6 Work and Retirement

Editor: Agar Brugiavini

6.1 Exits from the Labour Force ................................................................. 206
Agar Brugiavini, Giacomo Pasini, Franco Peracchi

6.2 Job Quality and Retirement Decisions ................................................. 215
Mario Schnalzenberger, Nicole Schmeevis, Rudolf Winter-Ebner, Martina Zweimüller

6.3 Public, Occupational and Individual Pension Coverage ..................... 222
Lisa Callegaro, Christina Benita Wilke

6.4 Changes in Health Status and Work Disability ..................................... 230
Axel Börsch-Supan

6.5 Dynamics of Volunteering ................................................................. 239
Karsten Hank, Marcel Erlinghagen

6.6 Retirement and Mental Health ............................................................. 247
Agar Brugiavini, Enrica Croda, Michael Dewey

6.7 Quality of Work and Well-being – The European Dimension ............ 255
Johannes Siegrist, Morten Wahrendorf

6.8 Caring for Parents and Employment of European Middle-Aged Women ................................................................. 263
Laura Crespo, Pedro Mira
6.1 Exits From the Labour Force

Agar Brugiavini, Giacomo Hausini, Franco Peracchi

This section describes the labour market activity of the elderly in the SHARE sample using both the cross-sectional and the longitudinal dimension of the survey. Although increasing the working lives of current and future cohorts is a priority in the European agenda, it is not entirely clear yet how retirement decisions are affected by the institutional setup in the different countries, in particular by social security and pension arrangements. In fact, while the available evidence suggests a direct relation between “unused labour capacity” and the incentives to retire early embedded in the social security and pension system (Gruber and Wise, 1999, 2004), other determinants of early retirement should also be considered, such as the health status of an individual. Because of its design, SHARE is especially suited to shed light on these issues.

Labour Force Participation in the 2006 Sample

Our analysis is based on the self-reported current economic status of the SHARE respondents. The survey distinguishes between six labour force states: working, unemployed, disabled, retired, homemaker and “other”. The question about labour market status is asked to all age-eligible individuals (including the first respondent’s spouse, irrespective of age).

Figure 1 presents the fraction of respondents aged 50+ who report themselves in the labour force (working or unemployed), retired or disabled, or in other conditions (homemaker and “other” in the original classification). A first striking result of Figure 1 is that in Austria, Italy and Poland, the fraction of retired men is much higher than in the other countries (above 60%). Overall, the percentage of people in the labour force is high in Sweden, Denmark, Switzerland and Czech Republic. As for gender differences, a general pattern is that the fraction of people who report to be in the labour force (employed or unemployed) is always higher for men than for women. This is partly true also for self-reported retired, although there are several exceptions. In Sweden, Denmark, Germany and Israel, for example, the differences by gender in the fraction of retirees are barely statistically significant, while in Poland and the Czech Republic the fraction of retired women is higher than that of retired men. The “other” category is especially important for women in Mediterranean countries (Italy, Spain, Greece) and in the Netherlands. In these countries, the “other” category contains a substantial fraction of women who report themselves as “homemaker” and have had limited or no labour market experience during their lifetime. These differences in labour market status across countries are likely to arise from differences in institutions and social norms.

Figure 2 presents the employment rate of people aged 50-64, by country and gender. We focus on individuals in this age group because, unlike older respondents in SHARE, they are likely to face important labour force participation decisions. The aim is to measure the fraction of people employed, but various definitions of employment are possible. Figure 2 considers three alternative definitions: the first definition (orange bar) is based on people who report themselves as employed or self-employed, the other two definitions are both based on (self-reported) usual hours of work per week. In particular, the second case (pink bar) corresponds to working fifteen hours or more per week while the third case (grey bar) corresponds to working a positive number of hours. Cross-country differences are little affected by the precise definition adopted: employment rates in this age group are lower for women than for men in all countries. Sweden and Switzerland stand out for the particularly...
high employment rate of both men and women. Employment rates are instead very low in Poland. Although cross-country differences may be partly driven by cohort and composition effects, the fact that we control for age by restricting attention to people aged 50-64 suggests that institutional features are important. As already mentioned, this age group largely consists of individuals whose labour force participation decisions are most likely affected by the generosity and eligibility rules of the social security and pension system.

