Gender Differences in Sports Participation: A Multi-Level Analysis

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Abstract

Regular sports participation and physical activities are associated with benefits for individual well-being. This study investigates gender differences in sports participation in Europe. Employing Eurobarometer (88.4) survey data, this study estimates multi-level logistic regression models for sports participation. Empirical findings indicate that females are less likely to participate in sports compared to males. Sports participation is also associated with various individual-level factors such as age, education level and health status and country-level factors such as unemployment rates and geographical location. Policy makers should avoid one-fit-all frameworks and develop heterogeneous programs, especially with respect to gender, to increase sports participation.

JEL Classification: J16, Z20, C30
Keywords: Gender; Sports Participation; Multi-Level Model; Europe

Spora Katılımda Toplumsal Cinsiyet Farklılıkları: Çok Düzeyli Bir Analiz

Özet

Düzenli spora katılım ve fiziksel aktiviteler, bireylerin sağlık ve refah düzeyleri için faydalar sağlamaktadır. Bu çalışma, Avrupa'da spora katılımdaki toplumsal cinsiyet farklılıklarını araştırmaktadır. Eurobarometer (88.4) anket verilerini kullanan bu çalışma, spora katılım için çok düzeyli lojistik regresyon modelleri tahmin etmektedir. Ampirik bulgular, kadınların erkeklere kıyasla spora katılma olasılıklarının daha düşük olduğunu göstermektedir. Ayrıca, spora katılım yaş, eğitim düzeyi, sağlık durumu gibi çeşitli bireysel özellikler ve işsizlik oranları, coğrafi konum gibi ülke düzeyindeki faktörlerle de ilişkilidir. Politika yapıcılar, spor katılımını artırmak için tek tip çerçevelerden kaçınmalı ve özellikle toplumsal cinsiyeti dikkate alan farklı yapıda programlar geliştirmelidir.

JEL Sınıflandırması: J16, Z20, C30
Anahtar Kelimeler: Toplumsal Cinsiyet; Spora Katılım; Çok Düzeyli Model; Avrupa

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During the last decades, some European Union (EU) countries experienced stagnations and declining trends for participation in sport and physical activity (van Bottenburg et al., 2005; Lera-Lopez and Rapun-Garate, 2011). The World Health Organization defines physical activity as "any bodily movement produced by skeletal muscles that results in energy expenditure above resting level" (WHO, 2011, p.15). On the other hand, sport is also defined as "all forms of physical activity which, through casual or organized participation, aim at expressing or improving physical fitness and mental wellbeing, forming social relationships or obtaining results in competition at all levels" (WHO, 2011, p.15). Improvements in the sport and physical activity participation levels of citizens provide benefits for health, economic and social outcomes for countries.

Participation in sport and physical activity is strongly associated with decreased risk of several chronic diseases such as diabetes, hypertension, coronary heart disease, strokes, osteoporosis and some cancers (Nocon et al., 2008; Warburton et al., 2006). Regular physical activity promotes subjective well-being and life quality, mostly through improved mood, increased self-esteem and self-perception (Biddle et al., 2003; Stephens, 1988). Furthermore, participation in sport improves mental health outcomes by reducing risks of anxiety and depression (Fox, 1999; Petruzzello et al., 1991). Hence, sedentary life styles and physical inactivity are recognized as major grounds for various health problems. Physical inactivity has been also identified as the fourth leading risk factor for global mortality and premature death. Insufficient levels of physical activity cause approximately 3.2 million deaths each year (WHO, 2009). Sports participation also generates positive externalities such as reduction in public healthcare costs, improvements in integration, increasing social inclusion and reduction in crime (Brosnan, 2020; Caruso, 2011; Downward et al., 2009).

Large number of studies reveal that individual-level variables such as demographics, social, economic, behavioral, physiological and psychological conditions correlate with participation in sport and physical activity among Europeans (van Bottenburg et al., 2005; Downward et al., 2014; Gerovasili et al., 2015; Gehrmann and Wicker, 2021; Hartmann-Tews, 2006; Hovemann and Wicker, 2009; Rodgers, 1977; Rütten and Abu-Omar, 2004; Scheerder et al., 2011; Van Tuyckom et al., 2010; Van Tuyckom and Scheerder, 2010a; Van Tuyckom and Scheerder, 2010b; Van Tuyckom, 2013). A common finding of these studies indicates that sports participation is socially stratified with respect to demographics and socioeconomic conditions (Hartmann-Tews, 2006; Van Tuyckom and Scheerder, 2010a). Gender differences in sports participation and selection of sport types are documented by the literature. Researchers reveal that men are more likely to participate in sports (Downward, 2007; Downward and Rasciute, 2010; Downward et al., 2014; Farrell and Shields, 2002; Federico et al., 2013; Garcia et al., 2016; Hovemann and Wicker, 2009; Strawinski, 2010; Van Tuyckom et al., 2010; Van Tuyckom and Scheerder, 2010a).

Encouraging mass participation in sport and physical activity has become an essential public policy task for many central and local governments in Europe. The EU has taken serious steps in terms of policy-making and helped its member states with developing general frameworks for sports policies throughout years (CE, 1980; CE, 1993; EC, 2007; EC, 2011). However, these documents only serve as inspirational sources for the concrete formulation of national sports policies and the financing and implementation of sports policies are the responsibilities of member states (van Bottenburg et al., 2005; Scheerder et al., 2011). Additionally, The Sustainable Development Goals of the United Nations put special emphasis on achieving "good health and well-being" as well as "gender equality" (UN, 2022). Hence, researchers and policy makers need

to identify and apply mechanisms to improve the levels of sport and physical activity participation of individuals and reduce inequalities in sports participation.

This study contributes to related literature in two-ways: (i) it analyses gender differences in sports participation in the EU by accounting for individual-level and country-level correlates; (ii) it utilizes survey data from a recent Eurobarometer 88.4 (EB, 2017) and focuses on sub-samples with respect to gender. This study combines individual-level and country-level data sets and employs a multi-level empirical estimation framework. Multi-level logistic regression models are estimated for analysis of gender differences in associations of sports participation with their individual-and country-level correlates.

Related Literature

Prior research on participation in sport and physical activity displays heterogeneities in different dimensions such as operationalization of dependent variables, data type, number of countries, estimation method and type of independent variables (Hoekman et al., 2011; Downward et al., 2019). First, we present a review of measurement approaches for sports participation and corresponding empirical methods. Then, we provide discussions on findings for determinants of sports participation at individual- and country-level.

Dependent Variable and Methodological Approaches

Firstly, measurements of sports participation vary across studies. Variation in survey questions on sports participation leads to heterogeneity in measurements of these variables. Sports participation and sport frequency are mostly operationalized by one of the following: (i) time spent in sports; (ii) participate (yes) or not (no); (iii) frequency or intensity of doing sports. A branch of literature uses a broader definition for sports participation to include recreational activities such as gardening, going for walks whereas others account for specific activities which result in increased heart rate and transpiration (Breuer et al., 2011). These differences may result in reform availability of the data, type of survey questions and conceptualizations of sport and physical activity. Since the current study focuses on the sports participation decisions of individuals, it constructs a binary choice (yes/no) variable to measure sports participation.

Types of dependent variables determine estimation methodology for empirical analysis. Studies with a binary choice sports participation variable employ probit or logistic regression models (Breuer et al., 2011; Downward, 2004, 2007; Farrell and Shields, 2002; Federico et al., 2013; Hovemann and Wicker, 2009; Kokolakakis et al., 2011; Lera-López et al., 2016; Ruseski and Maresova, 2014; Sjöström et al., 2006; Van Tuyckom et al., 2010). Investigations on frequency of participation use different methodologies such as Tobit models (Downward and Rasciute, 2010; Ruseski et al., 2011; Thibaut et al., 2017), ordered probit or zero-inflated probit models (Downward et al., 2011, 2014; Downward and Rasciute, 2015; Lera-López and Rapún-Gárate, 2007, 2011; Muñiz et al., 2014), Heckman sample selection models (Downward and Riordan, 2007; García et al., 2011; Humphreys and Ruseski. 2006; Thibaut et al., 2017), double-hurdle models (Humphreys and Ruseski, 2011; Muñiz et al., 2014; Oliveira-Brochado et al., 2017) and copula estimators (Eberth and Smith, 2010). Empirical analysis of this study utilizes multi-level logistic regression models due to the nested structure of the data and variables.

