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Join the Club - On the Attractiveness of Golf Club Membership

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Abstract

The aim of this paper is to analyze determinants of the attractiveness of membership in Swedish golf clubs. This is modeled as a utility maximization problem and is estimated using a unique data set that includes 99-percent of all golf clubs in Sweden. We find that the annual membership fees and the member profile have a significant impact on the club's attractiveness as well as a number of other important characteristics of the club and the municipality in which the club is located. The latter result indicates that not only the characteristics of the club itself but also its location matter for its attractiveness.

Keywords: Demand analysis, spatial econometrics, sports, structural change, utility maximization

JEL classification: D71, L83, R12

1. Introduction

This paper concerns the determinants of the attractiveness of membership in Swedish golf clubs. The main purpose is to study the potentially important characteristics of the golf club and its vicinity that make one club more attractive than others. A model for the attractiveness of membership in Swedish golf clubs is derived and estimated using a unique data set covering 99-percent of all golf clubs in Sweden for two consecutive years, 1998 and 1999. The data set contains information on annual membership fees, entrance fees, capital investments, qualities of the golf course, and characteristics regarding the region where the golf club is located. Swedish golf clubs are organized under the Swedish Golf Federation (SGF) which has provided us with parts of the data. In 2004, the Federation consisted of 475 golf clubs distributed between 21 golf districts.¹ Golf clubs are found all over the country, from Björkliden in the very north to Falsterbo in the far south.²

Thirty years ago, only a few clubs in Sweden could boast the existence of an excess demand for membership in their club. However, during the last few decades, the game of golf has become one of the most popular sports in Sweden and from 1980 until 2003 the number of active (i.e. number of individual memberships in golf clubs) has increased from 78 540 to 593 873.³ This makes Sweden the second largest golfing nation in Europe, second only to England.⁴ During this 'golf boom' in Sweden, the number of golf clubs has increased from 151 to 399. Still, SGF claimed in 1997 that 200 new courses needed to be built by the year 2004 in order to meet the increased demand for membership

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¹The tasks of the Federation are media, service, sports, and events. These include tournaments, junior golf as well as the responsibility for the implementation of the rules of golf.

²See Figure 1 in Appendix B for a map over the golf districts.

³The total population in Sweden where 8.9 million in 2003.

⁴England had in 2003, according to the Swedish Golf Federation, 877 355 golf club members.

in Swedish golf clubs. Based on this assessment, 97 clubs are still needed today to reach this goal and 61,021 individuals are still queuing for membership. As the number of clubs and courses has increased, so has the diversity of club types. Today, many clubs profile themselves in order to attract certain member types.

It is from this perspective that it is of interest to study the clubs' choice of profile and the determinants for guiding which club golfers choose to join or stand in line for membership contingent on the club profile. In other words, from the results based on the revealed preferences of members and individuals queuing for membership, our aim is to provide guidelines for future club designers and also suggest the location of new courses. In addition, and in contrast to many other sports and recreational activities requiring major investment (for instance, soccer fields, ice hockey rinks, slalom slopes etc.), golf courses in Sweden are primarily financed by private means. As a consequence, members in golf clubs bear the total cost of the club and its course while the other activities mentioned, to a large extent, are financed or heavily subsidized by public means.

There are only a handful papers about golf within the field of economics. For instance, the pricing of golf club membership has been studied by Shmanske (1998), who focuses on the pricing structure at public golf courses in the San Francisco Bay area. Shmanske (1999) contributes with an empirical study of the relationship between the golf club's revenues and the characteristics of the golf course. Data is collected from golf courses in the San Francisco Bay area and complemented by interviews with 900 golfers. Based on club theory and the issue of inefficiency of membership fees, Mulligan (2001) studies the pricing of a round of golf. Shmanske (2004) continues his study of golf in the San Francisco Bay area and finds evidence that the size of the reception area is important for the entry of new clubs. Golf clubs and their have been empirically studied by Do and Grudnitski (1995) using a hedonic approach. Sport and competitive aspects of golf are also considered in a number of papers. The focus in Szymanski (2003) is on the theory of contest and tournaments where golf is one application. Athletic performance is the issue in Chatterjee, Wiseman, and Perez (2002) and Cox and Falls (1998) and the relationship between money and performance are studied in Scully (2002), Orszag (2001, 1994), Moy and Liaw (1998), and Ehrenberg and Bognanno (1990). Rishe (2001) has this as focus but investigates the difference between the senior and the regular golf tours. Shmanske (2000) is another paper in this spirit, but here the difference is between the men's and women's professional tours (PGA versus LPGA). Finally, Barro (2000a, 2000b) and Blundell (2000) have a interesting discussion regarding the economics of golf balls.

