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Financial Barriers to Sports Consumption: The Dynamics of the Income-Expenditure Relation

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The Dynamics of the Income-Expenditure Relation

Introduction

UNESCO (2015) states that the practice of physical education, physical activity and sport is a fundamental right for all. Although the general belief is that everyone should have the opportunity to practice sports, the financial crisis, the economic crisis and the rising poverty rates have increased the probability that families and individuals with low income are excluded from sports participation (Bittman, 2002; Spinney and Millward, 2010; Vandermeerschen et al., 2015). This has implications for Western governments in reaching the Sport-for-all objective. Research indicates that people who are already on the lowest incomes are affected most by economic savings (Quarmby and Dagkas, 2013), which is not surprising as leisure ranks high on expenses that are cut in households that face financial difficulties (Deutsch et al., 2015). The risen income inequality in almost every Western country (Pickett and Wilkinson, 2015) has resulted in lower participation rates, as demonstrated by Veal (2016).

Previous empirical studies found that sports participation is socially stratified (Scheerder and Vos, 2011), and underlined the positive relationship between income and the time and/or money that is spent on sports (e.g. Hoekman et al., 2017; Thibaut et al., 2014; Wicker et al., 2010).

Nevertheless, the above-mentioned studies focus solely on the influence of *average* income on sports expenditure. Because this results in a rather static picture, the current paper aims to provide a more dynamic insight in the income-expenditure relationship by calculating the magnitude of the effect of income on sports expenditure for different levels of income. The latter makes it possible to quantify the above-mentioned finding of Quarmby and Dagkas

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(2013) and Veal (2016) that the sports participation rates of people with lower levels of income are affected most by economic savings.

More particularly, the current study (1) focusses on two measures of income which are individual labour income versus household labour and non-labour income, and (2) investigates two outcomes of an increase in income, namely the effect of a rise in income on the decision to spend money or not, and on the amount of money that is spent. The former point is relevant, because in previous research both forms of income have been used. To know whether the results of these studies are comparable, it should be investigated whether the effects of both income variables on expenditure are identical or not. With respect to the second point, research has demonstrated that expenditure on sports participation should be considered as a two-stage decision process, as differences are found in the significance and direction of the effect of the independent variables on sports participation and sports expenses (e.g. Pawlowski and Breuer, 2011; Thibaut et al., 2014). It is expected that these differences will certainly apply to the magnitude (i.e. elasticities) of the income-expenditure effect.

Although income is an essential barrier in spending money on sports, it is not the only determinant, and according to some studies it is not even the most influencing factor of sports expenditure (e.g. Scheerder et al., 2011; Spinney and Millward, 2010). The second aim of the current study is therefore to investigate to what extent other socio-demographic, socio-economic, sports-specific and non-sports leisure variables influence the sports expenditure decisions. The inclusion of the non-sports leisure variables is interesting, as it allows for an examination of whether they interfere positively (complements), negatively (substitutes) or not at all with spending money on sports.

Literature Review

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While until the recent past sports consumption was historically underexposed in academic research (Downward et al., 2009, p. xvi), in the past decade a rising number of studies aim to close this gap (for an overview, see Thibaut et al., 2016; Table 1 in Wicker et al., 2010). Downward et al. (2009, p. 66) define two essential components of sports consumption, specifically sports participation (time spent on sports) and sports expenditure (expenses to practice sports). Although the focus of the current study is on sports expenses, both concepts are closely related to each other, as taking part in sports on a regular and qualitative basis is impossible without spending money such as the acquisition of certain sports apparels (Downward et al., 2009, p. 66; Humphreys and Ruseski, 2015; Thibaut et al., 2016).

Income Effects

The relationship between sports consumption (the money and/or time that is spent on sports) and income has been investigated in numerous socio-economic studies. With respect to sports participation, it is found that income positively influences the probability of taking part in sports (Garcia et al., 2011; Humphreys and Ruseski, 2015), and that living in poverty reduces participation in organized sports (Vandermeerschen et al., 2015).

The above information is also relevant for the income-expenditure-relation, as it can be assumed that to take part in sports, people have to spend money on certain sports goods and services. Empirical results of Thibaut et al. (2014) and Pawlowski and Breuer (2011) confirm the positive effect of income on the probability of spending money on sports. Income also has a positive influence on the amount of money that is spent (Bloom et al., 2005; Hallmann and Wicker, 2015; Eakins, 2016a; Lera-López and Rapún-Gárate, 2005, 2007; Løyland and Ringstad, 2009; Thibaut et al., 2016; Wicker, Breuer et al., 2010; Wicker, Prinz et al., 2013). These findings contrast with the negative relationship between income and the number of sports participation minutes, as found by Garcia et al. (2011) and Humphreys and

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Ruseski (2015). Stated differently, income positively determines both the decision to spend money on sports and the amount of money that is spent, while only the former holds for sports participation.