Besides financial incentives and institutional rules, other determinants of early retirement should also be considered. Especially important is the health status of an individual. Figure 3 focuses on people aged 50-64 who are in the labour force, disabled or retired, and presents the distribution of current activity, by country. The top-left panel of the figure considers all individuals irrespective of their health, whereas the other three panels consider only “healthy people”. The top-right panel defines as healthy an individual who is “functioning”, i.e. does not have any limitation out of six activities of daily living, the bottom-left panel defines as healthy an individual with no symptoms, while the bottom-right panel defines as healthy an individual who reports no chronic diseases.

Figure 1 Labour Market Status by Gender

Note: Sample Size: Men = 15,227; Women = 18,266. Brackets on top of each bar represent 95% confidence intervals

Figure 2 Employment Rates by Gender

Note: Sample size: Men = 7635; Women = 9465. Brackets on top of each bar represent 95% confidence intervals
Comparing the various panels of Figure 3, it appears that people in good health tend to work more. However, there are significant differences both depending on the health definition and, given the same health definition, across countries. In particular, the fraction of people in good health who report themselves as fully retired is strikingly high in Austria and Poland. A comparison can be drawn between the different sub-samples and the full sample: there is little difference in employment rates between the full sample (top-left panel) and the sample in “good health” when good health is defined as absence of limitations (top-right panel). On the other hand, employment rates are approximately 5-10% higher when health is defined as absence of symptoms (bottom-left panel) or chronic diseases (bottom-right panel), suggesting that important differences emerge in the health measure to be used when studying labour market decisions. Interestingly, there is a non-negligible fraction of individuals who report themselves as disabled in Poland, Spain, the Netherlands and Denmark, but have no limitations in daily living activities (top-right panel). One explanation is that in these countries disability is used as a pathway to retirement. Of course, the relationship between labour market status and health may be more complex than it appears from our descriptive evidence, as retirement decisions depend in a complex way on pain perception and the number and type of limitations on activities of daily living.
Longitudinal Analysis: Labour Market Transitions

The dynamic features of the data can be studied by using both the 2004 and the 2006 SHARE samples. However, care is needed when interpreting the results because of the attrition problem: if the longitudinal sample is self-selected with respect to some dimension of interest, results may be biased. As an example, if only the healthy individuals remain in the sample, then the panel is no longer representative of the underlying population. A detailed discussion of the panel dimension of SHARE and of the potential attrition problems in the data can be found in the methodological chapters in Section 7 of the book. Because the panel SHARE sample provides information on the economic status of individuals two years apart, we can study the patterns of labour market transition over a two-year period. In what follows, we analyse three of these transitions, namely the transition out of the labour force, the transition out of employment, and the transition into retirement. Labour market participation, and its relation to incentives and health status, is intrinsically a dynamic problem. For example, because retirement decisions depend on health status, a worsening of health may be relevant. This is the issue tackled by the multivariate analysis at the end of this section. As already mentioned, retirement decisions also depend on the incentives that individuals face during their career, including eligibility conditions and benefits calculation rules. Table 1 contains the transition matrices for men and women aged 55-64, which is the age band where transitions are most likely. The labour force states considered are those of Figure 1, namely in the labour force, retired or disabled, and other. The rows and the columns of the table correspond to the labour market conditions in 2004 and 2006, respectively, and the entries to the fraction of people moving from one state in 2004 to the same or another state in 2006.

<table>
<thead>
<tr>
<th>LABOUR MARKET STATUS 2004</th>
<th>MEN</th>
<th>WOMEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>In labour force</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In labour force</td>
<td>1,157</td>
<td>465</td>
</tr>
<tr>
<td>Retired or disabled</td>
<td>29</td>
<td>1,244</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>1,192</td>
<td>1,719</td>
</tr>
</tbody>
</table>

Table 1 Transition Matrix, Self Reported Labour Market Status in 2004 and 2006

The fraction of people moving out of the labour force into disability or retirement is substantial: over a 2-year period 28% of the men and 23.8% of the women do so. A notable feature, highlighted by the column labelled “In labour force”, is that retirement is not a completely absorbing state: over a 2-year period, 2.2% both of men and women move back from retirement or disability into the labour force.

Figure 4 provides additional information on the transitions out of employment. Each bar represents the fraction of men and women employed in 2004 who are in any other state in
2006. There seems to be a stark heterogeneity in exit rates from employment, which range from 14% for Greek men to 61% for Austrian women. Moreover, there is no common pattern of gender differences across countries. Nevertheless, the small sample size in each country limits the statistical significance of these cross country differences.

