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**UCD SCHOOL OF ECONOMICS
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1st October 2012.

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Analysing Determinants of Match Attendance in the European Rugby Cup.

Abstract: The economic literature on professional sports leagues suggests supporters' utility depends on uncertainty of outcome (competitive balance) and the quality of play. Unlike soccer, where the Champions League is dominated by teams from larger countries, our analysis indicates that the ERC exhibits high degrees of both dynamic and inter-league competitive balance. Using data from 1,096 matches played over 17 seasons, we analyse match attendances in the pool stages of the European Rugby Cup (ERC), a competition that involves teams from the three main European rugby leagues. The results indicate that the quality of the home team is the main determinant of match attendances, although a strong visiting team also raises attendances. Medium-term (seasonal) uncertainty, which has received less attention in the literature, appears far more important than short-run (match) uncertainty. Measures designed to make matches more attractive, e.g. bonus points for high scoring, appear to have had little effect on attendances.

Key Words: Professional team sports, competitive balance, consumer demand.

JEL Classifications: D12, D21, L22, L23, L83.

1: Introduction.

There is an extensive literature on the economics of professional sports leagues, which suggests that fans derive utility from identifying with teams and from the quality of contests, where the latter depends on uncertainty of outcome (competitive balance) and the quality of play. (See, for example, Rottenberg, 1956 and Neale, 1964. For a more detailed discussion on determinants of attendance see Borland and Macdonald, 2003). The competitive balance/uncertainty of outcome argument has frequently been used to justify practices by sports leagues and their member teams which would normally be prohibited under competition law such as collective selling of broadcast rights. Most of the literature on competitive balance has focused on competitive balance within sports leagues. The present paper seeks to analyse the importance of various factors including competitive balance in explaining attendances at pool stage matches in rugby union's European Rugby Cup (ERC), a multi-league competition, similar in many respects to soccer's UEFA Champions' League.

A number of authors have argued that free movement of players within the EU combined with rules that require leagues to operate along national lines has increased competitive imbalances in soccer both in national leagues and in the Champions' League which has been increasingly dominated by teams from the four or five larger European countries. (Kessenne, 2007, Szymanski, 2007, Vrooman, 2007) Rugby provides an interesting contrast as there is no requirement for leagues to operate along national lines. In addition there are considerable differences between the main European rugby leagues with regard to revenue sharing, salary caps and other measures which might be expected to affect competitive balance.

The paper analyses the impact of competitive balance on attendance using data on results and attendances from 1,096 ERC pool matches played over 17 seasons from the beginning of the competition in 1995/96 up to 2011/12. In simple terms our underlying hypothesis is that supporters form an *ex ante* view on how close and thus how attractive a particular match is likely to be on the basis of the two teams' respective records in the competition. We use the historic cumulative win ratios of the two participating teams in each match as an *ex ante* measure of match uncertainty and analyse whether this helps explain match attendances. A second determinant of attendances we employ is whether the home team is still in contention to qualify for

the knock-out stages of the competition, a measure of medium-term or seasonal uncertainty. King et. al. (2011) point out that the effect on attendance of medium-term uncertainty has received far less attention in the literature than short-run uncertainty. We also measure the impact of specific changes in the format of the competition over time which were arguably designed to make matches more attractive to fans, such as awarding teams bonus points for high scoring or losing narrowly.

Most ERC pool matches involve teams from different leagues but a small number of matches are between teams who play in the same league. The ERC is a higher quality competition than the leagues from which its participating teams are drawn and thus might be expected to draw higher attendances. Comparing attendances for matches between the same two teams in the ERC and in their domestic league provides a natural experiment for testing this proposition.

The balance of the paper is structured as follows. Section 2 briefly reviews the relevant economic literature on professional team sports. In section 3 we describe the key characteristics of the ERC. The issue of dynamic competitive balance is analysed in section 4 and this is followed by an analysis of inter-league competition in section 5. Our model and the results are presented in Section 6. Finally some conclusions are offered in section 7.

2: The Economics of Professional Sports Leagues.

A key theme running through the sports economics literature is that uncertainty of outcome is an essential feature of sport and this requires a degree of equality between the teams in a competition. The competitive balance argument has been advanced to justify a variety of arrangements that are commonly found in professional team sports such as salary caps, restrictions on players moving between teams and the collective selling of broadcasting rights by sports leagues and their member clubs. (Rottenberg, 1956, Neale, 1964 and Szymanski and Kesenne, 2004).

Much of the literature on competitive balance is based on the experience of US team sports. Szymanski (2003) suggested that the competitive balance argument is based on two assumptions that may be unique to US sports:

1. The supply of talent available to clubs is fixed; and.

2. The absence of promotion and relegation in US leagues makes competitive balance more important for maintaining supporter interest over time.

Sloane (2006) argues that although the competitive-balance/uncertainty argument has tended to dominate the analysis of team sports, little attention has been paid to defining and accurately measuring it. The literature describes three different concepts of uncertainty.

- Short-run uncertainty of match outcome, i.e. uncertainty regarding the outcome of an individual match which should increase supporter interest in individual matches;
- Medium term or seasonal uncertainty of outcome, i.e. uncertainty over which team will ultimately win the league, which should serve to maintain supporter interest in matches involving a wider range of teams over the course of the season;
- Long term uncertainty of outcome, i.e. a lack of domination by one or more clubs over a number of seasons, sometimes referred to as dynamic competitive balance.

