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Physical activity patterns of European 50+ populations

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Abstract:

Data from the Survey of Health, Ageing and Retirement in Europe (SHARE) shows very low levels of physical activity in Poland relative to populations aged 50+ in other European countries. We examine the extent to which the cross-country differences in the level of physical activity can be explained by differences in other characteristics such as education, residence and health, and to what extent the differences between countries – and the observed low levels of physical activity in Poland – relate to unobserved characteristics and could thus be referred to as differences in "activity habits". We show that even controlling for a number of exogenous characteristics the Polish 50+ population is among the least active in Europe. Only when controlled for life-style and health characteristics (which are likely to be endogenous to physical activity), the level of physical activity in Poland is similar to several other countries but even then is still significantly lower compared to Switzerland, the Netherlands, Germany and the Nordic countries.

Keywords: physical activity, 50+ populations, ageing, health;

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1. Introduction

This article examines the differences in the level of physical activity among individuals aged 50+ in Europe using the data from the Survey of Health Ageing and Retirement in Europe (SHARE). The analysis focuses on trying to identify the extent to which the observed differences in the level of physical activity among European countries participating in SHARE can be explained by differences in characteristics such as education, residence and health, and to what extent these differences between countries – and in particular the observed low levels of physical activity in some countries – relate to unobserved characteristics and could thus be referred to as differences in "activity habits".

The benefits of physical activity for wellbeing and health have been recognised and documented for a long time in epidemiological literature. For example Blair et al. [1] find that higher levels of physical fitness reduce all-cause mortality primarily due to lower risk cardiovascular diseases (CVD) and cancer. Positive effects of physical activity on lowering the risk of cancer, CVD and overall mortality have been found in numerous studies ([2] [3] [4] [5]), while Weinstein et al. [6] find positive effects of physical activity on lowering the risk of type-2 diabetes, and Wessel et al. [7] conclude that physical activity acts as a potential mediator of the effects of obesity on CVD. Physical activity also seems to have beneficial influence on cognitive impairment. For example Weuve et al. [8] find that in terms of cognitive abilities regualr physical activity is equivalent to being about 3 years younger. However, despite of all these documented beneficial consequences of physical activity, in many countries one can observe very high rates of non-activity compared to other major behavioural risks such as smoking, high cholesterol or alcohol abuse. As noted by Dishman [9] this is despite the fact that physical activity seems to offer more opportunities for pleasure than most other health-related bahaviours, and despite the relatively undemanding levels of activity which can bring noticeable differences to health.

The analysis presented in this paper tries to identify the key characteristics which determine the level of physical activity among individuals aged 50+ in several European countries, and to demonstrate the degree of heterogeneity between the populations. International comparisons of participation in physical activity should shed further light on its role in determining differences in health between populations, and also signal which countries should pay special attention to popularising physical activity as a means to improvements in overall health levels.

The analysis is conducted using the data from the SHARE survey - a multidisciplinary longitudinal study which collects data on individuals aged 50 and over. In 2006/07 the SHARE survey collected its first wave of data in Poland and the Czech Republic, which together with Ireland joined 12 other countries in which the data has been collected since 2004. In these twelve countries the 2006/07 round of data collection constituted the second wave of the panel (the 12 countries include 10 countries of the EU15, Switzerland and Israel).[3]

The SHARE data constitutes a unique infrastructure for micro-level analysis and covers such fields as health (physical and mental), labour market activity, financial situation, family relationships, social activity, mutual assistance, health care and life style. It is a rich data set which facilitates analysis of various aspects of ageing in an international context. The analysis presented in this paper focuses on only a small subset of the data, and numerous studies show further examples of how it can assist in understanding the individual and social consequences of population ageing (for a list of papers illustrating the content of the SHARE database see for example Börsch-Supan, et al. [10], and Börsch-Supan et al. [11]; for examples focusing on Poland see for example Myck et al. [12]. See also a list of publications available on the SHARE webpage: www.share-project.org).