While the above results refer to the significance and sign of the income-expenditure effect, the magnitude can be calculated through income and expenditure elasticities. Elasticities represent the percentage change in expenditure in response to a percentage rise in income. For Germany elasticities were found of +1.20 based on the classic Tobit model and +0.78 based on the two-step Heckman approach (Pawlowski and Breuer, 2012), while for Norway an estimate of +1.25 was found (Løyland and Ringstad, 2009) and +1.139 for Ireland (Eakins, 2016a). Nevertheless, because these studies focus on the *average* effect of *average* income on sports expenditure, little is known about the dynamics of this relationship. The consequence is that this elasticity value not necessarily indicates the extent to which people on low incomes are held back from spending money on sports. Therefore, the first research goal of the current study is to calculate the income elasticities for different levels of income, for both the decision to spend money on sports and the amount of money that is spent.

Moreover, two measures of income will be compared, as it is interesting to notice that different operationalisations of income have been used in previous sports consumption literature. A first distinction in operationalisation is that some research uses labour income (e.g. Downward and Rasciute, 2010; Hallmann and Wicker, 2015), while in other studies non-labour income (e.g. rent, capital income, pensionable salary) is included (e.g. Humphreys and Ruseski, 2015; Thibaut et al., 2014). From a theoretical point of view, this could possibly result in differing income-expenditure-relationships as input of time is needed for the former compared to the latter. Therefore, for both labour and non-labour income, the positive relationship with sports expenditure is considered to stem from an income effect, meaning that the more income that someone has, the more he or she will consume. But according to the

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time allocation theory of Becker (1965) an opposite effect is also possible. More work not only means that more money can be spent, but also that there is less time left for other activities. Becker (1965) assumes that higher labour income induces a shift away from time-intensive commodities (such as sports participation) as the price/opportunity cost of 'free time' becomes higher. Humphreys and Ruseski (2015) indeed find empirical evidence to suggest that, although the income effect is dominant, a substitution effect regarding sports participation also exists. Furthermore, Késenne (1983) finds evidence that, with rising income, time-intensive activities (e.g. sports participation) are often substituted for other less time-consuming activities. To summarise, based on neo-classical theory it can be expected that the effect of non-labour income on sports expenditure is more prominent than is the case for labour income.

A second income-operationalisation difference is that certain studies opted for personal income (e.g. Hallmann and Wicker, 2015; Wicker, Breuer et al., 2010; Wicker, Prinz et al., 2013) as opposed to household income (Lera-López and Rapún-Gárate, 2005, 2007; Løyland and Ringstad, 2009; Thibaut et al., 2011) to investigate income-expenditure relationship. Although both measures have certain advantages, Spinney and Millward (2010) favour the use of household income instead of personal income, because the benefits of income would be well-distributed among family members. If again Becker's (1965) allocation theory of time is applied, household income also includes income from other family members and can therefore be expected to be less subject to 'foregone earnings' as is the case for personal income. Put differently, it can be expected that the effect of household income on sports expenditure would be larger than is the case for personal income.

Other Sociodemographic and Socio-economic Determinants

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In addition to income, other socio-demographic and socio-economic determinants have been investigated in sports expenditure research. Previous research demonstrated that classic socio-demographic and socio-economic variables are relevant factors for segmentation purposes. Male individuals with a job, a life-partner and a higher education are found to be bigger spenders on sports participation (for a detailed overview of these results, see Thibaut et al., 2016; Wicker et al., 2010).

The relationship between age and expenditure is less straightforward. Some researchers find that younger adults spend more money (Lera-López and Rapún-Gárate, 2007), while other studies find no significant relationship (Lera-López and Rapún-Gárate, 2005; Scheerder et al., 2011), a positive relationship (Hallmann and Wicker, 2015; Wicker et al., 2013) or a curvilinear relationship (Eakins, 2016a; Lamb et al., 1992). Household size is positively related to overall household expenditure (Bloom et al., 2010), although expenditure per family member turns out to be lower (Scheerder et al., 2011; Thibaut et al., 2014).

Disposable time is believed to be a key factor in sports participation, as both Spinney and Millward (2010) and Crompton (2015) find that time poverty is a more profound barrier than income in the discrete choice between consuming sports or not. In contrast, Hallmann and Wicker (2015) found that time availability is not a constraint in spending money on the specific sports activity golf.

