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Institutional Factors, Sport Policy, and Individual Sport Participation: An International Comparison

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Abstract

Many countries promote participation in sport and physical activity among its citizens. We undertake an international comparative analysis of participation using data from 34 countries in the 2007 International Social Survey Programme (ISSP) Leisure Time and Sports module, augmented with country-specific characteristics capturing economic, demographic, and institutional factors. Our findings indicate that participation in sport and physical activity falls with age and rises with education and income. GDP per capita and economic freedom are associated with higher participation; past success of the national team in the Olympics and hosting sports mega-events are associated with lower participation.

JEL Codes: H59, I12, I18, J22, L83

Key words: sport, physical activity; institutions; economic freedom

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1 Introduction

Many countries value participation in physical activity and sport and actively promote this participation among its citizens. While government policy often gives high priority to financing and promoting success in elite sport like the Olympic Games and World Cup, increasing participation in sport and physical activity at all levels of the population represents a major policy objective for many governments. This policy objective is motivated by statistics showing that most countries' citizens are not sufficiently physically active to obtain health benefits (World Health Organization, 2010b). Government interest in promoting sport participation extends beyond promoting health to achieving other important societal goals like reducing obesity, deterring crime, and promoting integration and social cohesion.

The increasing global policy priority of promoting participation in sport and physical activity motivated a number of studies in epidemiology, public health and, more recently, economics that examine physical activity and sport participation. These studies can be loosely grouped into three categories: 1) analyses of the determinants physical activity and sport (Downward, 2007; Humphreys and Ruseski, 2007, 2011; Wicker et al., 2009); 2) analyses of the impact of physical activity and sport on such factors as self-assessed health status, health outcomes, and health care utilization (Balia and Jones, 2008; Brown et al., 2007; Contoyannis and Jones, 2004; Costa-Font and Gil, 2005; Ruseski and Humphreys, 2011; Sherwood and Jeffery, 2000; Warburton et al., 2006; Sari, 2009); and 3) the impact of physical activity and sport participation on other factors, like labor market outcomes (Lechner, 2009) and self-reported happiness (Huang and Humphreys, 2010). A common factor motivating this body of research is a desire to improve the understanding of how participation in physical activity and sport benefits society. All of these studies examine participation in a single locality (country or region within a country) and focus on establishing a relationship between micro- or individual- level factors like age, gender, health outcomes, and labor market outcomes and physical activity.

In this paper, we undertake an international comparative analysis of individual participation in sport and physical activity using survey data from 34 countries contained in the International Social Survey Programme (ISSP) survey Leisure Time and Sports module, augmented with country-level characteristics like Olympic medal success, hosting mega-sporting events, GDP per capita and variables capturing other economic, institutional and social characteristics. An analysis of participation in physical activity using cross-country data has several advantages. It explicitly investigates the robustness of the results from studies using data from a single country, region, or other sub-national area. It also allows for factors that affect all residents of a particular country or sub-national area, like national sport policy, national economic conditions, geo-spatial factors,

and institutional characteristics to vary, which permits an empirical analysis of the relationship between these factors and participation in physical activity. This broadens our understanding of the determinants of participation in physical activity, and can also help to inform public policy aimed at encouraging participation in physical activity.

We examine the effect of both macro and micro-level factors on participation in physical activity. Our findings about the effect of individual-level characteristics on participation are consistent with other studies. Participation in physical activity falls with age and hours worked, and rises with education and income. We have new findings about the effect of aggregate factors on participation. Aggregate income per capita, economic freedom, and female labor force participation are associated with higher participation in physical activity and sport. Past success by the national Olympic team, and hosting sports mega-events like the Olympic Games and the World Cup are associated with lower participation in sport and physical activity. These results have important policy implications.

2 Related Literature

The public health priority of promoting regular physical activity and the complexity of the decision to participate in physical activity motivates hundreds of studies on the topic. The majority of the studies employ health behavior and behavioral medicine approaches to examine the correlates of participation in physical activity. This literature has been extensively reviewed. A table in Bauman et al. (2002), a recent survey of this literature, summarizes the results of about 300 studies of the correlates of participation in physical activity in the clinical and public health literature (Bauman et al., 2002, p. 11). This table shows that research consistently identifies a statistical association between participation in physical activity and many demographic, socioeconomic, psychological, physical environment, and biological factors. For example, Bauman et al. (2002) note that gender (male), education and income are positively associated with participation in physical activity in many studies; a negative association between age and participation in physical activity is repeatedly documented.