This paper contributes to the previous literature in several ways. Firstly, we are able to estimate the attractiveness of memberships in Swedish golf clubs based on information on almost all the golf clubs in Sweden. This data is unique since it provides information about the course and club characteristics as well as fee levels. We can also be sure that the choice parameters in our model, to a large extent, represents the Swedish golf players as the practice of the game of golf in Sweden requires membership in a Swedish or international golf club and Swedes are, in general, members of at least one Swedish club. After obtaining membership, which is most often associated with a capital investment⁵ and

⁵The general practise in Sweden has been that the capital investment is repaid without interest to the member when she leaves the club. Only in a few cases are the capital investments or shares in the club traded on the open market. One consequence of this system is that the golf club remain in control over who will be the next member, which is

paying an annual fee as well as an entrance fee, the new member is not allowed to play on the golf course (not even the course where she is a member) without a 'green-card', the golfers 'drivers license'. The 'green-card' ensures that the player knows the basic rules and understands the sense and etiquette of the game. Perhaps most importantly, it also ascertains that the player knows the basic safety rules, i.e. not to hit other players with either the golf club or the golf ball. 'Green-cards' are usually issued by the local golf pro who also acts as the examiner of new golf players and makes sure they know the basic rules. In contrast to most European golfers, Swedish golfers practice the game mainly on their member course. Although green fee revenues are important for Swedish clubs, the boards at the different clubs prefer focus on creating tee off possibilities for their own members. The study presented here differs from the studies by Shmanske as pay-and-play (which does not require a golf club membership) is a well established industry in the US but not in Sweden. The idea of pay-and-play is quite new in Sweden and there are only a few 'pay-and-play' courses. This means that for long time, the possibility of playing golf without club membership has been out of the question in Sweden. To summarize, the organizational structure of golf in Sweden makes it possible for us to draw conclusions about the determinants of the attractiveness of golf membership based on Swedish golf players revealed preferences with respect to characteristics of the club in question. The individual's choice of golf club and its attractiveness is modeled as a utility maximization problem. The choice of club is assumed to be dependent on characteristics of the club and the region in which it is located. We test for, but do not find, spatial dependence among the golf clubs. The results show that not only the characteristics of the club itself but also its location matters for its attractiveness.

The rest of the paper is organized as follows. The next section outlines a theoretical model describing an individual utility model from which a function describing the attractiveness of golf club membership is derived. Section 3 provides a description of the data set used and some institutional information. Econometric specification, estimation strategy and a discussion of the results are presented in Section 4 followed by a summary (Section 5) and Appendix A and B.

2. The Theoretical Model

The attractiveness of membership in a golf club can be modeled as a utility maximization problem for a representative individual j . Consider a situation where this individual receives utility from private consumption, c_j , and membership in one or more golf club(s), x_j . The choice of club to join is assumed to depend on the characteristics of the club such as for example the capacity, profile, and quality of the course. Hence, individual j 's utility function, where j is a member or in line for membership in a club is assumed to take the form

$$U_j = u_j(c_j, x_j; Q_l; Z_i) \quad (1)$$

where Q_l is a vector of the characteristics of the golf club, and Z_i is a vector of other exogenous conditions of region i (the region where the club is located) that affect the individual's utility. The cost associated with her consumption of golf club membership, x_j , is the capital investment in the golf club including the entrance fee, k_l , times the interest rate d and the annual membership fee, m_l .

usually the person at the top of the waiting list.

We disregard the potential travel cost associated with the use of the club facilities. Denote individual j 's income by y_j , then individual j maximizes (1) with respect to c_j and x_j subject to her budget constraint

$$c_j = y_j - x_j (k_l \cdot d + m_l) \quad (2)$$

Hence, the Lagrangian of this optimization problem can then be written as

$$\max_{c_j, x_j} L_j = u_j(c_j, x_j; Q_l; Z_i) + \lambda_j (y_j - x_j (k_l \cdot d + m_l) - c_j) \quad (3)$$

and the first order conditions are given by

$$\begin{aligned} \lambda_j &: y_j - x_j (k_l \cdot d + m_l) - c_j = 0 \\ c_j &: \frac{\partial u_j}{\partial c_j} - \lambda_j = 0 \\ x_j &: \frac{\partial u_j}{\partial x_j} - \lambda_j (k_l \cdot d + m_l) \leq 0, \quad x_j \geq 0, \quad x_j \cdot \left(\frac{\partial u_j}{\partial x_j} - \lambda_j \cdot (k_l \cdot d + m_l) \right) = 0 \end{aligned}$$

Assuming interior solutions, the attractiveness individual j subscribes club x can be written on reduced form as

$$x_j^* = x_j(y_j, k_l \cdot d, m_l; Q_l; Z_i) \quad (4)$$

This model implies that an individual may be a member or in line for membership in more than one golf club. Assume that the members and those waiting for membership in club l also live within the municipality where the club is located. Moreover, assume that the representative member of, and those waiting to join, club l have the same income as the average income within the municipality where the club is located. These two assumptions enable us to aggregate all the individual attractiveness equations (expression (4)) to attractiveness at club level. Hence, the attractiveness of golf club l is then determined by,

$$x_l^* = \sum_{j=1}^J x_j^* = x_l(y_l, k_l \cdot d, m_l; Q_l; Z_i) \quad (5)$$

The way in which the attractiveness (x) is defined means that members and individuals in line are treated equally. The basic idea is that a member can always revise her decision about the club she is currently a member of and leave to take up membership in or join a waiting list for another club.

