Antti Iho &
Jaakko Heikkilä

Has selling tickets in advance increased attendance in the Finnish football league?

University of Helsinki
Department of Economics and Management
Discussion Papers n:o 21
Environmental Economics
Helsinki 2008

Has selling tickets in advance increased attendance in the Finnish football league?

Antti Iho[1)] and Jaakko Heikkilä[2)]

Abstract

We analyse the overall determinants of demand and isolate the effect of advance ticket sales on Finnish football league attendances. We postulate a linear OLS model for log-attendance data from the years 1991-2007. Matchday weather, timing of the match, team performance and match characteristics together with team, year, month and stadium specific dummies are used as the explanatory variables. The model is found to explain the data very well. The results suggest that offering the option of buying the tickets in advance has had an isolated positive effect on attendance for associated teams.

Keywords:

football, attendance, demand, OLS, advance ticket sales

[1)] Department of Economics and Management, University of Helsinki. E-mail: antti.iho@helsinki.fi
[2)] MTT Economic Research, Agrifood Research Finland, Helsinki. E-mail: jaakko.heikkila@mtt.fi

Introduction

There are about 38 million registered football (soccer) players worldwide, with some 270 million people being involved in football overall. Football is the world's most significant team sport in economic terms. The value of the European football market in 2005/6 was 12.6 billion euro, and the revenues of, for instance, the English Premier League about 2 billion euro (Deloitte Touche 2007), equivalent to about 0.1% of the UK's GDP.

In Finland, however, the economic status of the national football league (Veikkausliiga) is relatively small. The aggregate budget of the Veikkausliiga teams in the season 2007 was about 16.1 million euro (Veikkausliiga, personal communication). In comparison to other Nordic football leagues, also the average attendance has been small: in 2007 it was 2,976 spectators per match. In Norway (Eliteserien), Denmark (SAS Ligaen) and Sweden (Allsvenskan), for instance, the associated figures for 2007 were 10,485, 8,104 and 10,258, respectively (European Football Statistics 2007). Part of the reason might be that there are simply more football enthusiasts in the other Nordic countries than in Finland: in 2006 there were 149,000 registered football players in Finland, 352,000 in Norway, 301,000 in Denmark and 553,000 in Sweden (FIFA 2006).

Football is, nevertheless, considered as one of the most important hobby sports in Finland. It is the most popular sport of 3-18 year-olds, with 230,000 youngsters having it as a hobby. Of the 19-65 year-olds, football is 11th most popular sport, but the second most popular team sport with 160,000 persons having it as a hobby. In comparison, 103,000 persons engage in volleyball, 90,000 in ice-hockey, and 26,000 in basketball (Anon 2006a,b).

Furthermore, the mean attendances in football matches have been increasing in Finland as in most other European countries, especially in the last five years. The Finnish level is beginning to reach the level experienced in Norway, Denmark and Sweden some 15 years ago (Figure 1). Having said that, the mean attendance is still low. Quality differences in the different leagues do exist, as suggested by for instance accomplishments in the Champions League, but these may be argued not to be as large as the attendance differences would suggest. In addition to low attendances, it appears that the average ticket prices in Veikkausliiga are lower than in other countries, even though unambiguous or readily available data on realized ticket prices are not available. Hence, the gate revenues of Veikkausliiga are even lower than average attendances would suggest, and substantially lower than those in the other Nordic leagues. For instance, currently, only some 10% of Tampere United turnover is from ticket sales (Kohtanen 2007) compared to around 35-40% for many clubs in the English Premier League (Yang and Sonmez 2005). Altogether, there is unrealized economic potential in the Finnish football league.

Globally, research on football related issues is abundant, and focuses strongly on determinants of demand, particularly the determinants of the match day attendances. Understanding the demand for football is essential for football authorities who wish to maintain and enhance its status. Borland and MacDonald (2003) provide a review of studies conducted on several types of sports. They find that there are two main lines of studies, economic oriented and sports marketing oriented. The weight is on the former, which uses primarily econometric methods and statistical data (mainly cross-sectional or panel data) to analyze the determinants of football demand, focusing on either seasonal or match specific attendances.

To our knowledge, there are no studies that estimate the impact of offering advance tickets on attendances. Intuitively, advance ticket sales affect attendances for at least two reasons. Firstly,

advance sales increase commitment. The random matchday weather, for instance, is influencing the decision-making less if the tickets are already bought and paid for. Secondly, there are always matches which are more alluring than the average ones. During these matches there are spectators who do not usually attend the matches, i.e. whose attendance probabilities are very low. Without advance tickets sales there will presumably be long queues in these matches, particularly at the entrance gates. Considering the next big match, these spectators can avoid the queues only by staying at home, not by buying the tickets in advance. If there was the option to buy the tickets in advance, the spectators would be able to avoid the ticket queues and still attend the match. In a dynamic sense, these matches would be the ones that trigger the average attendance to increase, consequently increasing the attendance of the more quiet matches as well.

The actual impact of advance ticket sales is challenging to trace empirically. The Finnish Veikkausliiga, however, offers an interesting natural experiment on this issue: only about half of the teams offer the possibility to buy tickets in advance. Furthermore, the teams that do so have adopted the practice gradually over the period 2000-2007. Combined with availability of matchday data from the past 17 years, this offers the possibility to isolate the effect of advance ticket sales from other match and year specific factors.

Our research question is whether selling tickets in advance has increased the average attendances of the respective teams *per se*, and if so, how quickly after such a decision the attendances begin to increase. If the answer is yes, it can be argued that a similar effect could potentially take place for the rest of teams as well, and hence increase the overall attendances in Veikkausliiga. Our research hypothesis is that a) there is a positive impact of advance sales on attendances, and b) this positive effect gradually increases for a few years after the adoption, as spectators slowly adapt their habits.

Answering these questions is of direct practical relevance to the football authorities who may encourage, require or even organize the advance ticket sales for the whole league. Whilst answering the main question, we also determine the overall determinants of football attendance in Finland and compare and contrast these to the results obtained elsewhere. The rest of the paper is organized as follows. First, we outline an econometric model to analyse the phenomenon. We then present our data as well as the results of the analysis. Finally we provide a discussion on the interpretation and policy relevance of the results.

The econometric model

In order to single out the effect of advance ticket sales, we first need to understand and explain the overall determinants of attendance demand in Finnish Veikkausliiga. We do this by undertaking an econometric analysis of demand in the period 1991-2007. In economic literature on football attendance, there are several factors that are typically found to affect match attendance decision. In the following we review these factors and briefly describe how we construct them – and other variables – in the current analysis. We then formulate our regression function, followed by the presentation of the available data.