Sports and Leisure Specific Variables

Research demonstrates that dedicated sports participants spend more money, as taking part in sports on a higher level and on a more frequent and time-intensive basis is positively related to sports expenses (Lera-López and Rapún-Gárate, 2005, 2007; Scheerder et al., 2011; Thibaut et al., 2016; Wicker, Breuer et al., 2010; Wicker, Prinz et al., 2010).

In contrast to the sports-specific variables, little research is available regarding the interdependency between consuming sports participation and other leisure activities

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(Pawlowski and Breuer, 2011). The studies of Pawlowski and Breuer (2011, 2012) demonstrate that, despite certain differences, a lot of similarities are found between the consumer profiles of distinct leisure activities.

On the one hand one could expect that all providers of leisure activities aim to increase their market share and thus compete for the 'free time' of citizens. According to this theory, sports and other leisure activities thereby function as possible substitutes for each other (Crompton, 2015; Roberts, 2015). The negative correlation between watching television and active engagement in sports is an example of this negative relationship between different leisure activities, both of which should therefore be seen as substitutes (Dawson and Downward, 2013; Scheerder et al., 2011).

On the other hand, it is also possible that practising sports goes hand in hand with more consumption of other leisure activities. Spillover effects suggest that complex skills like sports participation and cultural activities need to be learned. The use of identical goods generates accumulating consumption capital (Wicker et al., 2010), meaning that the consumption of one activity results in higher consumption of other related activities (Burgham and Downward, 2005). Empirical evidence indeed demonstrates that sports consumption is positively influenced by certain other leisure activities such as reading, listening to the radio, painting, dancing and arts (Downward, 2007). The second research goal of this study is to provide further evidence to map the interdependency between sports consumption and other leisure activities, and this for leisure activities for which no previous research was found.

Methodology

Data

The study is conducted based on data collected within the 2014 Flemish Participation Survey (Authors, 2015). The 2014 version is part of a cross-sectional survey that is requested by the

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Flemish government every five years, with questions regarding the socio-cultural participation habits of its citizens. Face-to-face interviews were taken from a representative sample of 3,965 Flemish inhabitants aged between 14 and 85 years. Because the focus is on adults, only the respondents above 18 years old are included in this study (N=3,775 adults).

The questionnaire asks about expenditure on sports participation during the previous year. More particularly, the respondents had to answer the following question: 'How much did you spend on the following sports participation expenditure categories during the past 12 months?'. Subsequently, seven categories of expenses on active sports participation (not sports spectatorship or sports volunteering) were listed, i.e. membership fees, use of sports infrastructure and participation in events, sports lessons/camps/holidays, sports clothing and shoes, sports equipment, transport by car, other costs such as sports drinks/food and medical care, and together these categories comprise total expenditure on sports participation, the dependent variable in this research (EXP, see Table 1). The independent variable of interest in the current study is income. The variable income is operationalised through taking the logarithm of household income (LOG_INC_HH, first dependent variable) and personal income (LOG_INC_PERS, second dependent variable). The former consists of income earned through labour and non-labour (e.g. capital, rent) by all family members, and is available for all categories of citizens. The latter excludes non-labour earnings, and is asked to the respondents with a paid job, and thus not retirees, housemen/women, students, etc. The analyses based on LOG_INC_PERS are only performed on individuals with a job, thus resulting in a much lower N of 1,898 than is the case for LOG_INC_HH (N=3,177). The latter N of 3,177 is lower when compared to the 3,775 subjects because of non-response (people who do not want to answer certain questions). Moreover, a dummy PRIM_INC_PERS and an interaction term PRIM_INC_PERS* LOG_INC_PERS are added to investigate whether an individual that has to primarily rely on personal income (at least

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fifty percent of the household income consists of personal income) has a higher income elasticity, as one would expect if the substitution effect is prominent. An important remark in this matter is that PRIM_INC_PERS and the interaction term PRIM_INC_PERS* LOG_INC_PERS are only included in the LOG_INC_PERS regression and not the LOG_INC_HH regression. This is because for a large part of the subjects of the latter (i.e. the individuals who only have household income and not personal income) the PRIM_INC_PERS data are missing, meaning that that the latter regression would be reduced to the former one.

Apart from the income variables, the other socio-economic variables are the percentage of a fulltime job (PERC_FT), the level of education (EDUC) and the perceived amount of free time each individual has (LEIS_SUBJ).

The socio-demographic variables that are included are variables that are often used in sports consumption research as segmentation and/or controlling variables (for an overview, see Wicker et al., 2010), namely gender (SEX), age (AGE), having a life partner or not (PARTN) and the number of family members (FAM_MEM). The variables duration (SP_MIN) and diversity (SP_DIV) form the sports-specific variables, while the other leisure variables indicate whether the respondent watched television (TV), took part in cultural activities (CULT), was an active member of a socio-cultural organisation (SC_ORG) or read books or comic strips (BOOKS) during the past six months.

