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Promoting Social Participation for Healthy Ageing

An International Comparison of Europeans Aged Fifty and Over

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A Counterfactual Analysis from the Survey of Health, Ageing, and Retirement in Europe (SHARE)

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Abstract: Promoting social participation of the older population (e.g. membership in voluntary associations) is often seen as a promising strategy for 'healthy ageing' in Europe. Although a growing body of academic literature challenges the idea that the link between social participation and health is well established, some statistical evidence suggest a robust positive relationship may exist for older people. One reason could be that aged people have more time to take part in social activities (due to retirement, fewer familial constraints, etc.); so that such involvement in voluntary associations contributes to maintain network size for social and emotional support; and preserves individuals' cognitive capacities. Using SHARE data for respondents aged fifty and over in 2004, this study proposes to test these hypotheses by evaluating the contribution of social participation to self-reported health (SRH) in eleven European countries. The probability to report good or very good health is calculated for the whole sample (after controlling for age, education, income and household composition) using regression coefficients estimated for individuals who do and for those who do not take part in social activities (with correction for selection bias in these two cases). Counterfactual national levels of SRH are derived from integral computation of cumulative distribution functions of the predicted probability thus obtained. The analysis reveals that social participation contributes by three percentage points to the increase in the share of individuals reporting good or very good health on average. Higher rates of social participation could improve health status and reduce health inequalities within the whole sample and within every country. Our results thus suggest that 'healthy ageing' policies based on social participation promotion may be beneficial for the aged population in Europe.

Key words: Healthy ageing, Self-reported health, Social participation, Social capital, SHARE data, Counterfactual analysis, Stochastic dominance

JEL Classification: I12, Z13

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> "Of all the self-fulfilling prophecies in our culture, the assumption that aging means decline and poor health is probably the deadliest."
>
> Marilyn Ferguson,
> *The Aquarian Conspiracy*, 1980

1. Introduction

Europe is the world's oldest continent in demographic terms. It has the highest median age of all continents (38 years) and 20.6% of its population is aged 60 and over. By 2050, this figure will reach 34.5% and the number of 'oldest old' (people aged 80 and over) is expected to grow by 180% (source United Nations, 2007). Europe is getting older. Country members of the European Union at the *Hampton Court informal Summit* in October 2005 stressed that demographic ageing is one of the main challenges that the European Union will have to face in the years to come. The threat is that with ageing comes poor health and in consequence, reduced economic performance and increased health care public expenditures (European Commission, 2006). Health promotion of the ageing population is not only a public health policy target, it also is an intermediate objective for economic sustainability. Following Jamieson's (1994) prior work, policy interventions in Europe already dealing with this issue often draw inspiration from theoretical frameworks promoting "active ageing" (WHO, 2002) or "healthy ageing" (WHO, 2006) as a process of increasing opportunities for health to enable older people to take part in society. Amongst the various directions that may help achieving this goal[1], individuals' involvement in social activities (or social capital) may be decisive.

During the last decade, a wide range of social capital measures were found to be associated with various health outcomes (cf. Hawe & Shiell, 2000, Szreter & Woolcock, 2004; Islam et al., 2006), giving substance to Punam's (2000: 326) famous assertion that "in none is the importance of social connectedness so well established as in the case of health and well-being." However, significant evidence suggests that the health-social capital nexus should not be taken for granted since correlations between some proxies are frequently unobserved. In particular, social participation is a form of social capital which relationships with health are not unambiguous. A small number of studies providing statistical evidence that these two concepts are linked (e.g. Petrou & Kupek, 2007; Lindström, 2004) is being challenged by a growing body of the literature reporting the absence of correlation between participation in social activities and self-reported health (Ziersch & Baum, 2004; Greiner et al., 2004; Veenstra et al., 2005; D'Hombres *et al.*, 2007) or other health outcomes (Ellaway & Macintyre, 2007).

A close look at the literature advocates that the positive effects of social participation on health could be significant for the sub-population of older people (Veenstra, 2000; Kondo et al., 2007). One reason could be that older people have more time to take part in social activities due to retirement (Christoforu, 2005) or fewer familial constraints (Bolin et al., 2003). This investment in social capital could help maintaining them in good health. At least two arguments may help in justifying this assumption. First, the number of cohort acquaintances an individual has throughout his life may decrease after a certain age (Glaeser *et al.*, 2002). Involvement in associations and other social groups may help maintaining (if not

[1] For a survey, see Agren & Berensson (2006).

increase) the size of social networks. Second, retirement has been found to be associated with a decrease of individuals' cognitive capacities (Adam *et al*, 2006). Social participation may slow down this process as it often requires cerebral efforts from the individuals and thus help preserve their mental health (cf. Almedom, 2005). If these two statements are true, then taking part in social activities could help improve older adults' health status.

In order to test these assumptions, we use cross-sectional self-reported data (2004) from non-institutionalized individuals aged 50 and over participating in the Survey of Health, Ageing, and Retirement in Europe (SHARE). The probability to report good or very good health is calculated for the whole sample (after controlling for age, education, income and household composition) using regression coefficients estimated for individuals who do and for those who do not take part in social activities (with correction for selection bias in these two cases). Counterfactual national levels of SRH are derived from integral computation of cumulative distribution functions of the predicted probability thus obtained, and compared with the current probability to report good/very good health status. This counterfactual conditional process allows us to measure the *potential* effect a change in the rates of social participation could have on SRH. Although counterfactual (conditional) analysis is often the basis of experimental methods for establishing causality in medicine and social sciences (cf. Morgan & Winship, 2007; Pearl, 2000), our aim is not to test the *direction* of causation. Base don recent development of the literature, we postulate here that involvement in voluntary associations influences respondents' health status. Notice that this study provides—*in passim*—a secondary analysis of the determinants of social participation since correction for selection bias requires as a preliminary to estimate the probability that a person is involved in one or more social activities.

The paper is structured as follows: the next section presents data from the SHARE project and some descriptive statistics. The method section deals with econometric issues and the different tests applied here. Regression results and interpretations are given in the results section; while comments, limitations and further research issues are displayed in the discussion. Conclusions are drawn in the final section.

2. Data

2.1. The Survey of Health, Ageing, and Retirement in Europe (SHARE)

This study used cross-section of individual-level data from Release 2.0.1 of the first wave of the Survey on Heath, Ageing and Retirement in Europe (SHARE) collected in 2004. SHARE has been developed on the basis of prior successful experiments which are the Health and Retirement Survey (HRS) in the United States, and the English Longitudinal Survey of Ageing (ELSA). SHARE is a bi-annual longitudinal survey with the aim to carry out international comparisons and analysis of economic and social problems related to ageing. This first wave consists of 22,000 households (31,000 individuals) surveyed in 11 countries (Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, and Switzerland).[2] Full rank data matrix used here consists of 18,210 individuals aged fifty and over.[3]

[2] See Börsch-Supan et al. (2005) for initial research from the first wave of SHARE.
[3] The loss of data from the initial sample is mainly due to the eviction of children and other household member who were surveyed but were less than fifty years old (cf. see Börsch-Supan & Jüerges, 2005).