The number of studies examining participation in physical activity (including sport) from an economic perspective is increasing in both the health and sports economics literature. Most of these studies employ large nationally representative survey data and include common set of demographic and socio-economic factors like age, education, income, marital status, household structure, and employment status (Some example include Farrell and Shields (2002); Downward (2004); Humphreys and Ruseski (2007); Downward (2007); Breuer and Wicker (2008); Sari (2009); Lechner (2009); Humphreys and Ruseski (2011); Downward et al. (2011); García et al. (2011)). Consistent with

the public health literature, these studies all find that participation in sport is affected by family commitments, ethnicity, age, household income and education. Most studies using cross-sectional data find that probability of participation in any kind of activity declines with age. On the other hand, Breuer and Wicker (2008) find that this consistently documented finding in cross-sectional studies is not supported using longitudinal data from Germany. Women and married people are less likely to participate than males and singles. The presence of children in the household has mixed effects depending on the type of activity and the dimension (participation or time spent) of physical activity studied. Education and income are consistently positively associated with participation in any type of activity. This pattern slightly changes if we move from overall participation to specific activities. Also, the importance of income differs across studies. Findings with respect to employment status are mixed. Some studies (Farrell and Shields, 2002; Downward, 2007) find that unemployed and part-time employed people are more likely to exercise than employed and full-time employed people, while others find that employed people are more likely to participate in physical activity and sport (Humphreys and Ruseski, 2007).¹

Overall, all the studies reviewed here examine sport participation in a single locality and generally identify micro-level factors influencing decisions about participation. There are some cross-national studies but, with very few exceptions, they focus only on the prevalence of sport participation using the standardized International Physical Activity Questionnaire (IPAQ) and the International Physical Activity and Environment Network (IPEN) questionnaire. An exception is a study by Rütten and Abu-Omar (2004) exploring the perceptions of environmental opportunities for physical activity in the European Union, using data from the Eurobarometer Survey 58.2 undertaken in 2002. They found that these perceptions are positively related to income and individual physical activity level. Another cross-national study by Van Tuyckom (2011) examines the macro-environmental factors associated with leisure time physical activity in the EU, using again Eurobarometer data from the 64.3 Survey extended with data from WHO and World Bank databases. He found that physical activity is positively associated with GDP, public expenditures on health, independence of media, political stability, government effectiveness, rule of law, and control of corruption.

Our study contributes to this emerging literature by extending the geographical scope to 34 countries around the world and by considering the effect of country-level factors such as economic and demographic conditions, institutional factors, success in elite international athletic competition, and hosting sports mega-events on participation at the individual level.

¹See Downward et al. (2011) for an excellent summary of the empirical evidence on the determinants of sport participation.

3 Theoretical Motivation

The theoretical framework motivating our empirical analysis draws from two separate areas. The first is an economic model of participation and time spent in sport and physical activity developed by Humphreys and Ruseski (2011). In this model, utility maximizing individuals facing time and money constraints make decisions about participating in sport and physical activity and other activities, and the purchase of goods and services. The key economic decisions in this model are the distinct but related decisions to participate in physical activity and how long to participate per episode of physical activity. These decisions are influenced by factors like income and the opportunity cost of time; demographic factors like age, marital status and ethnicity; and environmental factors, like access to parks and recreational facilities and the supply of equipment and specialized capital needed to participate in some forms of physical activity and sport. This model, as well as other empirical studies of physical activity participation, motivate the individual-level variables included in our empirical model.

The second comes from the idea that institutional factors can affect individuals' decisions by affecting tastes and preferences (Bowles, 1998). Tastes and preferences play an important role in decisions about participation in physical activity, since the opportunity cost of time affects the decision. Also, participation in physical activity and sport generates current consumption benefits and future benefits, in the form of improved health and appearance, but involves current monetary, time and physical costs. The rate of time preference may affect the decision to participate in sport and physical activity. The literature on the effect of institutions on individual preferences motivates the inclusion of macro-level variables, including variables reflecting institutional characteristics, in our empirical model. Since many institutional factors do not vary within a country or region, one way to investigate the effects of institutions on individual choice is to perform an international comparison. We analyze data from 34 countries, which provides considerable variation in institutional factors.

4 Econometric Approach

In order to understand the relationship between the decision to participate in sport and physical activity and individual and country-level characteristics, we undertake a conditional analysis of the decision by individuals to participate in leisure time sport or physical activity. To do this, we estimate a probit models of sport participation. The basic probit model estimated is:

$$Pr(y_{ij} \neq 0 | x_{ij}) = \Phi(x_{ij}\beta) \quad (1)$$

where y_i is an indicator variable for sport participation by individual i residing in country j , $\Phi(\cdot)$ is the standard cumulative normal distribution, x_{ij} is a vector of explanatory variables, some of which vary by individual and others which vary only by country j , and β a vector of unobservable parameters to be estimated. $x_{ij}\beta$ is the probit score and is estimated using maximum likelihood.

