# DIFFERENCES IN THE HUNGARIAN HOUSEHOLDS' SPORT EXPENDITURES[1]

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***Abstract:*** The paper searches the differences between the groups of Hungarian households regarding the sport expenditures' presence in household budget and determining factors. I used the latest Household Budget Survey (HBS) of the Hungarian Central Statistical Office from 2008 which contains data of more than 7000 households. My methods were logit and probit models, where the presence of sport expenditures were explained in households' budget. The increase of the following indicators has a positive effect onto the possibility of the sport expenditures: income status, level of education, number of the children in the household, size of settlement. The region of the household is determining the presence of the sport expenditures too, however sex of the household's head does not play a significant role.

**Key words**: sport expenditures, logit and probit models, socio-economic factors, household budget survey

## Introduction

The aim of the paper is to calculate the most important characteristics of Hungarian households with sport consumption. I analysed the socio-demographical factors, which differentiate the sport consumer households from the non-consumers and which have determining role at presence of sport expenditures in households' budgets.

There are some consumption-models in the international sport marketing literature, which analyse the basic determinants of sport consumption like socialisation, participation, attitudes and other internal (psychological, physiological) and external environmental (cultural, sociological) factors (Figure 1).

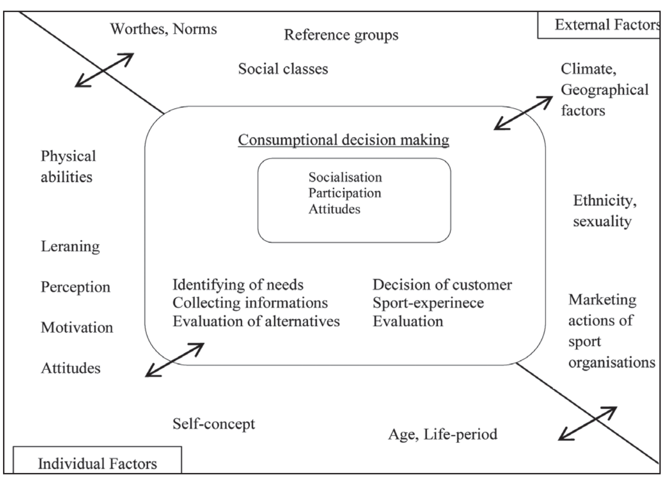


***Figure 1.*** Consumer Behaviour in Sport
Source: *Mullin et al.* (2007)

These are complemented with the situational factors like physical and social environment, problem determination, time, former experiences (Figure 2). All these start and influence the decision making process of sport consumer.

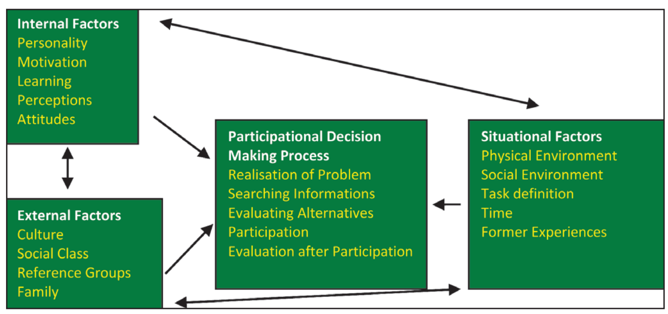


***Figure 2.*** Influencing Factors of Decision Making Process in Sport Consumption
Source: *Neulinger* (2007)

I used the model of *Pawlowski* (2009) as a theoretical frame, who analysed the sport expenditures of German households (Figure 3). He takes into consideration the economic factors too by differentiating not only the influence factors both on demand and supply side but the socio-economical and demographical factors too, which affect onto the leisure time preferences. The interaction of them produces the leisure time demand.

The two most important influencing factors are the disposable free time and the disposable income on the demand

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side, which are the axes of a two dimensional coordinate-system in which the different household types can be placed. The shifting in this system is influenced by number and age of children in the household, social state of the household, educational level of the head of household and expenditures of the household.

I analysed the sport expenditures of Hungarian households based on the model of Pawlowski but only the aggregated expenditures, which contains the expenditures of passive and active sport too (Figure 3).