Figure 5 illustrates the patterns of exit from employment, by country and gender. While men generally report moving into retirement, a substantial fraction of women reports moving into “homemaking”, especially in Switzerland, Belgium, the Netherlands, and the Mediterranean countries.
Further, as it also emerges from the first column of Table 1, individuals do not always move directly from employment into retirement. For example, a non-negligible fraction of Belgian and Swedish men move from employment into disability before ending up into retirement. While this may be driven by the incentives provided by the welfare state, the large fraction of transitions through unemployment in Germany and Spain (especially for men) cannot simply be considered as the result of individual choice. In the case of women, the homemaker category turns out to be important, although transiting through disability is still a choice, especially in Sweden.

In studying transitions out of employment, health also matters: Table 2 restricts attention to individuals working and in good health in 2004, and shows their labour market transitions, distinguishing by health status in 2006. Table 2 shows that health conditions are relevant in the dynamics of labour market choices: while 78.1% of people in good health in both 2004 and 2006 remain employed, this percentage falls to 72.0% if health deteriorates between 2004 and 2006.

<table>
<thead>
<tr>
<th>LABOUR MARKET STATUS 2004</th>
<th>LABOUR MARKET STATUS 2006</th>
<th>Retired from work</th>
<th>Employed or self employed</th>
<th>Unemployed</th>
<th>Permanently sick or disabled</th>
<th>Homemaker</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed or self-employed (good health in 2004 and 2006)</td>
<td>68</td>
<td>321</td>
<td>6</td>
<td>0</td>
<td>9</td>
<td>7</td>
<td>411</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td>16.5</td>
<td>78.1</td>
<td>1.5</td>
<td>0</td>
<td>2.2</td>
<td>1.7</td>
<td>100</td>
</tr>
<tr>
<td>Employed or self-employed (good health in 2004 and bad health in 2006)</td>
<td>102</td>
<td>373</td>
<td>12</td>
<td>6</td>
<td>15</td>
<td>10</td>
<td>518</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td>19.7</td>
<td>72.0</td>
<td>2.3</td>
<td>1.2</td>
<td>2.9</td>
<td>1.9</td>
<td>100</td>
</tr>
<tr>
<td>Total (good health in 2004)</td>
<td>170</td>
<td>694</td>
<td>18</td>
<td>6</td>
<td>24</td>
<td>17</td>
<td>929</td>
<td></td>
</tr>
<tr>
<td>Percentage</td>
<td></td>
<td>18.3</td>
<td>74.7</td>
<td>1.9</td>
<td>0.6</td>
<td>2.6</td>
<td>1.8</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 Transition Matrix: Employment and Health

To exemplify the role of health and the richness of the SHARE sample, we present a multivariate analysis of the determinants of the transition probabilities out of work. Figure 6 looks at the probability of leaving the labour force and reports the marginal effects obtained by a “probit regression”. Explanatory variables are: the health status in 2004 (measured by the number of chronic diseases), the difference between the number of chronic diseases in 2004 and 2006, “poor quality of work” in 2004, and a set of controls (age, gender, a self employment dummy, years of education, a full set of country dummies, and a dummy for the year of interview to account for different time effects). The interaction between the number of chronic diseases and the difference in the number of chronic diseases is also added. The marginal effects of health and of “poor quality of work” have the expected sign and are statistically significant. As for health, one additional chronic disease increases the probability of leaving the labour force by 3.5 percentage points. Further, the
dynamic effect of health is positive (i.e. a worsening of health implies a higher probability of leaving employment) and statistically significant: this result is in line with the intuition given in the previous section. The negative coefficient on the interaction is also as expected: the worse the initial health status, the less relevant is the effect of the change in health between 2004 and 2006.

**Interpreting Transitions**

The panel structure of SHARE helps us overcome, at least partially, the identification problems arising with cross-sectional data. The aim of this section is to isolate the age-profile of incentives a given cohort of individuals faces over its life cycle. In order to do so, we first use a simple “probit” model to estimate the cross-sectional probability of being out of the labour force conditional on age (from now on, CS probability). We then compare the age-profile of these CS probabilities with a set of generated steady-state probabilities of being out of the labour force (from now on, SS probability).

CS probabilities are the result of, amongst other things, cohort and age effects: they depend on the different pension and social welfare rules that each cohort faced during the lifetime. For example, the observed CS probability for the cohort who is currently 55 years old depends on the incentives to retire that its members faced at younger ages. The same is true for those who are currently 65 years old. The two cohorts faced different incentives due to the changes in the institutional and legislative setup. In particular, it is likely that those who are currently 65 years old found it easier to retire early and, therefore, it is likely that they had higher transition probabilities into retirement than those who are currently 55 years old.