Of particular interest, in this case, is the impact of the capital investment plus the entrance fee, k_l , and the annual membership fee m_l , on x , i.e. $\partial x_l / \partial k_l$ and $\partial x_l / \partial m_l$. The signs of these two derivatives are determined by

$$\text{sign} \left(\frac{\partial x_l}{\partial k_l} \right) = \text{sign} \left(x_j \cdot d \cdot \frac{\partial^2 u}{\partial c_j \partial x_j} + \lambda_j \cdot d - x_j \cdot d \cdot (k_j \cdot d + m_l) \right) \quad (6)$$

and

$$\text{sign} \left(\frac{\partial x_l}{\partial m_l} \right) = \text{sign} \left(x_j \cdot \frac{\partial^2 u}{\partial c_j \partial x_j} + \lambda_j - x_j \cdot (k_j \cdot d + m_l) \cdot \frac{\partial^2 u}{\partial c_j^2} \right) \quad (7)$$

which both depend on the cross derivative $\frac{\partial^2 u}{\partial c_j \partial x_j}$.⁶ As the interest rate is equal across the country, d cancel out. If golf club membership is a normal good, it is assumed that these two derivatives are negative. That is, as the capital investment and/or the membership fee increases, the demand for memberships decreases. However, it could also be that membership is a signal good, which would indicate that it is an empirical question to determine the sign of these two equations.

3. Data

The data used in the empirical analysis originate from three sources. Information about the characteristics of the different golf clubs was provided by SGF and refers to two years, 1998 and 1999. The characteristics of the municipalities in which the golf clubs are located are represented by information on average income levels, population density, level of education, and unemployment rate. This information was provided by Statistics Sweden (SCB). Information on plant zones was obtained from the Swedish Association for Leisure Gardeners (the relevance of the plant zones is described below).

In 1998, there were 381 golf clubs in Sweden and these increased to 386 in 1999. A few of these clubs have been excluded from the empirical analysis for various reasons. For instance, Björkliden Golf Club, which is a so-called 'mail-box' club, has been excluded. A 'mail-box' club is a club with a large share of members permanently living elsewhere in Sweden. In the case of Björkliden, the course (with 9 holes) is located in the very north of Sweden while the majority of the club's members (who number over 4 000) presumably live in the Stockholm area which is approximately 1,340 kilometers south of the location of the course (see Figure 1 in Appendix B). The large number of members in Björkliden GC is explained by the club's low membership fees in combination with long waiting list for membership in golf clubs located in or nearby Stockholm. A membership in a 'mail-box' club gives members the right to play on courses in Stockholm on payment of a green fee. Further, in order to get a balanced panel, clubs who became official members of SGF during 1999 are also excluded. This leaves us a data sample covering 380 clubs for two years. The variables that will be used in the empirical analysis are described below and descriptive statistics is found in Table 1.

The dependent variable in equation (5) (x), which should reflect the attractiveness of the golf club, is measured as the number of actual members in the club *plus* the number of individuals standing in line for membership. Even though those waiting for membership have not yet paid the membership fee nor made the capital investment, we argue that they should be included in the measurement of the club attractiveness. The fee structure is considered to be a key decision variable in the choice of club. Further, in order to provide a certain degree of accessibility to the course for the members, the number of golf holes at the course generally constitutes a capacity constraint on the number of members within the club. The number of members per golf hole does of course vary between clubs depending on their profile. The more 'exclusive' clubs tend to have lower number of members per golf hole than less 'exclusive' clubs. Accordingly, only including the number of actual members in the club in the measurement of the club's attractiveness would, to some extent, reflect the accessibility

⁶As $x_j \geq 0$, $d \geq 0$, $\lambda_j < 0$, $k \geq 0$, $m_l \geq 0$ and $\frac{\partial^2 u}{\partial c_j^2} < 0$. See Appendix A for a derivation of (6) and (7).

policy within the club. However, we argue that by adding the number of individuals standing in line for membership we will capture the total attractiveness of the club.

The explanatory variables in the data set are divided in three categories: the monetary characteristics of the golf club (M_l); its non monetary characteristics (Q_l, D_l); and the local characteristics of the municipality where the golf club is located (Z_i, y_i).

Table 1. Descriptive statistics. All monetary variables are measured in 1998 monetary values.

	1998				1999			
	Mean	Min.	Max	St. dev.	Mean	Min.	Max	St. dev.
Attractiveness (x)	1 211,8	0	3 886	607,1	1 274,7	53	4 992	619,7
<u>Monetary club charact.</u>								
Entry fee junior (kj)	599,5	0	30 000	1 968,7	724,6	0	29 860,7	2 438,1
Entry fee senior (ks)	8 280,2	0	112 200	8 970,8	7 818,9	0	34 837,5	6 500,3
Annual fee junior (mj)	1 151,3	0	2 600	390,1	1 180,5	0	2 876,6	396,5
Annual fee senior (ms)	2 358,1	450	6 300	785,9	2 432,4	0	6 858,0	796,2
<u>Non-monetary club charact.</u>								
Nr of golf holes ($holes$)	17,2	0	36	6,6	17,7	0	36	6,4
The club's age (age)	21,1	0	96	18,4	22,1	1	97	18,4
Plant zone ($pzone$)	2,8	1	8	1,5	2,8	1	8	1,5
Parkland ($park$)	0,3	0	1	-	0,3	0	1	-
Woodland ($wood$)	0,2	0	1	-	0,2	0	1	-
Seaside (sea)	0,1	0	1	-	0,1	0	1	-
Meadowland ($meadow$)								
Park/wood ($combpw$)	0,4	0	1	-	0,4	0	1	-
Hilly ($hilly$)	0,2	0	1	-	0,2	0	1	-
Nr of junior members	187,5	0	524	90,4	192,5	0	557	87,0
Nr of senior members	896,5	0	3 725	405,3	940,6	53	4 742	422,6
Member profile ($prof$)	0,2	0	3,2	0,2	0,2	0	4,2	0,3
Queue	127,8	0	1 836	281,5	142,2	0	1 983	299,3
Stock ($stock$)	0,1	0	1	-	0,1	0	1	-
<u>Municipality charact.</u>								
Population density ($dens$)	335,1	0,3	3 930,3	901,3	337,6	0,3	3 970,8	910,3
Unempl. rate ($unemp$)	3,1	0,3	6,1	0,9	3,0	0,6	6,2	0,9
Higher education ($hcap$)	15,1	1,4	34,3	6,0	15,5	4,4	34,8	6,1
Average income (y)	157,8	126,6	272,8	20,1	164,7	132,6	287,2	21,7