Palomino and Sakovics (2004) observe that in the case of US sports there is one major league whereas in European soccer each country has its own national league as soccer's rules require leagues to operate along national lines. Thus competition between teams in US sports leagues to attract players only affects the distribution of talent within the league and not the total amount of talent. In contrast individual European soccer leagues can increase the total amount of talent within the league by recruiting star players from other leagues. Increasing the total amount of talent in the league makes it more attractive to broadcasters and thus increases the value of broadcast rights. The European Court of Justice Judgment in the *Bosman*² case means that there is a single European wide labour market in soccer (and rugby). There is therefore competition for talent between leagues as well as within leagues.

Broadcast markets are more valuable in larger countries. Soccer clubs in larger countries are thus able to outbid those in smaller countries to attract players. The best

² Case C-415/93 *Union Royale des Societes de football association, Royal Club Liegeois et UEFA v. Jean Marc Bosman* [1995] ECR I 4921.

players have therefore tended to move to the four or five richest leagues, lowering the quality of leagues in smaller countries and widening the gap between teams from smaller and larger countries.³ (Kesenne, 2007). As a result Soccer's Champions League has become increasingly dominated by teams from the four or five largest countries. (Kesenne, 2007, Szymanski, 2007, Vrooman, 2007)⁴ Soccer's rules prevent teams from smaller countries joining leagues in larger countries and prevent mergers of smaller country leagues which would increase their broadcast market.⁵ No such restrictions apply in rugby.

3: The ERC – A Brief Overview.

The introduction of professionalism in 1995 led to a major restructuring in Rugby Union.⁶ Three full-time professional leagues emerged in the main European rugby playing countries; the Premiership in England, the Top 14 in France and the Celtic League which includes teams from Ireland, Italy, Scotland and Wales.⁷ The ERC was launched at the beginning of the 1995/96 season coincident with the introduction of professionalism. The ERC is in some respects similar to soccer's UEFA Champions League.

English and Scottish teams did not participate in the inaugural season of the ERC which saw 15 teams drawn from France, Ireland, Italy, Wales and one Romanian team

³ Hogan et. al. (2012) reported that, in contrast to soccer, short-run competitive balance in the three European rugby leagues had increased over time while all three leagues also displayed a high degree of long-run competitive balance.

⁴ This imbalance is exacerbated by the bias in the allocation of Champions League broadcasting revenues in favour of teams from the larger countries.

⁵ Vrooman (2007) reported that an attempt by clubs from Belgium, Denmark, Holland, Norway, Portugal, Sweden along with Scotland's Celtic and Rangers to establish a new league to compete with the big 5 leagues was blocked by UEFA. Szymanski (2009) reported that a proposed merger of the Dutch and Belgian leagues was also prevented by the existing rules.

⁶ Rugby split into amateur and professional codes in 1895. The amateur code, known as Rugby Union remained the more widely played version of the sport. The professional variant became known as Rugby League. Throughout the paper rugby is used to refer to Rugby Union. The two codes continue to operate separately with some differences in the basic playing rules. For a more detailed description of the move to professionalism see Hogan et. al. (2011).

⁷ The Celtic League was established in 2001/2 with a combination of Irish Scottish and Welsh teams reflecting the fact that the support base in these countries was insufficient to sustain full-time professional leagues at national level. Two Italian teams were admitted in 2010/11. The league has been renamed on several occasions reflecting changes in sponsors. Throughout the paper we use the original Celtic League title.

take part.⁸ Since 1999/00 the ERC has involved 24 participating teams drawn from England, France, Ireland, Italy, Scotland and Wales.⁹

The 24 teams are divided into six pools of four. Each pool is run as a mini-league with each team playing the other teams in its pool on a home and away basis. The top team in each pool along with the two best of the six pool runners-up qualify for the play-off stages. This format means that qualification for the play-off stages is generally not decided until the final round of matches, thus maintaining supporter interest right through the pool stages.¹⁰

In the early years teams were awarded two points for a win and one for a draw in the pool stages. Beginning with the 2003/04 season the number of points awarded for wins and draws was doubled and a system of bonus points was introduced with one bonus point awarded to a team that scored a minimum of four tries and a bonus point also awarded if a team lost a match by seven points or less.¹¹ Bonus points can have an important influence on the final pool standings.

⁸ There have been no Romanian participants in the ERC since its first season. English clubs did not participate in the ERC again in 1998/99.

⁹ The number of participating teams from each country has changed over time. Currently England and France each receive six automatic places which are allocated to the top six teams in their respective national leagues. Ireland and Wales each receive three automatic places while Italy and Scotland receive two each. The Italian and Scottish Celtic League teams thus automatically qualify for the ERC while the three Irish and Welsh ERC places are effectively allocated on the basis of national standings within the overall Celtic League. The final two ERC places are allocated to the previous season's winners and the winners of the Amlin Cup a multinational competition involving teams that do not qualify for the ERC. The number of English and French participants is capped at seven so that if teams from these countries win both the ERC and Amlin Cups, the last ERC place is allocated to the next ERC ranked team instead of the Amlin Cup winner. Recently English and French teams have sought a restructuring of the ERC which would reduce it to 20 teams made up of the top 6 teams from each of the three leagues along with the previous season's ERC and Amlin Cup winners.

