HOME ADVANTAGE IN FIVE NATIONS RUGBY TOURNAMENTS  
(1947-1999)

Miguel Saavedra¹; Óscar Gutiérrez²; Juan J. Fernández¹; Juan C. Vázquez¹; Paulo Sá³  
¹ Universidad de A Coruña (España)  
² Universidad de Elche (España)  
³ Instituto Superior da Maia (Portugal)  
miguel.saavedra@udc.es

Abstract  
This study evaluates the home advantage in Rugby Five Nations Tournament between 1947 and 1999 obtaining a global significant value (p<0.001) of 62.22±2.17. When the home advantage was compared between the teams significant differences were found (p<0.001) in Five Nations tournament. When the home advantage was valued and the points obtained or the classification significant and strong associations were found (0.786 with the points and -0.769 with the classification).

Introduction  
The popular knowledge of the existence of the home advantage has persisted during many years in all team sports. Koppet (1972) supports this knowledge empirically. The first studies analyzed were made by Schwartz and Barsky (1977), who established a home advantage in professional baseball (53%), professional football (60%), professional hockey (64%) and university basketball (64%). Later, Pollard (1986) established the advantage of playing at home in English football (65.2%), in NBA basketball (63.3%), in NHL hockey (59.9%), in American football (59.9%) and in American baseball (53.6%).  
In football Pollard (1986) established the existence of a home advantage in a study of the English League, finding that 64% of the points won were by home teams. Also, it has been studied that in a eliminatory phase that is played at both home and away ground, the team that plays at home the second time round has a 50 % greater probability of classifying (Page & Page, 2010).  
Since Nevill and Holder (1999) established a system to determine the existence of home advantage, this effect has been studied in many sports disciplines, exposed by Balmer, Nevill and Williams (2001) these can be divided in three groups depending on the level of subjectivity that exists in the attitude of the judges of each sport. Pollard (1986) established a method of analyzing the home advantage in sports whose points system was based on a round robin system, applied on football and concluding that the home advantage exists and sums to a total of 50 % of points obtained at home.  
Courneya and Carron (1992) identified four factors that are important for understanding the home advantage. These are crowd factors, learning or familiarity factors, travel factors and rule factors.  
Taking into account the number of studies dedicated to the analysis of the home advantage very few are found in rugby. In the studies found in this sport is the one of Kerr & Vanschaik (1995) who explained the emotional status of Dutch players who play home and away does not change. The work by Morton (2006) calculates the advantage of playing at home in Rugby Union in the south hemisphere. Two tournaments were analyzed, the Tri-nations and the Super 12. In the Tri- Nations tournament the team that played at home won 22 out of 33 games played (73.3%), proving a home advantage. In the Super 12 345 games were played, in which there were four draws and the home team won 217 times proving a 63% advantage.
The study by Polman, Nicholls, Cohen and Borkoles (2007) analyzed the place where the game was played and the consequences on the emotional state of professional athletes. For these the emotional state was measured using a dairy. The diary consists of six scales of emotional measurement (relaxed-tense, full of energy-tired, depressed-euphoric, tired-alert, anxious-tense, happy-sad). The results show that the location of the match has no influence on the emotions of the players, meaning that no explanation was found for the home advantage.

In the study by Ortega, Villarejo and Palao (2009) the performance of the winning teams and losing teams was compared between 2003 and 2006, but doesn’t calculate the percentage of the advantage of playing at home but compares the variables related with the points obtained, the phases of the game and the development of the game. Finally, the study by Page and Page (2010) evaluates the influence of the referee in the European Superleague between 2006 and 2009 and the Super 14 of the 2009 season finding no real influence.

Although none of the studies before mentioned refer to Rugby Five Nations Tournament 1947-99. In this present article we will study the home advantage in this tournament. The objectives of this study is to determine the global home advantage, the home advantage of each team and compare the results between teams; evaluate the relations between the points obtained, the final classification and the home advantage; analyze the relation between the points obtained and the nationality of the referees and the distance travelled by the visiting team.

Method

Sample and variables
The sample of the study is formed up of 528 games of male rugby disputed in the Five Nations Rugby Union tournament between 1947 and 1999 (which is the equivalent to 53 seasons in total).

The variables registered where the final results of the games played as a home and as an away team, the points obtained during the tournament, also the country, the season, the location, the ground, the distance travelled by the away team, the referee and the nationality of the referee.

The information was obtained from the Six Nations Championship web page (http://www.rbs6nations.com), from wikipedia (http://en.wikipedia.org/wiki/1883_Home_Nations_Championship), ESPN Scrum (http://www.espnscrum.com/scrum/rugby/series/) and the Sporting Heroes (http://www.sporting-heroes.net). The information obtained was compared in an independent manner using all of the websites mentioned to minimize the possible number of errors.

