Join the Club - On the Attractiveness of Golf Club Membership

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June 14, 2004

Abstract

This paper concerns the attractiveness for membership in Swedish golf clubs. A representative voter model is derived and the attractiveness for member ship in golf clubs estimated using a unique data set on qualities of the golf course, the quality of neighboring courses and characteristics regarding the region where the golf club is located. Characteristics and composition of population within the municipality where the club is located have a significant impact on the attractiveness of the club. The attractiveness increases as the share of number of junior members decrease. Golf is found to be a substitute to publicly financed goods.

Keywords: spatial econometrics, sports, utility maximization

JEL classification: D71, L83, R12

1. Introduction

This paper concerns determinants of attractiveness for membership in Swedish golf clubs. One purpose is to test the hypothesis that memberships in a golf club, which is nearly exclusively financed by the members in the club, serves as a complement to other sports and recreational facilities provided by the local government, which is financed through the local governments budget. Another is to study which characteristics of the golf club and it's vicinity that makes one club more attractive relative another club. A model for the attractiveness of memberships in Swedish golf clubs is derived and estimated on a unique data set covering 99-percent of all golf clubs in Sweden for two years, 1998 and 1999. The data set contain information on required capital investments by the individual member, annual and entry fees, the number of senior as well as junior members in the club, the number of individuals standing in line waiting for a membership in each club etc. In addition, this data is complemented by information on local public characteristics such as total local public expenditures, local public spending on recreational and sports facilities as well as local tax prices.

Let us begin with a few "stylized facts" regarding the structure of the Swedish market for membership in golf clubs and the requirements for being able to play the game of golf at a Swedish golf course. The demand for memberships in golf clubs has increased dramatically during the last decade as the "golf boom" have swept across the country. Today, about half a million people are registered as members in a Swedish golf club and many individuals are standing in line waiting for membership in a club.[1] As the numbers of practices has increased so has the number of clubs and courses as well as the diversity of club types. But not to the same extent as the demand for golf memberships. Thirty years ago, only a few clubs in Sweden could boast the existence of an excess demand for memberships

*The authors would like to thank Niklas Hanes for valuable comments and suggestions on previous versions of this paper and Peder Axenstent for graphical editing of maps. We also thank Mats Enqvist and Anders Hammarström at the Swedish Golf Association (SGF) for a discussion regarding more practical aspects of managing and running a golf course, and Anneli Engardt (also at (SGF)) for providing the data on golf courses.

[1] The total population in Sweden where 8.9 million in 2003.

in their club. However, during the last decades, the game of golf has become one of the most popular sports in Sweden. From 1980 until 2003 the number of active (i.e. individual memberships in golf clubs) have increased from 78 540 to 593 873. At the same time, the number of golf clubs has increased from 151 to 399. Still, the Swedish Golf Federation (SGF) claims year 1997 that 200 new courses have to be built by the year 2004 in order to meet the increased demand for golf membership. It is interesting to notice that today, when many clubs face the situation where the number of individuals in line for a membership exceed the number of available memberships, it is more common that clubs profile themselves in order to attract certain member types. From this perspective it is of interest to study clubs' choice of profile and the determinants for choice of club to join or stand in line for contingent on the club profile.

In order to being able to play the game of golf at a Swedish golf course a membership in a golf club, Swedish or international, is required. The phenomenon of so-called "pay-and-play" courses is quite new in Sweden and there exist only a few "pay-and-play" courses. For long, the possibility of playing golf without club membership has been out of the question. After receiving a membership, most often associated with a capital investment[2] and an annual fee as well as an entrance fee, the new member is not allowed to enter the golf course (not even the course where she is a member) without a "green-card", a golfers "drivers license". The "green-card" ascertain that the player knows the basic rules and have the sense and etiquette of the game. Moreover, it also ascertains that the player knows the basic security rules, i.e. not to hit other players with neither the golf club nor the golf ball. "Green-cards" are usually issued by the local golf pro who also act as the examiner of new golf players and make sure they know these basic rules.

One characteristic that distinguishes the practice of golf from other sports or recreational activities in Sweden lies within the financing of courses. While most other sports and recreational facilities like soccer fields, ski slopes, ice hockey rinks, swimming baths etcetera are totally financed or at least heavily subsidized by means from the local government budget, golf courses are practically without exception financed by private means. This means that the total cost of construction and maintenance are paid for by either those who practice the game (or at least are members of the golf club) or by private enterprises. Independent of which, the fact remain that golf courses in Sweden are mainly (to 99-percent) financed by private funds.

The pricing of golf club membership has previously been studied by Shmanske (1998). The focus is on the pricing structure at public golf courses in the San Francisco Bay area. The same author contributes with an empirical study (Shmanske (1999)) of the relationship between the golf club's revenues and the characteristics of the golf course. Again data is collected from golf courses in the San Francisco Bay area but this analysis is also based on interviews from about 900 golfers. The pricing of a round of golf has been studied by Mulligan (2001). The basis is club theory and the issue of inefficiency of membership fees. Golf clubs and it's effect on housing prices with a hedonic approach have been empirically studied by Do and Grudnitski (1995).