SS probabilities are generated “as if” labour market transition probabilities were fixed at their 2006 values for an entire cohort. They are computed exactly as a demographer would compute life expectancy. In fact, instead of using the patterns of mortality experienced by a given cohort, life expectancy is based on the cross-sectional age-profile of mortality rates, thereby mixing age and cohort effects. Because of this, life expectancy does not represent a forecast of residual life length for people of a given cohort and would forecast a person’s residual life length only if mortality rates would remain fixed at their current level.

Thus, starting from the probability of being in the labour force for those aged 55 years in 2004, we recursively generate the age-profile of the SS probabilities for this cohort using the transition probabilities observed in 2006. As discussed by Deltas and Kim (2007), these
age-profiles are “reference probabilities”, not forecasts of future state probabilities. A comparison of the SS and the CS probabilities helps the researcher to draw inferences about the kind of social welfare a country is moving towards. For example, if the SS probability for a 60 year old male in a given country stays below the corresponding CS probability, then this would imply that the probability of being out of the labour force at age 60 is going to decline, provided that transition probabilities remain close to their current values. This can be interpreted as a tendency of the current pension system to favour labour force participation at older ages, compared to the regimes faced by previous cohorts. Vice versa, if the SS profile lies above the CS curve, social welfare in 2006 looks more “generous” than in the past, since it discourages labour force participation.

A cross country comparison of these differences gives us some insight into the effectiveness of different pension reforms. Figure 7 reports CS and SS probabilities of being out of the labour force for males in three SHARE countries, namely Denmark, Germany and Italy (since we are trying to isolate institutional differences, cross-country aggregation would be meaningless). Despite the social security reforms of the past decade, the current social welfare seems still generous towards males: if transition probabilities do not change in the future, the probability of being out of the labour force for either a Danish, a German or an Italian male is going to increase.

Conclusions

In this chapter we described the cross-sectional and longitudinal relation between labour force participation and health. Although those who are employed tend to be healthier on average, there are countries where a large fraction of retirees are in very good health. Moreover, the comparison of the cross-sectional and the steady-state probabilities of being out of labour force suggests that current institutional setups provide little incentives to labour force participation at older ages. This empirical evidence has important policy implications:

• The SHARE 2006 sample confirms the presence of a large “unused labour capacity”: across countries a significant fraction of individuals aged between 50 and 64 is out of the labour force despite their good health status. This may be a motive to revise the incentives to retire early embedded in social security and pension systems.
• Current institutional setups allow for several pathways to retirement and, at the same time, do not incentive to work at older ages. Thus, social security and pension reforms may take some time to exert the desired effects.

References
6.2 Job Quality and Retirement Decisions

Mario Schnalzenberger, Nicole Schneeweis, Rudolf Winter-Ebmer, Martina Zweimüller

Given the ongoing demographic transition caused by decreasing fertility rates and an increasing life expectancy, the currently high proportion of persons in some form of retirement in the age group 55-65 observed in most European countries is one of the major challenges to European policymakers in the 21st century. In order to design policies that increase the participation rates among those 55 years and older, policymakers should be aware of the factors that influence the decision to stop working or to retire. Past research has shown that macroeconomic and institutional conditions, such as the incentives created by the pension system have a strong influence on retirement decisions (Gruber and Wise, 1999; Sousa-Poza and Fischer, 2006). Furthermore, the decision to stop working is influenced by health conditions (Kalwij and Vermeulen, 2005), such as chronic illness or disability, and job quality. First results from SHARE 2004 have shown that there is a strong association between poor job quality and poor health (Siegrist et al., 2005), and that both, poor job quality and reduced well-being are positively related to the intention to retire (Siegrist et al., 2006). Therefore, job quality may have both a direct and an indirect effect – by affecting health – on the decision to stop working or to retire.

In this contribution we use data from SHARE 2004 and 2006 to explore the relationship between job quality and the decision to stop working or to retire. As job quality is a collective term for various working and employment conditions, such as the physical work load, the imposed work pressure, the incentive structure and the perceived job stability, we use three different approaches to measure it. Our first measure of job quality is an individual’s subjective overall job satisfaction, which is meant to capture all dimensions of job quality, but is not very operative from a policy perspective. Therefore, we use two additional measures of job quality that should be easier to manipulate and therefore more relevant for policymakers. The first one is whether an individual is overeducated, undereducated or adequately educated for the job he or she holds. Tsang et al. (1991) have shown that overeducated male workers are less satisfied in their job and have a higher intention to leave the firm. The second one is derived from the effort-reward imbalance model (Siegrist et al., 2004) and measures the imbalance between a worker’s effort and the rewards he or she receives in turn.

