No. 2006–87

HEALTH AND LABOUR FORCE PARTICIPATION OF THE ELDERLY IN EUROPE: WHAT DO OBJECTIVE HEALTH MEASURES ADD TO THE ANALYSIS?

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September 2006

This is a revised version of CentER Discussion Paper No. 2005-130

December 2005

ISSN 0924-7815

Health and labour force participation of the elderly in Europe: what do objective health measures add to the analysis?*

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September, 2006

Abstract

In this paper, we study labour force participation behaviour of individuals aged 50-64 in 11 European countries. The data are drawn from the new Survey of Health, Ageing and Retirement in Europe (SHARE). We examine the value added of objective health variables in relation to potentially endogenous self-reported health. We approach the endogeneity of self-reported health as an omitted variables problem. In line with the literature on the reliability of self-reported health, ambiguous results are obtained. In some countries, self-reported health does a fairly good job: controlling for extra health related variables does not seem to add much to the analysis. In other countries, however, self-reported health is clearly endogenous with results that are in line with the justification hypothesis. They illustrate the multidimensional nature of health and the need to control for objective health variables when analyzing labour force participation behaviour. This makes an instrumental variables approach to deal with endogenous self-reported health less appropriate.
Key words: SHARE, labour force participation, self-reported health, objective health, retirement.
JEL-classification: I10, J22, J26.

*We are grateful to Rob Alessie and Martin Browning, as well as seminar participants in Leuven, Mons, Tilburg, the RTN-AGE workshop in Venice and EEA 2006 in Vienna for useful comments and suggestions. The authors acknowledge the financial support provided through the European Community's 5th framework programme under the project name AMANDA (QLK6-CT-2002-002426). This paper replaces an earlier study by the same authors entitled "Labour force participation of the elderly in Europe: the importance of being healthy".

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1. Introduction

Population ageing is considered to be one of the most important social and economic challenges in Europe in the next decades. Life expectancy has been increasing markedly since more than a century, while fertility has been declining. At the same time, most industrialized countries were subject to sweeping changes in their labour markets. Female labour force participation has increased over time, resulting in a shrinking gap between male and female participation rates. At the same time, however, workers retire at younger ages than they used to do. These features imply a big uncertainty concerning the long term sustainability of public pension programmes in European countries (see Banks et al., 2002 for a discussion).

It goes without saying that considerable attention has been devoted to these issues by policy makers and researchers. One basic requirement for a sound analysis of the ageing problem is, of course, the availability of adequate data sources. In this respect, many European countries are lagging behind the United States that has a tradition in gathering data on elderly persons; think, for instance, of the widely explored Retirement History Study (RHS) and its successor the Health and Retirement Study (HRS). Recently, however, Europe partly made up arrears by establishing the Survey of Health, Ageing and Retirement in Europe (SHARE) covering 11 European countries.[1]

SHARE contains data on the individual life circumstances of a representative sample of about 18,000 households with at least one household member aged 50 or over. The survey covers such issues like labour force participation, a wide range of physical and mental health indicators, socio-economic situation and family and social networks (see Börsch-Supan et al., 2005 for a sample of the issues covered by SHARE). The first wave of SHARE, which is designed as a longitudinal survey, contains data that was gathered in 2004 and was publicly released in Spring 2005. Given the availability of only one wave up to now, SHARE will expose its full strength in a couple of years when the next waves will be available. Nevertheless, its cross-national and its truly multi-disciplinary dimension, two features which make the dataset unique, are immediately exploitable.

In this study, we take a closer look at the labour force participation of men and women aged 50-64 (both years included) in Europe and explore which individual and household characteristics have an impact on individual participation decisions. A variety of variables affecting individual retirement behaviour have been studied in the

[1]This paper uses data from the early release 1 of SHARE 2004. This release is preliminary and may contain errors that will be corrected in later releases. The SHARE data collection has been primarily funded by the European Commission through the 5th framework programme (project QLK6-CT-2001-00360 in the thematic programme Quality of Life). Additional funding came from the US National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Fund, FWF), Belgium (through the Belgian Science Policy Office) and Switzerland (through BBW/OFES/UFES) was nationally funded. The SHARE data set is introduced in Börsch-Supan et al. (2005).

theoretical and empirical literature. As illustrated by Gruber and Wise (1998, 2002, 2005), an important set of such variables relate to incentives inherent in a country's social security provisions. At this stage, though, SHARE does not allow to calculate detailed incentive measures such as the accrual in social security wealth by working one more year or Stock and Wise's (1990) option value of postponing retirement.[2]

Also the health status is supposed to have an important impact on an elderly individual's participation decision (see Lumsdaine and Mitchell, 1999, for a theoretical discussion of this linkage). Usually, a single health indicator appears in equations describing labour supply decisions of the elderly (see Rust and Phelan, 1997, Blundell et al., 2002 and Gustman and Steinmeier, 2005 for only a few examples). A widely used health indicator in such analyses is self-reported health. It is well-known, however, that self-reported health may be endogenous. Think, for example, of the justification hypothesis, where individuals justify their non-participation by claiming that they are in ill-health (see Bound, 1991). In order to tackle this endogeneity problem, some authors instrument self-reported health by objective variables related to an individual's health to obtain a single exogenous health indicator (see Bound et al., 1999, Kerkhofs et al., 1999, and Disney et al., 2004).

An important aspect when studying the effects of health status on labour force participation is that health may be multi-dimensional: different health indicators may have a divergent impact on an individual's participation decision. While a severe health condition like cancer or a stroke may force an individual to leave the labour market, this is not necessarily the case for mild conditions such as high blood pressure or diabetes. The multi-dimensional nature of health makes an instrumental variables approach to remedy the endogeneity of self-reported health less appropriate. We therefore follow a different road to deal with this endogeneity problem. More specifically, we approach the endogeneity of self-reported health as an omitted variables problem. At this point, the multi-disciplinary nature of SHARE turns out to be very useful. The data set not only contains the standard self-reported health status, but also a wide range of objective health indicators. Some of the latter, like an individual's grip strength, are commonly used in the medical sciences but usually not surveyed in the social sciences.

The contribution of our study is twofold. First, we will briefly introduce the new SHARE data and shed some light on systematic differences in participation rates and health across the countries involved. This is not only interesting in its own right, but also because of SHARE's advantage that the same survey methodology is applied to all participating countries, which allows easy comparison of the figures. Second, we will analyse how labour force participation of the elderly is affected by health related and

[2] In the future, there will be a link established between SHARE and the social security administration of some countries, which will allow to calculate detailed pension benefits an individual will be eligible to when she or he stops working. On its turn this will allow to take into account incentive measures. (Compare to the link between the HRS and the US Social Security Adminstration).

socio-demographic characteristics. More in particular, we will examine the value added of various objective health related variables for elderly individuals' employment status, and this in relation to the possibly endogenous self-reported health (see Dwyer and Mitchell, 1999, for a related exercise on the basis of the HRS). Of course, since SHARE contains only one wave up to now and the data do not yet allow to calculate detailed incentive measures, our study is restricted to a static reduced form analysis of some of the determinants of labour force participation of the elderly in Europe. Nevertheless, knowing which variables are significantly associated with labour force participation is a first important step towards a more advanced analysis on longitudinal data.

The rest of the paper unfolds as follows. Section 2 presents the data and descriptive statistics on labour market behaviour and health of the elderly. Section 3 discusses our omitted variables approach to deal with the endogeneity of self-reported health and provides a reduced form analysis of the determinants of labour force participation of the elderly. Section 4 concludes.

2. Data and descriptive statistics

The Survey of Health, Ageing and Retirement in Europe (SHARE) is a multi-disciplinary and cross-national dataset that contains information on the individual life circumstances of, in principle, all eligible members of about 18,000 households. A household is eligible for participation in SHARE if at least one household member is born in or before 1954. An individual member of the household is eligible for interview if she or he, or her or his partner, is born in or before 1954. The SHARE data have been gathered in 2004 and is a random sample of the target population.[3] The resulting SHARE survey contains information on a wide range of health indicators and socioeconomic variables of over 26,000 individuals. SHARE covers 11 countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden and Switzerland. The dataset is designed after the Health and Retirement Study (HRS) and the English Longitudinal Study of Ageing (ELSA). Its cross-national dimension makes it a unique and particularly interesting dataset in comparison to other microdata focusing on the elderly.

In this study, we focus on the labour force participation of men and women aged 50 to 64 (both years included). Although there is an important number of individuals that are older in the dataset, policies that aim to increase labour force participation of the elderly probably do not target this group. For example, one of the targets in the Lisbon Strategy is to have an employment rate of 50 percent for individuals aged 55-64 by 2010 (see European Commission, 2004).

