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An Investigation of the Determinants of Demand for UEFA Qualifiers from 2012 to 2017

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DECLARATION

"This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism."

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ABSTRACT

This research investigates the determinants of demand for UEFA international football qualifiers from 2012 to 2017, inclusive. Previous research suggests competitive balance, economic factors, quality of viewing, and scheduling are important factors in increasing domestic football attendance. To date, limited attention has been paid to these factors and international football matches. This thesis uses a linear multivariable approach to explain the volatility of attendance by UEFA members for the 2014 and 2018 FIFA World Cup qualifiers. Using secondary data 541 UEFA qualifying matches are analysed. Each of UEFA's fifty-five members are included in the sample and the dataset incorporates all group and play off fixtures for each qualifying campaign. The results show that stadium quality, increases in income, team quality and significant matches substantially increase attendance. In addition, the findings reject the uncertainty of outcome hypothesis. There is no evidence that supporters appreciate outcome uncertainty in the short run. Interestingly, eliminations are found to be a significant deterrent to attend international fixtures in the UEFA region.

1. INTRODUCTION

Since the first World Cup in 1930 there has been twenty-one FIFA World Cup tournaments. The tournament has grown in popularity since its inception. The first FIFA World Cup tournament had a total attendance of 434,000, whereas the 2018 tournament experienced a total attendance of 3,031,768 (Statista, 2018). Evidently, international football is a product in demand. To investigate the factors that determine spectator attendance for international association football matches, this thesis uses data from the qualifying matches that took place in the Union of European Football Associations (UEFA) confederation zone for the 2014 and 2018 FIFA World Cups. Using previous sports economics literature, a model is specified to explain the volatility of attendances experienced by international association football teams across Europe during the period for their home matches.

1.1 Determinants of demand for international association football attendance.

Spectator demand for football matches is now a well-developed topic. However, researchers understanding of the determinants of football demand has been largely confined to domestic association football. Multiple studies have been completed on the demand for football in England (Bird, 1982, Peel and Thomas 1988 and 1992, Simmons, 1996, Syzmanski and Smith, 1997, Syzmanski, 2001, Forrest and Simmons, 2002, Feehan et al, 2003 Allan, 2004, Forrest and Simmons, 2006, Buraimo, 2008, Alavy et al, 2010 and Cox, 2018). Other papers have looked at domestic leagues in Scotland (Jennett, 1984, Cairns 1987 and Peel and Thomas, 1996), Spain (Garcia and Rodriguez, 2002 and Garcia et al, 2020), Switzerland (Baranzini et al, 2008), France (Falter et al, 2008) Germany (Czarnitzki and Stadtmann, 2002, Pawlowski and Anders, 2012), Ireland (Reilly, 2015) and Portugal (Martins and Cró, 2018).

Baimbridge (1997) was the first paper to look at the demand for football in an international context, when he analysed the European championships that were held in England in 1996. In more recent times, our knowledge of demand for international football matches has largely focused on broadcasting figures in Germany (Feddersen and Rott, 2011, Schreyer et al, 2017 and Bergmann and Schreyer, 2019). This dissertation aims to investigate the factors that affect attendance for international association football team's home matches outside of a major tournament.

1.2 Why select the UEFA World Cup qualifiers for analysis?

For major international competitions, all participating nations travel to one region where the competition is held. This means that all participants not hailing from the host region do not play any home matches. Therefore, international football's governing bodies and the host country benefit from most of the attendance proceeds. On the contrary, during the qualification campaigns for these major tournaments each team has a certain amount of guaranteed home matches. Each national association controls the entrance fee to their home ground and each team plays an average of five home UEFA World Cup qualifying matches each campaign. Given the variation in the quality of national teams in the UEFA region, and their stadium sizes and quality, attendance figures for qualifying matches are far more volatile than attendances at major tournaments. This is because many fans will attend matches at these big major competitions as a celebration for their team qualifying and taking part.

Several differences exist between domestic and international football which one may hypothesize could cause a modification in determinants of demand. Domestic football leagues usually feature teams that are located within the parameter of one country. However, through analysing attendance figures for international World Cup qualifying matches, attendance is

examined in multiple countries. There are many differences between these countries, for example, disposable income levels and expectations of success. These factors vary more transnationally than domestically, making international association football an interesting subject for research. Additionally, International matches provide an intriguing landscape to examine outcome uncertainty as the large differences in team quality can create very unbalanced contests. Outcome uncertainty has been a contentious topic amongst academics since the concept's inception by Rottenberg (1956) however, it has not been previously evaluated in the context of demand for the UEFA World Cup qualifiers.

Similarly, researchers have not yet assessed how attendances are effected by the low frequency of international matches compared to domestic matches. Domestic league football matches are played frequently. Domestic football clubs usually play at least one match each week from when their campaign begins to when it ends. This means that domestic fans have the option to attend a football match almost every week. The only intervals in domestic football calendars other than the summer break and brief winter recess are for international breaks. This is when international matches and the UEFA World Cup qualifiers are played. These international breaks last approximately a week and usually occur four or five times a year. This means that football fans have limited opportunities to attend international matches and attendance decisions may not be based on habit. Additionally, to the differences in frequency, the distance required to travel for away fans to stadiums is far shorter for domestic matches than international matches. These differences in supply and distance lead to increased planning and less spontaneous attendance for international matches.

The UEFA region was chosen for analysis due to the relevant data being both reliable and accessible. European countries have high levels of disposable income to spend on recreational

activities such as attending a football match. This means that consumers have a high level of spending power and access to a large market of substitutes. Moreover, the European domestic association football leagues are globally known as the most lucrative and well supported. Logically for these reasons the UEFA region became the most suitable area to investigate.

1.3 Summary of main findings.

This dissertation provides additional understanding into the role of stadium quality in determining attendance. International association football matches played in the selected timeframe, held in stadiums that feature on UEFA's four- and five-star list or stadiums that were built after the list was published have a substantial effect on increasing crowd figures. Increases in outcome uncertainty are found to negatively affect attendance, with supporters exhibiting a preference toward high quality teams and predictable results. In turn, balanced contests are observed as being undesirable. Therefore, this thesis rejects the UOH and suggests that the absolute quality of a fixture is a more important driver of fan interest. Increases in attendance are also correlated with fixtures where there is a high likelihood of a home win.

Additionally, attendance for international association football in the UEFA region is found to rise when average income increases. Thus, international football in the region is a normal good. Playoff matches play a large role in determining the teams that successfully qualify for the FIFA World Cup within the UEFA region. They represent significant matches within the dataset; hence they are found to result in increases in attendance. The inverse of this effect is seen when crowd numbers decrease when the home team has been eliminated and can no longer qualify. This thesis suggests that this decrease occurs because once a team has been eliminated supporters become disinterested in their remaining fixtures. It is evident that supporters prefer meaningful matches. Therefore, this dissertation advises competition regulators to possibly

increase the number of playoff participants to maximize attendance. This new approach can mitigate the number of meaningless matches that are played which fans exhibit displeasure toward. Additionally, stadium managers are advised to invest in the quality of their arenas. Such investment can assist in achieving increased attendance figures.

1.4 The governance of international association football.

Firstly, this dissertation begins by outlying and clarifying the key ideas that are central to international association football. International football describes association football matches between representative national teams under the regulation of FIFA. Originally, FIFA was formed in 1904 to govern football in several European countries, however its popularity soon grew and today its membership comprises of 211 national football associations. It is globally recognized as the international governing body of association football, futsal, and beech football. Below FIFA there are six regional confederations which oversee international football within each continent. Each national association is a member of FIFA and one confederation. The six confederations are UEFA, The Confederation of African Football (CAF), The South American Football Confederation (CONMEBOL), The Confederation of North, Central America, and Caribbean Association Football (CONCACAF), The Asian Football Confederation (AFC) and The Oceania Football Confederation (OFC).

UEFA is the largest confederation and consists of fifty-five national associations. It is also widely recognized as the most powerful due to its membership consisting of the strongest domestic leagues and most affluent population. For the World Cup qualifiers in Europe, UEFA coordinates the fixtures and issues guidelines to national associations within the region. There are several rules that UEFA enforces on national associations that effect attendances, for

example stadiums must have a minimum capacity of 200 people; this includes all standard and VIP seats.

There are two main UEFA regulations that can cause stadium owners to be unable to use their maximum stadium capacity. Firstly, at least five percent of the total stadium capacity must be positioned in a segregated area for away fans (UEFA, 2010). This means that certain spaces may be prohibited from use to allow the away fan seating areas to remain isolated from home fans. Secondly, UEFA mandates that each supporter has an individual seat and prohibits standing areas in stadiums for international association football matches, however, this rule does not extend to domestic football matches. This restricts the total capacity for international matches that are played in stadiums within countries that allow their domestic leagues to use terraces such as Germany. However, this rule has no effect on the capacity for stadiums within countries that do not use terraces such as England. Aside from these restraints, UEFA advises stadium designers that projected attendance figures are accurately estimated when determining stadium capacity as the stadium atmosphere will be most appreciated by supporters when it is "Full to capacity and buzzing" (UEFA, 2011).

UEFA organizes match scheduling and kick off times for all World Cup qualifying matches in Europe. The matches are usually played Thursday to Tuesday at 20:45CET with some earlier kick off times existing on the weekend. All group members play on the same day and each team must have a minimum of two days' rest between fixtures (UEFA, 2018). This two-day rest period between matches is not only beneficial for players, but it also provides fans with additional time to travel between fixtures which is advantageous for attendance figures. Furthermore, domestic football competitions are paused while international matches are played to prevent any potential attendance conflicts between domestic and international matches.

2. LITERATURE REVIEW

One important element of the sport economic literature is competition design. Although sports teams act like business cartels, they are unique as they must sell competition (Fort and Quirke, 1995). Syzmanski (2003) investigates the importance of competition design. He mentions how to stop the supporters of weaker teams from losing interest, competition regulators organize competitions to distribute winning percentages as equal as possible. Although a knockout format championship may be the most exciting form of competition, a league format creates a narrative throughout the season (Syzmanski, 2012).

2.1 International football competitions and the importance of competition design.

The FIFA World Cup takes place every four years, each time in a different selected host country/countries which qualify for the tournament automatically. Since the competition's formation, it has grown to include all of FIFA's 155 members and is split into two phases. The first phase is known as the qualifying round and is used to determine the teams that will participate in the second phase, the World Cup Finals. The qualifying round is designed to identify the strongest teams in each confederation. Each confederation has a set number of places which then represents them at the World Cup. For example, for a European nation to qualify for the World Cup they must compete against other European teams for one of UEFA's thirteen World Cup places. UEFA determines these places by splitting their members into nine groups of five or six teams.

For the group draw UEFA segregates teams based on quality which is calculated by their previous World Cup success. This is known as seeding and is used to prevent the highest quality teams eliminating each other which would cause a reduction in fan interest. After the groups have been drawn, each nation plays their other group members home and away in a league

format. Each UEFA World Cup qualifying group winner qualifies automatically for the World Cup. The teams that finish second in the group then enter the playoff round for the remaining World Cup places. This means that only two teams from each group progress from the group phase which heightens fan interest as group standings are valuable. Once a total of thirty-two international teams from the six confederations have qualified the World Cup qualifying round is complete. The World Cup tournament is usually held over approximately five weeks.

Aside from the World Cup, each international team enters continental competitions. The World cup and these continental competitions are known as major tournaments due to their prestige. The most notable of these continental tournaments is the UEFA European Football Championship, informally known as the Euros. ESPN (2016) note that the 2016 tournament's fifty-one matches had a combined audience of almost five billion viewers. Each individual association benefits from qualifiers for major tournaments through gate receipts for their home matches and broadcasting rights. International associations can make large profits for example The Football Association (FA) in England revealed that they had a total turnover of 467.2 million pounds in 2019 (The FA, 2019).

2.2 General economic theory in the context of thesis.

When analysing the demand for football this dissertation uses a standard linear demand function. A key assumption is that each individual national association faces a downward sloping demand curve for their home matches. Each home association has full control over the admission price they charge. The dependant variable of this thesis is attendance which is fixed in supply as the number of spectators which can attend a given sporting contest is restricted by stadium capacity. The demand for international football is centred on the classical consumer theory model. Consumer spending is shaped by preferences and budget constraints. This

creates a trade-off of consuming more of one good or the opportunity cost of consuming an alternative. This model is useful in explaining how people decide to spend their money. Other than the standard determinants of demand, there are several sporting factors which must be considered.

Borland and McDonald (2003) refer that consumption at a sporting contest must take place at a particular time and day, in the case of a football match the sporting contest usually lasts approximately ninety minutes. It has been previously noted in studies concerning the demand for domestic football that there is a correlation between high attendances and a club's catchment area (Czarnitzki and Stadtmann, 2002). Similarly, Buraimo and Simmons (2009) find a link between attendance and market size for football clubs, however, they also comment that there are many large metropolitan areas with underperforming domestic football clubs. Therefore, a large market size does not automatically lead to high attendance figures.

2.3 Detailed review of preceding sport demand research.

Direct comparisons can be made to the literature on the demand for football and the literature on the demand for sport. Originally, the pioneering sport economic research took place in North America with European examples lagging, however this is no longer the case, and we now have a vast array of knowledge on the subject in Europe and interest shows no sign of dwindling. Economists are particularly interested in the demand for sport's peculiar nature (Neale, 1964). This concept is used to capture the effect of atmosphere on fan utility. While traditional firms produce a distinguishable good or service, sporting contests produce a product that is a mixture of several products. One such component of this product is atmosphere. Fans will receive higher utility from events with large crowds than events with low attendance figures. In this sense sport is strange, as those in attendance essentially become part of the product.

Another irregularity as highlighted by Neale (1964) that exists in sporting markets is the Louis-Schmelling Paradox. This concept illustrates how sport is unique in the sense that participants in the market do not try and attain a monopoly. This is due to an interdependence between competitors to maximize gate receipts and because to form a league multiple teams are required. The example highlighted by Neale is how boxing benefits when its champions and contenders are equal in ability, this leads to an increase in ticket sales. Perhaps even further interest has been generated on the demand for sport by how Humphreys and Zhou (2015) have disputed this idea and described how Neale's proposition does not survive the test of time.

There are many aspects that must be considered when evaluating a football team's success. A football team's success can often be broken down to their achievements on and off the football pitch. A football team's success on the pitch is usually calculated through their competition or league performance and their off-field success through revenue (Jewell, 2017). When investigating the demand for sport, economists measure consumer demand through either attendance or broadcasting figures. These figures give the most accurate representation of event popularity. To date, there has been a large amount of research completed on the demand for domestic association football, as can be seen in table 2.1.

Table 2.1 (Previous literature on domestic association football).

Author/Author	Year	Title	Sample	Dependent variable
Bird	1982	The demand for league football.	English football league attendances from the 1948/49 to 1979/80 seasons	Attendance
Jennett	1984	Attendances, Uncertainty of Outcome and Policy in Scottish League Football,"	Scottish premier, first and second division matches from 1948-49 to 1974-75 compared to 1975-76 to 1981-82	Attendance
Cairns	1987	Evaluating changes in league structure: the reorganization of the Scottish Football League	Scottish premier, first and second division matches from 1971-1980	Attendance
Peel and Thomas	1988	Outcome uncertainty and the demand for football. An analysis of match attendances in the English football league	English football league matches during 1981/82 season	Attendance
Peel and Thomas	1992	The demand for football: Some evidence on outcome uncertainty	English football league matches during 1986/87 season	Attendance
Peel and Thomas	1996	Attendance demand: An investigation of repeat fixtures	Scottish football league during 1991/92 season	Attendance
Simmons	1996	The demand for English league football: A club-level analysis	Nineteen English football league clubs based in urban areas from 1962/63 to 1991/92	Attendance
Syzmanski	2001	Income inequality, competitive balance and the attractiveness of team sports	Matches from first two rounds of FA cup from 1982/83-1997/98	Attendance

Forrest and Simmons	2002	Outcome uncertainty and attendance demand in sport: the case of English soccer	872 English football league matches in divisions one, two and three	Attendance
Czarnitzki and Stadtmann	2002	Uncertainty of outcome versus reputation: empirical evidence for the First German Football Division	612 games played in the German football first division	Attendance
Garcia and Rodriguez	2002	The determinants of football match attendance revisited: Empirical evidence from the Spanish football league.	Spanish football league matches from 1992/92-1995/96	Attendance
Feehan et al	2003	Premier league soccer: normal or inferior good?	1998/99 FA premier league fan survey	Attendance
Forrest and Simmons	2006	New issues in attendance demand: The case of the English football league	Over 4,000 regular season English Football League games from 1999/2000-2001/02	Attendance
Falter et al	2008	Impact of overwhelming joy on consumer demand the case of a soccer World Cup victory	1,298 French soccer first league games between 1996-2000	Attendance
Buraimo	2008	Stadium attendance and television audience demand in English league football	English Football league matches from 1997/98 to 2003/04	Broadcasting
Alavy, Gaskell, Leach, and Szymanski,	2010	On the edge of your seat: Demand for football on television and the uncertainty of outcome hypothesis.	248 English Premier League games from January 1, 2002, and May 15, 2005	Broadcasting
Pawlowski and Anders	2012	Stadium attendance in German professional football–The (un) importance of uncertainty of outcome reconsidered.	306 games that were played in the German first football division in the 2005/06 season	Attendance

Reilly	2015	The demand for league of Ireland football	570 League of Ireland matches played between 2012-2014	Attendance
Cox	2018	Spectator Demand, Uncertainty of Results, and Public Interest: Evidence from the English Premier League	3,040 English Premier League matches between 2004 and 2012	Broadcasting
Martins and Cró	2018	The demand for football in Portugal: New insights on outcome uncertainty	898 games played in the Portuguese first division from 2010/11 to 2014/15	Attendance
Garcia et al	2020	The Demand for the Characteristics of Football Matches: A Hedonic Price Approach	Matches from the First Division of the Spanish football league played between 2007/08 and 2009/10	Average price per ticket sold

Domestic football attendance has been investigated in multiple countries. Different research papers have adopted different methods and contrasting approaches. When using attendance as the dependant variable, it has become common practise to convert attendance to its logarithmic form (Peel and Thomas, 1988, 1992, 1996, Simmons, 1996, Garcia and Rodriguez, 2002, Czarnitzki and Stadtmann, 2002, Forrest and Simmons, 2002, Forrest et al, 2004, Forrest and Simmons, 2006, Buraimo and Simmons, 2009, Reilly, 2015, and Martins and Cró, 2018). This is done to normalize the dependant variable as it is noted as being highly skewed in its natural form.

The first paper to investigate the demand for football in England is Bird (1982). The paper reveals that football fans have a low-price elasticity. However, not all football fans exhibit the same level of price sensitivity. Season ticket holders are less price sensitive than spontaneous fans (Simmons, 1996). Although in the long term it is perceived that the demand for football is inelastic, domestic clubs in England rarely make a profit (Syzmanski and Smith, 1997).