Both single country and cross-country analyses of participation in sport and physical activity have been conducted by researchers. Since collecting harmonized data is time consuming and costly, most studies on determinants of sport and physical activity participation are carried out

for single countries such as Belgium (Moens and Scheerder, 2004; Scheerder et al., 2005; Thibaut et al., 2017), England or the United Kingdom (Downward and Riordan, 2007; Farrell and Shields, 2002; Kokolakakis et al., 2011; Kokolakakis et al., 2014; Kokolakakis et al., 2017), Germany (Breuer et al., 2011; Hallmann and Breuer, 2014; Ruseski et al., 2011), Italy (Federico et al., 2013), Poland (Strawinski, 2010), Portugal (Oliveira-Brochado et al., 2017), Spain (García et al., 2011; Kokolakakis et al., 2011; Lera-López and Rapún-Gárate, 2007,2011; Castellanos-García et al., 2020). A branch of literature has conducted cross-country analysis for sports participation in European countries using data from surveys conducted by the EU authorities such as different versions of the Eurobarometer project (Downward et al., 2014; Hovemann and Wicker, 2009; Rütten and Abu-Omar, 2004; Sjöström et al., 2006; Van Tuyckom, 2011; Van Tuyckom, 2013; Van Tuyckom and Scheerder, 2010a; Van Tuyckom and Scheerder, 2010b). The current study contributes to this branch of literature by providing a comprehensive cross-country analysis of gender differences in sports participation through the utilization of a recent special Eurobarometer survey.

Determinants of Sports Participation

Empirical research reveals many individual-level correlates for sports participation such as demographics, socioeconomic conditions, household characteristics and health behaviors. Cross-sectional studies collectively find that men participate more in sports (Downward, 2007; Downward and Rasciute, 2010; Downward et al., 2014; Federico et al., 2013; Hovemann and Wicker, 2009; Van Tuyckom et al., 2010; Van Tuyckom and Scheerder, 2010a). These results may be explained not only by biological differences between men and women but also social and cultural influences that reflect differences in expectations of family commitments and work (Kokolakakis et al., 2011). Gender differences in physical capacities and development may lead to gender gaps in sports participation (Knisel et al., 2009). Researchers also reveal that socially constructed gender roles and psychosocial factors cause differences in approaches of males and females to sports participation and preferences for different types of sports (Chalabaev et al., 2013). Contrary to cross-sectional studies, longitudinal analysis reveals that over the course of life, increases in participation rates are higher for women relative to men (Breuer and Wicker, 2009). Some researchers indicate that males and females display differences in preferences for time spent in sports and types of sport at different age cohorts (Taks and Scheerder, 2006; Van Mechelen et al., 2000). Additionally, some single country studies reveal that there are significant gender differences in activities for different types of sports (Garcia et al., 2016). Farrell and Shields (2002) state that a significant proportion of men participate in activities such as cycling, running, football, rugby, gym exercise and racket sports whereas women usually take part in sports such as swimming and aerobics. Similarly, Strawinski (2010) finds that men exhibit considerably higher participation in football, basketball and weight sports while women choose to participate in gymnastics, joggings, walking and badminton. Thus, empirical evidence suggests that males tend to take part more in competitive sports such as group sports (Downward et al., 2014).

Many studies report that age is negatively correlated with the probability of sports participation and time spent in sports due to biological constraints (Downward et al., 2014; Eberth and Smith, 2010; Ruseski and Maresova, 2014; Van Tuyckom et al., 2010). Most studies report that the education level of individuals is positively correlated with sports participation (Downward, 2007; Downward et al., 2011; Downward and Rasciute, 2015; Eberth and Smith, 2010; Farrell and Shields, 2002; Federico et al., 2013; Hallmann and Breuer, 2014; Hovemann and Wicker, 2009;

Kokolakakis et al., 2014; Ruseski et al., 2011; Van Tuyckom and Scheerder, 2010a; Van Tuyckom and Scheerder, 2010b).

Marital status and the presence of children in households are associated with sports participation and choices for types of sport. Negative associations between being married and participation in sports are reported (Eberth and Smith, 2010; Farrell and Shields, 2002; Hovemann and Wicker, 2009; Oliveira-Brochado et al., 2017). However, some studies indicate that being married or cohabiting are not significant correlates of sports participation (Downward, et al., 2014; Ruseski et al., 2011; Van Tuyckom and Scheerder, 2010a). Having children, infant or adults in need of care lead to time constraints for individuals (Downward, 2004). Thus, the presence of children in households is associated with less participation in sports (Downward, 2004, 2007; Downward and Riordan, 2007; Downward et al., 2014; Kokolakakis et al., 2014; Ruseski et al., 2011; Scheerder et al., 2005). Farrell and Shields (2002) state that the presence of children results in higher sports participation of males. Mixed findings of the literature may be attributed to heterogeneities in data, methodological frameworks and country differences across studies.

Taking part in sports is contingent on the economic conditions of individuals which are measured by either income level, occupation or professional status (Kokolakakis et al., 2011). Most studies reveal that income has a significantly positive relationship with sports participation (Downward et al., 2011; Downward and Rasciute, 2010, 2015; Eberth and Smith, 2010; Farrell and Shields, 2002; Lera-López et. al, 2016). This may result from the fact that a higher income level is associated with higher access to sports opportunities, better equipment and more facilities (Downward, 2007; Ruseski and Maresova, 2014). Oliveira-Brochado et al. (2017) argue that individuals who earn higher levels of income face higher opportunity costs for their time allocated to any type of leisure activity. Empirical studies indicate that individuals with higher levels of professional status are more likely to participate in sports (Downard, 2007; Kokolakakis et al., 2011; Lera-López and Rapún-Gárate, 2007; Van Tuyckom and Scheerder, 2010a). Evidence suggests that being unemployed is positively associated with sports participation since unemployed individuals have more time (Downward, 2007; Eberth and Smith, 2010; Farrell and Shields, 2002; Humphreys and Ruseski, 2006; Moens and Scheerder, 2004). On the contrary, some studies report that being unemployed is negatively related with sports participation (Humphreys and Ruseski, 2007; Kokolakakis et al., 2011; Van Tuyckom and Scheerder, 2010a).

Health levels and lifestyle indicators interact with decisions of individuals on sports and physical activities. Empirical evidence suggests that higher levels of self-reported health are positively associated with participation in sports (Downward, 2007; Downward and Riordan, 2007; Eberth and Smith, 2010; Farrell and Shields, 2002; García et al., 2011). Additionally, Farrell and Shields (2002) document that, in cases of medical advice, individuals with bad health conditions participate more in specific sports. Prior literature reveals that there is a negative association between smoking and participation in sports (Downward, 2007; Downward and Rasciute, 2010; Downward and Riordan, 2007). Eberth and Smith (2010) emphasize that non-smokers are more likely to participate in sports since they are more conscious of the health benefits arising from regular sports participation. Moreover, prior studies report that higher levels of drinking are positively linked with taking part in sports (Farrell and Shields, 2002; Downward, 2007; Downward and Rasciute, 2010). On the other hand, Downward et al. (2014) find that alcohol consumption is negatively correlated with both the likelihood and frequency of participation in sports for males.

Most studies consider population size or the location of individuals to measure availability of sports infrastructure. Prior literature shows that characteristics of living areas are associated with

sports and physical activities of individuals. As Hovemann and Wicker (2009) argue, rural areas and suburbs offer fewer sports facilities compared to urban areas. On the other hand, large cities may offer a wide variety of entertainment options and leisure activities that substitute sports as demonstrated by García et al. (2011). In line with former arguments, empirical findings suggest that people living in large town are more likely to take part in sports (Downward et al., 2011; Kokolakakis et al., 2014; Van Tuyckom and Scheerder, 2010a).

Recently, paradigms on physical activity are moving from individual oriented approaches towards more complex models of health behaviours that includes higher levels of influences measured at either country- or regional- levels. Emphasizing the importance of changes in economic, societal and political environments on physical activity, the ecological model of Bronfenbrenner (1979) emphasizes that health behaviours such as physical activity are the result of not only intra- and inter-personal influences but also higher-level influences. By recognizing higher-level aspects of positive healthy behaviours, an ecological approach also reduces the possibility of "victim-blaming" (Becker, 1986).

Another line of literature uses cross-county data to explore country-level correlates of physical activity and sport participation such as economic indicators, social and political conditions and physical environment indicators (Bosdriesz et al., 2012; Cameron et al., 2013; Dallmeyer et al. 2018; Kokolakakis et al., 2014; Kokolakakis et al., 2017; Laverty et al., 2018; Lera-López et al., 2016; Ruseski and Maserova, 2014; Van Tuyckom, 2011; Weinberg et al., 2019; Wicker and Downward, 2017; Wicker et al., 2017).

Some studies explore associations of different country-level factors with the sports participation of individuals in the EU (Cameron et al., 2013; Lavery et al., 2018; Van Tuyckom, 2011; Weinberg et al., 2019). Empirical evidence reveal that GDP is positively associated with physical activity and sport participation (Downward et al., 2014; Ruseski and Maserova, 2014; Van Tuyckom, 2011; Wicker and Downward, 2017; Wicker et al., 2017). However, a study of Cameron et al. (2013) reports no significant association between GDP per capita and leisure-time physical activity. Negative association between GDP and physical activity are obtained by Bosdriesz et al. (2012). Likewise, Ruseski and Maserova (2014) point out that individuals living in countries with more economic freedom have higher likelihood of engage in physical activity. Some studies report no significant associations between unemployment rate and physical activity (Van Tuyckom, 2011; Laverty et al., 2018). Considering women's role in society, Ruseski and Msaserova (2014) reveal that female labor force participation rate and the number of years for voting rights of women are positive correlates of participation in sports and physical activities. Few studies focus on the link between educational attainment at the national level and physical activity. For instance, Van Tuyckom (2011) indicates that the number of students in tertiary education is not associated with leisure-time physical activity. Similarly, literacy rate is not significantly associated with any type of physical activity (Bosdriesz et al., 2012).