According to Borland and MacDonald (2003) the factors that determine attendance in a sports event may be divided into: 1) form of consumer preferences (crowd effect); 2) economic factors (price of ticket, cost of travel, fan income, unemployment level); 3) quality factors (stadium facilities, weather factors, weekday, advance ticket sales); 4) event characteristics (team success, match quality, outcome uncertainty, match significance, derby, opponent characteristics); and 5) supply scarcity (stadium capacity).

We concentrate on the quality factors and the event characteristics. Of the quality factors we include weather, timing of the match and advance ticket sales. Of the match characteristics, we include recent performance, uncertainty, significance of the match and whether the match is a derby or played against a high-profile opponent. In what follows, we briefly review the impact of these factors in published studies, as well as discuss how we formulate the said factors. We then say a few words about why we chose to ignore the other factors.

Weather: In their review study, Borland and MacDonald (2003) find that in general weather which can disrupt play has had a negative effect on attendance, whereas non-disruptive weather (for instance temperature or sunshine) has had no impact (but see Owen and Weatherston (2002) for an opposite result). Another feature Borland and MacDonald (2003) find is that in the US adverse weather has been shown to have a negative impact in for instance football and baseball attendances, whereas in Britain it has had little or no impact.

We include two measures of weather in the empirical analysis. The first is 'Rain'. Weather is rainy if it is has been defined by the meteorological institute as rain, hail, sleet or damp weather with thunder in the weather station nearest to the stadium at 2-8 pm on the matchday. Snow as well as damp weather without thunder have been excluded from the definition. 28% of the matches were thus classified as rainy. The second measure for weather is 'dTemp'. It is measured in degrees centigrade, at 3 pm on the matchday in the weather station nearest to the stadium. The variable is constructed so that it measures how many degrees the temperature is below the mean temperature of all observations (15.2°C). For temperatures above the mean, a value of zero is given, and hence they are assumed to have no impact on the level of attendance.

Timing of the match: Borland and MacDonald (2003) report that attendance in England has been higher on public holidays, and that in both the US and England it has been higher on weekends. There is also some indication that attendance is higher when the matches are spread across a longer time period and home matches do not take place close to one another (Simmons and Forrest 2005; Borland and MacDonald 2003).

We decided to exclude public holidays from our consideration, but to take the timing of the match into account in three ways. First, we include a dummy variable for Sunday ('Sunday'). Analysis of the data suggests that Sunday is the only day of the week that is truly associated with football matches, and hence this simple method best describes the impact of the weekday. In our data, 48% of the matches were played on Sundays. Second, the first match of the season is designated as a dummy variable ('First match'). Third, there are dummy variables for each month of the season, with the exception that April and May are combined together. The Finnish season begins in mid-April and runs until October.

Advance ticket sales: Advance ticket sales have not, as far as we are aware, been included in analyses of the sports attendance, probably primarily due to the fact that in most countries they are generally provided. We include the possibility to buy tickets in advance by creating three advance sales dummies. 'Sales+1' refers to home-matches of teams that are selling tickets in advance for the first year. 'Sales+2' refers to teams that sell tickets in advance for the second year and 'Sales+3' to teams who have been selling tickets for three years or more.

Furthermore, it is necessary to shed light on the causal effects of attendance and advance ticket sales. After all, it is possible that higher attendance induces advance ticket sales rather than vice versa. Hence we construct three dummy variables that indicate the years *before* advance ticket

sales were adopted. Hence, the home-matches of the teams which were going to adopt the practice in the following year are denoted by the dummy 'Sales-1'. Similarly, the teams that adopted ticket sales in two or three years time are denoted by 'Sales-2' and 'Sales-3'.

This formulation is presumed to allow the disintegration of the impacts of advance ticket sales from the impact of individual years. Given our hypothesis, we would expect to find each of these dummies positive, statistically significant and that 'Sales+3' > 'Sales+2' > 'Sales+1'. During the observation period one team began selling tickets in advance in 2000 (HJK), two teams in 2003 (Inter and TPS), one in July 2005 (KuPS), three in 2006 (Honka, Tampere United and KooTeePee) and two in 2007 (Oulu and Viikingit). This gradual adoption provides a meta-experiment that allows us to study the effects of advance sales. Altogether, 20% of the matches in the data are assigned one of these six advance sales dummies.

Recent performance: Team success and their recent performance have been shown to affect attendance. Buraimo and Simmons (2006) note that the wage bill of the team acts as an adequate measure of long term performance, whereas for short term performance there are other measures, including, for instance, team rank in the league or the home points acquired. It has been found that home-team performance consistently has a positive effect on attendance, whereas for away-team performance there is mixed evidence (Borland and MacDonald 2003). It is also worth noting that causality here is not self-evident. As Borland and MacDonald (2003) note, there have been studies that find strong evidence for causality being from high attendance to team performance, rather than vice versa.

We measure recent performance by the mean number of points that the home team has scored in the past five matches, including both home and away matches ('Perform'). As suggested by

Simmons and Forrest (2005), five matches are used to rule out random variation. Mean performance for all teams is 1.4 points in the last five matches.

Uncertainty: Uncertainty regarding the outcome of the match has been found to be a relatively poor predictor of attendance (Borland and MacDonald 2003; Owen and Weatherston 2002). This uncertainty has traditionally been measured by either using some measure of difference in the league rank of the teams or by the odds provided by betting companies. One problem noted is that the home-team has home advantage, and hence the mere rank difference may be an insufficient descriptor. Within our dataset, home teams won 45% of the matches, fairly close to the figure of 48% obtained in England (Buraimo and Simmons 2006). However, it is not necessarily the true uncertainty that matters, but that which is perceived by the fans, which may in fact be close to that suggested by the league ranking.

We include unpredictability of the match in the analysis and define it using the teams' league ranking (as measured by their points) before the match, weighted by a measure for how many matches have been played so far in the season ('Uncertainty'). This weighting reduces the impact of the league table on the uncertainty of the first few matches of the season, which often are relatively uncertain regarding their outcome. Mathematically our weighted uncertainty is determined by Expression (1) where p_{ht} (p_{at}) represents the points of the home-team (away-team) in the league table and m_{ht} (m_{at}) the number of matches played by the home-team (away-team).

$$\left| \frac{p_{ht}}{m_{ht}} - \frac{p_{at}}{m_{at}} \right| * \ln(m_{ht} + 1) \qquad (1)$$

Significance: The importance of the match has generally been found to be a significant predictor of attendance. Borland and MacDonald (2003) note that when the league ranking is fairly even, and thus a larger number of matches are significant, attendance is generally higher.