Data collected include health variables (e.g. self-reported health, physical functioning, cognitive functioning, health behaviour, use of health care facilities), psychological variables (e.g. psychological health, well-being, life satisfaction), economic variables (current work activity, job characteristics, opportunities to work past retirement age, sources and composition of current income, wealth and consumption, housing, education), and social support variables (e.g. assistance within families, transfers of income and assets, social networks, volunteer activities). Special care has been given to the harmonization of the collected data with the aim to produce internationally comparable statistics.[4] SHARE data thus consists of a set of harmonized micro data in which international variability is less the direct object of the measurement, than an additional factor of inter-individual variability allowing a more in-depth understanding of a given issue.

Despite the variety of objective health measures available in the dataset (such as grip strength or walking speed tests), we choose to focus on self-reported health (SRH) as our main outcome variable. The reason being that it is an increasingly common measure of health in empirical research (Blakely, Lochner, & Kawachi, 2002; Craig, 2004; Deaton & Paxon, 1998; Ettner, 1996; Kennedy *et al*. 1998), especially when focusing on the effects of social capital on health (Kawachi, Kennedy, & Glass, 1999; Veenstra, 2000). It also is a good predictor of mortality (Idler & Kasl, 1995), even after controlling for other health status indicators and covariates of ill-health (Idler & Benysmini, 1997). A binary SRH variable is derived from the initial five items (from bad to very good health) and gives 1 for individuals reporting good or very good health, and 0 if worse health status is reported. The choice of the social capital variable follows from the current debate on the effect of social participation as discussed in the introduction. A binary variable is derived from the participation (or not) to five social activities (voluntary/charity work, training course, sport/social club, religious organization, and political/community organization). Individual *i* will be assigned 1 as her social capital value if she is involved in at least one of these five associations, and 0 elsewhere. Some justifications of the use of a "selection" variable for social capital can be found below.

2.2. Preliminary Analysis

Descriptive statistics displayed in Table 1 show that the greater part of the 18,210 respondents retained in the analysis report good/very good health (56.7%). Germany, France, Italy, and Spain display the lowest values of SRH. These important differences in health status between countries illustrate the well-known gradient separating northern and southern parts of Europe. About social capital, Table 1 shows that more than one respondent out of three takes part in any of the five voluntary associations analyzed here, but this figure masks strong differences between countries and between activities. For instance, involvement in sport or social clubs is the most popular activity since it concerns 17.2% of the sample. However, Mediterranean respondents from Greece, Italy, and Spain do not seem to take much part in this activity since only 6.3% of them on average are involved. Less popular is participation to training courses (4.1%) and involvement in political or community organizations (3.7%). Membership in voluntary or charity work (12%) is comparable with the proportion of respondents taking part in religious organizations (12.2%). It is striking that 37.9% of Greek respondents' social participation deals with religion (out of 47.5% of them involved in any of the five social activities). By contrast, this figure drops to 9.2% on average

[4] For instance, ISCO and ISCED codes have been used respectively for education and job comparison amongst European countries.

for the ten other countries. This result makes Greece stand for an 'outlier' and requires to perform a sensitivity analysis on health status.

TABLE 1 ABOUT HERE

Preliminary observations show a common trend between social participation and better SRH. Table 2 indicates that taking part in social activities is associated with higher rates of SRH on the whole sample (OR=1.578, p<0.01), within each country, and for each form of social activity respectively. Countries with highest social capital performance on SRH are Denmark (OR=2.414, p<0.001) and Germany (OR=1.866, p<0.01), whereas Greece (OR=1.271, p<0.05), Spain (OR=1.362, p<0.1) and Italy (OR=1.427, p<0.001) have the lowest scores. On the whole sample, people taking part in the less frequented activities are found to report better health status—training courses (OR=1.70, p<0.01) and political or community organizations (OR=1.629, p<0.01). Sensitivity analysis shows that excluding Greece does not extensively modify the influence of social activities on SRH.

TABLE 2 ABOUT HERE

In the detail however, figures in Table 2 suggest that being involved in a particular form of association is not always associated with better SRH.[5] One may notice for example that being involved in voluntary or charity work is only significant for Germany. Since this result may come from the partition of the sample, the use of a combined index of social participation (whether or not the individual is a member of any of the five activities, disregarding which one) appears appropriate (i) to minimize the loss of information, and (ii) to prevent from threshold effects. Unlike most variables made out of qualitative items, little can be said on the coherence of this index because most respondents generally take part in one social activity only. Testing for 'cross-correlations' between the items (e.g. Chronbach's alpha, correspondence analysis) would not have much sense here. It may also be careful to derive international comparisons from a method based on the whole sample instead of focusing on country specific analysis. Methodological issues are detailed in the next section.

3. Method

3.1. Counterfactual Analysis

The initial intuition, with the aim to measure the contribution of social participation to self-reported health, was to run a regression with the former variable as one of the determinants of the latter. Although individual logistic models make it possible to estimate the influence of social participation on SRH (by providing the predicted value of *y* at *x-bar*) for each of the eleven European countries in the sample, we believe this method is not desirable here for several reasons. First, because of the significant loss of information resulting from the partition of the sample[6] (see above). Second, we would not benefit from the harmonized

[5] The use of a specific proxy for social participation may explain why some studies (like those cited in the introduction) do not account for any significant impact of social capital on health. Though interesting, the investigation of this issue goes beyond the scope of this study.

[6] For instance, regression for people taking part in voluntary associations would drop down to 231 individuals for Sweden, 212 for Spain, 399 for Italy, or 442 for Denmark. Further results on the whole sample are found comparable with those obtained using country-by-country analysis (not displayed here) so that the underlying hypothesis of a homogeneous effect of social participation of SRH cannot be rejected here.

feature of SHARE data for international comparisons. Third, if using usual regression analysis based on current cases (as in Table 2), the estimated contribution of social participation to health status would be derived from the frequency of association between SRH and social participation across actual cases. This method may be too descriptive since it would give the incidence of social participation at *x*-bar but says nothing about the potential gain/loss for each individual. Two detrimental consequences would arise: (i) nothing could be said about changes in the distribution of SRH, i.e. if a policy promoting social participation could be beneficial for everyone or just for a sub-population? and (ii), it would not take into account the *potential* effect a change in the rates of social participation could have on SRH. This measure is important because it allows setting the interval of changes in health status a policy based on social participation promotion may generate.