[Table 1 near here]

Data Analysis

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The normality assumption of linear regression is violated because of excess zeros, suggesting that a methodology which accounts for the presence of excess zeros should be preferred. Three groups of these methods are used in sports consumption literature, namely the Tobit model (e.g. Eakins, 2016a), two-step Heckman (e.g. Thibaut et al., 2014) and hurdle approaches (e.g. Humphreys and Ruseski, 2015). These methods differ in the way they attribute the zeros to underlying censoring mechanisms (Jones, 2000).

First, a distinction should be made between real zeros and non-genuine zeros. The Heckman approach is designed to deal with the latter. Non-genuine zeros occur because of sample selection, for example when the reference period for certain respondents to consume expenditure is too short (Humphreys and Ruseski, 2015; Jones, 2000). Because of the wide range of possible activities, the fact that almost every sports participant spends money during a reference period of one year, this option can be excluded.

Both the Tobit (Tobin, 1958) and the hurdle models assume that the zeros stem from actual non-consumption, and are thus 'real' or 'genuine' zeros. The Tobit model assumes that zero consumption is due to a constrained budget, or put differently, that the zeros are corner solutions (Aristei and Peironi, 2008). On the other hand, hurdle models not only account for corner solutions, but also for abstention. Another aspect of the hurdle model is that its design is less restricted, as the coefficients of the participation (spending money or not) and intensity (amount that is spent) decision are not necessarily the same. The main reason why the current study opts for the Tobit model, is because the focus is on the continuous variable income, and the potential burden of a constrained budget. The latter makes that the Tobit model best suits the research question, as a Tobit model assumes that all observed non-sports participants do not practice sports because the price of sports participation is too high given their preferences and income (Humphreys et al., 2010). As the literature does not always agrees on which theoretical argumentation decides whether a hurdle model versus a Tobit model should be

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used, it is also interesting to use tests that decide based on goodness of fit. Vuong-tests confirmed that the Tobit model indeed outperformed the hurdle models that were estimated (Vuong, 1989, see also Eakins, 2016b). The results of the log normal model (see also Eakins, 2016b; Wooldridge 2010) have been added to the appendix.

In order to assess the impact of the two measures of income on the dependent variable, it is necessary to calculate elasticities. In the Tobit model three different elasticities can be calculated based on three different definitions of the expected value of the dependent variable. Of most interest is the overall effect on the dependent variable. In the Tobit model, this is more commonly known as the unconditional expectation (or unconditional mean) because it is based on all values of the dependent variable rather than a subset of positive values for example. The unconditional expectation can be decomposed into two parts, the conditional expectation, which is the expected value of the dependent variable for values of the explanatory variables, x, conditional of dependent variable being positive and the probability of a positive value of the dependent variable for values of the explanatory variables, x.

For each definition of the expected value of the dependent variable elasticities can be calculated using the following formula:

$$e_{Prob} = \frac{\partial P[y_{exp} > 0|\mathrm{x}]}{\partial Income} * \frac{Income}{P[y_{exp} > 0|\mathrm{x}]} \quad (1a)$$

$$e_{Cond} = \frac{\partial E[y_{exp}|y_{exp} > 0,\ \mathrm{x}]}{\partial Income} * \frac{Income}{E[y_{exp}|y_{exp} > 0,\ \mathrm{x}]} \quad (1b)$$

$$e_{Uncond} = \frac{\partial E[y_{exp}|\ \mathrm{x}]}{\partial Income} * \frac{Income}{E[y_{exp}|\ \mathrm{x}]} \quad (1c)$$

These elasticities were calculated using the margins command in Stata. An interesting feature of the above Tobit elasticities is that the elasticity for the probability of a positive

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expenditure (e_{Prob}) and the elasticity for conditional expenditure (e_{Cond}) sum to the overall unconditional elasticity (e_{Uncond}), that is $e_{Uncond} = e_{Prob} + e_{Cond}$. This will allow for an investigation into the contribution that changes in the probability of participation for a change in income and changes in conditional expenditures for a change in income have on the overall effect i.e. unconditional expenditure.