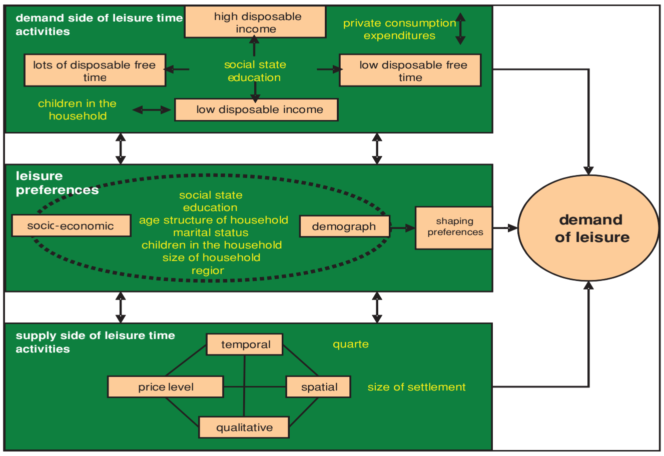


***Figure 3.*** Theoretical Model of the Demand in the Leisure Time Sector
Source: *Pawlowski* (2009)

## Database and methodology

Database of the analysis was the latest Household Budget Survey (HBS) of the Hungarian Central Statistical Office (HCSO) from the year 2008. It contains the data of 7 650 households, which means 19 637 people. The HBS is representative for the whole Hungarian population.

The database has detailed information about the composition of households in the following dimensions: type of settlement; regions; age, level of education, economic activity and sex of the heads of households; number of children under 20. It gives information about the income situation and the structure of expenditures in households' budgets.

The consumption structure of households' is following the Classification of Individual Consumption according to Purpose (COICOP) nomenclature. This paper uses the sport items of the 9th division, namely free time and culture (Table 1).

***Table 1.*** Types of Expenditures Included in the Analysi

| COICOP number | Type of Expenditure |
|---|---|
| *92110* | *Staple sporting and camping goods* |
| *92311* | *Accessories of staple sporting goods and musical instruments* |
| *92312* | *Reparation of staple sporting goods and musical instruments* |
| *93210* | *Sporting and camping goods* |
| *94111* | *Sport events, entrance fees* |
| *94112* | *Sport-, music-, dancing course* |
| *94113* | *Other leisure time services* |

Source: HCSO (2000)

We wanted to know, what are the determining factors of spending sport or not. Firstly we had to identified all the households, which have sport expenditures in their budget. After that a binary variable was created, which was explained by different parameters of the households (independent variables). We used two similar regression models for this: logit and probit models.

### *Logit and Probit Models*

The building of logit and probit models had begun with creating a binary dependent variable, which is

$$y = \begin{cases} 1 \quad if \quad y^* \rangle\, 0,\ when\ \ the\ household\ has\ sport\ \exp\ enses \\ 0 \quad if \quad it\ hasn't \end{cases} \qquad (1)$$

where y = dependent variable, y* = latent variable. (*Maddala* 2004)

Dependent variable was analysed by dummy variables (sex, age, educational level, economic activity of the head of household's; type of settlement and region of the household, and number of children in the household) and a metric variable (net income).

There is a latent regression behind both of the models. Latent regression models the personal utility based on the decision between two alternate ($y_i$) (spend for sport [$y_i$=1] or not to spend for sport [$y_i$= 0]). The person takes into account the possible reachable utilities through of pondering of the decision alternates ($U^a$ is at $y_i$=1 and $U^b$ is at $y_i$= 0). The person will decide basing on higher utility of the alternates. He will spend on sport if $U^a \langle U^b$ and he will not spend if $U^a \langle U^b$. However these utilities are not observable, so we call $y_i^*$ as a latent variable. Binary result of decision is observable only, which indicator is $y_i$= 1 if he spend for sport, and $y_i$= 0 if he does not. The latent spending willingness resultant from comparison of the alternates is:

$$y_i^* = U_i^a - U_i^b \qquad (2)$$

so

$$y_i^* = \alpha_i^a + \sum_{j=1}^{k} \beta_j^a x_{ij} - \alpha_i^b - \sum_{j=1}^{k} \beta_j^b x_{ij} + \varepsilon_i^a - \varepsilon_i^b = \alpha_i + \sum_{j=1}^{k} \beta_j x_{ij} + u_i \cdot \qquad (3)$$