Football clubs prefer to maximize seasonal winning percentages than revenue (Borland and McDonald, 2003). This is reflected by stadium owners and managers choosing to keep admission prices in the inelastic portion of the demand curve. (Martins and Cró, 2018).

Interestingly, the majority research papers that focus on the demand for football tend not to offer commentary on price even though price is one of the standard economic determinants for demand. This is because the actual price of attending a football match can be unique for each fan and difficult to measure. The true cost often involves much more than the monetary price of a ticket. Additionally, due to season ticket holders and bundling, the price of a ticket can vary between supporters. Simmons (1996) overcomes the varying ticket prices experienced by supporters by measuring attendances with and without alteration for the admission of season ticket holders. It is found that price elasticity is generally lower for season ticket holders than casual fans which suggests that different groups of fans are situated on different parts of the demand curve.

Another approach used to overcome the difficulty in measuring the price of attending a football match is to consider the cost of travel along with the price of a ticket (Garcia and Rodriguez, 2002). Garcia and Rodriguez (2002) do this by gathering data on both ticket prices and the cost of travel and calculating the average price of attending a premier division football match in Spain. It is found that increases in the average price of a ticket and cost of travel both have a negative effect on attendance, but tickets are priced on the inelastic section on the demand curve. Pawlowski and Anders (2012) agree that the price of attending a football match should include the ticket price and the cost of travel. However they also note that the availability and prices of substitutes is also of interest but that it is difficult to truly establish what a substitute for attending a football match is.

It appears that Simmons (1996) has developed the most comprehensive method to measuring price. Using the average price of a ticket and the average cost of travel views all football consumers as homogenous. Whereas, Simmons (1996) shows that different groups of football fans are situated on different parts of the demand curve. Nevertheless, football demand studies do not tend to differentiate between different groups of consumers. Clearly differentiation between supporters would be appropriate by researchers as different subsets of fans face different costs and obstacles to attend a football match. Treating all football fans as homogenous is certainly a limitation of the previous literature considering football fans can be divided many ways such as by home and away fans and by casual fans and season ticket holders, as done by Allan and Roy (2016).

Allan and Roy (2016) note that season ticket holders are less likely to respond to match day specific characteristics than pay at the gate spectators which further supports Simmons (1996) finding that the two different groups of supporters are situated on different sections of the demand curve. This is because for season ticket holders, often the price of a football ticket is a sunk cost. Whereas, for casual fans purchasing a football ticket is a prospective cost, whereby unfavourable match day specific factors make them less likely to attend. It is also noted by Allan and Roy (2016) that away fans are less likely to attend if the home team has a higher chance of winning. Presumably, this is due to the high cost of travel incurred by away fans to attend a football match. When the home team has a high chance of winning, away fans may be less inclined to travel.

Sadly, football demand research that differentiates between different groups of fans is lacking in volume. This is due to attendances mostly being announced as a whole which makes it difficult for researchers to accurately discriminate between groups of football supporters.

Inability to differentiate between different groups of supporters makes it difficult to accurately measure the determinants of attendance, as the majority of the football attendance literature uses match day specific data to explain attendance. Therefore, if the crowd for a given fixture comprises of a high proportion of home fans that hold season tickets and the away team has a high chance of winning, attendance will be more insensitive to match day specific factors. Without differentiation between supporters the true factors determining match day attendance can become hidden.

One topic which has dominated the demand for football literature is outcome uncertainty. Outcome uncertainty refers to a contests degree of unpredictability. It can be measured in the short term which is usually a given fixture, medium term which is over a season and long term which is over several seasons. Despite the large volume of research completed on the effect of outcome uncertainty on football demand its optimal measurement method remains somewhat debated. Researchers have primarily employed two principal methods when investigating the effect of outcome uncertainty on demand. The first method involves measuring outcome uncertainty through some form of a team's previous success for example Jennett (1984) developed a way to measure a team's mid-season success which incorporated if both teams could theoretically still win the championship and the number of matches that remained. However this method gained criticism from Cairns (1987) who argued that mid-season it was unknown how many points would actually be required to win the championship. The second method used by researchers to measure outcome uncertainty involves the use of betting odds to calculate the likelihood of each outcome. This method was first used by Peel and Thomas (1988, 1992 and 1996).

There has been an immense contribution to the topic of outcome uncertainty within the sport economic literature by Peel and Thomas (1988, 1992 and 1996). However, Peel and Thomas (1988, 1992 and 1996) can be criticized for two main reasons. Firstly, a lot of the football attendance literature which has used Ordinary Least Squares (OLS) can be criticized for failing to consider the restrictions placed on attendance by stadium capacity. Secondly, they fail to recognise that the betting market is not efficient. Peel and Thomas (1988) focus on the role of outcome uncertainty in determining football attendances in England in the 1981/82 season. By employing logistic and least squares estimators the paper argues that the use of betting odds as a measure of outcome uncertainty is more efficient than preceding measures of outcome uncertainty. Peel and Thomas (1992) reinforce this argument when they look at demand for the English football league for the 1986/87 season and again when they investigate attendances in the Scottish football league for the 1991/92 season (Peel and Thomas, 1996). For the latter several different specifications are assessed using OLS.

Biases in betting odds are not recognized by Peel and Thomas (1988, 1992 and 1996), they are first noted by Dixon and Pope (1996) who find that betting odds can be exploited for monetary gain by punters. Further biases in the betting markets are also noted by Dobson et al (2001). To calculate a more efficient means of calculating outcome uncertainty in the short run, Forrest and Simmons (2002) begin adjusting betting odds to incorporate the evident bookmaker biases. They note that for any given observation the bookmaker's odds minus the bookmaker's overrun provides a more accurate representation of each outcome's likelihood. However one limitation to the Forrest and Simmons (2002) approach is that they calculate the bookmaker's overrun evenly for each outcome.

Perhaps the evident biases within the betting markets are why many paper's still measure outcome uncertainty by a team's previous success rather than betting odds. Kuypers (1996) and Garcia and Rodriguez (2002) measured outcome uncertainty through the difference between the league positions of the home and the away teams prior to the match. A similar method was employed by Forrest and Simmons (2006) and Falter et al (2008), who calculated the points per game for both home and away teams as the measure of outcome uncertainty. It is found that the impact of home points per game is greater than away points per game on attendance.

Interestingly, regardless of how outcome uncertainty is measured its effect on match attendance has been mostly found to be weak as can be seen by Borland and McDonald (2003) who examine the two conventional approaches to measuring outcome uncertainty. However, it appears that overall the use of betting odds is a more suitable measurement considering the other method describes team success rather than uncertainty. Additionally, the use of betting odds to measure outcome uncertainty has proven to be far more popular amongst researchers which insinuates that it is a superior method (Peel and Thomas (1988, 1992 and 1996), Dixon and Pope (1996), Forrest and Simmons (2002), Buraimo and Simmons (2008), Pawlowski and Anders (2012), Reilly (2015), and Martins and Cró (2018).

Overall, the papers which have used methods that have considered the constraints placed on attendance by capacity such as the Tobit model provide more precise empirical results. The theme of outcome uncertainty in determining domestic football attendance is again explored by Czarnitzki and Stadtmann (2002) who look at 612 matches in the German first division. They derive their empirical results using a generalized Tobit estimator, which they comment is a solution to capacity constraints. A Tobit model is also used by Forrest et al (2004) to combat

the effect of stadium capacity on football demand. The paper comments that in the Tobit model, the upper limit should not be stadium capacity as capacity figures are often unreliable. Therefore, upper limits of ninety five percent and ninety percent are used. Capacity constraints are also considered by Martins and Cró (2018) who use a twostep Tobit model. The first step explains if a match was broadcast on television or not through an estimated Tobit model, the second step uses the results derived in step one to estimate the attendance variable. Martins and Cró (2018) comment that as over fifteen percent of matches in their sample reach ninety five percent capacity, there is a high likelihood that the demand curve is latent. Therefore, OLS would be unsuitable.

Alternatively, to a Tobit model, a parsimonious Prais-Winsten regression model with panel corrected standard errors is employed by Forrest and Simmons (2006) for over 4,000 English Football League matches from 1999 to 2002. This model provides accurate results as Football league matches in England seldom reach full capacity, therefore a Tobit model is not required. Forrest and Simmons (2006) argue that the model allows for autocorrelation and heterogeneity between panels, cross-sectional correlation of errors and delivers consistent estimates.

Many of the variables which have been used to explain the determinants of demand for professional sport can be organized into groups. Forrest and Simmons (2006) describe how they organize the variables in their empirical model into vectors. Similarly, Borland and McDonald (2003) and Martins and Cró (2018) both address the determinants of demand for professional sport. They suggest there are five key determinants: (i) economic factors (ii) competitive balance, (iii) quality of viewing, (iv) the effect of television, and (v) scheduling. These are now discussed in turn.

2.3.1 Economic factors.

As football attendance is like other products it is exposed to the macroeconomic environment. Income affects demand positively in a simple linear demand curve for a normal good. The previous research on income's effect on the demand for domestic football has provided conflicting findings. It is unclear whether domestic football attendance is an inferior or normal good. Bird (1982) and Falter and Perignon, (2000) find that domestic football is an inferior good although this is disputed by Simmons (1996) who finds no evidence for an inferior good effect. Simmons (1996) even observes that for certain clubs' football is a luxury good. Domestic football is also observed as a normal good in Spain (Garcia and Rodriguez, 2002) and in the English premier league by Feehan et al (2003). Football is also found to have no inferior characteristics when considered under a hedonic price approach (Garcia et al, 2020).

Increases in the price of related goods to football attendance tend to have a negative effect on demand. The best example of this is increases in the cost of travel will negatively affect football attendance (Feehan et al, 2003 and Pawlowski and Anders, 2012). Several studies have proxied the cost of travel by measuring distances between the away team and the home team. In these studies, it is shown that increases in distances correspond negatively with attendance (Walker, 1986, Baimbridge, 1997, Garcia and Rodriguez, 2002, Forrest and Simmons, 2002, Forrest et al, 2004, Forrest and Simmons, 2006, and Reilly, 2015). The inverse effect of this is captured derbies. A derby match is a term given to a game where the two teams are involved in a rivalry or feud. These are highly significant matches to supporters. Most often rivalries are a result of geographical consequences, for example two teams hailing from one city. Due to their significance to supporters these matches result in increases in attendance (Baimbridge, 1997 and Martins and Cró, 2018).

When consumer preferences and expectations change in favour of a product, they have a positive effect on demand. It is often unclear as what is a direct substitute when analysing the demand for sport. A substitute to attending a match is possibly viewing that game on TV, Baimbridge (1995) finds that televised rugby league matches reduce attendance by twenty five percent However, for the most committed football fans there is not a close substitute for their favourite football team (Borland and McDonald, 2003). It has previously been argued that top division matches serve as a substitute for lower division matches when they have corresponding kick off times. This has been proven in Germany where top division matches that are scheduled at the same time as lower division matches have been shown to have a substitution effect (Wallrafen et al, 2019).

2.3.2 Competitive balance.

Competitive balance is defined as the spread of winning percentages amongst the teams involved. It is generally considered as one of the biggest drivers of spectator interest in sport economics and remains a highly debated topic between academics. Competitive balance is usually measured using the Herfindahl-Hirschman Index. When applying this technique to professional sports leagues one is concerned with the balance of championship wins between participants over a selected period. In a league where perfect competitive balance occurs each team would have an equal chance of winning the league each season. Therefore, if there were n teams in the league, each team would win the league every n seasons. Of course, the opposite of this is perfect imbalance which is when the same team wins the championship every year.

Professional sports teams enter competitions against competitors of similar ability to maximize outcome uncertainty (Rottenberg, 1956). The UOH states that consumer demand is generally positively correlated with higher uncertainty in outcomes. Therefore, under the UOH if results are too predictable it will cause a decrease in attendance.

Researchers recognize that there are three different types of competitive balance, short term competitive balance, medium term or seasonal competitive balance and long-term competitive balance. It is generally believed that medium and long-term competitive balance have a larger effect on stadium attendances than short term competitive balance. Short term competitive balance is uncertainty of outcome at the match level, medium term or seasonal competitive balance is league wide competitive balance over one season and long-term competitive balance is league wide competitive balance over several seasons. Neale (1964) mentions how fan utility is created from the league standing effect, noting that excitement is generated when league positions change. This implies fans prefer more balanced leagues as positions change more regularly.

A competitions level of competitive balance can often be affected by the competitions format. This is identified by Jennett (1984) who investigates the reform of the Scottish football league. Cairns (1987) also investigates the Scottish football league reform and notes that the restructure of the premier division increases the average market size for premier division clubs by 30% as several clubs from low population areas are removed. Additionally, Cairns (1987) claims the reform has been a success as it increases the receptiveness of attendances and halts descending time trends, although Scottish league wide disparity is broadened.

There has been a large volume of research conducted on the UOH in the short run which has found that increases in outcome uncertainty do not result in increased demand. The UOH in the short run has been criticised for its lack of consideration for fans preference for a home win. Identification of a home win was first found to be a significant determinant of demand for football attendance by Peel and Thomas (1988, 1992 and 1996). Forrest and Simmons (2002)

note that according to Peel and Thomas's results attendance peaks when the likelihood of a home win is slightly more than twice the likelihood of an away win. Czarnitzki and Stadtmann (2002) remark that the role of outcome uncertainty in determining football attendance is overvalued and increases in disparities will not lead to decreases in demand. This is in congruence with the finding that fan's tendency for loss aversion seems to be greater than their desire for outcome uncertainty.

As home fans want to see their team win, they are less likely to attend even contests where the home teams' chances of winning have been diminished (Buraimo and Simmons, 2008). This creates a u-shaped relationship between the probability of a home win and match attendance. Supporters show a preference for either a home win very likely, or very unlikely. Although, Pawlowski and Budzinski (2012) find that home team favourites are only weakly significant and negatively correspond with attendance. Budzinski, and Pawlowski (2014) suggest that Rottenberg's UOH does not work in practice as supporters prefer slightly imbalanced contests due to their desire to watch the best teams. This is known as absolute quality and can often result in higher attendances when there is a dominant team present. Martins and Cró (2018) also remark that there is no evidence that greater match level outcome uncertainty positively effects attendance in Portugal.

When exploring seasonal competitive balance, it has been shown in Spain that higher attendances are recorded when there is a greater theoretical chance of the home team winning the championship (Garcia and Rodriguez, 2002). This can be contradicted to Pawlowski and Anders (2012) where attendance in Germany increased when either the home or away team had a greater theoretical chance of winning the championship. However, qualifying for the champion's league did not appear to have any effect on attendance. It is also worth noting that

attendance increases if the game is played at the start or at the end of a championship season (Czarnitzki and Stadtmann, 2002 and Martins and Cró, 2018). Presumably, the former is a result of the league being highly balanced at the start of the season and the latter by an increase in significant matches in the seasons closing stages. During the season attendances are likely to decrease due to less meaningful matches.

There is evidence that balanced competitions in the long run are desirable. Fans exhibit a loss of interest when seasonal outcomes are overly predictable. There is a notable decline in FA cup attendances in England as the inequality of resources between participant's increases and the competition becomes less balanced (Syzmanski, 2001) This finding is comparable to Pawlowski and Budzinski (2012) finding that fans in a league that is perceived as less balanced (Denmark) are willing to pay approximately 160% more than fans of a league perceived as more balanced (Germany and Holland). When seasonal outcomes are excessively unbalanced, there is a unanimous decline in utility. Supporters of successful teams experience a loss in sense of achievement, whereas supporters of weaker teams view the chances of their team's success as less likely. Budzinski and Pawlowski (2014) however argue that fans may prefer narrow oligopolies fighting for the championship for example Barcelona and Real Madrid in Spain, than more balanced leagues.

It is assumed that a certain level of competitive balance is necessary to ensure fan interest. Nevertheless, although the theory forming the UOH seems logical, when applied in previous studies it does not seem to hold up. Factors such as home team win preferences and loss aversion are more desirable than an even contest. The empirical evidence however does suggest that seasonal competitive balance is not only favourable but has a significant effect on increasing attendances. Additionally, although we see a preference for one-sided contests in

the short run, in the long run perceived leagues with a high level of competitive balance fare better in popularity amongst supporters.

2.3.3 Quality of viewing.

Quality of viewing is an important factor that must be considered when researching the demand for football. Important aspects are the stadium's characteristics, the quality of the teams on display, temporary changes popularity and the effect of promotions and relegations. Fans desire comfort when viewing a sporting contest. Stadium owners must consider small details such as leg and elbow room when designing their arena (Melnick, 1993). Aside from a stadium's physical characteristics, social interactions inside the stadium are also significant. It has been shown that crowding creates an unpleasant experience for fans and that it is the most significant factor that influences if fans leave a game early (Wakefield and Sloan, 1995). This is likely to have an adverse effect on future attendance.

Increases in stadium age have been prominent in leading to decreases in attendance. This is because when stadiums increase in age their facilities become outdated. Newer and more modern stadiums usually have better facilities and are associated with higher attendances. (McDonald and Rascher, 2000). Another element of stadium quality is seating distance from the sporting contest. Quality of viewing decreases when distance from the sporting contest increases (Borland and McDonald, 2003). Asides from watching their favourite team play, people attend sporting contests for entertainment. There is a positive relationship between consumer satisfaction and stadium atmosphere (Jensen et al, 2016). To increase stadium attendances, stadium managers must lead an approach that does not only improve stadium quality but improves fan satisfaction. It is likely improving stadium quality alone will not directly have a positive effect on attendances unless it directly leads to an increase in fan

satisfaction. Aesthetic factors have also been observed as having a positive effect on the likelihood of a fan re attending a football match (Phonthanukitithaworn and Sellitto, 2018). This suggests that thoughtful and visually pleasing stadium features are significant.

Foregoing research completed on the effect quality has on international football attendance by Baimbridge (1997) stated that fixtures with a seeded team contributed positively to demand for the Euros in 1996. Alternatively, special consideration has been given to fixtures, where the away team is one of the domestic leagues most successful clubs. The findings have linked these teams to increases in attendance (Garcia and Rodriguez, 2002, Buraimo and Simmons, 2009 and Martins and Cró, 2018). These large clubs, for example Real Madrid and Barcelona in Spain, and Porto and Benfica in Portugal, usually create scenarios when they play away against smaller teams, where a home win is unlikely. However, fans seem to appreciate watching opponents that are historically highly successful.

Sport demand is often affected by temporary changes in popularity which can influence attendances. Negative temporary changes in popularity can result in decreases in demand. For example, North American sport attendances are found to be temporarily damaged whenever a labour strike occurs (Carlton et al, 2004). Positive temporary changes in popularity however lead to surges in sport demand. These positive changes in popularity are often the result of a team's success. Falter et al (2008) observes that attendances in France following their 1998 World Cup win surge in the French Soccer First League. This increase in demand observed by French clubs is a direct result of the celebratory nature caused by the national teams World Cup triumph.