[2] The general practise in Sweden has been that the capital investment is, without interest, repaid to the member when leaving the club. Only in a few cases the capital investments, or shares in the club, are 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 usually the one next in line.

This paper contributes to the previous literature in several ways. First, we are able to estimate the attractiveness for memberships in Swedish golf clubs based on information and characteristics of 99-percent of the total number of golf clubs in Sweden for two consecutive years, 1998 and 1999. The data is unique since it both provides information about the course and club characteristics and fee levels. We can also be sure that the choice parameters in our model to a large extent represents Swedish golf players since practice of the game of golf in Sweden demands a membership in a Swedish or international golf club and Swedes are in general members in at least one Swedish club. The golf club information is complemented by information on local public spending on recreational activities and tax prices. This makes it possible to test the hypothesis that these two goods, memberships in a golf club and publicly provided recreational facilities serves as complements to each other. Moreover, this study differs from the studies by Shmanske since in contrast to Sweden the US where pay-and-play (which does not require a golf club membership) is a well established industry. We can thereby draw conclusions about the determinants of the attractiveness of golf membership based on revealed preferences with respect to characteristics of the club in question.

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 descriptive the data and some institutional information. Econometric model, results, discussion of results are presented in Section 4 followed by a Summary and Appendix.

2. The Theoretical Model

The attractiveness of membership in a golf club will be modeled as a utility maximization problem for a representative individual j. The individual will join a club i or stand in line for membership in that club if that maximizes her utility. Consider a situation where this individual receives utility from consumption of four different goods, private consumption, c_i, locally provided public goods minus recreational and cultural services provided by the local council, g_i, recreation and culture services provided by the local council, r_i, and membership in one or more golf club(s), x_i. The member's possibility to get access to golf at a club is defined as the tee off possibilities during one year. The clubs can have different profiles regarding accessibility, they can offer high or low access to tee-offs. They signal their profile by the maximum number of members. The more members the less accessibility there is, or crowding or even congestion. When a club decides its profile it is reasonable to assume that it takes into account the number of existing clubs in its vicinity and so does the potential member in its decision of club to be a member in. Here, x is a count variable. Hence, individual i's utility function, where j is a member or in line for membership in a club i is assumed to take the form

$$U_{ij} = u_{ij}\left(c_{ij}, g_{ij}, r_{ij}, x_{ij}; Q_{ij}; Z_{ij}\right) \tag{1}$$

where Q_{ij} is a vector of characteristics on the golf course, and Z_{ij} is a vector of other exogenous conditions that affect the individual's utility. The cost per unit of g_{ij} and r_{ij} is the local tax price p_{ij}. The cost associated with her consumption of x_{ij} is the capital investment in the golf club, k_{ij}, times the interest rate d and the annual membership fee, m_{ij}. We disregard potential travel cost associated

with the use of the golf course. Denote individual i:s income by y_i, then individual i maximizes (1) with respect to c_{ij}, g_{ij}, r_{ij}, and x_{ij} subject to her budget constraint

$$c_{ij} = y_{ij} - p_{ij}\left(g_{ij} + r_{ij}\right) - x_{ij}\left(k_{ij} \cdot d + m_{ij}\right) \tag{2}$$

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

$$\begin{aligned} \max_{c_i, g_i, r_i, x_i} L_{ij} \quad = \quad & u_{ij}\left(c_{ij}, g_{ij}, r_{ij}, x_{ij}; Q_{ij}; Z_{ij}\right) + \\ & \lambda_{ij}\left(y_{ij} - p_{ij}\left(g_{ij} + r_{ij}\right) - x_{ij}\left(k_{ij} \cdot d + m_{ij}\right) - c_{ij}\right) \end{aligned} \tag{3}$$

and the first order conditions are given by

$$\begin{aligned} \lambda_{ij} \quad &: \quad y_{ij} - p_{ij}\left(g_{ij} + r_{ij}\right) - x_{ij}\left(k_{ij} \cdot d + m_{ij}\right) - c_{ij} = 0 \\ c_{ij} \quad &: \quad \frac{\partial u_{ij}}{\partial c_{ij}} - \lambda_{ij} = 0 \\ g_{ij} \quad &: \quad \frac{\partial u_{ij}}{\partial g_{ij}} - \lambda_{ij} \cdot p_{ij} = 0 \\ r_{ij} \quad &: \quad \frac{\partial u}{\partial r_{ij}} - \lambda_{ij} \cdot p_{ij} = 0 \\ x_{ij} \quad &: \quad \frac{\partial u_{ij}}{\partial x_{ij}} - \lambda_{ij}\left(k_{ij} \cdot d + m_{ij}\right) \leq 0,\ x_{ij} \geq 0,\ x_{ij} \cdot \left(\frac{\partial u_{ij}}{\partial x_{ij}} - \lambda \cdot \left(k_{ij} \cdot d + m_{ij}\right)\right) \end{aligned}$$

Assuming interior solutions, the attractiveness individual j subscribes club x_{ij} can be written on reduced form as

$$x_{ij}^{*} = x_{ij}\left(y_{ij}, p_{ij}, k_{ij} \cdot d, m_{ij}; Q_{ij}; Z_{ij}\right) \tag{4}$$