2. Data and methodology

The analysis is based on the release-101 data from the SHARE 2006/07 survey which in some dimensions – for countries which participated in the first wave of SHARE – is complemented with information from the first wave of the survey collected in 2004/05. Individuals aged less than 50 and observations with missing crucial information used in the analysis are excluded from the analysis, and the paper focuses only on countries from continental Europe.[4] As a result the analysis is conducted on data from 13 countries (the number in parenthesis give the country specific total number of observations): Austria (948), Belgium (2,635), the Czech Republic (2,607), Denmark (2,015), France (2,405), Germany (2,222), Greece (2,755), Italy (2,531), the Netherlands (2,234), Poland (2,323), Spain (1,447), Sweden (2,280), and Switzerland (1,257). The total sample amounts to 27,659 individuals.

[3] For more information about SHARE including information concerning access to the data please see: www.share-project.org. For more information on the Polish part of the survey see: www.cenea.org.pl/share.
[4] SHARE interviews individuals aged 50+ and their spouses regardless of their age. This means that some respondents can be aged below 50.

The average age of men in the sample is 64.7, and of women is 66.1. Sample statistics split by country and gender are presented in Table 1.

One section of the SHARE interview focuses on life style of the respondents, and asks specifically two questions relating to the intensity of physical activity the individuals undertake, namely:

- how often do they engage in *"vigorous physical activity, such as sports, heavy housework, or a job that involves physical labour"*, and
- how often do they engage in *"activities that require a moderate level of energy such as gardening, cleaning the car, or doing a walk"*.

Answers to these two questions are the primary focus of our analysis.

Information presented in Table 1 shows a very high differentiation in health measures among the analysed 50+ populations, and Poland has some of the worst health statistics in this age group. Only 7.3% of men and 5.9% of women in Poland rate their health status as very good or excellent, compared for example with 19.0% and 16.4% in the Czech Republic or with 52.6% and 53.3% in Denmark. This self reported measure may not be a good objective reflection of the actual health status and may depend on various cultural factors, but more objective measures of health available in SHARE, like for example the lack of reported symptoms of poor health, also show Poland to have far worse indicators than other countries. Only 20.8% of men and 13.7% of women in the sample report no symptoms of poor health in Poland, compared to 23.7% and 18.9% respectively in the Czech Republic and 42.9% and 31.1% in Switzerland. When one looks at an example of a very specific common health problem – high blood pressure – the Polish population is not so different from the Czech Republic, though the proportion of women reporting high blood pressure in Poland is still highest among the 13 analysed countries. Polish women aged 50+ also have the worst obesity statistics with 29.8% being obese, in comparison to 24.9% in the Czech Republic, 14.4% in Denmark and 12.9% in Switzerland. A large proportion of Polish men aged 50+ (21.5%) are obese which is similar to Spain or Czech Republic, but much higher compared to Denmark (13.3%) and Switzerland (12.9%).

These reported cross-country differences in the measures of health raise interesting questions concerning the causes of such high variation, which may lay in the quality of available health care or financial resources as much as in life style of individuals including diet, hazardous habits like smoking, and the level of physical activity. In the last case, while one would expect to see better health among the physically active individuals, examining the causal relationship between activity and health is not straightforward. On the one hand, if it is

indeed the case that activity is beneficial for health, more active people would be more likely to be healthy. On the other, however, if good health is a prerequisite for physical activity, the observed positive relationship may overstate the implied causal relationship and at least partly reflect the necessity to be healthy to be physically active. The available data at the moment do not allow us to disentangle the effect of physical activity on health. What is attempted in this paper is an examination of the extent to which the observed differences in the level of physical activity can be explained by other observable characteristics.

The analysis examines the role of "habits" in determining the observed levels of physical activity among the 50+. In the analysis the conditional probability of observing a declaration of physical activity "*at least once a week*", y_i, is modelled using the linear probability model. This approach allows us to easily correct for differences in the distribution of explanatory variables to identify the remaining unexplained country differences in the dependent variable. The indicator variable for observed physical activity is regressed on a set of individual characteristics X_i and a vector of country specific dummy variables, Z_i:

$$y_i = \beta' X_i + \gamma' Z_i + \varepsilon_i \tag{1}$$

where ε_i is the normally distributed residual.