Promotion in sport refers to the best placed teams leaving a lower division to compete in a higher division at the end of the season. It has been noted in Major League Baseball (MLB) that promotions were found to have a positive effect on attendance (Bruggink and Eaton, 1996). However, there seems to be diminishing marginal returns for fans who support teams that have experienced multiple promotions over a short period of time (McDonald and Rascher, 2000). Relegation is the opposite of a promotion. Teams that are positioned the worst leave the higher league to compete in a lower division. One may hypothesize that demotion would cause a notable decrease in attendance, however this has been found to not always be the case (Noll, 2002). When a team in contention for relegation is involved in a televised game it negatively effects viewing figures in the English Premier League (Buraimo and Simmons, 2015). Presumably, this is because of relegation candidates being perceived as lower quality viewing.

2.3.4 The effect of television.

Sporting contests that are broadcast on television can offer fans an alternative to attending a live match. The pioneering research on the effect of television on attendances corresponds with the formation of the English Premier League as few football matches were broadcast on television prior to this. Kuypers (1996) finds that broadcasting matches on television has no significant impact on attendances, although other research has found that this is not the case. It has been observed that broadcasted football matches have no effect on weekend attendances, however broadcasted matches can significantly decrease weekday game attendances (Baimbridge et al, 1996). Forrest et al (2004) note that English Premier League clubs in the 1992/93 and 1993/94 seasons actually make a financial gain from broadcast matches as their attendances are not harmed and broadcasting generates increased revenue.

More in-depth studies on the effect of television have shown that matches broadcast on free to air channels have a greater negative effect on attendance than matches broadcast on subscription channels (Garcia and Rodriguez, 2002, Forrest and Simmons, 2006, Buraimo and Simmons, 2009). Interestingly, it has been shown that while broadcasting, negatively effects attendance, the level of stadium attendances positively effects television demand (Buraimo, 2008). However, other studies examining the effect of television on attendance have been unable to comprehensively conclude its effect (Allan and Roy, 2008). The effects of broadcasting were not considered in the early sport demand research due to the lack of broadcasted matches. Andreff and Scelles (2015) comment that if Neale (1964) was to write his seminal contribution fifty years later, he would have remarked that television demand correspondingly with attendance would increase, the more league standings change. Further difficulties when researching the effect of television on attendance have been noted by Martins and Cró (2018) where their television variable encounters an endogeneity error. Although, Cox (2018) notes that attendances decrease in the English Premier League when a game is broadcast on television.

2.3.5 Scheduling.

There is evidence that the time and date a football match is played alters attendance. Fans tend to spend their recreational time on the activities that provide them with the highest amount of utility. When a spectator chooses to attend a football match there may be opportunity costs to contemplate. Fans must consider the time taken to travel to the stadium and the length of time the sporting contest is held. Early research on the effect of scheduling on the demand for sport showed that there are noteworthy differences in attendances between matches that were held on weekends, afternoons, nights, and quarters of the season in American football, hockey, basketball, and baseball (Hansen and Gauthier, 1989). This observation has also been

prominent when investigated in other outdoor sports. Rugby league matches that take place in the evening or on public holidays have been found to positively correlate with attendance (Baimbridge et al, 1995).

However, for international football at a major tournament, Baimbridge (1997) finds weekday fixtures are correlated with higher attendances, this is a unique finding as for domestic football, evening matches midweek are associated with a decrease in attendance when compared to matches that take place on weekends, all other factors being equal (Allan, 2004). Most likely this is due to fans having less time to travel to sporting arenas on those days. Business hours are generally defined as Monday to Friday, from nine o'clock in the morning to five o'clock in the evening (9am to 5pm). This restricts the amount of recreation time available to supporters on those days. Logically, leisure time is higher on weekends which makes attending football matches more accessible. Forrest and Simmons (2006) also note that fans prefer to save their scarce leisure time for weekends. This is reflected by weekend home matches having higher attendances than preceding mid-week home matches. Other previous research has also found that matches held on the weekend or on public holidays have a positive effect on attendance (Buraimo, 2008 and Martins and Cró, 2018).

2.4 Summary and conclusion of preceding sport economic literature.

Researchers' passion for sport accompanied with sport being a fitting landscape to test certain economic theories can explain why sport economics attracts attention. The determinants of demand for professional sport are mostly analysed via broadcasting and attendance figures. The demand for football is affected by numerous different factors and national associations face a downward sloping demand curve for each home game. Each national association has control over admission prices and supply is limited by stadium capacity. Through a standard

consumer theory model researchers try and comprehend what provides supporters with their passion for football.

Researchers have adopted many different approaches when analysing the demand for professional football. Criticism can be directed at the previous football attendance literature which has failed to recognize the challenges that exist when using attendance as the dependant variable. As attendance is limited by capacity OLS estimates are inaccurate. Therefore, the use of a Tobit model is required when there is a high ratio of attendance to ground capacity. Asides from the standard determinants of demand there are several sport specific factors. A lot of the economic determinants of demand for domestic football attendance appear applicable to attendance for international association football. However, certain topics require further investigation. Several studies have focused on how income effects football attendance, but previous literature has failed to comprehensively determine if football is an inferior or normal good. Additionally, it is difficult to decipher what constitutes as a substitute to football, although it has been noted that fans will abandon lower league teams in favour of higher quality divisions.

In terms of competitive balance, there is mixed evidence regarding the UOH. It has been suggested that fans preference for a home win and loss aversion better explain variances in attendance. Although it has previously been observed that the UOH may lead to increases in viewership for televised football, more research is required for this to be comprehensively proven. At the seasonal level competitive balance seems significant. The empirical evidence suggests that attendance increases as teams compete for prizes. For example, when home teams have a theoretical chance of winning the championship attendances increase. However, the effect of the away team having a theoretical chance to win prizes remains open to discussion.

It is generally believed that in the long run a certain level of competitive balance is preferable, although the optimal level for long term competitive balance is still in question.

Supporters show a preference for high quality newly built or recently renovated stadiums whereas old stadiums negatively affect attendance. Additionally, historically successful away teams and promotions are associated with increases in attendance, whereas relegation seems to negatively affect television viewing figures but not always negatively affect attendance. Televisions effect on attendance is still under consideration. It appears football broadcast on free to air channels and during the week have more of a significant effect compared to matches broadcast on subscription channels and matches shown on the weekend. The latter can be associated to scheduling. Due to each supporter's recreational time being restricted by the time taken to travel to a sporting arena and working hours, matches scheduled on the weekend or on public holidays record a higher spectator presence than matches scheduled during the week. Overall, although there is a large volume of knowledge regarding sport and football attendance, many questions remain unanswered. Correspondingly, previous findings have been yet to be proven in the case of international football attendance outside of a major tournament.

3. DATA

All qualifying groups and playoff fixtures for each World Cup are taken into consideration. A total of fifty-five different national associations are represented in the sample. The data used for this thesis is cross-sectional time-series, or panel data. The matches take place from the 7th of August 2012 to the 14th of November 2017. The data for this thesis is gathered between September 2020 and February 2021.The number of home matches that each team plays varies due to one group in the sample having five participants instead of six and teams qualifying for the playoff round having additional home matches. Furthermore, Gibraltar and Kosovo take part in the 2018 World Cup qualifiers but not the 2014 World Cup qualifiers and Russia qualify for the 2018 World Cup as tournament hosts therefore do not take part in the qualifiers. A total of 546 matches take place in the UEFA region as qualifiers for these World Cups. The sample is reduced to 541 matches due to UEFA ordering five matches to be played behind closed doors as a punishment for antisocial behaviour[1]. For these five matches, attendance is zero, meaning they do not capture the demand to attend these matches. Hence, they are not suitable for inclusion.

3.1 Introduction to variables used.

Although all the listed variables may not explicitly feature in the specification model, their collection is essential to complete the research. The dependant variable is the natural logarithm of attendance which is fixed in supply and restricted by capacity. Furthermore, in accordance with the preceding literature, variables are created to measure the economic determinants of football attendance, competitive balance, quality of viewing and scheduling. It is not possible to measure competitive balance in the long run due to the structure of the competition, which

[1] Bulgaria Vs. Malta (22/03/2013), Hungary Vs Romania (22/03/2013), Croatia Vs. Turkey (05/09/2016), Croatia Vs. Iceland (12/11/2016) and Ukraine Vs. Iceland (05/09/2016).

is a series of several mini leagues that are altered every qualifying campaign. The effect of television is not included due to the lack of available data on international association football broadcasting.

3.1.1 Information variables.

Firstly, each fixtures home and away teams are established. This is given by **HOME TEAM** and **AWAY TEAM**. International teams play several home matches therefore, each observation is not independent. As fixtures with corresponding home teams share common characteristics, these observations must be considered as a group. The away teams for each fixture must be gathered to identify specific away fan factors which affect international football attendances. The effect of these factors will vary considerabley depending on who the away team is for a given fixture. As UEFA denotes each group with a letter, this letter is shown by **GROUP**. In congruence, **WC14** is a dummy variable where matches that are associated with the 2014 qualifiers are designated one and matches that are not associated with the 2014 qualifiers, which means they are associated with the 2018 qualifiers, are designated zero. This variable differentiates between qualifying campaigns.

3.1.2 International association football attendances.

The number of people that spectate each sporting contest is given by **ATTENDANCE,** and then converted into logarithmic form by **LOGATTENDANCE** to reduce skewness and the effect of outliers**.** Consistant with the literature the natural logarithm of attendance is the dependant variable. The variable is used to accuratley evaluate the demand for international football. It is important to recognise that attendance figures are limited by stadium capacity, which is shown by **CAPACITY**. **CAPACITY** is then shown in logarithmic form by **LOGCAPACITY,** similarly to attendance this is done to reduce skewness and the effect of

outliars**.** As stadium capacities are notoriously inaccurate, each stadium's capacity restricted to ninety five percent is shown by **LOGCAPACITY95%,** and each stadiums capacity restricted to ninety percent is shown by **LOGCAPACITY90%.** This is done to give special consideration to crowd management policies which may reduce each stadiums total capacity.

3.1.3 Economic measures.

Regional incomes are measured through the average income for each stadium's corresponding nomenclature of territorial units for statistics (NUTS) two code. The NUTS codes are a geocode standard used to distinguish between different socio economic regions within the EU. However, income data is unavailable for the geocode of 213 observations. The NUTS two code for each region is shown by **CODE.** This is then used to find each NUTS two regions corresponding average level of income which is shown by **INCOME HOST**. The average level of income for each host region is given in millions of euro. The distance that away fans are required to travel to matches is given by **DISTANCE,** this is given in kilometers and it calculates the distance between home team stadiums and away team capital cities. The distance is then converted to logarithmic form and shown by **LOGDISTANCE** to reduce skewness and any effects that may occur due to outliars. Corresponding with the literature distances are collected as a measure of the cost of travel.

3.1.4 Measures of competitive balance.

Outcome uncertainty in the short run is calculated through betting odds as first suggested by Peel and Thomas (1988, 1992 and 1996). To incorporate evident biases within the betting market, odds are adjusted as done by Forrest and Simmons (2002). The odds of a home win adjusted to remove the bookmakers overrun is represented by **PROBHOMEWIN**, the odds of a draw adjusted to remove the bookmakers overrun is shown by **PROBDRAW**, and the odds

of an away win adjusted to remove the bookmakers overrun is shown by **PROBAWAYWIN.** These adjusted probabilities are calculated by collecting betting odds in decimal form for the liklihood of each home win, draw, and away win. The betting odds for a home win,away win and draw for each fixture are then summed together. This gives a sum of liklihoods greater than one. The total overrun is then divided by the number of outcomes. The divided overrun is then subtracted from each outcomes bookmakers odds. The adjusted odds then sum to one which is shown by **SUM OF PROBABILITIES**.

The adjusted outcomes are then used to calculate the **THEIL** index for each match as first observed in the paper Theil (1967). It is calculated by measuring the difference in the liklihood of a home win, draw and away win. The Theil index is a measure of outcome uncertainty and it is generally considered a more accurate measure than the difference in betting odds between a home and away win because it considers the liklihood of a draw. The variable is used to investigate if the UOH is true in the short run for international association football matches.

Equation 3.1 (Theil index)

$$\text{THEIL} = \sum_{1}^{3}=1\frac{Pi}{\sum_{i=1}^{3} Pi} \text{Log } (\frac{\sum_{i=1}^{3} Pi}{Pi})$$

Similarly, the UOH has attracted dissaprovement for not considering if fans prefer home team favourites. Matches where home teams are more likley to win than away teams are shown by the dummy variable **HOMETEAMFAVOURITE**. Matches where the home team is more likley to win according to betting odds are given by one and matches where there is not a home team favourite according to betting odds are given by zero.

Several measures of seasonal competitive balance are employed. Play-off fixtures are shown by **PLAYOFF**. This is a dummy variable that is denoted one if a game is a play-off match and zero if it is a group match. Therefore, it differentiates between play off matches and group

matches. Group Level Uncertainty *(***GROUPUNCERTAINTY**) is used for group matches where a team has the opportunity to directly qualify for a World Cup. This variable is collected to investigate if international fans appreciate group matches where they can achieve qualification. It is a dummy variable which is one if a team can directly qualify for the World Cup through a given group fixture, and zero if no team can directly qualify for the World Cup through a given group fixture. The **GROUPUNCERTAINTY** variable is a measure of league or group wide competitive balance. Matches where the home team has succesfully qualified for the World Cup are shown by **HT QUALIFIED**. The value of **HT QUALIFIED** assumes one for matches where the home team has already qualified and zero where they have not. This variable is collected to investigate if achieveing qualification acts as a deterrent to attend as the remaining fixture results become obsolete.

3.1.5 Measures of quality of viewing.

Each matches location is shown by **STADIUM**, which is the name of the arena that the match takes place, and **CITY**, which is the city that each arena is located. **OPENED/RENOVATED** shows the last year that a stadium has been renovated or opened. It is used to determine stadiums that have been renovated or opened after UEFA released their list of four and five star stadiums. The newly built stadiums are assumed to be high quality arenas just as four and five star ranked stadiums are assumed to be high quality arenas. Stadiums that feature on the four and five star UEFA stadium list and stadiums that have been renovated or opened after the list was published are represented with a one by the dummy variable **HIGH QUALITY ARENA**[2] and alternative stadiums are signified with a zero**.** Similarly, matches that feature on the list of international rivalries are denoted with a one by the dummy variable **RIVALRIES,**

[2] The stadiums that feature on UEFA's four- and five-star list and the stadiums that were renovated or built after the list was published can be seen in appendix one.

and matches that do not, correspond with a zero. Certain matches may record higher attendances simply because the fixture is considered as a rivalry. Therefore, the collection of the variable is necessary.

ELO ratings are used to measure team quality. The ELO ratings are a way to measure subjective sports such as football. Each home and away team ELO rating is summed to give **QUALITY.** This gives a measure of total game quality. This variable is used to measure how supporters evaluate the quality of the teams on display. Finally, meaningless matches to home supporters are measured by home team eliminations (**HTELIMINATED**). A home team is considered eliminated when it is no longer mathematically possible to finish second in the group. This is because teams that finish second are rewarded with a place in the play off round. Therefore, teams who can no longer reach the play off round can no longer qualify for the World Cup. **HTELIMINATED** is a dummy variable that is designated a value of one if the home team is eliminated and zero if the home team is not eliminated. This variable is collected to determine if eliminations are associated with decreased attendances as qualification is no longer possible.

3.1.6 Scheduling variables.

The time and date that a match takes place is shown through **YEAR** and **DATE.** These pieces of information are used to determine what day the game is played. In turn, weekend matches are shown through the dummy variable **WEEKEND.** Weekend matches are represented as one, and matches that do not take place on the weekend are zero. Therefore, the variable distinguishes between weekend and mid week matches. This is done as the day that a football match is played has previously been shown to affect attendances. **KO TIME** is the time that each game begins. This is used to calculate if a match begins in the evening as previous research has identified that the time a match is played affects attendances. A game is considered to have

kicked off in the evening if it begins after 6pm. Evening matches are symbolized as one with matches before 6pm expressed as zero. The variables collected are summarized in table 3.1.

Table 3.1 (Summary of variables used)

Variable Name	Description
HOME TEAM	Name of Home Team
AWAY TEAM	Name of Away Team
YEAR	Year of Fixture
DATE	Date of Fixture
GROUP	Group
WC14	WC14 qualifiers =1
WEEKEND	Weekend match =1
KO Time	Kick off time
EVENING KO	Evening kick off =1
PLAYOFF	Playoff match =1
ATTENDANCE	Match attendance
LOGATTENDANCE	Log of attendance
STADIUM	Name of stadium
CITY	City match takes place
CAPACITY	Total capacity of stadium
LOGCAP	Log of total stadium capacity
LOGCAP90%	Log of 90% total capacity
LOGCAP95%	Log of 95% total stadium capacity
PROBHOMEWIN	Adjusted home team betting odds
PROBDRAW	Adjusted draw betting odds
PROBAWAYWIN	Adjusted away team betting odds
SUM OF PROBABILITIES	Sum of adjusted betting odds
THEIL	Theil index
HOMETEAMFAVOURITE	Home team favourite = 1
HIGH QUALITY ARENA	4/5-star stadiums and newly built/renovated stadiums
RIVALRIES	Fixture between rival teams = 1
QUALITY	Sum of Home ELO rating and Away ELO rating
GROUPUNCERTAINTY	Group level uncertainty = 1
HTQUALIFIED	Home team qualified = 1
CODE	Host stadium nuts2 region code
INCOME HOST	Average income for host region
DISTANCE (km)	Distance between home team and away team
LOGDISTANCE	Log of distance
HTELIMINATED	Home team eliminated = 1

3.2 Data sources and collection.

The home and away teams represented and the final scores for each game are collected from *www.oddsportal.com*. It is also possible to determine which World Cup campaign each fixture is associated with from this website through the dates shown for each match. Other information available on *www.oddsportal.com* is the kick-off time and the betting odds for each possible outcome in decimal form. Unfortunately, *www.oddsportal.com* shows information for World Cup qualifiers from all confederations, therefore the collection process involves finding and selecting the relevant UEFA qualifying matches. The information shown on *www.oddsportal.com* is extremely accurate and the bookmaker's odds that are presented are gathered from over sixty global bookmakers (Oddsportal, 2021).

Attending a football match is an active way to be interested in international association football, therefore it is an accurate measure of demand. Attendance data for the 2014 and 2018 FIFA World Cups is available at *www.wikipedia.org*. The site displays attendance figures for each qualifier match organised by group and date. Attendance figures are infamously inaccurate. Many attendance figures are estimated and rounded to the nearest thousand. Nevertheless, the attendance data available on *www.wikipedia.org* provides accurate attendance data for the 2014 and 2018 UEFA World Cup qualifiers. Alongside the attendance figures for each match, *www.wikipedia.org* shows the city and stadium name that each match takes place.