Indicators for political environment are also considered as predictors of sports participation and physical activity. Van Tuyckom (2011) concludes that the overall quality of political institutions such as political stability, government effectiveness and control of corruption are positive correlates of leisure-time physical activity. Similarly, Wicker et al. (2017) state that regional governance quality is positively associated with individual healthy activity level. On the contrary, Bosdriesz et al. (2012) report that governmental functioning is not a significant correlate of physical activity.

Previous research investigates impacts of different types of government spending on sports participation at both the local- and national-level. There are positive relationships between sports-related national government spending, sports participation and frequency (Downward et al., 2014). Some researchers point out that national expenditures on health and education are positively correlated with the sports participation of individuals due to spill-over effects (Lera-Lopez et al., 2016; Van Tuyckom, 2011). However, studies conducted on the regional-level yield mixed findings. For instance, Humphreys and Ruseski (2007) find that government spending on parks and recreation fosters the likelihood of participation in group sports whereas it reduces time spent in individual sporting activities in the United States. On the other hand, Dallmeyer et al. (2018) document that sport-related regional government spending promotes participation in sports or exercise in Germany. Finally, Kokolakakis et al. (2017) show that sports funding is not relevant in the explanation of regional differences in sports participation in England.

Previous findings indicate that characteristics of the physical environment are related with participation in sports and physical activity. Climate conditions are significant correlates of physical activity as well as sports participation activity (Bosdriesz et al., 2012; Kokolakakis et al., 2014; Kokolakakis et al., 2017; Weinberg et al., 2019). However, Laverty et al. (2018) report no significant association between climate conditions and participation in physical activity. Some studies report significant correlations between the area of inland water, coastal length and participation in water sports (Kokolakakis et al., 2014; Kokolakakis et al., 2017). Similarly, Wicker et al. (2009) indicate that the supply of forest area influences sport activity of elderly individuals. On the contrary, Van Tuyckom (2011) documents no significant relationship between forest area and leisure-time physical activity in 27-member states of the EU. Researchers also report positive associations between urbanization and physical activity or sports participation (Kokolakakis et al., 2014; Kokolakakis et al., 2017; Van Tuyckom et al., 2011). Finally, the prevalence of motor vehicles displays correlations with participation in sports and physical activity for individuals (Bosdriesz et al., 2012; Van Tuyckom, 2011).

Data Description

Individual-Level Variables

Individual-level data set for this study is obtained from the 88.4 wave of the Eurobarometer survey (EB). The EB is a survey which collects individual-level data from European citizens on their views for various topics such as energy, environment, politics, gender roles, information technology and health. It has standard and special versions which are regularly conducted by the GESIS-Leibniz-Institute for the Social Sciences, Mannheim, Germany. The 88.4 is the latest wave of EB with a special focus on sport and physical activity. This is a cross-sectional survey which covers residents from 28-member states of the EU. The sample of the survey is determined by a multi-stage random sampling methodology which assigns sample points based on population size and density of participating countries. The survey was conducted by face-to-face interviews in December 2017. 28,031 individuals, who are aged 15+, from 28 countries participated in the survey. However, due to missing observations, the operating sample of this study includes less number of participants. Table 1 provides the list of countries and the corresponding number of survey participants in the operating sample.

The EB utilizes separate survey questions to measure physical activity and the sports participation levels of participants. This study considers sports participation as the dependent variable. This variable is derived from QB1 of the EB which asks: “How often do you exercise or

play sports?" Answer choices include: 1) 5 times a week or more; 2) 3 to 4 times a week; 3) 1 to 2 times a week; 4) 1 to 3 times a month; 5) Less often; 6) Never; 7) Don't Know. Since this study considers the participation of respondents in exercise or sports, individuals who choose options 1), 2), 3), 4) and 5) are considered as participating in sports. Individuals who choose 'Never' are considered as non-participants. Respondents with 'Don't Know' are not included in the analysis. Sports participation is measured by a binary variable which reads 1 for participants and 0 for non-participants. Analysis of frequency levels for the sports participation of individuals is beyond the scope of this study.

Details of dependent variable and other individual-level control variables are provided in Appendix Table 1. The gender of respondents are represented by an indicator for female participants. Education level is measured by an ordered discrete variable ranging from 1 (Not completed primary education) to 5 (Graduate level education). Indicators for the employment status, marital status and socio-geographical status of respondents are included in empirical analyses. The general health levels of participants are quantified by self-rated health status which lies between 1 (the worst level of health) and 5 (the best level of health). Control variables for sports club membership, household income level, ability to pay bills and number of children aged below 10 in the household are also considered.

Country-Level Variables

This study combines an individual-level data set of EB with various country-level control variables. Country-level data are obtained from various international databases since variables of interest are diverse and the corresponding data are not consistently available for different years. Hence, the country-level data set is constructed by using data from the closest available year for the corresponding country. Country-level variables for economic conditions such as real GDP per capita, unemployment rate and government expenditures on recreational and sporting activities are considered. Political stability and governing conditions are controlled by construction of an average governance indicator for the corresponding country. Country-level indicators for health-related behaviors such as prevalence of tobacco smoking and alcohol consumption per capita are introduced for empirical analyses. Education levels of countries are measured by mean years of schooling. Forest area as a percentage of land area and regional control variables are introduced to account for physical and geographical conditions of countries. Definitions, sources and other details for country-level variables are presented in Appendix Table 1.

Methodology

Merging data for individual-level and country-level variables, this study conducts analysis of a data set with a nested structure. Due to the hierarchical nature of the data set, a multi-level estimation framework is employed. This study estimates multi-level logistic regression models for sports participation. Multi-level model equations of this study may be presented as follows:

$$\text{Individual Level: } S_{ij} = \beta_j + \alpha W_{ij} + r_{ij} \qquad i=1\ldots. N,\ j=1\ldots. C \tag{1}$$

$$\text{Country Level: } \beta_j = \delta_0 + \delta_1 Y_j + v_j \tag{2}$$

S_{ij} represents sports participation of individual i in country j. β_j and α are intercept and coefficient vectors for equation (1). W_{ij} is vector of individual-level control variables including gender of the individual. N and C correspond to total number of individuals and countries, respectively. β_j are linear functions of an intercept, δ_0, and country-level variables Y_{jk} with δ_1 being the corresponding

Table 1 Country-Level Distribution for Sports Participation: Percentage of Respondents

	Full Sample		*Males*		*Females*	
Country	*N*	*Participated in Sports (%)*	*N*	*Participated in Sports (%)*	*N*	*Participated in Sports (%)*
Austria	1,021	60.92	482	60.58	539	61.22
Belgium	1,001	69.63	474	73.84	527	65.84
Bulgaria	1,040	31.68	475	35.53	565	28.44
Croatia	1,031	46.65	446	48.88	585	44.96
Cyprus	502	47.41	221	52.04	281	43.77
Czech Republic	1,023	58.22	437	56.52	586	59.49
Denmark	1,011	76.16	518	77.03	493	75.25
Estonia	1,005	41.32	356	44.63	649	39.51
Finland	1,024	84.15	502	83.23	522	85.03
France	1,015	52.76	446	58.30	569	48.42
Germany	1,592	57.97	781	62.06	811	54.04
Greece	1,010	28.61	460	35.00	550	23.27
Hungary	1,038	43.35	429	45.92	609	41.54
Ireland	1,004	65.34	484	68.18	520	62.69
Italy	1,029	40.60	511	48.82	518	32.50
Latvia	1,000	40.82	373	47.17	627	37.06
Lithuania	1,013	44.96	376	45.87	637	44.43
Luxembourg	504	74.35	204	76.47	300	72.91
Malta	508	34.25	216	38.43	292	31.16
Poland	997	38.27	404	40.80	593	36.54
Portugal	1,089	28.65	445	34.38	644	24.69
Romania	1,005	36.43	476	39.50	529	33.65
Slovakia	1,089	46.32	474	48.20	615	44.86
Slovenia	1,042	74.06	475	76.00	567	72.44
Spain	1,024	51.17	460	61.30	564	42.91
Sweden	1,036	83.40	545	83.12	491	83.71
Netherlands	1,040	65.87	555	69.19	485	62.06
United Kingdom	1,338	60.07	653	65.75	685	54.68
Mean	-	*52.98*	-	*56.31*	-	*50.25*
Standard Deviation	-	*3.11*	-	*2.88*	-	*3.31*
Maximum	-	*84.15*	-	*83.23*	-	*85.03*
Minimum	-	*28.61*	-	*34.38*	-	*23.27*
Sources: EB (2017)						

vector of coefficients. $r_{ij,}$ v_j are normally distributed error terms for each level equation. Stata 15 software is employed for empirical analysis (StataCorp, 2017).