¹⁰ In 2011/12, for example, the only two teams assured of qualification going into the final round of matches were the Irish teams, Leinster and Munster. However, the four play-off qualifiers with the best records in the pool stages get to play at home at the quarter final stage which is considered a major advantage because the knock-out rounds are played on a one-off basis in contrast to the Champions' League where the knock-out rounds apart from the final are played on a home and away basis with the aggregate score deciding the winner. . Thus in the ERC even a team that has qualified still has a lot to play for in its final pool match. Over the period from 1997/98 64% of teams retained a mathematical chance of qualifying for the play-off stages going into their final home match.

¹¹ A try is scored by touching the ball down over the opponent's goal line and is worth five points. A team also gets a shot at goal for scoring a try and will obtain an additional two points for kicking the ball over the cross bar between the two uprights (referred to as a conversion). A difference of seven points between the teams is thus equivalent to one converted try. A losing team can obtain two bonus points if it loses by seven points or less and scores four tries.

The nature of the ERC raises some interesting issues for the competitive balance theory. There is no equivalent competition to the ERC involving teams from various different leagues in US sports. There are no mechanisms in place to ensure competitive balance in the ERC. In addition there are significant differences in the way the three leagues from which the participating teams are drawn operate.

All three leagues are open talent leagues, i.e. member teams can recruit players from outside of the league. Teams in all three leagues include players from the main Southern Hemisphere rugby playing countries, i.e. Australia, New Zealand and South Africa. The Premiership and Top 14 both have promotion and relegation similar to soccer leagues throughout the world, apart from the United States.¹² The Celtic League in contrast is a closed league with no promotion and relegation like US sports leagues. According to Hogan et. al. (2012) the evidence suggests that teams in all three leagues can be regarded as win maximisers.¹³

The Premiership has a high degree of revenue sharing and a salary cap.¹⁴ These arrangements were instituted primarily to ensure the viability of all member teams rather than as a means of promoting competitive balance. In contrast the degree of revenue sharing among Top 14 teams is much lower and a salary cap was only introduced in 2010/11 following the financial collapse of one of the participating teams.¹⁵

There are no league wide revenue sharing and salary cap arrangements in the Celtic League. The Irish and Scottish teams in the league are vertically integrated with their respective national governing bodies and operate a system of revenue sharing at national level. In Ireland, for example, the players on the four Celtic league teams are centrally contracted to the Irish Rugby Football Union (IRFU), revenue from teams' participation in European competitions is paid to the IRFU and it provides the bulk of

¹² In the Premiership only one team is relegated every season while in the Top 14 the bottom two teams are relegated.

¹³ Vrooman (2007) argues that revenue sharing and salary caps will improve competitive balance in leagues if team owners are win maximisers rather than profit maximisers.

¹⁴ Even revenue earned by teams from participation in the ERC is shared among all Premiership teams.

¹⁵ Revenues redistributed by the league, mostly derived from the sale of broadcast rights, represented just 13% of Top 14 teams' average revenues for 2009/10. (DNACG, 2011). The Top 14 salary cap is double that of the Premiership and effectively had little impact as it was set above clubs' actual salary levels.

the teams' revenue supplementing such monies with revenue from international matches.¹⁶

The Welsh clubs opposed a proposal by the Welsh Rugby Union (WRU) to follow the Irish vertically integrated approach. After a somewhat acrimonious debate five regional teams were established as a result of a series of mergers between clubs in 2003/04.¹⁷ There are contractual arrangements between the WRU and the regional teams and it provides them with some financial support from its revenue from international matches but the teams operate independently and do not share revenues otherwise. Financial pressures forced the Welsh teams to introduce a salary cap with effect from the start of the 2012/13 season.

The Italian teams are privately owned franchises although they were guaranteed a certain minimum level of revenue by the League for their first three seasons in the competition.

In general Top 14 teams have much greater financial resources than those in the other ERC participating countries. Deloitte (2011) estimated that nine of the top ten European rugby teams in revenue terms were French with just one English team making the top 10. Revenue data is publicly available in respect of 11 of the ERC participating teams for the 2009/10 season and is summarised in Table 1.¹⁸

The table shows that, in financial terms, French club Toulouse, who were the eventual winners in 2009/10, were well ahead of the other participants. Of the four English clubs for which data are available, only Leicester had revenue on a par with the other French teams, while the Welsh teams had much lower revenue than their English or

¹⁶ The IRFU does not distribute revenue evenly between its four professional teams. Specifically Connacht receives significantly less revenue from the IRFU than the other three teams and operates to some extent as a development or "farm" team, despite playing in the same league as the other three teams.

¹⁷ Cardiff and Llanelli, for example, opposed any merger and these two clubs simply became regional franchises. The other three regions involved mergers between clubs. The number of regional teams was reduced to four after one season due to the collapse of one of the regional teams.

¹⁸ Financial data is not publicly available for the Irish, Italian and Scottish teams. While we do not have data for two of the English participants – London Irish and Sale – neither team featured in Deloitte's list of the 15 richest clubs indicating that their operating revenues were lower than those of the other English participants. According to Deloitte (2011) Cardiff had the highest revenue of any of the Welsh teams.

French counterparts. Although individual financial data is not available for the three Irish participants, the IRFU (2009/10) reported that it provided €35m towards the overall cost of the four Irish professional teams in 2009/10.¹⁹ Even allowing for the fact that the Irish teams would have some additional sources of revenue besides IRFU funding, this figure suggests that their operating budgets were significantly lower than those of the English and French teams.