The site also displays the total capacity for each arena. Stadium capacity is collected as it places a constraint on demand. In certain cases, demand can exceed capacity which must be considered for the observed attendance figures. Therefore, the empirical results are derived with the use of a Tobit model. However, it is well known that total stadium capacities are dishonest and fail to consider crowd management policies and UEFA regulations. Additionally,

attendance data is often observed as exceeding capacity. AS UEFA prohibits the use of standing areas in stadiums for international fixtures but not domestic fixtures, certain stadiums are observed with two different capacities. Fortunately, *www.wikipedia.org* differentiates between domestic and international capacity for these stadiums, so the correct stadium capacity for each World Cup qualifying match can be identified.

Playoff matches, variables where the home team is either qualified, eliminated, or can directly qualify for a World Cup from a group fixture are also gathered through *www.wikipedia.org*. Playoff matches for the 2014 UEFA World Cup qualifiers take place between the 15th of November 2013 and the 19th of November 2013 and for the 2018 UEFA World Cup qualifiers, play off matches take place between the 9th of November 2017 and the 14th of November 2017. There is a total of sixteen playoff matches within the dataset and they have a mean attendance of 42,216. Playoff matches are significant in terms of qualification for the FIFA World Cup, as victorious playoff match participants are rewarded for their effort with a place at the FIFA World Cup finals.

Matches where the home team is either already qualified or eliminated represent meaningless matches in the dataset. For these teams, their qualifying fate has already been determined. Therefore, the match result has no significance. Matches where the home team is already qualified or eliminated are not explicitly shown by *www.wikipedia.org.* However, the site displays group results chronologically by date, so it is possible to mathematically work out the group standings after each fixture and detect the point that each team qualified or is eliminated. Similarly, the group level uncertainty variable, which refers to matches where a team can directly qualify for a World Cup from a group game is also mathematically calculated from the results displayed on *www.wikipedia.org.* These matches are considered important in terms of

qualification, similarly, to play off matches, as the result can reward teams with a place at the World Cup finals. The match results and dates observed on *www.wikipedia.org* are very accurate, therefore the calculated group standings after each fixture are very precise.

Home and away team ELO ratings are collected from *www.eloratings.net* and then summed to give total game quality. The ELO rating system calculates team or player quality in zero sum matches. Following each result, each team receives points that are attributed to their current ELO rating. For each match, the ELO rating of each team before the given fixture is collected. The ELO ratings are preferred to the traditional quality measurements used in the literature which measure quality by average points per game and seeding. The average points per game is not used as this approach takes several matches before accurately reflecting team quality. This is problematic as international teams play very few matches in World Cup qualifying campaigns. Whereas the ELO ratings take effect instantly. Furthermore, seeding considers all teams that are the same seed as homogenous in quality. Consequently, there are only six seeding categories for the UEFA World Cup qualifiers. The ELO ratings provide a more detailed differentiation between the levels of team quality than seeding as they tend to range between 2,000 and 4,000, hence they are preferred.

Distances between home and away teams are collected from *maps.google.com* whereas Nuts two codes and regional income is available on *ec.europa.eu.* Distances between home team stadiums and away team capital cities are used to measure the cost of travel for away fans attending a football match. Away team capital cities are selected as the point of travel for away fans as capital cities are usually leaders in population and airport distribution. This approach assumes that increases in distance result in increases in the cost of travel. A superior measure of the cost of travel for away fans would be average flight prices, however this data is not freely

available, so distances are used in accordance with the previous football demand literature. The Nuts codes are a list of geocode references used to distinguish the different socio-economic regions within Europe. There are three levels of Nuts codes. Nuts one codes refer to major socio-economic regions, Nuts two codes describe basic regions for the use of different regional policies and Nuts three codes describes small regions (Eurostat, 2021). The Nuts two codes are selected for use as they provide an accurate representation of each stadiums surrounding socio economic area.

The outstanding data required for the study is attained through renowned lists, for example rivalries are given by a list of international rivalries[3]. There are six international rivalry matches that take place in the UEFA World Cup qualifiers during the selected period. Rivalry matches often heighten fan interest so they must not be ignored. Additionally, special significance is also given to stadia that featured on UEFA's four- and five-star stadium list which was published in 2007. The stadiums that feature on this list are gathered from *stadiumdb.com.* To feature on this list stadiums must meet a list of criteria set out by UEFA that considers them to be high quality. For instance, capacity must be a minimum of 30,000 people. Stadia that are renovated or built after this list is published are also considered to be high quality arenas due to their modern facilities. This is a fair assumption based on the empirical evidence which has associated modern stadiums with higher attendances (McDonald and Rascher, 2000). As *www.wikepedia.org* provides stadium history information along with stadium capacities, stadiums built or renovated after 2007 are easily identified. Seventy-one matches in the dataset are played in a stadium that either features on UEFA's four- and five-star list or has been opened or renovated after the list is published. The sources of data are summarized in table 3.2.

[3] The list of international rivalries can be seen in appendix two.

Table 3.2 (Sources of UEFA 2014 and 2018 World Cup qualifying data)

Data	Source
HOME TEAM, AWAY TEAM, DATE, WC14, KO TIME, HOME WIN BETTING ODDS, DRAW BETTING ODDS, AWAY WIN BETTING ODDS	www.oddsportal.com
PLAYOFF, ATTENDANCE, STADIUM, CAPACITY, GAME LEVEL UNCERTAINTY, HOME TEAM ELIMINATED, HOME TEAM QUALIFIED	www.wikipedia.org
QUALITY	www.eloratings.net
DISTANCE	maps.google.com
NUTS 2 CODES	ec.europa.eu
NUTS 2 REGIONAL INCOME	
HIGH QUALITY ARENA	stadiumdb.com / www.wikipedia.org

3.3 Description of data and statistics.

Following collection, the data is observed. Firstly, descriptive statistics are created for each UEFA World Cup campaign. Secondly, the campaigns are merged and the descriptive statistics for the full sample are produced. Table 3.3 shows descriptive statistics broken down for each qualifying campaign. The mean attendance of the full sample is 22,232. When analysed it is seen that the mean attendance for the 2014 qualifers is higher than the mean attendance for the 2018 qualifiers. Additionally, the mean stadium capacity for the 2018 qualifiers is lower than the 2014 qualifiers. This is most likely due to the inclusion of Gibralter and Kosovo, in the 2018 qualifiers but not the 2014 qualifiers. These two nations use smaller stadiums than Russia, who participated in the 2014 qualifiers but not the 2018 qualifers. In addition countries who partake in both qualifying campaigns may use smaller stadiums for the 2018 qualifiers than the 2014 qualifiers. The mean percentage attendance of the sample is sixty nine percent. The mean percentage attendance for the 2014 qualifiers is two percent higher than the mean percentage attendance for the 2018 qualifiers.

Table 3.3 (Descriptive statistics)

	WC14	WC18
Total matches	266	275
Total goals scored	739	801
Goals per game	2.78	2.91
Mean attendance	23,200	21,295
Mean stadium capacity	31,924	30,281
Mean percentage attendance	0.7	0.68

After the data is analyzed for each UEFA World Cup qualifiying campaign, the campaigns are merged and the descriptive statistics for the total dataset are observed.The highest amount of home goals scored in a single game is nine, Ukraine achieved this feat against San Marino in 2013 and Belgium did the same against Gibralter in 2017. Five matches in the sample result in eight nil away wins. Interestingly, eighty percent of these matches are against San Marino. The rest of the descriptive statistics for the dataset are shown by table 3.4.

Table 3.4 (Descriptive statistics cont.)

Variable Name	Obs	Mean	St.Dev	Median	Min	Max
WC14	541	0.49	0.50	0	0	1
WEEKEND	541	0.23	0.42	0	0	1
EVENING KO	541	0.74	0.44	1	0	1
PLAYOFF	541	0.03	0.17	0	0	1
ATTENDANCE	541	22,232	18,902	16,511	341	87,258
CAPACITY	541	31,089	20,705	29,775	1,300	90,000
PERCENTAGE CAP	541	0.69	0.27	0.75	0.01	1.31
PROBHOMEWIN	541	0.46	0.30	0.43	0.01	0.97
PROBDRAW	541	0.20	0.09	0.22	0.02	0.61
PROBAWAYWIN	541	0.34	0.28	0.27	0.01	0.96
THEIL	541	0.66	0.47	0.62	0	1.32
HOMETEAMFAVOURITE	541	0.57	0.49	1	0	1
HIGH QUALITY ARENA	541	0.13	0.34	0	0	1
RIVALRIES	541	0.04	0.41	0	0	1
QUALITY	541	3,234	338	3,264	2,262	4,022
GROUPUNCERTAINTY	541	0.04	0.18	0	0	1
HT QUALIFIED	541	0.01	0.10	0	0	1
INCOME HOST	328	49,043	63,443	32,933	5,560	38,3636
DISTANCE (km)	541	2,334	1,308	2,073	44	7,306
HTELIMINATED	541	0.11	0.32	0	0	1

Table 3.4 indicates that only twenty three percent of fixtures take place on weekends. Therefore, the remaining seventy seven percent are played between Monday and Friday. Seventy-four percent of matches kick off in the evening compared to only twenty-six percent being played during the day. In terms of quality, the game with the highest ELO rating is Spain against France in 2013 with a rating of 4,022 and the lowest ELO score is noted in Moldova versus San Marino in 2013 with a rating of 2,262. The biggest distance away fans have to travel is Portugal to Russia at 7,306 kilometers.

The highest attendance in the sample is recorded in Wembley Stadium for England versus Scotland, with 87,258 spectators present. Whereas, the lowest number of fans present at a match is 341 at the GSP stadium in Nicosia, Cyprus where the away team is Albania. Home teams are favourites fifty seven percent of the time and the largest difference in betting odds is observed for Belgium versus Gibralter in 2017. Interestingly, over a quarter (142) matches recorded attendances less than fifty percent of capacity. The Estadi Communal in Andorra is the smallest arena with a total capacity of 1,300 and Wembleys total capacity of of 90,000 makes it the largest stadium to hold an international UEFA qualifier in the selected period. A total of thirty four matches are recorded as reaching full capacity and nine of those matches record attendence figures above their total stadium capacity.

4. METHOD

The restraints placed on the dependant variable by stadium capacity inspire this thesis to employ a Tobit model as the choice of estimation method. A Tobit model is used, as previously done by Czarnitzki and Stadtmann (2002), Forrest et al (2004), and Martins and Cró (2018) who employ a two stage Tobit model. The Tobit model used is right censored, meaning it is censored from an above limit. The Tobit model was originally used by Tobin (1958) for what was described as limited dependant variables. The paper describes how in many economic surveys of households, different variables take on values below or above a cetain limit. Tobit models estimate a regression line by using all observations at the limit and above the limit. Another regression model which is appropriate for right censored dependant variables is a quantile censored regression model, as described by Powell (1986). However, this model is most appropriate when the dependant variable used is time.

4.1 Tobit models as an estimation method.

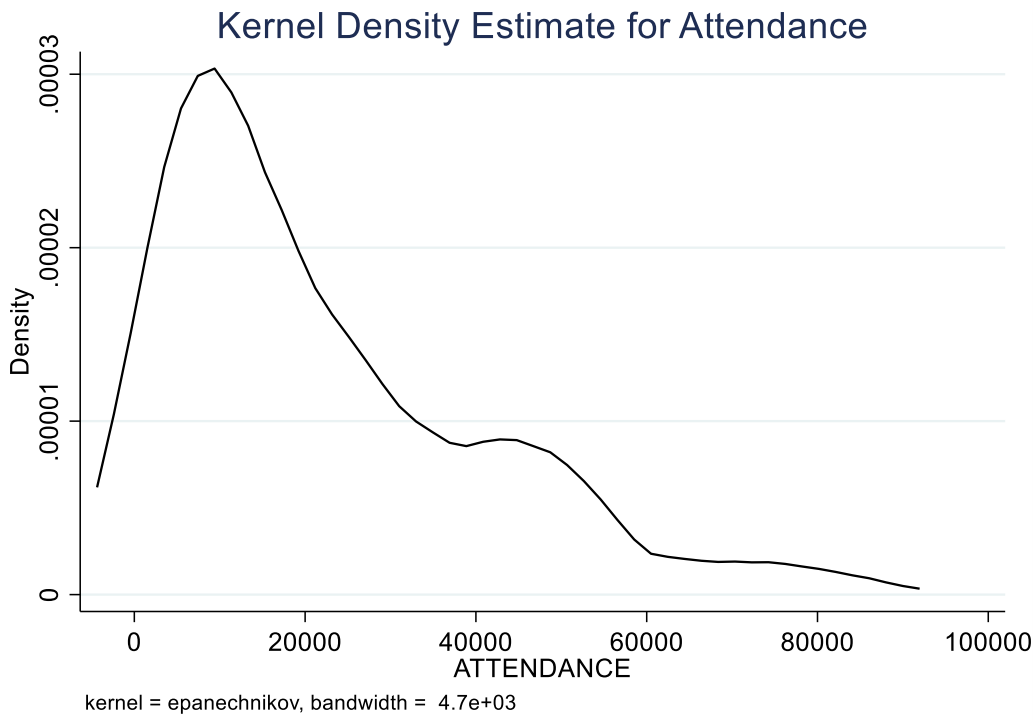
Alternitively to a tobit model this thesis gave special consideration to a Prais-Winsten regression model with panel corrected standard errors as done by Forrest and Simmons (2006). Attendance figures for international association football teams vary considerably. This can cause heteroscedasticity in the residuals and inflate standard errors. Forrest and Simmons (2006) observe that the matches in their sample rarely sell out which means they do not require a censored regression model. International football teams in the UEFA region exhibit a high ratio of attendance to ground capacity. Thirty-six fixtures within the sample reach full capacity. Therefore, the use of a censored regression model is imperative. Additionally, there may be a desire among fans to attend a football match that exceeds supply. This means that anything above the truncated limit is unobservable which means OLS estimates of the regression coefficiants would provide biased results (Rigobon and Stoker, 2007).

The advantage of a Tobit model is that is provides unbiased estimates for all *x* variables unlike a common linear regression model. However, Tobit models are not perfect. There are certain limitations to the models application for example it has been noted by Smith and Brame (2003) that Tobit models assume that the procedure that defines if the outcome variable is fully observed or not and the procedure that defines if the score on the dependent variable for observations whose outcome is fully observed are equal up to a continuous proportionality. Another issue with the application of a Tobit model is that it is inconsistent when the error term is not constant. Nevertheless, a Tobit model is preferred to other regressional models for this thesis due to the complications that arrise with the dependant variable.

4.2 Description of method.

A kernel density estimation (KDE) is used to visualize the probability density of attendance. This can be seen below in graph 4.1. Graph 4.1 illustrates that attendance does not follow a normal distribution pattern and is skewed to the right. It is noted that attendance is a highly skewed variable. Therefore, the logarithmic transformation is a suitable way to normalize this dependant variable. The one dimensionality between the response variables and the predictor variables are also improved through this conversion. Failure to transform the dataset through logs would cause the statistical analysis findings to decrease in validity. Conversion of attendance to its logarithmic form when it is deployed as the dependant variable is common practice within the preceding demand for football literature (Peel and Thomas, 1988, 1992, 1996, Simmons, 1996, Garcia and Rodriguez, 2002, Czarnitzki and Stadtmann, 2002, Forrest and Simmons, 2002, Forrest et al, 2004, Forrest and Simmons, 2006, Buraimo and Simmons, 2009, Reilly, 2015, and Martins and Cró, 2018).

Figure 4.1(Kernel density estimate for attendance)



When testing, the implemented Tobit model has two upper limits for increased robustness. The upper limits used are capacity at ninety five percent and capacity at ninety percent. The data implies that capacity figures are unreliable as nine matches record attendance figures above total stadium capacity, therefore the upper limits used in the Tobit model should not be total stadium capacity. Additionally, these upper limits are used to get an accurate representation of net capacity. UEFA regulations stipulate supporters may only attend football matches where there is sufficient seating, which means that there may be less seats available and less tickets sold than a stadiums total capacity. This regulation is for the health and safety of supporters and means that issues such as overcrowding are less likely, but atmosphere remains intact. The selected Tobit model upper limits used for this thesis have previously been employed by Forrest et al (2004), who comment that although the selected limits are arbitrary, they allow for other stadium management policies such as crowd segregation. The ninety five percent capacity limit gives 105 censored observations which represents nineteen percent of the total sample, and the

ninety percent capacity limit gives 157 censored observations which represents twenty nine percent of the total sample.

The home teams are clustered when regressing which removes the regular prerequisite that all observations are independent. This is because within the sample multiple observations have a common home team. Consequently, the standard error terms must consider intragroup relationships. The independent variables used are representations of key aspects of drivers of demand from the preceding sport demand literature. The model considers the dependant variable, the natural logarithm of attendance as a function of the economic environment, competitive balance, quality of viewing and scheduling. Certain variables require manipulation before they can be inserted into the model.

Asides from getting the natural log of attendance, the natural log of distance is also used. This is because there are large variations in distance between international football teams. Using the natural logarithm of distance removes the effect of outliers and normalizes the variable. The natural logarithm of distance has previously been included in the models used by Walker (1986) and Reilly (2015). Additionally, the betting odds are adjusted to remove the bookmaker's bias. This is done by taking the approach first mentioned by Forrest and Simmons (2002). The bookmakers' odds of a home win, draw and away win are added together. This gives a likelihood of outcomes greater than one, this is the bookmakers overrun and it is how they generate profit. The overrun is then equally divided by the number of outcomes. As there are three possible outcomes for each match, a third of the overrun is subtracted from the bookmakers betting odds for each outcome. This gives an adjusted and more accurate

representation of likelihood for each outcome. The sum of likelihoods then equals one. The adjusted betting odds are then inserted into equation 3.1 to calculate the Theil index. [4]

4.3 Model and variable interpretation.

Equation 4.2 shows the base model. This model loosely follows, but not exclusively the specification set by Peel and Thomas (1988, 1992 and 1996), Garcia and Rodriguez (2002), Forrest and Simmons (2006), Buraimo (2008) and Martins and Cró (2018). The implemented regression model is cross-sectional time-series, or panel, regression model. The dependant variable is the natural logarithm of recorded home team attendances.