Results

Descriptive Findings

Country-level distributions of sports participation across gender are provided in Table 1. Finland, Sweden and Denmark have the highest sports participation rates, 84.1%, 83.4% and 76.1%, respectively. Greece and Portugal display the lowest sports participation rates, 28.6% each. There are also heterogeneities in sports participation rates of males and females within the countries. Italy and Spain display remarkable gender differences. In Italy, 48.8% of males report sports participation whereas that of females reads 32.5%. Similarly, Spanish males report higher sports participation rates than their female counterparts, 61.3% and 42.9%. On the other hand, 83% of both males and females report sports participation in Sweden. These findings are in line with earlier findings which suggest that women residing in Mediterranean part of Europe display higher levels of gender gap in sports participation compared to women living in Scandinavian regions (Margetts et al., 1999). Researchers suggest that national differences in infrastructures, cultural orientations and gender specific norms may contribute to heterogeneities in sports participation across nations and gender differences in the sports participation of individuals within a country (Scheerder et al., 2005; Van Tuyckom et al., 2010).

Descriptive statistics for all variables of interest are provided in Appendix Table 2. 53.2% of all respondents report that they participated in sports. Females constitute 54.8% of the sample. Average age of the sample is 51.3 years. Average education level of participants is 3.3 and this corresponds to a level above secondary school education. 52.9% of the sample are married whereas 17.2% report that they are single. Unemployment rate of the sample reads 5.79%. 51.1% of respondents are either employed or self-employed. Average level of self-rated health status is 3.8, which falls between fair and good levels of health. 28.8% of the sample report that they are a member of sports club. Average household income level falls in between 2nd and 3rd quintile. On average, participants display high ability (2.56/3) to pay their bills. Finally, on average participants live with 0.26 children in their households, which indicates that many participants do not have any children in the household.

There are variations in country-level variables in the EU. Real GDP per capita ranges from 18,836$ to 103,744$. Average country-level unemployment rate is 7.6%. On average European governments spend 0.36% of their GDP for recreational and sporting services. Average governance indicator ranges between 1.77 and 0.18. On average, 28.7% of the EU population smokes tobacco products and consumes 11.4 litres of alcohol per capita in a year. Average years of schooling across European countries almost reads 12 years of education. On average, 33.8% of European land corresponds to forest area. Finally, there are 8 countries from each of the Northern and Southern regions and 6 countries from each of the Eastern and Western regions of the Europe.

Empirical Findings from Multi-Level Models

Intra-class correlations (ICC) from linear null models for multilevel framework imply that country-level variations are associated with 10.32% of variation in the sports participation of individuals in the EU. These results are consistent with prior literature and signal that further research to explain cross national variation is needed (Van Tuyckom and Scheerder, 2010b). Table 2 presents estimation results of multilevel logistic regression models for sports participation for the full

sample, males and females. Likelihood ratio test results support multilevel modelling of sports participation. These findings confirm that multilevel modelling is necessary and appropriate to deal with the nested structure of the data for this study. Additionally, Wald test result presented by Table 2 implies that all multilevel models are overall significant. Hence, explanatory variables are relevant and strong correlates of sports participation.

Empirical findings reveal that individual-level variables have significant associations with sports participation. Main findings of this study exhibit that there are gender differences in the sports participation of individuals in EU countries. According to Table 2, females are 13% less likely to participate in sports compared to males. Consistent with related literature (Downward et al., 2014; Federico et al., 2013; Hovemann and Wicker, 2009; Van Tuyckom et al., 2010; Van Tuyckom and Scheerder, 2010a), these findings confirm that there are gender inequalities in sports participation in the EU. Gender differences in the sports participation of individuals in European countries are frequently attributed to social and cultural institutions, gender-specific norms and family-work related time allocation decisions (Kokolakakis et al., 2011; Scheerder et al., 2005; Van Tuyckom et al., 2010).

Table 2 suggests that age is negatively associated with sports participation of both females and males in Europe. On average, one more year of age is associated with a 2.9% decline in probability of sports participation for males. Similarly, a unit increase in age is associated with 2% decrease in likelihood of sports participation for females. These findings support the notion that individuals are not able to keep up high levels of sport participation as they get older (Downward et al., 2014; Eberth and Smith, 2010; Ruseski and Maresova, 2014; Van Tuyckom et al., 2010).

Education level has significantly positive association with sports participation. Table 2 implies that, on average, holding a higher degree is associated with a 35.7% increase in probability of participating in sports for individuals in Europe. A higher level of educational attainment is related with 34.5% and 37.3% increases in likelihoods of sports participation of males and females, respectively. Previous research suggests that education may directly lead to improvements in awareness of benefits from sports and development of necessary skills for sports participation. Moreover, there are indirect effects of education on decisions of individuals for sports participation through income and health levels. (Downward et al., 2014). Thus, findings of this study are consistent with earlier results reporting positive relationships between sports participation and education level (Downward, 2007; Eberth and Smith, 2010; Federico et al., 2013; Hallmann and Breuer, 2014; Kokolakakis et al., 2014; Van Tuyckom and Scheerder, 2010b).

Empirical findings display mixed results for relationships of marital status with sports participation across gender. Similar to some earlier studies (Downward, et al., 2014; Ruseski et al., 2011; Van Tuyckom and Scheerder, 2010a), Table 2 reveals no significant differences in the sports participation of married and other groups such as living with a partner, single, divorced and widowed for the full sample. However, stratified analysis with respect to gender indicates different findings. Divorced males are 17.7% less likely to participate in sports compared to married males. Single females are 21.7% more likely to participate in sports compared to married ones. These results are in line with studies which report negative associations between being married and participation in sports (Eberth and Smith, 2010; Farrell and Shields, 2002; Hovemann and Wicker, 2009; Oliveira-Brochado et al., 2017).

Table 2 implies that self-employed individuals are 17.4% more likely to be involved in sports compared to employed. Students are 2.2 times more likely to participate in sports than

employed. However, individuals who are responsible for housework are 25.9% less likely to report sports participation compared to employed. Except for being retired and unemployed, all occupational statuses are statistically significant correlates of sports participation. These findings are also observed for the female sample as indicated by column 3 of Table 2. For instance, females with housework responsibilities are 22.1% less likely to do sports compared to employed females. Self-employed females are 31.8% more likely to participate in sports. For the sample of males, only male students are more likely to do sports compared to employed males. Considering time and income constraints of individuals, these results support the idea that work and family commitments could be more effective in undermining participation of females (Downward et al., 2014).

Consistent with earlier findings (Downward, 2007; Downward and Riordan, 2007; Eberth and Smith, 2010; Farrell and Shields, 2002; García et al., 2011), this study reports that self-rated health status of individuals is positively correlated with likelihood of sports participation. As indicated in Table 2, a higher level of self-rated health is associated with 35.1% and 28.9% increases in probability of participating in sports for males and females, respectively. Empirical results of Table 2 indicate that sports club members are 5 times more likely to participate in sports. Individuals living in large towns are 21.5% more likely to participate in sports compared to individuals from small or medium-sized locations. Individuals in rural areas are 6.7% less likely to report sports participation than their counterparts in small or medium-sized towns. In line with earlier studies (Downward et al., 2011; Kokolakakis et al., 2014; Van Tuyckom and Scheerder, 2010a) these findings support the hypothesis that large cities may offer a wider variety of options for sports (Hovemann and Wicker, 2009).

Household income level is positively correlated with probabilities of sports participation in the EU. On average, an increase in quintile level of household income is associated with 15.4% and 17.2% increases in likelihoods of sports participation for males and females, respectively. As an indicator for the poverty level of individuals, level of ability to pay bills has positively significant relationships with sports participation. According to Table 2, females with higher levels of ability to pay bills are 15.1% more likely to participate in sports compared to females with lower ability levels for paying bills. Similarly, a higher ability to pay bills is associated with 25.9% rise in likelihood of sports participation for males. These results suggest that level of economic resources is a key upstream driver of sports participation, especially for females (Downward et al., 2014).

Childcare activities require time and effort and leave less time and energy for parents. Table 2 implies that number of children in the household displays negatively significant correlations with the sports participation of individuals in Europe. Females living with higher number of children are 12.8% less likely to participate in sports compared females with less number of children. Males in households with higher number of children are 7.6% less likely to report sports participation. These results are in line with the notion that time constraints are essential for female participation (Ruseski et al., 2011).

This study reports mixed results for associations of country-level variables with sports participation. Similar to Cameron et al. (2013), this study reveals that GDP per capita is not significantly correlated with the sports participation of individuals in EU countries. Unlike earlier research (Van Tuyckom, 2011; Laverty et al., 2018), the current study suggests that unemployment rate has positively significant association with sports participation. On average, a unit increase in unemployment rate is associated with 7.8% increase in probability of participating in sports. Changes in sports participation probabilities of females and males in response to unit variation in country-level unemployment rate are 6.2% and 9.6%, respectively. Findings of this study also

imply that government expenditures on recreational and sporting services display positive correlations with sports participation. Overall, individuals living in a country which spends more on sporting services are 2.5 time more likely to participate in sports.