In Table 1, we show some basic statistics on the sample that we selected from SHARE. After dropping individuals that are younger than 50 (partners of an individual

[3] The data from Belgium and France were collected in 2004/2005.

who is 50+) or older than 64 (around 48 percent of the sample), and deleting observations with important missing information (3 percent of the remaining sample), we retain a sample of 12,237 observations. Sample size varies considerably across countries (see Table 1); countries like Belgium, Germany, the Netherlands and Sweden have around 1500 observations while the other countries, with the exception of Greece, have less than 1000 observations.

The last three columns of Table 1 show the percentages of individuals in three age classes. These age classes contain about one third of the selected sample, although there is quite some variation across countries. This variation partly reflects the different age composition in the SHARE countries, but may also be partly due to under- or overrepresentation of certain age groups.[4]

Table 1 about here.

As already mentioned in the introduction, SHARE contains a lot of health information. In what follows, we focus attention on eight different health indicators. These range from objective measures like an individual's maximum grip strength to the more subjective health measure indicating whether or not one has a good self-perceived health.

Summary statistics on the health variables are given in Tables 2 and 3. About 14.5 percent of individuals aged 50-64 ever had a severe condition such as a heart condition, a stroke, cancer or Parkinson. The extremes are covered by Belgium (about 17.5 percent) and Switzerland (9.8 percent). It is difficult to claim that this is due to the age composition since the Belgian subsample is slightly younger than the Swiss (see Table 1). More than 60 percent of the sample ever had a mild condition (cholesterol, diabetes, arthritis, high blood pressure, etc.; see Smith, 1999, for a classification). The extremes are again Belgium (68.0 percent) and Switzerland (45.6 percent). About 38 percent of the individuals in the selected sample suffer from restrictions in (instrumental) activities of daily living ((I)ADLs; walking 100 meter, bathing or showering, dressing, using the phone, preparing meals, etc.). This is quite high given that we do not focus on the oldest old in this study. Note the 20 percentage point difference between Austria and Switzerland. Part of this difference can be explained by the relatively older Austrian subsample. One relatively new health measure in social surveys is the maximum grip strength (the scale is from 0 to 100). It is recognized that this health variable, which is known to be correlated with mental as well as physical health, is a very good indicator of an individual's general health condition (see, for example, Christensen, Mackinnon, Korten and Jorm, 2001). The differences in the average across countries is almost 8 points.

[4] To correct for this one could use sample weights. These are, however, not yet available for the complete SHARE data.

Two other health measures are defined by means of the body-mass index (BMI). A BMI that is between 25 and 30 points out that an individual suffers from overweight. It turns out that this is the case for about 42 percent of the Europeans aged 50-64. A BMI that is above 30 indicates obesity, which is the case for 17 percent of the sample. Taken together, about 60 percent of the elderly in our sample suffers from a weight that is too high.

Further, about one fifth of the individuals aged 50-64 suffers from more than three bad mental health symptoms like a depression, pessimism, suicidality or guilt. Extremes are formed by France (30.7 percent) and Germany (15.2 percent). Finally, about 73 percent of the individuals in our selected sample have a good self-perceived physical health.[5]

Table 2 about here.

Table 3 about here.

As illustrated in Blanchet, Brugiavini and Rainato (2005), the transition from full time employment to full time inactivity has become less relevant over the last decades. The standard pattern to retirement has been supplemented by alternative pathways, where an individual may be unemployed, pre-retired or on sickness or disability insurance before actually retiring and drawing most resources from pension benefits. Given the wide variety of systems that persons aged 50 and over can make use of to bridge the period between regular employment and retirement, it can be argued that it is useful to focus on labour force participation and lumping together other social states like being unemployed or on disability insurance. In this study, we consider an individual as participating in the labour market if she or he has worked for pay either as an employee or as a self-employed during the four weeks preceding the interview.

Table 4 shows participation rates for men in the SHARE countries. These participation rates are given for three different age classes. As is clear from the table, there is quite some variation in labour force participation across age classes and countries. For example, in the Nordic countries (Denmark and Sweden) and in Switzerland, participation of men aged 55-64 is relatively high, with levels far above the Lisbon target (across gender) of 50 percent. In Belgium, participation for the same age group is less than 40 percent. As could be expected, participation is higher for men aged 50-54, although here too there is considerable variation between the different countries. Similar figures for women are provided by Table 5. Participation of women is lower than that of men at the country level and for the different age groups. The notable exception here are French women; we have no explanation for this. Roughly speaking, for women the same

[5] Unlike ELSA, SHARE does not contain biomedical data on health or bio-markers (see Banks and Kumari, 2005, for an illustration of the usefulness of such variables in retirement studies).

broad tendencies between countries can be observed as for men. For example, labour force participation is highest in the Nordic countries and Switzerland, while it is lowest in Belgium.

Table 4 about here.

Table 5 about here.

Another issue concerns the prevalence of part time work among the elderly in SHARE. Tables 6 and 7 give the percentages of individuals not participating, working part time and working full time. An individual is defined to work part time if her or his average weekly labour supply does not exceed 32 hours. It is clear from the tables that part time work is more common for women than for men (percentages across all countries are respectively equal to 19.4 and 8.2 percent). However, there is quite some variation between countries. While only 2.5 percent of Austrian men between 50 and 64 work part time, this is the case for about 13 percent of Dutch and Greek men. A similar variation can be observed for elderly women in Europe. In the Netherlands and Switzerland, more than 30 percent of women aged 50-64 work part time. Also in Denmark, Germany and Sweden part time working women are quite common, where percentages are observed of above 20. In the Southern countries (Greece, Italy and Spain), part time work for elderly women is less common, with percentage rates below 10.

A question that could be rightfully asked is whether individuals decrease the amount of hours worked if they get older. Therefore, we also calculated the hours choices of men and women for the three age classes that we used above.[6] However, it turns out that there is no evidence for diminishing working hours with age. Part time work seems to be more common for Swedish men in the oldest age classes. In the other countries, no clear pattern is observed. Of course, it should be remarked that convincing evidence with respect to the above question can only be obtained by longitudinal data were labour supply transitions of the same individuals are observed.

Table 6 about here.

Table 7 about here.

Several factors may have their influence on the different participation rates across European countries; these range from a country's particular institutional context, like its normal retirement age, possibilities for early retirement schemes and how labour income is taxed when an individual receives a pension, to variables that are individual-specific

[6] Statistics can be obtained from the authors at request.

such as an individual's health status or education level. In the next section, we will model labour force participation and analyse its determinants by means of a reduced form approach.

3. Estimation results

3.1. Introduction

We focus on the extensive margin of the labour supply decision. More specifically, we model the choice between not working and working. Given the data at hand, this is probably the most relevant dimension to further investigate (see also Section 2). To describe the individual participation decision, we make use of standard probit regressions. These regressions are separately applied to each of the SHARE countries, and apart for men and women. This allows us to let the data speak as much as possible for themselves. Recall that we are forced to leave out incentive measures. Consequently, we focus on non-financial individual characteristics in a reduced form analysis.

As mentioned in the introduction, self-reported health is widely used as the sole explanatory variable in participation models. This health measure is subjective in nature and is potentially endogenous. For example, an individual could justify her or his non-participation by her or his poor health. Note that such a justification bias entails an overestimation of the impact of self-reported health on employment.

In what follows, we will consider the possible endogeneity of self-reported health as an omitted variables problem. Omitted variables then are objective health related variables like maximum grip strength or dummies capturing whether or not an individual ever had a severe condition that are usually not taken into account in labour supply analyses. In such a context, two conditions must be satisfied to obtain biased estimates in participation equations that only control for self-reported health. Firstly, self-reported health and objective health related variables must be correlated. This condition does not pose too many problems since it can be safely argued that self-reported health is at the least a rough summary of the information provided by an individual's objective health indicators. Secondly, health must be multi-dimensional in the participation equation. More specifically, apart from the impact of self-reported health on participation, other health measures must have their own influence on the decision whether or not to participate. Such a situation can occur if self-reported health also contains information that is not captured by the objective health variables but at the same time does not summarize all the information that is provided by the latter variables.

If objective health variables are available in addition to self-reported health, a simple test for the endogeneity of the latter can be conducted. If both self-reported health and the set of objective health variables are significant in the participation equation, then self-reported health is endogenous in standard participation equations that only control

for the latter. A reduced impact on participation of self-reported health is then consistent with the justification hypothesis. It must be stressed that if self-reported health turns insignificant in the participation equation that additionally controls for objective health variables, then this is no evidence for endogeneity in the current context. Such a situation would arise, for example, if self-reported health is a sufficient statistic for an individual's general health condition in the sense that objective health variables do not provide extra information on this. Then self-reported health and (a linear combination of) objective health variables would act as very close substitutes. In this case, either of the two (sets of) regressors can be taken up in the participation equation.