Note: The unemployment rate and the level of higher education are in per capita (percent).

The average income is the average income in Swedish kronor (SEK) in each municipality.

Monetary golf club characteristics (M_l): Membership in a Swedish golf club usually includes three types of fees which differ for juniors (below the age of 20) and seniors (above the age of 20). These are an entrance fee (non-refundable if the member leaves the club); a capital investment (usually

refundable without interest); and an annual fee. The entrance fee plus the capital investment are denoted by ks_l for senior members and kj_l for junior members, and the annual fee is denoted by ms_l and mj_l respectively.

Non monetary golf club characteristics (Q_l, D_l): It is reasonable to assume that the attractiveness of a golf club partly depend on the characteristics of the club and its course. For instance, the number of holes (an indicator of the capacity of the golf course), the quality and type together with the clubs profile are likely to be such factors. Here, the number of golf holes at the course (*holes*), the clubs age (*age*), the plant zone⁷ where the course is located (*pzone*) are included in Q_l . See Table B1 in Appendix B for more details on the plant zones. The club's age could be an indicator of the condition of the course and thereby the quality of the golf club. However, with time improvements will probably be needed because of wear and tear of the course which will temporarily reduce its quality. Further, the technique used to build golf courses has developed with time. The need to reconstruction, for example, the greens are probably higher for older clubs than for younger ones. Accordingly, the age of the golf club enters the empirical analysis in a nonlinear form. The club's age is calculated as from the year when it became an official member of SGF. The club's age could also be an indicator of how rich in tradition it is.

Other characteristics relating to the course that are potentially important include the course type. Five different course types are defined and represented by dummy variables which take the value one if the course has the specified characteristic, otherwise zero. These are parkland (*park*), woodland (*wood*), seaside (*sea*), meadowland (*meadow*), and combined park and woodland (*combpw*). Sweden has very few links courses and these are included in the meadowland category, which serves as reference category in the empirical analysis. The final course characteristic used is a dummy variable that takes the value 1 if the course could be characterized as hilly (*hilly*), otherwise 0. The share of junior members (under 20 years old) relative the number of senior members is used as a profile measure (*profile*), i.e. the clubs attitude toward junior members. A dummy variable that takes the value one if the club is a share holder club (*stock*) is also included. All these course characteristics are based on information from the Swedish Golfers Guide (published by SGF) and contained in Q_l .⁸

The matrix D contains a set of dummy variables for the different golf districts in Sweden. In 1998 and 1999 there were 21 districts and the two largest in terms of members and number of golf clubs were (and still are) Skåne and Stockholm. Here, D_l includes $d2345$, $d6789$, $d10 - 15$, $d1617$, and $d18 - 21$, where $d2345$ takes the value 1 for clubs located in districts 2, 3, 4 and 5, otherwise 0. In a similar fashion, $d10 - 15$, $d1617$, and $d18 - 21$ take the value 1 if the club is located in districts 10 to 15, 16 or 17 and 18 to 21 respectively, otherwise 0. More information about the golf districts is found in Table B2 in Appendix B.

Municipality characteristics (Z_i, y_i): It is reasonable to assume that the reception area is important for the attractiveness of a golf club. This is in line with Shmanske (2004) who found the reception area to be of importance for joining golf clubs in the San Francisco Bay area. The variables that characterize the municipality in which the golf club is located are the percentage of the population

⁷Figure 2 in the Appendix shows a map of the plant zones.

⁸The course types specified in the Swedish Golfer's Guide are not completely equivalent to the ones in, for example, Great Britain. However, the Swedish types are translated to the ones in Great Britain.

with a university degree (*hcap*), the unemployment rate as a percentage of the total population (*unemp*), and the population density (*dens*). These non-monetary municipality characteristics are included in Z_i . The income (y) is the average income for citizens aged 16 and over in the municipality where the club is located.

Descriptive statistics of the variables presented above are given in Table 1, where all monetary values are expressed in Swedish Kronor (SEK)⁹ and the 1998 price level. According to Table 1, the club named *The Average Golf Club of Sweden* was, in 1999, 22 years old, had 18 holes, 941 senior and 193 junior members, and had 142 individuals standing in line for membership. In this club, junior members paid an annual fee of 1 181 SEK, while senior members paid 2 432 SEK per year. The course at this club is combined park and woodland.