Table 2 Multi-Level Logistic Regression Models for Participation in Sports

Dependent Variable: Sports Participation			
	Full Sample	**Males**	**Females**
Individual-Level Variables	*Odds Ratios*	*Odds Ratios*	*Odds Ratios*
Female	0.870***	-	-
	(0.0295)		
Age	0.976***	0.971***	0.980***
	(0.00168)	(0.00250)	(0.00231)
Education Level	1.357***	1.345***	1.373***
	(0.0274)	(0.0408)	(0.0376)
Marital Status: *Married*	-	-	-
Living with Partner	1.039	0.975	1.091
	(0.0591)	(0.0819)	(0.0850)
Single	1.079	0.923	1.217***
	(0.0588)	(0.0752)	(0.0905)
Divorced	0.980	0.823**	1.098
	(0.0594)	(0.0791)	(0.0864)
Widowed	1.005	0.886	1.020
	(0.0614)	(0.101)	(0.0767)
Employment Status: *Employed*	-	-	-
Housework	0.741***	1.264	0.779***
	(0.0618)	(0.379)	(0.0706)
Student	2.224***	2.544***	2.026***
	(0.265)	(0.475)	(0.319)
Unemployed	0.924	0.945	0.958
	(0.0661)	(0.105)	(0.0903)
Retired	1.056	1.117	1.042
	(0.0565)	(0.0886)	(0.0763)
Self-Employed	1.174**	1.070	1.318***
	(0.0785)	(0.0953)	(0.135)
Self-Rated Health Level	1.314***	1.351***	1.289***
	(0.0232)	(0.0359)	(0.0305)
Sports Club Membership	5.019***	4.818***	5.233***
	(0.205)	(0.290)	(0.293)
Socio-Geographical Status:	0.933*	0.909	0.960
Rural area/village	(0.0371)	(0.0538)	(0.0515)

Small/medium-sized town	-	-	-
Large town/city	1.215*** (0.0502)	1.263*** (0.0790)	1.165*** (0.0644)
Household Income Level	1.161*** (0.0181)	1.154*** (0.0266)	1.172*** (0.0250)
Ability to Pay Bills	1.193*** (0.0341)	1.259*** (0.0555)	1.151*** (0.0435)
Number of Children in Household	0.892*** (0.0258)	0.924* (0.0416)	0.872*** (0.0335)
Country-Level Control Variables			
Real GDP Per Capita	1.000 (0.0000065)	1.000 (0.0000069)	1.000 (0.0000071)
Unemployment Rate	1.078** (0.0343)	1.096*** (0.0355)	1.062* (0.0365)
Government Expenditures on Recreational and Sporting Services	2.594*** (0.949)	2.445** (0.907)	2.695** (1.056)
Average Governance Indicator	2.080** (0.669)	1.757* (0.572)	2.525*** (0.875)
Prevalence of Tobacco Smoking	0.938*** (0.0191)	0.930*** (0.0192)	0.945*** (0.0206)
Alcohol Consumption Per Capita	1.093* (0.0539)	1.093* (0.0546)	1.092* (0.0580)
Mean Years of Schooling	1.385*** (0.151)	1.338*** (0.149)	1.419*** (0.167)
Forest Area	1.007 (0.00459)	1.005 (0.00463)	1.009* (0.00496)
Region: *Eastern Europe*	0.719 (0.207)	0.715 (0.208)	0.741 (0.229)
Northern Europe	0.526** (0.145)	0.579* (0.162)	0.480** (0.142)
Southern Europe	-	-	-
Western Europe	0.594* (0.174)	0.679 (0.201)	0.528** (0.166)
Number of Observations	22,338	10,208	12,130
Number of Countries	28	28	28
LR Test (Multilevel vs. Standard Logistic Model)	334.93***	110.8***	186.61***
Wald $\chi 2$	3,813.57***	1,814.94***	2,037.78***
Sources: EB (2017); EHIG (2020a); EHIG (2020b); Eurostat (2020a); Eurostat (2020b); WB (2020a); WB (2020b); WGI (2018); UN (2020a); UN (2020b).			

Notes: Standard errors in parentheses. Two-tailed statistical test results are provided. ***p<0.01, **p<0.05, *p<0.10. Due to missing observations in certain variables, number of observations differ in model estimations compared to descriptive statistics.

Empirical findings indicate that quality of governance in a country displays significant correlations with sports participation. Individuals living in a country with a higher level of governance indicator are twice more likely to participate in sports. Thus, one can speculate that higher quality of governance seems to provide a sounder environment for formulation of health-related policies such as physical activity (Scheerder et al., 2011). Country-level health behaviour indicators have significant correlations with sports participation. Higher prevalence level of smoking in a country is negatively related with sports participation of females and males in the EU. Alcohol consumption level of a country displays positively significant association with sports participation. A unit increase in alcohol consumption per capita level is associated with 9.3% increase in probability of sports participation.

The education level of a country exhibits positively significant association with sports participation of individuals. A unit increase in mean years of schooling is associated with 33.8% and 41.9% increases in probabilities of sports participation for males and females in Europe, respectively. Individuals living in countries with higher levels of education are more likely to participate in sports. Physical conditions of the country relate with sporting activities of individuals in European countries. Level of forest area in a country is positively associated with sports participation of females only. Finally, there are regional differences in sports participation in the EU. Empirical findings reveal that individuals from Northern and Western Europe report lower sports participations compared to individuals living in Southern and Eastern Europe. These findings confirm the presence of regional divide in sporting activities in European countries (Van Tuyckom, 2011; Gratton et al., 2011). However, it should be noted that geographical classification of countries in this study slightly differs from previous literature. Table 1 reveals that Nordic countries have high sports participation rates and Baltic States have low participation rates. These countries are classified as Northern Europe with respect to the categorization of the United Nations (UN, 2020b). Compared to long-standing member states, these results confirm that lower participation rates are usually apparent in states that have newly joined the EU (Gerovasilli et al., 2015; Hartmann-Tews, 2006).

Conclusion

Engaging in sports and physical activities leads to multidimensional benefits for not only individuals but also for the society as a whole. This study contributes to the literature that analyses correlates of the sports participation of individuals. These findings are offered to help navigate public policies and strategies that improve participation and commitment levels for sporting activities. This study provides an analysis of gender differences in the sports participation of individuals in the EU.

Using data from the latest Eurobarometer survey and country-level data from official sources, this study employs a multilevel modelling framework to quantify associations of sports participation with their individual-level and country-level correlates. Gender-specific regression models are also estimated. Findings of this study reveal that females participate in sports less than males in European countries. Empirical findings confirm that sports participation decisions have a hierarchical structure and that they are associated significantly with both individual- and country-level variables. There are gender differences in individual- and country-level predictors of sports

participation. Estimation results further suggest that policies indirectly related with health behaviors play essential roles in individuals' decisions concerning sports participation.

The results of this study have implications for public policies. Policy programs designed to encourage sports and physical activities of individuals should avoid one-size-fits-all approaches. Policies should differ across sub-samples of society with respect to individual-level characteristics, especially the gender of participants. For instance, policies should specifically target women, the married, women with housework responsibilities, the elderly and people with childcare responsibilities in order to increase sports participation.

This study has multiple limitations. As a cross-sectional study, it is not able to provide any cause-effect findings and its findings should be interpreted as correlations only. Discussions in this article are limited to active participation in sports, neglecting other aspects of participation such as activity performed as spectator. In addition, the survey data are self-reported by individuals. Thus, there may be biases and measurement errors depending upon to what extent concept of "sports participation" is interpreted by respondents. Furthermore, the survey period of Eurobarometer 88.4 does not allow investigation of variation throughout the year. This may introduce some biases since patterns of physical and sports activities are heavily subject to seasonal effects. Another limitation of this article is the potential heterogeneity in levels of precision for country-level data. There may be biases and measurement errors depending on methodologies utilized in different countries. This study is not able to provide analysis for different types of sports activities. The ways that country-level variables influence sports participation may be dependent on the type of activities examined. Hence, the examination of different activity types in detail by multi-level approaches would provide contributions to the literature. Further studies are needed for the identification of causal mechanisms for relationships of sports participation and sports frequency with individual-level and country-level variables. Future research that explores impacts of policy changes on sports participation would make significant contributions. In addition, the investigation of individual habits regarding the use of media and technology could offer valuable insights on sports participation research. Finally, an analysis of the time dimension of these relationships with panel or time series data sets would also provide valuable contributions to the related literature.

References

Becker, M. H. (1986). "The Tyranny of Health Promotion." *Public Health Reviews*, *14*(1), 15-23.