We further control for other individual characteristics. A first set of such regressors are yearly age dummies. This level of detail allows us to partly capture the countries' social security characteristics that are defined in terms of an individual's age (think for example of the normal retirement age or arrangements for early retirement). The final set of regressors that we focus on capture an individual's socio-demographic situation, like her or his education level, marriage status or number of children.

In what follows, we will first discuss estimation results obtained for men, to continue with the same results for women.

3.2. Results for men

Tables 8 and 9 show the estimation results for men aged 50-64. Two specifications are shown per country: one with only self-reported health included (Specification 1) and one with a full set of health related variables (Specification 2). To ease interpretation, we give the marginal effects (along with their standard errors) associated with the different regressors. These are defined as the percentage change of the probability that an individual works for pay due to a marginal (discrete) increase of the associated continuous (dummy) variable. Note that most of the regressors are dummy variables. The only exceptions are the grip strength and the number of children. To compare their relative importance, we standardized these variables (by subtracting their means and dividing by their standard deviations). Consequently, their marginal effects are associated with the effect on participation when they increase by one standard deviation.

Let us first concentrate on Specification 1. In line with previous studies, self-reported health is significantly associated with participation. The percentage point difference in the probability to participate when a man claims to have a good health compared to a similar man who reports a bad health ranges from 15.8 percentage point in Greece to 34.5 percentage point in Germany. Only in Italy, the marginal effect is not significantly different from zero. However, as indicated earlier, self-reported health may be endogenous. Therefore, we added 6 extra health related variables in the regression of Specification 2.

We conducted a Wald test to check whether the null hypothesis could be rejected that

the extra health related variables have no impact on participation once one conditions on self-reported health. As is clear from Tables 8 and 9, results differ across countries. For five countries (Austria, Denmark, the Netherlands, Spain and Sweden), the test statistic exceeds the critical value of $\chi^2_{6;0.05} = 12.6$. Self-reported health is still significant after taking into account objective health related variables in Denmark, the Netherlands and Sweden. Moreover, the marginal effect of self-reported health considerably decreases once one takes into account other health indicators. These results are consistent with the justification hypothesis and indicate that self-reported health is indeed endogenous: not conditioning on the extra, objective, health related variables, obtains a biased estimate of the impact of self-reported health on participation (and possibly of the impact of other variables if the latter are not independent from self-reported health; see further).

Although the null hypothesis that objective health indicators have no impact on participation is rejected for Austria and Spain, the endogeneity of self-reported health seems less an issue. The initially significant and economically rather important self-reported health turns insignificant and economically less important when one also conditions on the full set of health related variables. In these countries, self-reported health thus seems to be strongly correlated with a linear combination of the other health variables, which makes the sole conditioning on self-reported health not a too big issue here. Note that in Austria, no less than three other health variables seem associated with self-reported health (the experience of a severe health condition, the grip strength and having a bad mental health).

Also for the other six countries (Belgium, France, Germany, Greece, Italy and Switzerland) endogeneity of self-reported health seems less of a problem: a Wald test cannot reject the joint insignificance of the objective health variables. A similar result has been found by Dwyer and Mitchell (1999) on the basis of the HRS. Following Benítez-Silva et al. (2004), this result could be explained by the fact that self-reported health summarizes, among others, a lot of unobserved health related information that cannot be captured by more objective health variables.

Let us now discuss the marginal effects of the other health variables. Having experienced a severe health condition implies a statistically significant lower probability to participate in only three of the SHARE countries (Austria, Denmark and Spain). The economic impact of a severe condition varies in a quite important way between these countries. In Denmark, the probability of participation is 14.6 percentage point lower for a man who experienced a severe condition compared to an individual who never had a severe condition and who is in all other aspects equal. In Austria, the similar percentage point decrease in participation amounts to more than 26. Note that this relatively large difference may be due to the particular composition of the countries' subsamples that are characterized by a severe condition. As could be expected, the impact of a mild condition is less important: its marginal effect is insignificant in all eleven countries. Having restrictions in (instrumental) activities of daily living, on the other hand, has

a significant and economically important impact in Spain and Sweden, with marginal effects between -13.9 and -25.4. Obesity, on its turn, has nowhere a significant marginal effect. A new health indicator in social surveys is the maximum grip strength of an individual. As is clear from the results, the indicator is quite important in five countries in the analysis (Austria, Denmark, Germany, the Netherlands and Sweden). All else equal, the higher an individual's grip strength, the more he is likely to participate to the labour market. In Austria, for example, an increase of one standard deviation in grip strength, implies a higher probability of working of about 10 percentage point. For Swedish men, the impact is economically less important, with a marginal effect of about 3 percentage point.

The above results demonstrate that health is multi-dimensional in six countries, which concurs with earlier findings by, for example, Dwyer and Mitchell (1999). Different health indicators have divergent and significant marginal effects in Austria, Denmark, Germany, the Netherlands, Spain and Sweden. In addition to mitigating the endogeneity problem associated with self-reported health, taking into account a broader set of health related variables allows to draw a more refined picture of how employment and health are associated in these countries.

Let us now focus attention on the other regressors in the analysis, starting with the age dummies. Although the normal retirement ages are at least 65 in the SHARE countries, it is clear from the tables that many age dummies are significantly different from zero, while they generally increase in importance for older individuals.[7] This is likely due to the existence of age specific early retirement and disability schemes in most countries. The probit results show that the age dummies do not start having any impact before the age of 56: the associated marginal effects are small in absolute value and not significantly different from zero for all countries. A significant age effect can be observed as soon as an individual is 56 in Austria, Belgium and Italy. Especially in Austria, this effect is rather important: the probability that an Austrian man of age 56 participates is 45 (39) percentage point lower than the participation probability of a similar 50 year old man in Specification 1 (2). In countries like Germany, the Netherlands and Spain, there is only a significant impact of the age dummies associated with ages that are at least equal to 60. A remarkable result is obtained for Sweden and Switzerland. Although the marginal effects get smaller for older ages, none of these is significantly different from zero in Specification 2. This implies that, everything else constant, age does not seem to be associated with employment before an individual reaches the normal retirement age in Sweden and Switzerland.

A final set of estimates refer to an individual's socio-demographic characteristics. The estimation results indicate that education plays a rather important role in the

[7] Not all age dummies could be taken into account for France and Switzerland, the reason being that some of these were perfectly correlated with participation/non participation. Problematic age dummies, together with the associated observations, were dropped.

participation decision in most countries. All else equal, the higher the level of education, the higher the probability of participation. Remarkably, in Greece, Spain, Sweden and Switzerland, education does not seem to be associated with participation in a significant way.[8] The impact of a household's demographic composition is not extremely important. Although, ceteris paribus, more children imply a higher probability of participation, this is only significantly estimated in Austria, Belgium, France and Sweden. Finally, only in the Nordic countries (Denmark and Sweden), the parameter associated with the dummy variable that captures whether or not a man lives in a couple is significantly estimated in both specifications. All else equal, Danish (Swedish) men who live in a couple have a participation probability that is 18 (12) percentage point higher than that of men who are single.

Worthy of note is that although self-reported health is likely endogenous in a number of countries, the impact on the marginal effects of the regressors that are not health related is relatively small. Differences in statistical and economic significance of the marginal effects in both specifications are far from substantial. This seems to indicate that the set of health related variables and the other regressors are close to independent from each other. The endogeneity problem is thus less important as far as the impact on participation of socio-demographic characteristics is concerned. Of course, there is no guarantee that this conclusion can be transferred to economic variables. Answering this question will be possible in the future when a link is established between SHARE and detailed social security data (see above).

Table 8 about here.

Table 9 about here.

3.3. Results for women

Marginal effects and standard errors associated with the probit regression results for women aged 50-64 are shown in Tables 10 and 11.[9] We again consider two specifications. Specification 1 only takes into account self-reported health, while Specification 2 conditions on a full set of objective and subjective health indicators. Given that the results for women are qualitatively similar to those obtained for males, we will keep the discussion that follows concise.

Self-reported health is likely to be endogenous in Belgium and Sweden. A Wald test strongly rejects the null hypothesis that the parameters associated with the extra

[8] This is also formally confirmed by means of a Wald test associated with the null hypothesis that both education dummies do not have any joint impact on participation.

[9] The age dummy associated with the age of 64 could not be taken into account for Belgium, since it is perfectly correlated with non participation. This problematic variable, together with the associated observations, were dropped.

health related variables are jointly insignificant once one conditions on self-reported health, while the latter remains significant in Specification 2. Moreover, taking into account the full set of health related variables has a negative impact on the marginal effect of self-reported health, which is consistent with the justification hypothesis.