The model set out in the previous section implies that an individual may demand memberships in more than one golf club. However, the available data does not make it possible to consider the number of memberships on an individual level. Instead we assume that each individual has or is in line for one membership only and this study focus on the determinants of the attractiveness of golf clubs given this assumption. The individuals who prefers the same golf club are assumed to have the same preferences regarding the characteristics of that club and they are all assumed to be living in the same region equally affected in their behavior by the same characteristics in that region. This assumption enables us to summarize all the individual attractiveness equations (expression (4)) to attractiveness on club level. The attractiveness of golf club i is then determined by,

$$x_i^{*} = \sum_{j=1}^{J} x_{ij}^{*} = x_i\left(y_i, p_i, k_i, m_i; Q_i; Z_i\right) \tag{5}$$

The income variable y_i is defined as the average income in the region where the golf club is located and Z_i consists of characteristics of that region which is assumed to affect the utility of its inhabitants equally. For simplicity the interest rate is normalized to one.

Of particular interest are the impact of the capital investment, $k_i \cdot d$, the annual membership fee m_i, and the tax price p_i on x_i, i.e. $\partial x_i / \partial\left(k_i \cdot d\right)$, $\partial x_i / \partial m_i$, and $\partial x_i / \partial p_i$. The tax price is relevant since

it indicates the degree of subsidization within the municipality. The signs of these three derivatives are determined by

$$sgn\left(\frac{\partial x_i}{\partial\left(k_i \cdot d\right)}\right) = sgn\left(\frac{\partial^2 u_i}{\partial c_i \partial r_i} \cdot \frac{\partial^2 u_i}{\partial r_i \partial x_i} - \frac{\partial^2 u_i}{\partial c_i \partial x_i} \cdot \frac{\partial^2 u_i}{\partial r_i^2}\right) \tag{6}$$

$$sgn\left(\frac{\partial x_i}{\partial m_i}\right) = sign\left(\frac{\partial^2 u_i}{\partial c_i \partial r_i} \cdot \frac{\partial^2 u_i}{\partial r_i \partial x_i} - \frac{\partial^2 u_i}{\partial c_i \partial x_i} \cdot \frac{\partial^2 u_i}{\partial r_i^2}\right) \tag{7}$$

and

$$sgn\left(\frac{\partial x_i}{\partial p_i}\right) = sign \tag{8}$$

Here, (6) and (7) are assumed to be negative while (8) is assumed to be positive. That is, as the capital investment, the membership fee, and/or the interest rate increases, the demand for memberships decreases. In other words, golf club membership is regarded as a normal good. In addition, given that public goods are normal goods an increase in the local tax price for locally provided public could either make golf club memberships more or less attractive depending on if Golf membership is a substitute or complement to other publicly financed leisure activities. A complete derivation of these results are given in the Appendix A.

3. Data

The data used originate from two sources. Information about characteristics of the different golf clubs has been provided by the Swedish Golf Federation (SGF) and refer to two years, 1998 and 1999. Data on average income levels, local public expenditures and tax prices for the two years 1998 and 1999 has been provided by Statistics Sweden (SCB). The total number of golf clubs in Sweden varied between 382 in 1998 and 385 in 1999. Descriptive statistics of some of the characteristics of the different golf club's are presented in Table 1.

Table 1. Descriptive statistics, golf clubs by year.

	Minimum		Maximum		Mean		Standard dev.		N	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
The club's age	0	0	96	97	21.1	21.9	18.4	18.5	381	385
No of holes	0	0	36	36	17.2	17.5	6.6	6.6	381	385
No of senior members	20	4	4115	4742	905.2	941.7	436.5	466.7	381	385
No of junior members	0	0	524	557	187.8	191.3	90.3	89.3	381	385
No of people in line	0	0	1836	1983	127.5	140.0	281.2	297.8	381	385

Most of the golf clubs and golf courses in Sweden are located in the southern part of the country and around the Stockholm area. Swedish golf clubs are organized in 21 golf district. Skåne (southern Sweden) and Stockholm are the two largest districts in terms of number of golf clubs. The typical (average) golf club was founded in 1983, has approximately 1 200 members and a golf course with 18 holes. According to the Swedish Golf Federation (1997) this is an increase compared to previous years

when the average number of members have been about 800. At that time this figure was regarded as the maximum number of members with respect to accessibility to golf play (capacity constrains). On average, the number of junior members (under the age of 18) in each club are about 190 ranging from 0 to 557. An increasing number of members or potential members is not a problem if the supply of golf follows the same direction. As mentioned in the introduction this is not what is happening in Sweden. The number of active players in relation to the number of golf courses has more than doubled between 1980 and 2000. This is illustrated in 1 showing the increase in active members[3] and number of golf courses (with 9 to 36 holes).

