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2007

Online at <https://mpra.ub.uni-muenchen.de/14323/>

MPRA Paper No. 14323, posted 28 Mar 2009 01:35 UTC

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Summary.-Home advantage is known to play an important role in the outcome of professional soccer games, and to vary considerably worldwide. In the Turkish Super League over the last 12 years, 61.5% of the total points gained have been won by the home team, a figure similar to the worldwide average and to the Premier League in England. It is lower (57.7%) for games played between teams from Istanbul and especially high for games involving teams from cities in the more remote and ethnically distinct parts of Turkey (Van and Diyarbakir). Match performance data show that although home teams in Turkey take 26% more shots at goal than away teams, the success rates for shots do not differ. For fouls and disciplinary cards, home and away teams do not differ significantly in Turkey, a finding that differs from games in England, perhaps due to less referee bias.

Home advantage is an important factor in the outcome of soccer games, although its precise causes are not clear. The main factors involved fall under the general headings of crowd support, travel effects, familiarity with local playing conditions, referee bias, territoriality, and psychological effects. The evidence for and against these factors are summarized in Pollard (2006a) and a model for the way in which they are likely to interact with each other is proposed. In national leagues worldwide, there is wide variation in the extent to which the home team derives an advantage (Pollard, 2006b). This advantage is unusually high in the Andean nations of South America and in the Balkan countries of Europe, where over 70% of points gained are won by the home team. This compares with a worldwide average figure of 61%. A heightened feeling of territoriality has been advanced as an explanation for the increased Andean and Balkan advantage.

The increasing availability of detailed match performance data allows more light to be shed on the way in which team performance indicators differ between the home and away teams. Carmichael and Thomas (2005) used such data from the Premier League in England to show that the home team had significantly higher figures for attack indicators, such as shots and successful passes in the scoring zone. Conversely, the away team committed significantly more fouls and suffered more red and yellow cards.

Thus far, most detailed research into the home advantage in soccer has been confined to professional soccer in England. An in-depth analysis of the home advantage is now provided for Turkey, which can be interpreted in the context of what is known in England. Turkey is now a major soccer playing nation, with the

national team finishing third in the 2002 World Cup. The top teams in the Turkish league regularly reach the group stages of the Champions League in Europe. A preliminary analysis of match performance data now available from the Turkish Super League has been made by Seckin (2006).

DATA AND METHODS

A complete record of all games played in the Turkish Super League was obtained from an established and reliable website² for the 12 seasons 1994-95 to 2005-06. This period was chosen for the study since the Turkish league expanded to 18 teams in 1994-95. Since then, the league has operated with the same 18 team format, with each team playing the other once at home and once away during the season. This balanced structure allows an unbiased quantification of home advantage to be made. The same structure has been used in League A since 2002-2003, providing four seasons for use in this study. Promotion and relegation operate at the end of each season between the Super League and League A, the top two tiers of soccer in Turkey. Comparative data for the Premier League in England was obtained from the same source. The match play data for teams in the Turkish league was provided by the sports data company FSTATS³ for the season 2005-2006. Data from five of the 306 games played during the season were incomplete and were omitted from the analysis.

² www.soccerway.com

³ www.fstats.net

Comparable data for the Premier League in England was generated by the Opta Index and reported by Carmichael and Thomas (2005) for the season 1997-98.

The calculation of home advantage follows the procedure adopted by Pollard (2006a). The overall home advantage in a balanced league can be quantified as the total number of points obtained by home teams expressed as a percentage of the total number of points gained in all matches. For an individual team, this becomes the number of points won at home expressed as a percentage of all points won by that team. The same calculation is used for groups of teams in specific matches, such as for London-based teams playing each other in local derbies. Comparisons in home advantage are made between leagues and as a function of distance travelled, specifically for local derbies and for teams in remote locations.

For the match performance indicators, comparison of home and away teams was made using paired sample two-sided t tests. Proportions were tested using the standard normal distribution. Effect size was estimated using Cohen's d statistic.

RESULTS AND DISCUSSION

The overall 12-year figures in the two leagues are very similar to each other, 61.5% in Turkey and 61.0% in England. This is also very close to the worldwide figure of 61.5% reported by Pollard (2006b), although slightly below the other major domestic leagues in Europe. Home advantage in League A in Turkey for the most recent 4-year period is 61.4%, which is almost identical to the higher

level Turkish Super League. However, this is consistent with other second level leagues in Spain, England, Germany, France and Italy where home advantage is generally at least as high as in the top-level leagues (Pollard, 2006a).