The country-specific dummy variables control for any differentiation in the level of physical activity which cannot be explained by cross-country differences in characteristics X_i. By imposing the overall sample average values of X_i, $\bar{X}$, we can compute the differences in the level of the dependent variables between countries controlling for the set of characteristics X_i, as:

$$E(y^j \mid \bar{X}, Z_i = j) = \frac{\sum_{nj} (\hat{\beta}' \bar{X} + \hat{\gamma}' Z_i)}{nj} \tag{2}$$

where $E(y^j)$ is the average expected probability of observing individuals involved in physical activity in country *j*, *nj* is the number of observations for country *j*, and $\hat{\beta}$ and $\hat{\gamma}$ are the estimated coefficients of the linear probability model. If all variation in the model could be explained by differences in X_i, then the values of $\hat{\gamma}$ would all be zero. Therefore one can expect that the larger the set of X_i the lower the "unexplained" differences between the countries would be. The section below presents results for three specifications:

- Specification 1 – where X_i consists only of age controls (age and age^2);

- Specification 2 – where X_i consists of age controls, controls for education, family structure, for town size, indicators of mental ability and self-assessment of financial situation;
- Specification 3 – where on top of the controls used in Specification 2 several life-style controls (smoking and drinking habits) as well as a number of controls for health status including specific identified health conditions, a health self assessment and a dummy for obesity are also added.

The main reason to differentiate between Specification 2 and 3 is the difference in the nature of the relationship between physical activity and the additional health and life style related variables in Specification 3. While one can relatively safely argue that variables included in Specification 2 are exogenous to physical activity (in the sense that physical activity is unlikely to determine them), it is very likely that the additional variables included in Specification 3 may be endogenous. This is in fact what has been documented in studies on the effect of physical activity on health and mortality quoted above. Thus the results ought to be treated with caution – first of all they may not be interpreted in a causal fashion, and secondly, the degree to which between-country differentiation is reduced in Specification 3 will be exaggerated because of this endogeneity. Nevertheless, as the results below demonstrate even when we include these variables there remain significant differences in the level of physical activity between countries.

3. Results

Figures 1 and 2 present the differences in vigorous activity by country for all three specifications separately for men and women. Table 2 shows the marginal effects related to specific control variables used in Specification 2 and 3 estimated using the probit model. Cross-country differences concerning moderate activity are presented in Figures 3 and 4 respectively for men and women. These are also presented for the three Specifications.

Figures 1 and 2 show how big the differences are between Poland and some of the EU15 countries and Switzerland. Correcting only for differences in the age structure of the 50+ populations as few as 37.9% of Polish men and 29.1% of Polish women declare “vigorous” physical activity (“*at least once a week*”). This compares with 68.4% and 59.6% of Swiss men and women, and 63.3% and 65.5% of men and women in the Netherlands. Among men the closest country in terms of physical activity to Poland is Italy (41.1%) while among

women the Czech Republic (32.8%) and Italy (33.2%). Differences in vigorous activity between Poland and populations in these coutnries are not statistically significant.

The differences are generally slightly smaller when the exogenous characteristics in Specification 2 are controlled for, but the Polish population still turns out to be the least active, and the overall "ranking" of countries is only slightly altered. If the cross-country differences in physical activity are interpreted as resulting from differences in "activity habits" then for men the difference between Poland and the Netherlands is 23.2 percentage points (pp), between Poland and Switzerland is 25.4pp, between Poland and Germany is 17.1pp, and between Poland and the Czech Republic 6.3pp. Among women these differences are respectively: 33.6pp, 26.7pp, 19.7pp and 2.0pp.

What improves the relative position of Poland with respect to physical activity is the inclusion of the health and life-style related variables in Specification 3. As noted earlier, though, these results ought to be treated with caution, since the explanatory variables are very likely to be endogenous, especially in the case of obesity, high blood pressure or self assessment of health status. When one looks at the differences between countries in the level of physical activity corrected for these measures, results for men in Poland are very close to those in France, Belgium and Austria and are 4.8pp higher than in Italy. For women they are in line with Italy and the Czech Republic. This would suggest, under the assumption that physical activity has a similar effect on the additional variables included in Specification 3 across countries that "activity habits" of the Polish 50+ population are not so much different compared to the 50+ individuals in Italy, France of the Czech Republic. Nevertheless, even under this rather strong assumption, the levels of physical activity are significantly lower compared to such countries as Switzerland, the Netherlands, Germany or Sweden.