We propose to overcome this main limitation (together with the two previous ones) using counterfactual conditional analysis for the whole sample. "In the counterfactual case strategy, by contrast, frequencies of association cannot be meaningfully assessed. They are arguably irrelevant in any event, since the researcher is attempting to perform the perfect experiment, in which everything but the tests factor is equal." (Fearon, 1991: 176). This method allows estimating the evolutions of a situation (reporting good/very good health) caused by a modification of another situation (being involved in voluntary associations).

The objective is (i) to simulate what would the observed situation be if no-one in the sample is involved in voluntary associations [subjunctive conditional B], (ii) to do the same if everyone is involved [subjunctive conditional C]; and (iii) to compare this counterfactuals situations with the current situation [indicative conditional A]. The first step is to estimate respondents' current probability to report good/very good health status according to individuals' characteristics. A binary Probit model for self-reported health is run over the whole sample [Equation 1] in which the list of independent variables includes: age, gender, education (ISCED codes), respondent's last job (ISCO codes), household income quintile *per capita*, household composition, whether the respondent is a migrant, and dummy variables indicating the country of residence. As a second step, we would estimate the same model only for respondents who do not participate in social activities [Equation 2]; the estimated parameters would then be used to compute individuals' probability to report good/very good health status for the whole sample. The same method would be carried out on the sub-sample of respondents who are involved in voluntary associations [Equation 3]. Finally, predictions from equations 1, 2 and 3 would be compared. However, such a straightforward method would be misleading due to selection bias.

3.2. Selection Bias

Estimations of equation 2 and 3 are potentially biased since membership in a voluntary association is less a random phenomenon than the result of a choice (Durlauf, 2002)—i.e. a form of rational investment in social capital. Correction for selection bias in equations 2 and 3 requires to take into account the potential motives of social participation. Drawing on recent developments of the literature on micro-scaled determinants of social capital (Kassa & Parts, 2007; Erlinghagen & Hank, 2006; Christoforou, 2005), we estimate a selection Probit model of social participation [Equations S2 and S3] using the following regressors: gender, age, age squared, number of years of schooling, household composition, and dummies indicating whether the respondent is a migrant and whether she belongs to the poorest income quintile. Notice that recent debate in the literature suggests that the 'absolute education' hypothesis (years of schooling) is being challenged by the 'relative education' thesis (cf. Helliwell &

Putnam, 2007). To be brief, the average level of education in a given area may be of decisive influence on the individual decision to get involved in social activities. Although such an hypothesis is usually tested through multi-level modeling, we suggest to add a cross-level variable (Oakes, 2004: 1937, footnote) of relative education in our selection equation.[7]

Notice that equations S2 and S3 only differ by their dependant variable: y_{11} in S2 takes values $y_{11}=1$ if the respondent is not involved in any social activities and $y_{11}=0$ elsewhere; whereas y_{12} in S3 takes values $y_{12}=1$ if the respondent takes part in any social activities and $y_{12}=0$ elsewhere. Using estimated parameters from the structural model made of equations 2 and S2, we compute the probability each respondent in the overall sample (N=18,210) reports good/very good health $P(y_2=1)$ conditionally to the probability she does not take part in any social activities. Formally, $P(y_2=1 \mid y_{11}=1)$. Similarly, the probability each respondent in the overall sample reports good/very good health conditionally to the probability she takes part in voluntary associations $P(y_2=1 \mid y_{12}=1)$ is derived from the structural model made of equations 3 and S3. Joined estimation of equations corrects for selection bias since the estimated parameters from equation S2 and S3 are used to calculate $P(y_{11}=1)$ and $P(y_{12}=1)$ respectively. This method is the extension of the Heckman procedure to Probit models, a.k.a. the Heckman selection for Probit models (Greene, 2000).

3.3. Statistical Inference

Within this framework, the proportion of respondents in good/very good health (for each of the three situations) is given by the integral computation of cumulative distribution function of the outcome probability of equations 1, 2 with S2, and 3 with S3. An interesting feature of this method is that it allows for the calculation of the relative contribution of involvement in social activities on overall old people's health status. The relative change in the outcome probability of equations 1 and 2 with S2 can thus be interpreted as the contribution the *n* percentage points of the population participating in social activities adds to the aggregated (average) level of self-reported health. However, this figure depends on the share of respondents involved in social participation in each country. In order to avoid size bias due to country differences in the rates of social participation, one would compare distributions of health when no-one is involved in social activities $P(y_2=1 \mid y_{11}=1)$, with the case where everyone in the sample takes part in social participation $P(y_2=1 \mid y_{12}=1)$.

The basic idea behind this method is to compare distributions of probabilities to report good/very good health status between various states of the nature; depending on the share of respondents involved in social activities. Statistical inference tests are thus of foremost importance to establish whether the contribution of social participation to SRH is significant or not. Two-sample Kolmogorov-Smirnov equality-of-distributions tests are the dedicated tools here since cumulative distribution functions (CDFs) have to be compared one with another. In addition, graphical comparison of CDFs may be required to rank the various situations possible in terms of better health status, i.e. "does one distribution always encompass the other?" However, first order dominance does not always allow for comparison (typically when two CDFs cross each other on the graph). In that case, tests should be applied to generalized Lorenz curves (GLCs) instead of CDFs (cf. Shorrocks, 1983). The GLC is

[7] Because of confidentiality matters, SHARE data do not provide respondents' geographical position within the country of residence, but data about the area of living in each country is available. This variable is made of five items (big city, suburbs, large town, small town, and rural area or village) for each country; the average level of years of education e_c is thus available for 5×11=55 clusters. Quoting e_i respondent's *i* years of schooling, our relative education variable is computed as $(e_i-e_c)/e_c$.

constructed by scaling up the Lorenz curve by the mean of the distribution. The height of the GLC reflects the level of the probability to report good/very good health (notice that first order stochastic dominance implies second order dominance), while the convexity of the GLC reflects the degree of health status inequality. Stochastic dominance tests based on GLC comparisons permit both (i) to rank health distributions; and (ii) to compare levels of health inequality between them. All analyses were performed using STATA software (StataCorp., 2005).

4. Results

4.1. Estimation Results

Table A1 in annex reports Probit estimates of equation 1. Statistical inference points out that the initial model can be interpreted as far as correctly predicted outcomes are high enough (63.2%) and the Chi-squared value of the LR test indicates that all coefficients are simultaneously and significantly different from zero ($p<0.001$). In addition, the usual predictors of health status are significant and associated with the expected signs for the overall sample. Unsurprisingly, age is a very powerful predictor in the decline of health status, and respondents with low levels of income (quintile 1 and 2) report lower levels of SRH whereas those who have higher levels of education and more intellectual jobs (ISCO 1, 2, 3) report better health status. It is also noticeable that respondents who do not live in their native country (migrants) generally report worse health status. Although household composition variables are not significant, these results support the idea that cross-country simulations can be carried out using this model. The previous model is then run on the initial sample (N=18,210) now partitioned respectively for respondents who do not take part in voluntary associations (N=11,761), and for those who do (N=6,449). Estimates for simultaneous equations 2 with S2 and 3 with S3 are displayed in Table A1 and Table A2 in annex. The Wald test of independence in equation S2 ($p<0.001$) and S3 ($p<0.004$) indicates that correction for selection bias was necessary.

