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Price structure in football clubs

A theoretical approach using two-sided market models

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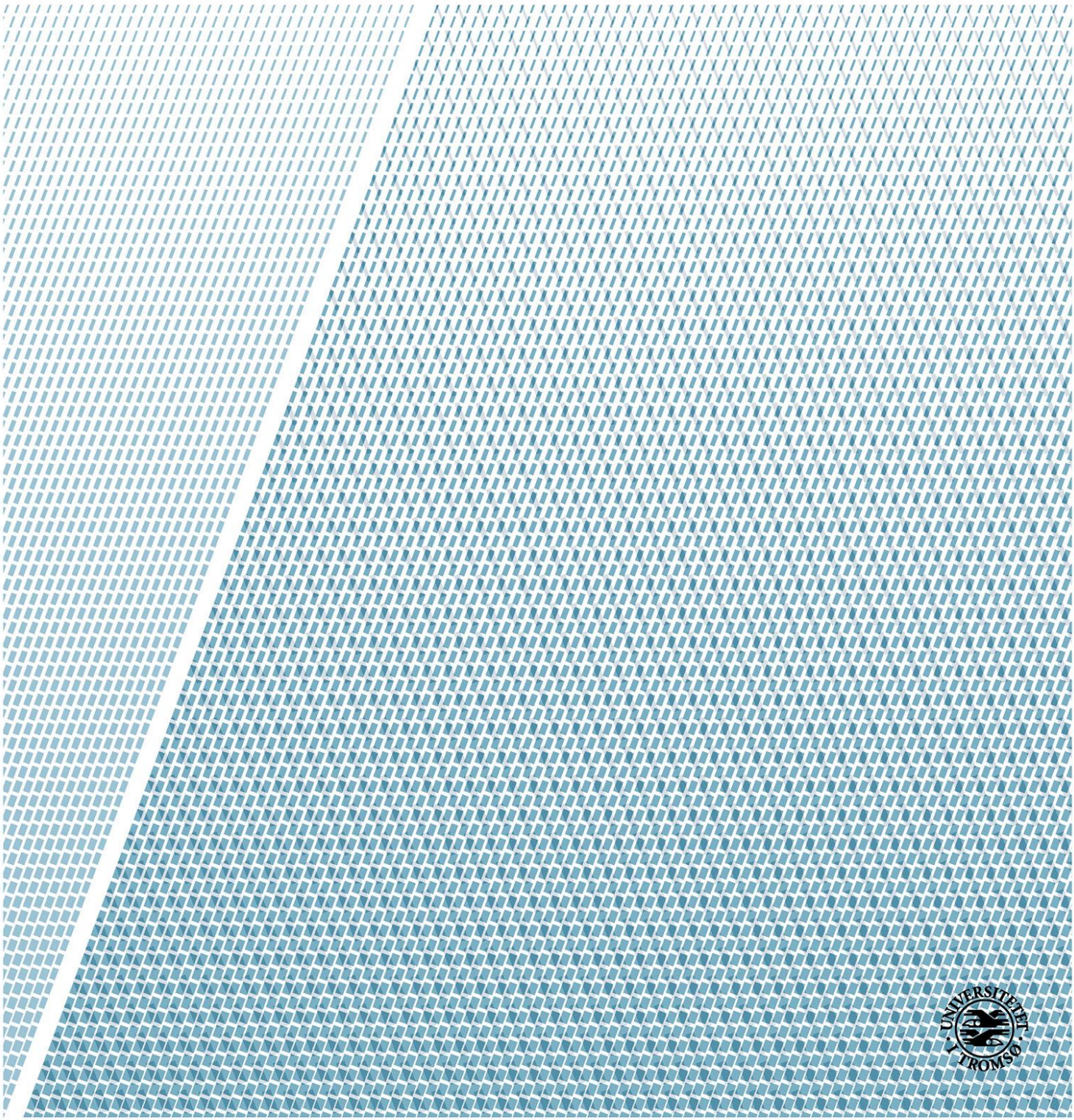

Preface

It is with mixed feelings I hand in my master thesis as an era of my life is over. The life as a student has been interesting to say the least. I started on a bachelor program in language and economics, and soon transferred to a bachelor program in economics. After I completed the bachelor degree I wanted to continue in the same tracks, and applied to the master program in economics.

It was with great joy I received the letter from the University where I was offered a place in the master program in Economics. I accepted and it was with great joy I started on the master program. Now I am at the end of my student life, and ready to start the next phase of my life.

There are many people I want to say my thanks to. I start off with the one that means the most to me; my mom. She has been a great support for me during my time as a student and I will be eternally grateful and I couldn't have done it without her support.
I will also thank my supervisor, Professor Jan Yngve Sand for his many insights and help writing my thesis, and I also want to thank all the professors and lecturers I have had during my master.
Last but not least I want to thank former fellow student Johan B. His help, support and cooperation during my master-years meant a great deal to me.

Tromsø, 16. February 2015

Bjørn Harald Jørgensen

Abstract

Football (also known as soccer) is by far the most popular sport in the world with several billion fans worldwide. In this thesis the focus will be on two different sides of a football club, spectators and advertisers (sponsors). These two sides have fundamentally different incentives why they want to associate with a football club; the spectators have emotional incentives, while the advertisers have economical incentives. The popularity of football and the different incentives of the two sides are the main reason a football club is a very interesting object to analyze.

The popularity of football makes it very attractive for firms to associate with football clubs, and thus increase their exposure to potential customers via advertising.

In this thesis I have used two-sided market models to see how the indirect network effects affect the price structure for a football club. In the analysis I have found it reasonable to use an assumption that advertisers have more benefit from spectators joining the football club, than the spectators have from advertisers. With this assumption the analysis shows that the price for advertisers will always be higher than for spectators, and also that in some cases the price for spectators could be zero.

Key words: Two-sided markets, football clubs, indirect network effects, externalities, price structure

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Introduction

A relatively new topic in economics is two-sided markets, and in the last decade there have been published a multitude of papers with formal models and applied models. But there haven't been much research done towards sports, and especially the world's most popular sport, football.

In a football club there are many sides that make up the whole economy within it, this thesis will focus on two of those sides and use two-sided market models to analyze different aspect of this. The first thing that needs to be analyzed is the details of the two sides in question, namely the spectators and advertisers or sponsors. For simplicity I will refer to advertisers and sponsors as advertisers, and these will include all different types on that side. One of the things that makes football clubs interesting to analyze is the fundamentally difference between the two sides. The advertisers have a high economical incentive to be associated with a football club, while the spectators have an emotional incentive.

Why do people want to watch a football match, and why would an advertiser want to show their ads in this setting, these are the first questions that needs to be answered, and will be covered in chapter 1. In chapter 2 the theory of two-sided markets will be explained, and also describe the characteristics relevant for football clubs. Chapter 3 is the analysis where I will first look at why a football club is a two-sided market, and which characteristics it has, secondly in the analysis I will look at the signs and relative size of the network effects, which is the special feature of two-sided market models. I will also find reasons why it is reasonable to assume that advertisers benefit more from having more spectators join the platform than spectators will benefit from having more advertisers join the platform. For the third and last part of the analysis I will use formal two-sided market models applied to a football club setting. In the two first models I will assume a football club in a monopoly setting to see the basic network effects between the two sides, and how revealing the prices to the different sides will affect the prices. In the last model we assume a football club competing with a television broadcaster for advertisers and spectators. These models will hopefully tell something about the price structure in a football club when it deals with the two sides, and hopefully shed some light on subsidizing one side by charging

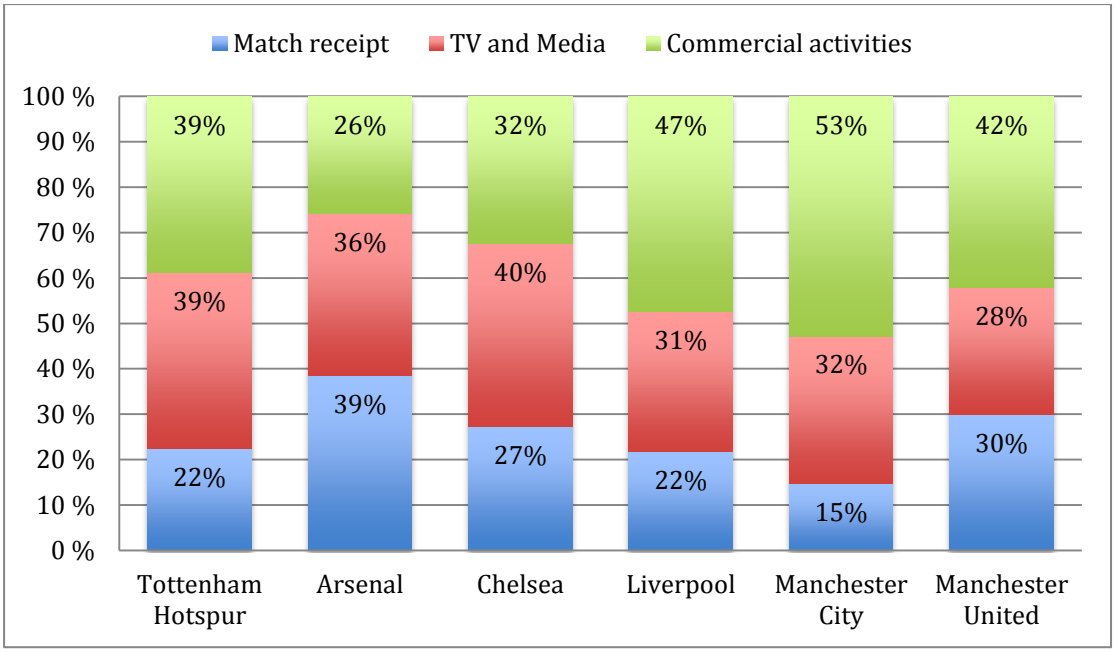
more to the other side to maximize profits. The term “price” in this setting could be interpreted as how much of the total revenue of the football club each side generates. This is obvious as we are looking at equilibrium participation levels and prices.

A football clubs main goal is hard to define; its owners might want to maximize profit, but the sporting leaders might want to maximize the success of the club in tournaments it is involved in. These goals are connected in the sense that participating and eventually winning tournaments has rewards in form of money, but also it increases the attractiveness of the club. The attractiveness of the club plays a huge part of how players decide which club to join, and also the attractiveness to advertisers and sponsors. In this thesis I will assume they want to maximize profits as the models have this as a goal, and also as sporting success leads to higher profits and making the club more attractive.

1. The football club

A football club has a very complicated economy, the revenue side includes ticket sales, advertisement and sponsors, player sales, participating in tournaments and awards from these. The cost side is also complicated; it includes player wages, player transfers, cost of stadiums etc. We will focus on the revenue in this thesis, and figure 1 shows the revenue for the 6 top clubs in England as percentage of their total revenue in 2012-2013 season.

Figure 1 (percentage view of revenue of 6 EPL clubs)



Data from The-Guardian (2013)

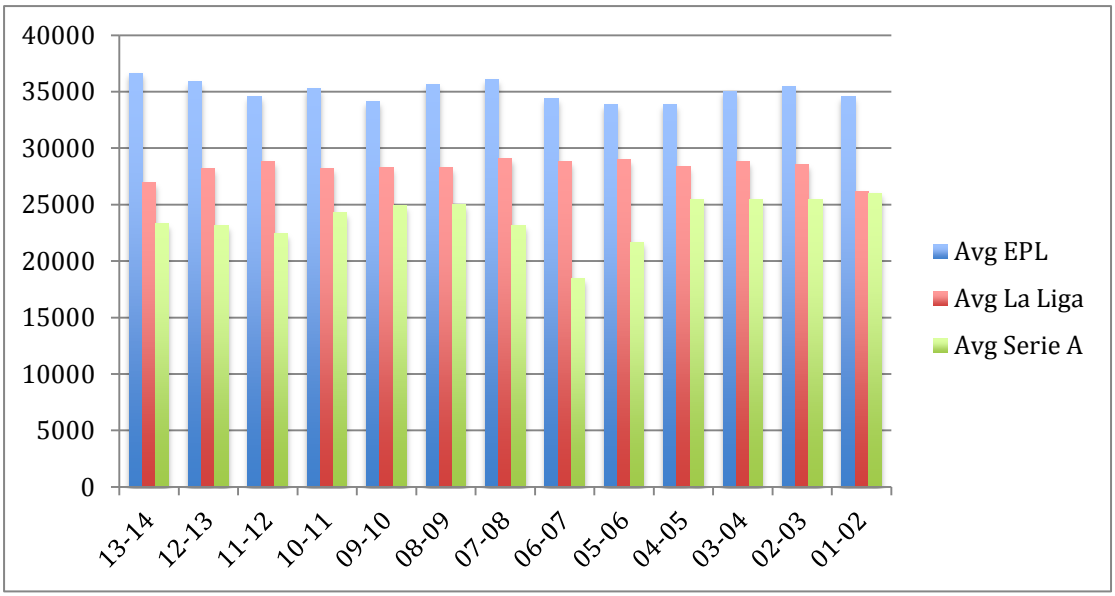
According to the finance reports from the clubs the commercial activities includes sponsorship and other types of revenue generated by the club and its players, the TV and Media is the television rights for live coverage and similar. The gate receipt is the income from match day attendance and season tickets. As we can see from figure 1 the attendance revenue only represent maximum a third of the total income, and the rest is divided between commercial activities and tv and media coverage. One of the most important factors is the match receipt and the spectators that attend the matches. This is based on the fact that the spectators creates the atmosphere in the arena and thus creates the desired environment for the match, and also the sponsors and advertisers want to expose their ads to the spectators.

In this thesis I will focus on two sources of income, as the models used in the analysis is two-sided. The two sides I will focus on are advertisers and spectators. The spectators for a football match are often divided into several types; you have the loyal fans that attend every match, and you have also the more casual fans that is indifferent between watching a match in the arena or on television, and in addition you have the neutral spectators that often is tourists and similar. I will not differ between the different types of spectators for simplicity, but this is possible to do by adjusting the utility for watching a match in the arena versus watching it on television. I won't differentiate between the different types of advertisers either, and treat them all as one type for simplicity.