We include the importance of the match and define it in relation to two target lines: an upper target line and a lower target line. The upper line is specified for each season and depends on the number of highest-ranking teams that will qualify for Euro-matches, including Champions League (1991-2007), UEFA Cup (1991-2007), Cup Winners' Cup (1991-1998), and UEFA Intertoto Cup (1995-2007). Additionally, in the years where a second stage of the domestic league was played (1993, 1996, 1999 and 2002), the upper line depends also on the number of teams reaching this second stage. Finally, all home matches for the top three teams in the league table are defined as significant. The lower line is also specified for each season and depends on the number of teams that are either directly relegated, or who face the threat of relegation by having to play a decisive match against a second tier team.

More specifically, a match is considered significant if it satisfies at least one of the following six criteria: 1) *Top three team:* the home team is in the top three of the league table. 2) *Possibility to make it to following year's Euro-matches*: by obtaining at least 70% of the available points, the home team will score more points than the last team entitled for the following year's Euro-matches, given that it obtains 50% of the available points. 3) *Risk for direct relegation*: by obtaining at most 30% of the available points, the home team will score fewer points than the team that is facing direct relegation, given that it obtains 50% of the available points. This criterion is valid for all other teams except for the last team. 4) *Risk for indirect relegation*: by obtaining at most 30% of the available points, the home team will score less points than the first team facing the retake match for relegation (usually the last but one team), given that it obtains

50% of the available points. This criterion is valid only for teams not in the position of direct or indirect relegation. 5) *Possibility to avoid direct relegation*: by obtaining at least 70% of the available points, the home team will score more points than the last but one team, given that it obtains 50% of the available points. This criterion is valid for the team that is last in the league standings. 6) *Possibility to avoid indirect relegation*: by obtaining at least 70% of the available points, the home team will score more points than the first team not in relegation, given that it obtains 50% of the available points. This criterion is valid for teams facing direct or indirect relegation.

From the view of spectators' decision-making, it is rather the insignificance of a match that affects the attendance probability. Therefore, we focus on the insignificant matches, i.e. on those not significant according to our criteria. Defined this way, 13% of the matches are considered insignificant. Any definition of significance is arbitrary: we have chosen to use fixed percentages: possibility to enhance a team's standing is calculated with a 70%-50% rule. The risk for relegation is calculated with a 30%-50% rule.

The opponent: The opponent was taken into account in two ways. First, whether the match in question is a local derby can be argued to increase attendance in the match (e.g. Owen and Weatherston 2002). In our analysis, we assume that the attendance consists primarily of the supporters of the home-team, and only a small proportion of the spectators are supporters of the away-team. A derby, then, can be argued to increase attendance through two effects: a local match is *per se* seen as an interesting event, and additionally there are likely to be more away-team supporters due to the shorter distance to travel to the match.

The derby teams for each team were chosen so that each team has at least one derby. In some cases the derby distances end up being fairly long, especially when it comes to teams from northern Finland. Derby is then, in our analysis, defined as a match against any team whose stadium is within 50 km from the home-team or if there are no teams within 50 km, the derby is against the team closest to the home-team. Given these criteria, in some instances the definition is not symmetric. For instance, for IFK Mariehamn (from the Åland islands) a derby is against Inter or TPS from Turku (the closest teams), but for Inter and TPS a home match against IFK Mariehamn is not a derby. As defined, altogether 8.7% of matches in the data were derbys.

The second explanatory variable for the opponent reflects a high-profile opponent that is capable of drawing larger crowds. In our analysis we define HJK Helsinki as such a team ('Opponent').

Ignored factors: Of the factors listed by Borland and MacDonald (2003), we ignore consumer preferences, economic factors and supply scarcity. The first two categories are ignored due to lack of reliable data on, for instance, ticket prices – a phenomenon encountered also elsewhere (Buraimo and Simmons 2006). Having said that, many team-specific factors such as stadium capacity, ticket prices, size of the potential fan population and regional unemployment are captured in the model through team and year specific dummies, but not designated as separate explanatory variables. The third category (supply scarcity problem) can be ignored because in very few occasions within the observation period a Veikkausliiga match has been sold out in Finland. Thus we do not need to worry about how to deal with the issue of demand exceeding supply, which is the case in many other studies. For the same reason we ignore the crowd effect in this study. The lack of the supply scarcity problem allows us to use all observations and Ordinary Least Squares estimation in the analysis.

Finally, we ignore the impact of away-team fans to a large extent, and only account for them in derbys. This is based on Finnish experience of not too many away-team fans attending the matches to make a difference for the overall attendance. This explains why only those qualities of the away-team are taken into account that affect the home-team fans' decision to attend.

Data and basic results

We use match specific data from Veikkausliiga matches from 1991 to 2007, provided by Veikkausliiga. The weather data for the matchdays (precipitation and temperature) were obtained from the Finnish Meteorological Institute. During the observation period, there were 34 teams appearing in the league, some of which have switched names or been merged. We combined the observations of such teams together (Allianssi and Atlantis, Jazz and PPT, Jokerit and PK-35, KooTeePee and Kotkan TP, Lahti and Kuusysi, Oulu and OTP, and Tampere United and Ilves).

The initial data includes 2,964 observations. During a typical season, the teams play against each other twice and the champion is the team with the most points. However, in 1993, 1996, 1999 and 2002 the league had in addition a final stage with the highest and/or the lowest placed teams playing a varying number of decisive matches against each other. We omitted all these extra matches (126 observations) from the data.

The matches have been played on a number of different stadiums or pitches. For instance, KuPS and Kuusysi have played on five different pitches during the time period concerned. We omitted all matches that were played on pitches where a team played only five matches or less. Having done that, the number of matches on individual pitches varies now from a minimum of 8 (Oulu on Heinäpää) to a maximum of 212 (Haka on Tehtaan kenttä). If within a season a team played

on more than one pitch, the pitch where less matches were played on was included as a dummy variable for that year. There were 14 such pitches.