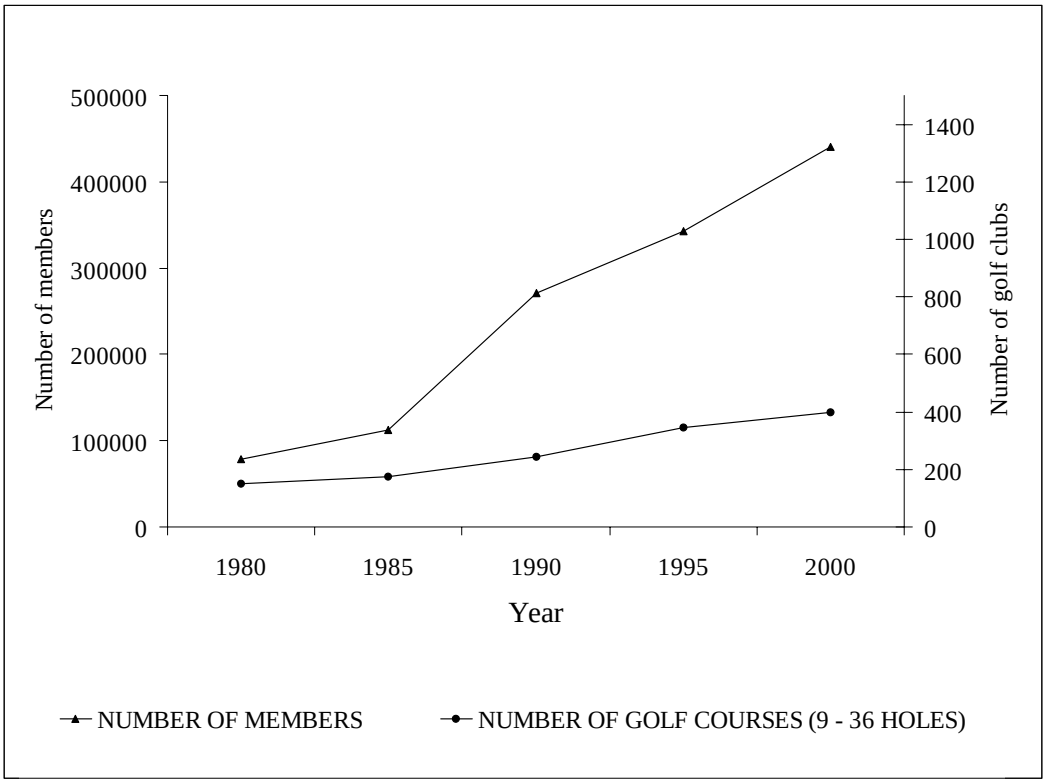

Figure 1: Development of number members and golf courses in Sweden 1980 - 2000.

The major increase in number of members took place between the year 1985 and 1990. Due to this increase the Swedish Golf Federation (SGF) argues for an increase in exploitation of new clubs and courses. The oldest club is 97 years old and was founded 1902 in Gothenburg. The age of an golf club is said to be an indicator of the condition of the golf course and thereby the quality of the golf club. However with time there is probably also a need for improvements due to wear and tear of the course temporarily reducing its condition. Another thing is that the technique used to build golf courses has developed with time. The need for reconstruction of, for example, the greens are probably higher for

[3] Given that you have a membership in a Swedish golf club you can be an active or passive member. The passive membership is an alternative when you temporarily can not use your membership.

older clubs than for younger ones. Therefore the age of the golf club enters the empirical analysis in a nonlinear form. The age is calculated as from the year when the golf club became an official member of the Swedish Golf Federation (SGF).

Another indicator of condition of the golf course is the plant zone in which the club is located. Sweden is divided into eight different plant zones. Plant zone one is characterized by lushness and the higher the number of the plant zone the less lushness there is. The plant zone may in some respect compensate the age of the club with respect to the condition of the golf course. Further, the geographical location of the golf club may compensate a higher number of the plant zone. A golf club in the southern golf districts with for example plant zone four is likely to be more lushness than a club in the same plant zone located in some of the northern golf districts reflecting better condition. Plant zone three is most common zone in our data, with about a third of the observations. Maps of the different plant zones and golf districts are found in Appendix B. Table 4 and 5 in Appendix B presents descriptive statistics and frequencies for the golf districts and plant zones, respectively.

As mentioned in the introduction golf play in Sweden demands a membership in a Swedish golf clubs. There are three types of fees. When a person is offered a membership he or she has to pay an entry fee which is sunk and a capital investment which in general is refundable (without appreciation) if the member exits the club. If so, without the appreciation. In addition to that the members pay an annual fee. Descriptive statistics on the different types of member fees are given in Table 2.

Table 2. Descriptive statistics, Member fees by year

Fee	Member	Mean		Stand.dev.		Minimum		Maximum	
	category	1998	1999	1998	1999	1998	1999	1998	1999
Entry	Senior	1182.62	1206.18	2116.98	2592.57	0	0	16400	35000
	Junior	361.74	402.31	988.43	1531.89	0	0	13000	25000
Capital	Senior	7027.91	6617.25	8870.97	6184.82	0	0	110000	33000
	Junior	237.76	325.66	1687.97	1917.55	0	0	30000	30000
Annual	Senior	2363.55	2447.64	783.29	802.90	450	0	6300	6890
	Junior	1154.59	1187.12	389.03	398.53	0	0	2600	2890

The distribution of junior entry fee and capital investment indicates that the clubs really differs in their policy regarding fees paid for junior members, probably reflecting their policy towards that member category. Therefore, the number of junior members in relation to number of senior members in each club will be used as an club characteristic in the empirical analysis. The distribution of the senior fees is perhaps more surprising with respect to the minimum values but again this probably reflects club profile. The fee structure measures the potential entry barrier while the profile variable defined above reflects observed behavior. Descriptive statistics for the municipalities in which the golf clubs are located are found in table 6 in Appendix B.