Results and Discussion

Two sets of Tobit regression results are presented, one with the logarithm of household income (LOG_INCOME_HH) and the other with the logarithm of the personal income (LOG_INCOME_PERS) (Table 2, respectively the left and right columns). Overall, the regression results of both groups resemble each other even when taking into account the fact that the latter group is based on a smaller sample. People with higher income spend more money on sports participation, which is consistent with previous research (Hallmann and Wicker, 2015; Eakins, 2016a; Lera-López and Rapún-Gárate, 2005, 2007; Løyland and Ringstad, 2009; Thibaut et al., 2014; Wicker, Breuer et al., 2010; Wicker, Prinz et al., 2013). Nevertheless, no significance is found for PRIM_INC_PERS nor for the interaction term PRIM_PERS * LOG_INCOME_PERS. This is opposite to expectations and could be an indication that the substitution effect (i.e. shift to less time consuming activities) is not that prominent. The results indicate that income positively influences sports consumption, and thus lower income individuals face a bigger barrier when spending money on sports participation. A consequence is that lower-income households are potentially excluded from (expensive) sports activities.

[Table 2 near here]

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Given that income is an important factor in the decision to spend money on sports participation, it is essential for sports managers and policy makers to gain insights into the magnitude and the dynamics of the income-expenditure effect. The graphs in Figure 1 present a schematic overview of the effect of a relative change in income on the relative change in expenditure, and this for different levels of household income (LOG_INCOME_HH, graphs 1-3) and personal income (LOG_INCOME_PERS, graphs 4-6). Given the non-significant effect of PRIM_PERS and PRIM_PERS * LOG_INCOME_PERS, these variables are excluded to assure the comparability of the results. Graphs 3 and 6 show the effect of income on overall sports expenditures (zero and non-zero values). While the Tobit regression results of Table 2 show that income positively influences sports expenses, graph 3 and 6 show that the relative effect of an income rise is higher for lower income-levels. A 1% rise in income results in a 0.6% rise in expenditure for the lowest incomes, while it is only 0.4% for the highest income levels. Nevertheless, this effect needs to be split in two, as the expenditure question consists of two related decisions, i.e. (i) spending money on sports participation or not, and if so, (ii) the amount of money that is spent on sports participation.

[Figure 1 near here]

In graph 1 and graph 4 the effect of a relative change in income on the probability of spending money is given. When income rises by one percent, the probability of spending money rises between 0.5% and 0.2%, depending on the income level. This positive effect is stronger for individuals with a lower personal and household income, suggesting that monetary scarcity is a significant and relative important barrier in consuming sports. Graph 2 and 5 are based on the sports participants that already have chosen to spend money, and they represent the effect of income on the amount of money that is spent. Sports participants that

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face an increase of 1% in income spend 0.1% extra on sports participation. The flat curve demonstrates that this change is relatively equal for all income levels.

Next, we turn to the differences between the graphs based on household income (graphs 1-2-3) on the one hand, and the graphs based on personal income (graphs 4-5-6) on the other hand. Overall, the trends in both groups are more or less the same, such that we could say that personal income and household income are good proxy variables for each other. A small difference that can be noticed is that changes in LOG_INCOME_HH influence the probability of spending money on sports to a slightly bigger extent than is the case for changes in LOG_INCOME_PERS. A possible explanation can be found in Becker's time allocation theory (1965) that assumes that higher income levels imply a higher opportunity cost of time. Therefore, a wage rise not only increases the chance of spending money on sports through a direct income effect, but at the same time it also has a small but negative substitution effect on the decision to spend money on sport because of a risen opportunity cost of time. Indeed, as LOG_INCOME_HH also includes non-labour income (e.g. rent) and income from other household members, the positive effect of a rise in income on the chance of taking part in sports is found to be higher for LOG_INCOME_HH than for LOG_INCOME_PERS.

The second research question relates to whether other leisure activities influence the sports expenditure decision. A look at the results for the larger sample using household income suggests that sports participation and other leisure activities are complementary (Burgham & Downward, 2005; Downward, 2007), as active (SC_ORG_2) and organising (SC_ORG_3) members of socio-cultural organisations spend more money on sports, and no negative effects of other activities are found. Nevertheless, for the smaller sample using personal income, sports expenditure is negatively influenced by watching TV (TV_2/TV_3) and cultural activities. The negative effect for TV viewing has previously been already

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identified (Dawson and Downward, 2013; Scheerder et al., 2011) and Roberts (2015) states that lower socio-economic strata spend less money on all leisure categories except watching television. The findings for cultural activities are less obvious however. The negative relationship between cultural activities and sports participation shed new light on the concept of consumption capital (Wicker et al., 2010), which is generated by the use of similar goods over a long period of time, and is expected to stimulate the consumption of related activities. Therefore, similar to Crompton (2015), these findings suggest that citizens consider sports participation and cultural activities to be substitutes for one another.