Biddle, S. J., Fox, K., & Boutcher, S. (Eds.). (2003). *Physical Activity and Psychological Well-Being*. Routledge, London, UK and New York, USA.

Breuer, C., Hallmann, K., & Wicker, P. (2011). "Determinants of Sport Participation in Different Sports." *Managing Leisure*, *16*(4), 269-286.

Breuer, C., & Wicker, P. (2009). "Decreasing Sports Activity with Increasing Age? Findings from A 20-Year Longitudinal and Cohort Sequence Analysis." *Research Quarterly for Exercise and Sport*, *80*(1), 22-31.

Bronfenbrenner, U. (1979). *The Ecology of Human Development*. Harvard University Press. Cambridge, MA.

Brosnan, S. (2020). "The Impact of Sports Participation on Crime in England Between 2012 And 2015." *Sport in Society*, *23*(6), 1080-1090.

Bosdriesz, J. R., Witvliet, M. I., Visscher, T. L., & Kunst, A. E. (2012). "The Influence of the Macro-Environment on Physical Activity: A Multilevel Analysis of 38 Countries Worldwide." *International Journal of Behavioral Nutrition and Physical Activity*, *9*(1), 110.

Cameron, A. J., Van Stralen, M. M., Kunst, A. E., Te Velde, S. J., Van Lenthe, F. J., Salmon, J. O., & Brug, J. (2013). "Macroenvironmental Factors Including GDP per Capita and Physical Activity in Europe." *Medicine and Science in Sports and Exercise*, *45*(2), 278-285.

Caruso, R. (2011). "Crime and Sport Participation: Evidence from Italian Regions over the Period 1997–2003." *The Journal of Socio-Economics*, *40*(5), 455-463.

Castellanos-García, P., Lera-López, F., & Sánchez-Santos, J. M. (2020). "Patterns of Sports Involvement in Spain." *European Journal of Sport Science*, 1-30.

Chalabaev, A., Sarrazin, P., Fontayne, P., Boiché, J., & Clément-Guillotin, C. (2013). "The Influence of Sex Stereotypes and Gender Roles on Participation and Performance in Sport and Exercise: Review and Future Directions." *Psychology of Sport and Exercise*, *14*(2), 136-144.

Council of Europe (CE). (1980). *The European Sport for All Charter: Text and Background*, Strasbourg: Council of Europe/Committee for the Development of Sport.

Council of Europe (CE). (1993). *European Sports Charter*, London: Sports Council.

Dallmeyer, S., Wicker, P., & Breuer, C. (2018). "The Relationship between Sport-Related Government Spending and Sport and Exercise Participation: The Role of Funding Size, Period, and Consistency." *International Journal of Health Promotion and Education*, *56*(4-5), 237-247.

Downward, P. (2004). "On Leisure Demand: A Post Keynesian Critique of Neoclassical Theory." *Journal of Post Keynesian Economics*, *26*(3), 371-394.

Downward, P. (2007). "Exploring the Economic Choice to Participate in Sport: Results from the 2002 General Household Survey." *International Review of Applied Economics*, *21*(5), 633-653.

Downward, P., & Rasciute, S. (2010). "The Relative Demands for Sports and Leisure in England." *European Sport Management Quarterly*, *10*(2), 189-214.

Downward, P., & Rasciute, S. (2015). "Exploring the Covariates of Sport Participation for Health: An Analysis of Males and Females in England." *Journal of Sports Sciences*, *33*(1), 67-76.

Downward, P., & Riordan, J. (2007). "Social Interactions and the Demand for Sport: An Economic Analysis." *Contemporary Economic Policy*, *25*(4), 518-537.

Downward, P., Dawson, A., & Dejonghe, T. (2009). *Sports Economics: Theory, Evidence and Policy*. Butterworth-Heinemann. Oxford, UK.

Downward, P., Frick, B., Humphreys, B. R., Pawlowski, T., Ruseski, J. E., & Soebbing, B. P. (Eds.). (2019). *The SAGE Handbook of Sports Economics*. SAGE Publications Limited.

Downward, P., Lera-Lopez, F., & Rasciute, S. (2011). "The Zero-Inflated Ordered Probit Approach to Modelling Sports Participation." *Economic Modelling*, *28*(6), 2469-2477.

Downward, P., Lera-Lopez, F., & Rasciute, S. (2014). "The Correlates of Sports Participation in Europe." *European Journal of Sport Science*, *14*(6), 592-602.

Eberth, B., & Smith, M. D. (2010). "Modelling The Participation Decision and Duration of Sporting Activity in Scotland." *Economic Modelling*, *27*(4), 822-834.

Eurobarometer 88.4 (EB). (2017). European Commission, Brussels. December 2017. ZA No. 6939. TNS Opinion, Brussels [Producer]; GESIS, Cologne [Publisher]: ZA6939, Dataset Version 2.0.0, doi:10.4232/1.13288. Available at: https://zacat.gesis.org/webview/index.jsp?object=http://zacat.gesis.org/obj/fStudy/ZA6939

European Commission (EC). (2007). White Paper on Sport. Brussels: Commission of the European Communities. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52007DC0391

European Commission (EC). (2011) Communication: Developing the European Dimension in Sport. Brussels, European Commission. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52011DC0012

European Health Information Gateway (EHIG). (2020a). Health for All Explorer: Real Gross Domestic Product, PPP$ per capita. Division of Information, Evidence, Research and Innovation. WHO Regional Office for Europe. Accessed (July 3, 2020) at: https://gateway.euro.who.int/en/hfa-explorer/#VWuqlNPKqk

European Health Information Gateway (EHIG). (2020b). Health for All Explorer: Age-Standardized Prevalence of Current Tobacco Smoking, Age 15+, WHO Estimates (%). Division of Information, Evidence, Research and Innovation. WHO Regional Office for Europe. Accessed (July 3, 2020) at: https://gateway.euro.who.int/en/indicators/hfa_622-3013-age-standardized-prevalence-of-current-tobacco-smoking-among-people-aged-15-years-and-over-who-estimates/

Eurostat. (2020a). Unemployment by sex and age: Annual data. Eurostat, the statistical office of the European Union. Accessed (July 3, 2020) at: https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en

Eurostat. (2020b). General government expenditure by function (COFOG). Eurostat, the statistical office of the European Union. Accessed (July 3, 2020) at: https://ec.europa.eu/eurostat/web/government-finance-statistics/data/database

Farrell, L., & Shields, M. A. (2002). "Investigating the Economic and Demographic Determinants of Sporting Participation in England." *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, *165*(2), 335-348.

Federico, B., Falese, L., Marandola, D., & Capelli, G. (2013). "Socioeconomic Differences in Sport and Physical Activity among Italian Adults." *Journal of Sports Sciences*, *31*(4), 451-458.

Fox, K. R. (1999). "The Influence of Physical Activity on Mental Well-Being." *Public Health Nutrition*, *2*(3a), 411-418.

García, J., Lera-López, F., & Suárez, M. J. (2011). "Estimation of a Structural Model of the Determinants of the Time Spent on Physical Activity and Sport: Evidence for Spain." *Journal of Sports Economics*, *12*(5), 515-537.

García, J., Muñiz, C., Rodriguez, P., & Suarez, M. J. (2016). "Comparative Analysis of Sports Practice by Types of Activities." *International Journal of Sport Finance*, *11*(4), 327.

Gehrmann, S., & Wicker, P. (2021). "The Effect of Regional and Social Origin on Health-Related Sport and Physical Activity of Young People in Europe." *European Journal for Sport and Society*, 1-18.

Gerovasili, V., Agaku, I. T., Vardavas, C. I., & Filippidis, F. T. (2015). "Levels of Physical Activity among Adults 18–64 Years Old in 28 European Countries." *Preventive Medicine*, *81*, 87-91.

Gratton, C., Rowe, N., & Veal, A. J. (2011). "International Comparisons of Sports Participation in European Countries: An Update of the COMPASS Project." *European Journal for Sport and Society*, *8*(1-2), 99-116.

Hallmann, K., & Breuer, C. (2014). "The Influence of Socio-Demographic Indicators Economic Determinants and Social Recognition on Sport Participation in Germany." *European Journal of Sport Science*, *14*(sup1), S324-S331.

Hartmann-Tews, I. (2006). "Social Stratification in Sport and Sport Policy in the European Union." *European Journal for Sport and Society*, *3*(2), 109-124.

Hoekman, R., Breedveld, K., & Scheerder, J. (2011). "Introduction to the Special Issue on Sports Participation in Europe." *European Journal for Sport and Society*, *8*(1-2), 7-13.

Hovemann, G., & Wicker, P. (2009). "Determinants of Sport Participation in the European Union." *European Journal for Sport and Society*, *6*(1), 51-59.

Humphreys, B. R., & Ruseski, J. E. (2006). "Economic Determinants of Participation in Physical Activity and Sport." *IASE Working Paper Series*, (06-13), 1-25.

Humphreys, B. R., & Ruseski, J. E. (2007). "Participation in Physical Activity and Government Spending on Parks and Recreation." *Contemporary Economic Policy*, *25*(4), 538-552.