Sample and Methods

In SHARE 2004, 51 percent of all individuals between 50 and 64 were working. Since we are interested in whether job quality has an influence on the decision to stop working later on, we reduced the data set to those individuals. Of those 8259 persons, 4920 were reinterviewed in the 2006 wave and 4889 completed the questions on their employment status.

As shown in Figure 1, the majority of those working individuals was still working two years later. About 15 percent of women and 19 percent of men retired or partly retired between 2004 and 2006. Nearly 7 percent of the female workers changed their employment status to other destinations (more than 80 percent of which are homemakers).
Differences among European countries are highlighted in Figure 2. While more than 85% are still working in Greece, in Spain, Italy, Austria and Germany less than 70% are still classified as working. The retirement and partial retirement rates vary a lot between European countries. In Austria, Italy and Sweden, more than 20% switched to retirement and partial retirement. While most of them are fully retired in Austria (nearly 18% of all individuals), Swedes opt more often for partly retirement (nearly 20%). The Austrian workers seem to give up working immediately when they start receiving public pensions. This phenomenon might be explained by differences in the pension systems and especially regulations concerning the compatibility of work and claims for public pensions.
We are particularly interested in whether the characteristics of the jobs, people hold in 2004, have an influence on the decision to stop working two years later. Thus, the dependent variable in our estimations is a binary variable, indicating whether a person gave up his or her job. Partly retired people are at the same time working and getting public pensions, therefore they contribute on the one hand to a countries’ GDP but on the other hand they are costly to the welfare state. We thus define two retirement indicators where we first classify partly retired individuals as still working and second as not working anymore. 15 percent of all individuals gave up their job between 2004 and 2006 (excluding partly retired) and 26 percent when including partly retired.

In SHARE 2004, the individuals completed questions on their job including a subjective measure of job satisfaction (“All things considered, I am satisfied with my job”: strongly agree – agree – disagree – strongly disagree). Nearly all individuals (about 92 percent) state that they are either strongly satisfied or satisfied with their job. This variable is meant to capture all dimensions of job quality. Since this information can not be leveraged by policy makers, we use two further measures or job quality, first, whether people are adequately educated for the job they hold and second, whether the effort they put into their work is balanced with the rewards they finally get.

Based on country- and occupation-specific education information we constructed binary variables for over- and undereducation. Overeducation means that a person has undergone more years of education than the mean value (plus one standard deviation) in the one-digit ISCO group in a country. Accordingly, undereducation is defined as having more than one standard deviation less years of education than the mean in the corresponding group. This approach is based on the work of Verdugo and Turner Verdugo (1989). About 11 percent of our sample was overeducated and 12 percent undereducated for their job, with male workers being slightly more overeducated and female workers slightly more undereducated.

The effort-reward imbalance ratio (ERI), developed by Siegrist et al. (2004), consists of two effort related dimensions (physical demand and time pressure) and five reward measures (support, recognition, adequate earnings, advancement possibilities and job security). According to Siegrist et al. (2006), we calculated tertiles of the ratio for each country separately, where people located in the third tertile are characterized by high effort and rather low rewards. Figure 3 shows the positive association in country means of overall job satisfaction and over- and undereducation and effort–reward imbalance, respectively.
We use logit regressions to estimate the relation of job quality and the probability to stop working. Individuals are weighted and cluster robust standard errors are estimated, accounting for differences in the sampling probabilities and non-independent standard errors among individuals from the same household.

Beside job quality, the following control variables are included in our regressions: sex, married or having a partner, years of education, self reported health and a binary variable for any activity limitations in daily life. We include country dummies and 14 age dummies to account for the heterogeneity in legal regulations concerning the minimum age of (early) retirement in the different countries. Furthermore, since some of our independent variables...
are missing, we set these values to zero and include missing dummies in the regressions. The number of missing values is small and ranges from 0.02% to 4.8%.

**Results**

In Figures 4-6 we present our results for the influence of (bad) job quality on retirement. We only show here the results for the case where partial retirement is coded as still working. The results are given in an odds-ratio format and can be interpreted as follows: An odds ratio of 1 indicates that the event under study is equally likely in both groups. An odds ratio greater than 1 indicates that the event is more likely in the first group.