The dependent variable is an indicator variable taking on the value of 1 if the respondent reported participating regularly in sport and physical activity and equal to zero if the frequency of participation was less frequent or never. The vector of explanatory variables include both individual characteristics and country-level variables that capture institutional characteristics and other country-level factors related to sport and physical activity. The explanatory variables include the “standard” set of individual characteristics used in the literature on participation in physical activity to explain participation in sport and physical activity like age, gender, marital status, education and income. These factors can be linked to the economic model developed by Humphreys and Ruseski (2011). In order to examine how institutional factors influence individual decisions about participation in sport and physical activity, we add several country specific variables like Olympic success, hosting mega-events, measures of economic freedom in the country, labor force participation, and per capita GDP to the vector of explanatory variables. Since these country-level factors do not vary across individuals in each country, the estimated standard errors must be corrected to account for this lack of variation. We cluster correct the estimated standard errors at the country level. We also include country-specific intercepts to account for unobservable heterogeneity affecting participation in sport and physical activity in each country. Parameter estimates for the unknown parameters of Equation (1) will provide information about the relationship between individual-level and country-level variables and the decision to participate in sport and physical activity.

5 Data Description

Our individual level data come from the International Social Survey Programme (ISSP) 2007 survey. The ISSP is an ongoing program of multinational cooperation on surveys covering topics that are important for social sciences research. In 2007, a *Leisure Time and Sports* module was administered as part of the ISSP. 36 countries participated in the survey, but data from Denmark and the Netherlands were not included in the public use data file due to a delay in the data deposit. The final sample available for analysis contains survey data from 34 countries.

The ISSP questionnaire was translated into national languages and administered in countries as a face-to-face interview or in a self-completion format, often as a part of a larger survey. The

data were collected between 2006 and 2008, with the fielding period ranging from 4 days up to nine months. 51,952 individuals from 36 countries were surveyed with sample sizes ranging from 906 to 2,907 in each country. Data for two countries were not included in the final public access data file, leaving a sample of 49,730 observations from 34 countries.

The ISSP 2007 *Leisure Time and Sports* survey is a rich source of information on leisure time activities and individual sport participation. The survey asks about frequency of different leisure time activities, reasons for doing them and obstacles preventing participation. The survey also asks questions about socio-demographic factors such as age, gender, marital status, composition of the household or education, and questions about economic factors such as respondent’s personal and family income, employment status, the number of working hours per week or occupation. This makes the ISSP data an ideal setting for examining the economic determinants of individual sport and physical activity participation.

The key question in the ISSP asked: “How often do you do each of the following activities in your free time?” where “Take part in physical activities such as sports, going to the gym, going for a walk” was one of the activities identified. Possible responses included “daily,” “several time a week,” “several times a month,” “several times a year” and “never.” Table 1 summarizes the participation rates in sport and physical activity by country and frequency based on responses to this question and the number of observations for each country. Note that we treat responses of “several times per year” as equivalent to “never.”

Table 1 indicates considerable variation in sport and physical activity participation rates across countries and across frequency of participation. In general, the fraction of individuals reporting daily participation was lowest, and the fraction reporting participating several times per week highest. Daily participation rates ranged from a low of 0.6% for daily participation in Cyprus to a high of 26% in South Korea. The rate of participation several times per week ranges from a lows of 5.4% in Cyprus and 8.6% in Bulgaria to highs of 44.6% in Switzerland and 42.7% in Norway.

The dependent variable used in Equation 1 is equal to one of the individual reported participating in sport daily or several time per week. This frequency of participation is consistent with the World Health Organization (WHO) guidelines on physical activity. Recent WHO guidelines suggest that adults aged 18-64 should engage in at least 150 minutes of moderate-intensity aerobic physical activity throughout the week to realize health benefits World Health Organization (2010a).

The ISSP survey also contains information about the demographic and economic characteristics of the individuals surveyed. Table 2 shows summary statistics for these individual-level characteristics.

The average age of an individual in the sample is almost 46 years. 55% of the individuals