Cross-country differences in at least moderate activity (i.e. vigorous or moderate) are generally very similar, though naturally the proportions of individuals involved in these is much higher, are presented in Figures 3 (men) and 4 (women). If moderate activity is considered, however, the level of physical activity is lowest in Poland regardless of the specification.

Looking at Table 2 it is worth noting some of the main determinants or, especially in the case of the additional variables in Specification 3 "correlates", of vigorous physical activity. Results for Specification 2 suggest that, as one would expect, activity falls (at a diminishing rate) with age and is higher among those with post-primary education. It is also greater among individuals living in the country side or in small towns or suburbs. What is remarkable is that mental ability reflected in numerical skills and a simple mental awareness

test of being able to name the current day of the month (at the time of interview) strongly correlate with physical activity, even after conditioning for education. This may suggest that either people who are mentally fit are more aware of the need to exercise, or as in the case of other health related variables that this just reflects some of the feedback effect of physical activity on mental health. The first interpretation gets some more justification when one looks at the estimates of these coefficients in Specification 3, which are very close to those of Specification 2. Interestingly people's assessment of their financial situation is also positively related to the level of physical activity, but as we can see from Specification 3 the effect disappears once health and other life style variables are controlled for.

In Specification 3 we can see that current habit of smoking strongly negatively correlates with physical activity and the habit of alcohol drinking correlates positively. The latter may reflect some social aspects of physical activity. As one would expect obese individuals are less likely to engage in vigorous physical activity, and the level of activity is also lower among those who have had a heart attack, who have been identified with diabetes, who have high blood pressure and give a low self-assessment of their health status. In these cases, however, there is a very high likelihood that the results reflect a correlation and the estimated coefficients strongly overestimate the causal effect of those conditions on physical activity. In some cases, however, the causal interpretation is probably more justified. This would be so in the case of cancer or arthritis who are very likely to lead to reductions of physical activity and which in themselves may not be very strongly affected by physical activity habits from the past.

4. Conclusions

The benefits of physical activity for health and wellbeing have been very well documented in the literature ([1] [2] [6] [8]). Yet despite these well-know beneficial consequences the rates of non-activity remain high and there are significant differences in the degree of physical activity between countries.

Using data on 50+ populations from 13 European countries the analysis demonstrated the extent to which cross-country differences in vigorous and moderate physical activity can be related to a number of characteristics and the degree to which they may reflect "habits" with regard to physical activity. When corrected for age and for a number of characteristics the Polish populations of both men and women are the least likely to engage in physical activity from among the analysed countries. Only about 29% of Polish women and 38% of Polish men engage in vigorous physical activity *"at least once a week"* compared to 68% of Swiss men

and 66% of Dutch women – the countries of highest degree of activity among the respective gender groups. When corrected for a number of exogenous characteristics populations of countries such as the Czech Republic or Italy and France are not far off the results for Poland, and suggest similar attitudes to physical exercise in these countries. The closeness of results for Poland and the Czech Republic is especially interesting and may relate to the common history of the countries which may have affected people's attitudes.

The cross-country differences are even closer once variables which are likely to be endogenous to the level of physical activity, such as other life style variables or health indicators are controlled for. These naturally strongly correlate with physical activity but are likely to have been affected by the level of activity in the past. Thus the degree of the resulting reduction in cross country differences in the level of physical activity when controlling for such variables is most likely overstated.

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Table 1. The SHARE sample used for analysis

– number of observations and health indicators by country.