1.1 Popularity of European football

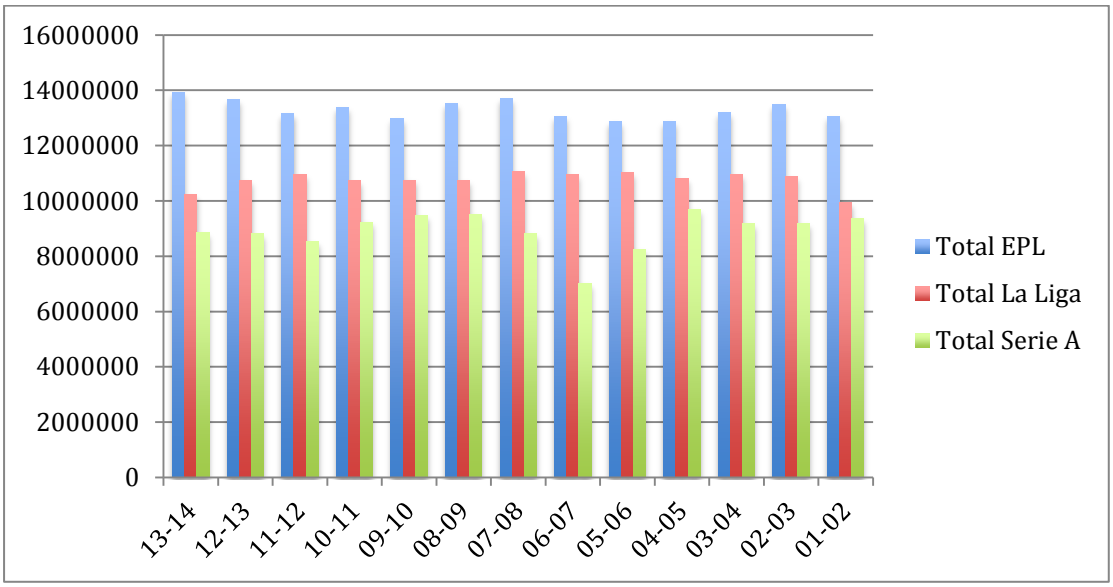
The question about why people attend matches is a complicated question that has several different answers that depends on where in the world the match is and what league. The English Premier League, which is seen as the biggest and most competitive league in the world, and also the richest have seen in the last 10 seasons the aggregated attendance on matches swing from 12 million to approximately 15 millions, and the average per match has been between 33 thousand to upward of 37 thousand (ESPN, 2015). If we look at figure 2 we can see how the average attendance on matches in three of Europe's most popular football leagues, which consist of English Premier League, Spanish La Liga and Italian Serie A over the last 10 seasons. In figure 3 the aggregated attendance on matches in the same football leagues has been over the last 10 seasons. From figures 2 and 3 we can see a picture of how popular football is in Europe, and to further underline the popularity of football, the EPL has a global audience of 4.7 billion viewers over a season (Premier-League, 2015a).

Figure 2 (Average attendance on football matches in EPL, La Liga and Serie A)



Data from (ESPN, 2015, European-football-statistics, 2015)

Figure 3 (Aggregated attendance on football matches in EPL, La Liga and Serie A)



Data from (ESPN, 2015, European-football-statistics, 2015)

1.2 Why do people attend football matches?

This is a complicated question, which has several different answers depending on where in the world it is or what club it is to mention some factors. Also the type of spectators will often have different reasons, to mention a few; we have the loyal fans

that attend every match no matter how the team are doing and what weather it is, in addition we have the neutral and less committed fans that will occasionally attend a match, and we also have the tourist that attends matches. The tourists are often in connection with the world famous teams in bigger European cities like Real Madrid and Barcelona in Spain, Manchester United and Liverpool in England, or Juventus and AC Milan in Italy to mention a few. Some people claims the atmosphere in the arena is vital for them to attend matches, and in this context Manchester United in England created a singing section in their stadium as an experiment to increase the loudness level throughout the whole arena and thus create a better atmosphere. This was a success and in 2013 they made this section a permanent section according to Manchester United (2014).

There have been some research into what affects football match attendance, one of them is by García and Rodríguez (2002) who did an extensive analysis of football match attendance in Spanish football league. In this research they looked at several different determinants of why people attended football matches, and they did a regression analysis of this to find the price elasticities and how other factors affected the attendance. The dependent variable in this regression model is the number of tickets sold for a match, not including season tickets and tickets for children. The explanatory variables that would affect attendance are grouped, and are as follows; the economic factors included are prices, measured by the cheapest price deflated by the consumer price index, and real income per capita in the province of the home team. They expected a negative effect from price, and positive for both income and population. The expected quality of the match is measured by ex ante quality, which is the quality of both teams in the beginning of the season, independent of the performance previous of the match and the variables proxying the most recent performance, i.e. current quality. In this group they included the budgets in real terms, this among other things does depend on the salaries that should proxy the productivity, and they also included the number of players playing for their international teams. They created dummy variables for matches with regional or historical rivalry, and dummy variables for if the away team were either Barcelona or Real Madrid which are the two biggest and important teams in Spain, and last a dummy variable for if the season ticket holders had to pay to attend a match (Club's day match) which is a usual practice among Spanish clubs. For the variables that

capture the recent performance of the teams they included how many matches won in the last three games, the number of goals scored in the previous match by the home team among others. They expected all variables that increasing quality of the match to have positive effect on attendance. Lastly they included variables to capture the opportunity cost of attending football matches, which are based on the weather conditions and if the match is televised. They assumed the better the weather was, the more attendance. For the factor of if the match is televised they expected that if the match was televised it would decrease attendance, and particularly if it was shown on a public channel. The day of the game was also assumed to have an effect on attendance; this was especially the case if the match was played on a weekday rather than in the weekend. The weekday-matches were assumed to decrease attendance compared to in the weekend. They did also take into consideration the distance the away team had to travel to capture the demand for the away supporters.

In the results for this study they use two preferred models; one with, and one without home team and season effects. They wanted to see which group of explanatory variables had the most impact. Their findings indicated that the variables in the ex ante quality group had the most impact in attendance in both models. The second most influential variable group was the opportunity cost. For the model with home team and season effects the home team effect was clearly the second most influential group of variables with opportunity cost as a third. For the economic group of variables it was substantially reduced when controlling for home team and season effects, and in particular income.

This paper by García and Rodríguez (2002) were quite extensive and seems to cover most of the different determinants of why people attend matches. This research is done on Spanish football, but it is reasonable to assume the determinants would apply to most other leagues as well with some variations of course.

The substitutes for watching a match in the arena is reasonable to assume would be watching it on television. If we regard watching a match in the arena and on television as the only alternatives, the strength of substitution will vary quite a bit depending on which country and league in question. For instance the biggest difference between Spanish- and English football leagues are likely to be that the

televised matches are a larger substitute to match attendance in Spain than in England as there are restrictions on how many matches that can be televised in England. The television rights for matches will be covered in the next section. According to Buraimo and Simmons (2009) the audience watching a match in the arena will tend to be loyal fans, mostly of the home team, and some tourist visiting the city. The television viewers on the other hand tend to be less-committed- and neutral fans.

Another interesting point about attendance to football matches is covered in a paper by Eichhorn and Sahm (2010). In this paper they ask the question why were the prices for tickets for the World cup of football in 2006 so low, when the excess demand amounted to more than factor 10. And in addition FIFA put restrictions on the tickets, such as they were personalized so they couldn't be sold on the black market. If they were to be resold they had to go through the official platform and sold at the purchasing price. In this context they point to two different things; the first being that successful marketing in sports events like this that are widely broadcasted, are largely dependent on the atmosphere in the stadium. This was emphasized in the paper by Huang (2001) where he point to that perceived emotions serve as significant mediators of consumer responses to advertising. The second point in this context of world cup prices is that the atmosphere in the stadium is influenced by different personality types of individuals among the audience, and in particular their level of extraversion, i.e. intensity of emotional expression. As McNiel and Fleeson (2006) points out that extraversion has a causal effect on positive affect, in other words, to the extent of a person is feeling enthusiastic and active, and thus willingness to cheer. The literature on personality psychology, including papers by Lynn and Martin (1995) and Wallbott and Scherer (1988) points to a negative correlation between intensity of emotional expression and income. In other words, if the ticket prices are too high the "good quality" fans that creates the desired atmosphere in the stadium will decrease in number, and this will lead to a loss of revenue in markets that suffer from low emotions, i.e. sponsorship contracts and merchandizing products (Eichhorn and Sahm, 2010).

1.3 Television rights for matches

The broadcasting rights for English Premier League (EPL from now on) were sold for 594 millions GBP for the 2014/2015, and the number of matches that could be broadcasted were limited to 138 matches of the total of 390 total played in a season with 20 teams (Cox, 2012). Up until 2007 only one broadcasting-firm had the rights to broadcast the matches within UK, and this was a huge concern that the EPL was acting like a cartel restricting output so only one company could afford the rights. The European Commission tried to influence this, and ruled that the broadcasting rights have to be sold to more than one broadcaster, but still the dominance of BSkyB is having a distorting effect on the market. The EPL claims that the broadcasted matches could be seen as a substitute to watching a match on a stadium, and restricting the amount of televised matches is a way to prevent the match attendance to be negatively affected. In the contracted period of 2010 to 2013 BSkyB and Setanta were the only ones buying broadcasting rights, and BSkyB bought the rights to 115 matches and Setanta bought the remaining 23 (Cox, 2012). The contract for live broadcast of EPL matches for the period of 2016 to 2019 season have been sold to Sky and BT for a total of 5.136 billion GBP. This means 1.712 billion GBP per year, which is a huge increase from the 2013-2016 contract with 539 million GBP per year. This also saw the live broadcasted matches increased from 138 in the previous contract to 168 matches (Premier-League, 2015b).

In Spain the rules are different, and the individual clubs can sell broadcasting rights on their own directly to a broadcaster. But opposite to EPL, in the Spanish La Liga all the matches each round is broadcasted in some way, 1 match each round is broadcasted on free-to-air television, another 1 is broadcasted on pay-television and the remaining matches are pay-per-view. In 2005-2006 season the two big teams, Real Madrid and Barcelona had 46% of the revenue created from the broadcast market (Buraimo and Simmons, 2009).

1.4 Advertisers

Regarding advertisers in a football match there are two different cases we need to look at; we have the advertisers in the arena and we have the advertisers on televised matches. Although the advertisers in the arena have the possibility for their

ads to be visible on television as well, I will for simplicity treat them separately. As we have seen there is a large potential number of people seeing an ad in connection with a football match, both in the arena and on television, and is most likely an attractive arena to advertise in.

1.4.1 Arena

There are many ways advertisers can show their ads in a football arena; we have the shirts and shorts for the players, the boards along the sides of the pitch, ads showing on the big screen and screens scattered in the arena, billboards in hallways, ads printed on tickets and matchday-flyers and ads that are announced over the PA (Public announcement) speakers. There are likely more than this, but looking at this list, we can see the audience probably is exposed to ads wherever they are within the stadium.

One study about the effectiveness of advertisements in a sports arena was conducted by Turley and Shannon (2000) where they studiy advertisement recall, purchase intentions and actual purchase behavior. This study focus on a basketball sports arena, which is smaller than a football arena, but is still suited as comparison and to draw important points from. In a sports arena the audience will be exposed to ads over a prolonged time-period, and marketers often refer to this situation as captive audience. Different captive settings may include airport terminals, public train stations, bus and subway stations and other types of sports arenas. As pointed out by Black (1953) where he mentions the subway station The Washington Station in the US described themselves to advertisers as being able to provide a guaranteed audience with saying "if they can hear-they can hear your commercial!"(Black, 1953 p. 961). This is a setting where the audience has none or very little choice whether or not to listen to the message, which in this case is advertisements, and can not leave the facility until the activity is over or is reluctant to do so. This fits well to an audience in a sporting arena as Turley and Shannon (2000) points out. In these kind of captive settings the ads will have to compete for the attention of the audience with other aspects of the atmosphere that is created by the facility and other people in it. Schlossberg (1992) points out that some of the reasons behind placing ads inside sport arenas is that the advertisers hope that the excitement and affiliation that fans

associate with home team will transfer to the product or organization in the ads. As the audience is often emotionally connected with the situation in a football match and stays within the arena for several hours, and in addition might attend matches several times during a season, thus they will have a high number of exposures to individual ads. In connection with this there are three different issues regarding advertisements, the first is to what extent the audience can recall ads in this setting. Second, does these ads influence purchasing intentions, and thirdly, what effect do they have on actual purchasing behavior?

In a sport arena there are many different stimuli's that compete for the attention of the audience, and there have been studies that connects environment influence on behavior and attitude, this includes satisfaction (Wakefield and Blodgett, 1994), repurchase intentions (Wakefield and Blodgett, 1994, Wakefield and Sloan, 1995), desire to stay in facility (Wakefield and Sloan, 1995), pleasure (Wakefield et al., 1996) and perceived value (Wakefield and Barnes, 1997). But there is also some doubt that advertisement in sports arena is sufficiently effective. Crimmins and Horn (1996) and (Pokrywczynski, 1994) covered this to some extent, but as Turley and Shannon (2000) points out, they might have failed to recognize the captive setting an arena is where the audience stays inside the arena for a prolonged time where they are exposed to repeated ads, and over a season the number of repeated ads can be very high. One thing that stands out in the studies mentioned by Turley and Shannon (2000) is that products sold inside the arena seems to benefit most from the ads placed there and was most recognized.

Turley and Shannon (2000) conducted a field study about the effect of in-arena ads have on people that attend sporting events. They did this on the last four home games in NCAA (National Collegiate Athletic Association) in a mid-western university in the USA playing basketball. The questions were about the ads that appeared inside the arena, and they looked at advertisement recall, purchase intentions and actual purchase behavior as mentioned earlier. Their conclusion was that the audience in a sports arena tends to notice at least some of the advertisements they are exposed to, but also appear to screen out a large number of them. They also found data that suggest that the frequency of exposure to ads have the largest impact on recalling ads, and suggest that advertisers should consider long-term advertisements

to achieve maximum level of recall and effectiveness. Thus single-game advertisements wouldn't be much effective. Some other interesting things they comments are that people with significant relation to the sport team in question, i.e. attending more matches and feeling loyalty will tend to recall ads better. In addition the results indicated that people tend to notice ads, but doesn't necessarily process them, and if there are clustering of ads it is difficult for an ad to stand out.

1.4.2 Television

There are many similarities for advertisers between arena ads and television ads. One similarity is that the ads shown on boards and big-screen in the arena are also visible on television that broadcast the match. But the biggest difference is that television has the opportunity to broadcast to significantly more people that the arena can hold audience. Bel and Domenech (2009) do an empirical study of what influences the advertising price in television channels in the Spanish market. In todays market the broadcasted matches might be offered on several different devices such as televisions, phones, tablets, computers etc. For simplicity I will treat them as one, and refer to them as television.

Up until recently public owned broadcasters had a clear role as a free-to-view option for the public, but as new technologies are developed they need to develop a new purpose as the competition for audience is increasing. This means higher quality programs, which means higher cost and thus needs a higher financial coverage. This means that public broadcasters will have to more and more rely on advertisers to have a sufficient income. Anderson and Coate (2005) refer to free-to-air television as a public good, and two types of agents can consume this kind of broadcasting; viewers and advertisers. Viewers have a direct benefit from this by enjoying free access to programs, for advertisers broadcasting can be an excludable public good with congestion. Most European public broadcasters which are often viewed as free-to-air, are becoming more and more financed in parts or total by advertising and have to compete with private owned broadcasters for advertising. But as it is also the case that public broadcasters are receiving funds from the government via budgets or user fees, they might have a crowding out effect in the advertising market. This is because the public broadcasters can lower ad prices because of the subsidies they receives from

the government, but in an effort to prevent this some governments have put in place regulations that prevents public broadcasters to show advertising (Bel and Domenech, 2009). In competition with private-owned broadcasters for the rights to broadcast football matches the public broadcasters is often out-bid, this can be seen in England amongst others. For example, BBC, which is the public broadcaster in England is prevented to show ads by the government as Bel and Domenech (2009) point out. As mentioned the broadcasting rights to the English Premier League is divided between BSkyB and Setanta in 2010-2013 period, and were sold for 1782 million GBP (Cox, 2012). BBC received the rights to broadcast highlights from the matches in the show called Match Of The Day (MOTD) (Whannel, 2014).