The result of the observable real decision is:

$$y_i = \begin{cases} 1, & if \quad y_i^* \rangle\, 0 \\ 0, & if \quad y_i^* \le 0 \end{cases} \qquad (4)$$

The probit and the binary logit models are both based on this latent regression. We get the followings based on this:

$$P(y_i = 1) = P\left[u_i \rangle - \left(\alpha_i + \sum_{j=1}^{k} \beta_j x_{ij}\right)\right] = 1 - F\left[-\left(\alpha_i + \sum_{j=1}^{k} \beta_j x_{ij}\right)\right] \qquad (5)$$

where $F$ is distribution function of $u$.

The appropriate possibilities are given by the maximisation of the likelihood function in both models, because $y_i$ is a realisation of a binomial process:

$$L = \prod_{y_i=1} P_i \prod_{y_i=0} (1 - P_i) \qquad (6)$$

The only difference between of the two functions is the different specification of the $u_i$ error term. The error term is handled as standard normal distribution in the probit model and it is handled as a logistic distribution in the binary logit model.

The estimation of chance is the following after that: (*Székelyi-Barna* 2005):

$$\frac{P(y_i = 1)}{1 - P(y_i = 1)} = e^{\alpha_i + \sum_{j=1}^{k} \beta_j x_{ij}}. \tag{7}$$

So $P(yi = 1)$ is the following (which means, that the household spends for sport):

$$P(y_i = 1) = \frac{e^{\alpha_i + \sum_{j=1}^{\kappa} \beta_i x_{ij}}}{1 + e^{\alpha_i + \sum_{j=1}^{k} \beta_i x_{ij}}}. \tag{8}$$

Marginal effects of the independent variables are not given by the estimated coefficients of the models, but the partial derives of the possibility values by the single variables ($x_j$).

$$\frac{\partial P(Z)}{\partial x_j}. \tag{9}$$

These effects should not be corrected independent from the model types, they are compared with each other. The marginal effect is the change in the possibility of spending sport or not, when the dependent variable changes.

Based on the practical experiences there are not significant differences in the results of the two model types. Independent from this the estimated results of the two models are not comparable. The estimations from the binary logit model have to be multiplied with $\sqrt{3}/\pi$, to be comparable with the results from the probit model. After *Amemiya* (1981) the multiplying with 1/1.6 = 0.625 is a better transformation.

We used McFadden $R^2$ and the rate of correctly predictions to measure the goodness of fitting.

We used the SPSS 19.0 and GRETL 1.8.0 softwares for modelling process.

## Results

### *Summarized and Average Sport Expenditures*

I calculated the number of the households with sport expenditures in their budget of the HBS 2008. After that we calculated the ratio of them related to the full sample. There were 1 346 households with any sport expenditures, which means 17.59% from the full sample (Table 2).

I calculated the total value of the households' sport expenditures on national economy level after that (Table 3). Using the weight numbers of households in the HBS the result is, that the Hungarian households spend about 113.7 billion Hungarian Forints (HUF) for sport in 2008. The average value per household – which means more than 3.8 million households in Hungary – is barely HUF30 000 and it is HUF11 000 per person – total population is fast 9.9 million people – if we take into consideration the households without sport expenditures too.

It gave a more realistic situation when I used only the households with sport expenditures (17.56%). The average sport expenditure of a Hungarian household is 173 000 forints in this case. The same value per person is HUF54 000 in a year.

I compared the value of total sport expenditures (HUF113.7 billion) to the total net incomes too. The total net income of the Hungarian population was over HUF9 000 billion from which they spent only 1.25% for sport. Comparing similarly the sport expenditures to the total expenditures (over HUF7 685 billion) it gave a 1.48% ratio.