Table A2 in annex provides Probit estimates of selection equations S2 and S3 that were used to correct for selection bias. We find that household composition of individuals aged 50 and over is the most powerful predictor for involvement in social activities. Households without family members tend to take more part in voluntary associations. This is consistent with Bolin *et al*. (2003) idea that fewer familial constraints increase the need for outside social relations. From a technical perspective, it seems that household variables are good selection variables since they are correlated with social capital but not with health. We shall develop this point in the discussion. By and large, our findings are consistent with previous studies on social capital[8] in that—holding everything else constant—education and income are important determinants of group membership. Notice that both absolute and relative education variable play a positive and significant role in our study. More precisely, it seems that social capital is mainly influenced by relative education (cf. Nie *et al*., 1996). Respondents with a higher than average number of years of schooling are more likely, *ceteris paribus,* to be involved in social participation. We also find that the probability to take part in voluntary associations increases with age up to around 63 years old[9] before it decreases. This finding gives substance to Glaeser's *et al*. (2002) hypothesis assuming that the relation between formal networks size and age is concave. Differences with other studies lie in that the

[8] cf. Kassa & Parts (2007) for a comprehensive survey of empirical studies on the determinants of social capital.

[9] Using Probit estimates from Table A2 in annex: $d_{AGE} / d_{SRH} = 0 \Leftrightarrow -(\beta_{AGE}) / (2 \times \beta_{AGE^2}) = 63.2$ (S2) or 62.8 (S3).

model predicts women have more chances than men to take part in voluntary associations. Notice that being a migrant seems to be a negative determinant of involvement in social activities outside the household.

4.2. International Comparisons

Table 3 presents the results of integral computation of cumulative distribution function (CDF) of the outcome probability of equations 1, 2 with S2, and 3 with S3 for the whole sample. Comparison between observed and predicted country levels of respondents reporting good/very good levels of health (respectively displayed in Table 1—column SRH—and Table 3—column A) show differences lower than 0.01. Table 3 also reports the estimated shares of individuals in the sample reporting good/very good health status according to the situation where (B) no-one in the sample is involved in any social activity; and (C) all the respondents take part in (at least one) voluntary association. According to the Kolmogorov-Smirnov tests displayed in Table 3, the differences between each situation (A, B, and C) are significant for each country, which means that the more individuals take part in voluntary associations, the higher is the probability to report good/very good health in each country.

TABLE 3 ABOUT HERE

Table 3 and Figure A1 (in annex) reveal that involvement in voluntary associations is beneficial to everyone since CDF of counterfactual (B) is strictly dominated by (A). Country by country graphical second order stochastic dominance comparisons confirm this result. GLCs comparisons indicate that if everyone takes part in voluntary associations, the probability of reporting good health would increase for every country in the sample. The current contribution of social participation for the whole sample is 0.032 (= 0.567 – 0.535), and this figure could reach 0.093 (= 0.628 – 0.535) under counterfactual assumption (C). Figure A1 in annex indicates that changes in the rates of social participation modifies the *structure* of the sample reporting good/very good SRH. Relative to a dominated Generalized Lorenz curve (GLC), a dominating GLC (e.g. $C >_{sd2} A$) indicates both that overall SRH for the population is higher and that it is more equally distributed. Results in Table 3 suggest that improved rates of membership in voluntary associations could lead to both better levels and reduced inequalities in SRH status of the older people both (i) within each country; and (ii) for the whole sample.

The relative contribution provides interesting additional information. It is striking that (i) not all countries have the same effect of social participation on good health, and (ii) countries where the share of respondents taking part in voluntary associations is higher, do not have systematically the best ‘rate of return’ for this kind of social investment (cf. Fig. 1 and 2). For instance, Germany has a lower proportion of respondents involved in social participation than Denmark, though the two countries have the same highest relative contribution. On the contrary, Greece, whose level of participation in voluntary associations is roughly comparable to Denmark, accounts for the worse relative contribution. If a ‘laboratory experiment’ would be conceivable on the basis of these results, then some countries would change their ranks in good health if all the respondents would take part in (at least) one voluntary association. Belgium, The Netherlands, Denmark and Austria would thus outrank Greece. Although this approach is purely fictitious, it is instructive in that it illustrates cross-country differences in social capital performance.

5. Discussion

5.1. Health Inequalities

Counterfactual reduction in health inequalities between respondents as a consequence of growth rates in social participation is an important result to be discussed. Reduction of inequalities between respondents (within countries or for the whole sample) is different from international convergence in health status. Nothing guaranties in our study that southern countries would catch up with northern countries—even if overall health inequalities could be reduced. For instance, moving from the current situation (A) to the counterfactual where everyone is involved in social activities (C) would more than double (×2.21) the gap between France and Denmark in terms of national health status. In order to provide systematic robust results about the phenomenon of convergence (or divergence) in SRH levels, second order stochastic dominance tests should be carried out between countries.

Although this question goes beyond the scope of this study, our results provide so far some interesting paths for further research. First, the composition of social capital may be crucial to understand international variations in counterfactual heath status. We saw indeed that the various forms of social participation do not have the same effect on SRH between countries (cf. Table 2). For example, the fact that social participation in Greece corresponds mainly to involvement in religious organizations (more than any other countries) may explain why social capital health-efficiency is so low in this country (cf. Fig. 2). Second, it may be that our variable of social participation is a proxy of deeper institutional arrangements produced by various political, social, and historical contexts (cf. Kawachi, 2007). This interpretation supports the efforts to investigate the determinants of social capital—and especially the use of institutional variables as instruments in simultaneous equations models of health and social capital (Folland, 2007; D'Hombres *et al*., 2007).

5.2. Social Capital Externalities

Our study only concentrates on individual return of membership in voluntary associations and, as a consequence, may not capture the overall influence of respondents' investment in social capital. In particular, the assumed positive externalities of social activities on the population could be best taken into consideration if regional information is provided in a multi-level model. However, multi-level estimation and inference of two binary outcome variables with selection bias is not yet available to our knowledge. Still, several recent studies have already emphasized the positive influence of multi-level measures of social capital on individual health outcomes (e.g. Scheffler, Brown & Rice, 2007; Olsen & Dahl, 2007). A common finding of these studies suggests that the influence of social capital is underestimated when multi-level influence is not taken into account.