During the 12-year period under study, home advantage for Super League games played in Istanbul between Istanbul teams (“local derbies”) was 57.7%, lower than the figure of 61.7% for all other games in Turkey ($z = 1.54, p = .06$). Figures for the Premier League in England for the same period, comparing London derbies with all other games, were 55.5% and 61.3% ($z = 3.47, p < .001$). Thus in both countries the advantage of playing at home was lower in local derbies than in other games. This is consistent with expectation if one assumes that crowd support will be more evenly balanced in these games and any adverse effects from travel will be minimized.

Teams in remote locations may derive more advantage from playing at home, both as a result of increased travel effects and a heightened sense of territoriality (Pollard, 2006b). Four such locations were selected in Turkey and home advantage calculated for their local teams when playing in the Super League during the 12-year period under study. The results were Trabzon (55.5%), Rize (67.5%), Diyarbakir (68.1%) and Van (76.5%). Thus three of these locations had home advantage figures substantially higher than the overall league average of 61.5% (all $p < .05$). Of particular interest is the city of Van, whose local team, Vanspor, played in the Super League for 5 seasons in the 1990s and had an usually high home advantage figure of 76.5%. Situated in the extreme east of Turkey at an altitude of 1,750 m, with a harsh winter climate and a violent,

bloody history, Van has much in common with towns in the Balkan countries where home advantage is also extremely high (Pollard, 2006b). This may be due to a heightened sense of territoriality, defined as a “protective response to an invasion of one's perceived territory” and discussed in the context of soccer by Neave and Wolfson (2003). Home advantage for the team from Diyarbakir is also high (68.1%). Since the city has a large Kurdish population as well as a history of conflict, territoriality could again be advanced as a contributing factor.

The match performance analysis for the Turkish Super League in 2005-06 is summarized in Table 1. For each performance indicator, the season total for home and away teams is given, followed by the percentage by which the home figure exceeds the away, and the corresponding values of t and p , together with the effect size d . The match performance figures for the Turkish Super League suggest, not surprisingly, that home teams have significantly higher figures on variables that capture the extent to which a team is in attacking positions near the opponents' goal. Shots are 26% higher than for the away team, and successful passing in the scoring zone 11% higher. However, the effectiveness of shooting is no different for home and away teams, both as measured by the proportion of shots on target and by the proportion producing goals. In contrast to the attack indicators, there are no significant differences between home and away teams for any of the four aggressive indicators, tackles, fouls, and yellow and red cards.

In the English Premier League the performance indicators showed a more clear-cut difference between home and away teams, especially for fouls and the disciplinary cards. For fouls, the magnitude of the differences between home and

away teams does differ significantly between Turkey and England ($z = 3.72, p < .001$). The same applies to yellow cards ($z = 4.33, p < .001$), but for red cards the much smaller sample sizes did not produce a significant difference. These results should be interpreted with caution since they are based on a single season for each country, and at a different time. Nevertheless, referees in England have been shown to be more lenient in penalizing the home team, both with free kicks (Nevill, Balmer, & Williams, 2002) and yellow cards (Dawson, Dobson, Goddard, & Wilson, 2007). Thus a possible explanation for the differences found between the two countries is that decisions by Turkish referees are less influenced by the reaction of the home crowd to opponents' tackles, possibly a consequence of smaller and less dense crowds. Whatever the reason for the differences with regards to these aggressive indicators, the net effect on home advantage seems to be small, since the differences between home and away teams in terms of shots and goals, as well as points, are very similar in Turkey and England.

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TABLE 1
 MATCH PERFORMANCE TOTALS FOR HOME AND AWAY TEAMS IN
 THE TURKISH SUPER LEAGUE, 2005-2006

Performance indicator	Home	Away	Percent by which home exceeds away	<i>t</i>	<i>p</i>	<i>d</i>
Shots	4,321	3,420	26.3%	6.82	<.001	.63
Percentage of shots resulting in goals	11.1%	11.3%	-0.2%	-0.19	.85	-.01
Percentage of shots on target	40.1%	39.5%	0.2%	0.48	.63	.04
Passes to own team in scoring zone	92,359	82,881	11.4%	4.54	<.001	.39
Tackles	5,344	5,251	1.8%	0.67	.51	.03
Fouls	4,363	4,278	2.0%	0.78	.44	.06
Yellow cards	598	644	-7.1%	-1.49	.14	-.11
Red cards	37	47	-21.1%	-1.09	.28	-.09
Ratio of cards to fouls	.159	.177	-10.4%	-1.72	.09	-.14