The previous findings seem to suggest that workers, when consuming sports participation, are determined by their choices for other leisure activities. Because this is less apparent in the model that uses household income, a possible explanation could be a lack of available free time. Nevertheless, the latter explanation contrasts with the finding that the overall time scarcity is not an issue. People who perform more household tasks (HH_WORK), experience more time-pressure (LEIS_SUBJ), have a job (JOB_2/JOB_3) or work more hours a week (PERC_FT) do not significantly spend less money on sports. The fact that overall time availability is not an issue in sports consumption, is in line with the findings of Hallmann and Wicker (2015). Based on all the results, it can be concluded that income is an important barrier in consuming sports, and a combined effect of time scarcity and tastes determine the decision to consume sports participation versus other leisure activities.

Finally, we also discuss the effects of the other socio-demographic, socio-economic and sports-specific variables on sports expenditure. Women (SEX) are found to spend less money on sports participation, which is also consistent with previous research (e.g. Lera-López and Rapún-Gárate, 2005; Scheerder et al., 2011; Thibaut et al., 2016). Nevertheless, this conclusion only holds for the larger sample of individuals. An explanation can be found in the composition of the research population, as it only includes people who are in the labour

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force. Therefore, once individuals are actively involved in the labour force, the gender difference in spending behaviour apparently disappears. As people get older they spend less money on sports participation (AGE). This finding is also present for middle-aged labourers, but does not hold for workers who are in the last part of their working career. Education (EDUC) is found to positively influence sports consumption (see e.g. Lera-López and Rapún-Gárate, 2005, 2007; Scheerder et al., 2011; Wicker et al., 2010). Students also spend more on sports relative to those with just primary education. The fact that education is not a significant influencing factor for people who are in the labour force (right column of Table 2) indicates that this is possibly due to the fact that people who are in the labour force have a higher education on average when compared with the total sample. The more sports activities (SP_DIV) and minutes (SP_MIN) one practices, the more money they spend on sports. The significant effect of the sports-specific variables is straightforward and confirms that the amount of sports participation that is consumed and the money that is spent are closely related to each other, as suggested by economic theory (e.g. Downward et al., 2009, p. 66) and underpinned by experimental results (e.g. Scheerder et al., 2011).

In the current study the focus was on marginal changes in income and expenditure, for which the neoclassical theory – and Becker (1965) in particular – provides a good framework. The findings that the elasticities for household income are lower than the ones for personal income and that lower income individuals and households have higher income elasticities, are in line with Becker's (1965) time allocation theory and the assumed income effect. On the other hand, whether personal income is the prime income source of the household does not influence sports consumption. An explanation for the latter could possibly be found in heterodox economic theories. The latter theories argue that individuals' decisions not only depend on marginal changes in income and prices, but that also other variables and theories

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(sociological, psychological) should be included. Downward (2004) for example argues that these theories outperform neoclassical models of leisure choice.

Conclusion

The results demonstrate that income is a significant barrier in spending money on sports participation. More insight is given in the income-expenditure relationship, by the calculation of income elasticities for different levels of income.

The effect of a rise in income on the probability of spending money on sports is relatively bigger for individuals with a lower personal labour and household income, than for individuals with a higher income. This finding has important implications for sports policy makers. First, given the risen poverty rates as a result of the economic crisis, governments should carefully monitor how this influences sports participation rates. Second, it suggests that income-based segmentation of sports participants could turn out to be an efficient policy tool. Indeed, by lowering the monetary-burden for lower incomes, it can be expected that participation rates can be raised relatively efficiently, especially when compared with the current supply-driven subsidies that all sports participants benefit from. Another advantage of an income-dependent policy is that the focus on improving the chances for those who are socio-economically deprived results in a more equal society, thereby increasing physical activity as demonstrated by Veal (2016). On the other hand, the finding that sports expenditure rises at a faster pace for higher income individuals, is interesting for sports enterprises. They should look for opportunities to raise profits by developing marketing strategies for certain specific (expensive) sports products and services that target higher income consumers.

The findings also demonstrate that, although income is an important determining factor of sports consumption, it is certainly not the only one. A combined effect of tastes and

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leisure-specific time scarcity also turns out to be an essential burden for spending money on sports. The latter is reflected by the finding that for labourers the consumption of certain leisure activities (e.g. watching TV, attending cultural activities) is negatively related with sports consumption. Sports governing bodies need to be aware of this finding, as it suggests that policy actions in different leisure fields intervene with each other, and that consequently it is possible that they partially erase each other's impact. A possible solution could be to integrate different leisure activities such that multiple policy goals are achieved. For example, active leisure (e.g. cultural walking, city trips by bike, active museums) could be a time-efficient alternative for separately consuming leisure and cultural activities. Also, the results suggest that it could be interesting to investigate whether investing money in removing time-barriers is more effective than the current one-size-fits-all policy of reducing the price on the sports club-organised supply side, especially for higher income households for which the effect of income on the possibility to participate is lower. For example, a possible policy action could be to support employers that facilitate sports participation at work, thereby making it possible for employees to engage in sports during lunch time. Other possible actions could be to provide sports facilities that also have childcare, active commuting, etc.