An initially significant marginal effect associated with self-reported health in Specification 1 turns insignificant in Specification 2 for Denmark, France and the Netherlands. This demonstrates that for these countries, self-reported health is strongly correlated with the other health related variables. In some countries, self-reported health does a fairly good job: it is the only significant health related variable in the female participation equations for Austria, Germany and Greece. No additional information is thus provided by objective health indicators on top of an individual's self-reported health.

A number of health indicators have their own significant marginal effects. There is quite an important variation between countries though. While only one health variable has a significant marginal effect in Austria, Denmark, Germany, Greece and Switzerland, in countries like Sweden and France, respectively four and three health indicators have an own significant marginal effect. The marginal effects of the individual health variables are generally comparable to those obtained for men.

Similar to the men's results, many age dummies have significant marginal effects. However, these effects start earlier. In Belgium, for example, women who are 54 years old are about 20 percentage point less likely to work compared to a 50 years old woman. In Germany and the Netherlands, age comes into play as soon as a woman reaches the age of 60 (as was also the case for German and Dutch men). For Swedish women, the age effect gets significant for women who are 64. Contrary to the estimation results for men (for Specification 2), there are no countries that are characterized by absence of any age effects.

The impact of education is both economically and statistically significant for all countries: higher education implies a, ceteris paribus, higher probability of working for pay.[10] The lowest impact is observed in Sweden, where highly educated women are 10 percentage point more likely to participate than low educated women, all else equal. In Italy, highly educated women have a probability of participation that is even 46 percentage point higher than otherwise similar low educated women.

Other striking differences can be observed for the regressors that are related to a household's demographic composition. All else equal, in many countries women have a lower probability to participate if they live in a couple (up to about 23.5 percentage point in France and Spain) and/or if there are children present in the household. Given the positive impact of the dummy variable associated with living in a couple and the number of children in many of the men's equations, this could indicate that there is some

[10] Although both dummies associated with education are not significantly different from zero for France, the null hypothesis of their joint insignificance is rejected at the 5 percent significance level.

coordination going on within couples: on average men seem to specialize in market work while women stay home and take care for the children.

Following the men's results, it must be stressed that the impact of the endogeneity problem on the other regressors is not very dramatic. Marginal effects associated with the latter do not differ much across the two specifications; this both in terms of statistical and economic significance.

Table 10 about here.

Table 11 about here.

4. Conclusion

In this paper, we studied labour force participation behaviour of elderly individuals in Europe. The data used were drawn from the first wave of the new Survey of Health, Ageing and Retirement in Europe (SHARE). This survey, which is designed as a longitudinal survey, contains detailed data on the life circumstances of a representative sample of individuals aged 50 and over in 11 European countries. Its cross-national and multi-disciplinary nature makes it a very valuable source for all kinds of social and economic analyses.

We had two objectives in mind. A first objective was to introduce the new SHARE data and describe participation and health patterns for the countries involved. The common methodology applied to each of the countries allows an easy comparison of the figures discussed. As has been illustrated, differences in participation rates and health are quite substantial across the SHARE countries.

Secondly, we examined the value added of objective health variables, in addition to the potentially endogenous self-reported health status, in studies focusing on participation of the elderly. Contrary to earlier studies, we approach the possible endogeneity of self-reported health as an omitted variables problem. The exercise turns out to be a perfect illustration of the "empirical minefield", which Benítez-Silva et al. (2004) use to describe the empirical literature on the reliability of self-reported health, with its far from unambiguous results. In some countries, the subjective health measure does a fairly good job: controlling for extra health related variables does not seem to add to the analysis and implies an exogenous self-reported health (at least within our participation model, in which we could not control for economic variables like the accrual in social security wealth that is not available yet in SHARE). In other countries, however, self-reported health is clearly endogenous with results that are in line with the justification hypothesis. They also illustrate the multi-dimensional nature of health. As a consequence, simply instrumenting self-reported health by a set of objective measures may be a too rough remedy in employment studies. But even in this case, marginal

effects of the other socio-demographic regressors in the analysis seem not very much affected by the endogeneity problem associated with self-reported health. Of course, it is a bridge too far to transfer this conclusion to the impact of economic variables on participation of the elderly; an issue that we could not investigate yet.

When taking these results together, they suggest that the objective health variables are likely to be of empirical importance to mitigate the potential endogeneity of subjective health and account for the multi-dimensional nature of health in the participation decision.

References

[1] Banks, J., R. Blundell, R. Disney and C. Emmerson (2002), "Retirement, pensions and the adequacy of saving: A guide to the debate", *IFS Briefing Note*, 29, Institute for Fiscal Studies, London.

[2] Banks, J. and M. Kumari (2005), "Health and retirement in England: New evidence from the English Longitudinal Study of Ageing", mimeo.

[3] Benítez-Silva, H., M. Buchinsky, H.M. Chan, S. Cheidvasser and J. Rust (2004), "How large is the bias in self-reported disability", *Journal of Applied Econometrics*, 19, 649-670.

[4] Blanchet, D., A. Brugiavini and R. Rainato (2005), "Pathways to retirement", in A. Börsch-Supan, A. Brugiavini, H. Jürges, J. Mackenbach, J. Siegrist and G. Weber (eds.), *Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe*, Mannheim Research Institute for the Economics of Ageing, Mannheim, 246-252.

[5] Blundell, R., C. Meghir and S. Smith (2002), "Pension incentives and the pattern of early retirement", *Economic Journal*, C153-C170.

[6] Bound, J. (1991), "Self-reported versus objective measures of health in retirement models", *Journal of Human Resources*, 26, 106-138.

[7] Bound, J. M. Schoenbaum, T. Stinebrickner and T. Waidmann (1999), "The dynamic effects of health on the labor force transitions of older workers", *Labour Economics*, 6, 179-202.

[8] Börsch-Supan, A., A. Brugiavini, H. Jürges, J. Mackenbach, J. Siegrist and G. Weber (eds.), *Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe*, Mannheim Research Institute for the Economics of Ageing, Mannheim.

[9] Christensen, H., A. Mackinnon, A. Korten and A. Jorm (2001), "The "common cause hypothesis" of cognitive aging: Evidence for not only a common factor but also specific associations of age with vision and grip strength in a cross-sectional analysis", *Psychology and Aging*, 16, 588-599.

[10] Disney, R., C. Emmerson and M. Wakefield (2004), "Ill health and retirement in Britain: A panel data based analysis", forthcoming in *Journal of Health Economics*.

[11] Dwyer, D. and O. Mitchell (1999), "Health problems as determinants of retirement: are self-rated measures endogenous?", *Journal of Health Economics*, 18, 173-193.

[12] European Commission (2004), *Report from the Commission to the Spring European Council. Delivering Lisbon. Reforms for the Enlarged Union*, Commission of the European Communities, Brussels.

[13] Gruber, J. and D. Wise (1998) (Eds.), *Social Security Programs and Retirement around the World*, University of Chicago Press, Chicago.

[14] Gruber, J. and D. Wise (2002), "Social security programs and retirement around the world: Micro estimation", NBER Working Paper 9407, NBER, Cambridge.

[15] Gruber, J. and D. Wise (2005), "Social security programs and retirement around the world: Fiscal implications. Introduction and summary", NBER Working Paper 11290, NBER, Cambridge.

[16] Gustman, A. and T. Steinmeier (2005), "The social security early entitlement age in a structural model of retirement and wealth", *Journal of Public Economics*, 89, 441-463.

[17] Kerkhofs, M., M. Lindeboom and J. Theeuwes (1999), "Retirement, financial incentives and health", *Labour Economics*, 6, 203-227.

[18] Lumsdaine, R. and O. Mitchell (1999), "New developments in the economic analysis of retirement" in O. Ashenfelter and D. Card (eds.), *Handbook of Labor Economics. Volume 3*, Elsevier, Amsterdam.

[19] Rust, J. and C. Phelan (1997), "How social security and medicare affect retirement behavior in a world of incomplete markets", *Econometrica*, 65, 781-831.

[20] Smith, J. (1999), "Healthy bodies and thick wallets: the dual relation between health and economic status", *Journal of Economic Perspectives*, 13, 145-166.

[21] Stock, J. and D. Wise (1990), "Pensions, the option value of work and retirement", *Econometrica*, 58, 1151-1180.

Country	Observations	Age 50-54	Age 55-59	Age 60-64
Austria	882	27.21	32.43	40.36
Belgium	1511	38.19	36.00	25.81
Denmark	866	35.22	34.76	30.02
France	785	38.73	36.31	24.97
Germany	1450	35.24	28.69	36.09
Greece	1098	42.08	31.24	26.68
Italy	1205	25.06	37.34	37.59
The Netherlands	1544	32.71	37.37	29.92
Spain	971	33.88	34.09	32.03
Sweden	1464	30.12	37.09	32.79
Switzerland	461	38.83	30.37	30.80
Total	12,307	33.95	34.45	31.59

Table 1: Sample statistics and age classes
Note: Entries for age classes are in percent.