Acknowledging that the role of the social and institutional context is of prior importance to understand international differences in social capital efficiency and SRH differences, suggests a broader definition of social capital could be fruitful. As argued by Kawachi *et al.* (2004: 683): "The concept of social capital surely contributes something additional to the already well-established literature on social networks and support. The novel contribution of social capital, in our view, lies in its collective dimension, i.e. its potential to account for group-level influences on individual health. […] the question about the theoretically appropriate level for analysing the effects of social capital on health ought not to be couched in terms of a dichotomy (*either* individual level *or* the collective level)—rather, it is *both*, implemented

within a multi-level analytical framework." The downside of this method lies in its conception of social capital as something multifaceted and multidimensional which creates often more questions than answers compared to the 'social networks' approach (cf. Dasgupta, 2005).

5.3. Preemption and Causation

A major problem counterfactual theory faces is preemption (cf. Pearl, 2000). Preemption illustrates how an event *x* (e.g. participate in any social activity) can be considered a cause although the effect *y* (e.g. reporting good/very good health) persists in its absence. For example, it could be that people who are not involved in voluntary associations compensate by spending time with their family. This would modify the structure of social capital in that the social network would be made of relatives instead of friends; but the effect of social support on health status would remain the same. We believe our method partially overcomes this problem because some variables (i.e. household structure) in the selection equations S2 and S3 are determinants of social participation but do not seem to have any significant impact on health status. Although equations 1, 2, 3, and selection equations S2, S3 do not display the same variables of household structure in the present article, several other specifications (not displayed here) have been tested; all indicating that household structure seem to be a good instrument for social participation of the older population.

FIGURE 1 & 2 ABOUT HERE

The issue of preemption leads to another important issue to be currently discussed in any empirical study on social capital and health: the causality problem. We assume here that involvement in voluntary associations has positive effects on respondents' health status, thought it may also be that causality is reversed (healthier people are more able to participate in social activities), or more assuredly, that both variables influence each other. The current debate on this issue is still ongoing and Kawachi (2007) acknowledges that existing studies have not yet adequately answered this question. However, some recent empirical research using instrumental variables technique give support to the assumption that social capital is a cause of enhanced health status (Folland, 2007; D'Hombres *et al*., 2007). In our case however, the use of instrumental variables is technically problematical since the endogenous variables (SRH and social participation) are both binary outcomes. Randomization is an alternative technique to test for causality (Didelez & Sheehan, 2007), but its implementation here is also being technically difficult. In addition, the cross-sectional feature of the data makes impossible the use of time-based investigations for causality.

6. Conclusion

Using counterfactual analysis, we examine the effects of membership in voluntary associations on self-reported health (SRH) for the population of individuals aged fifty or more in eleven European countries. From a research perspective, we cannot confirm that social participation is a cause of better SRH, though counterfactual dependence of the latter on the former is well established. Correction for selection bias in the analysis permits us to investigate the determinants of social capital. We found that both absolute and relative education hypotheses are likely to influence individuals' involvement in social activities. Household structure is another major determinant of social participation and seems to be a potential instrument to consider in further research on causality issues. From a policy-based perspective, our results indicate that (i) social participation contributes to better health status

in all countries in the sample, (ii) the potential effect of social participation on health is important since it could raise the current share of respondents in good/very good health from 56.7% to 62.8% on average, *ceteris paribus*; and (iii) improved rates of social participation could contribute to reduce health inequality within each country and on the whole sample. As a consequence, "healthy ageing" policies based on social participation promotion may be beneficial for the aged population in Europe.

Disclaimer

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Table 1: Descriptive statistics of the main variables in percent of respondent (N=18,210)

Country	N	SRH	Social participation in:					
		Good or very good	Voluntary or charity work	Training course	Sport, Social club	Religious org.	Political, community org.	Any of these five
Austria	7.5	57.5	7.7	1.9	13.4	21.4	4.5	36.0
Belgium	13.2	64.1	16.6	7.9	21.2	7.1	6.7	38.5
Denmark	5.3	58.6	18.2	4.4	31.7	5.3	3.7	45.8
France	10.0	55.8	15.4	2.6	18.8	5.7	2.3	31.6
Germany	10.2	46.0	11.3	3.0	24.6	9.7	3.2	36.9
Greece	12.3	63.1	3.3	4.3	6.4	37.9	5.4	47.5
Italy	13.5	49.5	6.8	0.9	5.6	4.9	1.9	15.8
Netherlands	9.2	62.4	22.4	4.7	26.4	11.4	2.9	45.8
Spain	6.7	44.6	2.2	0.9	7.0	8.8	0.8	17.2
Sweden	9.3	55.5	17.8	7.6	22.1	6.9	4.6	39.6
Switzerland	2.8	75.2	12.4	8.9	28.4	11.2	3.9	45.3
Total	**100**	**56.7**	**12.0**	**4.1**	**17.2**	**12.2**	**3.8**	**35.4**

Table 2: SRH and membership in association
Odds Ratios (with correction[(a)] for age, gender, education, and household size)

Country	Voluntary or charity work	Training course	Sport, social club	Religious org.	Political, community org.	Any of these five
Austria	1.211	2.707	2.473***	1.231	1.552	1.698***
Belgium	1.167	1.618*	1.513***	1.066	1.843***	1.680***
Denmark	1.522	1.003	1.632***	2.386**	2.514**	2.414***
France	1.296	2.963	1.405**	1.376	2.128*	1.608***
Germany	2.037***	3.535**	1.495***	1.479**	1.406	1.866***
Greece	1.006	1.714	1.443	1.118	1.463	1.271**
Italy	1.484*	1.175	1.234	1.748***	0.758	1.427***
Netherlands	1.156	0.411**	1.943***	1.341*	2.362**	1.841***
Spain	1.147	0.657	1.383	1.328	1.996	1.362*
Sweden	0.993	2.098**	1.959***	1.078	0.954	1.691***
Switzerland	0.499	0.783	2.493**	1.042	2.765	1.765***
Total[(b)]	**1.268*** **	**1.710*** **	**1.592*** **	**1.263*** **	**1.629*** **	**1.578*** **
Without Greece	*1.251*** **	*1.467*** **	*1.646*** **	*1.310*** **	*1.521*** **	*1.692*** **

Legend: * p<0.1; ** p<0.05; *** p<0.01 N.B. (a) Logistic regression with SRH as dep. var. and robust S.E. from Huber/White/sandwich robust variance/covariance estimator. (b) Correction for country dummies in addition of other regressors.