As the private-owned broadcasters are almost always fully financed through advertising, they will also have the most incentive to try to get the highest sought after programs, like football matches of the most popular football leagues like the English Premier League or La Liga in Spain. The English Premier league which is thought of as the most popular football league in the world has a total of 4,7 billion tv-viewers in a season (Premier-League, 2015a), thus giving advertisers in these matches the opportunity to reach a huge number of potential customers.

Kind et al. (2007) looks at a mixed oligopoly market and found that where public and private programs are close substitutes the channels would have monopolistic power over the viewers. These channels could broadcast a high level of ads because they were most likely to maintain their audiences anyway. The result from Bel and Domenech (2009) study of advertising prices in the Spanish television market revealed that the market share of the broadcaster is a key variable in advertising contracts, i.e. high elasticity of advertising price with respect to audience size. They also find a strong negative relation between ad time and advertising price, i.e. the advertisers pay more for advertising on the broadcasters that have little total advertising time in hope that the ads will have a higher impact. Another interesting thing they find is that public television and ad price has a negative relation, this might indicate that public television has a less aggressive advertisement management, and this may induce less willingness to pay on the part of advertisers.

Another author who has comments on the economic value of sport is Gratton (2000), he wrote that the economic value is based on its popularity. He based this on that the top eight television programs in the US is sport events, where Super Bowl is the most popular with 130 million viewers. A 30 second ad during the Super Bowl costs 1 million USD when he wrote the paper in 2000. In 2014 a 30 second ad in Super Bowl cost 4 million USD, and a 60 second cost 8 million USD (Forbes, 2014). This is also a testament that the more popular a broadcasted sport event is, the more it cost to advertise during it.

2. The theory of Two-sided markets

2.1 History and background

The more common market definition is a one-sided market where there are two actors, one buyer and one seller or producer. This way of considering a market doesn't apply to all cases. Most markets have several other aspects to it, and to take one example that relates to the focus of this thesis. Lets consider a football club; it makes it revenue from activities and factors related to football matches. This revenue comes from several different sources as mentioned earlier; we have the spectators buying tickets to a match, advertisers that wants to advertise their products, tv-channels that wants to show the match on television and so on. In a one-sided market view these sides doesn't take into account the externalities that comes indirectly from each other, but only deals directly to the football-club. One issue with this is the fact that these groups could be affected by each other's participation. Lets continue with the example relating to football clubs; if there are few spectators, the advertisers doesn't want to buy space for their ads in the arena because few spectators would see them. A one-sided market view wouldn't take these indirect network effects into consideration when we would look at equilibrium prices, and would be less accurate as they only view one part of the picture.

Baxter (1983) noticed this interdependency between different sides involved in the case of credit cards, where the cardholders were on one side, and the merchants accepting the cards on the other side. He suggested that neither side would join the platform if there weren't enough participants on the other side, the card-holders wouldn't want to have the card if the merchants wouldn't accept it in their stores, and the merchant wouldn't make their stores accept these cards if there weren't any customers that had this card. This result suggested that some markets weren't as one-dimensional as earlier assumed, and this led to a new research topic of two-sided markets. This type of market has been referred to with several different notations and names; Evans and Schmalensee (2005) and Dou et al. (2009) are using two-sided platforms, Evans (2003) is using multi-sided platforms, Budzinski and Satzer (2011) is using multi-sided markets, Armstrong (2006), Rochet and Tirole (2003), Rochet and Tirole (2006) and Rysman (2009) are using two-sided markets. These are all quite similar; a multi-sided market is a market where two or more sides are interacting,

whereas two-sided markets there are only two sides. A platform in this sense is a firm that connects two or more sides with each other, but Rochet and Tirole (2003) mentions industries in this connection. A two-sided market industry is where two-sided platforms compete, and to mention a few these can be media or software and others.

For a market to be defined as a two-sided market there are some conditions that needs to be met. Rysman (2009) defines a two-sided market as one where two sets of agents interact through a platform and the decisions of each agent affects the outcome of the agents on the other side through externalities or indirect network effects. Evans (2003) mentions that the two sides are distinct from each other, one of the most used examples are men and woman in a dating scenario, another example is retailers and customers in a shopping mall. They can also be different for the particular transaction in question, eBay is an example of that where the users sometimes can be buyers and other times they can be sellers. As Filistrucchi et al. (2014) points out, a two-sided market is different from a market with complementary goods where products are bought by the same buyers and thus takes the price of both goods into account. But while two-sidedness might exist in mostly all markets, it is not always quantitatively important as Rysman (2009) points out.

2.2 Externalities / indirect network effects

The main feature of two-sided markets is the network effects or externalities. This is what links the two sides and enables them to affect each others demand. Evans (2003) sums up three conditions that are required for a market to be defined as a two-sided market, these conditions are also mentioned in most literature about two-sided markets.

First of all there needs to be two or more distinct groups of customers, these can be quite different from each other, examples of this are men and women in a dating platform or customers and retailers in a shopping mall. These groups of agents can also be different only for the transaction in hand, eBay is an example of this as sometimes the customers are buyers and other times they are sellers.

Secondly the different sides must be connected or coordinated via externalities through a platform. These externalities are also called indirect network effects, or network effects, but throughout this thesis these will all mean the same. The externalities can be negative or positive depends on what market and sides in question, and it is also not necessary for more than one of these effects to be present for a market to be defined as a two-sided market (Filistrucchi et al., 2012), this means if there is only a one-sided network effect it is still considered a two-sided market as the sides are connected through externalities. A positive externality is when the value obtained by one of the sides increases as the number of participants on the other side increases. Examples of this are VISA- or credit cards, and game consoles to mention a few. A game console will have users and developers as groups of agents, the users will benefit from having many developers joining the platform, i.e. more games, and the developers will benefit from having more users joining the platform as more will buy their games. A negative externality is when the obtained value for one side decreases as more users joins the other side. The most commonly used example of this is in regard to media platforms, for instance a newspaper that is largely funded by the income from advertising. The readers might have a negative effect or disutility from the ads in the newspaper being a nuisance, but the advertisers would benefit from more readers buying the newspaper and seeing the ads. Thus the readers have a negative network effect from advertisers, while the advertisers have a positive network effect from readers.

The third and likely the most important aspect of two-sided markets is that the sides are not able to exploit or use these externalities on their own, and they need a platform that can facilitate these for them. As Filistrucchi et al. (2012) points out, when a reader of a newspaper buys the paper, he doesn't take into account that he is indirectly making the newspaper more attractive for advertisers, and likely doesn't care about the price the advertiser have to pay for advertising. This is what distinguish a two-sided market from a market with complementary goods where the agents doesn't take the indirect network effect into account when deciding to join the platform (Filistrucchi et al., 2012). There are two different types of externalities regarding two-sided markets, first there is membership externality which comes from joining the platform, secondly there is usage externalities which comes from using the platform (Filistrucchi et al., 2014).

2.3 Transaction and non-transaction

There are two types of two-sided markets, transaction and non-transaction. Filistrucchi et al. (2014) describes a non-transaction two-sided market as a market where there is no transaction between the sides, even though an interaction is present it is usually not observable. Thus it is not possible for a per-transaction or per-interaction fee or two-parts tariff. Media is a good example of a two-sided non-transaction market, for a newspaper there is no observable transaction between readers and advertisers for a newspaper. A transaction two-sided market is a market where the transaction is observable, examples of this are payment cards, virtual marketplaces, operating systems, game consoles and so on. As a result that the transaction is observable the platform has the possibility to charge a joining fee and also, but not necessarily a using-fee, i.e. a two-part tariff. As mentioned there are two different types of externalities regarding two-sided markets, transaction markets inhabits both types of externalities, whereas non-transaction markets only inhabit membership externalities.

2.4 Price discrimination

This is one of the most important features of two-sided markets, as there is a need to discriminate between the different sides. Evans (2003) points out a key finding that is mentioned in several others papers concerning multi-sided markets is the need to get all sides onboard, and they need to balance the demand and price-structure. The problem of getting both sides onboard is caused by complementarity of the two sides; they need to both be onboard for the market to function. This shouldn't be mistaken as a complementary market, as the same consumer does not buy the same product or service in question as they would in a complementary market.
Optimal prices in these markets don't need to be proportional to marginal costs as it is the case with the Lerner conditions, and it is even possible for the optimal price for one side to be less than the marginal cost. Rysman (2009) says that in any market, prices typically fall as the price elasticity of demand increases, but a two-sided market can even enlarge this effect. As the low price on one side attracts not only elastic agents on that side, it also leads to higher prices or more participation on the other side. This increased value for the other side magnifies the value of participation on the

first side, and leads to an even bigger decrease in price and increase of quantity by the side that experience the increase in elasticity.

The price structure will in most cases depend on the magnitude of the externalities for each side. This is especially the case when there is a need to get both sides onboard, take for example the dating platform where there might be easier to get men onboard than women, and the platform might have a low or even zero-price for women. The demand on each side tends to vanish if the demand on the other side is low or none, regardless of the price. This is referred to as a "chicken-and-egg" problem, which points to the fact that you need both sides onboard to make this market work. Credit cards are a commonly used example, if we consider VISA-cards as an example. If a lot of consumers have VISA-cards, but no merchants accept the card in their stores. Or the other way around, if a lot of merchants accept the card, but no consumers have the card. In both cases the VISA-card is virtually worthless, and none of the sides wish to join the platform. To solve this problem Evans (2003) points to investment and pricing strategies as the keys to get both sides onboard. Rysman (2009) mentions that if there are multiple competing platforms the effects of participation on one side has even more effect on the other side.

One way to obtain a critical mass on one side is to offer a zero price, or even a negative price, i.e. paying them. This have become more often a case concerning credit cards, some banks are offering credit cards with a small amount of money for free to sign up. This is a strategy that is often preferred in many two-sided markets. Another way of solving this "chicken-and-egg" problem is to invest heavily on one side of the market to lower the cost for the users on that side. This would make the users on that side to be more willing to join the platform as the price will be lower, and thus more users are willing to join the other side due to the network effects. Evans (2003) continues on this issue with mentioning that firms that has gone through the entry-phase and solved this "chicken-and-egg" problem still have to focus on maintaining an optimal pricing structure. This typically ends up with the prices heavily skewed towards one of the sides in the sense that the margin for one side is very low compared to the other side. There are also two other factors that influence the pricing structure; the first one is some special customers on one side that Rochet and Tirole (2003) referred to as "marque buyers", and the second is when some

special customers are extremely loyal to a two-sided firm. Rochet and Tirole (2003) explains that the presence of "marque buyers" tends to make the platform more attractive for the sellers, and thus the price the sellers have to pay to the platform will increase. This will in turn lower the *de facto* marginal cost of providing the service to the buyers, and thus lowers the price for buyers. The existence of very loyal customers tends to do the same as "marque buyers", and these very loyal customers could be explained by many factors. For instance long-term contracts or sunk-cost investments, which Evans (2003) takes as an example is that American Express have charged the merchant a relatively high discount compared to other brands because the merchants thought of the American Express clientele as extremely attractive.

Evans (2003) divides two-sided markets into three different categories according to how they are set up; the first one is market makers, second is audience makers and the third is demand coordinators. Market makers enables two or more distinct sides to transact with each other, and each member on either side values the service higher if there are more members joining on the other side. Audience makers are typically advertising-financed media, where they match advertisers to audiences and often involve negative network effects. Advertisers value the service higher if more audience watch their advertisements and reacts positively to them, and the audience value the service higher if the advertisement is useful or they can benefit from it in other ways. The last category is demand coordinators and is the least studied according to Evans (2003). Demand coordinators create externalities by making goods and services that connects the different sides, gaming consoles is a good example of this. Take Microsoft Xbox for instance, Microsoft makes the console and the operating system, but the two sides are developers and users, where the developers make the games for the users, and the users buys and plays the games.

Rysman (2009) points to another important thing about price discrimination in two-sided markets; it allows for a new form of price discrimination, which is discrimination based on heterogeneity in the attractiveness of another member on the other side. He also mentions the normal price discrimination for a situation of demand heterogeneity, where manipulating the prices for participation and usage allows the platform to capture more of the surplus on the side with discrimination, and thus

increasing the value extracted on one side which leads to lower prices on the other side which value has increased Evans (2003).

2.5 Single- and multi homing

As a two-sided market has different sides that are connected to the platform, there is a question of if the platform is alone in the market or there are competing platforms. This brings up the question if there are competing platforms, and if the sides can join different sides simultaneously or only one at the time. As Armstrong (2006) mention this is commonly called if the sides are single- or multi homing. If a side can only join one platform at the time they are called single homing, and if they can join more than one platform at the time they are called multi homing. There is significant difference between outcomes if the sides are single- or multi homing, and there are three different combinations possible in any setting: all sides are single homing, all sides are multi-homing or, one side is single homing and the other side is multi homing. The case of both sides are multi-homing is most likely not very common if the main reason agents on either side decide to join the platform is to interact with the other side according to Armstrong (2006). The case where both sides are single homing is probably a very interesting case to analyze in economic sense, but this is most likely not a very common configuration. Rysman (2009) points out that two-sided markets often seem to evolve to a situation where one side is single homing, and the other side is multi homing. Game consoles are a typical two-sided market where one side is single homing and the other side is multi homing. The "gamers" usually chose to buy and use only one gaming console, but the game developers can develop games that are available on several different game consoles.

3. Analysis

A football club possesses many of the conditions that defines a two-sided market, or a platform that operates in a two-sided market. We have several combinations of the different sides that are independent of each other; we have spectators and advertisers, advertisers and players, players and spectators and so on. These sides can't directly interact with each other without the club being a common platform for them to participate on. In this thesis we will focus on the combination of spectators and advertisers, and the participation levels and prices for each side and find the equilibrium for these.

In this setting the spectators pays a ticket price, which is assumed to be the same for all types of spectators. The different types of spectators include the season tickets, VIP tickets and match-day tickets and more. For the advertisers we assume they have to pay a price for each ad they want to show in the arena, and will be assumed to be the same for all different types of advertises in the arena.

The sign and relative size of the network effects will be analyzed in chapter 3.1 and 3.2, but there are some characteristics that need to be looked at first.
First, is the football club a transaction or a non-transaction two-sided platform? Secondly, is the football club a market- or audience maker or a demand-coordinator? The third and last one is if the sides are likely to single- or multi home and also what kinds of externalities are present?

A non-transaction two-sided market as most media platforms belongs to don't have observable transactions between the two sides. This particular characteristic is similar for a football club, there are no observable transactions between spectators and advertisers, and it is also not easily measurable. The question of if a football club is a market- or audience maker or a demand coordinator is a more complex one. A market maker enables the sides to transact with each other, but as this is a non-transaction platform there are no transaction between the sides. An audience maker is one that matches advertisers to audience, which is basically what media platforms do. This is what football clubs does with the two sides in question; they are matching spectators to advertisers. If we look at the last type, a demand-coordinator makes

goods and services that generate externalities across the sides. This doesn't fit a football club well, as the football club doesn't coordinate the demand between the sides, only matches them.