4. The Econometric Specification and Results

In order to determine the factors affecting the attractiveness of a golf club and its relationship to publicly financed recreation and cultural services we use data on municipal and club level. The attractiveness of golf club i is estimated with ordinary least square and the regression equation is

$$x_i = \alpha_i + \beta_y y_i + \sum_{Z=1}^{3} \beta_Z Z_i + \beta_k k_i + \beta_m m_i + \sum_{Q=1}^{3} \beta_Q Q_i + \beta_p p_i + \epsilon_i \tag{9}$$

where the error term is assumed to be normally distributed and $E[\epsilon_{jl}] = 0$. The income (y_i) is as mentioned above the average income in the region where the region is defined by the geographical area corresponding to the municipality in which the golf club is located. The municipality is characterized by the population density, share of citizens in different age categories[4], share of citizens with higher education, unemployment rate, and average income for citizens aged 16 and over. All these variables are included in Q_i. There are three variables included in Z_i that besides the fee structure characterize the club. These are the age of the club (assumed to be nonlinear), the plant zone in which the club is located, and the member structure of the club. The fees are the entrance fee and the capital investment (k_i) and the annual fee (m_i). In order to see if golf membership is a complement or substitute to other leisure activities publicly founded the annual local government spending on culture and leisure per capita is included in the analysis. This is reflected by the local tax price (p_i) which is defined as the total subsidies divided by the total expenditure in the municipality in which the golf club is located. The tax price, age categories, unemployment rate, and level of higher education are expressed in percent.

From Table 1 above it is apparent that the data contains newly founded clubs and that some clubs do not even have a golf course. Therefore golf clubs without an existing golf course are excluded from the analysis. Another exclusion is Björklidens Golf Club a so-called mail-box club. That is, a club with a large share of members permanently living elsewhere in Sweden. Björkliden is located in the Norrbotten-Västerbotten golf district. In this case, Björkliden attracts members presumably living in the Stockholm area (very remotely located from Björkliden, see Figure 2 in Appendix B). This is explained by the low member fees at Björkliden and long waiting time for membership in golf clubs in Stockholm. A membership in a mail-box club gives them to right to play in Stockholm on green fee. The potential counter acting effect on quality from plant zone and golf district is measured with a plant zone variable and dummy variables for the golf districts. The golf districts have been aggregated into 7 districts and the two largest districts, Skåne and Stockholm, are reference categories. See Table 4 and Figure 2 in Appendix B for a presentation of the golf districts.

Three different specifications of the model are presented in Table 3. The level of higher education and the unemployment rate are both correlated (0.58 and -0.40) with the average income. The first specification includes the first two regional characteristics, the second specification the average income and finally for comparison the third model is specified with all three variables. It is obvious that the specification affects the other parameter estimates.

[4]The age groups are defined as number of citizens in the ages of 16-24, 25-64, and 65 and older. The share of citizens aged 15 and younger are reference category.

Table 3. Estimations results, OLS ($N = 724$)

Variable	β	$t-value$	β	$t-value$	β	$t-value$
Constant	-55.08	-0.04	-175.87	-0.13	-354.64	-0.26
			Club characteristics			
Age	11.16	3.29	11.49	3.53	11.57	3.48
Age^2	-0.01	-0.29	-0.01	-0.26	-0.02	-0.41
# Holes	40.44	9.07	39.66	8.69	40.35	8.98
Plant zone	-44.89	-2.38	-43.38	-2.12	-47.61	-2.34
Entry fees junior	0.01	1.89	0.01	2.27	0.01	2.08
Entry fees senior	-0.00	-1.40	-0.00	-1.52	-0.00	-1.60
Annual fee junior	0.05	1.11	0.04	1.04	0.04	1.07
Annual fee senior	-0.08	-1.67	-0.07	-1.50	-0.08	-1.66
District 2,3,4,5,	-41.69	-0.63	-33.24	-0.48	-28.23	-0.41
District 6,7,8,9	36.72	0.77	32.32	0.66	41.69	0.86
District 10,12,13,14,15	-9.59	-0.16	-5.54	-0.09	1.83	0.03
District 16,17	97.17	1.07	135.20	1.47	132.56	1.43
District 18,19,20,21	347.89	3.12	379.01	3.24	376.15	3.22
Profile	-287.61	-4.50	-253.70	-3.98	-282.04	-4.48
			Region characteristics			
Population density	0.09	2.39	0.04	1.20	0.06	1.43
Average income	6.02	4.45	-	-	3.15	1.65
Unemployment rate	-	-	-66.62	-3.27	-41.91	-1.84
Higher education	-	-	17.31	3.29	12.16	2.12
Tax price	0.25	4.79	0.14	2.70	0.20	3.51
Age 16-24	19.08	1.10	-20.39	-0.99	-3.81	-0.16
Age 25-64	-5.66	-0.29	19.77	0.97	9.90	0.47
Age 65+	-12.60	-0.90	-7.70	-0.55	-5.66	-0.41
R^2_{adj}		0.46		0.46		0.46