Table 3: Estimated current (A) and counterfactual (B, C) shares of the sample reporting good or very good health status – 2004

Country	N	Current situation (A)	If no-one does social activities (B)	If everyone does social activities (C)	Relative contribution (C-B) / (B)	Second Order Stochastic Dominance			
						(A) $>_{sd2}$ (B)		(C) $>_{sd2}$ (A)	
						Graph[(a)]	K.-S.[(b)]	Graph[(a)]	K.-S.[(b)]
Austria	1357	0.576	0.537	0.653	0.215	Yes	0.144***	Yes	0.293***
Belgium	2405	0.637	0.605	0.694	0.149	Yes	0.105***	Yes	0.178***
Denmark	964	0.586	0.509	0.683	0.340	Yes	0.229***	Yes	0.326***
France	1827	0.557	0.530	0.618	0.165	Yes	0.081***	Yes	0.176***
Germany	1857	0.460	0.412	0.549	0.332	Yes	0.192***	Yes	0.352***
Greece	2233	0.642	0.632	0.650	0.030	Yes	0.039*	Yes	0.084***
Italy	2465	0.498	0.483	0.573	0.187	Yes	0.060***	Yes	0.244***
Netherlands	1680	0.622	0.574	0.688	0.199	Yes	0.183***	Yes	0.274***
Spain	1221	0.446	0.435	0.491	0.130	Yes	0.056**	Yes	0.179***
Sweden	1689	0.553	0.512	0.619	0.208	Yes	0.140***	Yes	0.254***
Switzerland	512	0.748	0.726	0.782	0.078	Yes	0.082*	Yes	0.137***
Total	**18210**	**0.567**	**0.535**	**0.628**	**0.173**	**Yes**	**0.092*** **	**Yes**	**0.180*** **

Legend: * p<0.1; ** p<0.05; *** p<0.01. NB: (a) 2nd order SD tests from the comparison of Generalized Lorenz Curves (GLCs) on the whole sample. See Figure A1 in annex for 1st and 2nd order stochastic dominance (SD) tests. (b) Two-sample Kolmogorov-Smirnov equality-of-distributions tests carried out on CDFs.

Fig. 1: Absolute contribution of involvement in social activities to respondents' self-rated health - 2004

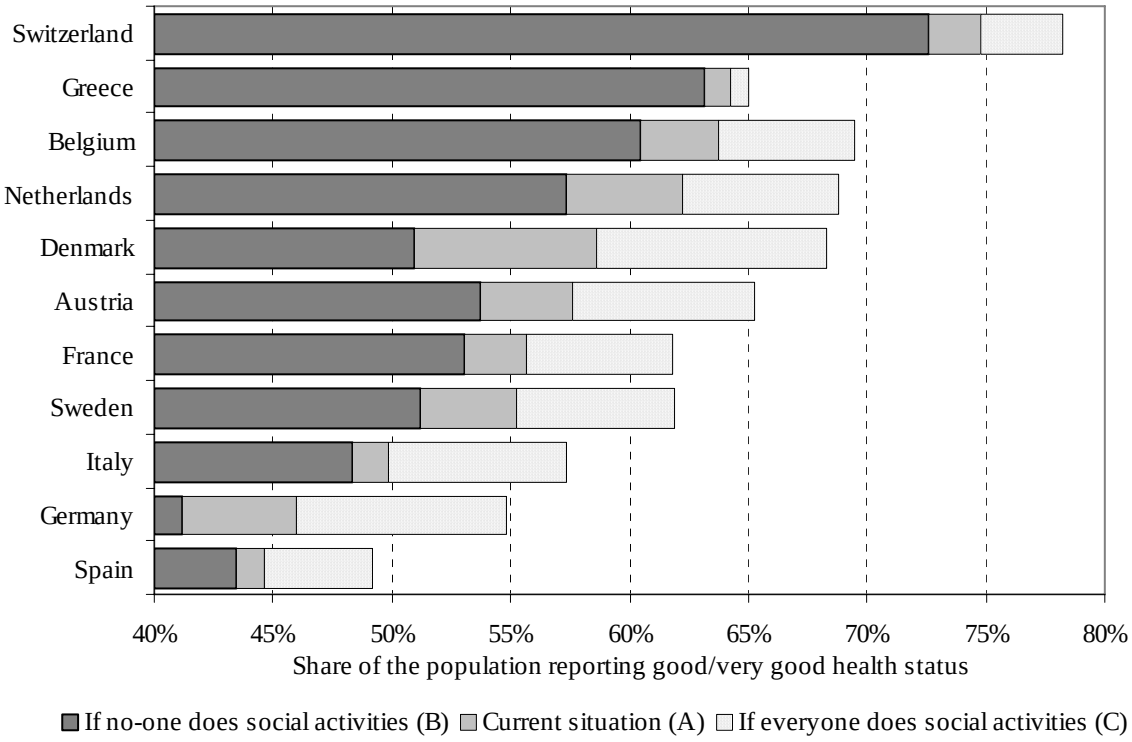
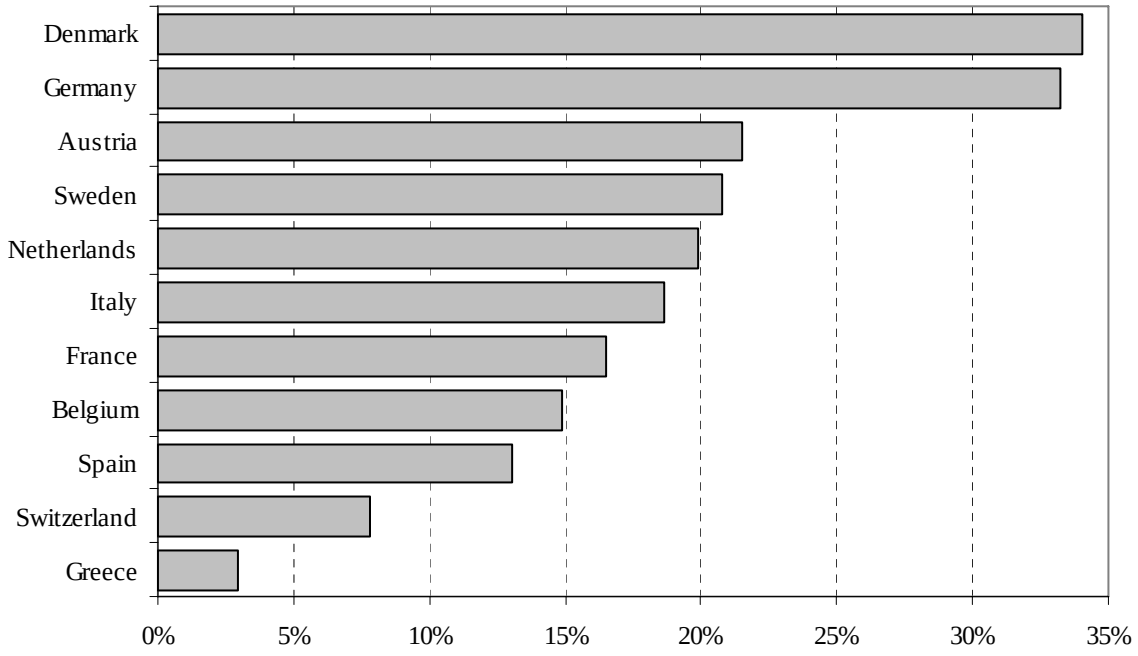