Country	Severe condition	Mild condition	(I)ADLs	Max. grip strength
Austria	12.02	56.69	44.22	39.26
Belgium	17.54	67.97	41.56	38.82
Denmark	17.21	62.36	31.99	40.29
France	14.14	62.29	34.27	37.26
Germany	14.76	59.59	40.41	39.97
Greece	9.93	55.28	41.44	36.99
Italy	14.19	65.98	41.08	34.23
The Netherlands	17.42	54.99	35.23	39.13
Spain	12.98	67.04	43.98	32.28
Sweden	14.62	60.52	32.59	38.41
Switzerland	9.76	45.55	24.51	39.00
Total	14.54	60.62	38.09	37.85

Table 2: Health indicators. Part 1
Note: Occurrence of conditions and (I)ADLs in percent; maximum grip strength in kg.

Country	Overweight	Obese	Bad mental health	Good self-perceived health
Austria	42.29	21.54	15.76	73.81
Belgium	41.03	19.39	21.91	75.65
Denmark	40.18	13.97	16.51	76.44
France	37.32	15.54	30.70	75.80
Germany	45.03	15.52	15.17	67.10
Greece	48.36	19.95	19.58	78.78
Italy	43.82	17.93	29.63	62.16
The Netherlands	42.68	14.90	17.49	76.49
Spain	45.21	23.79	27.39	65.09
Sweden	40.92	14.34	16.73	71.58
Switzerland	33.19	12.80	17.57	86.12
Total	42.46	17.29	20.50	72.70

Table 3: Health indicators. Part 2
Note: Entries are in percent.

Country	Age 50-54	Age 55-59	Age 60-64
Austria	82.35	65.35	16.77
Belgium	79.72	51.10	18.99
Denmark	84.05	78.26	56.49
France	87.66	60.87	7.87
Germany	83.04	77.04	39.37
Greece	92.42	77.96	44.97
Italy	85.34	56.28	29.21
The Netherlands	87.00	78.13	29.57
Spain	85.37	77.30	40.54
Sweden	93.85	82.86	67.83
Switzerland	93.75	92.65	72.00
Total	86.33	71.18	38.20

Table 4: Labour force participation men
Note: Entries are in percent.

Country	Age 50-54	Age 55-59	Age 60-64
Austria	67.77	38.36	11.28
Belgium	59.79	30.15	7.58
Denmark	85.92	73.62	29.46
France	68.67	58.82	16.82
Germany	78.05	60.91	23.05
Greece	40.64	28.66	15.28
Italy	47.31	28.29	7.97
The Netherlands	61.70	49.53	17.24
Spain	47.57	40.53	19.02
Sweden	84.96	79.87	62.40
Switzerland	79.80	69.44	47.76
Total	64.35	50.00	22.65

Table 5: Labour force participation women
Note: Entries are in percent.

Country	Nonparticipation	Half time	Full time
Austria	49.9	2.5	47.7
Belgium	46.4	7.5	46.1
Denmark	27.1	7.2	65.7
France	41.6	4.8	53.6
Germany	35.8	4.8	59.5
Greece	32.6	13.4	54.0
Italy	48.7	9.5	41.8
The Netherlands	35.1	12.8	52.1
Spain	35.4	7.3	57.3
Sweden	19.3	8.5	72.2
Switzerland	17.9	9.9	72.2
Total	36.0	8.2	55.8

Table 6: Labour supply choice men
Note: Entries are in percent.

Country	**Nonparticipation**	**Half time**	**Full time**
Austria	65.3	14.1	20.6
Belgium	65.9	19.4	14.7
Denmark	35.9	21.2	42.9
France	48.7	15.5	35.8
Germany	46.3	26.2	27.6
Greece	73.0	9.1	17.9
Italy	75.9	9.7	14.4
The Netherlands	55.6	31.0	13.4
Spain	64.4	9.8	25.8
Sweden	24.6	23.2	52.3
Switzerland	35.7	31.5	32.8
Total	54.5	19.4	26.1

Table 7: Labour supply choice women

Note: Entries are in percent.

	Austria				Belgium				Denmark				France				Germany				Greece			
	Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2	
	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.
Age dummies																								
Age51	-0.130	(0.210)	-0.240	(0.221)	0.004	(0.110)	-0.012	(0.110)	-0.048	(0.130)	-0.012	(0.121)	0.217	(0.166)	0.220	(0.176)	-0.173	(0.197)	-0.199	(0.190)	-0.033	(0.137)	-0.030	(0.135)
Age52	0.096	(0.230)	-0.064	(0.268)	-0.054	(0.107)	-0.061	(0.106)	0.010	(0.129)	0.044	(0.120)	0.075	(0.164)	0.105	(0.160)	-0.172	(0.191)	-0.208	(0.182)	0.041	(0.119)	0.035	(0.119)
Age53	-0.046	(0.217)	-0.176	(0.244)	0.010	(0.107)	0.011	(0.106)	-0.206	(0.150)	-0.161	(0.149)	-0.204	(0.190)	-0.193	(0.197)	-0.234	(0.190)	-0.236	(0.183)	-0.051	(0.144)	-0.056	(0.145)
Age54	-0.213	(0.188)	-0.304	(0.191)	0.011	(0.105)	0.018	(0.105)	-0.110	(0.135)	-0.084	(0.130)	0.082	(0.168)	0.165	(0.150)	-0.024	(0.179)	-0.025	(0.171)	-0.221	(0.162)	-0.223	(0.163)
Age55	-0.034	(0.205)	-0.169	(0.224)	-0.083	(0.103)	-0.081	(0.103)	-0.048	(0.125)	-0.039	(0.123)	-0.288	(0.175)	-0.252	(0.189)	-0.019	(0.188)	-0.019	(0.181)	-0.111	(0.153)	-0.106	(0.149)
Age56	**-0.386**	(0.131)	**-0.454**	(0.113)	**-0.280**	(0.089)	**-0.276**	(0.090)	0.037	(0.110)	0.088	(0.092)	-0.297	(0.184)	-0.268	(0.194)	-0.124	(0.201)	-0.144	(0.195)	-0.186	(0.164)	-0.203	(0.165)
Age57	-0.247	(0.186)	**-0.349**	(0.173)	**-0.327**	(0.087)	**-0.303**	(0.092)	-0.183	(0.153)	-0.151	(0.147)	**-0.371**	(0.165)	-0.324	(0.181)	-0.223	(0.194)	-0.216	(0.188)	-0.287	(0.158)	-0.279	(0.158)
Age58	-0.241	(0.176)	-0.287	(0.188)	**-0.386**	(0.075)	**-0.359**	(0.081)	-0.113	(0.154)	-0.072	(0.146)	**-0.388**	(0.159)	**-0.349**	(0.173)	-0.301	(0.188)	-0.301	(0.181)	-0.303	(0.156)	-0.302	(0.157)
Age59	**-0.357**	(0.140)	**-0.391**	(0.146)	**-0.480**	(0.058)	**-0.466**	(0.062)	-0.138	(0.161)	-0.088	(0.156)	**-0.460**	(0.153)	**-0.425**	(0.172)	-0.329	(0.190)	-0.304	(0.188)	**-0.489**	(0.145)	**-0.486**	(0.145)
Age60	**-0.463**	(0.093)	**-0.486**	(0.098)	**-0.519**	(0.047)	**-0.501**	(0.053)	-0.101	(0.142)	-0.028	(0.129)	**-0.671**	(0.042)	**-0.662**	(0.049)	**-0.419**	(0.165)	**-0.424**	(0.160)	**-0.476**	(0.149)	**-0.487**	(0.149)
Age61	**-0.571**	(0.042)	**-0.585**	(0.043)	**-0.508**	(0.049)	**-0.503**	(0.051)	-0.277	(0.149)	-0.216	(0.152)	**-0.684**	(0.047)	**-0.675**	(0.054)	**-0.613**	(0.103)	**-0.617**	(0.099)	**-0.477**	(0.151)	**-0.499**	(0.147)
Age62	**-0.577**	(0.050)	**-0.601**	(0.048)	**-0.522**	(0.048)	**-0.511**	(0.052)	**-0.383**	(0.149)	**-0.317**	(0.156)	**-0.699**	(0.052)	**-0.687**	(0.061)	**-0.554**	(0.124)	**-0.535**	(0.129)	**-0.667**	(0.101)	**-0.670**	(0.102)
Age63	**-0.585**	(0.043)	**-0.599**	(0.044)	**-0.545**	(0.038)	**-0.533**	(0.045)	**-0.547**	(0.142)	**-0.512**	(0.151)					**-0.551**	(0.128)	**-0.556**	(0.122)	**-0.612**	(0.127)	**-0.622**	(0.125)
Age64	**-0.572**	(0.041)	**-0.588**	(0.041)	**-0.540**	(0.039)	**-0.532**	(0.043)	**-0.635**	(0.107)	**-0.581**	(0.131)	**-0.668**	(0.048)	-0.663	(0.054)	**-0.626**	(0.096)	**-0.613**	(0.101)	**-0.760**	(0.066)	**-0.763**	(0.066)
Demographic variables																								
Secondary education	0.012	(0.097)	0.013	(0.093)	0.056	(0.051)	0.050	(0.051)	0.070	(0.063)	0.078	(0.068)	**0.171**	(0.071)	**0.187**	(0.071)	0.144	(0.099)	0.144	(0.105)	-0.016	(0.046)	-0.019	(0.046)
Higher education	**0.251**	(0.099)	**0.238**	(0.097)	**0.163**	(0.047)	**0.172**	(0.048)	**0.149**	(0.057)	**0.159**	(0.059)	**0.339**	(0.063)	**0.351**	(0.063)	**0.257**	(0.088)	**0.252**	(0.093)	-0.016	(0.047)	-0.020	(0.047)
Children	**0.064**	(0.030)	**0.081**	(0.033)	**0.061**	(0.026)	**0.058**	(0.027)	0.057	(0.036)	0.049	(0.037)	**0.087**	(0.032)	**0.094**	(0.034)	0.032	(0.025)	0.027	(0.025)	-0.004	(0.018)	-0.003	(0.018)
Couple	**0.181**	(0.078)	0.126	(0.081)	0.102	(0.064)	0.095	(0.065)	**0.179**	(0.063)	**0.180**	(0.065)	0.075	(0.093)	0.063	(0.094)	-0.009	(0.058)	-0.015	(0.059)	-0.068	(0.052)	-0.074	(0.051)
Health related variables																								
Self-reported health	**0.246**	(0.063)	0.076	(0.082)	**0.185**	(0.050)	**0.119**	(0.058)	**0.309**	(0.059)	**0.236**	(0.074)	**0.186**	(0.082)	0.072	(0.096)	**0.345**	(0.043)	**0.281**	(0.055)	**0.158**	(0.060)	**0.166**	(0.070)
Severe condition			**-0.263**	(0.089)			-0.105	(0.058)			**-0.146**	(0.071)			-0.141	(0.105)			-0.029	(0.059)			0.023	(0.058)
Mild condition			-0.011	(0.068)			-0.033	(0.046)			0.070	(0.047)			0.062	(0.068)			-0.001	(0.047)			0.049	(0.040)
(I)ADL			-0.096	(0.073)			-0.048	(0.048)			-0.040	(0.062)			-0.103	(0.089)			-0.041	(0.047)			-0.003	(0.042)
Obese			0.028	(0.075)			0.044	(0.053)			0.085	(0.054)			-0.058	(0.092)			-0.085	(0.061)			0.015	(0.047)
Grip strength			**0.098**	(0.033)			0.042	(0.022)			**0.058**	(0.024)			0.005	(0.035)			**0.053**	(0.023)			0.020	(0.020)
Bad mental health			**-0.293**	(0.085)			0.013	(0.060)			-0.066	(0.077)			-0.172	(0.089)			-0.068	(0.074)			-0.058	(0.070)
Wald test statistic			**24.0**				9.5				**16.9**				10.5				10.6				3.4	
Observations	407		407		737		737		432		432		346		346		674		674		546		546	
Pseudo R squared	0.368		0.416		0.246		0.255		0.212		0.245		0.407		0.424		0.261		0.276		0.236		0.242	