The results in Table 3 show that the profile of the club has significant impact on its attractiveness. Clubs with a friendly profile towards junior members, low barrier to entry and high share of junior members, is less attractive. An increasing number of holes that the club can offer and its age increases the attractiveness. The more holes a club has the less is probably the capacity constraint. The effect of plant zone is what one could expect. The less lushness, indicated by higher plant zone number, the less attractive is the club. The counter acting effect from golf district to plant zone is evident for a comparison of the Norr and Västerbotten district and the reference districts, Stockholm and Skåne. When it comes to the regional characteristics there is a significant positive effect from the tax price and depending on the model specification from level of higher education or average income. Higher unemployment level suggests decreasing attractiveness of golf club memberships. The age structure does not affect the attractiveness of golf club memberships. The population density is not

significant for two of the model specifications. One conclusion is that it is not how densely populated the reception area is that matters for a clubs attractiveness, it is the composition of its population that is important. The interpretation of the local tax price parameter is that golf club membership is a substitute good to consumption of publicly financed goods, preferable leisure and culture activities, given that these are normal goods. The results in Table 3 are corrected for heteroscedasticity in accordance with White's corrected covariance matrix.

5. Conclusions

This paper analyzes the attractiveness of membership in Swedish golf clubs. The paper is motivated by the current increasing interest for the game of golf in Sweden and the by the Swedish Golf Federation stated need for more golf clubs and courses in Sweden. This is also interesting since this sport activity significantly differs with respect to financial structure compared to other leisure activities in Sweden. Approximately 7 percent of the Swedish population are members in a Swedish golf club and more are waiting in line for a membership. The paper provides a theoretical model that describes the attractiveness of a golf club membership as a function of characteristics of the club and the region in which the golf club is located. The region is defined as the municipality. This function is derived from a representative individual utility function. The attractiveness of a club is defined as the members plus the people in line for a membership. This definition is justified by the fact that golf play in Sweden demands a membership in a Swedish or international golf club. All individuals in line for a membership or already members in the same club are assumed to have the same utility and live in the same municipality (with the same set of region characteristics). This could in some extreme cases be misleading but is in general in line with observed behavior. The most explicit post box club is excluded from this study in order to prevent such problems. The empirical analysis is based on a data set on all Swedish golf clubs 1998 and 1999. The data contains information about member and fee structure as well as the age of the club. The empirical results suggest that attractiveness of membership in Swedish golf clubs are determined by the age of the club, the plant zone in which it is located, the number of holes that the club can offers, and also its policy regarding junior members. Region characteristics are also important for the attractiveness of golf clubs or its citizens desire to play golf. The population density of the region is not so important as the composition of its population expect for age structure. But unemployment and higher education have negative respectively positive significant effect on the attractiveness of golf club memberships. There is also evidence of that golf club membership are substitute to consumption of publicly financed leisure and cultural activities. This is interesting since golf play is the only (or at least one of few) completely privately financed sport activity in Sweden while other leisure, sports, and cultural activities are more or less subsidized with public funds.

Appendix A. Derivation of marginal effects.

Given the first order conditions

$$\lambda_i \quad : \quad y_i - p_i\left(g_i + r_i\right) - x_i\left(k_i \cdot d + m_i\right) - c_i = 0 \tag{10}$$

$$c_i \quad : \quad \frac{\partial u_i}{\partial c_i} - \lambda_i = 0 \tag{11}$$

$$g_i \quad : \quad \frac{\partial u_i}{\partial g_i} - \lambda_i \cdot p_i = 0 \tag{12}$$

$$r_i \quad : \quad \frac{\partial u_i}{\partial r_i} - \lambda_i \cdot p_i = 0 \tag{13}$$

$$x_i \quad : \quad \frac{\partial u_i}{\partial x_i} - \lambda_i\left(k_i \cdot d + m_i\right) \leq 0,\ x_i \geq 0,\ x_i \cdot \left(\frac{\partial u_i}{\partial x_i} - \lambda \cdot \left(k_i \cdot d + m_i\right)\right) \tag{14}$$

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

$$\left|\overline{H}\right| = \begin{vmatrix} 0 & -1 & -p_i & -p_i & -\left(k_i \cdot d + m_i\right) \\ -1 & \frac{\partial^2 u_i}{\partial c_i^2} & \frac{\partial^2 u_i}{\partial g_i \partial c_i} & \frac{\partial^2 u_i}{\partial r_i \partial c_i} & \frac{\partial^2 u_i}{\partial x_i \partial c_i} \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial g_i} & \frac{\partial^2 u_i}{\partial g_i^2} & \frac{\partial^2 u_i}{\partial r_i \partial g_i} & \frac{\partial^2 u_i}{\partial x_i \partial g_i} \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial r_i} & \frac{\partial^2 u_i}{\partial g_i \partial r_i} & \frac{\partial^2 u_i}{\partial r_i^2} & \frac{\partial^2 u_i}{\partial x_i \partial r_i} \\ -\left(k_i \cdot d - m_i\right) & \frac{\partial^2 u_i}{\partial c_i \partial x_i} & \frac{\partial^2 u_i}{\partial g_i \partial x_i} & \frac{\partial^2 u_i}{\partial r_i \partial x_i} & \frac{\partial^2 u_i}{\partial x_i^2} \end{vmatrix} \geq 0 \tag{15}$$