Team	Country	Revenue €m
Toulouse	France	33.5
Clermont Auvergne	France	23.8
Stade Francais	France	22.0
Leicester Tigers	England	21.0
Brive	France	19.5
Biarritz	France	17.7
Perpignan	France	15.7
Northampton Saints	England	13.7
Harlequins	England	12.1
Gloucester	England	10.7
Cardiff Blues	Wales	10.0

Notes: We used the €/£ average exchange rate for the period 1 July 2009 to 30 June 2010 to convert revenue for English and Welsh teams to Euros.

Source: DNACG (2011), p.38 for French Top 14 teams. Figures for English and Welsh teams are taken from Deloitte (2011).

4: Competitive Balance.

It would obviously be interesting to analyse competitive balance in the ERC given the significant differences in the financial resources of the participating teams. The most widely used measure of short-run competitive balance within leagues is the adjusted standard deviation (ASD) of teams' win ratios. (See, Noll, 1988 and Scully, 1989). The ASD is calculated as the ratio of the actual standard deviation to an idealised win ratio generated by a perfectly balanced league which is given by the formula $0.5/\sqrt{n}$ (where n is the number of matches played). Humphreys (2002) argues that the ASD is better than other measures of competitive balance, although Lenten (2009) points out

¹⁹ The fourth Irish team, Connacht, did not play in the ERC in 2009/10.

that it is highly sensitive to occasional outliers. The ASD is designed to measure short-run competitive balance within leagues and is therefore not an appropriate measure to apply to the ERC.

An alternative way of measuring short-run competitive balance is to consider trends in the number of close matches in the ERC pool stages. The evidence on this point, which is reported in Section 6 below, indicates that the number of close matches has risen over time, suggesting that short-run competitive balance has improved over time.

It is possible to analyse dynamic competitive balance where the issue is whether or not the competition is dominated by a small number of teams over time. The Herfindahl-Hirschman Index (HHI) which is widely used to measure market concentration in the industrial organisation literature has also been used to measure dynamic competitive balance in sports leagues where a team's "market share" is defined as the number of times the team has won a competition divided by the number of seasons. (Leeds and von Allmen, 2005). Table 2 lists all of the ERC winners along with HHIs based on the number of times each team has won the competition and made it to the quarter-finalists.

There have been nine different winners of the ERC in the 17 years of the competition. French team Toulouse have won the ERC four teams, which is more than any other team.²⁰ The HHI for winners was 0.142. The minimum possible value of the HHI in this case is 0.059 which would occur if there had been 17 different winners. A HHI of 1 would arise if a single team had won the competition every season. We also calculated the HHI based on the number of times each team reached the quarter-final stage of the ERC. The HHI in this case was .057 which compares with a maximum possible value of 0.125 which would arise if the same eight teams had reached the quarter finals every season. These results indicate that the ERC displays a reasonable degree of dynamic competitive balance.

²⁰ Table 1 indicated that Toulouse is by far the richest club in European rugby.

Table 2: ERC Winners

Team	Number of Wins
Toulouse (France)	4
Leinster (Ireland)	3
Munster (Ireland)	2
London Wasps (England)	2
Leicester (England)	2
Northampton (England)	1
Bath (England)	1
Ulster (Ireland)	1
Brive (France)	1
HHI (Winners)	0.142
HHI (Quarter-Finals)	0.057

Source: <http://www.ercrugby.com/eng/>

5: Inter-League Competition.

As in soccer the three professional European rugby leagues compete for talent²¹ but unlike soccer the rules do not require leagues to operate along national lines which enabled the three smaller rugby playing countries – Ireland, Scotland and Wales – to establish a joint league in competition with those in the two larger countries England and France. As the CEO of the WRU observed:

“The Celtic League is vitally important for rugby in this country. We have to take it seriously and we have to encourage Ireland to take it seriously. If the Celtic League is to go head-to-head with the Zurich Premiership, the Irish Rugby Football Union - in particular - have to get on board.” (WRU, 2003/4. p.7)

It is therefore interesting to compare the degree of competitive balance between the different leagues.

Table 3 gives details of the number of wins and quarter-final appearances for each of the three leagues from which the ERC participants are drawn. We again estimate

²¹ In 2009/10 close to 30 English players were employed by French Top 14 clubs, roughly double the figure for 2007/8. (Owen, 2010).

HHIs this time based on the number of wins and quarter-final appearances by teams from each league in order to measure competitive balance between the three leagues.

Table 3: ERC Wins and Quarter-Final Appearances by League

	Wins	Quarter-Finals	
			Excl. 1998/99
Premiership	6	36	36
Top 14	5	46	42
Celtic League	6	46	42
HHI	0.336	0.337	0.335

Source: <http://www.ercrugby.com/eng/>

Premiership and Celtic League teams have won the ERC 6 times while Top 14 teams have only recorded five wins. All six Celtic League wins were due to Irish teams. The HHI in this case is 0.336. In terms of quarter-final appearances Premiership teams have not performed as well as teams from the other two leagues with 36 appearances compared with 46 for the Top 14 and Celtic League.²² This is partly due to the Premiership teams' non-participation in the ERC in 1998/99.²³ Excluding that season reduces the number of quarter final appearances for Celtic League and Top 14 teams to 42. The HHI for quarter final appearances was 0.337 (0.335 excluding 1998/99). If the three leagues' share of wins and quarter final appearances were identical the HHI would be 0.333. Thus the HHI results indicate a high degree of dynamic competitive balance between the three leagues, in contrast to the Champions' League in soccer which is dominated by teams from the four or five larger European leagues. The result is perhaps also surprising given the imbalance in financial resources between teams from the different leagues which was highlighted in Table 1 and the lack of a salary cap in the Top 14 prior to 2010/11. *A priori* French teams might be expected to outperform their English and Celtic League rivals but this is not borne out by the data.²⁴

²² Of the 46 quarter final appearances by Celtic League teams, Irish teams accounted for 25, Welsh teams 19 and Scots teams have made only two quarter final appearances.