Table 8: Marginal effects men. Part 1
Note: Bold entries are significant at the five percent significance level

	Italy				Netherlands				Spain				Sweden				Switzerland			
	Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2	
	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.
Age dummies																				
Age51	0.063	(0.217)	0.029	(0.215)	-0.004	(0.122)	-0.018	(0.128)	0.184	(0.111)	0.228	(0.086)	-0.088	(0.168)	-0.033	(0.149)	-0.021	(0.125)	-0.043	(0.147)
Age52	-0.196	(0.185)	-0.237	(0.172)	0.104	(0.106)	0.091	(0.112)	0.037	(0.145)	0.057	(0.147)	-0.037	(0.160)	0.006	(0.140)	-0.062	(0.179)	-0.071	(0.192)
Age53	-0.009	(0.222)	-0.058	(0.218)	0.035	(0.123)	0.056	(0.120)	0.142	(0.118)	0.130	(0.125)	0.025	(0.120)	0.072	(0.088)				
Age54	-0.115	(0.189)	-0.140	(0.181)	0.051	(0.109)	0.062	(0.108)	0.067	(0.141)	0.099	(0.127)	-0.034	(0.147)	-0.011	(0.140)				
Age55	-0.207	(0.177)	-0.239	(0.165)	-0.019	(0.135)	-0.023	(0.138)	0.133	(0.126)	0.147	(0.128)	-0.027	(0.146)	0.032	(0.114)	-0.023	(0.143)	-0.007	(0.124)
Age56	**-0.328**	(0.143)	**-0.362**	(0.129)	-0.044	(0.121)	-0.054	(0.124)	-0.127	(0.178)	-0.073	(0.179)	-0.179	(0.185)	-0.124	(0.183)	-0.024	(0.173)	-0.056	(0.200)
Age57	**-0.319**	(0.146)	**-0.363**	(0.128)	-0.056	(0.122)	-0.037	(0.124)	-0.111	(0.171)	-0.104	(0.178)	-0.180	(0.188)	-0.100	(0.171)	-0.019	(0.150)	-0.010	(0.139)
Age58	**-0.423**	(0.117)	**-0.456**	(0.101)	-0.150	(0.124)	-0.144	(0.128)	0.052	(0.134)	0.096	(0.129)	-0.211	(0.182)	-0.144	(0.177)	0.049	(0.103)	0.043	(0.102)
Age59	**-0.524**	(0.068)	**-0.542**	(0.058)	-0.216	(0.137)	-0.236	(0.142)	-0.037	(0.152)	0.024	(0.145)	-0.248	(0.203)	-0.154	(0.193)				
Age60	**-0.531**	(0.067)	**-0.552**	(0.055)	**-0.459**	(0.110)	**-0.468**	(0.111)	**-0.458**	(0.141)	**-0.372**	(0.172)	-0.344	(0.201)	-0.251	(0.205)	-0.120	(0.171)	-0.195	(0.204)
Age61	**-0.491**	(0.084)	**-0.510**	(0.074)	**-0.451**	(0.108)	**-0.450**	(0.114)	**-0.422**	(0.151)	**-0.357**	(0.176)	-0.318	(0.203)	-0.251	(0.210)	-0.239	(0.205)	-0.205	(0.208)
Age62	**-0.542**	(0.066)	**-0.562**	(0.057)	**-0.556**	(0.090)	**-0.559**	(0.092)	-0.210	(0.164)	-0.159	(0.175)	-0.301	(0.206)	-0.217	(0.206)	-0.211	(0.200)	-0.261	(0.231)
Age63	**-0.573**	(0.042)	**-0.589**	(0.035)	**-0.688**	(0.050)	**-0.694**	(0.050)	**-0.351**	(0.160)	**-0.286**	(0.183)	**-0.445**	(0.212)	-0.333	(0.231)	-0.402	(0.228)	-0.441	(0.251)
Age64	**-0.494**	(0.089)	**-0.523**	(0.074)	**-0.651**	(0.058)	**-0.641**	(0.068)	**-0.427**	(0.148)	**-0.371**	(0.169)	**-0.461**	(0.203)	-0.361	(0.224)	**-0.461**	(0.247)	-0.462	(0.282)
Demographic variables																				
Secondary education	**0.170**	(0.054)	**0.164**	(0.056)	**0.103**	(0.044)	**0.085**	(0.045)	0.032	(0.070)	0.023	(0.069)	-0.005	(0.038)	-0.010	(0.039)	0.055	(0.057)	0.028	(0.057)
Higher education	**0.287**	(0.064)	**0.277**	(0.066)	**0.111**	(0.046)	**0.116**	(0.046)	0.077	(0.067)	0.051	(0.075)	0.039	(0.031)	0.022	(0.031)	0.087	(0.053)	0.049	(0.052)
Children	0.024	(0.025)	0.030	(0.025)	0.037	(0.021)	0.039	(0.021)	0.014	(0.022)	0.011	(0.022)	**0.048**	(0.022)	**0.045**	(0.021)	0.014	(0.026)	0.010	(0.025)
Couple	0.099	(0.084)	0.099	(0.085)	0.097	(0.070)	0.053	(0.069)	0.072	(0.078)	0.078	(0.078)	**0.122**	(0.048)	**0.115**	(0.049)	-0.030	(0.059)	-0.009	(0.057)
Health related variables																				
Self-reported health	0.058	(0.053)	0.052	(0.060)	**0.341**	(0.053)	**0.301**	(0.063)	**0.206**	(0.056)	0.025	(0.067)	**0.190**	(0.041)	**0.117**	(0.041)	**0.334**	(0.110)	**0.283**	(0.136)
Severe condition			-0.049	(0.077)			0.025	(0.052)			**-0.242**	(0.087)			-0.029	(0.038)			-0.003	(0.077)
Mild condition			-0.007	(0.052)			0.000	(0.043)			0.017	(0.056)			0.012	(0.029)			-0.005	(0.050)
(I)ADL			0.025	(0.057)			0.017	(0.050)			**-0.254**	(0.065)			**-0.139**	(0.042)			0.049	(0.060)
Obese			-0.128	(0.065)			-0.033	(0.064)			-0.047	(0.067)			-0.020	(0.039)			-0.038	(0.074)
Grip strength			-0.015	(0.027)			**0.052**	(0.021)			0.013	(0.027)			**0.032**	(0.015)			0.042	(0.029)
Bad mental health			-0.017	(0.066)			**-0.199**	(0.069)			-0.006	(0.077)			-0.026	(0.050)			-0.262	(0.139)
Wald test statistic			5.1				**17.0**				**33.3**				**25.2**				6.7	
Observations	517		517		709		709		412		412		670		670		181		181	
Pseudo R squared	0.217		0.225		0.320		0.338		0.198		0.263		0.167		0.202		0.189		0.233	