4. Econometric Specification, Estimation Strategy, and Results

4.1. Econometric Specification and Estimation Strategy

Using the notation introduced above, the attractiveness of a Swedish golf club is assumed to be determined by the equation

$$x_i = \alpha + M_i\beta_M + Q_i\beta_Q + D_i\beta_D + Z_i\beta_Z + \beta_y y_i + \epsilon_i \quad (8)$$

where α and the β 's are parameters to be estimated and ϵ_i is the error term which is assumed to be normally distributed and $E[\epsilon_{il}] = 0$. Given the 'demand' structure of the theoretical set up, the different prices contained in M_i and the income measure y are potentially endogenous, as is the member profile (*prof*). However, it is quite difficult to find good instruments for these variables, in particular we only have limited additional information on the different clubs over and above the information already used in the empirical set up and we do not have information for previous years. The additional information we have available on the different golf clubs concerns the different green fees (weekdays, weekends, junior, senior) and the average handicap for men and women. The exception is the income variable y , for which we do have information for previous years, and we also have information on the age structure within the municipality. However, this information is used in order to instrument for the different prices, M_i , member profile, *prof*, and income, y .

One potential source of misspecification of equation (8) relates to the existence of spatial heterogeneity. In general, there are two distinct aspect of spatial heterogeneity; structural instability and heteroscedasticity. Structural instability means that the, in many cases, strong assumption of constant parameter estimates across golf clubs has to be relaxed. Heteroscedasticity follows from missing variables or other forms of misspecification of the model that lead to non-constant variance in the error term. The existence of spatial heterogeneity is tested for using the Koenker-Bassett test for heteroscedasticity (see Koenker (1981) and Koenker and Bassett (1982)). As the probability of this test exceed 0.05, the null hypothesis of homoskedastic errors is rejected. In this case, a test statistic of 55.70 and a probability of 0.00 suggest that we can, by far, rule out the null hypothesis of homoscedastic errors.

⁹USD 1 = SEK 7.66 on june 14 2005.

In order to reduce the existence of heteroscedasticity the assumption of constant parameter estimates across districts is relaxed and the restriction $\beta_D \equiv 0$ is imposed. The sub-grouping of the data set could be based on several different criteria. For instance, those clubs located in the same municipality or the same golf district could constitute one regime, or those clubs located in district numbers 1, 2 and 3 could be one regime. We have chosen to elaborate with a large set of different groupings based on golf districts. However, in order to save space, only the parameter estimates of the model that performed the best in terms of the Koenker-Bassett test are presented in Table 2 below. In this model, the golf clubs contained in the two districts Skåne and Stockholm are defined as one regime and the rest of the golf clubs as the other. This model gave a Koenker-Basset test statistic of 1.10 with a probability of 0.29.

Having taken care of the problem with heteroscedasticity we also test for the presence of spatial dependence in the data, i.e. that the attractiveness of club l is affected by the attractiveness (or some other characteristics) of the neighboring club q . To test for this potential misspecification of (8) we make use of what is probably the most frequently used test for spatial autocorrelation, the Moran's I test. Let n be the number of golf clubs in our data set and \mathbf{W} a spatial weighting matrix of dimension $(n \times n)$ whose elements assign the neighbors to each golf club. The weights matrix to be used here can be characterized as $\mathbf{W} = \{w_{lq}\}$ such that $0 < w_{lq} \leq 1 \forall l \neq q$ if l and q are neighbors, otherwise $w_{lq} = 0$. Note that $w_{ll} = 0$. In this case, neighbors are defined as those golf clubs within the same district. Moreover, using row-standardized weights, which is advisable,¹⁰ $\sum W_l = 1$. The Moran's I is then calculated as $I = (\epsilon' \mathbf{W} \epsilon) / (\epsilon' \epsilon)$. Next, the test statistic is compared with its theoretical mean, $I = -1/(n - 1)$, where n is the number of observations. Hence, $I \rightarrow 0$ as $n \rightarrow \infty$. The null hypothesis $H_0 : I = -1/(n - 1)$ is tested against the alternative $H_a : I \neq -1/(n - 1)$. If H_0 is rejected then there are two alternative interpretations depending on whether the test statistic I is significantly greater or smaller than its expected value. If H_0 is rejected and $I > -1/(n - 1)$, this indicates a positive spatial autocorrelation meaning that golf clubs with similar levels of attractiveness are more spatially clustered than could be caused by chance. If H_0 is rejected and $I < -1/(n - 1)$ this indicates a negative spatial autocorrelation, golf clubs with high and low attractiveness are mixed together. A perfect negative spatial autocorrelation is characterized by a checkerboard pattern of high and low values. With test statistics of -0.49 and a probability of 0.62, we rule out the hypothesis of spatial correlation.

4.2. Results

The parameter estimates of the final model are displayed in Table 2 below where the estimates and corresponding t-values for the two districts Skåne and Stockholm are presented in columns 1 and 2, while the estimates and corresponding t-values for the other districts are presented in columns 3 and 4.

The results in Table 2 suggest that the membership fee structure of the club does affect the attractiveness of the club. The annual fee for senior members (those above 20 years of age, *ms*) is estimated to have a negative impact on the club's attractiveness. This result is significant at the

¹⁰See for instance Anselin (1988).