Country	No. observations		Health: v. good or excellent		No reported symptoms of poor health		Identified with high blood pressure		BMI > 30 (obesity)	
	M	W	M	W	M	W	M	W	M	W
Austria	393	555	0.336	0.288	0.320	0.246	0.347	0.359	0.209	0.254
Belgium	1227	1408	0.303	0.278	0.309	0.211	0.309	0.359	0.199	0.181
Czech Republic	1136	1471	0.190	0.164	0.237	0.189	0.420	0.433	0.231	0.249
Denmark	975	1040	0.526	0.533	0.357	0.278	0.332	0.320	0.133	0.144
France	1040	1365	0.221	0.196	0.282	0.207	0.287	0.297	0.174	0.146
Germany	1044	1178	0.219	0.215	0.326	0.242	0.368	0.369	0.179	0.176
Greece	1283	1472	0.422	0.307	0.439	0.267	0.325	0.375	0.178	0.225
Italy	1154	1377	0.232	0.189	0.322	0.214	0.394	0.405	0.168	0.188
Netherlands	1024	1210	0.274	0.275	0.406	0.294	0.261	0.288	0.128	0.148
Poland	1034	1289	0.073	0.059	0.208	0.137	0.383	0.490	0.215	0.298
Spain	687	760	0.170	0.132	0.427	0.247	0.320	0.354	0.227	0.244
Sweden	1085	1195	0.455	0.383	0.347	0.230	0.321	0.330	0.141	0.149
Switzerland	570	687	0.466	0.439	0.429	0.311	0.294	0.250	0.129	0.129
Total	12652	15007	0.295	0.256	0.335	0.231	0.337	0.362	0.177	0.195

Source: SHARE data 2004/5 & 2006/7, release 101.

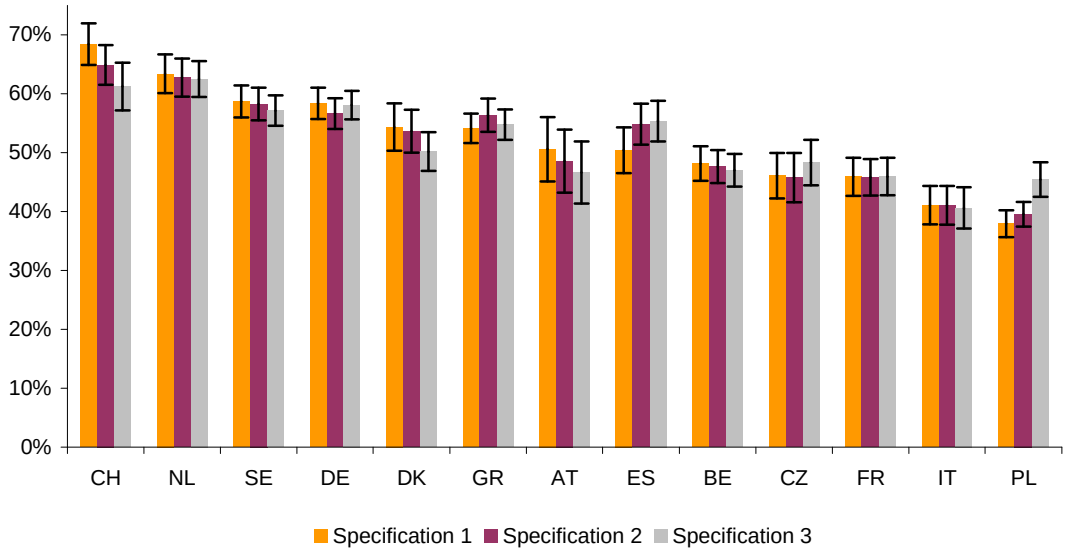
Notes: All statistics corrected for differences in age distributions. BMI – body mass index. M – men, W – women. “Health: v.good or excellent” – respondent declares health to be very good or excellent on a five-level scale;

Table 2. Determinants (and correlates) of vigorous physical activity among the 50+.