Figure 4 uses subjective job satisfaction as an indicator for job quality. For the full sample workers not satisfied with their job are twice as likely to retire within two years; those (in the minority) who were strongly dissatisfied with their job were even three times as likely to retire – as compared to those who are strongly satisfied and also to those who are satisfied with their current job. These results point toward a very strong influence of job quality on retirement. While the impact of dissatisfaction with the job is still more pronounced for male workers, female workers do not react so much to bad job quality: Odds ratios for the case of strong dissatisfaction are 4.2 for men and 2.3 for women. Still, it is remarkable, that female workers who are not fully satisfied with their jobs – they are only satisfied but not strongly satisfied – react with a 50 percent higher flight into retirement. This somewhat quicker reaction of females points toward a looser attachment to the workforce. Coding also partial retirement as “non-working” gives us very similar results, but numerically somewhat smaller effects.

In Figure 5 we use the prevalence of overeducation or undereducation as an indicator of bad job quality. It turns out that in the whole population overeducation leads to increased odds of early retirement: workers who have jobs requiring less education and training as the worker has acquired, quit into early retirement 40 percent more often than those with an adequate education. By contrast, undereducation does not increase the odds of (early) retirement. By gender, the results are somewhat mixed: whereas males suffer particularly from overeducation, there is no such reaction for females.

Finally, in Figure 6 we use the effort-reward imbalance ratio as an indicator of bad job quality. Individuals in the first tertile of the ERI ratio are those with disproportionally high rewards relative to the effort exerted. Contrary to expectations, the effort-reward imbalance has no significant relation to actual retirement.
Work and Retirement

Figure 4 Job satisfaction and retirement
Note: Base category: strongly agree to the question: “All things considered, I am satisfied with my job”

Figure 5 Over- and Under-education and Retirement
Note: Base category: adequately educated for the job

Figure 6 Effort-Reward Imbalance and Retirement
Note: Base category: 1st tertile ERI
Conclusions

- Job quality and the situation at the workplace can have important consequences for job satisfaction, which, in turn, can lead to premature quitting of the labor force and early retirement.
- We model job satisfaction with three different indicators and look at retirement behavior using SHARE 2004 and 2006.
- We find subjective overall job satisfaction to be the strongest predictor for early retirement, along with the fact, that the actual job is not challenging enough; i.e. the individual is overeducated for the position.

References


6.3 Public, Occupational and Individual Pension Coverage
Lisa Callegaro, Christina Benita Wilke

In Europe as well as in most of the industrialized world, ever-rising life expectancies paired with low fertility rates have led to an ongoing process of population ageing. In addition many countries have to cope with the large baby boom cohorts of the 1950s and 1960s that will drastically reduce the size of the labour force and increase the number of pensioners once these retire. As a consequence, during the last two decades, pension systems in Europe and worldwide have been subject to fundamental pension reform. In general, three main reform trends can be perceived: the increasing importance of supplementary private pension schemes as an answer to projected decreases in future public pensions, a trend away from traditional defined-benefit to defined-contribution systems and an effort to further extend social security coverage to the most “needy” parts of the population in order to better cope with poverty in old-age. In this article, we will focus on the first trend, the increasing role of supplementary pensions.

Pension systems can be described in pillars where the first pillar refers to the public pay-as-you-go system, the second pillar to private company pension schemes and the third pillar to private individual pensions. Public pension systems usually are mandatory and public and do not only provide old-age pensions but also disability and survivor pensions. Company pension schemes are usually voluntary, offered by the employer and are mostly capital-funded. Private individual pensions basically can be any kind of regular payments from some annuitized capital stock. The second and third pillar pensions are referred to as supplementary pensions.

While most public pay-as-you-go systems in Europe have universal coverage, coverage within the second and third pillar can vary immensely across countries and across demographic groups. This article looks at a) what differences in coverage rates can be found for selected European countries, b) which dynamics can be observed here for the most recent years and c) how these coverage rates differ across certain demographic groups. All these questions are of great importance for the current political debate in many European countries where the effects of alternative pension reform measures that lead to a stronger policy mix of the three pillars are still widely being discussed.

Measuring Pension Coverage

In the literature, the term pension coverage usually refers to the percentage of working individuals covered by and participating in a certain pension scheme. In this article, we use a broader definition of the term coverage in the sense that we do not only look at the pension claims of today’s working individuals and future pensioners but also at those of today’s pensioners.