98-percent level for the two districts of Skåne and Stockholm and at the 95-percent level for the other districts. The most obvious interpretation of this result is that the attractiveness of a golf club is negatively correlated with its annual membership fee for senior members. In addition, our results indicate that the annual fee for junior members (m_j) has a positive impact on the attractiveness outside the two districts Skåne and Stockholm. This is an interesting result which could be interpreted in terms of attitude towards junior members. Assuming that a higher annual fee for junior members will lead to fewer junior members in the club, a more restrictive attitude toward junior members through the annual member fees make the club more attractive. This interpretation is supported by the negative correlation between the member profile ($prof$) and the club's attractiveness. However, our results do not indicate any significant correlation between the capital investment, including the entrance fee (k_j and ks) and the club's attractiveness. From this we conclude that the sign of equation (7) is negative whereas we are not able to sign the impact of the capital investments (equation (6)).

Turning to non-monetary club characteristics, the results suggest that the attractiveness of a Swedish golf club located outside the two districts Skåne and Stockholm is positive correlated with its age (age) while we do not find any significant correlation between the club's age in square (age^2) and its attractiveness. One possible interpretation of these results is that the age of the golf course is a strong indicator of quality and possibly also how rich on tradition the club is making an older club more attractive. However, there is no indication of any wear and tear effect, which would have been the case if the parameter estimate of age^2 had been negative and significant.

Increasing the number of golf holes ($holes$) that the club can offer is estimated to have a positive effect on the attractiveness of the club. The more golf holes a club has the higher is its capacity. A large number of golf holes also increases the variation of the course. For instance, if the course consists of 27 holes, these holes could be divided into three 'trails', A, B and C with 9 holes each. As the game of golf is most often played over 18 holes, these three 'trails' could (if the layout of the course permits) be combined in three different ways which means that the club actually has three different courses. If the course consist of 36 holes, the number of possible combinations of the different holes could of course increase, and so the variety of the course. On the other hand, if the course only have 9 holes, each hole must be played twice in order to play 18 holes. Therefore, the number of holes may not only reflect capacity but also variety of the course.

Further, our model indicates the amount of lush vegetation is important, the less the lushness, measured by a higher plant zone number ($pzone$), the less attractive the club is if it is located in the Skåne or Stockholm area. At first glance, as Stockholm is located north of Skåne, this variable would only seem to capture differences between these two districts. However, all the plant zones found in Stockholm are also found in Skåne (but not the other way around). Even though this parameter is not significant for the rest of the country, the sign is what one would expect. When it comes to course characteristics, our model does not predict any significant impact from these variables on the club's attractiveness. That is, it does not matter whether the course is characterized as a parkland ($park$), woodland ($wood$), seaside (sea), combined park and woodland ($combpw$) or a hilly course ($hilly$) when it comes to the club's attractiveness.

Table 2. Parameter estimates of equation (8) based on 2sls and two spatial regimes.

	Skåne & Stockholm		Other districts	
	Estimate	t-value	Estimate	t-value
<u>Monetary club charact.</u>				
Entry fee junior (<i>kj</i>)	0,02	0,83	-0,02	-0,33
Entry fee senior (<i>ks</i>)	0,02	1,07	-0,00	-0,14
Annual fee junior (<i>mj</i>)	0,08	0,08	6,97	1,99
Annual fee senior (<i>ms</i>)	-1,63	-2,35	-3,19	-1,94
<u>Non-monetary club charact.</u>				
The club's age (<i>age</i>)	7,08	0,45	52,17	2,18
The club's age squared(<i>age</i> ²)	0,01	0,03	-0,39	-1,54
Number of golf holes (<i>holes</i>)	154,92	2,89	49,83	2,28
Plant zone (<i>pzone</i>)	-676,58	-2,11	-78,26	-1,07
Parkland (<i>park</i>)	-277,10	-1,10	-427,44	-0,82
Woodland (<i>wood</i>)	178,36	0,34	-379,18	-0,75
Seaside (<i>sea</i>)	-233,82	-0,69	97,60	0,20
Comb. park/wood (<i>combpu</i>)	183,25	0,40	-193,20	-0,45
Hilly (<i>hilly</i>)	608,48	1,86	248,10	1,22
Member profile (<i>prof</i>)	-7,54	-1,52	-154,37	-4,56
Stock (<i>stock</i>)	1 629,70	2,03	-143,98	-0,27
<u>Municipality charact.</u>				
Population density (<i>dens</i>)	-0,05	-0,34	0,13	0,29
Unemployment rate (<i>unemp</i>)	307,99	2,06	-244,93	-2,07
Higher education (<i>hcap</i>)	8,23	0,32	159,78	0,79
Average income (<i>y</i>)	23,63	3,37	6,32	0,60

Returning to the member profile (*prof*), as mentioned previously, the share of junior members within the club is predicted to have a negative impact on the club's attractiveness, at least outside the two districts Skåne and Stockholm. The results also indicate that shareholder clubs (*stock*) are more attractive than other clubs in the Skåne and Stockholm districts. Even though we control for income differences by including the average income level, this result could be interpreted in terms of signal goods, as these two districts contain areas with the highest income levels in the country. Within these high income areas, it may be of greater importance to be a member of an 'exclusive' club.