It seems like a football club fits the characteristics of media platforms quite well if we look at that a football club is a non-transaction platform that is an audience-maker. The question of if the sides are single- or multi homing is also of importance regarding football clubs. In this setting we are looking at two sides; spectators and advertisers. The spectators are reasonable to assume are single homing as they can only watch a football match in one place, either in the arena or on television. There is the possibility they could watch the match on a tablet or phone inside the arena, but this is not a likely scenario and won't be considered here. The advertisers can be single homing as well if they choose to show their ads only in the arena, or only on television. But they also have the choice of showing their ads in both places during a football match to maximize their ads exposure to the spectators, i.e. multi homing. There is another possibility regarding the advertisers, the fact that their ads in the arena are visible on television as well could be considered multi homing. For simplicity we will assume that if the advertisers are multi homing, they will join both platforms, and if they are single homing they will only choose one platform to join.

The main goal for a football club depends on whom we are asking. If we assume there are two types of leaders in a football club; owners and sporting leaders. It is reasonable to assume both sets of leaders want sporting success, but the sporting leaders will likely have more focus on sporting success and the club owners have more focus on maximizing profits. If we include the fans, spectators and the advertisers, they also want the club to succeed. The spectators want their team to win matches and tournaments, and the advertisers knows that a successful club attracts more spectators and attention, thus leading to more exposure of their ads. The term maximizing profits in a football club have a different meaning than in a normal firm. In a football club there isn't that much profit as such, but rather there is a focus on revenue. Revenue is often channeled back into the club by paying wages, buying new and better players and also developing the arena and so on. In this thesis I will use the term profit, but the meaning will be more in the sense of higher revenue to be used developing the club. These goals and wishes are connected as sporting success will

give access to tournaments and eventual awards that will increase profits, and will also cause the club to be more attractive to advertisers, spectators and also new players.

The price structure is a very important factor in most firms and organizations which goal is to maximize profit, and this includes football clubs as well. A football club want to attract as many spectators and advertisers as possible to increase profit, but to do this they need sporting success as well. These things make it interesting to look at the price structure in a football club is, and which side has the higher price.

The rest of this analysis will be divided into two parts, the first part will look into what sign the different externalities have for each side and also the relative size between them. The second part will look into the price structure and maximizing the profit for a football club with using two-sided market models.

The price structure and maximizing profit for a football club is closely connected to the network effects between spectators and advertisers, and we will use two-sided market models to analyze this. I will use three formal models applied to the football club setting, and use the assumptions already in the formal models as well as the assumptions about the sign and relative size of the network effects in chapter 3.1 and 3.2. The first model is presented in chapter 3.4.1 and is a single homing monopoly model. The second is also a single homing monopoly model, but this model analyses the incentives to reveal the price paid by each side to each other and is covered in chapter 3.4.2. The third and last model analyzes two competing platforms that compete for multi homing advertisers and single homing spectators and is covered in 3.4.3.

3.1 Positive or negative externalities

As we are analyzing football clubs in a two-sided market setting, we need to look at the externalities, or rather, the signs of the externalities. This is a crucial point in this analysis as this well tell us if the spectators gets any benefit from the participation of advertisers and if the advertisers gets any benefits from the participation of spectators.

The network effects for advertisers from audience are quite straightforward, this is reasonable to assume is always positive. We base this on the that the main goal of advertisers are to maximize the amount of people that sees their ads and thus increase the likelihood that people will buy their products and services.

The sign of the network effect for spectators from advertisers are not straightforward, and will depend on several things. As mentioned the ads in the arena have to compete for the attention of the spectators with a number of other factors, and specially the match being played as it is likely their main focus. It is not obvious that if they notice the ads, that this actually leads to buying the product or service in the ads. This is somewhat supported by the findings by Turley and Shannon (2000) where they found that the spectators tends to notice some of the ads, but appears to screen out a large number of them. They also found that long-term exposure to ads had the largest impact on recalling ads in the arena. The difference between noticing an ad and processing an ad is also important. According to the authors of this study the spectators tends to notice the ads, but not necessarily process them, and thus leads to the ads having a lot less impact. These findings and others mentioned earlier might indicate that in an arena the ads doesn't cause much of a nuisance for the audience, this is based on that the audience tends not to notice them, and the ads tends to drown with the rest of the visual and audial inputs a spectator have in the arena.

The network effects for spectators from advertisers on television might be different. If we take the Super Bowl in USA as an example, this is a huge sport event and had more than 108 million viewers in 2013 (Forbes, 2014). One thing in particular with this event is that people are actually watching the event just to watch the ads. Ads are usually associated with interrupting shows that people are watching, and being an annoyance. But according to Forbes (2014) several studies have indicated that about 50% of the viewers tuned in just to watch the ads. According to Abt (2010) the CBC network that carries the sport event will have a total number of 62 pauses for commercials during the game. This alone might indicate that not all ads are a nuisance to audience, at least not in some huge events, and would likely be true for both audience in arena and watching television. If we also take into consideration that on television during a football match the only opportunity to show commercials are during half time. It is reasonable to assume the spectators watching the match on

television would use this time on other things, for example getting something to drink, go to the bathroom, switch to other channels and so on.

Taking these things into consideration the signs of the network effects might be ambiguous. The network effect for spectators from advertisers could be either positive or negative depending on the sport event in question. In the setting of a football match it is reasonable to assume the spectators are generally ignoring the ads in both arena and on television, and thus the network effects is likely to be zero or slightly positive. For the advertisers the network effects from audience are always positive, which is a reasonable assumption, as they want their ads exposed to as large audience as possible.

3.2 Relative sizes of externalities

The relative size of the externalities is also important to look into. We found it reasonable to assume the network effects for advertisers from audience were always positive as the advertisers wants to show their ads to as many people as possible. The size of these network effects is reasonable to assume are large, and will always be larger than the network effects the other way around. This is a reasonable assumption as the spectators were assumed to generally ignore the ads. The network effects for spectators from advertisers is not necessarily zero, it might be that the ads in question are showing something connected to the football match and thus have a positive effect, and also if the spectators have some other benefit from advertisers. We also saw that in some cases the audience actually watch the sport event partly because of the ads, but in a normal football setting we find it reasonable to assume they would attend a match because of the match.

Based on this it is reasonable to assume the network effect for advertisers from spectators are always positive and also larger than the network effect for spectators from advertisers. The network effects for spectators from advertisers are reasonable to assume they are either zero or positive.

3.3 Price structure

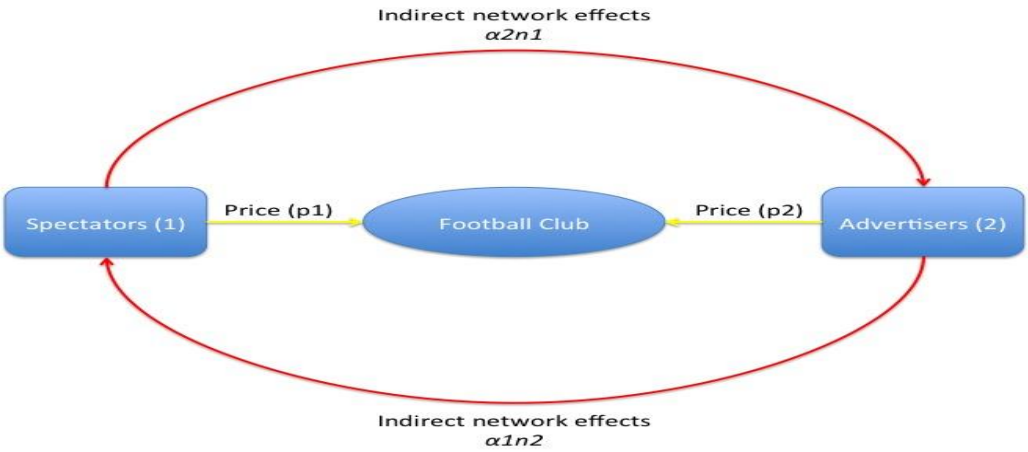
An advertisers main objective is to expose his ads to as many spectators as possible, and thus increase the likelihood of increasing the sales of its products or services. In a football setting there are many different types of advertisers, some are sponsors that have the naming rights for the arena, others have their ads shown on the boards along the pitch, and others have their ads scattered throughout the stadium or on the big screens or over the PA system. If we first look at the possible amount of audience the advertisers can reach. The English premier league (EPL) is by far the biggest in terms of audience and money generated. Just by looking at how many watches each match on average in EPL we get an idea exactly how much bigger it is. According to Pilger (2014), the average number of global audience per game is 12.3 million people, Italian serie A has about 4.5 millions, and for the Spanish La Liga the number is 2.2 million and Bundesliga in Germany have about 2 millions. This gives an idea of the potential audience an advertiser can reach by advertising in an arena for a football match. In an economical view they are likely to have the best incentives to join the football club as they have the most to gain, and thus the football clubs demand from advertisers is likely to be very high. For the spectators they don't have this economical incentive to join the club, but they might have emotional incentives. This means the football club needs to find a price structure where they takes the incentives into consideration, and charge the side with the highest economical incentive the most.

3.3.1 Single homing monopoly

To look at the a simple case of how two sides can affect each others decision to participate on a platform in a monopoly setting, we can use a formal model for monopoly platform made by Armstrong (2006). I will use this model and apply the football club setting to it, where spectators (1) and advertisers (2) are the two sides. In this setting the football club is the two-sided platform, and it has two groups of agents or sides that are interdependent on each other through externalities.
The first group is the spectators watching the football-match, and the second group is the advertisers paying to show their advertisements in the football arena during the match. We will use the assumption from chapter 3.1 and 3.2, and assume the network effects for advertisers from spectators are larger than the network effect for spectators

from advertisers, i.e. $\alpha_1 < \alpha_2$. For the signs of the network effects we assume they are both positive. For simplicity the authors didn't include the effects from the participation of members of its own side on the utility, i.e. one more spectator doesn't have any effect on the other spectators, and likewise for advertisers.
Figure 4 shows an overview over the monopoly setting with each side.

Figure 4 (Monopoly two-sided market



The utility for each spectator is given by

$$u_1 = \alpha_1 n_2 - p_1 \qquad (1.1)$$

The utility function for spectators in this model is not ideal in the sense that the only way to get higher utility is to have more advertisers participating. We could consider the network effect $\alpha_1$to be some sort of proxy for the quality of the club. This means that if the quality of the club is high it will attract more advertisers, and this will lead to higher revenue and also the possibility to buy better players. Another possibility is to do as in the model in chapter 3.3.2, where they have added an intrinsic utility variable $\widehat{v_1}$, which is positive, but this is not a desirable solution as this will not fit with the solving of this model. Based on this we will assume that the network effect α_1 is a proxy of quality, and is always positive and smaller than α_2 as first assumed.

The utility for each advertiser is given by

$$u_2 = \alpha_2 n_1 - p_2 \qquad (1.2)$$

In these utility functions, p_1 is the price the football-club charges per ticket to the spectators, and p_2 is the price the platform charges to the advertisers for advertising in the football-arena. n_1 is the number of spectators watching the match, and n_2 is the

number of advertisers. The externalities in this model that connects the two groups are α_1 and α_2. α_1 measures the increased utility spectators gets from a higher quality of the club proxied via the advertisers, and we also need $\alpha_1 n_2 > p_1$ to prevent negative utility. α_2 measures the benefit advertisers get from more spectators participating, and will in this setting be large as the main goal of advertisers is to show their ads to the spectators to increase sales of their products and services. We need as before $\alpha_2 n_1 > p_2$ to prevent negative utility.

Also from 1.1 and 1.2 we can see that the utility of the groups are determined as a function of how many participating. Armstrong (2006) specifies the number of participants as a function of the utilities to close the demand model and means the utilities offered to the different groups are given by u_1 and u_2.

The amount of each group that joins the platform are given by

$$n_1 = \phi_1(u_1) \tag{1.3}$$

$$n_2 = \phi_2(u_2) \tag{1.4}$$

for some increasing functions $\phi_1(\cdot)$ and $\phi_2(\cdot)$.

For the cost side of the platform, suppose the platform has a per-agent cost f_1 for spectators and f_2 for advertisers, this gives us the profit for the platform

$$\pi = n_1(p_1 - f_1) + n_2(p_2 - f_2) \tag{1.5}$$

If the football-club is assumed to be offering utilities instead of prices, this gives the implicit price for each group to be

$$p_1 = \alpha_1 n_2 - u_1 \tag{1.6}$$

$$p_2 = \alpha_2 n_1 - u_2 \tag{1.7}$$

From this we get the football-club's profit in terms of utilities instead of prices

$$\pi(u_1, u_2) = \phi_1(u_1)[\alpha_1 \phi_2(u_2) - u_1 - f_1] + \phi_2(u_2)[\alpha_2 \phi_1(u_1) - u_2 - f_2] \tag{1.8}$$

If we let the aggregate consumer surplus of the spectators and advertisers be respectively $v_1(u_1)$ and $v_2(u_2)$ where $v_i(\cdot)$ satisfies the envelop condition $v_i'(u_i) \equiv \phi_i(u_i)$ where $i = 1,2$ (Spectators and advertisers).

This gives us the welfare measured by the unweighted sum of profit and consumer surplus

$$\omega = \pi(u_1, u_2) + v_1(u_1) + v_2(u_2) \quad (1.9)$$

The welfare-maximizing outcome has the following utility for respectively spectators and advertisers

$$u_1 = (\alpha_1 + \alpha_2)n_2 - f_1 \quad (1.10)$$

$$u_2 = (\alpha_1 + \alpha_2)n_1 - f_2 \quad (1.11)$$

We see that the utility of each group is dependent on the externalities multiplied with the number of participants of the other group minus the cost.

The socially optimal prices are as follows

$$p_1 = f_1 - \alpha_2 n_2 \quad (1.12)$$

$$p_2 = f_2 - \alpha_1 n_1 \quad (1.13)$$

Here we can see that the price for each group is adjusted downward by the benefit from one more participant from the other group multiplied with the externality.

The profit-maximizing prices are given by

$$p_1 = f_1 - \alpha_2 n_2 + \varepsilon_1 \quad (1.14)$$

$$p_2 = f_2 - \alpha_1 n_1 + \varepsilon_2 \quad (1.15)$$

The profit-maximizing prices for each group is the same as the welfare-maximizing price, but is adjusted upwards by a factor related to the elasticity of the group's participation. In other words, for spectators in 1.14; one more advertiser that joins the platform will decrease the price for spectators ($\alpha_2 n_2$ in the price function for spectators), and the law of demand states; if the price decreases the demand will increase, i.e. more spectators will join the platform. This will be the same for advertisers in 1.15 as the functions are symmetrical.

However, the elasticity of each group's participation given by $\varepsilon_1 = \left(\frac{\phi_1(u_1)}{\phi_1'(u_1)}\right)$ for spectators and $\varepsilon_2 = \left(\frac{\phi_2(u_2)}{\phi_2'(u_2)}\right)$ for advertisers will have a positive effect on the price, and the price will increase.