There have been various promotion campaigns over the years, but unfortunately data on these are not complete. We, however, omitted four individual matches:

- 1996 HJK vs. MyPa in Helsinki due to its exceptional promotion campaign and tickets free-of-charge; attendance 23,382
- 2002 Tampere United vs. HJK in Tampere due to promotion campaign; attendance 12,782
- 2004 Lahti vs. TP-47 in Lahti, Jari Litmanen's home-coming match; attendance 12,850
- 2005 Tampere United vs. Inter in Tampere due to promotion campaign; attendance 10,720

The final dataset consists of 2,793 matches. The minimum attendance within the dataset is 196 (Lahti) and the maximum 11,817 (HJK). The mean attendance of all teams is 2,289. The basic characteristics of the data are described in Table 1, which provides the team-specific mean attendances, years attended, home matches played, and possible advance ticket sales.

Certain observations can be made from the data. First, the mean attendance has been increasing over the years, from about 2,000 spectators in 1990s to nearly 3,000 in 2007. As is visible also in Figure 1, the mean attendance was in fact relatively stable throughout 1990s, and has only increased more rapidly in the past five years. Second, there is large month-specific variation within each season, with the mean attendance first slightly rising, and then falling steadily. This is remarkable, given that the last matches of tight seasons could be argued to be the ones that should draw large attendances. There are several possible explanations for this phenomenon, including temperature, summer vacations, and beginning of the ice-hockey season in September.

Figure 2 shows team-specific mean attendance by year for eight long-standing teams, most of which have at different points in time adopted advance ticket sales. Apart from a slight overall increase in the mean attendance of all teams, merely looking at the graph does not reveal any specific pattern in the attendances or in how advance ticket sales have affected them. Hence we resort to econometric analysis. The regression for each team's home-match attendance becomes:

$$\ln y_{it} = \alpha + \boldsymbol{\beta x'_{it}} + \varepsilon_{it}, \qquad (2)$$

where $\ln y_{it}$ is the natural logarithm of match-specific attendance, a is a constant, $\boldsymbol{\beta}$ is a vector of coefficients, $\boldsymbol{x_{it}}$ is a vector of explanatory variables and ε_{it} is the error term. Subscripts i and t refer to the home team and the match event, respectively. The vector of explanatory variables ($\boldsymbol{x_{it}}$) comprises of the variables discussed above and summarised in Table 2.

The analysis was undertaken using SAS statistical software (SAS Institute Inc., Cary, NC, USA). Overall, the model explained the data reasonably well. We first present the overall results, then focus on specific variables and finally discuss the main result of the study – the effect of the advance ticket sales on match day attendances. The key results are given in Table 3.

All the variables are significant at 99% level. The parameter values are also logical and of the expected sign. The interpretation of the variables is as follows. The intercept gives the log of the regression constant (711) – recall that we use Ponnistus as the base team and that their mean attendance is fairly low. For continuous variables (dTemp, Perform, W_uncertain), the parameter estimate gives the percentage change in average attendance as the value of the variable is changed by one unit. For dummy variables, the estimate can be used to obtain the associated percentage change in the average attendance, when the value for the dummy changes from 0 to 1.

This can be done by taking the exponential function from the parameter estimate and subtracting one from its value (Halvorsen and Palmquist 1980). In the case of derby matches, for instance, the attendances are on average 41.7% (and not 34.7%) higher than in non-derby matches.

Weather overall seems to be relatively significant in our model. The dummy for rainy weather suggests that on rainy days the attendance will be 8.0% lower. Lower temperatures are also associated with somewhat lower attendance. A decrease in temperatures by one degree decreases the attendance by 2.5 %. Note that the impact of temperature is only accounted for as degrees below 15.2°C. Since this variable explains the attendance statistically better than simple temperature (results not shown), we suggest that temperature has a greater impact at the lower scale of the temperature range. In 1991-2007, the temperature has varied between -4.2 and 29.7 degrees centigrade. The model suggests that, for instance, the attendance of a match with 15.2°C would have 10.2% more spectators than if, other things equal, the temperature would have been 11.1°C (mean September temperature in Helsinki).

The coefficient value for Sunday suggests that on average having the match played on a weekday that is most strongly associated with football, increases the attendance by approximately 4.1%. This is smaller than the 6.4% impact found in the English Division One (Simmons and Forrest 2005). Perhaps the status of football and the matchdays are so well established in England that deviating from traditions has a stronger influence on potential spectators' decision-making. The other variable for timing suggests that the first match of the season draws, other things equal, an attendance that is 10.7% higher than the rest of the matches on average. Finally, June gathers an attendance 3.9% lower, August 4.0% lower, September 9.5% lower and October 7.1% lower than the mean. July is statistically not different from the base (April/May).

The performance parameter (the range of the variable [0...3]) suggests that the number of average points won in the last five matches has a distinctive effect on matchday attendance. For instance, winning five times in a row instead of having three wins, a draw and a defeat in recent matches is associated on average with 10.8% higher attendance in the next match. Having five defeats in a row instead of five victories is associated, other things equal, with 32.4% lower attendance in the following match.

The parameter value for weighted uncertainty [0...4.99] suggests that the spectators are sensitive towards uncertainty regarding the outcome of the match. The higher the value of the variable, the more predictable is the outcome of the match. For example, consider a match with a fairly certain outcome such as HJK vs. VPS in 2002 with an uncertainty value 4.12. The match drew an attendance of 2,531 (and ended up 2-0 for the home-team). The model suggests that if the outcome of the match would have been, ceteris paribus, totally unpredictable on grounds of the performance, there would have been about 10.3% more spectators in the match (2,792).

The dummy for insignificance does not differentiate between the teams in the upper end of the league table (those that have lost chances for the next year's Euro-matches or this year's championship) and those in the lower end (facing certain relegation or otherwise facing an insignificant match). The variable merely classifies a match as significant or insignificant. The results suggest that the attendance for the insignificant matches is on average 13.9% lower than for the significant ones.

Whether a match is a local derby has the most substantial effect on attendance in our analysis: in a derby the attendance is on average 41.7% higher than if an otherwise identical match would not

have been a derby.[1] It is also worth noting that the effect of derbys seems to be substantially higher than the 6% impact found in the English Premier League (Buraimo and Simmons 2006). Simmons and Forest (2005) found that the effect of the derbys is higher the further down in the division one looks at. In the English Division Three (where mean attendance is slightly above the Finnish league) the impact of derbys is estimated to be 37% – fairly close to our estimate.

Finally, a high-profile opponent has a positive impact on attendance. Having HJK Helsinki as the opponent draws on average an attendance that is 19.4% higher than against other teams.