The parameter estimates of the municipality characteristics suggest that there is a positive correlation between the unemployment rate within the municipality (*unemp*) and the club's attractiveness within the two districts Skåne and Stockholm. This effect is, however, estimated to be negative outside these districts. As expected, the results suggest a positive correlation between the attractiveness of a golf club and the income level (*y*) within the two districts Skåne and Stockholm. As the income level within the municipality where the club is located increases, so does the attractiveness. However, we

do not find a significant correlation between x and the education level ($hcap$), here measured as the share of the population with a university degree. Finally, our model does not predict a significant relationship between the population density ($dens$) and the club's attractiveness.

5. Conclusions

This paper analyzes the determinants of the attractiveness of membership in Swedish golf clubs. The attractiveness is measured as the number of members and people in line for membership in a particular club. The paper is motivated by the current increasing interest in the game of golf in Sweden and by the needs according to the Swedish Golf federation (SFG) for more golf clubs and courses in Sweden. Today, approximately 7-percent of the Swedish population are members in a Swedish golf club and more are on waiting lists for membership. This is also interesting as this sporting activity differs significantly with respect to its financial structure in comparison with other leisure activities in Sweden. While other activities requiring large investments in different types of arenas, such as ice hockey, soccer, downhill skiing, etc. are mainly financed, or at least heavily subsidized, by public means, golf clubs facilities and courses are, to a large extent, financed by private means.

The results presented here are based on estimations using detailed data, from 1998 and 1999, on Swedish golf club member's revealed preferences for their choice of golf club. One interesting result from this analysis is that the only course characteristic that matters for the club's attractiveness is the number of holes. Other characteristics such as the course profile do not have a significant impact on the club's attractiveness. This indicates that the layout of the course does not matter in contrast to its capacity. In the two largest districts, Skåne and Stockholm, not even the club's age (which could be interpreted in terms of the course quality and the richness of tradition within the club) matter. Golf clubs located in the other districts in Sweden are found to be more attractive the older the club is, that is, the higher its quality is. Results from the Moran's I test rule out spatial dependence among the golf clubs. That is, the attractiveness of a club is not affected by the characteristics of the clubs located in its neighborhood defined as the same golf district.

Another interesting result from this analysis is that our model predicts that the club's annual fee for senior members have a negative impact on the club's attractiveness whereas annual fee for junior members have a positive impact (at least outside the two districts Skåne and Stockholm). In addition to this, we also find golf clubs with a large share of junior members to be less attractive relative to clubs with a low share of junior members. One interpretation of these results is that there seems to be a negative attitude toward junior members. This seems to go against the official policy of SFG which favour of junior golf.

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Appendix A. Derivation of marginal effects.

Given the first order conditions

$$\lambda_i : y_j - x_j(k_l \cdot d + m_l) - c_i = 0 \quad (9)$$

$$c_i : \frac{\partial u_i}{\partial c_i} - \lambda_i = 0 \quad (10)$$

$$x_j : \frac{\partial u_i}{\partial x_j} - \lambda_i(k_l \cdot d + m_l) \leq 0, x_j \geq 0, x_j \cdot \left(\frac{\partial u_i}{\partial x_j} - \lambda_i(k_l \cdot d + m_l) \right) = 0 \quad (11)$$

the bordered Hessian, $|\overline{H}|$, which is required to be positive semidefinite, is

$$|\overline{H}| = \begin{vmatrix} 0 & -1 & -(k_l \cdot d + m_l) \\ -1 & \frac{\partial^2 u_j}{\partial c_j^2} & \frac{\partial^2 u_j}{\partial x_j \partial c_j} \\ -(k_l \cdot d + m_l) & \frac{\partial^2 u_j}{\partial c_j \partial x_j} & \frac{\partial^2 u_j}{\partial x_j^2} \end{vmatrix} > 0 \quad (12)$$

The impact from k_l on x_j^* is given by

$$\frac{\partial x_j^*}{\partial k_l} = \frac{\begin{vmatrix} 0 & -1 & -x_j \cdot d \\ -1 & \frac{\partial^2 u_j}{\partial c_j^2} & 0 \\ -(k_l \cdot d + m_l) & \frac{\partial^2 u_j}{\partial c_j \partial x_j} & -\lambda_j \cdot d \end{vmatrix}}{|\overline{H}|} \quad (13)$$

and

$$\frac{\partial x_j^*}{\partial m_l} = \frac{\begin{vmatrix} 0 & -1 & -x_j \\ -1 & \frac{\partial^2 u_j}{\partial c_j^2} & 0 \\ -(k_l \cdot d + m_l) & \frac{\partial^2 u_j}{\partial c_j \partial x_j} & -\lambda_j \end{vmatrix}}{|\overline{H}|} \quad (14)$$

giving

$$\text{sign} \left(\frac{\partial x_l}{\partial k_l} \right) = \text{sign} \left(x_j \cdot d \cdot \frac{\partial^2 u}{\partial c_j \partial x_j} + \lambda_j \cdot d - x_j \cdot d \cdot (k_j \cdot d + m_l) \right) \quad (15)$$

and

$$\text{sign} \left(\frac{\partial x_l}{\partial m_l} \right) = \text{sign} \left(x_j \cdot \frac{\partial^2 u}{\partial c_j \partial x_j} - x_j \cdot (k_j \cdot d + m_l) \cdot \frac{\partial^2 u}{\partial c_j^2} + \lambda_j \right) \quad (16)$$

Appendix B. Tables and figures.