The households with sport expenditures spent 7.25% of their budget for sport which is 5.9% of net income per person. These expenditures compared to the total expenditures are 8.6% and 7%, respectively. The difference between the values of households and personal ratio comes from the fact, that the size of households with sport expenditures is bigger than the size of an average household (2.6 persons/household).

***Table 2.*** Presence Ratio of Sport Expenditures in all the Household's Budget

| | Number of Households with Sport Expenditures | Total Number of Households | Ratio of Household with Sport Expenditures |
|---|---|---|---|
| Sport Expenditures | 1346 | 7650 | 17.59% |

Source: HCSO and own calculations

***Table 3.*** Summarized and Average Values of Total Sport Expenditures and Net Incomes, Ratio of Sport Expenditures Related to Net Income

| | Total (million Ft) | Average Values (Included All Househols) (Ft) | | Average Values (Included only Households with Sport Expenditures) (Ft) | |
|---|---|---|---|---|---|
| | | per Household | per Person | per Household | per Person |
| Total Sport Expenditures | 113 666 | 29 838 | 11 492 | 173 005 | 54 491 |
| Total Net Income | 9 082 514 | 2 384 218 | 918 277 | 2 385 004 | 918 409 |
| Total Expenditures | 7 685 852 | 2 017 585 | 777 069 | 2 017 585 | 777 069 |
| Ratio of Total Sport Expenditures Related to the Total Net Income | 1.25% | | | 7.25% | 5.93% |
| Ratio of Total Sport Expenditures Related to Total Expenditures | 1.48% | | | 8.57% | 7.01% |

Source: HCSO and own calculations

## *Results of logit and probit Models*

I have run the two models with GRETL, which gave similar results in the two models, because there were minimal differences between that. We have run the models without the variables of economic activity to eliminate the collinearity problem, because of the effects of them are possible included into other variables like age variable of the head of household's.

The two models are equal based on the goodness of fitting. (McFadden $R^2$: Probit: 0.212, Logit: 0.211) The number of correctly predicted items (83.7% and 83.8%), the likelihood-value and the rate of likelihood are fast equal too. Collinearity had been tested with Variance Inflations Factor, and it was not present at the models.

The scale of transformed coefficients of logit model is not different from the coefficients of probit model. This is right for marginal effects too. (Table 5)

I have run the binary logit model in the SPSS too. The advantage of its model is, that it calculates the rate of chance for the single variables too (Table 4).

models. It is interesting, that the households in this region spend with higher possibility for sport. The chance rate of the region shows, that it has a 1.3 more times higher chance than the reference region (Middle Hungary).

**Educational level variables** were significant at 1% level in both models too. The reference group was the less educated group (vocational school or lower). This had the lowest possibility of sport expenditures. There was a direct ratio at these variables, because the second level category (graduation) has the second highest value and the professionals have the highest level.

The chance rates are the followings: most educated heads of household have 3.1 and middle educated heads have 1.9.

There were two significant variables from the **children dummies**. These were 1 or 2 and 3 or 4 children in the household variables and both of them were on 1% level significant. There was no significant difference between the reference variable (no children) and the 5 or more children dummy. The households with 3 or 4 children had the highest possibility to have sport expenditures, and the households with 1 or 2 children have the second highest value.

***Table 4.*** Rates of chance for presence of sport expenditures resulted from the logit model

| **Settlement (VILL)** | **Exp(B)** | **Region (MDHUN)** | **Exp(B)** | **Age group (AGE65)** | **Exp(B)** | **Number of children (CHILD0)** | **Exp(B)** |
|---|---|---|---|---|---|---|---|
| BP | **2.871** | MDTRD | **1.299** | AGE24 | **7.525** | CHILD12 | **2.034** |
| CS | **1.778** | WTRD | **1.036** | AGE2534 | **4.500** | CHILD34 | **2.594** |
| OC | **1.371** | STRD | **1.024** | AGE3544 | **5.110** | CHILD5 | **1.495** |
| | | NHUN | **0.778** | AGE4554 | **2.754** | | |
| | | NGP | **1.230** | AGE5564 | **1.623** | | |
| | | SGP | **1.007** | | | | |
| **Educational level (SCHOOL1)** | **Exp(B)** | **Sex of the household's head (FEMALE)** | **Exp(B)** | **Net income category** | | **Exp(B)** | |
| SCHOOL2 | **1.899** | MALE | **0.997** | | | **1.408** | |
| SCHOOL3 | **3.147** | | | | | | |