Fig. 2: Relative contribution of involvement in social activities to respondents' self-rated health - 2004



Annex

Table A1: Probit estimates of the determinants of respondents' self-reported health status

Dep. Var.: Binary SRH[a]	Equation 1		Equation 2		Equation 3	
Sample selection	All sample		Do not do social activities		Do social activities	
Model	(Binary Probit)		(Heckman Probit)		(Heckman Probit)	
Variables	Coef.	Robust S.E.[b]	Coef.	Robust S.E.[b]	Coef.	Robust S.E.[b]
Individual Characteristics						
Male	0.088***	0.021	0.104***	0.024	0.097***	0.035
Age	-0.018***	0.001	-0.015***	0.002	-0.009***	0.002
Education (ISCED)	0.044***	0.003	0.019***	0.005	0.029***	0.007
Last Job (ISCO)						
ISCO 1	0.216***	0.040	0.166***	0.043	0.139**	0.066
ISCO 2	0.297***	0.037	0.296***	0.039	0.202***	0.063
ISCO 3	0.224***	0.036	0.199***	0.038	0.159***	0.061
ISCO 4	0.077	0.048	0.012	0.053	0.079	0.081
ISCO 5	0.070*	0.036	0.054	0.037	0.084	0.064
ISCO 6	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Household Structure						
Single	0.037	0.034	-0.049	0.037	0.022	0.059
Couple without other members	0.052*	0.027	-0.016	0.029	0.009	0.048
Couple with family members	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Couple with other members	-0.129	0.088	-0.167*	0.090	-0.127	0.172
Household Income						
Quintile 1 (lowest)	-0.202***	0.033	-0.113***	0.038	-0.136**	0.061
Quintile 2	-0.117***	0.032	-0.068**	0.034	-0.178***	0.052
Quintile 3	-0.046	0.031	-0.060*	0.033	-0.020	0.048
Quintile 4	-0.052*	0.031	-0.086**	0.033	0.010	0.048
Quintile 5	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Country of residence						
Austria	0.407***	0.046	0.347***	0.056	0.334***	0.077
Belgium	0.626***	0.042	0.490***	0.058	0.463***	0.076
Denmark	0.423***	0.052	0.184***	0.068	0.326***	0.089
France	0.523***	0.045	0.447***	0.057	0.405***	0.078
Germany	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Greece	0.602***	0.045	0.370***	0.071	0.254***	0.090
Italy	0.321***	0.045	0.414***	0.050	0.452***	0.088
Netherlands	0.526***	0.044	0.308***	0.063	0.349***	0.083
Spain	0.439***	0.053	0.474***	0.061	0.381***	0.105
Sweden	0.433***	0.045	0.296***	0.059	0.269***	0.078
Switzerland	0.929***	0.071	0.723***	0.099	0.649***	0.119
Constant	0.389***	0.100	0.036	0.116	0.692***	0.211
N	18210		11761		6449	
Log Likelihood	-11626.5		-18633.4		-14940.6	
Correctly classified	63.19%					
LR test (p-value)	1662.457	(0.000)				
Wald chi-sqrd. (p-value)			414.900	(0.000)	174.010	(0.000)
Test of Indep.[c] (p-value)			36.64	(0.000)	8.52	(0.004)

Legend: * p<0.1; ** p<0.05; *** p<0.01. NB: (a) Good or very good self-reported health = 1, else = 0. (b) Huber/White/sandwich robust variance/covariance estimator is used. (c) Wald test of independent equations with H0: rho=0. See Table A2 for selection equations results.

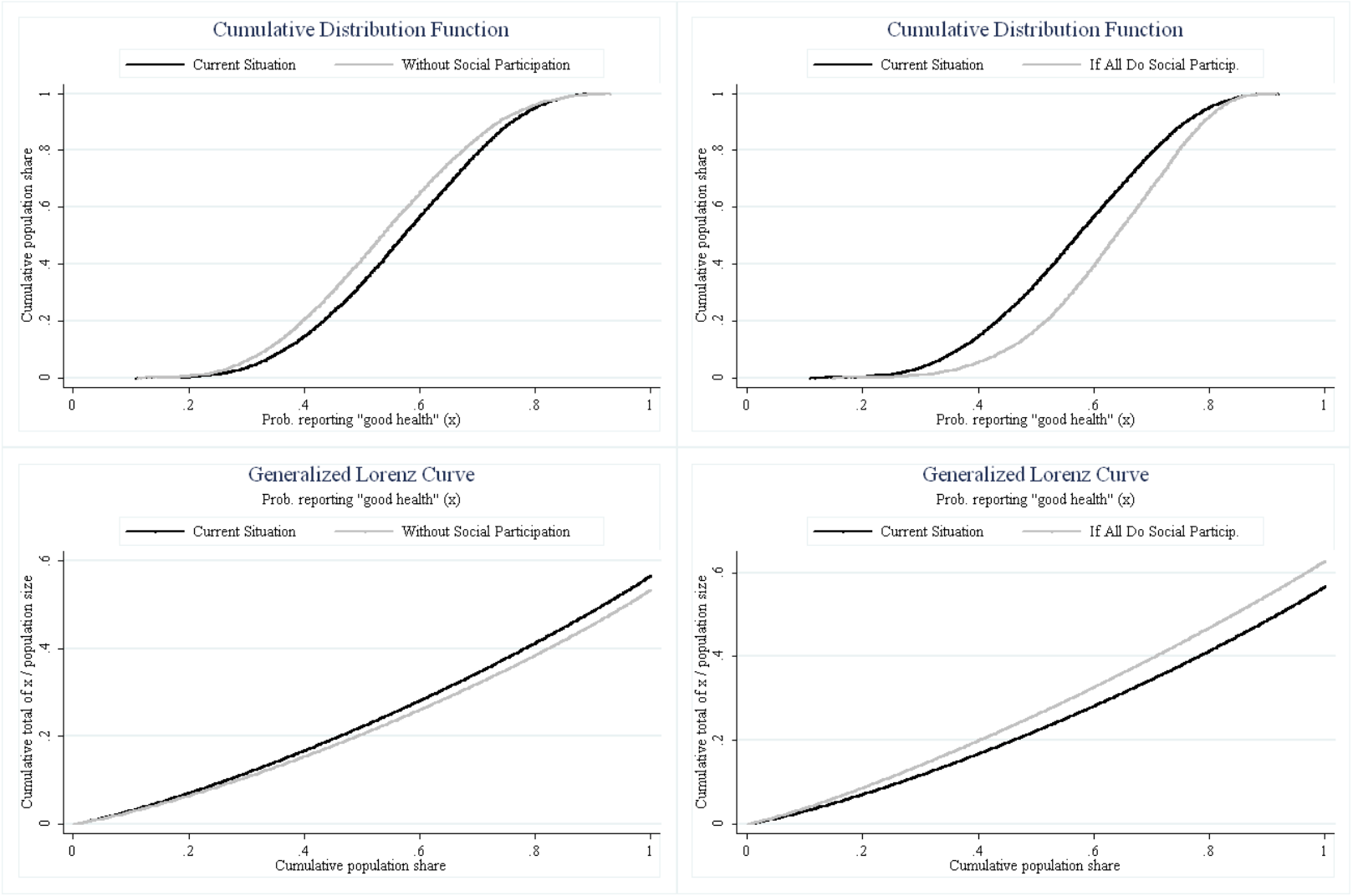
Table A2: Selection equations[a] – Probit estimates of the determinants of respondents' involvement in voluntary associations