The impact from $k_i \cdot d$ on x_i^* is given by

$$\frac{\partial x_i^*}{\partial\left(k_i \cdot d\right)} = \frac{\begin{vmatrix} 0 & -1 & -p_i & -p_i & -x_i \\ -1 & \frac{\partial^2 u_i}{\partial c_i^2} & \frac{\partial^2 u_i}{\partial g_i \partial c_i} & \frac{\partial^2 u_i}{\partial r_i \partial c_i} & 0 \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial g_i} & \frac{\partial^2 u_i}{\partial g_i^2} & \frac{\partial^2 u_i}{\partial r_i \partial g_i} & 0 \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial r_i} & \frac{\partial^2 u_i}{\partial g_i \partial r_i} & \frac{\partial^2 u_i}{\partial r_i^2} & 0 \\ -\left(k_i \cdot d - m_i\right) & \frac{\partial^2 u_i}{\partial c_i \partial x_i} & \frac{\partial^2 u_i}{\partial g_i \partial x_i} & \frac{\partial^2 u_i}{\partial r_i \partial x_i} & -\lambda_i \end{vmatrix}}{\left|\overline{H}\right|} \tag{16}$$

Using Laplace expansion

$$\frac{\partial x_i^*}{\partial\left(k_i \cdot d\right)} = \frac{x_i \cdot \frac{\partial^2 u_i}{\partial g_i^2} \cdot \left(\frac{\partial^2 u_i}{\partial c_i \partial r_i} \cdot \frac{\partial^2 u_i}{\partial r_i \partial x_i} - \frac{\partial^2 u_i}{\partial c_i \partial x_i} \cdot \frac{\partial^2 u_i}{\partial r_i^2}\right)}{\left|\overline{H}\right|} \tag{17}$$

and the impact from m_i on x_i^* is given by

$$\frac{\partial x_i^*}{\partial m_i} = \frac{\begin{vmatrix} 0 & -1 & -p_i & -p_i & -x_i \\ -1 & \frac{\partial^2 u_i}{\partial c_i^2} & \frac{\partial^2 u_i}{\partial g_i \partial c_i} & \frac{\partial^2 u_i}{\partial r_i \partial c_i} & 0 \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial g_i} & \frac{\partial^2 u_i}{\partial g_i^2} & \frac{\partial^2 u_i}{\partial r_i \partial g_i} & 0 \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial r_i} & \frac{\partial^2 u_i}{\partial g_i \partial r_i} & \frac{\partial^2 u_i}{\partial r_i^2} & 0 \\ -\left(k_i \cdot d + m_i\right) & \frac{\partial^2 u_i}{\partial c_i \partial x_i} & \frac{\partial^2 u_i}{\partial g_i \partial x_i} & \frac{\partial^2 u_i}{\partial r_i \partial x_i} & -\lambda_i \end{vmatrix}}{\left|\overline{H}\right|} \tag{18}$$

$$\frac{\partial x_i^*}{\partial m_i} = \frac{x_i \cdot \frac{\partial^2 u_i}{\partial g_i^2} \cdot \left(\frac{\partial^2 u_i}{\partial c_i \partial r_i} \cdot \frac{\partial^2 u_i}{\partial r_i \partial x_i} - \frac{\partial^2 u_i}{\partial c_i \partial x_i} \cdot \frac{\partial^2 u_i}{\partial r_i^2}\right)}{\left|\overline{H}\right|}$$

We know that $x_i > 0$ and $\frac{\partial^2 u_i}{\partial g_i^2} < 0$ so the sign of expressions 17 and 18 will be determined by the expression in brackets in the numerator. If this term is positive(negative) the marginal effect on attractiveness of the capital investment or member fee is negative(positive). The sign could go either way and will be empirically determined. The impact from p_i on x_i^* is given by

$$\frac{\partial x_i^*}{\partial p_i} = \frac{\begin{vmatrix} 0 & -1 & -p_i & -p_i & -(g_i + r_i) \\ -1 & \frac{\partial^2 u_i}{\partial c_i^2} & \frac{\partial^2 u_i}{\partial g_i \partial c_i} & \frac{\partial^2 u_i}{\partial r_i \partial c_i} & 0 \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial g_i} & \frac{\partial^2 u_i}{\partial g_i^2} & \frac{\partial^2 u_i}{\partial r_i \partial g_i} & -\lambda_i \\ -p_i & \frac{\partial^2 u_i}{\partial c_i \partial r_i} & \frac{\partial^2 u_i}{\partial g_i \partial r_i} & \frac{\partial^2 u_i}{\partial r_i^2} & -\lambda_i \\ -(k_i \cdot d + m_i) & \frac{\partial^2 u_i}{\partial c_i \partial x_i} & \frac{\partial^2 u_i}{\partial g_i \partial x_i} & \frac{\partial^2 u_i}{\partial r_i \partial x_i} & 0 \end{vmatrix}}{\left|\overline{H}\right|} \tag{19}$$

$$\begin{aligned} \frac{\partial x_i^*}{\partial p_i} &= \frac{p_i(A) - (k_i \cdot d + m_i) - (\lambda_i(pB) - (g_i + r_i))}{\left|\overline{H}\right|} \\ A &= \frac{\partial^2 u_i}{\partial c_i \partial r_i} \cdot \frac{\partial^2 u_i}{\partial g_i \partial x_i} + \frac{\partial^2 u_i}{\partial c_i \partial x_i} \\ B &= \frac{\partial^2 u_i}{\partial r_i \partial c_i} + \frac{\partial^2 u_i}{\partial g_i \partial c_i} \cdot \frac{\partial^2 u_i}{\partial r_i \partial g_i} \end{aligned}$$