Effect of advance ticket sales

The effect of advance tickets sales was examined with the three dummy variables 'Sales+1', 'Sales+2' and 'Sales+3'. All parameter estimates are found to be statistically significant at 99.9% confidence level. 'Sales+1' was associated with a 41.3%, 'Sales+2' a 30.0% and 'Sales+3' a 39.7% increase in average attendances. Our hypothesis that these variables would draw a positive and statistically significant effect on attendance is confirmed. However, the results are in some contradiction with the assumption of a gradual increase in impact.

However, it may merely be that for some reason the said teams' attendance has been unusually high at the time of adopting advance ticket sales. We thus looked at these teams also in the three years before advance ticket sales began ('Sales-3', 'Sales-2' and 'Sales-1'). The results show that advance ticket sales were also preceded by a slightly higher attendance. 'Sales-3' was associated with a 16.6%, 'Sales-2' a 14.7% and 'Sales-1' a 17.4% increase in average attendance.

[1] The authors strongly emphasize that this does not suggest that increasing the number of derbys would increase the average attendance. The results only mean that *given the current number of derbys*, the derby matches have had a high impact on attendance.

An intuitive interpretation of these results would be that teams have introduced advance ticket sales once experiencing attendances slightly higher than expected, and perhaps facing some congestion at ticket gates. This may have been due to, for instance, exogenous socio-economic conditions in the region. Offering the option to buy tickets in advance, then, has triggered even higher levels of mean attendance. The results thus suggest that advance ticket sales result in on average 15-25% higher attendance than if they were not provided.

Further support for the true impact of advance ticket sales is provided by the fact that all team-specific dummy parameters are significant at 99.9% significance level (except Reipas at 94% level), which suggests that the Sales-dummies have indeed captured an effect separate from the team-specific effects. Furthermore, recall that 'Sales+1' includes observations from 2000, 2003 and 2005-2007, 'Sales+2' from 2001, 2004 and 2006-2007 and 'Sales+3' from 2002-2007. Despite this, most year-specific dummies are statistically significant at 99% level, except for six years (1992, 1995, 1996, 2001, 2003 and 2006). Even though all year-dummies are not statistically significant, it seems that the advance ticket sale dummies are capturing an effect that is separate from most year-specific effects as well.

Naturally, it may still be that the advance ticket sales dummies are reflecting some other factor, but at least the authors are not able to single out which factor that might be. Altogether, the results strongly support the assumption that advance ticket sales have *per se* increased the attendances of the respective teams. We argue that the first part of our hypothesis holds. For the second part (gradual increase in impact) we do not find statistical support.

Team-specific regressions

We also undertook team-specific regressions in order to find out whether some variables are particularly strong for some teams but not for others. This analysis is naturally hindered by the lack of data for many of the teams. Having said that, regressions were successfully applied to a number of teams. The results are given in Table 4 for twelve long-standing teams. The dummy variable coefficients have been converted to percentage impacts.

The first observation is that for some teams the regression works for better than others. This is not entirely explained by the number observations: for instance for HJK (n=228) only three significant variables were found (R^2=0.415), whereas for Honka (n=25) four variables were significant (R^2=0.90). Most coefficients are of the expected sign, except for the positive insignificance value for Inter, They are also relatively similar in magnitude, which lends confidence to the results.

Certain team-specific results can be drawn from the team-specific regressions, although care should be taken in interpreting the results. By comparison of the coefficient magnitudes, it appears that recent performance is particularly important for Honka supporters, uncertainty for HJK and Honka and insignificance of the match for Oulu. Derbys are exceptionally important for Inter and TPS (both from Turku), and having HJK as the opponent matters for Haka. Rain has a large impact for Oulu, as well as VPS and HJK.

The statistically significant team-specific coefficients are shown in Figure 3 to get an overview of their distribution across teams. The boxes represent the 25th and 75th percentiles, and the whiskers show the 5th and 95th percentiles. The 95th percentile of Derby goes to 1.31 and is not shown in the Figure, and three cases that yielded unexpected signs are excluded.

Discussion

In this study, we analysed the overall determinants of demand and isolated the effect of advance ticket sales on Finnish football league attendances. For this purpose we postulated a linear OLS model for log-attendance data from the years 1991-2007. For explanatory variables we used matchday weather, timing of the match, team performance, and match characteristics together with team, year, month and certain stadium specific dummies. The effect of advance ticket sales was analysed using six Sales dummies representing the three years before and after advance ticket sales commenced. Altogether, we were able to find statistically significant explanatory variables, and our regression model explained the data very well. Further support to the model is provided by the team-specific regressions and the results from alternative model specifications (not reported here), all of which resulted in effects that were consistent with one another.

The results suggest that after controlling for other explanatory variables, offering the option of buying the tickets in advance has had an isolated effect on attendances for the respective teams. One explanation for this might be that if the teams offer advance ticket sales, the individual matches alluring many spectators are either not associated with queues at the gates or at least those queues can be avoided by buying the ticket in advance. Without the option to buy the ticket in advance, queuing can only be avoided by staying at home. The other apparent effect is the commitment effect. In our regression model, the negative effects of temperature and rain were significant. The spectators that have paid for the match event in advance are more likely to attend it regardless of the weather

The general determinants of matchday demand closely resemble those reported in earlier studies. There were, however, two important differences between the present results and those attained

from other European football leagues. First, we found uncertainty to be statistically significant (with a 99.9% confidence level). One reason for this might be that the uncertainty was linked to the difference in opponents' average points per match instead of just the difference in league standings. Using league standings may either neglect or exaggerate the information derived from the table. Teams standing second and fifth may have equally many points, and on the other hand, teams standing sixth and seventh may have a huge difference in points. Further, using the weight in the uncertainty measure removes, or at least weakens, the artificial uncertainty of the early season matches. The second difference to other studies is that we found a statistically significant and negative effect for rain, even in most team-specific regressions. One explanation for this may be the relatively primitive stadium conditions in Veikkausliiga – together with the lack of advance ticket sales.

Based on the explanatory variables in the model, we may consider options available to the football authorities to increase attendances. There is very little that can be done about the weather, except perhaps through timing of the season or building better stadium-facilities, and there can obviously be only one first match of the season. The matchday (Sunday) affects attendance positively, so having the matches on designated days in a consistent way would help in increasing attendance. Performance, uncertainty, insignificance and derbys are pretty much beyond any authorities' powers, except perhaps through design of the match schedule or through acquiring better players and hence increasing the standard. Organizing advance ticket sales, on the other hand, requires only few financial resources and practically no time. As its' effect on matchday attendance is shown to be positive, it appears as a sensible thing to do in order to promote the Finnish football league. Of course, there are other factors affecting the positive development of attendances than advance ticket sales alone, but given the variables included in our analysis, the results suggest that it is an efficient way to increase attendances.