Source: HCSO and own calculations

The **variables of settlement** of the households' were significant in both models on the level of 1%. The marginal effects show, that the less possibility of sport expenditures is at households in villages, they are the base of comparison. The households in Budapest have the highest marginal effect and the half value of it have the households in county seats and the households in another city have the much less value. Both of the models show, that more smaller the settlement of a household has the less possibility of sport expenditures is in its budget.

Based on the rate of chance the Budapester households spend 2.9 times more, the county seat households spend 1.8 times more, the households in other cities spend 1.4 times more than the households in villages.

Only the variable of Middle Transdanubia from the **regional dummies** was significant on the level of 10% in both

The chance rate of households with 3 or 4 children was the highest, they spend for sport with 2.6 times more chance. The same rate at the households with 1 or 2 children was 2.0.

We can say, that the presence of children in household is improving the possibility of sport expenditures until a certain number of children. However it is not exactly sure, that 5 or more children in the household have not a positive effect on sport expenditures, maybe the variable was not significant because the low number of observation in this category. The households without children have the less possibility of sport expenditures. The reason is maybe the dominance of old and retired households in this category.

All of the variable of the **age of the household's** head were significant in both models on 1% level. The reference

***Table 5.*** Summary Table about the Results of Logit and Probit Models

| | Logit model | | | | Probit model | | |
|---|---|---|---|---|---|---|---|
| | *Coefficient* | | | *Marginal effect* | *Coefficient* | | *Marginal effect* |
| const | -5.03328 | -3.1458 | *** | | -2.80202 | *** | |
| | (-24.3948) | | | | (-25.9295) | | |
| BP | 1.0545 | 0.659063 | *** | 0.134908 | 0.613483 | *** | 0.149783 |
| | (6.8427) | | | | (7.094) | | |
| CS | 0.575509 | 0.359693 | *** | 0.064282 | 0.326625 | *** | 0.0714555 |
| | (5.6226) | | | | (5.7232) | | |
| OC | 0.31572 | 0.197325 | *** | 0.0329759 | 0.183236 | *** | 0.0379985 |
| | (3.1765) | | | | (3.3502) | | |
| VILL | | | | | | | |
| CHILD12 | 0.709817 | 0.443636 | *** | 0.078995 | 0.410096 | *** | 0.089461 |
| | (8.1333) | | | | (8.2852) | | |
| CHILD34 | 0.953213 | 0.595758 | *** | 0.129812 | 0.537053 | *** | 0.137208 |
| | (6.3967) | | | | (6.172) | | |
| CHILD5 | 0.402412 | 0.251508 | | 0.0462953 | 0.196375 | | 0.043344 |
| | (0.8884) | | | | (0.7543) | | |
| CHILD0 | | | | | | | |
| REGIO_MDTRD | 0.261936 | 0.16371 | * | 0.0280379 | 0.161757 | * | 0.0344248 |
| | (1.6455) | | | | (1.8064) | | |
| REGIO_WTRD | 0.0358199 | 0.022387 | | 0.00357615 | 0.0415283 | | 0.00836745 |
| | (0.2167) | | | | (0.4497) | | |
| REGIO_STRD | 0.0240163 | 0.01501 | | 0.00238904 | 0.0269212 | | 0.0053876 |
| | (0.1404) | | | | (0.2825) | | |
| REGIO_NHUN | -0.25054 | -0.156588 | | -0.0230995 | -0.130189 | | -0.0243391 |
| | (-1.6033) | | | | (-1.4951) | | |
| REGIO_NGP | 0.206859 | 0.129287 | | 0.021654 | 0.126231 | | 0.0263095 |
| | (1.3598) | | | | (1.4774) | | |
| REGIO_SGP | 0.00651938 | 0.004075 | | 0.000644746 | 0.0211332 | | 0.00421131 |
| | (0.043) | | | | (0.2495) | | |
| REGIO_MDHUN | | | | | | | |
| AGE24 | 2.01819 | 1.261369 | *** | 0.369329 | 1.06787 | *** | 0.332352 |
| | (7.7237) | | | | (7.2754) | | |
| AGE2534 | 1.504 | 0.94 | *** | 0.225612 | 0.774206 | *** | 0.206937 |
| | (9.6617) | | | | (9.5808) | | |
| AGE3544 | 1.63129 | 1.019556 | *** | 0.236268 | 0.850539 | *** | 0.221665 |
| | (10.5898) | | | | (10.7019) | | |
| AGE4554 | 1.01316 | 0.633225 | *** | 0.124133 | 0.486486 | *** | 0.111449 |
| | (6.8767) | | | | (6.5587) | | |
| AGE5564 | 0.484511 | 0.302819 | *** | 0.0528796 | 0.206797 | *** | 0.0435175 |
| | (3.2014) | | | | (2.7558) | | |
| AGE65 | | | | | | | |
| SCHOOL2 | 0.641361 | 0.400851 | *** | 0.0712463 | 0.350531 | *** | 0.0760186 |
| | (7.5317) | | | | (7.4128) | | |
| SCHOOL3 | 1.14641 | 0.716506 | *** | 0.1494 | 0.643086 | *** | 0.158049 |
| | (12.0409) | | | | (11.972) | | |
| SCHOOL1 | | | | | | | |
| MALE | -0.0028723 | -0.001795 | | -0.00028367 | -0.011151 | | -0.0022082 |
| | (-0.0322) | | | | (-0.2252) | | |
| FEMALE | | | | | | | |
| NINC | 0.342202 | 0.213876 | *** | 0.0337833 | 0.193141 | *** | 0.0381561 |
| | (10.7896) | | | | (11.1112) | | |
| Log-likehood value | -2806.227 | | | | -2802.841 | | |
| Likelihood-rate, $\chi^2$ (21) | 1505 [0.0000] | | | | 1511.77 [0.0000] | | |