The elasticity of demand given a level of participation is given by

$$\eta_1(p_1|n_2) = \frac{p_1\phi_1'(\alpha_1 n_2 - p_1)}{\phi_1(\alpha_1 n_2 - p_1)} \tag{1.16}$$

$$\eta_2(p_2|n_1) = \frac{p_2\phi_2'(\alpha_2 n_1 - p_2)}{\phi_2(\alpha_2 n_1 - p_2)} \tag{1.17}$$

The profit-maximizing prices will satisfy

$$\frac{p_1 - (f_1 - \alpha_2 n_2)}{p_1} = \frac{1}{\eta_1(p_1|n_2)} \tag{1.18}$$

$$\frac{p_2 - (f_2 - \alpha_1 n_1)}{p_2} = \frac{1}{\eta_2(p_2|n_1)} \tag{1.19}$$

If the spectators are offered a subsidized service with $p_1 < f_1$, this could occur for two reasons. The first one is if the elasticity of demand is high enough, and secondly if the external benefit for the advertisers is large.
This would make the price for spectators to be small or even negative if the external benefit for advertisers is large, and would be suitable in the scenario for a football club. If we consider the ticket prices for spectators to be very high, the demand would decrease and fewer spectators will attend the football match. Thus fewer spectators would see the ads by the advertisers, and the demand from advertisers will also decrease.

As we have assumed the network effect for advertisers from spectators is larger than the other way around. If we look at the relative size of the elasticity of participation, these will as mentioned increase the price if more participants from its own side join the platform. If we consider an upper limit for spectators in the arena, and also a limited space available for advertisers to show their ads in the arena, we can make a reasonable assumption about the size of these elasticities.
For the spectators the limited amount of seats inside an arena is likely never at its maximum, except for some big football clubs that almost always have the arena filled up with spectators. But in general we will assume this will not be the case, and the elasticity of participation will be relatively small. This is supported by the fact that in general the more spectators the better atmosphere inside the arena, and thus the utility increases.

For the advertisers it is the other way around, the space available to place ads and show a commercial on the big screens is limited, and most likely not have empty space. This means that the elasticity of participation is relatively large, and one more advertiser will have a relatively big impact on the price paid by the advertisers. This is also supported by the fact that the potential number of spectators for one match can be very large, and the ads can be seen by a large amount of spectators.

Proposition 1

> If the network effects for advertisers from spectators are larger than the network effects for spectators from advertisers, and also the elasticity of participation is larger for advertisers than for spectators, i.e. $\alpha_1 < \alpha_2$ and $\frac{\partial p_1}{\partial \varepsilon_1} < \frac{\partial p_2}{\partial \varepsilon_2}$, the price for advertisers is higher than for spectators.

If we look at the socially optimal price given by 1.12 for spectators, we can see that the higher the network effects for advertisers are, the lower the price for spectators is. In addition the socially optimal price for advertisers given by 1.13, would be closer to cost because the network effect from audience is relatively low. The profit-maximizing prices are given by 1.14 and 1.15, and are the same as the socially optimal price but adjusted upwards by a factor related to the elasticity of its own group's participation. As we have assumed the participation elasticity for spectators is relatively small and relatively large for advertisers. From 1.14 and 1.15 and earlier assumptions we can see that $\frac{\partial p_1}{\partial \varepsilon_1} < \frac{\partial p_2}{\partial \varepsilon_2}$, and we know $\alpha_1 < \alpha_2$, and this indicates that the price for spectators will always be lower than for advertisers.

3.3.2 Incentives to reveal prices

Another question in a two-sided market setting is about the incentives to reveal the prices paid my each side to the platform, and this was analyzed in a formal model by Belleflamme and Peitz (2014). The interesting focus of this model fits well in a football club setting. Lets consider the advertisers, the only thing they want is to show their ads to the spectators, and by knowing the price for spectators they would be able to estimate the attendance to some degree.

I will as before apply this model to a football club setting, where the two sides are as before, spectators (a) and advertisers (b). The model is based on a monopoly platform as the previous model, but with some additions. The main focus of this model is how the participation levels and prices for each side react to changes in the information structure. The information structure in this model is the probability for knowing the price for the other side. They also want to find the optimal information structure, and if it is optimal for the platform to set prices for both sides simultaneously, and also if the platform could commit to the prices. In a football club setting there might be reasons why one would like to pay attention to reveal the prices for each side. If we assume a football club want to maximize profit, and this leads to being able to offer higher salaries and thus buy better players that will increase the quality/entertainment value of the matches. With this assumption it might be possible to increase profit by revealing the prices paid by each side.
One assumption that is imposed by the authors in this model is that the sides expect the platform to insulate the effect each side gets from price changes on its own side.

Suppose a monopoly platform serving two sides, spectators (a) and advertisers (b). They are charging different prices to each side, M_a for spectators and M_b for advertisers, and have the following net utility when interacting on the platform with users of the other group.

$$U_i = u_i + \gamma_i n_j^e - M_i \, , i = a, b \tag{2.1}$$

Here u_i is an intrinsic utility for being on the platform, and thus the net utility for spectators is not only dependent on the advertisers as in the previous model. The indirect network effects from the participation of the other side is captured by γ_i, and is multiplied by the number of expected participants n_j^e on the other side. For a membership fee of M_i and expected participation n_j^e on the other side, the users on side i decides to join if $u_i \geq M_i - \gamma_i n_j^e$, i.e. the utility is zero or larger than the membership fee minus the benefit from the expected participation on the other side.

The number of participating users is computed as follows

$$n_i = v_i + \gamma_i n_j^e - M_i \, , where \; i = a, b \tag{2.2}$$

We assume that the users on side i can observe their own price M_i, but only have a probability λ_i to observe the membership fee on the other side, i.e. M_j. The probabilities to observe the membership fee on the other side is common knowledge, i.e. λ_i and λ_j. These probabilities will be referred to as information structure and information levels throughout the model. This means that the spectators and advertisers will be able to take into account a price-change on the other side by the probabilities given by the information structure λ_i and λ_j. We further assume that the football club can make adjustments to the membership fees at zero costs with publishing the price information.

We will look at different scenarios concerning in what order the spectators and advertisers act, in this first scenario they will decide whether or not to join the platform simultaneously. In the second scenario they will decide sequentially to join the platform.

Simultaneous decisions

The stages for the simultaneous decision scenario is solved in a three-stage game, where in stage 1 the football club chooses the information structure, in stage 2 the football club set the prices for spectators and advertisers, whereas in stage 3 the spectators choose to buy a ticket, and for advertisers to advertise. We want to find the Bayesian equilibrium in this game.

Stage1

We want to find how many will attend a match on each side given an information structure (λ_i, λ_j). Each side is informed of the membership fee for the other side with a probability λ_i, and is therefor able to anticipate the correct number of users on the other side $n_j^e = n_j$. The remaining part of each side is not informed of the membership fee for the other side with a probability $1 - \lambda_i$, holds the expected number of participants on the other side constant given by $n_j^e = x_j$.

From these assumptions we can derive the participation for each side given by

$$n_a = \frac{v_a+\gamma_a x_b-M_a+\gamma_a\lambda_a(v_b-x_b-M_b+\gamma_b(1-\lambda_b)x_a)}{1-\lambda_a\lambda_b\gamma_a\gamma_b} \quad (2.3)$$

$$n_b = \frac{v_b+\gamma_b x_a-M_b+\gamma_b\lambda_b(v_a-x_a-M_a+\gamma_a(1-\lambda_a)x_b)}{1-\lambda_a\lambda_b\gamma_a\gamma_b} \quad (2.4)$$

We can see the participation on either side will decrease if the membership fee increases. This is always true if $\gamma_i\lambda_i\gamma_j\lambda_j < 1$, and will always be satisfied as long as $\gamma_i\gamma_j < 1$ for $i = a, b \; and \; i \neq j$. This is seen by $\frac{\partial n_a}{\partial M_a} = -\frac{1}{1-\lambda_a\lambda_b\gamma_a\gamma_b}$.

Stage 2

In the second stage the football club chooses which prices to charge to each side, i.e. M_a and M_b, to maximize their profit as given by

$$\Pi = M_a n_a + M_b n_b \tag{2.5}$$

To ensure an interior maximum we need to impose three assumptions given by 2.6-2.8.

$$4 > (\gamma_a + \gamma_b\lambda_b)(\gamma_b + \gamma_a\lambda_a) \tag{2.6}$$

This assumption states that the indirect network effects cannot be too large, and is implied by $\gamma_a\gamma_{\square} < 1$ so that participation is a decreasing function of the price set on that side.

$$2v_a + (\gamma_a + \gamma_b\lambda_b)v_b > 0 \tag{2.7}$$

$$2v_b + (\gamma_b + \gamma_a\lambda_a)v_a > 0 \tag{2.8}$$

The second and third assumptions are in case of negative indirect network effects.

Under these assumptions we get the following equilibrium membership fees for a given information structure

$$m_a^* = \frac{(2-\gamma_b\lambda_b(\gamma_b+\gamma_a\lambda_a))v_a+(\gamma_a+\gamma_b\lambda_b)v_b}{4-(\gamma_a+\gamma_b\lambda_b)(\gamma_{\square}+\gamma_a\lambda_a)} \tag{2.9}$$

$$m_b^* = \frac{(2-\gamma_a\lambda_a(\gamma_a+\gamma_b\lambda_b))v_b+(\gamma_b+\gamma_a\lambda_a)v_a}{4-(\gamma_a+\gamma_b\lambda_b)(\gamma_b+\gamma_a\lambda_a)} \tag{2.10}$$

Stage 3

We can use the equilibrium membership prices to find the equilibrium participation levels given by

$$n_a^* = \frac{2v_a+(\gamma_a+\gamma_b\lambda_b)v_b}{4-(\gamma_a+\gamma_b\lambda_b)(\gamma_b+\gamma_a\lambda_a)} \tag{2.11}$$

$$n_b^* = \frac{2v_b+(\gamma_b+\gamma_a\lambda_a)v_a}{4-(\gamma_a+\gamma_b\lambda_b)(\gamma_b+\gamma_a\lambda_a)} \tag{2.12}$$

Given the assumptions 2.7 and 2.8 we are guaranteed positive participation from both spectators and advertisers. And we also note that

$$M_a^* = n_a^* - \lambda_b \gamma_b n_b^* \quad (2.13)$$

$$M_b^* = n_b^* - \lambda_a \gamma_a n_a^* \quad (2.14)$$

Changes in information levels

Given these equilibrium prices and participation levels, we want to know how they respond to changes in the information structure, i.e. λ_a, λ_b, and what information structure is the optimal for simultaneous decisions by the two sides.

If we assume both spectators and advertisers exhibits positive indirect network effects, i.e. $\gamma_a, \gamma_b > 0$. Then by looking at 2.11 and 2.12 we can clearly see that participation on both sides increase with the level of information on either side. This can also be checked with the following equation

$$\frac{d\Pi^*}{d\lambda_a} = \frac{\partial M_a^*}{\partial \lambda_a} n_a^* + \frac{\partial n_a^*}{\partial \lambda_a} M_a^* + \frac{\partial M_b^*}{\partial \lambda_a} n_b^* + \frac{\partial n_b^*}{\partial \lambda_a} M_b^* \quad (2.15)$$

Computing these gives us the following equations

$$\frac{\partial M_a^*}{\partial \lambda_a} = (\gamma_a - \lambda_b \gamma_b)\gamma_a K_a$$

$$\frac{\partial n_a^*}{\partial \lambda_a} = (\gamma_a + \lambda_b \gamma_b)\gamma_a K_a$$

$$\frac{\partial M_b^*}{\partial \lambda_a} = -\big(2 - \gamma_b(\gamma_a + \lambda_b \gamma_b)\big)\gamma_a K_a$$

$$\frac{\partial n_b^*}{\partial \lambda_a} = 2\gamma_a K_a$$

And by simplifying the exposition we use

$$K_a \equiv \frac{2v_a + (\gamma_a + \gamma_b \lambda_b)v_b}{(4 - (\gamma_a + \gamma_b \lambda_b)(\gamma_b + \gamma_a \lambda_a))^2} \quad (2.16)$$

$$K_b \equiv \frac{2v_b + (\gamma_b + \gamma_a \lambda_a)v_a}{(4 - (\gamma_a + \gamma_b \lambda_b)(\gamma_b + \gamma_a \lambda_a))^2} \quad (2.17)$$

We have from assumption 2.7 and 2.8 that $K_a > 0$ and $K_b > 0$.

The effect an increase in information level has on the membership fees is dependent on the relative strength of the indirect network effects and on the level of information on the other side. A change in information level for one side can have opposite effects on participation levels and on fees. If λ_b is close to zero, that means very few advertisers are informed of the fees for spectators, then increasing λ_a would induce the football club to increase the fee for spectators $\left(\frac{\partial M_a^*}{\partial \lambda_a} > 0\right)$. But if most advertisers are informed of the fee charged to spectators (λ_b close to 1), then the previous result

will only hold if advertisers enjoy the participation of spectators more then the other way around ($\lambda_a > \lambda_b$). As for spectators this can also go both ways.

To see the net effect we use the fact that $M_a^* = n_a^* - \lambda_b \gamma_b n_b^*$ and $M_b^* = n_b^* - \lambda_a \gamma_a n_a^*$, and rewrite 2.15 to the following expression

$$\frac{d\Pi^*}{d\lambda_a} = \gamma_a K_a (2\gamma_a(1-\lambda_a)n_a^* + \gamma_b(1-\lambda_b)(\gamma_a + \lambda_b\gamma_b)n_b^*) \qquad (2.18)$$

This is symmetrical for $\frac{d\Pi^*}{d\lambda_b}$.

We can see these are clearly positive when $\lambda_a, \lambda_b > 0$, and to solve this system we need $\frac{d\Pi^*}{d\lambda_a} = 0$ and $\frac{d\Pi^*}{d\lambda_b} = 0$, and this is only possible with $\lambda_a^* = \lambda_b^* = 1$. This means when spectators and advertisers decides simultaneously to join or not, the football club chooses to inform all users in equilibrium.

Sequential decisions

In the case with sequential decisions there are two different scenarios; the first is if the club doesn't commit to the price set previous to one side decides to join or not, and the second is to commit to this price.

Non-commitment case

In the non-commitment case there are four stages; in stage 1 the football club sets the membership fee for spectators M_a, in stage 2 the spectators chooses to participate or not, in stage 3 the football club sets the membership fee M_b for advertisers, and in stage 4 the advertisers chooses to participate or not. The game is solved with backwards induction and we start with stage 4.

Stage 4

In stage 4 the advertisers observe the participation level of spectators (n_a) and their own price (M_b). The advertisers decide to join if their utility is larger than the price minus the benefit from the network effects, i.e. $u_b \geq M_b - \gamma_b n_a$. The number of advertisers that decides to join is computed as

$$n_b(M_b; n_a) = v_b + \gamma_b n_a - M_b \qquad (2.19)$$

Stage 3

In stage 3 the football club chooses the price for advertisers (M_b) to maximize their profit $\Pi(M_b; n_a) = M_b n_b(M_b; n_a)$ subject to $\Pi(M_b; n_a) \geq 0$.

The unconstrained optimum is $M_b(n_a) = \frac{1}{2}(v_b + \gamma_b n_a)$, which yields the participation level for advertisers $n_b(n_a) = \frac{1}{2}(v_b + \gamma_b n_a)$, and assume $v_b + \gamma_b n_a > 0$ as we only have positive indirect network effects.

Stage 2

At stage 2 the spectators observe their own price (M_a). Lets suppose that a share of spectators denoted μ_a correctly anticipate the number of advertisers that attend the match, i.e. $n_b(n_a)$, whereas the rest of the spectators $(1 - \mu_a)$ take the number of participating advertisers as a constant (y_b). The spectators that can correctly anticipate the participation of advertisers are called forward-looking, and the ones that can't are called myopic.