Table 1: Physical Activity and Sport Participation Rates by Country

Country	Observations	Fraction Reporting Participation		
		Daily	Several times per week	Several times per month
Argentina	1,651	0.125	0.217	0.121
Australia	2,637	0.220	0.351	0.228
Austria	1,019	0.129	0.320	0.251
Belgium	1,248	0.055	0.246	0.263
Bulgaria	969	0.052	0.086	0.108
Chile	1,501	0.104	0.169	0.148
Taiwan	2,147	0.227	0.251	0.185
Croatia	1,200	0.173	0.197	0.142
Cyprus	996	0.006	0.054	0.184
Czech Republic	1,214	0.120	0.261	0.274
Dominican Republic	2,125	0.090	0.166	0.247
Finland	1,330	0.226	0.411	0.205
France	2,025	0.124	0.358	0.270
Germany	1,694	0.161	0.354	0.209
Hungary	1,024	0.158	0.186	0.126
Ireland	2,031	0.200	0.288	0.186
Israel	1,334	0.139	0.252	0.169
Japan	1,226	0.116	0.232	0.211
South Korea	1,427	0.260	0.298	0.156
Latvia	1,069	0.119	0.294	0.133
Mexico	1,594	0.208	0.207	0.144
New Zealand	973	0.251	0.381	0.192
Norway	1,127	0.145	0.427	0.252
Philippines	1,198	0.087	0.110	0.124
Poland	1,282	0.099	0.138	0.124
Russia	1,999	0.078	0.127	0.139
Slovak Republic	1,130	0.086	0.206	0.242
Slovenia	1,001	0.198	0.313	0.191
South Africa	2,902	0.088	0.132	0.114
Sweden	1,297	0.190	0.414	0.247
Switzerland	999	0.244	0.446	0.150
Great Britain	872	0.222	0.322	0.221
United States	1,533	0.228	0.314	0.180
Uruguay	1,435	0.137	0.179	0.105

Table 2: Summary Statistics: Individual Characteristics

Variable	Mean	Std. Dev.	Min	Max
Age	45.89	17.35	15	98
Education (years)	11.72	3.96	0	25
Male	0.45	0.49	0	1
Married	0.52	0.50	0	1
Household Size	3.21	1.78	1	28
Employed Fulltime	0.45	0.49	0	1
Hours Worked	22.0	23.36	0	96
N	49,749			

samplings are female. The percentage of married people is 55% and of those living with a steady life partner is even higher at 65%. The most frequent, 26% of the sample, composition of the household is 2 adults and 46% of individuals lived in the household with some children. As for the education, the most frequent length of schooling is 12 years and the most frequent degree (24% of the sample) is higher secondary.

People who are employed and especially those working long hours have different opportunity costs of time than the unemployed or those working fewer hours. These differences in the opportunity cost of time will likely influence decisions about participation in sport and physical activity. 45% of those surveyed report being employed full time and another 11% are employed less than full time. 7% of the respondents are unemployed, 18% retired and 9% are homemakers. The average number of hours worked weekly for those employed is almost 42.

A positive relationship between income and sport participation has been found in a number of cross-sectional studies. People with higher income can better afford the specialized equipment, fees, and other costs associated with some types of sport and physical activity. The ISSP survey includes questions about personal income. The challenge in using these variables in our statistical analysis is achieving comparability in reported income across countries. The data are not comparable across countries for two reasons. First, the way in which the income question is posed varies across countries so that the survey administered in some countries asks for gross income while others asks for net income. Second, the currency in which income is reported is country specific. We overcome these challenges by using the distribution of personal income in each country to create indicator variables for within-country income quartiles. For example, the variable *inc_quart_1* takes on the value of one if the respondent is in the lowest income quartile in his country and zero otherwise. These variables provide a measure of where each respondent falls in the income distribution in her country.

5.1 Country-level characteristics

In order to assess the effect of country-level factors on individuals' decisions, we augment the ISSP survey data with country-level data obtained from several sources. The first group are basic country economic and demographic characteristics compiled from the World Bank Online Database for 2007, the year the ISSP survey was administered. The basic country characteristics include GDP and GDP per capita in PPP adjusted dollars, overall population of each country, population density measured as a number of persons per km^2 and percent urban population in the country. We expect a positive relationship between participation in sport and physical activity and GDP per capita; countries with higher GDP per capita have more resources to expend on supplying the specialized facilities and equipment required for participation in sport and physical activity. The basic economic and demographic characteristics of each country in the sample are summarized in Table 3. All these variables were taken from World Bank Online Database for 2007. GDP and GDP per capita are expressed in US 2009 PPP dollars.

The average GDP of a country in the sample in 2007 was 1.083 million and the average GDP per capita was 25,816 PPP adjusted US dollars, with countries ranging from lower-middle-income economies to high-income economies. The average population of a country was 39.8 million and the average density of population 140 persons per km^2 . Urban population represented on average 74% of the overall population. From Table 3, the sample includes a wide range of countries with different economic and demographic characteristics. The sample includes large economies in terms of GDP like the US and small economies like Cyprus and Uruguay. It also includes countries on all continents, although only South Africa represents Africa.

The second group of characteristics measure national sport policy including the number of sports mega-events hosted and measures of national sporting success in international competitions. Our definition of a sports mega-event includes the Olympic Games, the FIFA World Cup, the UEFA European Football Championships, the Commonwealth Games, the Pan-American Games, the Rugby World Cup, the FIBA World Championship for basketball, and the Cricket World Cup for the period 2000-2014. The venues for all these events had been announced and facility construction begun by 2007 when the ISSP survey was conducted.