Table 9: Marginal effects men. Part 2
Note: Bold entries are significant at the five percent significance level

	Austria				Belgium				Denmark				France				Germany				Greece			
	Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2	
	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.
Age dummies																								
Age51	0.006	(0.136)	0.012	(0.138)	-0.032	(0.083)	-0.023	(0.088)	0.027	(0.149)	0.058	(0.143)	0.103	(0.131)	0.072	(0.135)	0.079	(0.109)	0.079	(0.109)	-0.081	(0.077)	-0.073	(0.079)
Age52	-0.051	(0.117)	-0.048	(0.116)	0.030	(0.094)	0.026	(0.097)	-0.191	(0.185)	-0.146	(0.194)	-0.056	(0.142)	-0.127	(0.136)	0.152	(0.109)	0.148	(0.110)	0.075	(0.098)	0.092	(0.101)
Age53	-0.151	(0.088)	-0.153	(0.088)	-0.135	(0.075)	-0.132	(0.075)	-0.083	(0.160)	-0.023	(0.162)	-0.098	(0.124)	-0.158	(0.118)	0.181	(0.102)	0.183	(0.102)	0.050	(0.096)	0.070	(0.101)
Age54	0.057	(0.152)	0.061	(0.156)	**-0.201**	(0.057)	**-0.192**	(0.060)	0.173	(0.115)	0.191	(0.102)	-0.048	(0.143)	-0.027	(0.149)	0.159	(0.104)	0.157	(0.104)	-0.113	(0.068)	-0.108	(0.070)
Age55	**-0.219**	(0.065)	**-0.215**	(0.066)	**-0.221**	(0.055)	**-0.206**	(0.059)	-0.003	(0.165)	0.017	(0.169)	0.040	(0.136)	0.003	(0.135)	0.102	(0.111)	0.118	(0.108)	**-0.209**	(0.054)	**-0.205**	(0.055)
Age56	-0.071	(0.108)	-0.054	(0.113)	**-0.241**	(0.051)	**-0.215**	(0.058)	0.014	(0.149)	0.041	(0.151)	-0.155	(0.125)	-0.192	(0.124)	-0.115	(0.115)	-0.123	(0.114)	-0.136	(0.074)	-0.132	(0.074)
Age57	**-0.256**	(0.054)	**-0.251**	(0.056)	**-0.329**	(0.033)	**-0.313**	(0.037)	-0.104	(0.173)	-0.017	(0.170)	-0.125	(0.123)	-0.195	(0.118)	-0.119	(0.119)	-0.104	(0.120)	0.015	(0.112)	0.033	(0.118)
Age58	**-0.249**	(0.057)	**-0.235**	(0.063)	**-0.309**	(0.037)	**-0.295**	(0.041)	-0.261	(0.173)	-0.199	(0.191)	**-0.290**	(0.100)	**-0.328**	(0.093)	-0.124	(0.121)	-0.123	(0.122)	0.018	(0.100)	0.037	(0.104)
Age59	**-0.305**	(0.036)	**-0.302**	(0.038)	**-0.279**	(0.043)	**-0.255**	(0.051)	**-0.370**	(0.152)	**-0.346**	(0.172)	**-0.314**	(0.109)	**-0.330**	(0.103)	-0.107	(0.124)	-0.113	(0.124)	-0.121	(0.094)	-0.114	(0.097)
Age60	**-0.340**	(0.034)	**-0.339**	(0.035)	**-0.363**	(0.024)	**-0.354**	(0.025)	**-0.432**	(0.148)	**-0.397**	(0.173)	**-0.404**	(0.086)	**-0.442**	(0.067)	**-0.331**	(0.092)	**-0.322**	(0.094)	**-0.191**	(0.060)	**-0.185**	(0.062)
Age61	**-0.287**	(0.042)	**-0.287**	(0.042)	**-0.337**	(0.030)	**-0.322**	(0.033)	**-0.592**	(0.105)	**-0.577**	(0.125)	**-0.475**	(0.059)	**-0.499**	(0.048)	**-0.380**	(0.084)	**-0.377**	(0.085)	**-0.175**	(0.069)	**-0.158**	(0.077)
Age62	**-0.345**	(0.034)	**-0.340**	(0.035)	**-0.345**	(0.027)	**-0.331**	(0.030)	**-0.581**	(0.112)	**-0.573**	(0.128)	**-0.532**	(0.033)	**-0.532**	(0.031)	**-0.366**	(0.088)	**-0.359**	(0.090)	-0.108	(0.094)	-0.083	(0.104)
Age63	**-0.345**	(0.031)	**-0.342**	(0.031)	**-0.377**	(0.021)	**-0.369**	(0.021)	**-0.581**	(0.113)	**-0.567**	(0.130)	**-0.515**	(0.034)	**-0.520**	(0.030)	**-0.395**	(0.082)	**-0.387**	(0.085)	**-0.264**	(0.040)	**-0.264**	(0.039)
Age64	**-0.380**	(0.031)	**-0.375**	(0.032)					**-0.610**	(0.099)	**-0.579**	(0.126)	**-0.526**	(0.040)	**-0.535**	(0.034)	**-0.536**	(0.047)	**-0.535**	(0.049)	**-0.281**	(0.032)	**-0.275**	(0.035)
Demographic variables																								
Secondary education	0.074	(0.057)	0.080	(0.058)	0.020	(0.045)	0.007	(0.046)	0.114	(0.064)	0.096	(0.065)	-0.018	(0.064)	-0.046	(0.067)	0.080	(0.061)	0.073	(0.061)	-0.017	(0.047)	-0.015	(0.047)
Higher education	**0.317**	(0.074)	**0.317**	(0.075)	**0.214**	(0.051)	**0.190**	(0.051)	**0.311**	(0.059)	**0.298**	(0.062)	0.135	(0.070)	0.124	(0.071)	**0.178**	(0.063)	**0.168**	(0.064)	**0.231**	(0.062)	**0.227**	(0.063)
Children	-0.016	(0.028)	-0.018	(0.028)	-0.012	(0.023)	-0.008	(0.023)	0.032	(0.063)	0.040	(0.069)	**-0.064**	(0.027)	**-0.070**	(0.028)	-0.003	(0.028)	0.000	(0.028)	-0.011	(0.021)	-0.014	(0.021)
Couple	**-0.110**	(0.054)	**-0.112**	(0.054)	-0.017	(0.048)	-0.022	(0.048)	0.008	(0.059)	0.004	(0.060)	**-0.167**	(0.059)	**-0.235**	(0.061)	-0.087	(0.053)	-0.094	(0.054)	**-0.177**	(0.049)	**-0.175**	(0.049)
Health related variables																								
Self-reported health	**0.116**	(0.051)	**0.119**	(0.060)	**0.166**	(0.040)	**0.108**	(0.052)	**0.285**	(0.066)	0.155	(0.081)	**0.130**	(0.063)	0.058	(0.071)	**0.150**	(0.043)	**0.111**	(0.050)	**0.128**	(0.043)	**0.131**	(0.046)
Severe condition			-0.087	(0.068)			-0.060	(0.054)			-0.143	(0.077)			**-0.292**	(0.080)			-0.043	(0.065)			0.096	(0.098)
Mild condition			-0.018	(0.052)			-0.038	(0.043)			-0.007	(0.059)			-0.049	(0.065)			-0.053	(0.044)			-0.065	(0.046)
(I)ADL			0.023	(0.054)			-0.017	(0.044)			-0.035	(0.062)			0.069	(0.063)			-0.062	(0.044)			0.025	(0.043)
Obese			0.010	(0.063)			-0.038	(0.050)			0.087	(0.072)			**-0.151**	(0.075)			0.026	(0.058)			0.046	(0.052)
Grip strength			0.019	(0.026)			**0.075**	(0.022)			0.083	(0.030)			0.020	(0.031)			-0.033	(0.021)			0.028	(0.022)
Bad mental health			0.086	(0.067)			0.014	(0.048)			**-0.145**	(0.076)			**-0.154**	(0.059)			-0.011	(0.055)			-0.015	(0.048)
Wald test statistic			2.5				**17.0**				**16.3**				**20.9**				6.2				6.4	
Observations			475				735				434				427				776				552	
Pseudo R squared	0.274		0.279		0.213		0.231		0.326		0.360		0.213		0.247		0.221		0.226		0.149		0.158	