This means that the forward-looking spectators will decide to join if $u_a \geq M_a - \gamma_a n_b(n_a)$, the myopic spectators will attend if $u_a \geq M_a - \gamma_a y_b$.

With these assumptions the number of spectators that will join is computed as

$$n_a = v_a - M_a + \gamma_a(\mu_a \frac{1}{2}(v_b + \gamma_b n_a) + (1 - \mu_a) y_b) \qquad (2.20)$$

When we solve 2.19 for n_a we have the participation level of spectators

$$n_a(M_a; y_b) = \frac{2(v_a - M_a) + \gamma_a \mu_a v_b + 2\gamma_a(1 - \mu_a) y_b}{2 - \gamma_a \gamma_b \mu_a} \qquad (2.21)$$

We are assuming that $2 > \gamma_a \gamma_b$, so that the spectators participation level (n_a) decreases with its own price (M_a).

Substituting n_a into $n_b(n_a)$ and $M_b(n_a)$ the participation level for advertisers is given by

$$n_b(M_a; y_b) = M_b(M_a; y_b) = \frac{\gamma_b(v_a - M_a) + v_b + \gamma_a \gamma_b (1 - \mu_a) y_b}{2 - \gamma_a \gamma_b \mu_a} \qquad (2.22)$$

Stage 1

In stage 1 the football club choose the price for spectators (M_a) to maximize profit

$$\Pi(M_a; y_b) = M_a n_a(M_a; y_b) + M_b(M_a; y_b) n_b(M_a; y_b) \qquad (2.23)$$

This gives us the following optimal results if the football club cannot commit to the price for advertisers before the spectators make their decision to participate

The optimal prices for spectators and advertisers in the non-commitment case is given by

$$M_a^{nc} = \frac{\left(4-2\gamma_b(\gamma_a\mu_a+\gamma_b)\right)v_a+\left(2\gamma_a-\gamma_b(\gamma_a^2\mu_a+2)\right)v_b}{2(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b))} \quad (2.24)$$

$$M_b^{nc} = \frac{2\gamma_b v_a+(4-\gamma_a\gamma_b\mu_a)v_b}{2(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b))} \quad (2.25)$$

And the resulting participation levels in this case is given by

$$n_a^{nc} = \frac{2v_a+(\gamma_a+\gamma_b)v_b}{4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b)} \quad (2.26)$$

$$n_b^{nc} = M_b^{nc} = \frac{2\gamma_b v_a+(4-\gamma_a\gamma_b\mu_a)v_b}{2(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b))} \quad (2.27)$$

The profit for the platform given these prices and participation levels is given by $\Pi^{nc} = n_a^{nc}M_a^{nc} + n_b^{nc}M_b^{nc}$, and substituting 2.24-2.27 we obtain the following

$$\Pi^{nc} = \frac{v_a^2+v_b^2+(\gamma_a+\gamma_b)v_a v_b}{4-(\gamma_a+\gamma_b)^2} + \frac{\gamma_a^2(2v_a+(\gamma_a+\gamma_b)v_b)^2}{4(4-(\gamma_a+\gamma_b)^2)}K(\mu_a) \quad (2.28)$$

From this we can find how the level of anticipating of spectators on the participating of advertisers is affecting the profit.

$$K \equiv -\frac{4-\mu_a\gamma_b(2\gamma_a+2\gamma_b-\mu_a\gamma_b}{\left(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b)\right)^2} \quad (2.29)$$

$$\frac{\partial K}{\partial \mu_a} = 2\gamma_b^2(1-\mu_a)\frac{4-(\gamma_a+\gamma_b)^2}{\left(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b)\right)^3} > 0 \quad (2.30)$$

From this we can see that Π^{nc} is an increasing function of μ_a, and the profit of the football club is maximized if all the spectators are forward-looking, and can correctly anticipate the participating number of advertisers (μ_a is close to or is 1).

Commitment case

For the commitment case the football club will commit to the prices for spectators and advertisers, and this is solved in three stages. In stage 1 the football club sets membership fees for spectators and advertisers (M_a and M_b), in stage 2 the spectators decide whether to participate or not, and in stage 3 the advertisers decide whether to participate or not. We will use backwards induction to solve this game, and we start with stage 3.

Stage 3

In stage 3 the participating number of advertisers are given by

$$n_b(M_b; n_a) = v_b + \gamma_b n_a - M_b \tag{2.31}$$

Stage 2

In stage 2 the spectators' participation is computed from observing the prices (M_a, M_b) and anticipating the number of participating advertisers given by $n_b(M_b; n_a)$.

The participation of spectators is thus given by

$$n_a = v_a + \gamma_a(v_b + \gamma_b n_a - M_b) - M_a \tag{2.32}$$

If we solve this for n_a, we obtain the participating number of spectators given the prices and participation of advertisers.

$$n_a(M_a, M_b) = \frac{v_a - M_a + \gamma_a(v_b - M_b)}{1 - \gamma_a\gamma_b} \tag{2.33}$$

Stage 1

By solving stage 1 in this game we find the perfect Bayesian equilibrium prices and participation of spectators and advertisers.

If we assume the spectators decide to join before the advertisers do, and the football club can commit to the price for advertisers before the spectators makes their decision to join. Then the football club sets the optimal prices as

$$M_a^c = \frac{(2 - \gamma_b(\gamma_a + \gamma_b))v_a + (\gamma_a - \gamma_b)v_b}{4 - (\gamma_a + \gamma_b)^2} \tag{2.34}$$

$$M_b^c = \frac{(2 - \gamma_a(\gamma_a + \gamma_b))v_b + (\gamma_b - \gamma_a)v_a}{4 - (\gamma_a + \gamma_b)^2} \tag{2.35}$$

With these optimal prices, we can derive the participation level for spectators and advertisers, and these are given by

$$n_a^c = \frac{2v_a + (\gamma_a + \gamma_b)v_b}{4 - (\gamma_a + \gamma_b)^2} \tag{2.36}$$

$$n_b^c = \frac{2v_b + (\gamma_a + \gamma_b)v_a}{4 - (\gamma_a + \gamma_b)^2} \tag{2.37}$$

Simultaneous decisions vs sequential decisions

As we want to find the optimal information structure and how to maximize the profit to the football club we need to compare the different cases. To do this we start

by comparing the cases with simultaneous and sequential decisions with the cases of commitment and non-commitment.

From the equilibrium prices given by 2.9 and 2.10, and participation levels given by 2.11 and 2.12 in the simulations decision game we can assume $\lambda_a = 0$ and $\lambda_b = 1$. This means none of the spectators are informed of the price charged to advertisers, while all the advertisers are informed of the price charged to the spectators.

From this we obtain the following prices and participation levels

$$M_a^*(0,1) = \frac{(2-\gamma_b^2)v_a+(\gamma_a-\gamma_b)v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.38)$$

$$M_b^*(0,1) = \frac{\gamma_b v_a+2v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.39)$$

$$n_a^*(0,1) = \frac{2v_a+(\gamma_a+\gamma_b)v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.40)$$

$$n_b^*(0,1) = M_b^*(0,1) = \frac{\gamma_b v_a+2v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.41)$$

If we now compare these results to the game with sequential decision game without commitment, by setting $\mu_a = 0$ in the optimal prices given by 2.24 and 2.25, and also in the optimal participation levels given by 2.26 and 2.27. By setting $\mu_a = 0$ we assume that all spectators are myopic in stage 2, thus none of the spectators can anticipate the number of advertisers that are joining.
If we look at the stages of the game it means the spectators moves first, and can't observe the price charged to advertisers M_b, while the advertisers is in a position to observe the price charged to spectators M_a.

We obtain the following results

$$M_a^{nc}(\mu_a = 0) = \frac{(2-\gamma_b^2)v_a+(\gamma_a-\gamma_b)v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.42)$$

$$M_b^{nc}(\mu_a = 0) = \frac{\gamma_b v_a+2v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.43)$$

$$n_a^{nc}(\mu_a = 0) = \frac{2v_a+(\gamma_a+\gamma_b)v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.44)$$

$$n_b^{nc}(\mu_a = 0) = M_b^{nc}(\mu_a = 0) = \frac{\gamma_b v_a+2v_b}{4-\gamma_b(\gamma_a+\gamma_b)} \quad (2.45)$$

As we can see that it gives the exact same result as in the game with simultaneous moves where spectators can't observe the price charged to advertisers and the advertisers can observe the price charged to spectators.

If we do the same procedure with the simultaneous game with symmetrical information, that is, we set $\lambda_a = 1$ and $\lambda_b = 1$ in the equilibrium prices given by 2.9 and 2.10, and the equilibrium participation levels given by 2.11 and 2.12. This means spectators are fully informed about the price charged to advertisers, and the advertisers are fully informed about the price charged to the spectators.

$$M_a^*(1,1) = \frac{(2-\gamma_b(\gamma_a+\gamma_b))v_a+(\gamma_a-\gamma_b)v_b}{4-(\gamma_a+\gamma_b)^2} \quad (2.46)$$

$$M_b^*(1,1) = \frac{(2-\gamma_a(\gamma_a+\gamma_b))v_b+(\gamma_b-\gamma_a)v_a}{4-(\gamma_a+\gamma_b)^2} \quad (2.47)$$

$$n_a^*(1,1) = \frac{2v_a+(\gamma_a+\gamma_b)v_b}{4-(\gamma_a+\gamma_b)^2} \quad (2.48)$$

$$n_b^*(1,1) = \frac{2v_b+(\gamma_a+\gamma_b)v_a}{4-(\gamma_a+\gamma_b)^2} \quad (2.49)$$

If we compare these results with the case where the football club commits to the prices set to spectators and advertisers given by 2.34 and 2.35, and the participation levels given by 2.36 and 2.37, we get the following results

$$M_a^c = \frac{(2-\gamma_b(\gamma_a+\gamma_b))v_a+(\gamma_a-\gamma_b)v_b}{4-(\gamma_a+\gamma_b)^2} \quad (2.50)$$

$$M_b^c = \frac{(2-\gamma_a(\gamma_a+\gamma_b))v_b+(\gamma_b-\gamma_a)v_a}{4-(\gamma_a+\gamma_b)^2} \quad (2.51)$$

$$n_a^c = \frac{2v_a+(\gamma_a+\gamma_b)v_b}{4-(\gamma_a+\gamma_b)^2} \quad (2.52)$$

$$n_b^c = \frac{2v_b+(\gamma_a+\gamma_b)v_a}{4-(\gamma_a+\gamma_b)^2} \quad (2.53)$$

As we can see the case with symmetrical information in a simultaneous decision game gives the exact same result as the case where the football club commits to the prices where the sides moves sequentially.

Commitment vs non-commitment

This gives us the opportunity to compare the commitment and the non-commitment cases, and find which one gives optimal results.

The profit for the commitment case is given by

$$\Pi^c = n_a^c M_a^c + n_b^c M_b^c \tag{2.54}$$

The profit for the non-commitment case is given by

$$\Pi^{nc} = n_a^{nc} M_a^{nc} + n_b^{nc} M_b^{nc} \tag{2.55}$$

We take the profit for the commitment case minus the profit for the non-commitment case, and we obtain

$$\Pi^c - \Pi^{nc} = \frac{\gamma_a^2(2v_a+(\gamma_a+\gamma_b)v_b)^2(4-\mu_a\gamma_b(2\gamma_a+2\gamma_b-\mu_a\gamma_b))}{4(4-(\gamma_a+\gamma_b)^2)\left(4-\gamma_b(\gamma_a(1+\mu_a)+\gamma_b)\right)^2} \tag{2.56}$$

The second-order conditions (SOC) for these two games require that $4 > \gamma_b(2\gamma_a\mu_a + \gamma_b)$ and $4 > (\gamma_a + \gamma_b)^2$, and hence the sign of 2.56 depends on the sign of $(4 - \mu_a\gamma_b(2\gamma_a - \mu_a\gamma_b))$. As this decreases with μ_a, and its smallest value is 0, it follows that $4 - (\gamma_a + \gamma_b)^2 > 0$ implies that $4 - \gamma_b(2\gamma_a\mu_a + \gamma_b) > 0$.

This means that if the spectators and advertisers decide sequentially whether or not to join, the profit for the football club is larger if it can commit to the prices charged to both sides.

Thus we have an optimal information structure for the football club, and we can now turn our attention to the network effects. If we assume that the advertisers have relatively more benefit from the participation of spectators than the spectators have from advertisers, i.e. $\gamma_a < \gamma_b$. And we also know that the equilibrium price and participation from the commitment case is optimal for the football club, we can then find how the network effects affect these.

Proposition 2

> When the network effects for advertisers from spectators are larger than the network effects for spectators from advertisers, the price for advertisers will always be higher than the price for spectators.

Lets assume the price for advertisers is higher than the price for spectators, i.e. $M_a^c < M_b^c$, and the intrinsic utility for both sides equal to 1, i.e. $v_a = v_b = 1$.

This gives us the optimal prices for advertisers and spectators as follows.

$$M_a^c = \frac{(2-\gamma_b(\gamma_a+\gamma_b))+(\gamma_a-\gamma_b)}{4-(\gamma_a+\gamma_b)^2} < \frac{(2-\gamma_a(\gamma_a+\gamma_b))+(\gamma_b-\gamma_a)}{4-(\gamma_a+\gamma_b)^2} = M_b^c \quad (2.57)$$

As from assumption 1 given by 2.6, with $4 > (\gamma_a + \gamma_b\lambda_b)(\gamma_b + \gamma_a\lambda_a), and\ \lambda_a = \lambda_b = 1$ which is the case for the commitment case, the denominators are positive and equal and is omitted.

$$\big(2 - \gamma_b(\gamma_a + \gamma_b)\big) + (\gamma_a - \gamma_b) < \big(2 - \gamma_a(\gamma_a + \gamma_b)\big) + (\gamma_b - \gamma_a) \quad (2.58)$$

$$2 - \gamma_b(\gamma_a + \gamma_b) + \gamma_a - \gamma_b < 2 - \gamma_a(\gamma_a + \gamma_b) + \gamma_b - \gamma_a \quad (2.59)$$

$$2 - \gamma_b^2 - \gamma_a\gamma_b + \gamma_a - \gamma_b < 2 - \gamma_a^2 - \gamma_a\gamma_b + \gamma_b - \gamma_a \quad (2.60)$$

$$-\gamma_b^2 < -\gamma_a^2 \quad (2.61)$$

$$\gamma_b > \gamma_a \quad (2.62)$$

This result is also showed in table 1

Table 1

γ_a	γ_b	v_a	v_b	Prices	Participation
0.1	0.9	1	1	$M_a^c = \frac{1}{10} < \frac{9}{10} = M_b^c$	$n_a^c = 1 = n_b^c$
0.5	0.5	1	1	$M_a^c = \frac{1}{2} = M_b^c$	$n_a^c = 1 = n_b^c$
0,9	0,1	1	1	$M_a^c = \frac{9}{10} > \frac{1}{10} = M_b^c$	$n_a^c = 1 = n_b^c$
0	0.9	1	1	$M_a^c = \frac{1}{11} < \frac{10}{11} = M_b^c$	$n_a^c = \frac{10}{11} = n_b^c$

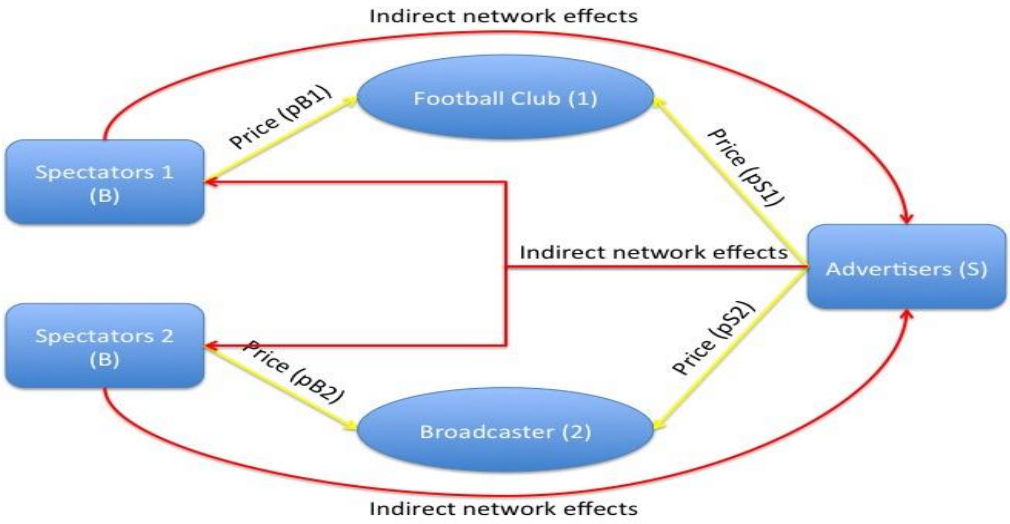
Assuming $v_a \geq \gamma_a n_b^c - M_a^c$ and $v_b \geq \gamma_b n_a^c - M_b^c$ to prevent negative utility, these will hold in the case of zero network effects on one side as well.