Table B1. Frequencies plant zones.

 $(N = 380)$

Plant zone	#	Percent
1	92	24.2
2	70	18.4
3	115	30.3
4	61	16.1
5	19	5.0
6	11	2.9
7	8	2.1
8	4	1.1

Table B2. Frequencies and aggregation of golf districts

Golf district	#	Percent	Aggregated with
1 Skåne	53	13.9	11
2 Blekinge	8	2.1	3,4,5,6
3 Småland	35	9.2	2,4,5,6
4 Gotland	6	1.6	2,3,5,6
5 Halland	15	3.9	2,3,4,6
6 Göteborg	24	6.3	2,3,4,5
7 Bohuslän - Dalsland	16	4.2	6,8,9
8 Västergötland	24	6.3	6,7,9
9 Östergötland	16	4.2	6,7,8
10 Södermanland	16	4.2	12,13,14,15
11 Stockholm	44	11.6	1
12 Uppland	22	5.8	10,13,14,15
13 Västmanland	14	3.7	10,12,14,15
14 Örebro län	9	2.4	10,12,13,15
15 Värmland	16	4.2	10,12,13,14
16 Dalarna	16	4.2	17
17 Gästrikland - Hälsingland	12	3.2	16
18 Medelpad	4	1.1	19,20,21
19 Ångermanland	4	1.1	18,20,21
20 Jämtland & Härjedalen	8	2.1	18,19,21
21 Norr- & Västerbotten	18	4.7	18,19,20



Figure 1: Golf districts in Sweden. Published with permission from the Swedish Golf Federation.

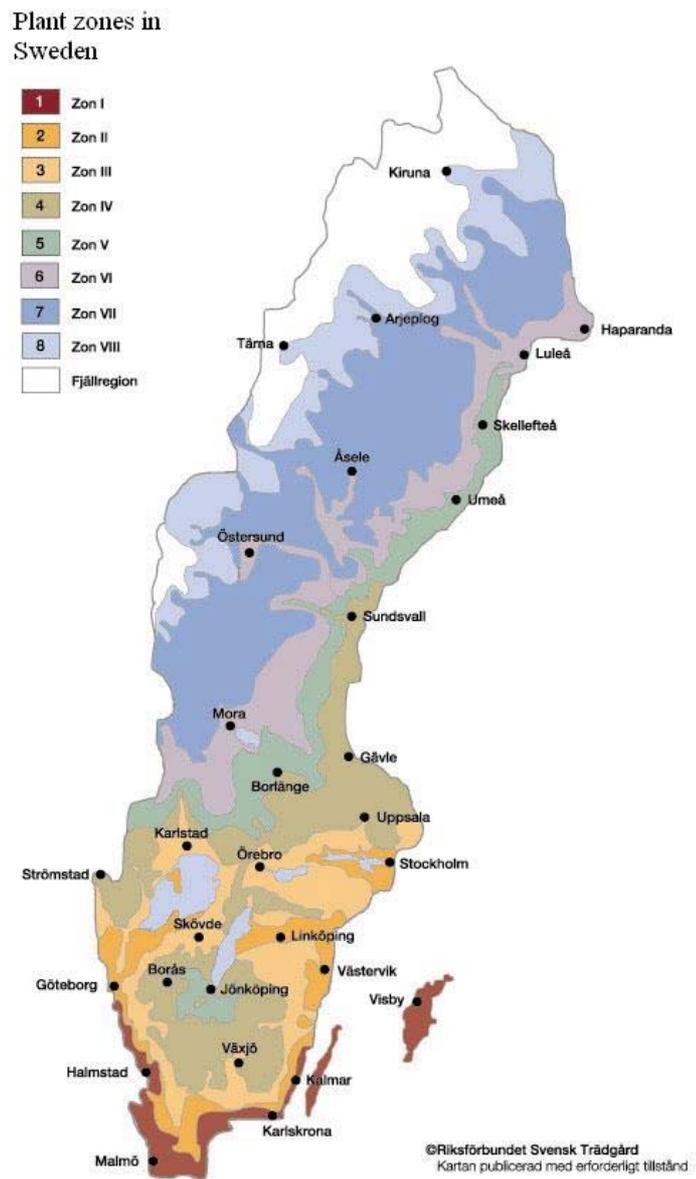


Figure 2: Plant zones in Sweden. Published with the permission of the Swedish Association for Leisure Gardeners.

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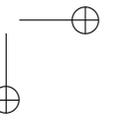
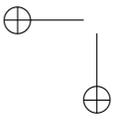
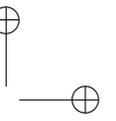
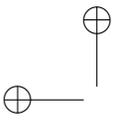
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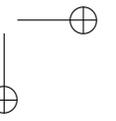
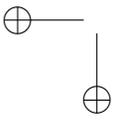
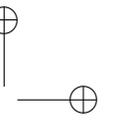
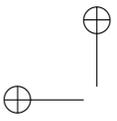
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