Dependent variable:	**Men**				**Women**			
Vigorous activity	**Specification 2**		**Specification 3**		**Specification 2**		**Specification 3**	
	ME	SE	ME	SE	ME	SE	ME	SE
Age	0.008	(0.007)	0.017*	(0.007)	0.015*	(0.006)	0.024*	(0.006)
Age2/100	-0.016*	(0.005)	-0.021*	(0.005)	-0.021*	(0.004)	-0.027*	(0.004)
Education 8+	0.027*	(0.012)	0.020	(0.013)	0.027*	(0.011)	0.015	(0.011)
Education 12+	-0.016	(0.012)	-0.036*	(0.012)	0.039*	(0.011)	0.013	(0.012)
Town size								
- suburbs big city	0.051*	(0.017)	0.044*	(0.017)	0.034*	(0.016)	0.028	(0.016)
- large town	0.024	(0.016)	0.028*	(0.016)	0.023	(0.015)	0.024	(0.015)
- small town	0.069*	(0.016)	0.066	(0.016)	0.041*	(0.015)	0.042*	(0.015)
- village	0.127*	(0.015)	0.130*	(0.015)	0.053*	(0.014)	0.058*	(0.014)
Married	0.042*	(0.014)	0.028*	(0.014)	0.025*	(0.010)	0.018	(0.010)
1 child	0.017	(0.019)	0.029	(0.019)	0.042*	(0.018)	0.048*	(0.018)
2 children	0.039*	(0.017)	0.039*	(0.018)	0.050*	(0.016)	0.053*	(0.016)
3 children	0.027	(0.019)	0.031	(0.019)	0.063*	(0.017)	0.068*	(0.018)
4+children	-0.008	(0.021)	0.001	(0.021)	0.068*	(0.019)	0.079*	(0.020)
Day given	0.069*	(0.015)	0.058*	(0.015)	0.077*	(0.014)	0.068*	(0.015)
Numerical good	0.093*	(0.014)	0.077*	(0.014)	0.065*	(0.011)	0.048*	(0.011)
Easy ends meet	0.038*	(0.011)	0.003	(0.011)	0.023*	(0.010)	-0.010	(0.010)
Smoked ever			-0.014	(0.011)			0.003	(0.012)
Smokes now			-0.050*	(0.013)			-0.044*	(0.014)
Drinks 1/week+			0.094*	(0.010)			0.073*	(0.010)
Health problems:								
- cancer			-0.111*	(0.025)			-0.077*	(0.021)
- ulcer			-0.005	(0.021)			0.001	(0.022)
- high b.pressure			-0.039*	(0.010)			-0.038*	(0.010)
- high cholesterol			-0.002	(0.012)			-0.006	(0.011)
- diabetes			-0.067*	(0.015)			-0.043*	(0.015)
- heart attack			-0.138*	(0.014)			-0.128*	(0.015)
- arthritis			-0.036*	(0.014)			-0.064*	(0.010)
Self ass. health								
- v.good or excell.			0.137*	(0.011)			0.130*	(0.011)
Obesity			-0.054*	(0.013)			-0.068*	(0.011)
Country dummies	included		included		included		included	
No. observations	12652				15007			
Pseudo r^2	0.0837		0.1180		0.1079		0.1361	