Humphreys, B. R., & Ruseski, J. E. (2011). "An Economic Analysis of Participation and Time Spent in Physical Activity." *The BE Journal of Economic Analysis & Policy*, *11*(1).

Knisel, E., Opitz, S., Wossmann, M., & Ketelhut, K. (2009). Sport motivation and physical activity of students in three European schools. *International Journal of Physical Education, 46*(2), 40-53.

Kokolakakis, T., Castellanos-García, P., & Lera-López, F. (2017). "Differences in Formal and Informal Sports Participation at Regional Level in England." *International Journal of Sport Policy and Politics*, *9*(3), 491-504.

Kokolakakis, T., Lera-López, F., & Castellanos, P. (2014). "Regional Differences in Sports Participation: The Case of Local Authorities in England." *International Journal of Sport Finance*, *9*(2), 149-171.

Kokolakakis, T., Lera-López, F., & Panagouleas, T. (2011). "Analysis of the Determinants of Sports Participation in Spain and England." *Applied Economics*, *44*(21), 2785-2798.

Laverty, A. A., Thompson, H., Cetateanu, A., & Filippidis, F. T. (2018). "Macro-environmental Factors and Physical Activity in 28 European Union Countries." *The European Journal of Public Health*, *28*(2), 300-302.

Lera-López, F., & Rapún-Gárate, M. (2007). "The Demand for Sport: Sport Consumption and Participation Models." *Journal of Sport Management*, *21*(1), 103-122.

Lera-Lopez, F., & Rapun-Garate, M. (2011). "Determinants of Sports Participation and Attendance: Differences and Similarities." *International Journal of Sports Marketing & Sponsorship, 12*(2), 167-190.

Lera-López, F., Wicker, P., & Downward, P. (2016). "Does Government Spending Help to Promote Healthy Behavior in the Population? Evidence from 27 European Countries." *Journal of Public Health*, *38*(2), e5-e12.

Margetts, B. M., Rogers, E., Widhal, K., de Winter, A. R., & Zunft, H. J. (1999). "Relationship Between Attitudes to Health, Body Weight and Physical Activity and Level of Physical Activity in a Nationally Representative Sample in The European Union." *Public Health Nutrition, 2*(1a), 97-103.

Moens, M., & Scheerder, J. (2004). "Social Determinants of Sports Participation Revisited. The Role of Socialization and Symbolic Trajectories." *European Journal for Sport and Society*, *1*(1), 35-49.

Muñiz, C., Rodríguez, P., & Suárez, M. J. (2014). "Sports and Cultural Habits by Gender: An Application Using Count Data Models." *Economic Modelling*, *36*, 288-297.

Nocon, M., Hiemann, T., Müller-Riemenschneider, F., Thalau, F., Roll, S., & Willich, S. N. (2008). "Association of Physical Activity with All-Cause and Cardiovascular Mortality: A Systematic Review and Meta-Analysis." *European Journal of Cardiovascular Prevention & Rehabilitation, 15*(3), 239-246.

Oliveira-Brochado, A., Brito, P. Q., & Oliveira-Brochado, F. (2017). "Correlates of Adults' Participation in Sport and Frequency of Sport." *Science & Sports*, *32*(6), 355-363.

Petruzzello, S. J., Landers, D. M., Hatfield, B. D., Kubitz, K. A., & Salazar, W. (1991). "A Meta-Analysis on the Anxiety-Reducing Effects of Acute and Chronic Exercise." *Sports Medicine*, *11*(3), 143-182.

Rodgers, B. (1977). *Rationalising Sports Policies: Sport in Its Social Context: International Comparisons*. Council of Europe Committee on Sport.

Ruseski, J. E., & Maresova, K. (2014). "Economic Freedom, Sport Policy, and Individual Participation in Physical Activity: An International Comparison." *Contemporary Economic Policy, 32*(1), 42-55.

Ruseski, J. E., Humphreys, B. R., Hallmann, K., & Breuer, C. (2011). "Family Structure, Time Constraints, and Sport Participation." *European Review of Aging and Physical Activity*, *8*(2), 57-66.

Rütten, A., & Abu-Omar, K. (2004). "Prevalence of Physical Activity in the European Union." *Social and Preventive Medicine, 49*(4), 281-289.

Scheerder, J., Vandermeerschen, H., Van Tuyckom, C., Hoekman, R., Breedveld, K., & Vos, S. (2011). "Understanding the game. Sport participation in Europe." In *Play the Game Conference 'Bringing Change to the Heart of Sport',* Date: 2011/10/03-2011/10/06, Location: Cologne

Scheerder, J., Vanreusel, B., & Taks, M. (2005). "Stratification Patterns of Active Sport Involvement among Adults: Social Change and Persistence." *International Review for the Sociology of Sport, 40*(2), 139-162.

Sjöström, M., Oja, P., Hagströmer, M., Smith, B. J., & Bauman, A. (2006). "Health-Enhancing Physical Activity Across European Union Countries: The Eurobarometer Study." *Journal of Public Health, 14*(5), 291-300.

StataCorp. (2017). *Stata Statistical Software: Release 15.* College Station, TX: StataCorp LLC.

Stephens, T. (1988). "Physical Activity and Mental Health in the United States and Canada: Evidence from Four Population Surveys." *Preventive Medicine*, *17*(1), 35-47.

Strawinski, P. (2010). "Economic Determinants of Sport Participation in Poland." *Rivista di Diritto ed Economia dello Sport, 3*, 55-76.

Taks, M., & Scheerder, J. (2006). "Youth Sports Participation Styles and Market Segmentation Profiles: Evidence and Applications." *European Sport Management Quarterly*, *6*(2), 85-121.

The United Nations (UN). (2020a). Human Development Data (1990-2018): Mean Years of Schooling (Years). Accessed (July 3, 2020) at: http://hdr.undp.org/en/data

The United Nations (UN). (2020b). Standard Country or Area Codes for Statistical Use (M49): Countries or Areas / Geographical Regions. Accessed (July 3, 2020) at: https://unstats.un.org/unsd/methodology/m49/

The United Nations (UN). (2022). The 17 Sustainable Development Goals (SDGs). UN Department of Economic and Social Affairs. Available at: https://sdgs.un.org/goals

The World Bank (WB). (2020a). The World Development Indicators: Forest area (% of land area). Accessed (July 3, 2020) at: https://data.worldbank.org/indicator/AG.LND.FRST.ZS

The World Bank (WB). (2020b). The World Development Indicators: Total Alcohol Consumption per Capita (Liters of Pure Alcohol, Projected Estimates, 15+ Years of Age). Accessed (July 3, 2020) at: https://data.worldbank.org/indicator/SH.ALC.PCAP.LI

The Worldwide Governance Indicators (WGI). (2018). The Worldwide Governance Indicators (WGI) Project by Kaufmann, D. and Kray, A. Available at: https://info.worldbank.org/governance/wgi/

Thibaut, E., Eakins, J., Vos, S., & Scheerder, J. (2017). "Time and Money Expenditure in Sports Participation: The Role of Income in Consuming the Most Practiced Sports Activities in Flanders." *Sport Management Review*, *20*(5), 455-467.

Van Bottenburg, M., Rijnen, B., & van Sterkenburg, J. C. (2005). *Sports Participation in the European Union: Trends and Differences*. Arko Sports Media/WHJ Mulier Institute. Utrecht, The Netherlands.

Van Mechelen, W. I. L. L. E. M., Twisk, J. W., Post, G. B., Snel, J. A. N., & Kemper, H. C. (2000). "Physical Activity of Young People: The Amsterdam Longitudinal Growth and Health Study." *Medicine and Science in Sports and Exercise*, *32*(9), 1610-1616.

Van Tuyckom, C. (2011). "Macro-Environmental Factors Associated with Leisure-Time Physical Activity: A Cross-National Analysis of EU Countries." *Scandinavian Journal of Public Health*, *39*(4), 419-426.

Van Tuyckom, C. (2013). "Six Sporting Worlds. A Cluster Analysis of Sports Participation in the EU-25." *Quality & Quantity*, *47*(1), 441-453.

Van Tuyckom, C., & Scheerder, J. (2010a). "A Multilevel Analysis of Social Stratification Patterns of Leisure-Time Physical Activity Among Europeans." *Science & Sports*, *25*(6), 304-311.

Van Tuyckom, C., & Scheerder, J. (2010b). "Sport for All? Insight into Stratification and Compensation Mechanisms of Sporting Activity in the 27 European Union Member States." *Sport, Education and Society*, *15*(4), 495-512.

Van Tuyckom, C., Scheerder, J., & Bracke, P. (2010). "Gender and Age Inequalities in Regular Sports Participation: A Cross-National Study of 25 European Countries." *Journal of Sports Sciences*, *28*(10), 1077-1084.

Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). "Health Benefits of Physical Activity: The Evidence." *CMAJ: Canadian Medical Association Journal*, *174*(6), 801-809.