As a mental exercise, if the projected 15-25% increase applied to all teams that do not currently provide advance sales, the mean attendance of the whole league would increase, other things equal, from the current 2,976 to some 3,100-3,200. With an average ticket price of 10 euro, this would translate into additional annual gate revenue of some 225,000-400,000 euro, which would then be the upper bound that is sensible to pay for the provision of ticket services. The projected increase in mean attendance of the whole league is still relatively modest, and advance ticket sales cannot thus be seen as a panacea that would help the Finnish league to catch up with the other Nordic leagues. However, we argue that it would be one important step in the path towards higher attendance. Any increase may then fuel further increase through the crowd effect, but this effect is beyond the scope of this paper.

We acknowledge that the causalities are sometimes difficult to assess, and having two factors correlated does not necessarily mean that one causes the other. Hence the results obtained here should be considered as suggestive, but not decisive. In the present analysis we have ignored the impact of, for instance, televised matches, promotion campaigns, ticket prices and the crowd effect. Including these would increase the overall fit of the regression model, but the overall determinants as presented here probably would not change in any dramatic way.

Acknowledgements

The authors would like to thank Professor Timo Kuosmanen, Dr. Antti Niemistö, Dr. Mitri Kitti, Kimmo Ollikka and the participants of the environmental economics research seminar at the Department of Economics, University of Helsinki for their valuable comments on the first draft

of this paper. We would also like to thank Sami Verno at Veikkausliiga for providing the data as well as showing interest towards our work. Any remaining mistakes are our own.

References

Anon. 2006a. Kansallinen liikuntatutkimus 2005–2006: lapset ja nuoret. SLU:n julkaisusarja 4/06.

Anon. 2006b. Kansallinen liikuntatutkimus 2005–2006: aikuisliikunta. SLU:n julkaisusarja 5/06.

Borland J. & MacDonald R. Demand for Sport. 2003. Oxford Review of Economic Policy 19(4): 478-502.

Buraimo B. & Simmons R. 2006. Market size and attendance in English Premier League football. Lancaster University Management School Working Paper 2006/003.

Deloitte Touche. 2007. Annual review of football finance 2007. Highlights. Manchester, UK: Available: http://www.deloitte.com/dtt/cda/doc/content/UK_ARFF_2007_Highlights.pdf

European Football Statistics. 2007. Available at: http://www.european-football-statistics.co.uk/

FIFA. 2006. Big count, Football 2006 Worldwide, Official survey. FIFA.

Halvorsen R. & Palmquist R. 1980. The interpretation of dummy variables in semilogarithmic equations. The American Economic Review 70 (3): 474-475.

Kohtanen J. 2007. Markkinoinnissa korostetaan tunnetta. Tutka 34/2007.

Lago U., Simmons R. & Szymanski S. 2006. The Financial Crisis in European Football. Journal of Sports Economics 7(1): 3-12.

Simmons R & Forrest D. 2005. New issues in attendance demand: the case of the English football league. Lancaster University Management School Working Paper 2005/004.

Yang D. & Sonmez M. 2005. Intangible balls. Business Strategy Review. Summer 2005. 38-44.

Table 1. Characteristics of teams.

Team	**Mean attendance**	**Years in the league**	**Home matches**	**Advance tickets**
Allianssi	1727	2001-2005	62	no
FinnPa	2240	1993-1998	75	no
Haka	1863	1991-1996, 1998-2007	212	no
HJK	3676	1991-2007	228	2000-
Honka	4089	2006-2007	25	2006-
Hämeenlinna	1622	2002-2004	37	no
IFK Mariehamn	2089	2005-2007	38	no
Inter	2380	1996-1997, 1999-2007	143	2003-
Jaro	1927	1991-1998, 2002-2007	175	no
Jazz	2204	1991-2004	189	no
Jokerit	2797	1998-2001, 2003	70	no
KooTeePee	2617	1999-2000, 2003-2007	87	2006-
KuPS	2151	1991-1992, 1994, 2001-2003, 2005-2006	107	2005-
Lahti	1904	1991-1995, 1999-2007	185	no
MP	1447	1991-1996	79	no
MyPa	1816	1992-2007	212	no
Oulu	1625	1991-1992, 1994, 2007	56	2007-
Ponnistus	839	1995	10	no
Reipas	889	1991	14	no
RoPS	1530	1991-2001, 2004-2005	176	no
Tampere United	2921	1991-1996, 2000-2007	186	2006-
TP-47	2199	2004-2005	26	no
TP-Seinäjoki	1852	1997	13	no
TPS	2711	1991-2000, 2003-2007	198	2003-
TPV	2405	1993-1995, 1999	47	no
Viikingit	2526	2007	13	2007-
VPS	2738	1995-2002, 2006-2007	130	no

Table 2. Explanatory variables.

Symbol	Name	Explanation
$ln\ y$	Attendance	Natural log of match-specific attendance. Dependent variable.
x_1	Rain	Dummy for rainy day
x_2	dTemp	Degrees centigrade below mean temperature
x_3	Sunday	Dummy for Sunday
x_4	First match	Dummy for the first match of the season
x_5	Performance	Mean points in the last five matches
x_6	Uncertainty	Teams' weighted difference in points per matches played
x_7	Insignificance	Not possible to access important league positions
x_8	Derby	Dummy for local derby
x_9	Opponent	Dummy for HJK as the opponent
$x_{10,11,12}$	Sales+	Dummies for 1, 2 and 3 (or more) years after advance sales began
$x_{13,14,15}$	Sales-	Dummies for 1, 2 and 3 (or more) years before advance sales began
x_{16}-x_{31}	Year	Year-specific dummies for each year less one (1991)
x_{32}-x_{58}	Team	Team-specific dummies for each team less one (Ponnistus)
x_{59}-x_{72}	Stadium	Dummies for multiple stadiums within one season
x_{73}-x_{77}	Month	Dummies for each month of the season less one (April/May)

Table 3. The main results from the regression analysis.