3.3.3 Single- and multi homing platform competition

We have covered a football club in a monopoly setting, but this is most often not the case. Lets suppose two competing platforms, where a football club is one, and a broadcasting station is the other one. These two platforms compete for the same two sides; spectators and advertisers. In this setting it is reasonable to assume that spectators can only single home as they can only watch the match in one place at the time, i.e. they have to choose between going to the arena or watch the match on television. For the advertisers it is reasonable to assume they can multi home, which

means they can pay to have their ads shown in the arena and/or on television during a match. The advertisers main objective is to show their ads to as many spectators as possible, and thus means it is reasonable to assume they will multi home rather than single home. Armstrong and Wright (2007) present a model with competing platforms, and they use product differentiation and exclusive contracts. I will apply this model to a football club setting, where spectators (B) and advertisers (S) will be the sides. Figure 5 shows an overview for this situation, and has kept the notations for the different sides and platforms.

Figure 5 (Two-sided competing platforms)



Lets suppose two different groups, advertisers (S) and spectators (B), and an agent from group $k = S, B$ obtain benefit $b_k n$ by participating in the market, which allows her to interact with n agents from the other group. We will assume the platforms are symmetrical for simplicity and to comply with the framework of the model. Platform 1 is the football club and platform 2 is the broadcaster, these two symmetric platforms $i = 1,2$ competes, and offers a service to the two groups. Agents from these groups gets an intrinsic utility v_k^0 from joining a platform, this allows duplicate intrinsic utility with multi homing. The platforms are located at each end of a unit interval as a standard Hotelling manner, and agents are uniformly distributed along the unit interval. Group k agents have a transport cost $t_k x$ of traveling a distance x to purchase from the platforms, this means it will have a cost $t_k x$ for joining the football club, and $t_k(1 - x)$ of joining the broadcaster. If an agent multi home, the transport

cost will be as if she joins both separately. The agents that single-home and buys only from platform $i = 1,2$ exclusively is denoted n_k^i, and the agents that multi home is denoted N_k. The cost for each platform to provide service to an agent of group k is denoted by $f_k \geq 0$. The price for each agent of group k to join platform i is denoted by p_k^i, and is assumed to be non-negative if not stated otherwise.

The utility of a group k agent located at x when she joins the football club is given by

$$v_k^1(x) = v_k^0 - p_k^1 - t_k x + b_k(n_l^1 + N_l) \quad (3.1)$$

If the same agent joins the broadcaster, the utility is given by

$$v_k^2(x) = v_k^0 - p_k^2 - t_k(1 - x) + b_k(n_l^2 + N_l) \quad (3.2)$$

And when an agent multi homes, she obtain utility given by

$$v_k^{12} = v_k^0 - p_k^1 - p_k^2 - t_k + b_k(n_l^1 + n_l^2 + N_l) \quad (3.3)$$

for $k = S, B$, and $l \neq k$.

The profit for platform $i = 1,2$ is given by

$$\pi^i = \left(p_S^i - f_S\right)\left(n_S^i + N_S\right) + (p_B^i - f_B)(n_B^i + N_B) \quad (3.4)$$

This model is solved as a game with 2 stages, in stage 1 the platforms simultaneously choose the prices, and in stage 2 the agents simultaneously choose which platform to join after observing the prices. This game will be solved with the use of backwards induction where we start with stage 2.

Stage 2

If only one side has a high degree of product differentiation, and also has relatively low transport- and supply costs, then this group is able to multi home. The market is assumed to be a market where the two platforms are viewed as homogeneous by one group and differentiated by the other group. Lets take the football club setting; the advertisers often view the platforms as relatively homogeneous, while the spectators have preferences that decide which platform to use. The spectators will tend to single home when the product differentiation is relatively high compared to the network benefits, this will give the advertisers incentive to multi-home to reach maximum exposure to spectators.

There are three assumptions that will lead to this result and are listed as A1-A3.

(A1) $v_S^0 = 0$, and v_B^0 is sufficiently high such that spectators will wish to join at least one platform in equilibrium.

(A2) The transport cost for the advertisers are zero, i.e. $t_S = 0$, and the transport cost for spectators are larger than the externality benefits from having more advertiser on the other platform, i.e. $t_B > b_B$.

(A3) $f_S \leq \min[\frac{1}{2}t_B, \frac{1}{4}(b_S + b_B)]$.

A platform benefits when it serves the advertisers for two reasons, it obtain revenue from advertisers and it can compete better for spectators, i.e. $b_S > 0$ and $b_B > 0$. But to enjoy these benefits the platforms must incur the costs for advertisers f_S, and the benefits outweighs the costs when f_S is sufficiently small as given by the second part of assumption A3. The first part of assumption A3 ensures that profits are non-negative for the equilibrium prices.

If we assume the same amount of advertisers joins each platform, the participating number of spectators that joins the football club is given by

$$n_B^1 = \frac{1}{2} + \frac{p_B^2 - p_B^1}{2t_B} \tag{3.5}$$

Whereas $1 - n_B^1$ joins the broadcaster. For it to be optimal for advertisers to multi home, three different conditions have to be true and are given by 3.6-3.8.

$$b_S - p_S^1 - p_S^2 \geq b_\square n_B^1 - p_S^1 \tag{3.6}$$

$$b_S - p_S^1 - p_S^2 \geq b_S(1 - n_B^1) - p_S^2 \tag{3.7}$$

$$b_S - p_S^1 - p_S^2 \geq 0 \tag{3.8}$$

3.6 states that the advertisers prefers to multi home rather than single home on the football club, and 3.7 states the same thing for the broadcaster.

Condition3.8 states that advertisers prefer to multi home rather than joining no platforms.

Conditions 3.6 and 3.7 can be rewritten as 3.9 and 3.10

$$p_S^2 \leq \left(\frac{1}{2} + \frac{p_B^1 - p_B^2}{2t_B}\right) b_S \tag{3.9}$$

$$p_S^1 \leq \left(\frac{1}{2} + \frac{p_B^2 - p_B^1}{2t_B}\right) b_S \tag{3.10}$$

This gives us the profits for the football club and broadcaster given prices for spectators.

$$\pi^1 = p_S^1 - f_S + (p_B^1 - f_B)\left(\frac{1}{2} + \frac{p_B^2 - p_B^1}{2t_B}\right) \tag{3.11}$$

$$\pi^2 = p_S^2 - f_S + (p_B^2 - f_B)\left(\frac{1}{2} + \frac{p_B^1 - p_B^2}{2t_B}\right) \quad (3.12)$$

If the network effects for spectators from advertisers are zero, and the network effects for advertisers from spectators are positive, we have a single-sided network effect ($b_B = 0$ and $b_S > 0$). If we let conditions A1-A3 hold, and suppose $b_B = 0$ we will have a unique and symmetric equilibrium where platforms will serve both sides and advertisers multi home and spectators single home.

Stage 1

This gives us the equilibrium price to advertisers as follows

$$p_S = \frac{b_S}{2}, \text{ if } f_B + t_B \geq b_S \quad (3.13)$$

And the equilibrium price to spectators is given by

$$p_B = f_B + t_B - b_S \geq 0 \quad (3.14)$$

And thus the profit for each platform is given by

$$\pi = \frac{t_B}{2} - f_S \quad (3.15)$$

If the supply cost and transport cost for spectators are smaller than the network effects for advertisers from spectators, i.e. $f_B + t_B < b_S$, then the price to spectators is zero ($p_B = 0$), and the price for advertisers is given by 3.13, and each platform makes profit

$$\pi = \frac{b_S}{2} - \frac{f_B}{2} - f_S \quad (3.16)$$

As seen here the platforms set the price for spectators to zero as there is only a one-sided network effect present, the advertisers care about how many spectators that joins and will decide accordingly. Thus the platforms behave as they don't compete directly for the advertisers, but do so rather indirectly by attracting the spectators to join. This causes the platforms to behave as monopolists controlling the interaction between advertisers and spectators, and then exploit the advertisers surplus.

4. Discussion

Football is by far the most popular sport in the world, with several billion fans worldwide. This makes advertising in connection with football matches attractive, and the potential audience is a big incentive for advertisers to join the club.
Advertisers also stand for most of the revenue for a football club as it seems that spectator attendance is stagnating because the prices seems to be relatively high already. The link between the prices for spectators and advertisers in a football club is interesting, and by using two-sided market models to analyze this there are several things that was seen.

The reasons why the spectators and advertisers join the club are very interesting as they are fundamentally different. With join a club we mean spectators attending matches and advertisers sponsoring or advertise in connection with the club. It is quite clear that the advertisers have the most economic incentive to join the club, and it is also not clear that spectators have any economic incentive to join. The incentive for the spectators is more of an emotional one as they often feel connected to the club and feel a kind of affiliation. How often have we not heard of fans talking about the football club they support as “we won the match” or “we bought that player” and so on? This clearly indicates that the two sides are fundamentally different, and thus their wish to join the club will be based on very different things. They all might want the same in the end, for instance the wish for the club to succeed and win tournaments and thus getting higher revenue to invest in new players and develop as a club.

With this in mind we can look at how the football club is dependent on the different sides. If we start with the spectators; the football club knows that the advertisers join the club because of them, and also the atmosphere created by the spectators in the arena affects the players and their success on the pitch. This indicates that the spectators are a fundamentally part of the football club. We saw that studies have indicated that there is a negative correlation between income and the willingness to express emotions. If we put this in connection with the spectators it means the football clubs might want to keep the price charged to spectators at a reasonable level to balance this. If we look at figure 1 we could see the spectator attending the matches

amounted to less than 1/3 on the total revenue with the exception of Arsenal. The exception of Arsenal is likely to be because they have the highest price for match day- and season tickets of all the clubs in the Premier League according to (BBC, 2014).

The advertisers on the other side join the club mostly because of the spectators and the customer potential the spectators are. The revenue from advertisers is covering most of the revenue if we look at figure 1. It seems like there is a correlation between the ticket prices and spectator limit for the arena according to BBC (2014).

In the analysis in chapter 3 we used two-sided market models to analyze the link between spectators and advertisers, and the prices for each. We found it reasonable to assume the network effects were skewed towards the advertisers; they have much more benefit from spectators joining the football club than the other way around. We also know that the advertisers have high economical incentive to join the club, while the spectators have an emotional connection with the club. From proposition 1 we saw that the relative size of the network effects and elasticities of participation for each side made the price for spectators to always be lower than the price for advertisers. The networks effects had a negative effect on the prices, and the elasticities of participation had a positive effect. This meant that if more users on the other side joined the club the price decreased, but the more of its own group that joined the price increased.

We saw the same result from proposition 2, where we applied a formal model to find the optimal information structure and then found which price would be higher given network effects. We found that the optimal prices and participation levels were from the commitment case with full information on both sides. In the commitment case the football club sets the prices and then the sides decides to join sequentially with full information of the other side. In proposition 2 we found that given the assumption that the intrinsic utility was equal to 1 for both sides, the price for advertisers will always be higher than for spectators as long as the network effects is larger.

In the last case where we had competing platforms we saw the same thing. In this case we had competing platforms were the advertisers had the opportunity to

multi home, i.e. join both platforms, while the spectators were single homing and naturally could join only one platform at the time. We assumed as earlier that the network effects for advertisers were higher than for spectators. In this case we saw that the competing platforms set the price for spectators equal to zero, and exploited the surplus for advertisers. This means they are competing indirectly for advertisers by trying to attract as many spectators as possible by setting the price equal to zero. This is a typical strategy to avoid the "chicken-and-egg" problem in two-sided markets where they are setting the price for one side close to zero or zero, and thus attracting a critical mass and exploit the other side for profit. A football club obviously has already overcome this problem, but this might indicate that a non-optimal price structure could trigger this problem at a later stage.

If we look at football clubs in Norway for the past years, reports states that the number of spectators in Norway has been steadily decreasing, and this is a big concern to the clubs and the Norwegian football association. In 2013 the Norwegian football club IK Start drastically reduced the ticket price for one match to 50NOK, they announced this was an attempt to attract as much spectators as possible to create the atmosphere and support for the home team as they were on the verge of relegation. Some called this reduction of the ticket price as a cry for help, and the clubs leadership said it could be interpreted as exactly that. According to NRK journalist Thomas Sommerset (2013) the feedback from the spectators indicated that this was a huge success. Some of the spectators commented that this was their first time attending a football match, and compared the ideal price to be equal to the price for a movie-ticket, i.e. 80-100NOK. Later in 2013, Tromsø IL , another Norwegian football club that was facing relegation copied this, and reduced the ticket price to 50NOK for a match to attract as many spectators as possible. From Norsk internasjonal fotballstatistikk (2013) we can see that this match had the second highest attendance of the home matches in that season. They were hoping to attract upwards of 7000 spectators according to club officials, but only 6033 attended the match. The leaders of the clubs commented that they were looking at the prices in general to try to attract more spectators according to NRK journalists Bjørnar Hjellen (2013)

If we call the reducing of the ticket price an experiment, it seems like it was partly successful. In the case with IK Start they attracted spectators that hadn't attended a match before, and these spectators commented that the price were the reason. We also saw the same result from Tromsø IL, the attendance for that match seemed to increase. As this was a one-time experiment, it is hard to rely heavily on the results, but it indicates that the prices in Norwegian football might not be optimal. If we differentiate between the fans attending a match, it is reasonable to assume loyal fans would attend the match at the pre-experiment prices. And by lowering the price the football clubs could attract more neutral fans, and perhaps more fans that would otherwise see the match on television. Based on this the two types of spectators seems to have different price elasticities, the loyal fans have a lower price sensitivity as they would likely attend the match at pre-experiment prices, but the neutral fans seems like they responded to a reducing of the price.