Table 10: Marginal effects women. Part 1
Note: Bold entries are significant at the five percent significance level

	Italy				Netherlands				Spain				Sweden				Switzerland					
	Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2		Specification 1		Specification 2			
	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.	Marg. eff.	St. err.		
Age dummies																						
Age51	0.045	(0.097)	0.047	(0.098)	0.095	(0.107)	0.121	(0.110)	-0.088	(0.097)	-0.102	(0.096)	0.097	(0.068)	0.093	(0.064)	-0.032	(0.186)	-0.018	(0.187)		
Age52	0.050	(0.101)	0.048	(0.101)	0.093	(0.106)	0.085	(0.109)	-0.123	(0.089)	-0.131	(0.088)	-0.078	(0.106)	-0.096	(0.110)	-0.298	(0.185)	-0.251	(0.194)		
Age53	0.033	(0.098)	0.028	(0.098)	-0.027	(0.095)	0.014	(0.100)	-0.104	(0.091)	-0.096	(0.093)	0.032	(0.083)	0.031	(0.084)	-0.018	(0.164)	-0.051	(0.175)		
Age54	-0.061	(0.072)	-0.060	(0.073)	0.029	(0.106)	0.036	(0.109)	-0.159	(0.084)	-0.169	(0.080)	0.030	(0.078)	0.017	(0.077)	-0.111	(0.158)	-0.095	(0.170)		
Age55	-0.019	(0.082)	-0.016	(0.085)	-0.030	(0.101)	0.006	(0.104)	-0.013	(0.105)	-0.027	(0.107)	-0.039	(0.097)	-0.030	(0.093)	0.008	(0.217)	-0.061	(0.243)		
Age56	**-0.154**	(0.046)	**-0.148**	(0.048)	-0.040	(0.096)	-0.003	(0.099)	**-0.213**	(0.073)	**-0.210**	(0.073)	0.057	(0.077)	0.050	(0.076)	-0.267	(0.197)	-0.303	(0.186)		
Age57	**-0.130**	(0.053)	**-0.123**	(0.056)	0.009	(0.098)	0.054	(0.102)	-0.164	(0.085)	-0.160	(0.086)	0.019	(0.082)	0.024	(0.078)	-0.322	(0.186)	**-0.377**	(0.194)		
Age58	-0.108	(0.059)	-0.105	(0.060)	-0.140	(0.093)	-0.124	(0.096)	-0.106	(0.098)	-0.104	(0.103)	-0.079	(0.100)	-0.072	(0.094)	-0.362	(0.178)	-0.283	(0.199)		
Age59	**-0.141**	(0.051)	**-0.139**	(0.051)	-0.118	(0.099)	-0.060	(0.107)	-0.101	(0.095)	-0.074	(0.103)	-0.038	(0.088)	-0.033	(0.085)	-0.210	(0.174)	-0.138	(0.184)		
Age60	**-0.235**	(0.024)	**-0.230**	(0.024)	**-0.347**	(0.059)	**-0.331**	(0.063)	-0.137	(0.095)	-0.125	(0.098)	0.024	(0.086)	-0.003	(0.089)	**-0.418**	(0.151)	**-0.353**	(0.170)		
Age61	**-0.201**	(0.031)	**-0.197**	(0.032)	**-0.333**	(0.063)	**-0.304**	(0.070)	**-0.267**	(0.061)	**-0.254**	(0.065)	**-0.234**	(0.107)	**-0.207**	(0.105)	**-0.404**	(0.176)	**-0.377**	(0.190)		
Age62	**-0.221**	(0.025)	**-0.216**	(0.026)	**-0.288**	(0.074)	**-0.259**	(0.082)	**-0.338**	(0.040)	**-0.329**	(0.043)	-0.106	(0.108)	-0.109	(0.108)	**-0.362**	(0.181)	-0.218	(0.212)		
Age63	**-0.211**	(0.027)	**-0.205**	(0.029)	**-0.421**	(0.037)	**-0.405**	(0.042)	-0.160	(0.095)	-0.151	(0.098)	**-0.322**	(0.121)	**-0.338**	(0.119)	**-0.610**	(0.120)	**-0.563**	(0.158)		
Age64	**-0.227**	(0.028)	**-0.223**	(0.029)	**-0.356**	(0.059)	**-0.327**	(0.070)	**-0.332**	(0.046)	**-0.328**	(0.048)	**-0.399**	(0.119)	**-0.387**	(0.122)	**-0.602**	(0.111)	**-0.543**	(0.150)		
Demographic variables																						
Secondary education	**0.185**	(0.046)	**0.180**	(0.047)	**0.129**	(0.048)	**0.114**	(0.048)	**0.205**	(0.070)	**0.200**	(0.071)	0.064	(0.035)	**0.067**	(0.034)	0.121	(0.068)	0.069	(0.076)		
Higher education	**0.457**	(0.069)	**0.456**	(0.069)	**0.305**	(0.045)	**0.286**	(0.047)	**0.353**	(0.079)	**0.321**	(0.083)	**0.100**	(0.032)	**0.100**	(0.032)	**0.189**	(0.068)	**0.195**	(0.064)		
Children	**-0.034**	(0.016)	**-0.038**	(0.016)	0.013	(0.025)	0.013	(0.026)	0.010	(0.018)	0.015	(0.019)	0.006	(0.030)	0.004	(0.030)	**-0.070**	(0.033)	**-0.068**	(0.033)		
Couple	**-0.174**	(0.055)	**-0.171**	(0.055)	-0.071	(0.057)	-0.078	(0.058)	**-0.181**	(0.059)	**-0.192**	(0.060)	0.022	(0.043)	0.010	(0.041)	0.040	(0.073)	0.030	(0.074)		
Health related variables																						
Self-reported health	**0.107**	(0.034)	**0.077**	(0.039)	**0.184**	(0.042)	0.078	(0.053)	**0.171**	(0.044)	**0.146**	(0.054)	**0.266**	(0.037)	**0.137**	(0.041)	0.040	(0.092)	-0.039	(0.096)		
Severe condition			-0.037	(0.047)			-0.089	(0.053)			0.147	(0.079)			-0.066	(0.050)			0.146	(0.082)		
Mild condition			-0.050	(0.041)			-0.055	(0.042)			0.016	(0.052)			-0.026	(0.034)			-0.071	(0.071)		
(I)ADL			0.032	(0.038)			-0.082	(0.042)			-0.062	(0.053)			**-0.110**	(0.035)			-0.047	(0.082)		
Obese			**-0.082**	(0.041)			**-0.185**	(0.046)			-0.026	(0.051)			0.000	(0.041)			0.154	(0.080)		
Grip strength			0.025	(0.021)			**0.040**	(0.019)			**0.059**	(0.026)			**0.034**	(0.016)			**0.143**	(0.045)		
Bad mental health			0.007	(0.038)			0.024	(0.049)			0.029	(0.053)			**-0.117**	(0.041)			0.102	(0.072)		
Wald test statistic			7.3				**32.7**				9.8				**33.0**				**21.0**			
Observations			688				835				559				794				238			
Pseudo R squared	0.239		0.248		0.175		0.202		0.152		0.167		0.167		0.205		0.138		0.196			

Table 11: Marginal effects women. Part 2
Note: Bold entries are significant at the five percent significance level