Observations	F Value	Pr > F	R^2	Adjusted R^2
2793	40.56	<0.0001	0.5316	0.5185
Variable	**Parameter estimate**	**Standard error**	**t value**	**Pr > |t|**
Intercept	6.56679	0.11404	57.58	<.0001
Rain	-0.08284	0.01448	-5.72	<.0001
dTemp	-0.02527	0.00252	-10.01	<.0001
Sunday	0.04023	0.01332	3.02	0.0025
First match	0.10126	0.02794	3.62	0.0003
Perform	0.10268	0.00997	10.29	<.0001
Uncertainty	-0.02504	0.00672	-3.72	0.0002
Insignificance	-0.15005	0.02234	-6.72	<.0001
Derby	0.34839	0.02263	15.39	<.0001
Opponent	0.17757	0.02366	7.51	<.0001
Sales-3	0.15391	0.04345	3.54	0.0004
Sales-2	0.13755	0.04810	2.86	0.0043
Sales-1	0.16043	0.05684	2.82	0.0048
Sales+1	0.34640	0.04329	8.00	<.0001
Sales+2	0.26230	0.04482	5.85	<.0001
Sales+3	0.33444	0.04199	7.96	<.0001

Table 4. Team-specific regression results.

Team	R^2	Rain	dTemp	Sunday	First match	Perform	Uncert.	Insignif.	Derby	Opponent
Haka	0.542					0.065		-0.191	0.327	0.436
HJK	0.415	-0.162					-0.182		0.468	
Honka	0.898				-0.256	0.228	-0.176		0.476	
Inter	0.726	-0.085	-0.041				-0.055	0.202	1.238	0.187
Jaro	0.684	-0.069	-0.023	0.104		0.103		-0.133	0.648	0.139
KuPS	0.713	-0.108	-0.018	0.095		0.105			0.533	
MyPa	0.427	-0.124	-0.028				-0.058	-0.201	0.293	0.225
Oulu	0.868	-0.224	-0.022	0.170		0.155		-0.363	0.370	
RoPS	0.528		-0.030		0.315	0.178			0.243	0.239
TamU	0.527	-0.137		0.112		0.088			0.623	0.187
TPS	0.639		-0.032					-0.141	0.863	
VPS	0.711	-0.178	-0.043		0.158	0.124	-0.036		0.443	0.197

Figure 1. Mean attendances in the Nordic countries 1991-2007.

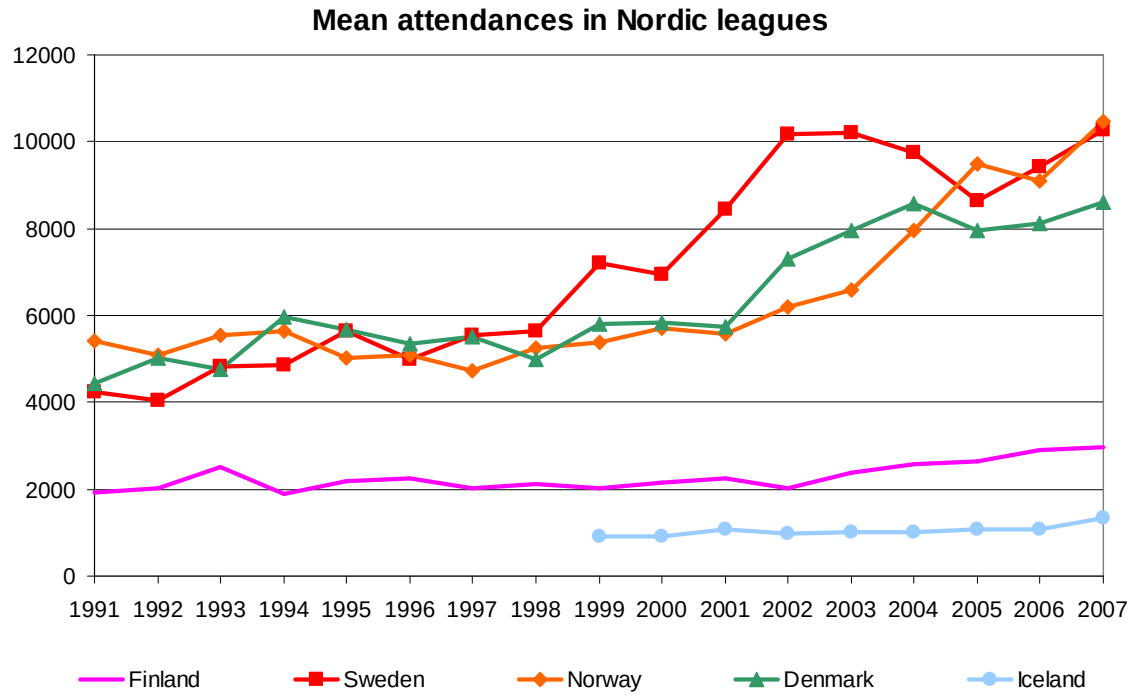


Figure 2. Team-specific mean attendances for a selection of teams.