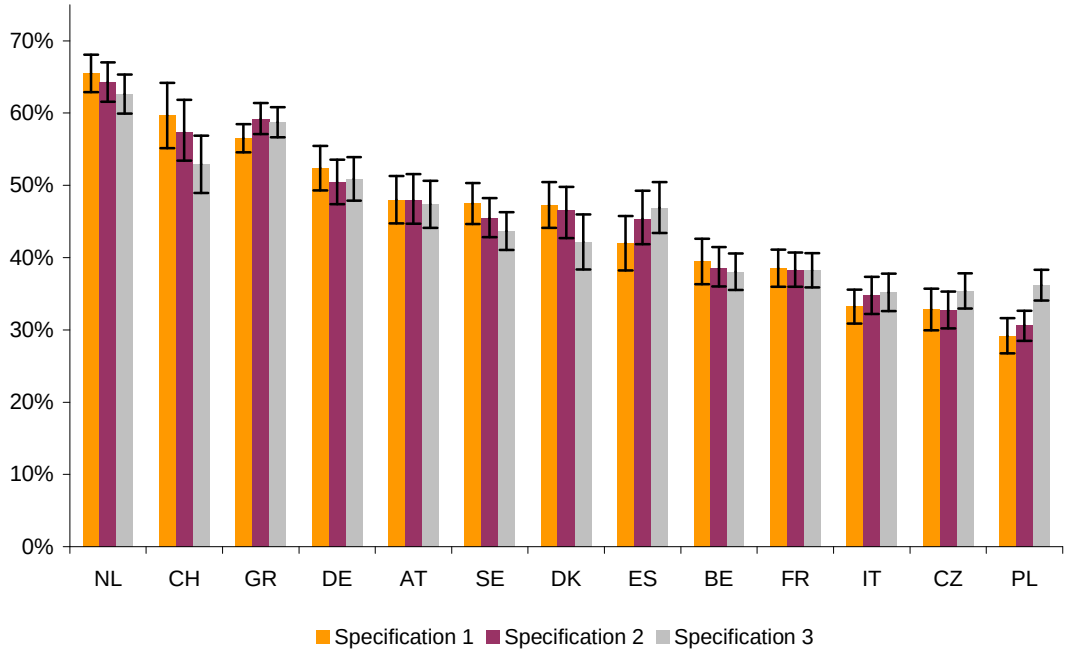
Source: Author's estimations using SHARE data 2004/5 & 2006/7 for 13 countries (see Table 1 for countries included and sample statistics).
Notes: Estimates using the probit model.
* - significant at 5% (p<0,05); ME – marginal effects; SE – standard error.
Reference categories for dummy variables: Town size: "big city"; Children: no children;
Variable labels: Dependent variable: "vigorous activity" – respondent declares undertaking vigorous activity at least once a week; "Day given" – respondent correctly gives the day of the month of interview; "Numerical good" – the respondent correctly solves a simple arithmetic exercise; "Easy ends meet" – the respondent declares that it is easy or very easy for the household to "make ends meet"; "Education X+" – respondent has at lease X years of full time education; "Drinks 1/week+" – respondent declares having drunk alcohol at least once a week over the past three months. "Self ass. health" – respondent declares very good or excellent health status on a five-level scale.

Figure 1. Country differentiation of vigorous activity for specifications 1-3, men.



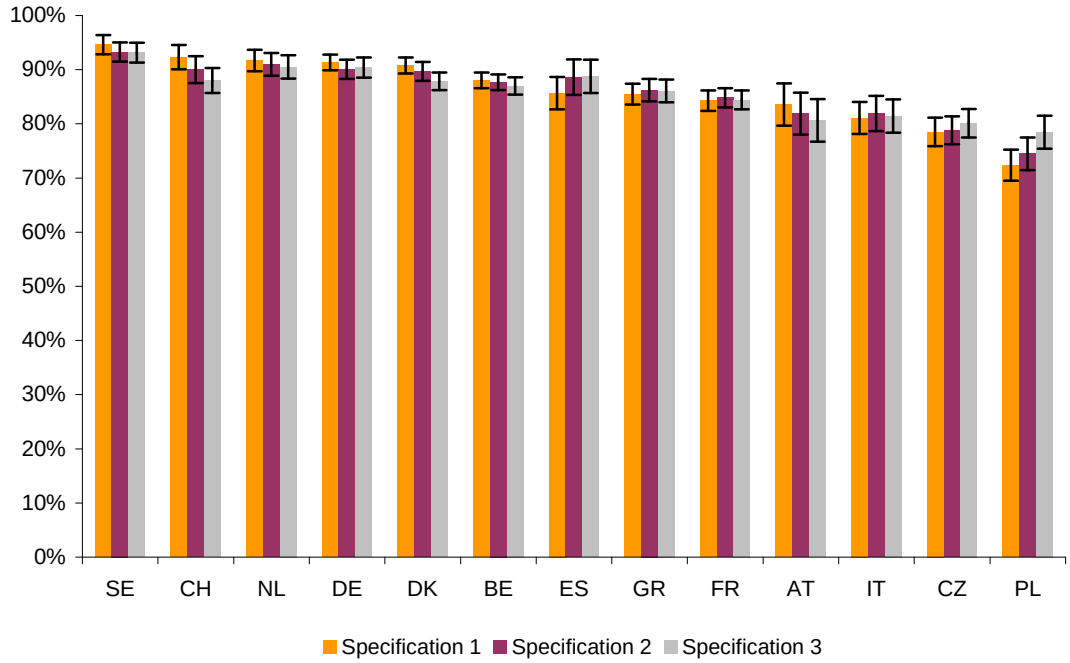
Notes: Country labels: AT: Austria, BE: Belgium, CH: Switzerland, CZ: Czech Republic, ES: Spain, DE: Germany, DK: Denmark, FR: France, GR: Greece, IT: Italy, NL: Netherlands, PL: Poland, SE: Sweden. Black labels show 95% confidence intervals.