Calculation of the advantage of playing at home
The rugby championships studied have an annual format of simple competition: each team play against all teams at once during the tournament, alternating each year the condition of the home and away teams. This format of completion means a round robin system every two years. Each tournament is like a half league in which a team plays the same amount of games as a home and away team. With the Five Nations tournament system each team play four games: two at home and two away.

The home advantage is quantified by the number of games won by a home team expressed as a percentage of the total of games played expressing the number of points won at home as a percentage of the total of points obtained (Pollard, 1986). When an analysis of the home advantage is done independently for each team, it is established comparing the performance of the team both home and away. This analysis can be made with the percentage of games won at home in relation with the total number of games won home and away, understanding draws as half victories.
Statistic Analysis
The contrast between the points obtained by a team and the null hypothesis of no advantage obtained by a home team was done using the sign test with Wilcoxon rank. The bivariate correlations of Pearson and Spearman were used to establish the level of association between the numbers of points obtained and the classification with the advantage of playing at home. In all cases the level of significance used was less than 5% (p<0.05).

Results
The home advantage of the national annual tournaments of Rugby Union Five Nations between 1947 and 1999 is real and significant (p<0.001) with a value of 62.22±2.17. (Table 1).

Table 1. Home advantage (HA) in Rugby Union Five Nations Championship

<table>
<thead>
<tr>
<th>Competition</th>
<th>Seasons</th>
<th>Played</th>
<th>Won</th>
<th>Drawn</th>
<th>Lost</th>
<th>%</th>
<th>S.E.</th>
<th>Signification¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five Nations 1947-1999</td>
<td>53</td>
<td>528</td>
<td>309</td>
<td>39</td>
<td>180</td>
<td>62.22</td>
<td>2.17</td>
<td>0.000</td>
</tr>
</tbody>
</table>

¹ Significance of the Wilcoxon Rank Sign test.

The evolution of the home advantage in the different season can be observed in figure 1 and oscillates between annual values of 40 and 100. Towards the end of the series, in 1995, rugby becomes professionalized, then the variations in home advantage are much less than in previous competitions (Figure 1).

Figure 1. Home advantage overall Five Nations evolution.

The home advantage of the teams
The global advantage of playing at home for each one of the six participating teams and for each period of the tournament can be found in Table 2.

Table 2. National Rugby Union teams home advantage

<table>
<thead>
<tr>
<th>Country</th>
<th>Seasons</th>
<th>HW</th>
<th>HD</th>
<th>HP</th>
<th>AW</th>
<th>AD</th>
<th>AP</th>
<th>Team HA</th>
<th>S.E.</th>
<th>Signification¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>53</td>
<td>63</td>
<td>15</td>
<td>141</td>
<td>38</td>
<td>9</td>
<td>85</td>
<td>62.39</td>
<td>3.56</td>
<td>0.000</td>
</tr>
<tr>
<td>Wales</td>
<td>53</td>
<td>70</td>
<td>5</td>
<td>145</td>
<td>41</td>
<td>8</td>
<td>90</td>
<td>61.70</td>
<td>3.41</td>
<td>0.000</td>
</tr>
<tr>
<td>Scotland</td>
<td>53</td>
<td>56</td>
<td>5</td>
<td>117</td>
<td>25</td>
<td>5</td>
<td>55</td>
<td>68.02</td>
<td>5.37</td>
<td>0.000</td>
</tr>
<tr>
<td>Ireland</td>
<td>53</td>
<td>43</td>
<td>10</td>
<td>96</td>
<td>32</td>
<td>6</td>
<td>70</td>
<td>57.83</td>
<td>4.80</td>
<td>0.075</td>
</tr>
<tr>
<td>France</td>
<td>53</td>
<td>77</td>
<td>4</td>
<td>158</td>
<td>43</td>
<td>11</td>
<td>97</td>
<td>61.96</td>
<td>3.56</td>
<td>0.000</td>
</tr>
</tbody>
</table>

¹ Significance of the Wilcoxon rank sign test.
Legend: HW= Home Wins; HD= Home Draws; HP=Home Points; AW=Away Wins; AD= Away Draws; AP=Away Points
In the longest period, the Five Nations tournament between 1947 and 1999, all of the teams, except Ireland, have a significant home advantage. England, Wales and France have very similar values at 62%, with Scotland reaching 68%.

Comparison of the home advantage between the teams
The comparison of the home advantage between the teams can be seen in table 3. Significant differences were found (p<0.001) in the Five Nations tournament. In the second series of the Five Nations tournament between 1947 and 1999, Scotland had the highest home advantage at 68%. The rest of the countries oscillate between four percentage points (58% to 62%) (Table 3).