We hypothesize that national sport policy and success in international competitions can affect an individual's decision to participate in sport and physical activity. We include two variables that reflect national sport policy in a country: the performance of athletes in elite international competition and the past number of sports mega-events hosted by the country. Most countries have a national Olympic Organizing Committee that sets priorities about the support of elite athletics in the country, and many of these organizations make decisions about the allocation of resources and

Table 3: Basic Country Characteristics

Country	GDP (PPP \$, in 000)	GDP/capita PPP \$	Population Total	Density Persons per km^2	Urban population % of total
Austria	305,859,103	36,847	8,300,788	101	67
Belgium	368,179,339	34,650	10,625,700	351	97
Bulgaria	80,356,184	10,491	7,659,764	71	71
Cyprus	20,092,071	25,628	853,814	92	70
Czech Republic	247,689,203	23,968	10,334,160	134	74
Finland	186,936,068	35,346	5,288,720	17	63
France	2,071,781,853	32,462	61,938,464	113	77
Germany	2,846,929,838	34,606	82,266,372	236	74
Great Britain	2,134,012,374	34,981	61,005,113	252	90
Hungary	189,211,217	18,816	10,055,780	112	67
Ireland	194,238,785	44,582	4,356,931	63	61
Latvia	35,344,579	15,529	2,276,100	37	68
Poland	621,740,358	16,310	38,120,560	125	61
Slovakia	109,387,198	20,267	5,397,318	112	56
Slovenia	53,463,129	26,492	2,018,122	100	49
Sweden	336,591,730	36,794	9,148,092	22	84
Croatia	74,483,552	16,791	4,436,000	82	57
Norway	253,192,110	53,766	4,709,153	15	77
Switzerland	313,002,321	41,451	7,551,117	189	73
USA	13,741,600,000	45,609	301,290,000	33	81
Argentina	523,449,758	13,255	39,490,465	14	92
Chile	230,194,184	13,837	16,636,135	22	88
Dominican Republic	75,212,993	7,664	9,813,686	203	68
Mexico	1,493,177,309	14,183	105,280,515	54	77
Uruguay	38,195,350	11,491	3,323,906	19	92
Israel	192,436,295	26,801	7,180,100	332	92
Japan	4,297,517,834	33,635	127,770,750	351	66
Philippines	299,184,326	3,372	88,718,185	298	64
Russia	2,095,276,912	14,745	142,100,000	9	73
South Korea	1,287,678,714	26,574	48,456,000	500	81
Taiwan	731,000,000	32,000	22,974,347	639	na
Australia	795,702,481	37,760	21,072,500	3	89
New Zealand	115,212,847	27,248	4,228,300	16	86
South Africa	467,833,504	9,777	47,850,700	39	60

Note: GDP for 2007 in 2009 PPP USD

Source 1: World Bank Online Database; data for 2007

Source: CIA Fact Book and The Republic of China Yearbook 2009

funding to athletics and sport. In addition, success in international competitions like the Olympic Games received wide spread media attention in countries, and international media report daily updates on medals won by countries during the Olympic Games.

Olympic success and hosting sports mega-events could have either a positive or negative effect on individual participation in sport and physical activity. Success in elite international competitions, and hosting these competitions could increase participation in sport and physical activity if these events encourage people to become more physically active, either because of an advertising effect where individuals are made more aware of the range of sport and physical activity options available, or because they want to emulate the athletes that participate in these events. Other underlying mechanisms could be either information asymmetries or simple self-identification. Watching members of the national team perform well in the Olympic Games could, in some cases, make residents of a country aware of the potential for them to undertake some sort of physical activity that they were unaware of prior to the the Games. Alternatively, watching a successful member of the national team could lead a resident of a particular country to conclude that, since another resident of the country is good at some sport, other residents of the country will also be good at that sport, and thus become physically active.

Success in elite international competitions, and hosting these events, could reduce participation in sport and physical activity if government resources devoted to promoting elite athletic performance or building venues for use in sports mega-events reduces the resources devoted to encouraging non-elite athletes to participate in sport and physical activity. In other words, resources devoted to elite athletes and hosting mega-events have opportunity costs that could affect decisions to participate in sport and physical activity in the entire population. We collected data on Olympic medal counts by country for the Athens (2004) Games. We do not examine the relationship between success in the Torino (2006) Games and participation in sport and physical activity because relatively few countries in our sample participate in, and have success in, the Winter Olympic Games compared to the Summer Games. Table 4 contains information about Olympic medal success and country representation in the 2004 Athens Olympic Games.