For commercial sports providers, the results give an idea how they can optimize their profit. Potential customers can be segmented based on their income. Although higher income citizens spend more money on sports, persuading people that have a lower income by means of price reductions is also a valid strategy to capture the consumer surplus.

An important limitation of the current study is that the operationalisation of the consumption of sports and non-sports activities (e.g. reading books) was not operationalised in the same way, as the former was expressed in expenses on sports, while for the latter only data about their frequency are available. It would for example also be interesting to calculate

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cross-price elasticities between expenses on sports participation, and expenditure on other leisure activities and non-leisure products and services.

Future research should also investigate the time-dimension of sports participation versus other leisure activities. Time-budget studies can for example include variables such as the time that is spent on different leisure activities, while including the time that is spent on working, sleeping, household tasks, etc. Second, for specific policy and management decisions, more research is needed regarding the effects of income on specific sports activities (e.g. soccer, running, etc.) and specific expenditure categories (e.g. membership fees, social costs, etc.). Third, Chiu and Choi (2018) demonstrate that the inclusion of attitude, subjective norms and emotions contribute to explaining sports expenditure. A final suggestion is that the current study focusses on individual and household characteristics. As demonstrated by Hoekman et al. (2017) it would also be interesting to include factors at the meso-level, such as the socio-economic status of the neighbourhood. Fourth, the non-significance of income as the primary source is not in line with what would be expected based on the income-leisure trade-off. A possible explanation comes from Downward (2004) who argues that there is little support for the predictions of neoclassical models (e.g. Becker, 1965) of leisure choice. Therefore, future research should (also) focus on heterodox economic theory, also because the findings in the current paper are not opposed to what would be expected based on these theories.

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Table 1. Descriptive statistics of the dependent and the independent variables.

Variable	Definition	Mean (SE) or Frequency	
		Household income (N=3177)	Personal income (N=1901)
EXP	Total annual expenditure on sports participation	€378.38 (17.06)	€443.71 (21.49)
LOG_INCOME_HH	Logarithm of the labour and non-labour household income	7.89 (0.01)	/
LOG_INCOME_PERS	Logarithm of the labour personal income	/	7.50 (0.01)
PRI_INC_PERS	Personal income is the prime source of the household income	/	Yes (26.40%) – No (73.60%, REF)
PRI_INC_PERS*LOG_INCOME_PERS	Interaction term	/	4.16 (0.09)
SEX	Sex	Man (50.27%) – Woman (49.73%; REF)	Man (51.92%) – Women (48.08%; REF)
AGE	Age	18-34 (21.53%; REF) – 35-54 (36.36) – 54-65 (18.38) – 65+ (23.73)	18-34 (29.51%; REF) – 35-54 (54.34) – 54-65 (15.41) – 65+ (0.74)
PARTN	Respondent has a life partner	Yes (78.00%) – No (22.00%; REF)	Yes (81.96%) – No (18.04%; REF)
FAM_MEM	Number of family members	2.67 (0.02)	3.02 (0.03)
EDUC	Level of education	Still a student (5.00%) – Primary School (9.38%; REF) – Secondary (49.51%) – Higher (36.10%)	Still a student (0%) – Primary School (2.79%; REF) – Secondary (48.40%) – Higher (48.82%)
JOB	Job status	Job (55.87%; REF) – Retired (28.20%) – No paid job (15.93%)	Job (100%)
PERC_FT	Percentage of a fulltime job	50.70 (0.84)	90.53 (0.84)
HH_WORK	Household tasks ranging from very little (1) till very much (8)	5.28 (0.03)	5.31 (0.03)
LEIS_SUBJ	Subjective perception of the amount of available leisure time ranging from very little (1) to very much (7)	3.57 (0.03)	3.05 (0.03)
SP_MIN	Number of minutes a year that someone participates in sports	7703.43 (225.94)	6994.62 (245.72)
SP_DIV	Number of sports activities that someone took part in during the past year	1.01 (0.02)	1.14 (0.02)
TV	Frequency of TV-watching	Low (29.15%; REF) – Middle (42.71%) – High (28.14%)	Low (35.14%; REF) – Middle (41.19%) – High (23.67%)
CULT	Respondent took part in a cultural activity (cultural heritage, art, museum) during the last 6 months	Yes (54.74%) – No (45.26%; REF)	Yes (58.76%) – No (41.24%; REF)
SC_ORG	Respondent is a member of a socio-cultural organisation (culture, charity, etc.)	No (44.57%; REF) – Active Member (37.83%) – Organising member (17.60%)	No (43.14%; REF) – Active Member (38.03%) – Organising member (18.83%)
BOOKS	Respondent read books and/or strips during the past 6 months	Yes (56.85%)) No (43.15%; REF)	Yes (62.34%)) No (37.66%; REF)