	Equation S2		Equation S3	
Dep. Var.	Do *not* do social activities = 1, else = 0		Do social activities = 1, else = 0	
Variables	Coef.	Robust S.E.[b]	Coef.	Robust S.E.[b]
Individual Characteristics				
Male	0.101***	0.021	-0.092***	0.021
Age	-0.108***	0.014	0.099***	0.015
Age sqrd.	8.54e-04***	0.000	-7.87e-04***	0.000
Retired	-0.111***	0.028	0.085***	0.028
Migrant	0.252***	0.037	-0.251***	0.038
Quintile 1 (lowest)	0.132***	0.027	-0.140***	0.027
Education (ISCED)				
Absolute	-0.017**	0.007	0.022***	0.008
Relative	-0.225***	0.061	0.184***	0.064
Household Structure				
Spouse	-0.009	0.026	0.009	0.027
Children:				
None	-0.102***	0.037	0.121***	0.038
In the household	Ref.	Ref.	Ref.	Ref.
In the same building	-0.206***	0.048	0.218***	0.050
Less than 1Km	-0.089***	0.033	0.099***	0.034
Between 1 and 5 Km	-0.099***	0.032	0.127***	0.033
Between 5 and 25 Km	-0.130***	0.034	0.129***	0.035
More than 25 Km away	-0.178***	0.035	0.194***	0.036
Country of residence				
Austria	0.040	0.049	-0.025	0.049
Belgium	-0.092**	0.047	0.115**	0.047
Denmark	-0.225***	0.052	0.243***	0.052
France	0.070	0.059	-0.041	0.060
Germany	Ref.	Ref.	Ref.	Ref.
Greece	-0.379***	0.054	0.391***	0.055
Italy	0.569***	0.063	-0.547***	0.065
Netherlands	-0.281***	0.048	0.294***	0.048
Spain	0.451***	0.085	-0.408***	0.086
Sweden	-0.118**	0.052	0.144***	0.052
Switzerland	-0.255***	0.065	0.279***	0.065
Constant	3.974***	0.487	-3.736***	0.504
rho	0.683***	0.074	-0.459***	0.134

Legend: * p<0.1; ** p<0.05; *** p<0.01. NB: (a) Full Heckman Probit statistics displayed in Table A1. (b) Huber/White/sandwich robust variance/covariance estimator is used.

Fig. A1: 1st and 2nd Order Stochastic Dominance Tests

SHARE 2004 - All Sample



Promoting Social Participation for Healthy Ageing

Nicolas Sirven (Irdes), Thierry Debrand (Irdes)

Promoting social participation of the older population (e.g. membership in voluntary associations) is often seen as a promising strategy for 'healthy ageing' in Europe. Although a growing body of academic literature challenges the idea that the link between social participation and health is well established, some statistical evidence suggest a robust positive relationship may exist for older people. One reason could be that aged people have more time to take part in social activities (due to retirement, fewer familial constraints, etc.); so that such involvement in voluntary associations contributes to maintain network size for social and emotional support; and preserves individuals' cognitive capacities.
Using SHARE data for respondents aged fifty and over in 2004, this study proposes to test these hypotheses by evaluating the contribution of social participation to self-reported health (SRH) in eleven European countries. The probability to report good or very good health is calculated for the whole sample (after controlling for age, education, income and household composition) using regression coefficients estimated for individuals who do and for those who do not take part in social activities (with correction for selection bias in these two cases). Counterfactual national levels of SRH are derived from integral computation of cumulative distribution functions of the predicted probability thus obtained. The analysis reveals that social participation contributes by three percentage points to the increase in the share of individuals reporting good or very good health on average. Higher rates of social participation could improve health status and reduce health inequalities within the whole sample and within every country. Our results thus suggest that 'healthy ageing' policies based on social participation promotion may be beneficial for the aged population in Europe.

Encourager la participation sociale afin de vieillir en bonne santé - Une analyse contrefactuelle de l'enquête sur la santé, le vieillissement et la retraite en Europe (SHARE)

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Encourager la participation sociale des personnes âgées (par exemple, par l'adhésion à des associations) est souvent perçu comme une stratégie prometteuse pour « vieillir en bonne santé » en Europe. Bien que la littérature académique, toujours croissante, remette en question l'idée qu'il existe un lien manifeste entre la participation sociale et la santé, certains travaux suggèrent qu'une telle relation (positive et significative) serait vérifiée pour les personnes âgées. Une raison pourrait être trouvée dans le fait qu'elles ont plus de temps pour participer à des activités sociales (en raison de la retraite, d'obligations familiales moins contraignantes, etc.) et, qu'ainsi, leur engagement dans des associations concourt au maintien d'un réseau relationnel suffisamment développé pour permettre un soutien social et affectif. Un tel réseau participerait par ailleurs à l'entretien des capacités cognitives des individus. En utilisant les données de l'enquête sur la santé, le vieillissement et la retraite en Europe (SHARE) obtenues, en 2004, auprès de personnes âgées de cinquante ans et plus, cette étude propose de tester ces hypothèses en évaluant la contribution de la participation sociale à l'état de santé auto-déclaré dans onze pays européens. La probabilité de déclarer une bonne ou une très bonne santé est calculée pour l'échantillon complet (après avoir contrôlé les effets de l'âge, du niveau d'éducation, du revenu et de la composition du ménage) en utilisant des coefficients de régression estimés pour les individus qui ont une activité sociale, ainsi que pour ceux qui n'ont pas (avec correction du biais de sélection dans ces deux cas). Les niveaux nationaux d'états de santé auto-déclarés sont obtenus à partir du calcul intégral des fonctions de distribution cumulative des probabilités prédites. L'analyse montre que la participation sociale contribue pour trois pour cent à l'augmentation de la proportion des individus déclarant en moyenne une bonne ou une très bonne santé. Des taux de participation sociale plus élevés pourraient améliorer l'état de santé et réduire les inégalités de santé au sein de l'échantillon complet et au sein de chaque pays. Nos résultats suggèrent que les politiques visant à « vieillir en bonne santé » basées sur l'encouragement à la participation sociale peuvent être bénéfiques pour les personnes âgées en Europe.

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