<table>
<thead>
<tr>
<th>Country</th>
<th>Team HA</th>
<th>Mean Rank</th>
<th>Sig.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>62.39</td>
<td>139.07</td>
<td></td>
</tr>
<tr>
<td>Wales</td>
<td>61.70</td>
<td>143.96</td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>68.02</td>
<td>120.58</td>
<td>0.001</td>
</tr>
<tr>
<td>Ireland</td>
<td>57.83</td>
<td>100.68</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>61.96</td>
<td>157.61</td>
<td></td>
</tr>
</tbody>
</table>

1 Significance of the Wilcoxon rank sign test.

Home advantage, points and classification
Both the classification of a team and the number of points won have a significant association with the home advantage. The points obtained by a team have a positive association (0.786) with the home advantage. The classification of a team in the league has an inverse association with the home advantage with a value of -0.769 (Table 4).

<table>
<thead>
<tr>
<th>Points1</th>
<th>Classification2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.786</td>
<td>-0.769</td>
</tr>
<tr>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

1 Bivariate correlations of Pearson.
2 Bivariate correlations of Spearman.

Discussion
The Rugby Union tournaments Five Nations (1947-1999) have a real and significant advantage of playing at home. Although the comparison between the home advantage of each team does prove significant differences. Also significant association between the home advantage of the teams with points obtained in a league and with the classification of the tournaments was found. Finally, the influence of the distance travelled by the away team was analyzed finding that they are higher when the local teams loses than when the local team wins.

In this present study the existence of a home advantage has been established at 62.22±2.17. These values are very similar than the ones found in previous studies in similar sports. Pollard (1986) determined a home advantage in baseball at 53.6%, in North American football at 65.5%, 63.3% in European basketball and 63.9% in European football. In ice hockey the home advantage was established at 66% (Schwartz & Barsky, 1977).

The evolution of the home advantage in rugby during the 53 seasons has an anomalous character, which may be down to the fact that rugby wasn't immersed in the future meaning of professionalism, with all sits pros and cons of this situation. The home advantage was also affected by this situation, as before the professionalism of the sport, big oscillations in its value were found (a general tendency is of an amateur value from the origins of the
tournament in 1947 until its professionalism in 1995), these oscillations fall considerably after the sport is made professional in 1995 (also a slight fall in the home advantage tendency was observed).

In the study of the evolution of the home advantage by Pollard (1986) was focused on national competitions, which may contradict with the results obtained in the present study, as this study is of an international character, which made travelling in the first periods very difficult.

In the analysis of the home advantage of a team, in the same way as Pollard (2006) or Pollard and Gómez (2009) found that the higher values of home advantage do not belong to the best teams. This has a clear significance. The teams of lower quality base their best results on winning at home and obtain few points playing away, in a way that teams of a higher quality obtain nearly the same amount of victories playing both home and away. The comparison of the home advantage of each team isn't a usual parameter in other studies, but it is in this study as significant differences were established in the profile of the obtainment of points for each team, which seems logical as there is only between four and six teams and they are always the same ones.

When analysing the existence of a significant association between the home advantage, the points obtained in a league and the classification of the teams, the results coincide with the results obtained by Bray (1999) in ice hockey, in which the relation between the advantage of playing at home and the quality of the team was proved. In the same way Gutiérrez, Saavedra and Fernández (2012), in their home advantage study in handball, established the existence of a strong positive association between the home advantage and the points obtained in the league by a team and a strong negative association between the home advantage and the final classification of a team in a league.

On the other hand, Morton (2006) established in rugby (in the South hemisphere) that no associations were found between the quality of the team and the advantage of playing at home.

**Conclusions**

The home advantage of the annual tournaments of national Rugby Union Five Nations (1947-1999) is real and significant.

The evolution of the values of the home advantage is irregular until the professionalism of rugby (1995) a moment from which the values stabilize.

We found a significant association between the home advantage and the points obtained in a year with the final classification of the season.

**References**

• Morton, R. H. (2006). Home advantage in southern hemisphere rugby union: National and 
on the advantage of playing at home. Sports Medicine, 28, 221-236.
winning and losing rugby teams in the Six Nations Tournament. Journal of 
Sport Science and Medicine, 8, 523-527.
Working Paper Series, Brisbane, Australia, 62.
Gazette, 69. 45-7.
Sciences, 4, 237–248.
• Pollard, R. (2006b). Worldwide regional variations in home advantage in association 
• 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.
location and outcome on behavior and moods states among professional 
• Thomas, S., Reeves, C. & Bellhome, A. (2008). Advantage in the six nations rugby union 