Note. REF=Reference category

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Table 2. Tobit regression results for the determinants of expenditure on sports participation, with household (regression 1) and personal (regression 2) income as the dependent variables

Regression 1 (N=3,177)	Coef.	Regression 2 (N=1,898)	Coef.
LOG_INCOME_HH	372.0***	LOG_INCOME_PERS	306.5**
		PRI_INC_PERS	-1023.3
		PRIMARY_PERS * LOG_INCOME_PERS	125.5
SEX	195.9***	SEX	105.2
AGE_2	-69.7	AGE_2	-95.2
AGE_3	-326.5***	AGE_3	-336.4***
AGE_4	-486.3***	AGE_4	114.2
PARTN	36.8	PARTN	93.6
FAM_MEM	-39.6	FAM_MEM	-18.3
EDUC_1	422.5*	EDUC_1	Omitted
EDUC_3	321.6**	EDUC_3	328.0
EDUC_4	344.5**	EDUC_4	299.3
JOB_2	-57.2	JOB_2	Omitted
JOB_3	79.4	JOB_3	Omitted
PERC_FT	0.1	PERC_FT	-0.7
HH_WORK	2.2	HH_WORK	8.4
LEIS_SUBJ	3.7	LEIS_SUBJ	2.8
SP_MIN	0.03***	SP_MIN	0.03***
SP_DIV	667.0***	SP_DIV	609.5***
TV_2	21.5	TV_2	-126.8*
TV_3	16.2	TV_3	-26.7
CULT	-82.4	CULT	-161.1**
SC_ORG_2	317.9***	SC_ORG_2	330.6***
SC_ORG_3	227.3***	SC_ORG_3	337.1***
BOOKS	44.7	BOOKS	37.6
_cons	-4452.2***	_cons	-3480.9***
Sigma	1165.5	Sigma	1035.9

Note. * p<0.05; ** p<0.01; *** p<0.001

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Table Appendix. Log normal hurdle regression results for the determinants of expenditure on sports participation, with the chance of spending money (Y/N) and the amount that is spent (log(exp)) as the dependent variables

Regression 1 (N=3,177)	Coef.		Regression 2 (N=1,898)	Coef.	
	Y/N	Log(exp)		Y/N	Log(exp)
LOG_INCOME_HH	0.2*	0.4***	LOG_INCOME_PERS	0.6**	0.3
			PRI_INC_PERS	6.0**	0.2
			PRIMARY_PERS * LOG_INCOME_PERS	-0.8**	0.2
SEX	-0.0	0.3***	SEX	-0.0	0.2
AGE_2	-0.3*	-0.0	AGE_2	-0.3**	-0.0
AGE_3	-0.6**	-0.4**	AGE_3	-0.7**	-0.5***
AGE_4	-1.0**	-0.2	AGE_4	0.3	0.4
PARTN	-0.0	0.1	PARTN	-0.0	0.2
FAM_MEM	-0.0	-0.1*	FAM_MEM	-0.0	-0.1
EDUC_1	0.6*	0.3	EDUC_1	Omitted	Omitted
EDUC_3	0.3*	0.3	EDUC_3	0.3	0.4
EDUC_4	0.5**	0.4	EDUC_4	0.5	0.4
JOB_2	-0.0	0.1	JOB_2	Omitted	Omitted
JOB_3	-0.1	0.4	JOB_3	-0.0	Omitted
PERC_FT	-0.0	0.0	PERC_FT	-0.0	0.0
HH_WORK	-0.0	-0.0	HH_WORK	-0.0	-0.0
LEIS_SUBJ	0.0	-0.0	LEIS_SUBJ	0.0	-0.0
SP_MIN	0.0**	0.0***	SP_MIN	0.0	0.0***
SP_DIV	2.0***	0.3***	SP_DIV	2.2***	0.3***
TV_2	0.1	0.2*	TV_2	0.1	0.0
TV_3	0.1	0.1	TV_3	0.0	0.0
CULT	0.0	-0.2**	CULT	-0.0	-0.2**
SC_ORG_2	0.6***	0.5***	SC_ORG_2	0.6***	0.5***
SC_ORG_3	0.4***	0.3***	SC_ORG_3	0.4***	0.0***
BOOKS	-0.1	-0.0	BOOKS	-0.0	0.0
_cons	-3.3***	1.0	_cons	-6.1***	2.8

Note. * p<0.05; ** p<0.01; *** p<0.001

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