²³ Although Premiership teams did not participate in 1995/96 either, there were no quarter finals that season.

²⁴ As previously noted, the evidence on the number of close matches indicates that short-run competitive balance in the ERC has improved over time. As over 90% of ERC pool matches are

Another way of analysing inter-league competitive balance is illustrated in Table 4 which looks at the overall win ratio in ERC pool matches by league. The table shows that overall the win ratio of Premiership teams and Top 14 teams is virtually identical. Celtic League teams have a significantly lower win ratio than the other two leagues although the table also shows a considerable variation between countries in this case.²⁵ Irish teams have the highest win ratio of any country in the competition at 61% while Scottish teams have won only 32% of their matches.²⁶ Welsh teams have won 45% of their ERC pool matches. Interestingly the restructuring of Welsh teams into four regional teams has had virtually no impact on the win ratio for Welsh teams.²⁷ Italian teams have by far the poorest record winning just over 12% of their ERC pool matches.

Table 4: ERC Pool Matches % Wins By League 1995/6-2010/1

Premiership	57.3
Top 14	57.2
Celtic League	47.3
of which	
Ireland	60.9
Wales	44.9
Scotland	31.8
Italy	12.1

Note The Celtic League figure does not include Italian teams as they only joined the league in 2010/1.

Source: http://www.ercrugby.com/eng/13_70.php

6: Analysing Attendance at ERC Pool Matches.

between teams that play in different leagues this indicates an increase in short-run competitive balance between the leagues.

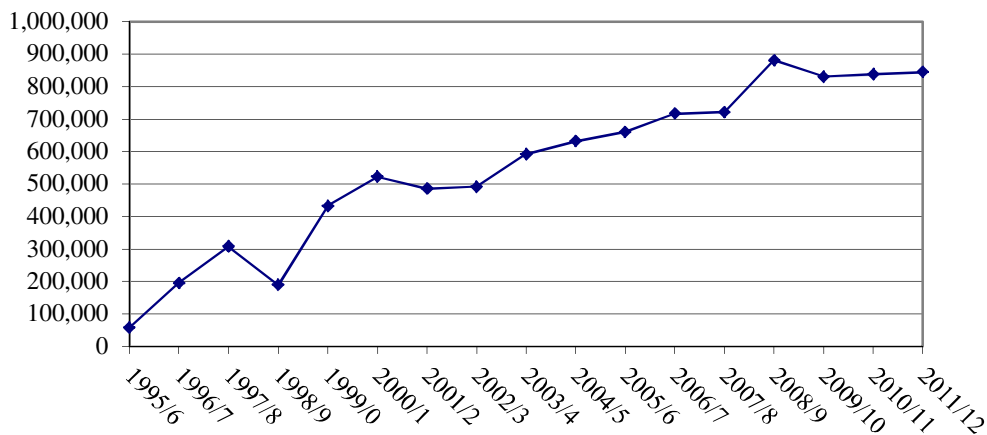
²⁵ The current allocation of ERC places means that only the strongest teams from the Premiership and Top 14 qualify whereas virtually all of the Celtic League teams qualify. This may partly explain the lower Celtic League win ratio.

²⁶ In general teams from different countries are kept apart in the group stages so the country win ratios provide a good indication of the record of teams from each country against those from other countries.

²⁷ In the period up to 2003/04 Welsh club teams won 45.3% of their ERC pool matches while the regional teams have won 44.6% of their ERC pool matches in the period since then. Similarly of the 19 Welsh quarter final appearances, 11 occurred in the 7 seasons prior to 2003/04 while there have only been 8 in the 9 seasons since the establishment of the regional teams.

The success of the ERC in attracting supporter interest is illustrated in Chart 1 which gives aggregate seasonal attendances at ERC matches since its inception.

Chart 1: Aggregate Attendance at ERC Pool Matches by Season



Source: http://www.ercrugby.com/eng/13_70.php

The 12 pool stage matches in the inaugural 1995/96 season attracted just 58,000 spectators, an average of 4,800 per match. In 2008/09 the 72 pool stage matches attracted 880,000 spectators, an average of 12,200 per match. Despite a slight decline a total of 844,000 people attended the 72 pool matches in 2011/12.

Table 5 gives details of average attendances at ERC pool matches for each of the participating countries for every season of the competition.

Attendances have increased significantly in England, France, Ireland and Wales; although in the latter case there has been some fall off in recent years.²⁸ Attendances in Scotland and Italy are much lower than in the other participating countries, although both recorded a significant increase in 2011/12.

We now try and analyse the factors that determine attendances at ERC pool stage matches. In particular, we wish to ascertain whether uncertainty of outcome is an

²⁸ Average attendances in Ireland fell in 2011/12 but this was due to the fact that a fourth Irish team Connacht, which participated in the competition for the first time, had much lower average attendances than the other three Irish teams.

important explanatory variable. Our original data set comprised attendance data for 1,096 ERC pool matches played over 17 seasons from 1995/96 to 2011/12. One obvious problem that arises is how to measure uncertainty of outcome/competitive balance in ERC pool stage matches.