Tables 4 report how many athletes from each country participated in the Athens Games and how many medals they won. To be able to compare different countries, we constructed variables such as the share of total medals won (calculated as a ratio of medals won by the country and total number of medals distributed at the Games); the share of participants (calculated as a ratio of number of participants from a country and total number of participants at the Games); and the share of participants sent by each country (calculated as a ratio of number of participating athletes and the overall population of the nation). In Athens in 2004, each country in the sample won, on

Table 4: Olympic Success: Athens 2004

Country	Percent of	Medals			Participants		Participants as % of total participants
	Total Medals	Gold	Silver	Bronze	Participants	as % of pop	
Austria	0.75	2	4	1	79	9.52	0.66
Belgium	0.32	1	0	2	61	5.74	0.51
Bulgaria	1.29	2	1	9	102	13.32	0.85
Cyprus	0	0	0	0	20	23.42	0.17
Czech Republic	0.86	1	3	4	145	14.03	1.21
Finland	0.43	0	2	2	85	16.07	0.71
France	3.55	11	9	13	341	5.51	2.84
Germany	5.27	13	16	20	512	6.22	4.27
Great Britain	3.23	9	9	12	278	4.56	2.32
Hungary	1.83	8	6	3	266	26.45	2.22
Ireland	0	0	0	0	52	11.94	0.43
Latvia	0.43	0	4	0	36	15.82	0.3
Poland	1.08	3	2	5	215	5.46	1.79
Slovakia	0.65	2	2	2	66	12.23	0.55
Slovenia	0.43	0	1	3	82	40.63	0.68
Sweden	0.75	4	2	1	131	14.32	1.09
Croatia	0.54	1	2	2	107	24.12	0.89
Norway	0.65	5	0	1	62	13.17	0.52
Switzerland	0.54	1	1	3	124	16.42	1.03
USA	10.98	36	39	27	614	2.04	5.12
Argentina	0.65	2	0	4	180	4.56	1.5
Chile	0.32	2	0	1	22	1.32	0.18
Dominican Republic	0.11	1	0	0	40	4.08	0.33
Mexico	0.43	0	3	1	133	1.26	1.11
Uruguay	0	0	0	0	15	4.51	0.13
Israel	0.22	1	0	1	38	5.29	0.32
Japan	3.98	16	9	12	331	2.59	2.76
Philippines	0	0	0	0	16	0.18	0.13
Russia	9.9	27	27	38	513	3.61	4.28
South Korea	3.23	9	12	9	279	5.76	2.33
Taiwan	0.54	2	2	1	90	3.92	0.75
Australia	5.27	17	16	16	512	24.3	4.27
New Zealand	0.54	3	2	0	154	36.42	1.28
South Africa	0.65	1	3	2	117	2.45	0.98

Source: http://olympiastatistik.de/index.php?mainframe=/og_de/statistics/index.php

average, 1.75% of total medals awarded. The USA won 10.98% of total medals. Four countries did not win any medals. A country sent, on average, 11.22 participants per million of population to these Games and a national team represented on average 1.43% of the total number of participants, with the biggest share, 5.12%, sent by the USA and the smallest, 0.13%, from Uruguay.

The final group of country characteristics describe institutional characteristics of the country. We obtained these data from a variety of sources. The variables in this category include indices of economic freedom, the year in which women were given the right to vote, and female labor force participation rates. Economic freedom refers to “the degree to which a market economy is in place, where the central components are voluntary exchange, free competition, and protection of persons and property (Berggren, 2003, p. 193).” It reflects a range of institutional factors that can affect individuals’ economic decisions. Our measure of economic freedom is the Index of Economic Freedom. This index is published by the Heritage Foundation and the *Wall Street Journal* and reflects ten dimensions of economic freedom, including the ease of starting a new business, the presence of trade barriers, the presence of regulations on personal investment, the protection of property rights, and other factors. It is intended to capture the extent to which individuals can work, produce, consume, and invest in any way they choose; in other words, the extent to which markets allocate resources in an economy. This index ranges from 0 to 100 with higher numbers reflecting more economic freedom. Previous research has linked the Index of Economic Freedom to long run economic growth (Carlsson and Lundström, 2002; Heckelman and Knack, 2009), literacy and life expectancy (Esposto and Zaleski, 1999), entrepreneurship (Nyström, 2008), and health and well-being (Stroup, 2007).² Female labor force participation has been shown to have an important effect on sport (Klein, 2004), among other economic outcomes.

Individual sport and physical activity participation decisions might be influenced by the institutional characteristics of a country. We hypothesize that countries with greater economic freedom and countries that are more progressive with respect to women’s role in society, as reflected in the female labor force participation rate and the number of years women have had the right to vote, will have higher individual participation in sport and physical activity. Table 5 summarizes country-level institutional characteristics, as well as selected other country-level variables.

The Index of Economic Freedom in the sample ranges from a low of 52.2 in Russia to a high of 82.6 in Ireland. The median countries in this sample, in terms of the Index of Economic Freedom, are Norway and Latvia at 67.9. Female labor force participation averaged 52% and clusters in the 35 to 50% range. Taiwan (68.1%) had the highest female labor force participation rate in the

²Polachek and Xiang (2009) and Wagner et al. (2009) have analyzed ISSP data combined with the Index of Economic Freedom in different contexts.