In its section on employment and pensions (EP), the Survey of Health, Ageing and Retirement in Europe (SHARE) provides detailed information on individual pension coverage, both for existing pensioners and future retirees. We combine this data with selected demographic and socio-economic characteristics provided by the cover screen, the demographic module (DN) and the asset section (AS). All calculations are weighted with individual weights according to age and income. Even though there is additional information on income sources in other modules of SHARE, such as the household section (HH), we do not use this data as our analysis is based on individual variables only. In SHARE, all individual information is derived from separate interviews with each eligible person in the
Pension Coverage Across Countries and Dynamics Among Today’s Pensioners

We begin our analysis with a description of the coverage situation of today’s pensioners. We define a pensioner as a person who responds to be retired from work (EP005=1) and who receives at least one pension from one of the three pillars.

Pensioners are covered by the first pillar if they receive an old-age pension, an early retirement pension and/or a survivor pension. Persons who receive some kind of disability pension or unemployment benefits and consider themselves to be retired are also included in this category. In many countries such as Sweden, Germany, the Czech Republic and Spain, these last two benefit types have been extensively used as an alternative pathway to retirement and can thus be regarded as a substitute for early or pre-retirement pensions.

Pensioners who receive some kind of company pension are covered by the second pillar. Covered by the third pillar are all pensioners who receive regular life insurance payments, regular private annuity and/or private personal pension payments. Figure 1 shows the pension coverage rates for all three pillars across countries separately for SHARE 2004 and SHARE 2006.

First, if we look at the first pillar we can see a very homogenous picture across countries. In most SHARE countries, more than 90 percent of the pensioners receive some kind of public pension with the only exception of the Netherlands, Switzerland and Israel where it’s only around 85-86 percent. One explanation could be that some respondents do not perceive the public base pension in these countries as a pension but rather as a kind of social assistance (see OSE 2004). The pattern for first pillar coverage has not changed significantly across the two SHARE waves.

For the second pillar the picture is a totally different one. Here, large differences can be found among countries. While in Sweden, the Netherlands and Switzerland at least half of the pensioners received a company pension in 2006, coverage was less than 10 percent in most of the remaining SHARE countries except for Denmark, Germany and Israel where it was between 20 and 40 percent. Studies for the OECD showed comparable figures of around 50 percent for the Netherlands and 21 percent for Germany (see Whitehouse,
studies for the EU partly found higher rates, e.g. around 20 percent for Belgium (European Commission, 2006). Some countries such as Spain may show comparably low company coverage rates since pensioners choose a lump sum payment instead of a regular pension income at the point of retirement. Both second and third pension pillars are not well developed in Poland and in Czech Republic (below the 5 percent level). In Poland, on March 2004, the Parliament adopted two new acts concerning company and individual level pension programmes. In both cases the main ambition was to increase the importance of supplementary and voluntary schemes. France is a special case. The relevant dichotomy is not between public and private pensions, but between basic and complementary pensions: the former are generally co-managed by the State and social partners, the latter are organised on a professional basis, exclusively managed by social partners, but both forms of pensions are considered as public. The second and third pillars are represented by supplementary and voluntary funded schemes planed at the company level.

Across the two waves, almost all countries show some dynamics of increasing company pension coverage. However, most of these dynamics are due to a change in the corresponding question between the two waves. A panel analysis on pensioners in SHARE 2004 and 2006 shows that true increases in company pension coverage over the past three years can only be found for Germany and Switzerland. Indeed, a major pension reform in Germany in 2001 has spurred company pension coverage ever since.

Last, individual pensions seem to play only a minor role for today’s pensioners anywhere in the SHARE countries. With the exception of Sweden and Denmark where roughly 20 and around 16 percent of the pensioners, respectively, receive an individual pension, coverage rates in all other SHARE countries are below 10 percent.
Pension Coverage Across Countries Among Tomorrow’s Pensioners

We will now turn to the coverage situation of future pensioners that is today’s working population. We consider employed, self-employed and unemployed individuals as well as civil servants. Figure 2 shows the coverage rates for all three pillars for the 2006 wave. Note that for the third pillar, we only have information on participation in individual retirement accounts and therefore cannot account for life insurance claims that could be turned into an annuity at retirement.

Figure 2 Pension coverage of future pensioners across countries (SHARE 2006) Sample size 8,179. Weighted observations.