Season	Ireland	England	France	Wales	Italy	Scotland	Total
1995/96	4,167	n.a.	10,723	5,367	2,100	n.a.	4,865
1996/97	4,417	6,420	8,875	2,800	1,300	2,400	4,894
1997/98	4,017	6,400	7,167	4,894	2,767	3,500	5,126
1998/99	5,278	n.a.	5,633	2,808	1,350	2,507	3,934
1999/00	7,278	6,686	7,718	4,987	2,384	3,173	6,013
2000/01	9,956	8,461	7,850	7,281	1,717	3,317	7,259
2001/02	10,111	7,752	6,526	6,305	2,684	4,484	6,744
2002/03	9,772	8,779	7,311	5,211	1,934	4,090	6,832
2003/04	12,870	9,863	9,312	5,593	3,304	3,565	8,215
2004/05	11,549	11,905	8,980	6,690	3,118	2,798	8,769
2005/06	12,609	9,609	11,493	8,399	3,075	2,686	9,167
2006/07	13,842	11,312	11,941	11,612	1,922	2,613	9,951
2007/08	13,540	11,196	11,857	9,234	3,015	3,657	10,017
2008/09	17,350	13,064	15,057	10,568	3,417	4,307	12,231
2009/10	18,112	13,515	12,963	8,349	4,295	4,163	11,543
2010/11	20,655	13,868	12,462	8,525	3,933	3,172	11,646
2011/12	17,334	14,079	13,034	8,412	5,179	6,279	11,728

Note: English and Scottish teams did not participate in the ERC in its first season in 1995/6 while the English teams did not participate again in 1998/9.
Source: http://www.ercrugby.com/eng/13_70.php

The uncertainty of outcome hypothesis implies that fans prefer close matches to highly unbalanced matches. On that basis, in deciding whether or not to attend an ERC match, fans have to form some *ex ante* view as to how evenly matched the two participating teams are, bearing in mind that the away team plays in a different league and the two teams may never have played one another previously. This assumes some knowledge among fans on the respective merits of different teams which we suggest

is based on teams' track record in the competition. In order to capture this we calculated the historic cumulative win ratio for each participating team for each season. This was defined as the team's cumulative win ratio up to the end of the previous season. For example, in the case of English club Bath for the 2009/10 season we estimate its cumulative win ratio for every season that it played in the ERC up to the end of the 2008/09 season.²⁹ Our basic hypothesis is that the more evenly balanced the two teams are, the more attractive the match is to fans and hence the higher the attendance.

The participating teams in the ERC change from year to year. This is particularly true for English and French teams. This precluded simply using teams' win ratios from the previous season when measuring competitive balance because some teams will not have participated in the competition in the previous season.³⁰ Using a team's win ratio from the last season in which it played in the competition also seems unsatisfactory as this could mean comparing recent performances for one team with performances from a number of years previously for the other. Consequently we use teams' cumulative win ratios.

We initially tested for short-run uncertainty of outcome in ERC pool matches using a test adapted from the trade literature similar to that proposed by Fourie and Siebrits (2008). The test defined the attractiveness of a match between two teams i and j as:

$$A_{ij} = (w_i w_j) / D_{ij}^2 \quad (1)$$

²⁹ This means we have to exclude the first season of the competition 1995/96 from our regressions. As English and Scottish teams did not participate in that season, it was not possible to estimate a win ratio for 7 of the 20 teams that participated the following season so we also dropped 1996/97 from our regressions. This reduces our total sample from 1,096 matches to 1,042. In the case of other teams participating for the first time in the competition we assign them a cumulative win ratio which is equal to the average of the ratio for the other teams from that country. The intuition for this is that in the case of a French team, for example, participating for the first time, fans of the teams that it is due to play against will have no prior record to gauge it against but are likely to consider that a team that finished in the top 6 of the French league is likely to be a reasonably good team. Similarly the team's own supporters are likely to estimate how it might perform on the basis of how other French teams have performed previously. One final nuance, in 2003/04 three of the participating Welsh teams which were formed as a result of mergers entered for the first time. For that season we assigned these teams win ratios based on the historic cumulative performances of the teams from which they had merged.

³⁰ Suppose four teams had not played in the ERC in the previous season. Using the previous season's win ratios to estimate competitive balance would exclude 24 of the 72 matches in that season.

where w_i and w_j are the win ratios of the respective teams and D_{ij} is the difference in the two win ratios. The proposed match attractiveness variable, however, proved to be statistically insignificant.³¹

As specific measures of competitive balance proved statistically insignificant we included the win ratios for each team as explanatory variables. In addition to short-run *ex ante* competitive balance, the other key factor in determining attendance in our model is whether or not the home team is in contention to qualify for the knock-out stages of the competition, which captures the issue of medium-term competitive balance. In line with the literature we assume that the majority of attendees at a match are home team supporters and, in general, they will be less inclined to go if the home team is effectively out of the competition. To capture this we analysed the results of all pool stage matches to identify whether, prior to each match, it was mathematically possible for the home team to qualify. This measure is not perfect because while qualification may be mathematically possible, it may be unlikely which may discourage fans from attending. As pointed out, the ERC is structured in a way that maintains medium-term uncertainty as qualification for the knock-out stages is generally not decided until the final round of pool matches has been played.

The results of the estimation of the basic model are shown in column 1 of Table 6 below. The dependant variable, match attendance, is measured in thousands. The first thing to note is that both win ratios are positive and significant. In addition both effects are large in magnitude. For example if the home team's win ratio was to rise from, say, 0.25 to 0.75, average attendance would rise by about 5,500. To put this in context, the average attendance at an ERC match over the 15 years was only 8,817.