in bracket: z-scores; *** significant on 1% level; **significant on 5% level; *significant on 10% level

**BP**: Budapest; **CS**: county seat; **OC**: other city; **VILL**: village; **CHILD12**: 1 or 2 children; **CHILD34**: 3 or 4 children; **CHILD5**: 5 or more children;, **CHILD0**: no children; **REGIO_MDTRD**: Middle Transdanubia; **REGIO_WTRD**: West Transdanubia; **REGIO_STRD**: South Transdanubia; **REGIO_NHUN**: North Hungary; **REGIO_NGP**: North Great Plain; **REGIO_SGP**: South Great Plain; **MDHUN**: Middle Hungary; **AGE24**: 24 or under 24 years; **AGE2534**: between 25-34 years; **AGE3544**: between 35-44 years; **AGE4554**: between 45-54 years; **AGE65**: 65 or more years; **SCHOOL2**: graduation or other middle educational level; **SCHOOL3**: diploma or higher education; **SCHOOL1**: 8 classes or less educational level; **MALE**: male head of household; **FEMALE**: female head of household; **NINC**: net income category

Source: HCSO and own calculations

category (head at the age 65 or over) has the less possibility of sport expenditures. The relationship between the age and the presence of sport expenditures is reversed, the youngest households spend with highest possibility for sport. Two middle aged categories have fast similar marginal rate, these are age groups 25–34 and 35–44.

The chance rates show a similar trend. The youngest age group has the highest rate (7.1), however the second highest rate is linked to the only third youngest group (35-44 years with 5.1). The group 25–34 years has a little bit lower rate (4.5), but the following groups show a falling trend.

The **sex of the head of households** variable was not significant in the logit nor in the probit models.

The categorical **variable of net income** was significant in both models. The higher net income results a higher possibility in sport expenditures, which is confirmed by the chance rate too. It is a similar result as our former research had that sport is a luxury good in microeconomical sense (*Paár* 2010).