We know that $(g_i + r_i) > 0$, $\frac{\partial^2 u_i}{\partial g_i^2} < 0, (k_i \cdot d + m_i) > 0$, the tax price can go either way therefore the sign of expression 19 will be determined by the first and fourth expression in brackets in the numerator. If this term is positive(negative) the partial effect on attractiveness of the tax price is negative(positive). The sign could go either way and will be empirically determined.

Appendix B. Figures and tables.

Table 4. 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

Table 5. 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

Figure 2: Golf districts in Sweden. Used with permisson from the Swedish Golf Federation. www.golf.se

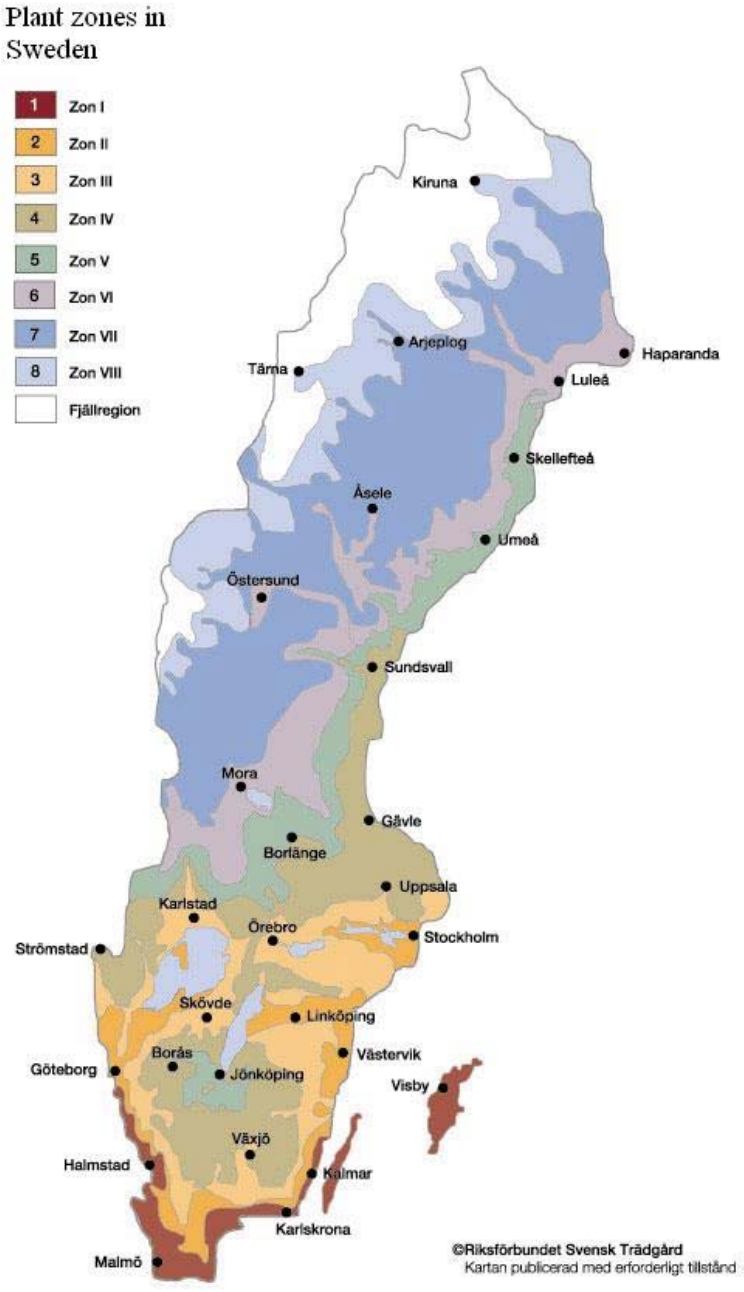

Figure 3: Plant zones in Sweden. Published with permission from the Swedish association for leisure gardeners.

Table 6. Descriptive statistics regions
(municipality in which the golf club is located)

Variable	Mean	Stand.dev.	Min	Max
Age 0 - 6	7084.99	13084.60	202	56660
Age 7-15	9498.49	15537.79	306	67031
Age 16-24	9572.50	17396.29	212	72748
Age 25-64	49584.17	97090.44	1233	423735
Age 65+	15306.11	28595.49	790	126172
Population density	337.79	910.29	0.34	3970.86
Higher education level	15.47	6.09	4.37	34.81
Unemployment rate	2.98	0.91	0.57	6.20
Average income	161.66	21.32	126.60	288.50
Tax price	16.17	86.49	-1657.51	42.07
N				380

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