Equation 4.2 (The base model).

$$\text{LOG (ATTENDANCE)} = \beta 0 + \beta 1*\text{WC14} + \beta 2*\text{LOG (Distance)} + + \beta 3\text{INCOME HOST} + \beta 4*(\text{THEIL, HOMETEAMFAVOURITE}) + \beta 5*\text{PLAYOFF} + \beta 6*\text{RIVALRIES} + \beta 7*\text{GROUPUNCERTAINTY} + \beta 8*\text{HTELIMINATED} + \beta 9*\text{HOME TEAM QUALIFIED} + \beta 10*(\text{HIGH QUALITY ARENA}) + \beta 11*\text{QUALITY} + \beta 12*\text{WEEKEND} + \beta 13*\text{EVENING KO} + \varepsilon$$ [5]

WC14 shows the matches that are qualifiers for the 2014 FIFA World Cup. Therefore, the variable indicates which World Cup qualifying campaign that each fixture is associated with. As the 2014 UEFA World Cup qualifying matches record a higher mean attendance than the 2018 UEFA World Cup qualifying matches, the hypothesis is that there will be a benefit to being associated with the 2014 campaign. Walker, (1986), Garcia and Rodriguez, (2002),

[4] The theil index was also estimated for each match by distributing the overrun in a way that was proportional to the size of each outcome's probability. It was found that regardless of how the overrun was distributed, the theil index for each match remained the same. Therefore, the method which distributed the overrun equally was included in the model due to its simplicity.

[5] Two correlation matrixes were used to inspect potential multicolliniarity between the variables that feature in the model. The first correlation matrix features the theil as the measure of outcome uncertainty and can be seen in appendix seven. The second correlation matrix features the home team favourite variable as the measure of outcome uncertainty and can be seen in appendix eight.

Forrest and Simmons, 2002, Forrest et al, 2004, Forrest and Simmons, (2006), and Reilly, (2015) all proxy the cost of travel incurred by away fans via distance. Similarly *LOGDISTANCE* is included in the model to measure the distance that away fans must travel to matches. A decrease in recorded attendances that corresponds with increasing distances would be assumed to be a result of increased travel costs for away fans. *INCOME HOST* is the measure of regional income. This is used to determine if international football is a normal or inferior good. A positive coefficient would indicate that international association football is a normal good, whereas a negative coefficent would indicate that it is an inferior good.

The adjusted betting odds are used to calculate *THEIL*. The Theil index measures the differences in outcomes (Theil, 1967). Therefore, the variable is a measure of short term competitive balance and is used to investigate the validity of the UOH. Increases in the Theil index are correlated with increases in outcome uncertainty, therefore a positive coefficient would indicate that supporters appreciate balenced contests and would support Rottenberg's hypothesis. However, if the Theil index is negatively associated with international football attendance, supporters prefer imbalenced contests and the UOH can be rejected. The UOH has often drawn citicism for its lack of consideration for fan preference for a home win (Peel and Thomas, 1988,1992,1996, Forrest and Simmons, 2002 and Buraimo and Simmons, 2008). Therefore, *HOMETEAMFAVOURITE* is used to investigate if fans are more likely to attend matches where the home team is favourite. A positive coefficient would indicate that supporters prefer when there is a high liklihood of a home win.

The play off variable is included in the model to differentiate between group and play off matches. It is also a measure of seasonal competitive balance. Playoff matches provide participants with the chance of qualification. A positive relationship with attendance would

indicate that international football fans hold play off matches in high regard. Alternative measures of seasonal competitive balance in the model include *HTELIMINATED* and *GROUPUNCERTAINTY*. *HTELIMINATED* is used to capture the effect of insignificant matches wherein, home fans no longer expect the home team to reach the World Cup. It is anticipated that eliminations will negativley correspond with attendances as these teams have failed to qualify and the results of their remaining matches are insignificant. *GROUPUNCERTAINTY* is used for group matches where a team can successfully qualify for the World Cup. Group matches where a team can directly qualify for the World Cup may be viewed by supporters as significant due to the possibility of qualification or arbitrary as qualification is very likley for the teams involved. Similarly, *HT QUALIFIED* is used to investigate a possible loss of incentive for supporters to attend matches where the home team has already qualified for the World Cup. It is estimated that attendance will decrease when a team has already qualified for the World Cup as the results of their remaining fixtures become meaningless which is expected to provide a loss of incentive to attend for fans.

In regards to quality of viewing, *HIGH QUALITY ARENA* is used to calculate stadium quality. A positive coefficient for this variable would indicate that fans appreciate high quality stadiums and that stadium quality is given special consideration when fans decide to attend a international football match. *QUALITY* measures the standard of international teams that are on display for a given fixture. Each team has a unique set of characteristics. Quality is the most important element of these characteristics. The hypothesis for this variable is that increases in quality will result in increases in attendance. *WEEKEND* and *EVENINGKO* are used to investigate the effect that scheduling has on international football attendance. As the previous literature has identified the day and time that a football fixture is played as important in determining attendances, these variables are used to investigate if international fans are as

sensitive to fixture organisation as domestic fans. The error term in the model represents any margin of error that may exist. It is included to consider the fact that the independent variables are never absolute predictors of the response variable.

Following specification this study features a series of Tobit models. Sixteen different models are estimated. Each model is unique and developed using the base model as described in equation 4.2. Between models, changes are made to the independent variables, and the sample size is altered. The results from each model are analysed in the context of the underlying economic theory to determine an assured set of conclusions. By comparing these results to previous literature this thesis examines the patterns that encourage and discourage supporters to attend international matches. Subsequently, recommendations are made for stadium owners and national associations to maximize future attendance figures.

Firstly, four models are used to test the full sample of 541 observations. The results of these four models can be seen in table 5.1. Models one and two contain the same independent variables however the upper limit in model one is capacity at ninety five percent and the upper limit in model two is capacity at ninety percent. In both model's outcome uncertainty is measured via Theil index. Models three and four follow the same structure as models one and two however outcome uncertainty is measured through the home team favourite variable instead of the Theil index. The Theil index is used to investigate the UOH. The Theil index is then replaced by the home team favourite variable to investigate if a preference for a home win is a bigger driver of attendance than uncertainty of outcome. Similarly, to the first two models, model three and model four are tested at contrasting upper limits. The remainder of the independent variables are used to capture the various elements that determine attendance in the

previous sport demand literature such as scheduling, short term and medium competitive balance, the economic environment and quality of viewing.

The second table of results can be seen in table 5.2. Models one, two, three and four are repeated; however, the sample is restricted. Seventy-five observations in which attendance figures appear rounded to the nearest thousand are removed. This means that the most accurate attendance figures remain. For these models, the observations that are removed are treated as estimates. It is well known that attendance figures are rarely correctly gathered. Attendances are often estimated to avoid the tedious nature of collecting the accurate figures. Once the attendance data has been scrutinized, estimation patterns become evident, wherein certain figures appear smoothed to the closest thousand, whereas other observations appear to be precisely calculated. The omission of these estimated observations means that only the most trustworthy attendance data remains.

The sample is then further restricted to omit the minnows. This gives the third set of results which can be seen in table 5.3. The minnows refer to the lower quality teams that traditionally record a very low group points tally. The teams removed are San Marino, Gibraltar, Malta, the Faroe Islands, Liechtenstein, Luxembourg, and Andorra. The national teams mentioned represent very small countries and their stadiums have very low capacities. The minnow's home and away fixtures are removed from the sample. Along with the estimates this leaves a restricted sample of 359 observations. The minnows are associated with low attendances owing to their low calibre. Due to the low outcome uncertainty surrounding their fixtures, opposition fans are less likely to attend matches featuring these teams. These teams often have a higher proportion of semi-professional football players than other teams, which is regarded as a sign of low quality. Therefore, it is possible that inclusion of these weak teams may skew results,

hence they are omitted. It is anticipated that the reduction of these countries from the sample will lead to an increase in outcome uncertainty as they are outliers in terms of quality. Once again, the restricted sample is inserted into a model where outcome uncertainty is measured though the Theil index and repeated with upper limits of ninety five percent and ninety percent capacity and then again once the Theil index has been substituted for the home team favourite variable.

Finally, the sample is restricted to only include observations for which the NUTS income data is available. This leaves a sample of 328 matches and can be viewed in table 5.4. The sample is restricted in this way to evaluate if attendances are higher in more affluent regions. As the previous findings regarding income's effect on the demand for football have incomprehensively determined if football is an inferior or normal good, this final table of results is of particular interest. Yet again, the restricted sample is tested with upper limits of ninety five percent and ninety percent and with alternative measures of outcome uncertainty. Following the creation of an established set of results, the demand for international football is analysed and interpreted.

5. ANALYSIS AND RESULTS

This thesis uses a series of Tobit models to scrutinize the attendance figures faced by UEFA members for two FIFA World Cup qualifying campaigns. Tables 5.1, 5.2, 5.3 and 5.4 below show the findings of sixteen different models which provide insight into how different elements affect crowd numbers. Before this dissertation, the underlying economic theory had yet to be tested on World Cup qualifying campaigns. Before the empirical results are analysed, several objectives are established.

5.1 Research objectives and presentation of results.

This thesis aims to research if international association football is a normal or inferior good and determine how increases in distance affect crowd attendance. Additionally, previous literature on domestic football has found that preference for a home win better explains fan turnout than the UOH. Using the Theil index and a home team favourite variable as measures of outcome uncertainty, the hypothesis is tested in the context of international association football. It is widely accepted that seasonal competitive balance is a driver of fandom in many ways. Seasonal competitive balance is tested on the selected sample in several ways. Matches where the home team can qualify for a world cup directly from a group match, matches where the home team has already qualified for the World Cup and matches where the home team can no longer qualify are all used to evaluate the effect of seasonal competitive balance on international association football attendance. When deciding to spectate a football match, fans must consider many aspects. This study tests if rivalries and play off matches can increase excitement and in turn attendance. It also evaluates if increases in team and stadium quality can create a more pleasurable viewing experience for supporters and increase demand. As fans must also carefully decide how they spend their limited amount of recreational activity, the effect of match scheduling is also evaluated

Table 5.1 (Total sample results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (1)		Model (2)		Model (3)		Model (4)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.644***		0.671***	
					(0.092)		(0.097)	
THEIL	-0.424***		-0.477***					
	(0.111)		(0.118)					
WC14	0.045		0.028		-0.025		-0.042	
	(0.101)		(0.108)		(0.092)		-0.099	
WEEKEND	0.008		0.017		-0.013		-0.003	
	(0.093)		(0.103)		(0.088)		(0.098)	
EVENINGKO	-0.090		-0.127		-0.050		-0.071	
	(0.113)		(0.121)		(0.113)		(0.120)	
PLAYOFF	0.385**		0.451*		0.286		0.361	
	(0.177)		(0.243)		(0.181)		(0.240)	
HIGH QUALITY ARENA	0.852***		0.791***		0.757***		0.692***	
	(0.128)		(0.130)		(0.122)		(0.126)	
RIVALRIES	0.020		0.348*		0.002		0.249	
	(0.201)		(0.194)		(0.186)		(0.240)	
QUALITY	0.002***		0.003***		0.002***		0.002***	
	(0.000)		(0.000)		(0.000)		(0.000)	
GROUPUNCERTAINTY	-0.283		-0.179		-0.193		-0.071	
	(0.197)		(0.238)		(0.192)		(0.230)	
HTQUALIFIED	0.046		0.144		-0.028		0.059	
	(0.140)		(0.248)		(0.166)		(0.267)	
LOGDISTANCE	-0.003		-0.001		0.068		0.075	
	(0.060)		(0.067)		(0.055)		(0.060)	
HTELIMINATED	-0.481***		-0.449***		-0.342***		-0.319***	
	(0.108)		(0.117)		(0.099)		(0.108)	
CONSTANT	2.242***		1.729**		1.743***		1.296**	
	(0.746)		(0.807)		(0.611)		(0.648)	
OBSERVATIONS	541	541	541	541	541	541	541	541

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

5.2 Detailed breakdown of total sample results.

The results show that unbalanced contests and quality of viewing have a substantial effect on international association football attendances. Fans exhibit a fondness for matches with a low level of outcome uncertainty where the home team has a high likelihood of victory. The empirical evidence shows that the Theil index is negatively correlated with attendance. Additionally, the negative coefficients recorded have a relatively high absolute value. A one unit increase in outcome uncertainty results in a 0.424 decrease in attendance at the ninety five percent limit and a 0.477 decrease in attendance at the ninety percent limit. The negative sign indicates that supporters do not prefer matches where the outcomes are unpredictable, therefore rejecting the UOH. Alternatively, the results show that supporters prefer unbalanced one-sided contests. When the Theil index is used as the measure of outcome uncertainty, it is significant at the one percent level. However, increases in outcome uncertainty are associated with a decrease in attendance. Instead, supporters exhibit a preference for a home win. Matches where the home team are favourite are associated with a 0.644 increase in attendance at the ninety five percent limit and a 0.671 increase in attendance at the ninety percent level compared to matches where the home team is not favourite.[6] Similarly, to the Theil index, home team favourites are significant at the one percent level. This indicates that supporters have a relationship with home team favourites that is U-shaped as identified by Peel and Thomas (1988, 1992 and 1996). Supporters prefer when the home team is either a very heavy favourite or an unfancied underdog.

[6] A model was also developed which used the probability of a home win to measure the relationship between the extent to which a home team is favoured and attendance. Similarly, to the home team favourite dummy variable, attendance was found to increase as the likelihood of a home win increased. A one unit increase in the probability of a home win was found to increase attendance by 1.327 at the ninety five percent level and 1.398 at the ninety percent level. The probability of a home win was significant at the one percent level. Outcome uncertainty, stadium quality, team quality, and eliminations all remained positive at the one percent level.

Quality is significant at the one percent level in each model however the variable's coefficients are quiet low. A one unit increase in quality only results in a 0.002 or a 0.003 increase in match attendance. Supporters show an appreciation for increases in quality as quality is associated with increases in attendances. The coefficient seems small however, ELO ratings in the sample range between 2262 and 4022. Therefore, one would expect the variable to have a low coefficient. The positive sign shows that fans prefer watching high calibre players. Playoff matches are significant in models one and two, at the five percent and ten percent levels. However, playoff matches are not significant in models three and four when the home team favourite variable replaces the Theil index in the model. Playoff matches are important matches to supporters as the participating teams have an opportunity to qualify for the World Cup, unsurprisingly they are associated with substantial increases in attendance and are associated with increases of attendance between 0.286 and 0.451 compared to non-playoff matches. Therefore, one can expect increased attendances for play off matches compared to group matches. Playoff matches capsulate the importance of seasonal competitive balance, whereby the winner's progress to the World Cup and the losers can no longer qualify which maximizes excitement and fan interest. Interestingly, matches held in the stadiums which feature on UEFA's four- and five-star list and stadiums built after that list was published are significant at the one percent level. This shows the importance of high-quality stadiums to supporters[7]. The robust positive value of the high quality arena variable shows that high standard stadiums are strongly linked to increases in crowd turnout. Rivalries are associated with increases in

[7] To evaluate the effect of stadium quality further, a different measure of stadium quality was used in the model. Special consideration was given to stadiums that had previously held a major UEFA final. A dummy variable was created for these stadiums called FINALHOSTS. To host a major UEFA final, UEFA has several requirements. These requirements are put in place to ensure high quality stadiums host the major finals. Therefore, stadiums that had held a major UEFA final are assumed to be high quality arenas. The list of stadiums used for this variable can be seen in appendix three, whereas the results for this variable can be seen in appendix four. The FINALHOSTS variable is positive and significant at the one percent level, similarly to the HIGH QUALITY ARENA variable which shows that the stadium quality results are robust.

attendances, although they are only significant at the ten percent level in model two. These matches are not significant in models one, three and four.

The group level uncertainty measurement is not significant; however, the variable is associated with a decrease in attendance with negative coefficients between 0.071 and 0.283. Perhaps, this is because the fans of these teams already expect to reach the World Cup. Therefore, there is a disincentive for them to attend these qualifying matches and wait for the probable likelihood that their team reaches the World Cup. Matches where the home team has already qualified for the World Cup are linked to an increase in attendance, however, these matches are not statistically significant. These are matches that involve teams who have already achieved their objective to qualify. This means the results of these matches do not matter to the home sides. Most likely the increase in attendance is caused by a celebratory atmosphere where fans commend their team's successful campaigns. Matches where the home team has been eliminated and has no chance of qualification are concurrent with a major reduction in attendance as the variable displays staunch negative coefficients. Matches where then home team has been eliminated are associated with a reduction in attendance between 0.319 and 0.481 compared to matches where the home team has not been eliminated. They are also staunchly significant at the one percent level. This decrease in attendance for matches where the home team is eliminated is in congruence with increases in attendance where the home team is favourite. Increases in likelihood of success for the home team corresponds with increases in demand, therefore when it is no longer possible for a home team to qualify for the World Cup supporters of that team are discouraged to attend matches.

Matches associated with the 2014 World Cup are not significant along with scheduling. Matches that take place on the weekend are generally linked to decreases in attendances,

although this is not robust. Attendances also decrease when the kick-off time of a match is after six o'clock in the evening (6pm). The coefficients of both scheduling variables are very low, and their insignificance shows that the time and day an international football match is played has a very minute effect on crowd numbers. Presumably, scheduling does not have a strong effect on attendance due to the low frequency of international football matches in a calendar year. This gives fans more time to engage in planning and leads to less impulsive attendance. Increases in distance do not have a noteworthy effect on crowd numbers. Comparably to scheduling, the unimportance of distance is likely due to the low regularity of international football fixtures. Due to fans having a prolonged period to organize attending national team matches, distance is insignificant as fans have a long time to prepare if they wish to attend a given international match. This allows them to select the most cost-efficient method of transport to travel to matches regardless of increases in distance.[8]

[8] The model was also tested with fixed effects present. The home teams were used as the fixed effects. The results which include fixed effects do not display any notable differences. Outcome uncertainty, stadium quality, team quality, and eliminations all remain positive at the one percent level.