The home team win ratio is clearly the most important variable in determining attendance, but the away team win ratio is also important. Its effect is positive, statistically significant and large in magnitude. It is however, only about one quarter of the size of the home team effect.

³¹ We also used a simpler measure, relative win ratios, i.e. w_i/w_j , as a measure of competitive balance but this also failed to explain match attendances.

Table 6: A Model of Attendance at ERC matches

VARIABLES	(1)	(2)	(3)
Home Win Ratio	10.89*** (0.856)	10.65*** (0.857)	11.43*** (0.838)
Away Win Ratio	2.853*** (0.846)	2.681*** (0.845)	2.986*** (0.821)
Home Qualification	1.789*** (0.533)	1.821*** (0.532)	2.218*** (0.519)
Away Qualification	0.290 (0.516)	0.270 (0.514)	-0.0821 (0.501)
Previous Appearances	0.537*** (0.0396)	0.558*** (0.0403)	0.275*** (0.0523)
Home Winner Last Yr.	3.182*** (0.841)	3.159*** (0.838)	3.681*** (0.815)
Away Winner Last Yr.	0.624 (0.837)	0.665 (0.834)	0.433 (0.809)
Same League		-1.513*** (0.554)	-1.585*** (0.537)
Bonus Points			0.715 (0.600)
Trend			0.340*** (0.0761)
Constant	-3.014*** (0.798)	-2.781*** (0.800)	-5.441*** (0.860)
Observations	1,030	1,030	1,030
R-squared	0.34	0.34	0.38

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Perhaps unsurprisingly, these results suggest that crowds seem to be larger for good teams. Nevertheless, given the different magnitudes of the effects, fans are quite happy to turn up to see a good home team take on a relatively bad away team. Thus

the standard view that short-run competitive balance is the main driver of attendance does not appear to be supported by our results. Given these coefficients, an imbalanced match between a good home team and a bad away team, would attract a higher crowd than a balanced match between two bad teams. In short, it appears that good home teams attract large crowds regardless.

The third variable included in the regression is a dummy variable set to one for matches where it is still possible for the home team to qualify for the next stage of competition. This is a measure of medium-term or seasonal imbalance. As is to be expected, the possibility of qualification has a positive and statistically significant effect on attendance. Almost 1800 extra fans will attend a match where the home team has a possibility of qualifying. This is roughly the same order of magnitude as a better than average away team (i.e. with a win ratio of 0.5 or more). The third variable in the regression is dummy variable set to one when it is still possible for the away team to qualify. Interestingly the effect of this variable is not significantly different from zero. Again this suggests that what really matters for attendance is the quality of the home team regardless of the quality of the away team.

The next variable in column 1 is the number of previous years the home team has played in the ERC. The more often the home team has played in the ERC the larger the crowd. For each extra year a team has appeared, its average home attendance will rise by 552.

The next variable in column 1 is a dummy set equal to one when the home team won the competition in the previous season. The effect of this variable is very large in magnitude and statistically significant. Winning the competition adds over 3,000 to average home match attendance the following season. A similar dummy set equal to 1 if the away team won the competition in the previous season has no effect. Once again, away team performance seems to matter relatively little for match attendance.

So far the results presented in column 1 are as might be expected. The only surprise is that short-run competitive balance seems to matter less than the absolute quality of the home team. King et. al. (2011), however, report similar results in the case of the

Australian National Rugby League, although they used a different methodological approach.³²

We also tested for the existence of, what might be described as, a “Derby” effect. In general teams from the same countries are kept apart in the ERC pool stages. There have, nevertheless, been a number of instances of teams from the same league playing against one another in the ERC pool stages. We have identified 102 instances of ERC pool matches between teams from the same league. Most of these matches involve teams from the Celtic League as it has a higher number of participating teams than the Premiership or Top 14. In some seasons, however, there have been pools that involved two English or two French teams.

Column 2 of the table allows us to test for the presence of this Derby effect. The “same league” variable is a dummy set to one if the two teams play each other in one of the other leagues. Perhaps surprisingly the coefficient on this variable is large statistically significant and negative. According to these results, an ERC match between two teams from the same league will have attendance lower on average by 1,513. To put this figure in context, this is a similar order of magnitude to the effect of possible qualification.

In some ways it is a curious result insofar as we might have expected the rivalry between teams that play each other on a regular basis to attract an extra crowd. The negative effect could be rationalised as indicating that fans find these matches less exciting precisely because the teams will meet again that season.

We can examine this effect more directly by comparing the attendance at the ERC match directly with the attendance at the corresponding league match in the same season.

Theoretically the ERC is a higher quality competition as it involves the best teams from the various leagues. In general it is also true that there is more at stake in ERC matches. Teams only play six matches in the ERC pool stages and because only the

³² The latter study somewhat confusingly relates to rugby league rather than rugby union.

top team in the pool is certain to qualify for the knock-out stages, every match is vital, provided qualification is still possible. In contrast a team's overall league performance will generally not hinge on an individual league match to the same extent. Consequently ERC matches should be more attractive than league matches. We test this hypothesis by comparing attendances for ERC and league matches involving the same two teams in a given season. The data set in this instance involves 82 cases where we have attendance data for an ERC match and the corresponding league fixture.³³

We find that over 75% of matches have a higher attendance at the ERC than in the local league.³⁴ This suggests that the ERC match is taken more seriously by fans than the corresponding league match. However, those same fans are less interested in an ERC match between league rivals than they are in an ERC match with "foreign" competition. The results of a similar natural experiment comparing soccer attendances at league and FA Cup matches between teams in the same division of English football were reported by Szymanski (2001). He found that, while historically cup matches had drawn larger crowds, this was no longer the case and interpreted this result as supporting the proposition that increased competitive imbalance had a negative effect on attendances.³⁵ Although the ERC might be considered more unbalanced than the individual leagues, given the considerable imbalance in teams' resources illustrated in Table 1, our results indicate that supporters regard ERC matches as more attractive, contrary to Szymanski's findings in the case of English soccer. It must be acknowledged, however, that the number of observations in our sample was many times smaller than in Szymanski's study.