5. Concluding remarks

In this thesis we have looked at why spectators want to attend a football match, and also stated how popular the sport is worldwide. It is by far the most popular sport in the world, and have several billions fans. This makes the football arenas to be very attractive for advertisers given the popularity of the club. A football club cannot set the prices too high for either side, but it is obvious that the side with highest economical incentives to join will also have the highest price. For the spectators too high price will lead to a less desirable atmosphere, which in turn will affect the attractiveness of advertising negatively. Setting the price for advertisers too high will cause the demand to decrease too much, and this will in turn lead to less profit and thus reduce the quality of the club.

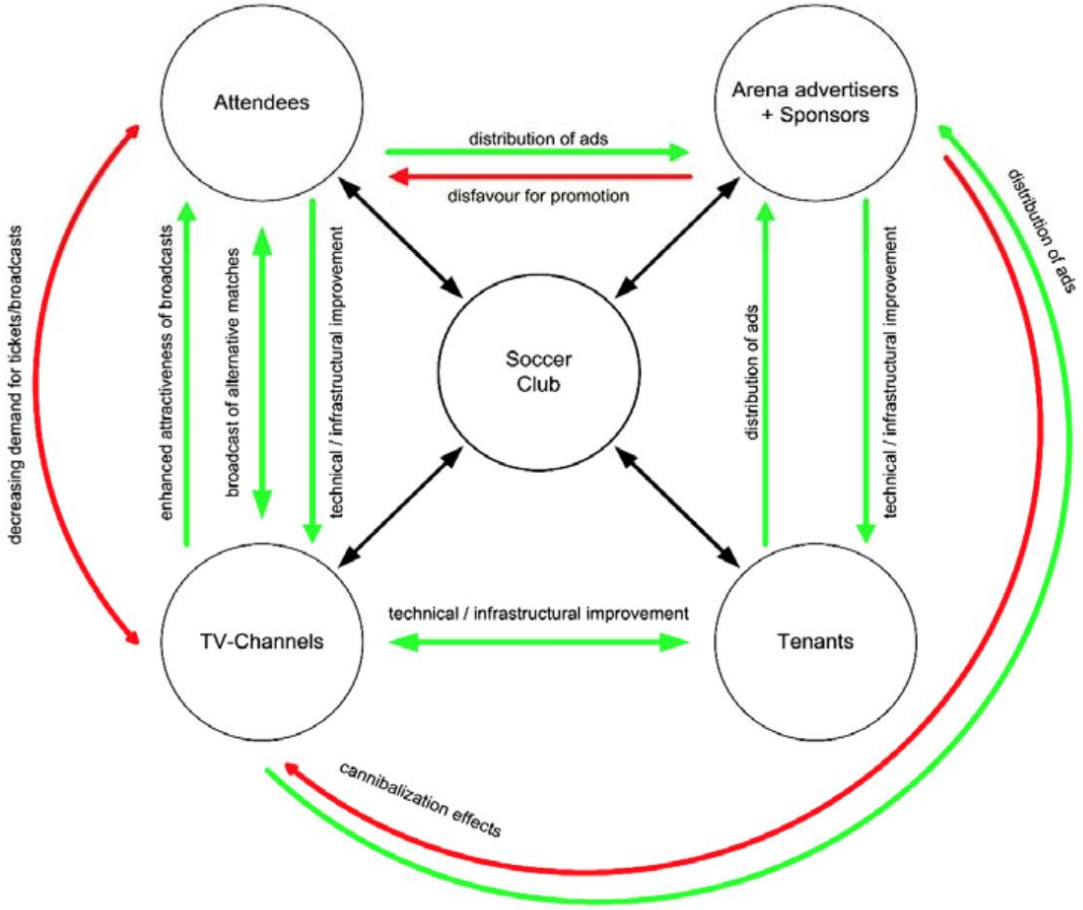
It seems like there is a correlation between network effects and economical incentives to join a platform. But as we are analyzing these models and focusing on the prices this is an expected connection. If you have a higher economical incentive to join, the price will also be higher. This was the case for advertisers, as spectators have an emotional incentive to join.

Football clubs are a very interesting object to analyze because of the fundamentally differences between the sides. The football club could experience a sort of "chicken-and-egg" problem with the two sides, very similar to the dating-clubs example referred to by Evans (2003) and Filistrucchi et al. (2014) amongst some. In the dating-club example the women gets free access to the club, while the men have to pay. This strategy is used to get a critical mass on one side, and use it to attract users on the other side. The exact same strategy seems to be in place for a football club, although a football club is already established and have likely overcome this problem. As we are discussing the price structure, it seems the football clubs should be aware of this problem, and know it could arise if they charge the spectators too much, and they stop attending matches. But as we know, the price is not the only factor concerning attendance for a football match, as García and Rodríguez (2002)'s study showed. But the price seems to be an important factor as the situation with the Norwegian football clubs showed, and thus the price structure should be efficient and shouldn't be taken lightly. The attendance of the advertisers seems to be mostly

dependent on the spectators and success of the club. The advertisers seem to amount to most of the revenue of a football club, and also have the highest price as the analysis have shown.

There is kind of a circle of life in a football club, as the different sides are all indirectly dependent of each other. As figure 6 shows, there is indeed a circle of life where everybody are dependent of each other.

Figure 6 (Externalities in a football club)



(Budzinski and Satzer, 2009)

This figure shows that there are several different sides, and they are all indirectly connected to each other. Some of the sides have more than one connection to each other, and this makes it hard to analyze as a whole. In this thesis we have focused on two of the sides, and also looked at different platforms that competes for these.

As this thesis has shown, the price structure of a football club is a complex one that involves several different factors and aspects. We have argued and shown that as advertisers benefit more from participation of spectators than the spectators benefit from advertisers, advertisers will always have a higher price. Thus have to cover most of the costs by the revenue in generates for the football club. It also seems like the attendance of spectators in the arena is stagnating as the arenas in the big leagues are relatively close to their maximum, and the price for spectators are already relatively high. Thus the opportunity to increase revenue from spectators comes mostly by developing bigger arenas. To say exactly how the price structure should be is difficult; this is because the difference and the money involved in the different leagues and countries are varying. But the results from this thesis shows that the difference between the prices is highly dependent on how much difference there is between the network effects for each side. If the network effects differ very much, the prices will also differ very much, and if the network effects are equal, the prices should be relatively equal as well.

Litterature list

ABT, S. 2010. *ESPN positions itself to take on Europe* [Online]. New York Times. Available: http://www.nytimes.com/2010/01/25/business/media/25iht-espn.html?_r=0.

ANDERSON, S. P. & COATE, S. 2005. Market provision of broadcasting: A welfare analysis. *The review of Economic studies,* 72**,** 947-972.

ARMSTRONG, M. 2006. Competition in two‐sided markets. *The RAND Journal of Economics,* 37**,** 668-691.

ARMSTRONG, M. & WRIGHT, J. 2007. Two-sided markets, competitive bottlenecks and exclusive contracts. *Economic Theory,* 32**,** 353-380.

BAXTER, W. F. 1983. Bank interchange of transactional paper: Legal and economic perspectives. *Journal of Law and Economics***,** 541-588.

BBC. 2014. *Price of Football: Ticket increases outstrip cost of living* [Online]. Available: http://www.bbc.com/sport/0/football/29614980.

BEL, G. & DOMENECH, L. 2009. What influences advertising price in television channels?: An empirical analysis on the Spanish market. *Journal of Media Economics,* 22**,** 164-183.

BELLEFLAMME, P. & PEITZ, M. 2014. Price Information in Two-Sided Markets. *Unpublished Manuscript*.

BJØRNAR HELLEN, E. H. T. 2013. *Dumper billettprisene: -kall det gjerne et rop om hjelp* [Online]. NRK. Available: http://www.nrk.no/sport/fotball/ogsa-tromso-dumper-billettprisene-1.11258703.

BLACK, C. L. 1953. He Cannot Choose But Hear: The Plight of the Captive Auditor. *Columbia Law Review***,** 960-972.

BUDZINSKI, O. & SATZER, J. 2009. Sports business and the theory of multisided markets. Working Paper, Department of Environmental and Business Economics, University of Southern Denmark.

BUDZINSKI, O. & SATZER, J. 2011. Sports business and multisided markets: towards a new analytical framework? *Sport, Business and Management: An International Journal,* 1**,** 124-137.

BURAIMO, B. & SIMMONS, R. 2009. A tale of two audiences: Spectators, television viewers and outcome uncertainty in Spanish football. *Journal of Economics and Business,* 61**,** 326-338.

COX, A. 2012. Live Broadcasting, Gate Revenue, and Football Club Performance: Some Evidence. *International Journal of the Economics of Business,* 19**,** 75-98.

CRIMMINS, J. & HORN, M. 1996. Sponsorship: from management ego trip to marketing success. *Journal of Advertising Research,* 36**,** 11-21.

DOU, Y., XIAO, Y. & CHEN, J. Asymmetric pricing game in two-sided platforms. Service Systems and Service Management, 2009. ICSSSM'09. 6th International Conference on, 2009. IEEE, 921-926.

EICHHORN, C. & SAHM, M. 2010. Why were FIFA World Cup tickets so cheap? Monopoly pricing, demand quality and two-sided markets. *Journal of Economic Psychology,* 31**,** 212-217.

ESPN. 2015. *ESPN statistics* [Online]. Available: http://www.espnfc.com/barclays-premier-league/23/statistics/performance?season=2013.
EUROPEAN-FOOTBALL-STATISTICS. 2015. *Espana attendances* [Online]. Available: http://www.european-football-statistics.co.uk/attn.htm.
EVANS, D. S. 2003. Some empirical aspects of multi-sided platform industries. *Review of Network Economics,* 2.
EVANS, D. S. & SCHMALENSEE, R. 2005. The industrial organization of markets with two-sided platforms. National Bureau of Economic Research.
FILISTRUCCHI, L., GERADIN, D. & VAN DAMME, E. 2012. Identifying two-sided markets.
FILISTRUCCHI, L., GERADIN, D., VAN DAMME, E. & AFFELDT, P. 2014. Market Definition in Two-Sided Markets: Theory and Practice. *Journal of Competition Law and Economics,* 10**,** 293-339.
FORBES. 2014. *Yes, A Super Bowl Ad Really Is Worth $4 million* [Online]. Available: http://www.forbes.com/sites/onmarketing/2014/01/29/yes-a-super-bowl-ad-really-is-worth-4-million/.
FOTBALLSTATISTIKK, N. I. 2013. *Tilskuertall Tromsø 2013* [Online]. Available: http://www.nifs.no/tilskuertall.php?land=1&t=5&fra=2013&til=2014&lag_id=3&kamper=&u=667328&kamper=1.
GARCÍA, J. & RODRÍGUEZ, P. 2002. The determinants of football match attendance revisited empirical evidence from the Spanish football league. *Journal of Sports Economics,* 3**,** 18-38.
GRATTON, C. 2000. The peculiar economics of English professional football. *Soccer and Society,* 1**,** 11-28.
HUANG, M.-H. 2001. The theory of emotions in marketing. *Journal of Business and Psychology,* 16**,** 239-247.
KIND, H. J., NILSSEN, T. & S∅ RGARD, L. 2007. Competition for Viewers and Advertisers in a TV Oligopoly. *Journal of Media Economics,* 20**,** 211-233.
LYNN, R. & MARTIN, T. 1995. National differences for thirty-seven nations in extraversion, neuroticism, psychoticism and economic, demographic and other correlates. *Personality and Individual Differences,* 19**,** 403-406.
MCNIEL, J. M. & FLEESON, W. 2006. The causal effects of extraversion on positive affect and neuroticism on negative affect: Manipulating state extraversion and state neuroticism in an experimental approach. *Journal of Research in Personality,* 40**,** 529-550.
PILGER, S. 2014. Why the premier league is the most powerful league in the world.
POKRYWCZYNSKI, J. The Differential Impact of Televised Exposure to Arena Displays vs. Commercials. Proceedings of 1994 American Academy of Advertising Conference, 1994.
PREMIER-LEAGUE. 2015a. *About the premier league - what we do* [Online]. Available: http://www.premierleague.com/en-gb/about/the-worlds-most-watched-league.html.
PREMIER-LEAGUE. 2015b. *Scudamore: New UK live broadcast deal good for all English football* [Online]. Available: http://www.premierleague.com/en-gb/news/news/2014-15/feb/110215-premier-league-uk-live-broadcasting-rights-good-for-all-levels-says-scudamore.html.

ROCHET, J. C. & TIROLE, J. 2003. Platform competition in two‐sided markets. *Journal of the European Economic Association,* 1**,** 990-1029.
ROCHET, J. C. & TIROLE, J. 2006. Two‐sided markets: A progress report. *The RAND Journal of Economics,* 37**,** 645-667.
RYSMAN, M. 2009. The economics of two-sided markets. *The Journal of Economic Perspectives***,** 125-143.
SCHLOSSBERG, H. 1992. Sports marketing. *Journal of Promotion Management,* 1**,** 119-122.
THE-GUARDIAN. 2013. *Premier League finances: the full club-by-club breakdown and verdict* [Online]. Available: http://www.theguardian.com/football/2014/may/01/premier-league-accounts-club-by-club-david-conn.
THOMAS SOMMERSET, H. R. 2013. *50-lapp ga folkefest* [Online]. NRK sørlandet. Available: http://www.nrk.no/sorlandet/50-lapp-ga-folkefest-1.11256513.
TURLEY, L. W. & SHANNON, J. R. 2000. The impact and effectiveness of advertisements in a sports arena. *Journal of Services Marketing,* 14**,** 323-336.
UNITED, M. 2014. *Singing section made permanent* [Online]. Available: http://www.manutd.com/en/Tickets-And-Hospitality/Tickets-And-Hospitality-News/2014/Apr/manchester-united-singing-section.aspx?pageNo=2.
WAKEFIELD, K., BLODGETT, J. & SLOAN, H. 1996. Measurement and management of the sportscape. *Journal of Sport Management,* 10**,** 15-31.
WAKEFIELD, K. L. & BARNES, J. H. 1997. Retailing hedonic consumption: a model of sales promotion of a leisure service. *Journal of Retailing,* 72**,** 409-427.
WAKEFIELD, K. L. & BLODGETT, J. G. 1994. The importance of servicescapes in leisure service settings. *Journal of Services Marketing,* 8**,** 66-76.
WAKEFIELD, K. L. & SLOAN, H. J. 1995. The Effects of Team Loyalty and Selected stadium Factors on Spectator Attendance. *Journal of sport management,* 153**,** 172.
WALLBOTT, H. G. & SCHERER, K. R. 1988. Emotion and economic development—Data and speculations concerning the relationship between economic factors and emotional experience. *European journal of social psychology,* 18**,** 267-273.
WHANNEL, G. 2014. The Paradoxical Character of Live Television Sport in the Twenty-First Century. *Television & New Media,* 15**,** 769-776.