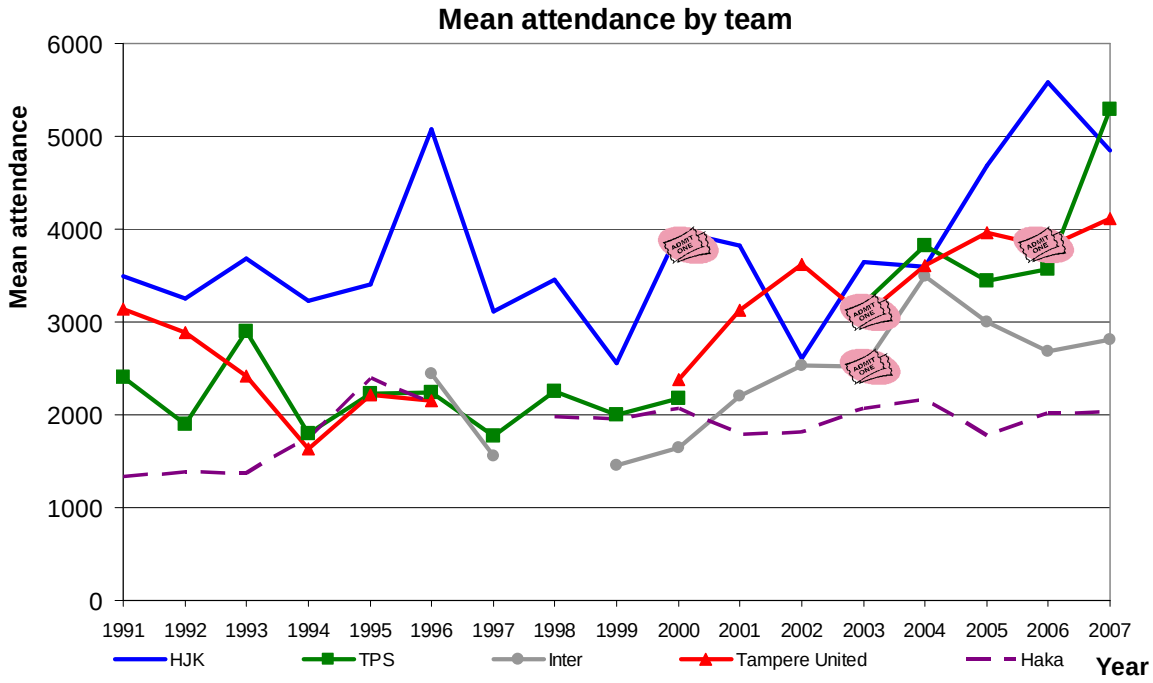
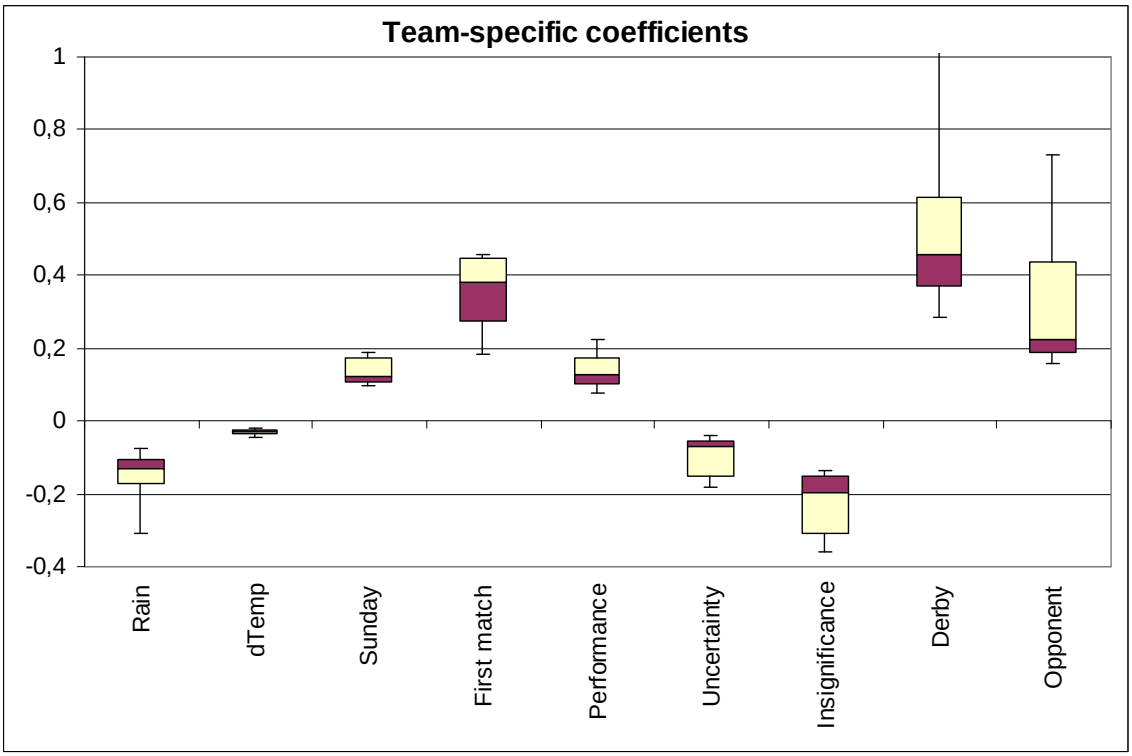


Figure 3. Box and whiskers plot of team-specific regression coefficients. The boxes represent 25th and 75 percentiles and the whiskers 5th and 95th percentiles.



UNIVERSITY OF HELSINKI

Discussion Papers:

No.

7. Lone Grønbæk Kronbak & Marko Lindroos (2005): Sharing rules and stability in coalition games with externalities: the case of the Baltic Sea cod fishery. Environmental Economics.
8. Nina Hyytiä & Jukka Kola (2005): Citizens' attitudes towards multifunctional agriculture. Agricultural Policy.
9. H. Dahlbo, M. Ollikainen, S. Peltola, T. Myllymaa & M. Melanen (2005). Combining ecological and economic assessment of waste management options - case newspaper. Environmental Economics.
10. Aleksandar Shivarov, Soile Kulmala & Marko Lindroos (2005). Fisheries Management Costs: The Case of Baltic Salmon Fishery. Environmental Economics.
11. Soile Kulmala, Hanna Peltomäki, Marko Lindroos, Sakari Kuikka & Pirkko Söderkultalahti (2005). Individual Transferable Quotas in the Baltic Sea Herring Fishery: a Socio-bioeconomic Analysis. Environmental Economics.
12. Hanna-Mari Ahonen & Kari Hämekoski (2005). Transaction costs under the Finnish CDM/JI Pilot Programme. Environmental Economics.
13. Chen Quizhen & John Sumelius (2006). Comparative Study on Chinese and Finnish Experts' Opinion of Multifunctional Agriculture. Agricultural Economics.
14. Hervé Guyomard, Jussi Lankoski & Markku Ollikainen (2006). Impacts of Agri-environmental Policies on Land Allocation and Land Prices. Environmental Economics.
15. Kyösti Arovuori & Jukka Kola (2006). Farmers' choice on multifunctionality targeted policy measures. Agricultural Economics.
16. Seppo Vehkamäki & Stefan Bäckman (2006).Evaluation of economic activities and poverty in the region close to the National Park of Río Abiseo in Peru.
17. Jussi Lankoski & Markku Ollikainen (2006). Bioenergy crop production and climate policies: A von Thunen model and case of reed canary grass in Finland. Environmental Economics.
18. Heini Ahtiainen (2007). The willingness to pay for reducing the harm from future oil spills in the Gulf of Finland – an application of the contingent valuation method. Environmental Economics
19. Andrea Cattaneo, Jussi Lankoski & Markku Ollikainen (2007). Green auctions with joint environmental benefits. Environmental Economics.
20. Chen Qiuzhen, Kyösti Arovuori & John Sumelius (2007). Evolution and Implementation of Multifunctionality-Related Policies in China and Finland. Agricultural Economics.

ISSN 1459-9996
Helsinki 2008