## Discussion

The two econometrical methods verified that almost all of the included socio-demographical and economical explanatory variables had a significant effect on the presence of sport expenditures in the household budgets. We have to know that there are a lot of other variables which have an important effect on the presence (e.g. sport socialisation, attitudes to sport, supply of sport, social environment etc.) but I have no possibility to use them from HBS. However it is noticeable that the two models were able to identify especially good the sport decisions of the households (over 83%).

My results confirm some of the former tendencies in the international literature (*Davies* 2002; *Downward* and *Riordan* 2007; *Humphreys* and *Ruseski* 2006; *Pawlowski* 2009). The results are similar to the former Hungarian results linked to physical activity (*Földesi et al.* 2008; *Gáldi* 2004; *Neulinger* 2007; *Szabó* 2006), however, my hypothesis was linked to sport expenditures not to physical activity.

I have different results too because sex variables were not significant, however, the literature suggested that households with man head spend with higher possibility on sport than household with woman head.

The range of consumers could be very different in active and passive sport consumption. So we would like to improve this research to analyse the active and passive sport consumption items in the households' budget. Another improving possibility is the analysis of the measure of sport consumption with the same explanatory variables.

## References


**Amemiya, T.** (1981): Qualitative Response Model: A Survey. *Journal of Economic Literature. 19.* 1483-1536.

**Davies, E. L.** (2002): Consumers' Expenditure on Sport in the UK: Increased Spending or Under-estimation? *Managing leisure: an international journal, 7.* 83-102.

**Downward, P. M. – Riordan, J. G.** (2007): Social Interactions and the Demand for Sport An Economic Analysis. *Contemporary Economic Policy*, *25.* 518-537.

**Földesi Sz. Gy. – Gál A. – Dóczi T.** (2008): *Társadalmi riport a sportról 2008.* Ministry of State for Municipal Affairs, State Secretariat of Sport – Hungarian Society of Sport Science, Budapest, 124.

**Gáldi G.** (2004): *Szabadidostruktúra és fizikai rekreáció Magyarországon 1963-2000 között, életmód-idomérleg vizsgálatok tükrében*. Ph.D. thesis, Semmelweis University Faculty of Physical Education and Sport Sciences, Doctoral School, Budapest. 181.

**Humphreys, B. R. – Ruseski, J. E.** (2006): Economic Determinants of Participation in Physical Activity and Sport. Working Paper Series, Paper No. 06-13, North American Association of Sport Economists. http://www.holycross.edu/departments/economics/RePEc/spe/HumphreysRuseski_Participation.pdf

**Hungarian Statistical Office** (2000): *Az egyéni fogyasztás rendeltetés szerinti osztályozása (COICOP).* Budapest,

**Maddala, G. S.** (2004): *Bevezetés az önkonometriába*. Macmillan Pub. Co., 704.

**Mullin, B. J. – Hardy, S. – Sutton, W. A.** (2007): *Sport Marketing*. Human Kinetics. Leeds, 552.

**Neulinger Á.** (2007):*Társas környezet és sportfogyasztás – A folyamatos megerősítést igénylő tanult fogyasztás*. Ph.D. thesis Corvinus University of Budapest, Doctoral School, Budapest, 221.

**Paár D.** (2011): The Income and Price Dependency of the Hungarian Sport Goods Consumption – *Periodica Polytechnica Social and Management Sciences*, 19/1. 11-17.

**Pawlowski, T.** (2009): *Die Dienstleistungsnachfrage im Freizeitsektor – Eine ökonomische Modellierung des Ausgabenverhaltens von Privathauwshalten in Deutschland auf Basis von Daten der Laufenden Wirtschaftsrechnungen*. Ph.D. thesis, German Sport University Cologne.

**Szabó Ágnes** (2006): *Egyetemisták szabadisősport-(szolgáltatás) fogyasztása, 76. sz. Műhelytanulmány.* Corvinus University of Budapest, Budapest.

**Székelyi M. – Barna I.** (2005): *Túlélőkészlet SPSS-hez*. Typotex, Budapest.