A further factor that we consider in analysing attendances at ERC matches is the impact of bonus points which were introduced in 2003/04. Awarding teams bonus points for scoring a minimum of four tries or for losing narrowly can be seen as a

³³ In its first two seasons the Celtic League was divided into two groups and Celtic League teams that played against one another in the ERC did not meet in the League. There were some ERC matches between Welsh and Scottish teams prior to the Celtic League but we do not have attendance data for the Welsh-Scottish League. Thus we have attendance data for 82 of the 102 matching cases of ERC and League matches.

³⁴ A formal t-test of the null hypothesis that both ERC and league attendances have the same mean can be rejected at the 1% significance level.

³⁵ This was due to the fact that the degree of competitive imbalance had increased faster in the case of the FA Cup than in the league.

measure designed to make matches more attractive to fans by encouraging attractive high-scoring close contests. Our data thus allows us to test the effectiveness of this measure.

Column 3 of Table 6 adds a dummy variable to the regression that is set to 1 from 2003/4 on. As this variable would also pick up the effect of any secular time trend, we have included a time trend in the regression. We find that the bonus variable is not significant (p-value of 0.22) in the presence of the time trend. The coefficient is positive as is expected. It is, however, impossible to disentangle the true effect of the introduction of bonus points from the secular increase in attendance over time.

The fact that measures designed to make matches more attractive to supporters have had little impact on attendances is surprising and raises some questions about contest design. In order to analyse this further we ran some time regressions for average tries scored per match per season and the percentage of close matches (defined as the percentage of matches where there was seven points or less between the teams) to ascertain whether the introduction of bonus points increased the number of tries scored or resulted in more close finishes in matches. The results are summarised in Table 7.

Table 7: Trends in Match Quality

	(1) % Close Games	(2) Tries per Game	(3) % Close Games	(4) % Home Wins
Tries per game	-	-	-6.18 (3.08)	-
Trend	0.83 (0.38)	-0.09 (0.03)	0.25 (0.46)	-1.14 (0.70)
Constant	27.81 (3.62)	6.04 (0.27)	65.18 (18.89)	79.55 (6.63)
R ²	0.23	0.40	0.41	0.15
Obs	17	17	17	17

It turns out that the number of close games has risen over time, while the number of tries per game has fallen (columns 1-2). Furthermore, there is a statistically significant inverse relationship between average tries per game and the proportion of close matches (column 3). This is hardly surprising; a team is more likely to score lots of tries in an unbalanced match. Overall the results suggest that the ERC has become more balanced over time with more close games but with fewer tries scored and even a reduction in the degree of home team advantage. Our earlier analysis indicated that attendance depended primarily on the relative strength of the home team while short-run competitive balance had no effect so it is perhaps not surprising that bonus points appear not to have affected attendances. Interestingly column 4 indicates that the proportion of home wins has also declined over time. The existence of a home team bias is a widely observed feature of sports leagues.

7: Conclusions.

The competitive balance/uncertainty of outcome hypothesis has frequently been used to justify practices by sports leagues and their member teams such as collective selling of broadcast rights which would normally be prohibited under competition law. The present paper analysed the effect of both short-run and medium-term competitive balance on attendances at pool stage matches in the ERC. The latter measure has received far less attention in the literature.

Our results indicate that ERC has become more balanced over time with more close matches but with fewer tries scored and even some decline in the degree of home team advantage. The ERC also displays a high degree of long-run or dynamic competitive balance. The competitive balance results are perhaps a little surprising given the significant differences in financial resources between participating teams.

In soccer rules requiring leagues to operate along national lines combined with a fully mobile player labour market as a result of the *Bosman* judgment have resulted in the domination of the Champions League by teams from the four or five largest leagues. In rugby the absence of a requirement that leagues be organised along national lines has enabled the smaller countries to establish a joint league which has so far been able to compete with the leagues in the two larger countries. It remains to be seen whether

this will change in light of the demands from English and French teams for a reduction in the number of Celtic League participants in the ERC.

Our results indicate that team quality and the possibility of qualifying for the knock-out stages of the competition are the main determinants of attendance at ERC pool matches. In terms of team quality, the strength of the home team is far more important than the away team. The results also indicate that medium-term or seasonal uncertainty is far more important than short-run uncertainty of outcome of a particular match. Although the ERC introduced a system of bonus points which was arguably designed to make matches more attractive to supporters in 2003/04, our results indicate that these have had little effect on attendances. Winning the competition significantly increases a team's home attendances the following season.

Interestingly an ERC pool match between teams from the same league is less attractive than one between teams from different leagues. At the same time ERC matches between teams from the same league generally draw larger crowds than the corresponding league fixture which may be explained by the fact that the ERC is a higher quality competition and that there is more at stake in individual ERC matches than individual league matches.

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