Table 5: Summary Statistics: Country Characteristics

Variable	Mean	Std. Dev.	Min	Max
% of Medals in Athens	6.93	4.60	0	17.93
# of Mega-Events hosted	0.56	0.87	0	3
Index of Economic Freedom	68.0	8.73	52.2	82.6
Female Labor Force Participation (%)	52.1	6.29	39.2	68.1
Women’s Suffrage Year	1939	20.82	1906	1994

sample; Chile (39.2%) had the lowest.

6 Results and Discussion

We estimate the unknown parameters of Equation (1) using maximum likelihood. Recall that the model includes separate country-specific intercepts to capture unobservable heterogeneity and cluster-corrects the estimated standard errors at the country level. The results are shown on Table 6. We estimated two alternative models: Model 1 is a basic sport participation model that contains only individual level explanatory variables and the country-specific intercepts; Model 2 adds adds country-level characteristics. Table 6 shows marginal effects, standard errors, and P-values for the two probit models.

This is among the first, if not the first, comparative analysis of international sport participation. Because of this, the estimates of both Model 1 and Model 2 are of interest, in that they provide an assessment of the ability of individual characteristics to explain observed participation in physical activity. The results from Model 1 are consistent with similar analyses using data from a single country or region. With respect to demographic characteristics, the probability of participation falls with age, being married and household size. Larger households likely indicate the presence of children. Other studies find that small children in the household negatively impact participation in sport and physical activity. Participation in physical activity increases with education, which is also consistent with previously published research. Both hours worked and full-time employment status are associated with a reduced probability of participating in physical activity. These two variables reflect the amount of time spent working, and thus represent time constraints placed on individuals. Increased time spent working is associated with a reduced probability of participating in physical activity. The results on Table 6 indicate a positive relationship between income and the probability that an individual participates in physical activity, holding other factors constant. This is also consistent with previously published results, and reflects the fact that participating in many types of physical activity is costly. Participation in physical activity often requires equipment or

Table 6: Probit Model Estimates: Marginal Effects

Variable	Model 1			Model 2		
	Parameter Estimate	Standard Error	P-Value	Parameter Estimate	Standard Error	P-Value
Age	-0.002	0.001	< 0.001	-0.002	0.001	< 0.001
Years of Education	0.015	0.002	< 0.001	0.015	0.002	< 0.001
Male	0.032	0.014	0.025	0.032	0.014	0.025
Married	-0.017	0.008	0.033	-0.017	0.008	0.033
# in Household	-0.006	0.002	0.002	-0.006	0.002	0.002
Hours Worked	-0.001	0.000	< 0.001	-0.001	0.000	< 0.001
Employed Full Time	-0.048	0.010	< 0.001	-0.048	0.010	< 0.001
Income Quartile 2	0.022	0.010	0.033	0.022	0.010	0.033
Income Quartile 3	0.045	0.010	< 0.001	0.045	0.010	< 0.001
Income Quartile 4	0.085	0.013	< 0.001	0.085	0.013	< 0.001
GDP Per Capita	—	—	—	0.001	0.001	< 0.001
% Medals in Athens	—	—	—	-0.011	0.001	< 0.001
Mega Events Hosted	—	—	—	-0.024	0.001	< 0.001
Index of Economic Freedom	—	—	—	0.008	0.000	< 0.001
Female Labor Force Part.	—	—	—	0.011	0.001	< 0.001
Years Women's Suffrage	—	—	—	0.002	0.001	< 0.001
Observations	45567			45567		
Pseudo R^2	0.094			0.094		

membership fees, and may also involve travel to and from a location where the activity takes place. Those with higher income are better able to afford these costs.

The last three columns on Table 6 contains results for the model that includes both individual-level and country-level variables in the probit model. Again, the standard errors for this model have been corrected for clustering at the country level. The results suggest that these macro-level variables are associated with individuals' decisions to participate in physical activity. The higher GDP per capita in a country, the more likely are individuals to report participating in sport and physical activity. We interpret this as reflecting the fact that participation in some activities requires some specialized infrastructure, like playing fields, as well as coaching or instruction, and that the higher is GDP per capita in a country, the more likely is that an individual has access to this specialized infrastructure and instruction.