5.2 Restricted sample assessments.

Table 5.2 (Estimations restricted results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (5)		Model (6)		Model (7)		Model (8)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.666***		0.696***	
					(0.097)		(0.102)	
THEIL	-0.357***		-0.411***					
	(0.120)		(0.128)					
WC14	0.031		0.011		-0.033		-0.053	
	(0.105)		(0.113)		(0.096)		(0.104)	
WEEKEND	0.007		0.014		-0.032		-0.028	
	(0.094)		(0.104)		(0.091)		(0.101)	
EVENINGKO	-0.114		-0.156		-0.102		-0.130	
	(0.129)		(0.137)		(0.128)		(0.136)	
PLAYOFF	0.324*		0.377		0.230		0.288	
	(0.170)		(0.236)		(0.177)		(0.236)	
HIGH QUALITY ARENA	0.796***		0.726***		0.695***		0.620***	
	(0.110)		(0.114)		(0.098)		(0.103)	
RIVALRIES	-0.079		0.365		-0.003		0.346	
	(0.234)		(0.281)		(0.220)		(0.320)	
QUALITY	0.002***		0.003***		0.002***		0.002***	
	(0.000)		(0.000)		(0.000)		(0.000)	
GROUPUNCERTAINTY	-0.378*		-0.219		-0.282		-0.101	
	(0.211)		(0.280)		(0.197)		(0.255)	
HTQUALIFIED	0.157		0.316		0.066		0.203	
	(0.139)		(0.280)		(0.166)		(0.294)	
LOGDISTANCE	0.008		0.006		0.074		0.078	
	(0.062)		(0.070)		(0.054)		(0.059)	
HTELIMINATED	-0.511***		-0.483***		-0.364***		-0.347***	
	(0.110)		(0.121)		(0.098)		(0.107)	
VAR(E.LOGATTENDANCE)		0.570***		0.645***		0.472***		0.532***
		(0.079)		(0.092)		(0.062)		(0.072)
CONSTANT	2.020***		1.537*		1.634***		1.224*	
	(0.778)		(0.848)		(0.607)		(0.653)	
OBSERVATIONS	466	466	466	466	466	466	466	466

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

The matches where the attendance figures are estimates or seem to be inaccurate are removed to give table 5.2. This set of results shows that the Theil index remains negatively correlated with attendance and is significant at the one percent level. These results reiterate that fans show a preference for one-sided contests. Yet again, the home team being favourite is associated with a large increase in attendance. The home team being favourite is also significant at the one percent level. The Theil index and home team favourite results yet again highlight international fans do not appreciate outcome uncertainty. Playoff matches are again associated with an increase in attendance figures, however this time they are only significant at the ten percent level in model five. Stadiums which feature on UEFA's four- and five-star list and the stadiums built after the list was published are robustly significant at the one percent level. In this restricted sample they are again strongly linked to increases in crowd numbers in all four models. The effect of rivalry matches is altered, as these matches are found to have no substantial effect on the estimations restricted sample. Increases in quality again result in increases in attendance and are significant at the one percent level in all four models

In line with the unrestricted sample results, the group level uncertainty measurement is related to decreases in attendance. It is only significant at the ten percent level in model five and is not significant in the other three models. Fixtures where the home team has been eliminated are again very important in deterring attendance. The coefficient for these matches is negative and the variable is significant at the one percent level in all four models. Matches where the home team has already qualified for a World Cup lead to higher attendances similarly to the observed results in table 5.1. However, these matches are not significant. There are no substantial effects on attendance caused by increases in distance, scheduling, or the 2014 World Cup variable.

Table 5.3 (Minnows and estimations restricted results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (9)		Model (10)		Model (11)		Model (12	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.438***		0.456***	
					(0.106)		(0.111)	
THEIL	-0.322**		-0.366***					
	(0.126)		(0.132)					
WC14	0.030		0.022		-0.034		-0.047	
	(0.105)		(0.114)		(0.105)		(0.115)	
WEEKEND	-0.104		-0.102		-0.117		-0.113	
	(0.091)		(0.099)		(0.089)		(0.098)	
EVENINGKO	-0.090		-0.128		-0.132		-0.165	
	(0.134)		(0.144)		(0.133)		(0.144)	
PLAYOFF	0.286*		0.316		0.209		0.242	
	(0.151)		(0.211)		(0.154)		(0.205)	
HIGH QUALITY ARENA	0.645***		0.573***		0.600***		0.523***	
	(0.108)		(0.111)		(0.099)		(0.104)	
RIVALRIES	-0.013		0.390		0.001		0.385	
	(0.229)		(0.267)		(0.225)		(0.285)	
QUALITY	0.002***		0.003***		0.002***		0.003***	
	(0.000)		(0.000)		(0.000)		(0.000)	
GROUPUNCERTAINTY	-0.241		-0.046		-0.189		0.024	
	(0.191)		(0.253)		(0.185)		(0.243)	
HTQUALIFIED	0.158		0.294		0.144		0.275	
	(0.132)		(0.252)		(0.164)		(0.282)	
LOGDISTANCE	0.038		0.041		0.101*		0.110*	
	(0.064)		(0.073)		(0.058)		(0.066)	
HTELIMINATED	-0.509***		-0.457***		-0.396***		-0.353***	
	(0.139)		(0.158)		(0.118)		(0.136)	
VAR(E.LOGATTENDANCE)		0.448***		0.508***		0.416***		0.472***
		(0.076)		(0.090)		(0.068)		(0.080)
CONSTANT	1.930**		1.184		0.862		0.076	
	(0.793)		(0.925)		(0.877)		(1.003)	
OBSERVATIONS	359	359	359	359	359	359	359	359

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Fixtures which feature San Marino, Gibraltar, Malta, the Faroe Islands, Liechtenstein, Luxembourg, and Andorra are omitted to give the results visible in table 5.3. Despite the exclusion of these countries who are considered outliers in terms of quality there are no noticeable changes to the results regarding outcome uncertainty. The Theil index is negative again and it is significant at the five percent level in model nine and at the one percent level in model ten. Attendance continues to increase when the home team is favourite, and the likelihood of a home win is higher. The significance of these matches remains consistent at the one percent level. The results when the minnows are removed are consistent with tables 5.1 and 5.2, wherein the outcome uncertainty results conflict with the UOH and show that increases in attendance are better explained by favouritism toward a home win.

Playoff matches are significant at the five percent level in model nine and ten percent level in model ten, similarly to table 5.2 they are not significant when the model includes the home team favourite variable. Yet again, playoffs are responsible for substantial increases in attendance due to the importance of their outcomes in qualification for a World Cup tournament, however they are only significant in model nine at the ten percent level. Increases in stadium quality are strongly linked to substantial increases in crowd turnout for international fixtures when the sample omits the minnows. Stadiums which feature on UEFA's four- and five-star list and the stadiums built after the list was published are significant at the one percent level for all four models displayed in table 5.3. Rivalry matches do not have a notable effect on attendance when the estimations and minnows are omitted. Comparably with tables 5.1 and 5.2 quality is positive and significant at the one percent level.

The measure of group level uncertainty is again linked to decreases in crowd turnout and it is not significant. This contrasts with matches where the home team has been eliminated which

are significant at the one percent level. These matches remain strongly associated with decreases in attendance as the variable is in both preceding sets of results. Matches where the home team has already qualified are not significant, however they result in upsurges in attendance. Matches played on the weekend and matches played in the evening, result in reductions in crowd numbers when the minnows are omitted. However, both scheduling measurements are insignificant. For this set of results, increases in distance are only significant in models eleven and twelve at the ten percent level, however, increases in distances are linked to increases in attendance in each model. Yet again, there is no substantial effect caused by matches that are associated to the 2014 World Cup qualifying campaign.

Table 5.4 (Income host restricted results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (13)		Model (14)		Model (15)		Model (16)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.760***		0.787***	
					(0.125)		(0.134)	
THEIL	-0.467***		-0.526***					
	(0.144)		(0.153)					
WC14	0.012		-0.005		-0.051		-0.070	
	(0.121)		(0.134)		(0.100)		(0.113)	
WEEKEND	0.093		0.126		0.150		0.185	
	(0.127)		(0.144)		(0.117)		(0.131)	
EVENINGKO	0.221*		0.184		0.307**		0.295*	
	(0.127)		(0.143)		(0.140)		(0.156)	
PLAYOFF	0.117		0.187		0.028		0.108	
	(0.139)		(0.219)		(0.142)		(0.208)	
HIGH QUALITY ARENA	0.902***		0.817***		0.812***		0.722***	
	(0.135)		(0.138)		(0.130)		(0.133)	
RIVALRIES	-0.038		0.465**		-0.009		0.420	
	(0.298)		(0.235)		(0.284)		(0.325)	
QUALITY	0.002***		0.003***		0.002***		0.002***	
	(0.000)		(0.000)		(0.000)		(0.000)	
GROUPUNCERTAINTY	-0.410**		-0.247		-0.312*		-0.149	
	(0.178)		(0.239)		(0.182)		(0.243)	
HTQUALIFIED	0.017		0.122		0.020		0.131	
	(0.179)		(0.326)		(0.188)		(0.320)	
LOGDISTANCE	-0.065		-0.040		-0.028		-0.005	
	(0.083)		(0.091)		(0.075)		(0.081)	
HTELIMINATED	-0.541***		-0.508***		-0.335**		-0.309**	
	(0.158)		(0.166)		(0.147)		(0.157)	
INCOMEHOSTNUTS2	0.000***		0.000***		0.000***		0.000***	
	(0.000)		(0.000)		(0.000)		(0.000)	
VAR(E.LOGATTENDANCE)		0.558***		0.650***		0.455***		0.532***
		(0.095)		(0.111)		(0.066)		(0.078)
CONSTANT	2.702**		1.883		2.378***		1.716**	
	(1.094)		(1.171)		(0.741)		(0.777)	
OBSERVATIONS	328	328	328	328	328	328	328	328

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

The sample is restricted to only contain observations where the income data is available. These results are displayed in table 5.4. The Theil index is significant at the one percent level in model thirteen and fourteen. The results show that increases in outcome uncertainty are negatively correlated with attendance. Increases in the likelihood of a home win are significant at the one percent level in model fifteen and sixteen. The outcome uncertainty results displayed in table 5.4 are in line with the previous results. Supporters are more likely to attend a game where the home team is favourite, rather than a game with a high level of outcome uncertainty. Table 5.4 shows that playoff matches are insignificant. However, these matches remain associated with rises in crowd numbers. Stadiums ranked by UEFA as four- and five-star arenas and stadiums which were constructed after the list was issued maintain their significance at the one percent level. These stadiums are also strongly linked to increases in attendance. Rivalry matches are associated with increases in attendance in models where the upper limit is set to ninety percent, however the coefficients become negative when the upper limit is changed to ninety five percent. The variable is only significant in model fourteen at the five percent level. Quality is significant at the one percent level when the sample is restricted to include income data, comparably to tables 5.1, 5.2 and 5.3.

In contrast to the preceding results, game level uncertainty is significant at the five percent level in model thirteen and ten percent level in model fifteen. Although, group level uncertainty is still negatively linked to attendance. Matches where the home side has been eliminated and no longer reach the World Cup cause attendances to decreases. Home team eliminations are significant when the sample is restricted to include income data at the one percent level when the Theil index is included in the model and the five percent level when the home team favourite variable is included in the model. Weekend matches and evening kick offs are linked to escalations in fan attendance in table 5.4. However, weekend matches are not significant,

whereas evening kick offs are significant at the ten percent level in models thirteen and sixteen and at the five percent level in model fifteen. The set of result visible in table 5.4 are the only models to evaluate incomes effect on attendance. The results show that the average level of income in the host region is strongly significant at the one percent level. The coefficient is shown to be very small (0.000). This is because income is measured in millions of euros. Therefore, a one euro increase in a host regions average income leads to a very small increase in attendance. This means that international football is a normal good. There are no noteworthy effects on attendance in table 5.4 linked to distance, the home team being qualified, or matches associated to the 2014 World Cup. [9]

5.3 Comparison of full and restricted sample results.

Overall, there are no significant differences between the empirical results derived from the total sample and restricted samples. Home team favourites, income, high quality teams and stadiums, and significant matches are observed as the important drivers of international association football demand. Whereas insignificant matches caused by eliminations deter attendance. Scheduling and distance are noted as having an inconsequential effect. Additionally, there is no evident benefit or disadvantage to a game being connected to the 2014 World Cup qualifiers compared to the 2018 World Cup qualifiers. In each table of results the Theil index and home team favourite variable remain consistent. The Theil index is negative and significant at the one percent level in every model that it is included in, except for model nine where it is negative and significant at the five percent level. Home team favourites are positive and significant at the one percent level in each model that the variable is included in.

[9] The gross national income (**GNI**) per capita of each away team at the time of each fixture was also collected. This data was gathered as a measure of away fan affluence. The hypothesis was that wealthier away fans would be more likely to travel and therefore matches with wealthier away fans would experience higher attendance. The results for this variable can be seen in appendix six. The away team GNI per capita was not found to be significant.

Therefore, this paper concludes that Peel and Thomas (1988, 1992 and 1996), Buraimo and Simmons (2008) and Martins and Cró (2018) were correct to identify preference for a home win as having a more substantial effect on football demand than outcome uncertainty. Therefore, the UOH is rejected. No evidence is found which shows that supporters prefer matches with a high level of outcome uncertainty.

The measure of stadium quality is positive and significant at the one percent level in all sixteen models. Previous research has measured stadium quality through stadium age (McDonald and Rascher, 2000). This has shown more modern stadiums are substantial determinants of demand. This thesis shows that stadium quality corresponds with increases in international football demand regardless of stadium age as many of the stadiums that feature on UEFA's four- and five-star stadium list are long standing grounds[10]. Along with stadium quality, supporters also exhibit a preference to attend matches of a high footballing standard. Quality is included in all sixteen models and is robustly significant and positive at the one percent level. The positive effects of stadium and match quality show the importance of quality of viewing within the supporter mind-set.

Similarly, playoff matches which are the epitome of the seasonal narrative in World Cup qualifiers are seen as favourable by fans. The level of significance for playoff matches alternates between models. These matches are significant at the five percent level in model one and at the ten percent level in models two, five, and nine. Interestingly, playoff matches are only significant when the Theil index is used as the measure of outcome uncertainty and are

[10] To investigate further the effect of stadium age on attendance, the number of years since each stadium had been built or renovated was also gathered to measure stadium quality. This measure of stadium quality was previously used by McDonald and Rascher (2000). More modern stadiums are assumed to be higher quality due to their newer facilities. **YSLR** denotes the number of years that have passed since the stadium has been built or renovated since the year of the fixture. The results for this variable can be seen in appendix five. Stadium age is not found to be significant.

not significant when home team favourites are included in the model. Perhaps, this is because home team favourites are less likely for playoff matches, as both teams have finished second in their qualifying groups, therefore, they are more likely to be considered as similar quality teams. The effect of rivalry matches tends to alternate between models. Rivalry matches are significant at the five percent level in model fourteen and at the ten percent level in model two. Rivalry matches are associated with increases in attendance for eleven models and associated with a decrease for four models. The high level of ambiguity surrounding the effect of rivalry matches is most likely because of the low number of rivalries that occur in the dataset. Only six rivalry matches occur in the dataset, therefore the rivalry match results are more likely to be affected by restricted samples. There is a decrease in attendance for teams who can no longer reach the World Cup. Matches where the home team is eliminated are included in all sixteen models. Eliminations are negative and significant at the one percent level in all models except for model sixteen where they are negative and significant at the five percent level. This shows the importance of qualification to supporters. Once a team can no longer achieve their ambition of qualification supporters become disinterested. Group level uncertainty is only significant in model five at the ten percent level. However, these matches are consistently negative throughout the sixteen models. Likewise, matches where the home team has already qualified are not significant in any of the sixteen models, however they are consistently associated with increases in attendance.

The time and day that a game is played has previously been found to alter attendance at sporting contests. This study finds that evening kick offs and weekend matches do not significantly affect international football demand. Significant increases in attendance are associated with evening matches and weekend matches only in table 5.4, where the sample is restricted to include income data. However, the two-scheduling variable's lack of significance and

ambiguous coefficient signs allow this thesis to conclude that scheduling is not a noteworthy determinant of demand for international association football. As most of the previous literature exploring scheduling's effect on football demand has been confined to domestic football, it seems as though the difference in significance is caused by differences between the supply of domestic and international association football. Along with scheduling, increases in distance are not found to have a noteworthy decrease in viewing figures for international association football. Distance is not significant in any of the sixteen models. Comparable to scheduling, distance's lack of significance may be attributed to the low frequency of international association football matches. Income data is not available for certain observations. Therefore, income data is only included in the final robustness test where it is positive and significant at the one percent level in each model. This thesis finds that as income increases in European regions, the demand for World Cup qualifier attendance increases. This means that football is a normal good. Therefore, the more disposable income made available to consumers the higher the demand for international association football attendance.

5.4 How do these findings compare to previous sport demand research?

The observed results regarding short term competitive balance are in line with Peel and Thomas (1988, 1992 and 1996) and Buraimo and Simmons (2008) which identify fan partiality toward a home win as a more significant driver of attendance than uncertainty of outcome. Similarly, to Czarnitzki and Stadtmann (2002) and football attendance in Portugal (Martins and Cró, 2018), this study finds no evidence that greater outcome uncertainty increases attendance. Increases in inequality between teams are found to increase demand. This study rejects the UOH and acknowledges that matches that have a high likelihood of a home win are more likely to increase attendance for international association football than balanced contests. As mentioned by Budzinski and Pawlowski (2014) the absolute quality of a fixture better explains

increases in football attendance than outcome uncertainty. Through absolute quality, unbalanced contests are required to recognize high quality teams. This is because, to consider a team high quality there must be a weaker team that serves as a means of comparison. This is reinstated by the observed association of fixture quality with increases in attendance for international football. This coincides with Baimbridge (1997) who mentions how fixtures where a seeded team are involved enhance spectator numbers for the 1996 Euros.

Playoff matches represent matches that are highly significant in the seasonal narrative, they are linked to increased demand. As noted by Czarnitzki and Stadtmann (2002) and Martins and Cró (2018) supporters prefer matches at the beginning or the end of the season, relatedly playoff matches are played at the very end of the World Cup qualifying phase. Therefore, these matches create excitement as they are significant for qualification which provides fans with an incentive to attend. It is evident that the likelihood of seasonal success increases fan interest. This is comparable to Garcia and Rodriguez (2002) where increases in attendance are found when the home team has a chance to win the domestic league, similarly, Pawlowski and Anders (2012) find that the matches where both the home and away team can theoretically win the league increase attendance. The inverse effect of significant matches is captured through eliminations. This study finds that the home team being eliminated negatively impacts attendance. This is most likely caused by a loss of incentive for supporters to attend matches where the home team can no longer qualify as their results become meaningless.

Melnick (1993) and McDonald and Rascher (2000) note that improved stadium characteristics and more modern arenas correspond with increases in attendance, likewise in this thesis the measure of stadium quality remains consistently positive and significant. This emphasizes how increases in stadium quality are positively correlated with attendance. Interestingly, as many

stadiums on FIFA's four- and five-star list are old but high-quality stadiums, the consistent significance and positive coefficient indicates that supporters prefer reputable stadiums regardless of their age. Nevertheless, as McDonald and Rascher (2000) designate there is often a strong correlation between stadium age and standard of facilities.

This thesis finds increases in income to have a positive effect on consumer demand. These results reverberate the findings noted by Garcia and Rodriguez (2002) and Feehan et al (2003) which have previously stated that football attendance is a normal good. Therefore, this thesis rejects other previous research which has found football attendance to be an inferior good (Bird, 1982 and Falter and Perignon, 2000). Although, the effect of rivalry matches is not consistent in the robustness checks, overall, rivalry matches are found mostly to have a positive influence on demand for the World Cup qualifiers. This finding can be compared with Baimbridge (1997) and Martins and Cró (2018), where rivalries were found to have a positive effect on fandom. Unlike Baimbridge et al (1995) the kick-off time of a match is not important in determining international football demand. Likewise, there is no evidence that mid-week matches resulted in lower attendances than weekends in contrast to Allan (2004). As the previous studies that have shown scheduling to be significant in determining football demand have been completed on domestic football, the factors different results are most likely due to sample and competition differences.