Figure 2. Country differentiation of vigorous activity for specifications 1-3, women.



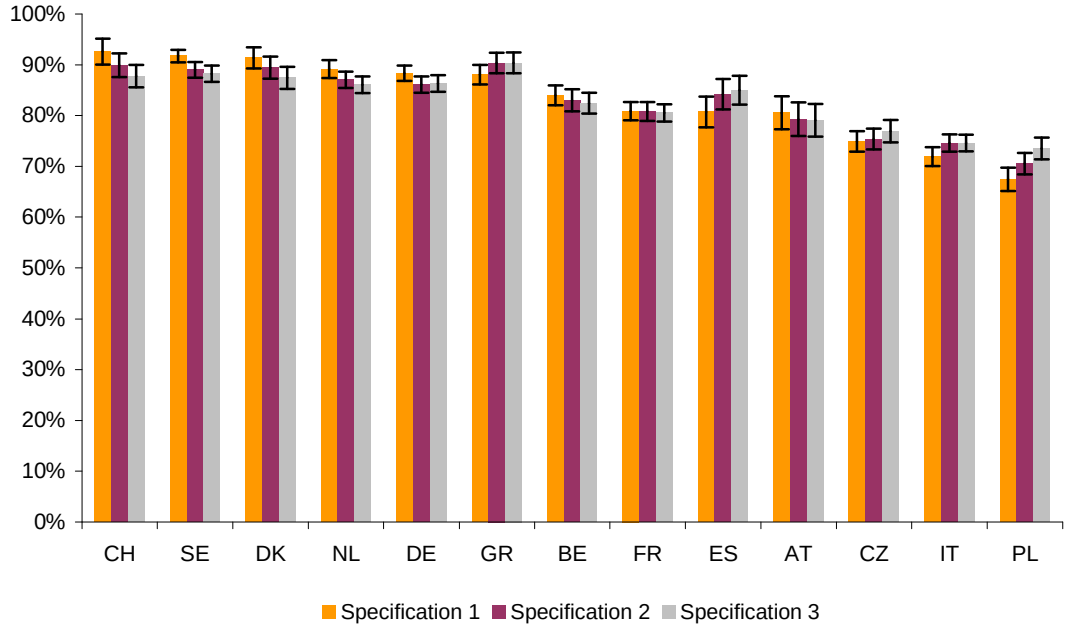
Notes: Country labels: AT: Austria, BE: Belgium, CH: Switzerland, CZ: Czech Republic, ES: Spain, DE: Germany, DK: Denmark, FR: France, GR: Greece, IT: Italy, NL: Netherlands, PL: Poland, SE: Sweden. Black labels show 95% confidence intervals.

Figure 3. Country differentiation of vigorous and/or moderate activity for Specifications 1-3, men.



Notes: Country labels: AT: Austria, BE: Belgium, CH: Switzerland, CZ: Czech Republic, ES: Spain, DE: Germany, DK: Denmark, FR: France, GR: Greece, IT: Italy, NL: Netherlands, PL: Poland, SE: Sweden. Black labels show 95% confidence intervals.

Figure 4. Country differentiation of vigorous and/or moderate activity for Specifications 1-3, women.



Notes: Country labels: AT: Austria, BE: Belgium, CH: Switzerland, CZ: Czech Republic, ES: Spain, DE: Germany, DK: Denmark, FR: France, GR: Greece, IT: Italy, NL: Netherlands, PL: Poland, SE: Sweden. Black labels show 95% confidence intervals.