The two variables representing national sport policy, medals success in Athens and the number of mega-sporting events hosted, have negative and significant parameter estimates. The more success the national team had in the Athens Olympic Games, the less likely was an individual in that country to report participating in physical activity in the ISSP survey. The more mega-sporting events hosted by a country, the less likely was an individual in that country to report participating in physical activity. These estimated negative effects could reflect substitution effects in sport infrastructure and resources devoted to sport in countries in this sample. Hosting mega-events like the World Cup or the Olympic Games requires significant investment in infrastructure for elite sport, in terms of stadiums and other facilities that cannot be used by average residents of a country to participate in sport or physical activity. This spending might take the place of spending on sports infrastructure that could be used by a large number of residents of a country, for example bike paths or public basketball or tennis courts. If such substitution takes place, then residents of countries that hosted more mega events would have reduced access to facilities required to participate in some types of physical activity.

The estimated parameter on the Economic Freedom Index is positive and significant, suggesting that the more economic freedom in a country the more likely are individuals in that country to participate in sport and physical activity, other things equal. The Index of Economic freedom reflects a broad range of economic freedoms, and can be interpreted as a measure of the amount of individual autonomy in economic decisions in each country and can represent a number of institutional characteristics of a country. The positive association between economic freedom and participation in physical activity could reflect either supply side or demand side effects. The positive association reflects supply side effects to the extent that countries with high economic freedom have more market-driven economies that supply more of the facilities, equipment, and instruction

required for individuals to be physically active. The positive association reflects demand side effects to the extent that countries with high economic freedom enable individuals to have more control over their leisure time and more leisure time, thus providing them with more opportunity to be physically active. In either case, increased participation in sport and physical activity appears to be one previously unidentified benefit from economic freedom.

The variables reflecting institutional factors related to women, as reflected in female labor force participation and suffrage, also have a positive and statistically significant association with overall participation in sport and physical activity. Klein (2004) reported a positive relationship between female labor force participation and success by national teams in elite international athletic competitions. These results suggest a mechanism through which this effect is transmitted. Countries with institutions that support females, in terms of labor force participation and voting, have more residents participating in sport and physical activity. This increase in the supply of athletes would increase the likelihood of identifying individuals with the skill, ability and motivation to compete and succeed in elite international competition.

7 Conclusions

We perform a cross-country analysis of individual participation in sport and physical activity. Much of the previous research has used data from a single country or region. While this type of research can uncover the relationship between individual characteristics and participation in sport and physical activity, it cannot examine the relationship between national sport policy, or institutional characteristics, and individuals' decisions about participation in sport and physical activity. Because increasing individual participation in sport and physical activity has become an important policy goal in many countries around the world, understanding the relationship between individual participation in sport and physical activity is an important element in devising policies to encourage people to be more physically active. This research is a first step in that direction.

The results for Model 2 on Table 6 indicate that a number of the country-level factors, including institutional characteristics that promote economic freedom and gender equality, are associated with individuals' decisions to participate in sport and physical activity. One interpretation of these results is that the institutional factors affect individual preferences in a way that promotes participation in sport and physical activity. The results from this model suggest that aggregate economic performance, policies directly related to sport, and policies indirectly related to sport play some role in the process through which individuals decide to be physically active. The general association between country-level factors and the decision by individuals to participate in physical

activity supports the idea that government policy can play some role in influencing the level of physical activity in a country. However, the fact that the measure of economic freedom shows positive association with participation in sport and physical activity suggests that general economic policies that affect economic freedom broadly play an important role, and not just sport-related policies. Targeted national sport policy, in the form of concentrated efforts to host sports mega-events and provide resources for the training of elite athletes, does not appear to be successful in increasing broad-based participation in sport and physical activity in the general population. Taken together, these results suggest that effective policies to encourage individuals to be more physically active need to take the broader institutional characteristics of a country into account, and not just focus narrowly on sport-related factors like hosting sports mega-events or encouraging success in elite international competition. The decision to participate in sport depends on both broad institutional factors, in this case institutional factors that promote economic freedom and gender equality, and sport-related policies.

Also, the positive relationship between participation in sport and physical activity and economic freedom suggests a previously unknown benefit of economic freedom: residents of market economies with voluntary exchange, free competition, and protection of private property are more physically active. Since physical activity is associated with improved health outcomes and worker productivity, countries may reap additional economic benefits in the form of lower health care costs and higher worker productivity.

It is worth noting that the results presented in this paper are exploratory. This is the first international comparative analysis of the impact of both individual- and country-level factors on individual participation in sport and physical activity. Because of this, we estimated simple probit models of sport participation in order to see if our baseline results are consistent with the findings in the larger literature. We are encouraged that our results with respect to the relationship between individual-level characteristics such as age, household size, education, employment and hours worked are consistent with the general findings in the literature. A new and interesting finding is that institutional factors are associated with an increased probability of individual participation in sport and physical activity. The addition of country-level variables generated some interesting results that are also suggestive of an influential role of government policy in promoting physical activity at the grassroots level. Additional research is needed to firmly establish a relationship between government policy and the economic climate and grassroots sport participation.

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