Walker (1986), Baimbridge (1997) Garcia and Rodriguez (2002), Forrest and Simmons (2002), Forrest et al (2004), Forrest and Simmons (2006) and Reilly (2015) all note that increases in distance cause reductions in crowd numbers. This thesis finds that increases in distance do not have a significant effect on international football demand. This may be attributed to the low number of international association football matches each year which provides supporters with

more time to arrange travel. Although the home team being already qualified for the World Cup is not significant, the variable has a positive coefficient. This positive coefficient is most likely caused by a celebratory atmosphere created through qualification. The celebratory atmosphere is similar to the observed increased attendances in France by Falter et al (2008) following France's 1998 World Cup triumph.

6. DISCUSSION

Considering the previous sport and domestic association football demand literature, and the empirical results of this thesis, the determinants of international association football attendance become clear. Stadium owners and national associations must understand how to use these observations to their advantage. The dependant variable, the natural logarithm of attendance describes the number of supporters that were in attendance for each match in the UEFA region for the 2014 and 2018 FIFA World Cup qualifiers. Attendance figures for these fixtures are announced as a whole, therefore there is no differentiation between home and away fans or season ticket holders and casual supporters. Independent variables with a positive coefficient are associated with an increase in the overall match attendance, whereas independent variables with a negative coefficient are associated with decreases in the overall match attendance. The results show that there are many similarities and differences between the determinants of demand for international football in the UEFA region and the previous sporting demand literature. Therefore, through comparing the results of this thesis with the results of previous literature, this dissertation explores the connotation of the observed factors of demand for international association football.

6.1 Outcome uncertainty, quality of viewing, income, & meaningful matches.

It is important to appreciate that consumer decisions are shaped by their past experiences which allow them to evaluate their current situation. Before interpretation of the results, the assumption must be made that each supporter is a rational consumer. Thus, under rational choice theory the factors that affect football demand are a result of fans making decisions that will benefit their self-interests. This means that the reason that supporters decide to attend a football match is because they believe that it will provide them with more utility than an alternative good. Possibly, the observation which best encapsulates supporters acting in the

way which most benefits their self-interests is the association between increases in attendances and home team favourites. Supporters are more likely to attend matches where home teams are more likely to win. Additionally, there is a pattern in the results which shows that fans prefer matches that are important regarding seasonal competitive balance with playoff matches inspiring attendance and meaningless matches in the form of eliminations, discouraging attendance. Logically, under rational choice theory one can assume from these results that supporters show a preference toward significant matches and home team favourites because they provide them with more value. Therefore, they consciously decide to attend these matches.

Perhaps, the most interesting observation from tables 5.1, 5.2, 5.3 and 5.4 is the consistency of variables that are significant at the one percent level. Despite restricting the model on four different occasions, then estimating the restricted samples with different independent variables and with alternate upper limits, the results observed for outcome uncertainty, stadium quality, quality and eliminations do not change in a notable way. Each of these variables remain statistically significant despite the accruing modelling changes. Therefore, it is evident that these are the overwhelming factors that influence a supporter's decision to attend or not attend a football match. Interestingly, each of the factors mentioned directly influence what can be considered the sporting product. Income is the only variable significant at the one percent level that affects a consumer's ability to attend an international association football match and it is only included in the model observed in table 5.4. The variables significant at the one percent level indicate that the sporting contest itself is more important in the eyes of international supporters than the factors which may affect their ability to attend.

6.2 Variables which do not appear to be significant.

Not all variables that affect the sporting contest are found to be significant. Group level uncertainty fixtures, matches where the home team has already qualified and rivalry matches are all elements which directly affect the sporting contest however, the empirical results show that these factors do not effect consumer decisions as much as outcome uncertainty, quality of viewing, and meaningful matches. There are nineteen group matches where teams can directly qualify for the World Cup. Spain, Germany, England, and Belgium have group matches in the 2014 and 2018 qualifying campaigns where they can directly qualify for the World Cup. These four teams also finish first in their groups for both campaigns. As these teams regularly qualify for the World Cup, their supporters may expect qualification which causes the group matches where they can directly qualify to become less important. Additionally, supporters of teams that feature in group matches where they can directly qualify for the World Cup may view these matches as insignificant as the teams involved are in such a good position to qualify that failure seems unlikely.

Matches where the home team has already qualified do not appear to have a substantial effect on shaping international football attendance. The positive coefficient for the variable is most likely caused by the festive atmosphere which occurs when a team has successfully qualified. However, overall, these matches do not seem to have a large effect on attendance. Similarly, rivalry matches directly affect the sporting contest but do not appear to be overwhelmingly significant. Although rivalry matches usually provide an added importance to football fixtures, international rivalry matches do not occur frequently. Rival international teams are seldom drawn in the same qualifying group which means that they rarely compete against each other. Furthermore, the supporters of international football rivalry teams rarely interact which may result in international football rivalries not being as fierce as domestic football rivalries.

Distance, and the time that a match is scheduled do not directly affect the sporting contest. However, they have previously been shown to affect sport demand as they can make attending a football match inconvenient or impossible for some supporters. International attendance does not appear to be swayed by these factors which can cause attending a football match to be problematic. Although these factors provide the same challenges for international football fans as domestic football fans, international fans appear to be less sensitive and do not allow these problems to affect their decisions.

6.3 How do these results enhance our understanding of sport demand?

The negative Theil index is perhaps best described by absolute quality as mentioned by Budzinski, and Pawlowski (2014). Supporters do not desire to watch teams that are homogenous in quality. This is echoed by increases in quality being correlated with increases in attendance. Differences in quality are larger between international teams than domestic teams, some matches even result in semi-professional players against professionals. To have a high-quality team, inferior teams must exist as a means of comparison. It is not possible to have a high-quality team without a lower quality opposition to contrast it to. This desire of absolute quality results in the rejection of the UOH as to maximize outcome uncertainty there must be teams that are similar in ability. This leads to a decrease in demand as although outcome uncertainty is maximized, there is no team considered to be high quality present. This finding casts further doubt on Rottenberg's UOH and strengthens the claim that the hypothesis does not hold up in practice.

Along with absolute quality supporters prefer matches where the home team has a higher likelihood of winning. This is concurrent with Peel and Thomas (1988, 1992, and 1996) and Buraimo and Simmons (2008) who refer that supporter's displeasure toward balanced contests

creates a u-shaped relationship between the probability of a home win and match attendance. This means that attendance is optimised when a home win is either expected or unanticipated and that matches likely to result in draws lead to decreased demand. Attendances are higher when a home win is likely due to the high proportion of home fans that make up the crowd. Home fans prefer to see their team win. Although as mentioned by Buraimo and Simmons (2008), contests wherein a home win is very unlikely can also cause high attendances due to supporters getting the opportunity to watch superior opposition.

The increase in attendances associated with playoff matches was anticipated. Playoff matches are significant at the five percent level in model one and at the ten percent level in model two. The variable has a consistent positive coefficient throughout the robustness checks. Matches important on a seasonal context have repeatedly been linked to increases in demand. Czarnitzki and Stadtmann (2002) and Martins and Cró (2018) imply supporters prefer more meaningful matches as higher attendances are recorded at the beginning and the end of league seasons. World Cup qualifying play offs are extremely relevant to seasonal outcomes. Reaching the playoff round means that a team has successfully finished second in their qualifying group. As a reward they take part in the playoff round where they have an opportunity to qualify for the World Cup.

Lower attendances occur in the middle of the season due to less significant matches. Correspondingly, World Cup qualifying matches where the home team can no longer progress to the World Cup result in lower attendances. These matches are effectively pointless for the home team. It seems however, that seasonal prizes only increase attendances when the feat is valued by the fans. Champion's league qualification (Budzinski and Pawlowski, 2012) does not incentivise attendance and this thesis finds that group matches where a team can directly qualify for the World cup does not either. Most likely, the teams who can directly qualify for

the World Cup from a group match have got themselves into such a good position for qualification that not qualifying seems unlikely. This causes these matches to become less significant to supporters which causes demand to decrease.

Rivalry matches provide an additional competitive element to supporters. Baimbridge (1997) and Martins and Cró (2018) find that rivalries increase attendance, correspondingly this study also finds that rivalries increase attendances overall. However, the effect of rivalry matches is not robust. This may be due to the low amount of rivalry matches that occurred in the UEFA region throughout the selected period. Only six rivalry matches are played in the European region for the 2014 and 2018 World Cup qualifiers, this may cause the varied significance and coefficients for the variable when the sample is restricted. The quality of stadiums has previously been found to increase sport demand (Melnick, 1993). However, many studies have measured stadium quality via age (McDonald and Rascher, 2000). As mentioned in section 3.3, this study measures stadium quality as UEFA's four- and five-star stadiums and stadiums built after the list was created. The corresponding increase in demand associated with stadium quality shows that high quality stadiums are viewed favourably by supporters regardless of age. Stadium quality is found to be one of the biggest determinants of increased attendances for the World Cup qualifiers in the UEFA region. This shows that the location of a sporting contest is considered a vital component of the sporting product.

This thesis provides new insights into the effect of scheduling on football attendance. Contradictory to Baimbridge et al (1995) this study finds the kick-off time of a game to have an insignificant effect on demand. Also, matches that take place on the weekend did not cause a substantial increase in attendance unlike Allan (2004). However, differences exist in the frequency of fixtures between the association international football matches that were analysed

for this study and the foregoing studies that were completed on the demand for association domestic football. Domestic association football matches are played usually every week, whereas international teams may play five or six qualifying matches in a calendar year. This sparser schedule gives international fans more time to plan. Another difference between international and domestic football is the time of the week that they are usually played. International World Cup qualifiers are mostly played on weekdays. Domestic football is played mostly on weekends whereas only twenty-three percent of fixtures in the dataset are played on weekends. Thus, supporters rarely can exhibit a preference to save their scarce leisure time for weekends (Forrest and Simmons, 2006).

Contrasting to Walker (1986), Baimbridge (1997), Garcia and Rodriguez (2002), Forrest and Simmons (2006) and Reilly (2015) increases in distance are not found to be a substantial deterrent for attendance. Yet again, distance may be less of a driver of demand for international football due to the low regularity of matches which gives away fans more time to plan for travel. Although another possible explanation is the high ratio of home to away fans at each game, as distance is a bigger factor of attendance for away supporters than home supporters. As this study contains income data for many countries across the continent of Europe, the income observations used are very varied. In agreement with preceding literature completed by Garcia and Rodriguez (2002) and Feehan, Forrest and Simmons (2003), attendance figures for the 2014 and 2018 UEFA World Cup qualifiers are found to increase when regional income rises. Hence, these international matches can be considered a normal good as increases in disposable income result in increased consumption. Although the 2014 qualifiers are found to have a greater mean attendance than the 2018 qualifiers, the results show that being associated to the 2014 campaign does not cause any significant effect on attendance.

6.4 Recommendations following analysis.

Borland and McDonald (2003) comment that it is impossible for policy makers and stadium owners to make correct decisions on issues considered important to them if they do not understand demand and that competition regulators can use it to maximize social welfare. Stadium owners and national associations benefit from an enhanced understanding of the determinants of international football attendance as it assists them in crowd management. This allows them to manipulate demand and helps them to achieve their selected objective. Stadium managers can choose to try and maximize attendance figures or use their knowledge of crowd volatility to aid them in security planning.

The seasonal outcome uncertainty findings make for clear reading if one wishes to maximize sporting demand. Important matches featuring high quality teams leads to optimal consumer demand. This is especially important in the context of competition design. To maximize attendance, competition organizers must minimize meaningless matches. In a standard league design as noted by Czarnitzki and Stadtmann (2002) and Martins and Cró (2018) these insignificant matches tend to occur in the middle of the season. As mentioned in section 2.1 the UEFA World Cup qualifiers are essentially several mini leagues where qualification and a position in the playoff round rewards for successful performance. This means that at the beginning of the campaign all teams begin with 0 points, which means theoretically that each team has an equal chance of qualification causing fan interest to be high at this stage of the campaign.

Attendance tends to ease off in the middle of the campaign and rise again at the end of the season when teams compete for prizes. However, supporters of national teams who are not in contention for prizes display a reduction in interest at the latter stages of the season as their

team can no longer qualify. To combat this loss of interest competition designers must create additional prizes other than qualification to incentivise demand. Unmistakably if these additional prizes are not valued by supporters, they will not lead to higher demand as observed by Budzinski and Pawlowski (2012). Currently the only prize other than qualification for UEFA members is a high seeding for the next set of qualifiers. Evidently this is not valued by fans as attendance decreases after a team can no longer qualify.

Play off matches lead to increases in demand, therefore one possible way competition regulators may maximize attendance for World Cup qualifiers is by increasing the number of teams that participate in the playoff round. Currently eight teams that finish second in their groups compete in the playoff round. Each team plays a two-legged tie, and the winner reaches the World Cup. Increasing the number of play-off places would decrease the amount of meaningless matches in the group phase of qualification. Additionally, reducing play off fixtures to one leg would make the tie more significant.

It is vital for national associations to preserve the quality of their stadium's facilities. This thesis observes that stadium quality has a substantial effect on increasing demand for international association football. McDonald and Rascher (2000) find that increases in stadium age lead to decreases in attendance, therefore regular upkeep and renovation of stadiums result in higher quality arenas. This thesis finds that supporters show a preference for matches held in UEFA's four and five star ranked stadiums and the arenas built after the list was published. As many of UEFA's four- and five-star stadiums are old sports grounds compared to other stadiums within the dataset, this finding demonstrates that high reputable stadiums can maintain high attendances even if their facilities become outdated. Stadiums considered to be four and five stars receive the award due to the prestige of their amenities. The best way for

stadium bosses to enhance the standard of their grounds is by regular maintenance, in turn attendance will be optimised due to supporters viewing their stadiums more favourably. It is important that improvements in stadium quality directly lead to increases in consumer satisfaction as improvements in stadium quality alone will not directly result in increased demand.

Previous findings on domestic football have found weekends are linked to higher attendances than weekdays (Allan, 2004 and Forrest and Syzmanski, 2006). This dissertation notes that the time and date an international football game is played does not have any noteworthy effect on attendance. Therefore, this thesis advises competition regulators to continue scheduling international football in its current manner as the results do not exhibit any clear benefit to changing the scheduling of international matches. This dissertation also uncovers no evidence that decreasing the distance away fans must travel for UEFA World Cup qualifiers would increase attendances. Therefore, it is not advised to alter distances between home and away teams.

Overall, when aiming to maximize attendance for international association football matches, the empirical evidence indicates that prioritising the factors that affect home fans will increase attendance figures far more than factors that affect away fans. Distance and scheduling are more likely to determine away fan attendance than home fan attendance, neither are found to be significant, therefore, both components are found to be viewed trivially by supporters when deciding to attend international matches. This indicates that international attendances consist of a lower proportion of away fans to home fans than exists in domestic football. Therefore, to maximize crowd turnout stadium owners should aim to improve home team supporter satisfaction through specific factors such as stadium improvements whereas competition

regulators can increase attendances in the UEFA region by restricting meaningless matches by possibly increasing prizes and playoff round positions.

6.5 Limitations of dissertation.

This thesis only examines the determinants of demand for international association football in the UEFA region. As mentioned in section 2.1 FIFA governs six different confederations across the globe. The Confederation of African Football region, The South American Football Confederation region, The Confederation of North, Central America, and Caribbean Association Football region, The Asian Football Confederation region and The Oceania Football Confederation region do not feature in the dataset. Consequently, one cannot assume that the factors that affect international association football attendance in these areas are identical to the UEFA region. Furthermore, only World Cup qualifiers are included in the dataset with qualifiers for the Euros, international friendlies and nations league matches omitted. Differences in competition and format may lead to fluctuations in the determinants of demand despite the analysis of the UEFA region remaining constant.

As each home association obtains full control over the price of tickets, price data could not be collected. Therefore, price is not included within the model. As price is regarded as one of the five principal determinants of demand, the inclusion of this variable may have provided intriguing insight into the relationship between the fee charged to attend an international association football match and consumer demand. Although the price of international association football matches may be endogenous, combined with *INCOMEHOSTNUTS2,* price data may have provided a more comprehensive examination into the effect of the economic environment and how it shapes supporter decisions. Price data would also have assisted in

investigating whether international football follows the law of demand. However, the inclusion of price can be problematic econometrically.

Another issue which arises with the demand for sport is the effect of ticket bundling. Certain national associations may choose to group ticket sales for selected fixtures together in the hope of maximizing attendance. Conversely, it is difficult to both identify matches which have been included in bundling packages and accurately measure demand for these matches. Similarly, the existence of season tickets can give an inflated representation of demand. This is because season ticket holders may decide to attend a football match because they already have tickets even if they do not particularly desire to go. Crowd figures with a high proportion of season ticket holders consequently may not capture the precise determinants of demand for that game. Comparable to bundling, season tickets are not included in the model due to the lack of availability of the required data to measure their effect.

Although the betting odds are considered more accurate when they are adjusted to consider bookmaker bias, the method created by Forrest and Simmons (2002) has limitations. The method is a simple approach and assumes that the bookmakers overrun is equally distributed across each outcome, which may not always be true. Additionally, the method does not consider favourite-longshot bias. Favourite-longshot bias is an economic phenomenon wherein punters underestimate the value of favourites and overestimate the value of underdogs.

Complications arise in measuring catchment areas due to the distance fans are willing to travel to home matches. Therefore, each national team's market size is not explicitly treated in the model. This is because it is difficult to calculate market sizes and catchment areas for football teams. Many national teams rotate their home stadiums which may cause their catchment areas

to change in size. Similarly, Baimbridge et al (1996), Garcia and Rodriguez (2002) and Forrest and Simmons (2006) all include the effect of television when measuring the demand for football. Other papers however have been unable to vigorously prove its influence (Allan and Roy, 2008) and encountered difficulty in measuring its effect (Martins and Cró, 2018). Owing to this previous difficulty in determining televisions effect on attendance and the difficulty in obtaining the necessary data this thesis does not include the effect of television in the model. Likewise, the effect of weather is not included. Garcia and Rodriguez (2002), Butler (2002) and Baranzini et al (2008) have previously noted that weather can alter the demand for sport. This thesis does not include weather because the supply of international association football is lower than domestic football. This leads to less impulsive attendance which is more likely to be influenced by weather than planned attendance. Both the effect of television and weather are presumed to be included in the error term.

7. CONCLUSION

Overall, it seems as though the differences in supply for domestic and international football cause the main disparities in the determinants of attendance. The low frequency of international association football matches causes international attendance to be more susceptible to the factors that affect the sporting product than the possible obstacles for supporters to attend. International breaks only occur around four or five times a year, which provides limited opportunities for international football fans to attend matches. Whereas domestic football fans can attend domestic football matches almost every week.