Weinberg, D., Stevens, G. W., Bucksch, J., Inchley, J., & de Looze, M. (2019). "Do Country-Level Environmental Factors Explain Cross-National Variation in Adolescent Physical Activity? A Multilevel Study in 29 European Countries." *BMC Public Health*, *19*(1), 680.

Wicker, P., & Downward, P. (2017). "Exploring Spillovers Between Government Quality and Individual Health Production Through Sport and Physical Activity." *European Sport Management Quarterly*, *17*(2), 244-264.

Wicker, P., Breuer, C., & Pawlowski, T. (2009). "Promoting Sport for All to Age-Specific Target Groups: The Impact of Sport Infrastructure." *European Sport Management Quarterly*, *9*(2), 103-118.

Wicker, P., Downward, P., & Lera-López, F. (2017). "Does Regional Disadvantage Affect Health-Related Sport and Physical Activity Level? A Multi-Level Analysis of Individual Behaviour." *European Journal of Sport Science*, 17(10), 1350-1359.

World Health Organization. (2011). *Promoting Sport and Enhancing Health in European Union Countries: A Policy Content Analysis to Support Action.* World Health Organization, Regional Office for Europe, Copenhagen, Denmark. Available at: https://www.euro.who.int/__data/assets/pdf_file/0006/147237/e95168.pdf

World Health Organization (WHO). (2009). *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks.* WHO Press. World Health Organization, Geneva, Switzerland. Available at: https://www.who.int/healthinfo/global_burden_disease/GlobalHealthRisks_report_full.pdf

Appendix

Appendix Table 1: Variable Descriptions for Empirical Analysis

Individual-Level Variables	
Sports Participation	Indicates whether the respondent exercises or plays sports. 1=Participates in sports/exercise; 0=Does not participate in sports/exercise. This variable is derived from QB1 of EB: "How often do you exercise or play sports?" 1) 5 times a week or more; 2) 3 to 4 times a week; 3) 1 to 2 times a week; 4) 1 to 3 times a month; 5) Less often; 6) Never; 7) Don't Know. Individuals who choose 1-5 are considered as participating in sports. Individuals who chooses 'Never' are considered as non-participants. Respondents with 'Don't Know' are not included in the analysis.
Female	Indicator for gender of the individual. 1=Female and 0=Male. (Derived from D10 in EB).
Age	Age of the respondent in years. (Derived from D11 in EB).
Education Level	Measures the highest level of education attained by the individual. 1=Not completed primary education level; 2=Completed primary education level; 3=Completed secondary education level; 4=Completed post-secondary vocational studies, or higher education to bachelor level or equivalent; 5=Completed upper level of education to master, doctoral degree or equivalent. (Derived from QA9A in EB).
Marital Status	Indicator for marital status of the individual. 1=Married; 2=Living with partner; 3=Single; 4=Divorced; 5=Widowed. (Derived from D7 in EB).
Employment Status	Indicator for employment status of the individual. 1=Housework; 2=Student; 3=Unemployed; 4=Retired; 5=Self-employed; 6=Employed. (Derived from D15A in EB).
Self-Rated Health Level	Indicator for self-reported health status of individual. It ranges discretely from 1 (the worst level of health) to 5 (the best level of health). (Derived from QA1A_1 in EB).
Sports Club Membership	Indicator for sports/exercise related club/group/center membership for the individual. 1=Member of a club; 0=Not a member of a club. (Derived from QB10 in EB).
Socio-Geographical Status	Measures socio-geographical status of the respondent. 1=Rural area or village; 2=Small or medium-sized town; 3=Large town/city. (Derived from D25 in EB).
Household Income Level	Measures the quintile for income level of the household in which individual lives in. 1 indicates the lowest income group and 5 is the highest income group in the country. (Derived from QA11 in EB).
Ability to Pay Bills	Measures the ability of individual to pay his/her monthly bills in last 12 months. 1=Low ability; 2=Medium ability; 3=High ability. (Derived from D60 in EB).
Number of Children in Household	Measures number of children (aged below 10) in household. 0=None; 1=One child; 2=Two children; 3=Three children; 4=Four or more children (Derived from D40b in EB).
Country-Level Variables	
Real GDP Per Capita	Real gross domestic product (GDP) per capita (at PPP$) in the country for survey year of 2017. It is obtained from EHIG (2020a).
Unemployment Rate	Unemployment rate in the country for survey year 2017 (% of active population for age 15-74). It is obtained from Eurostat (2020a).
Government Expenditures on Recreational and Sporting Services	Government expenditures on recreational and sporting services in the country for survey year 2017 (% of GDP). It is obtained from Eurostat (2020b).
Average Governance Indicator	Measures the average level of governance for the country in the survey year 2017. This average includes governance indicators: 1) Voice and Accountability; 2) Political Stability and Absence of Violence; 3) Government Effectiveness; 4) Regulatory Quality; 5) Rule of

	Law; 6) Control of Corruption. Numerical values of governance measures range from -2.5 to 2.5. Higher values of variables indicate better governance levels for the country. They are obtained from WGI (2018).
Prevalence of Tobacco Smoking	Measures age-standardized prevalence of current tobacco smoking as a percentage of 15+ years of age population for the country in the year 2016. It is obtained from EHIG (2020b).
Alcohol Consumption Per Capita	Measures total alcohol consumption per capita in liters of pure alcohol for 15+ years of age for the country in the year 2016. It is obtained from WB (2020b).
Mean Years of Schooling	Measures the average number of completed years of education in a country for 25+ years of age population in the survey year 2017. It is obtained from UN (2020a).
Forest Area	Measures forest area as percentage of land area for the country in the year 2016. It is obtained from WB (2020a).
Region	Indicates the geographical classification of the country in Europe. *Eastern Europe* includes Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia. *Northern Europe* includes Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Sweden and United Kingdom. *Southern Europe* includes Croatia, Cyprus, Greece, Italy, Malta, Portugal, Slovenia and Spain. *Western Europe* includes Austria, Belgium, France, Germany, Luxembourg and Netherlands. These categories are based on the United Nation's classification (UN, 2020b).

Sources: EB (2017); EHIG (2020a); EHIG (2020b); Eurostat (2020a); Eurostat (2020b); WB (2020a); WB (2020b); WGI (2018); UN (2020a); UN (2020b). Note: Country-level data were missing for some of the variables of interest in the survey year. The available data from the closest year are used.

Appendix Table 2: Descriptive Statistics

		Mean or %	Maximum	Minimum	Standard Deviation	N
Individual-Level Variables:						
Sports Participation		0.532	1	0	0.499	27,972
Female		0.548	1	0	0.498	28,031
Age		51.387	99	15	18.18	28,031
Education Level		3.344	5	1	0.966	27,887
Marital Status:	*Married*	*52.97%*	-	-	-	14,717
	Living with Partner	*11.36%*	-	-	-	3,155
	Single	*17.25%*	-	-	-	4,792
	Divorced	*7.88%*	-	-	-	2,190
	Widowed	*10.55%*	-	-	-	2,931
Employment Status:	*Employed*	*43.83%*	-	-	-	12,287
	Housework	*4.82%*	-	-	-	1,350
	Student	*5.73%*	-	-	-	1,605
	Unemployed	*5.79%*	-	-	-	1,624
	Retired	*32.53%*	-	-	-	9,118
	Self-Employed	*7.30%*	-	-	-	2,047
Self-Rated Health Level		3.84	5	1	1.047	27,995
Sports Club Membership		0.288	1	0	0.453	28,031
Socio-Geographical Status:	*Rural area/village*	*28.83%*	-	-	-	8,075
	Small/medium-sized town	*43.34%*	-	-	-	12,140
	Large town/city	*27.84%*	-	-	-	7,798
Household Income Level		2.69	5	1	2.577	22,763
Ability to Pay Bills		2.56	3	1	0.653	27,555
Number of Children in Household		0.26	4	0	0.636	28,031
Country-Level Variables:						
Real GDP Per Capita		41,063.52	103,744.8	18,836.52	17,008.73	28
Unemployment Rate		7.6	21.5	2.9	4.053	28
Government Expenditures on Recreational and Sporting Services		0.368	1.2	0.1	0.204	28
Average Governance Indicator		1.02	1.772	0.189	0.478	28
Prevalence of Tobacco Smoking		28.75	43.7	18.9	5.9	28
Alcohol Consumption Per Capita		11.45	15	7.5	1.828	28
Mean Years of Schooling		11.964	14.1	9.2	1.066	28
Forest Area		33.806	73.107	1.093	17.133	28
Region:	*Eastern Europe*	*21.43%*	-	-	-	6
	Northern Europe	*28.57%*	-	-	-	8
	Southern Europe	*28.57%*	-	-	-	8
	Western Europe	*21.43%*	-	-	-	6

Sources: EB (2017); EHIG (2020a); EHIG (2020b); Eurostat (2020a); Eurostat (2020b); WB (2020a); WB (2020b); WGI (2018); UN (2020a); UN (2020b).