbolda ev sahibi olma avantajı: Türkiye 1. Liginin analizi]. *Journal of Human Sciences*, 14(4), 3292-3299.
- Han, B., Yang, L., Pan, P., Garcia-de-Alcaraz, A., & Liu, T. (2022). The influence of removing home advantage on the Chinese Football Super League. *BMC Sports Science, Medicine and Rehabilitation*, 14, 208.
- Harris, A. R., & Roebber, P. J. (2019). NBA team home advantage: identifying key factors using an artificial neural network. *PLoS ONE*, 14(7), e0220630.
- IBM (2019). IBM corp. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.
- Jamieson, J. P. (2010). The home field advantage in athletics: A meta-analysis. *Journal of Applied Social Psychology*, 40(7), 1819–1848
- Jones, M. B. (2018). Differences in home advantage between sports. *Psychology of Sport and Exercise*, 34, 61-69.
- Kuvvetli, Ü., & Vupa Çilengiroğlu, Ö. (2023). Statistical modelling of home advantage and away disadvantage of Turkish super league teams. *Gazi Beden Eğitimi ve Spor Bilimleri Dergisi*, 28(3), 206-214.
- Kuvvetli, Ü. (2023). An investigation on home advantage and away disadvantage of teams in TFF 1. League [TFF 1. ligde takımların ev sahibi avantajı ve deplasman dezavantajı üzerine bir araştırma]. *Sportmetre*, 21, (Special Issue for 100<sup>th</sup> year), 78-90.
- Kuvvetli, Ü., & Çilengiroğlu Ö. V. (2024). Home advantage and away disadvantage of teams in champions league: is it valid for all teams and against every opponent? *Journal of Human Kinetics*, 92, 161-179.
- Leite, W., Giardina, M., Almeida, C. H., & Pollard, R. (2023). Home advantage in football after moving to a new stadium: evidence from European professional teams. *International Journal of Sport and Exercise Psychology*, 21(4), 750-760.
- Leite, W., & Pollard, R. (2020). Comparison of home advantage between level 1 and level 2 in Women's Football Leagues. *Journal of Anthropology of Sport and Physical Education*, 4(4), 9–13.
- Marek, P., & Vávra, F. (2017, June). Home team advantage in English Premier League. *Paper presented at Mathsport International 2017 Conference Proceedings/ Padua, Italy*.
- Matos, R., Amaro, N., & Pollard, R. (2020). How best to quantify home advantage in team sports: an investigation involving male senior handball leagues in Portugal and Spain. *RICYDE. Revista internacional de ciencias del deporte*, 59(16), 12-23.



27. **Nevill, A. M., & Holder, R. L.** (1999). Home advantage in sport: An overview of studies on the advantage of playing at home. *Sports Medicine*, 28(4), 221-236.
28. **Nevill, A. M., Balmer, N. J., & Mark, W. A.** (2002). The influence of crowd noise and experience upon refereeing decisions in football. *Psychology of Sport and Exercise*, 3, 261-272.
29. **Öndes, H.** (2019). Home ground advantages of Turkey Spor Toto Super League clubs [Türkiye Spor Toto Süper Ligi kulüplerinin ev sahibi olma avantajı], *Spor Bilimleri Dergisi*, 30(2), 74-84.
30. **Pic, M.** (2018). Performance and home advantage in handball. *Journal of Human Kinetics*, 63, 61-71. <https://doi.org/10.2478/hukin-2018-0007>.
31. **Pollard, R. (1986).** Home advantage in soccer: A retrospective analysis. *Journal of Sports Sciences*, 4, 237-248.
32. **Pollard, R., Silva, C. D., & Medeiros, N. C.** (2008). Home advantage in football in Brazil: differences between teams and the effects of distance traveled. *Revista Brasileira De Futebol (The Brazilian Journal of Soccer Science)*, 1(1), 3-10.
33. **Pollard, R., & Gómez M. A.** (2009). Home advantage in football in South-West Europe: long-term trends, regional variation, and team differences, *European Journal of Sport Science*, 9(6), 341-352.
34. **Pollard R., & Gómez, M. A.** (2014). Comparison of home advantage in men's and women's football leagues in Europe. *European Journal of Sport Science*, 14(1), S77-S83.
35. **Pollard, R., & Gómez, M. A.** (2014b). Components of home advantage in 157 national soccer leagues worldwide. *International Journal of Sport and Exercise Psychology*, 12(3), 218-233.
36. **Pollard, R., Prieto, J., & Gómez, M.** (2017). Global differences in home advantage by country, sport and sex. *International Journal of Performance Analysis in Sport*, 17(4), 586-599.
37. **Pollard, R., & Stefani, R.** (2021). The assessment and quantification of the home advantage effect. In M. A. Gómez-Ruano, R. Pollard, & C. Lago-Peñas (Eds.), *Home advantage in sports: Causes and the effect on performance* (pp. 31-43). Routledge.
38. **Ponzo, M., & Scoppa, V.** (2016). Does the home advantage depend on crowd support? evidence from same-stadium derbies. *Journal of Sports Economics*, 19(4), 562-582.
39. **Ramchandani, G., Millar, R., & Wilson, D.** (2021). The relationship between team ability and home advantage in the English football league system. *German Journal of Exercise and Sport Research*, 51, 354-361.
40. **Rooney, L., & Kennedy, R.** (2018). Home advantage in Gaelic football: the effect of divisional status, season and team ability, *International Journal of Performance Analysis in Sport*, 18(6), 917-925.
41. **Seçkin, A., & Pollard, R.** (2008). Home advantage in Turkish professional soccer. *Perceptual and Motor Skills*, 107, 51-54.
42. **Sors, F., Grassi, M., Agostini, T., & Murgia, M.** (2021). The sound of silence in association football: Home advantage and referee bias decrease in matches played without spectators. *European Journal of Sport Science*, 21(12), 1597-1605.
43. **Wunderlich, F., Furley, P., & Memmert, D.** (2021). Home sweet home: theoretical explanations on why the local and local environment affects the performance of home and away teams. In M. A. Gómez-Ruano, R. Pollard, & C. Lago-Peñas (Eds.), *Home advantage in sports: Causes and the effect on performance* (pp. 44-50). Routledge.
44. **Volossovitch, A., & Debanne, T.** (2021). Home advantage in handball, In Gómez-Ruano M., & Pollard R., & Lago-Peñas C. (Eds.) *Home Advantage in Sport: Causes and the Effect on Performance*. Routledge. eBook ISBN:9781003081456.
45. **Yonghui, Y., Antonio, G. A., Kai, C., & Tianbiao, L.** (2020). Interactive effects of home advantage and quality of opponent in Chinese Women's Volleyball Association League. *International Journal of Performance Analysis in Sport*, 20(1), 107-117.