7.1 Summary of thesis.

The overwhelming factors that affect international football attendance are predictable results, home team favourites, stadium and team quality, eliminations, and income. Income is the only significant element that affects a supporter's ability to attend a match and not the sporting product. International fans have few opportunities each year to attend matches, this causes elements such as distance and scheduling to be less important. The World Cup qualifying empirical evidence shows that distance and scheduling are regarded as insignificant by international football fans, however both elements have been shown to be important in the domestic football attendance literature. Distance is not significant in any of the sixteen empirical models. This can be attributed to the low frequency of international football matches in a calendar year. Furthermore, the cost of travel is more likely to affect supporters when there is a frequent supply of football as supporters can choose not to travel long distances at a low opportunity cost. Domestic fans can afford to make this choice as they are not punished with long waiting periods between matches. Contrastingly, as international matches do not occur frequently, when international fans decide not to travel long distances, they often must endure an excessive waiting period until they have the chance to attend an international association

football match again. However, this also means that international fans have more time to find cost efficient methods of transport which makes them less likely to be affected by increases in distance.

Scheduling is also observed as being less important to international association football fans than domestic fans. The day that World Cup qualifying matches are played is not observed as being significant whereas evening kick off matches are only observed as being significant at the five percent and ten percent levels when the sample is restricted to include income data. This disregard for scheduling shown by international fans may also be a result of the high opportunity cost that international football fans experience when they choose not to attend a match. Alternatively, it may be caused by the high proportion of mid-week to weekend matches that occur in international football. This may cause international attendances to be less likely to be damaged by football matches that are scheduled on weekdays.

The empirical evidence suggests that international football attendance is more determined by the sporting contest itself. The product being sold at sporting events is generally considered to be a combination of different products which supply consumers with value. This amalgamation includes the characteristics of the teams on display, the importance of the match in a seasonal context, and the love for one's favourite team. These different components can all be identified as significant in the empirical results for international association football. The characteristics of the teams on display is directly related to match quality and outcome uncertainty, the importance of the match on a seasonal context is directly related to play off matches and eliminations, and the love for one's favourite team is directly related to home team favourites. One such element of the sporting product which has previously been given a lack of consideration is stadium quality. The empirical results indicate that stadium quality has an

important role in determining World Cup qualifying attendances as supporters exhibit a clear appreciation for fixtures held in high class arenas.

7.2 Future topics of investigation.

The importance of stadium quality in determining football attendance has been neglected in the previous domestic association football literature. Presumably, stadium quality has a comparable effect on domestic football demand as international football demand. Although few studies control for stadium quality when analysing domestic football attendances. More knowledge is needed to understand the link between stadium quality and the policies taken by stadium owners. One would estimate that there is a high correlation between the capital spent on stadium upkeep and stadium reputation. Therefore, owners of stadiums that are viewed as high quality benefit from regular investment through increased ticket sales. More knowledge on the subject may show that catchment areas and the price of tickets that fans are willing to pay rise as stadiums increase in value.

Aside from World Cup qualifying matches, UEFA members also compete in qualifiers for the European Championships or Euros. Additional research is required to compare the determinants of demand for the European championship qualifiers and the World Cup qualifiers. Such research may be treated additionally to this thesis. Furthermore, once the required data has become available in other FIFA confederate regions, the factors of international association football demand can be investigated in alternative continents to Europe.

More research is required to evaluate the effect of price on sport attendance. It is possible that price is endogenous, and each match's price is set in correlation with the other aspects that

amalgamate to form the sporting product. Similarly, certain pricing strategies such as bundling, must be investigated to establish their effect on demand. Ticket bundling is often used by national associations to increase revenue. Presumably, high implementation of bundling by national stadium owners results in decreased spontaneous attendance. Therefore, demand would become more inelastic as bundling is a similar pricing strategy to season ticket sales and Simmons (1996) notes that season ticket holders are less price sensitive than unpremeditated fans.

Researchers are yet to successfully derive a method to distinguish between home and away fans in the previous sport demand literature. Unfortunately, crowd figures are universally announced as a whole, and national associations do not reveal how many home or away fans are exactly in attendance. This leaves plenty of scope for future sport demand studies to identify the exact computation of home to away supporters. Evidently, away fans make up a lower proportion of the crowd than home fans and face an increased number of obstacles and inconveniences to attend matches. It is possible that the effect of each determinant of demand for sport attendance will change as the home to away fan ratio is either increased or decreased.

7.3 Final word.

In general, the previous literature on the demand for domestic association football provides an accurate prediction of the factors that determine international association football attendance. Despite the differences in competition structure, organisation, and supply, there are several aspects within the results that can be compared. Firstly, there seems to be a general pattern that Rottenberg's UOH is incorrect. There is a lack of evidence to support outcome uncertainty effecting sport demand positively in the short run. Also, the significance of home team favourites reiterates the absence of appetite for outcome uncertainty.

There is a link between the importance of quality and preference for unbalanced contests through absolute quality. Therefore, it seems that the desire to view high quality teams is greater than the desire for unpredictable results. There does seem to be some accuracy in the suggestion by Neale (1964), who proposes that balanced leagues generate excitement as positions change more regularly. This is likely for UEFA World Cup qualifying groups as eliminations are notably disliked by home fans. Balanced groups lessen the amount of insignificant matches, as when positions rotate frequently the likelihood of qualification remains more evenly spread amongst competitors. Therefore, early eliminations are reduced.

It is difficult to evaluate the effect of long-term competitive balance for international football. This is unfortunate. It is commonly accepted that a certain amount of long run competitive balance is appreciated. However, international fans may prefer a low level of long run competitive balance to see high quality national teams. This is a topic which requires more investigation to correctly evaluate its effect on demand. Clearly there is a significant role for stadiums in determining football demand. It seems for international supporters the quality of the stadium is more important than feasibility to attend through scheduling or the distance required for away fans to travel. Overall, stadiums are the aspect of the sporting product that stadium owners have the most control over. Consequently, if stadium owners wish to optimise demand, the best way to do it is by investing in their arenas.

To conclude, this thesis finds that significant matches, unbalanced contests with high quality teams, income and stadium quality are the most substantial determinants of international association football attendance in the UEFA region for the 2014 and 2018 FIFA World Cups. Through several Tobit models and robustness checks the observed results provide new insight into a previously neglected topic in sport demand research. There are still more opportunities

to research international association football in the future. It is anticipated that researchers understanding of the topic will improve as the volume of research on the subject increases.

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APPENDIX

Appendix 1. (List of UEFA 4 and 5 star stadiums + new stadiums)

Arena Lviv	Arena Națională
Astana Arena	Aviva Stadium
Büyükşehir Stadium	Cardiff City Stadium
Croke Park	Fisht Olympic Stadium
Friends Arena	Juventus Stadium
Krestovsky Stadium	New Eskişehir Stadium
Nizhny Novgorod Stadium	Olimpiyskiy National Sports Complex
Olympic Stadium (GREECE)	Olympic Stadium (BAKU)
Opel Arena	Otkrytiye Arena
Sammy Ofer Stadium	Şenol Güneş Stadium
Stadion Narodowy	Stadionul Național (BUCHAREST)
Stožice Stadium	Torku Arena
Turk Telekom Arena	Turner Stadium
Wembley Stadium	

Appendix 2. (List of international rivalries)

Albania vs. Serbia	England vs. Republic of Ireland
Albania vs. Kosovo	England vs. Scotland
Armenia vs. Turkey	Finland vs. Russia
Austria vs. Hungary	France vs. Germany
Austria vs. Switzerland	Italy vs. France
Belgium vs. Netherlands	Italy vs. Germany
Croatia vs. Italy	Netherlands vs. Germany
Croatia vs. Iceland	Greece vs. Turkey
Croatia vs. Serbia	Romania vs. Hungary
Czechia vs. Slovakia	Republic of Ireland vs. Northern Ireland
Denmark vs. Norway	Italy vs. Spain
Denmark vs. Sweden	Norway vs. Sweden
England vs. France	Poland vs. Russia
England vs. Germany	Portugal vs. Spain
	Russia vs. Ukraine

Appendix 3. (Final Hosts)

Allianz Arena	NSC Olimpiysky
Amsterdam Arena	Olympiastadion (berlin)
Arena Națională	Olympic Stadium (Athens)
Aviva Stadium	Olympic Stadium (Baku)
Estádio da Luz	Philips Stadion
Friends Arena	San Siro
Hampden Park	Santiago Bernabéu
Johan Cruyff Arena	St. Jakob Park
Juventus Stadium	Stadio Olimpico (Rome)
Luzhniki Stadium	Şükrü Saracoğlu Stadium
Millennium Stadium	Wanda Metropolitano
National Stadium (Warsaw)	Wembley Stadium

Appendix 4. (Final hosts results.)

	UL (CAP95%)		UL (CAP90%)		UL (CAP95%)		UL (CAP90%)	
	Model (17)		Model (18)		Model (19)		Model (20)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.607***		0.632***	
					-0.095		-0.1	
THEIL	-0.354***		-0.405***					
	-0.108		-0.114					
WC14	0.02		0.005		-0.038		-0.054	
	-0.098		-0.105		-0.09		-0.097	
WEEKEND	-0.019		-0.003		-0.039		-0.022	
	-0.092		-0.101		-0.085		-0.094	
EVENINGKO	-0.099		-0.136		-0.068		-0.088	
	-0.116		-0.123		-0.119		-0.125	
PLAYOFF	0.388**		0.438*		0.303*		0.364	
	-0.155		-0.235		-0.169		-0.236	
FINALHOSTS	0.843***		0.841***		0.745***		0.739***	
	-0.129		-0.137		-0.126		-0.133	
RIVALRIES	-0.137		0.259*		-0.13		0.164	
	-0.213		-0.151		-0.174		-0.18	
QUALITY	0.002***		0.002***		0.002***		0.002***	
	0		0		0		0	
GROUPUNCERTAINTY	-0.169		-0.07		-0.109		0.007	
	-0.187		-0.228		-0.186		-0.223	
HTQUALIFIED	-0.018		0.153		-0.095		0.055	
	-0.171		-0.234		-0.181		-0.254	
LOGDISTANCE	0.003		0.004		0.069		0.076	
	-0.06		-0.068		-0.056		-0.061	
HTELIMINATED	-0.491***		-0.456***		-0.355***		-0.327***	
	-0.103		-0.112		-0.093		-0.101	
VAR(E.LOGATTENDANCE)		0.582***		0.656***		0.501***		0.564***
		-0.076		-0.088		-0.06		-0.069
CONSTANT	2.705***		2.204**		2.154***		1.695**	
	-0.811		-0.873		-0.686		-0.719	
OBSERVATIONS	541	541	541	541	541	541	541	541

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Appendix 5. (YSLR results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (21)		Model (22)		Model (23)		Model (24)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.660***		0.691***	
					-0.1		-0.104	
THEIL	-0.391***		-0.454***					
	-0.125		-0.132					
WC14	0.03		0.017		-0.037		-0.052	
	-0.102		-0.111		-0.093		-0.101	
WEEKEND	-0.026		-0.007		-0.051		-0.033	
	-0.096		-0.106		-0.088		-0.097	
EVENINGKO	-0.111		-0.149		-0.085		-0.107	
	-0.122		-0.131		-0.12		-0.128	
PLAYOFF	0.407**		0.488*		0.330*		0.425	
	-0.194		-0.271		-0.198		-0.265	
YSLR	-0.004		-0.004		-0.001		-0.001	
	-0.004		-0.004		-0.003		-0.003	
RIVALRIES	0.187		0.499**		0.141		0.369	
	-0.192		-0.236		-0.177		-0.257	
QUALITY	0.002***		0.003***		0.002***		0.002***	
	0		0		0		0	
GROUPUNCERTAINTY	-0.191		-0.063		-0.135		0.01	
	-0.211		-0.249		-0.206		-0.237	
HTQUALIFIED	-0.049		0.059		-0.139		-0.041	
	-0.146		-0.26		-0.168		-0.275	
LOGDISTANCE	-0.018		-0.017		0.056		0.065	
	-0.066		-0.073		-0.06		-0.064	
HTELIMINATED	-0.488***		-0.451***		-0.343***		-0.315***	
	-0.111		-0.121		-0.101		-0.109	
VAR(E.LOGATTENDANCE)		0.657***		0.737***		0.560***		0.628***
		-0.08		-0.092		-0.064		-0.073
CONSTANT	2.337***		1.784**		1.723***		1.225*	
	-0.771		-0.827		-0.666		-0.697	
OBSERVATIONS	541	541	541	541	541	541	541	541

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Appendix 6. (GNI per capita away team restricted results)

	UL(CAP95%)		UL(CAP90%)		UL(CAP95%)		UL(CAP90%)	
	Model (25)		Model (26)		Model (27)		Model (28)	
DEP VARIABLE	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**	**logattendance**	**/**
HOMETEAMFAVOURITE					0.534***		0.549***	
					-0.084		-0.089	
THEIL	-0.278**		-0.323***					
	-0.115		-0.123					
WC14	0.052		0.047		-0.038		-0.053	
	-0.101		-0.11		-0.095		-0.102	
WEEKEND	-0.012		0.006		-0.043		-0.026	
	-0.089		-0.098		-0.085		-0.093	
EVENINGKO	-0.115		-0.153		-0.12		-0.142	
	-0.114		-0.121		-0.111		-0.119	
PLAYOFF	0.314**		0.408*		0.23		0.292	
	-0.157		-0.217		-0.163		-0.217	
HIGH QUALITY ARENA	0.778***		0.721***		0.707***		0.641***	
	-0.124		-0.126		-0.114		-0.118	
RIVALRIES	-0.067		0.052		-0.048		0.23	
	-0.023		-0.026		-0.192		-0.207	
QUALITY	0.003***		0.003***		0.003***		0.003***	
	0		0		0		0	
GROUPUNCERTAINTY	-0.261		-0.153		-0.208		-0.085	
	-0.194		-0.239		-0.19		-0.23	
HTQUALIFIED	0.065		0.158		0.016		0.109	
	-0.152		-0.253		-0.161		-0.254	
LOGDISTANCE	0.034		0.031		0.078		0.085	
	-0.06		-0.069		-0.056		-0.062	
HTELIMINATED	-0.502***		-0.468***		-0.337***		-0.305***	
	-0.107		-0.117		-0.09		-0.099	
LOGGNIPERCAPITAAWAYTEAM	-0.004		0.008		0.044		0.054	
	-0.038		-0.04		-0.036		-0.038	
VAR(E.LOGATTENDANCE)		0.553***		0.628***		0.456***		0.516***
		-0.07		-0.085		-0.053		-0.063
CONSTANT	0.822		0.14		0.127		-0.507	
	-0.762		-0.827		-0.64		-0.697	
OBSERVATIONS	495	495	495	495	495	495	495	495

Robust standard errors in parentheses
***** p<0.01, ** p<0.05, * p<0.1**

Appendix 7. Correlation Matrix One.

	LOGATTENDANCE	THEIL	WC14	WEEKEND	EVENINGKO	PLAYOFF	HIGH QUALITY ARENA	RIVALRIES	QUALITY	GROUP UNCERTAINTY	HTQUALIFIED	LOGDISTANCE	HTELIMINATED
LOGATTENDANCE	**1**												
THEIL	**0.1006**	**1**											
WC14	**0.0462**	**0.0968**	**1**										
WEEKEND	**-0.0158**	**-0.0306**	**-0.489**	**1**									
EVENINGKO	**0.128**	**-0.0121**	**-0.01**	**-0.2896**	**1**								
PLAYOFF	**0.155**	**0.1182**	**0.0029**	**-0.0166**	**0.0771**	**1**							
HIGH QUALITY ARENA	**0.2946**	**0.1144**	**0.001**	**-0.028**	**-0.0112**	**0.061**	**1**						
RIVALRIES	**0.1043**	**0.0964**	**0.0023**	**0.0238**	**0.0173**	**0.138**	**0.0686**	**1**					
QUALITY	**0.6817**	**0.3066**	**0.0381**	**-0.026**	**0.2404**	**0.183**	**0.1291**	**0.1473**	**1**				
GROUPUNCERTAINTY	**0.0711**	**-0.0794**	**-0.007**	**-0.0556**	**0.0195**	**-0.03**	**0.0448**	**-0.0262**	**0.1444**	**1**			
HTQUALIFIED	**0.0858**	**-0.0579**	**0.0371**	**-0.0153**	**0.062**	**-0.02**	**-0.0412**	**-0.0145**	**0.0836**	**-0.0202**	**1**		
LOGDISTANCE	**-0.0913**	**-0.0886**	**0.0082**	**-0.0085**	**-0.186**	**0.02**	**-0.0508**	**-0.0951**	**-0.1301**	**-0.0191**	**-0.0176**	**1**	
HTELIMINATED	**-0.316**	**-0.036**	**-0.029**	**-0.029**	**-0.0557**	**-0.06**	**-0.0367**	**-0.0494**	**-0.2455**	**0.0575**	**-0.0381**	**0.0151**	**1**

Appendix 8. Correlation Matrix Two

	LOGATTENDANCE	THEIL	WC14	WEEKEND	EVENINGKO	PLAY OFF	HIGH QUALITY ARENA	RIVALRIES	QUALITY	GROUP UNCERTAINTY	HTQUALIFIED	LOGDISTANCE	HTELIMINATED
LOGATTENDANCE	**1**												
HOMETEAMFAVOURITE	**0.372**	**1**											
WC14	**0.0462**	**0.0455**	**1**										
WEEKEND	**-0.0158**	**0.0115**	**-0.489**	**1**									
EVENINGKO	**0.128**	**0.0286**	**-0.01**	**-0.2896**	**1**								
PLAYOFF	**0.155**	**-0.004**	**0.0029**	**-0.0166**	**0.0771**	**1**							
HIGH QUALITY ARENA	**0.2946**	**0.0463**	**0.001**	**-0.028**	**-0.0112**	**0.0614**	**1**						
RIVALRIES	**0.1043**	**0.007**	**0.0023**	**0.0238**	**0.0173**	**0.1381**	**0.0686**	**1**					
QUALITY	**0.6817**	**0.0498**	**0.0381**	**-0.026**	**0.2404**	**0.1829**	**0.1291**	**0.1473**	**1**				
GROUPUNCERTAINTY	**0.0711**	**0.0219**	**-0.007**	**-0.0556**	**0.0195**	**-0.0333**	**0.0448**	**-0.0262**	**0.1444**	**1**			
HTQUALIFIED	**0.0858**	**0.0911**	**0.0371**	**-0.0153**	**0.062**	**-0.0185**	**-0.0412**	**-0.0145**	**0.0836**	**-0.0202**	**1**		
LOGDISTANCE	**-0.0913**	**-0.103**	**0.0082**	**-0.0085**	**-0.186**	**0.0196**	**-0.0508**	**-0.0951**	**-0.1301**	**-0.0191**	**-0.0176**	**1**	
HTELIMINATED	**-0.316**	**-0.184**	**-0.029**	**-0.029**	**-0.0557**	**-0.0628**	**-0.0367**	**-0.0494**	**-0.2455**	**0.0575**	**-0.0381**	**0.0151**	**1**