In all SHARE countries, it can be seen that coverage rates of both second and third pillar pensions are considerably higher among future pensioners than they were for today’s pensioners. For the second pillar, Sweden and the Netherlands again show the highest coverage rates (participation in the second pillar has become mandatory in Sweden with the 2000 pension reform), followed by Denmark and Switzerland (all above 70 percent). Israel follows the Northern Countries’ trend with a rate around 60 percent. For Germany, Belgium and Italy, company pension coverage of the working population is between 20 and 30 percent. These rates are low compared to recent figures by the European Commission that report 46 percent for Germany and between 40 and 45 percent for Belgium (see European Commission, 2006). However, this can be explained by the fact that SHARE only covers the population 50+ and thus only captures the older part of the working force.

The importance of the third pillar for future pensioners compared to that for today’s pensioners increases largely across all SHARE countries except Greece. Sweden, Denmark, Germany, the Netherlands, Belgium, Poland and Austria all record coverage rates above 40 percent, Switzerland and the Czech Republic above 30 percent. These figures seem roughly in line with recent EU data (e.g. 40 percent for Sweden, see again European Commission, 2006) even though figures on individual pension coverage can vary greatly depending on the underlying definition of the third pillar. For Poland and the Czech Republic, coverage of the second pillar for future pensioners – as for existing pensioners – is basically nonexistent.
Portfolio Composition Across the Three Pension Pillars

Before we look at some selected demographic characteristics of recipients of second and third pillar pensions, we want to find out whether these pensioners are separate groups or largely overlap.

Table 1 shows the pension portfolio composition of all persons who reported to be pensioners in the 2006 wave. In 2006, 12,498 persons received only a public pension, 383 only a company and 26 only an individual pension. 328 persons received pensions from all three pillars and 807 persons did not receive a pension from any of the three pillars. Of those who received a public pension, roughly 17 percent also received a company pension and barely 5 percent an additional individual pension. Only 2 percent of all persons and 10 percent of pensioners with at least one supplementary pension received both forms of supplementary pensions (company and individual pensions).

Thus, even though there is some overlapping, pensioners with a company and pensioners with an individual pension can be considered as two separate groups.

<table>
<thead>
<tr>
<th>Participant in 1st pillar</th>
<th>Participant in 2nd pillar</th>
<th>Participant in 3rd pillar</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No</td>
<td>807</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>383</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>328</td>
</tr>
</tbody>
</table>

Table 1 Pension portfolio composition of today's pensioners (SHARE 2006)

Company and Private Pension Coverage Across Ages

Company as well as private pension coverage rates seem to follow an inverted-u-shaped pattern across age groups among today’s pensioners, see Figure 3. While the fact that older pensioners are less covered could be explained by the rising trend towards supplementary pension coverage during the last two decades, it is somewhat striking that younger pensioners also seem to be covered less than pensioners from age 65 on. One explanation could be that among the younger pensioners the share of those receiving disability pensions or unemployment benefits as a kind of early retirement pension is larger and the recipients of these benefit types are less likely to engage into a second or third pillar private pension arrangement. Another explanation could be that the younger pensioners are not yet drawing on their company or private pensions.

However, this European-wide pattern does not apply to all SHARE countries equally. For second pillar coverage, the Netherlands and Belgium show the quasi opposite pattern where the relatively young and old pensioners respectively are better covered by supplementary pension schemes. This pattern seems difficult to explain. For Switzerland, France, Spain and Greece company pension coverage rates among pensioners decrease with age as expected. Regarding individual pension coverage, patterns across countries are more similar, but often on such low levels that a direct comparison of patterns seems difficult.
Still, it can be seen that coverage of supplementary pension schemes varies greatly across ages. Younger pensioners in general are more likely to receive a second or third pillar pension than older pensioners.

Is There a Gender Gap in Company or Private Pension Coverage?

Figure 4 shows company and individual pension coverage rates, according to gender. For company pension coverage among today’s pensioners, there clearly is a gender gap in SHARE countries with considerable participation. Men are more likely to receive a supplementary pension than women. In the Netherlands as well in Switzerland almost twice as much male as female pensioners received company pension payments, for Germany this ratio is roughly the same. For Sweden, in contrast, the ratio seems to be the same among male and female pensioners. For individual pensions, no significant differences between coverage rates of male and female pensioners can be found in most SHARE countries.
Once looking at future pensioners, this picture changes greatly. There seems to remain hardly any gender gap neither within the second nor within the third pillar and this despite the enormous increases in individual pension coverage rates in almost all SHARE countries for future retirees.

The Role of Gender and Education in Company and Private Pension Coverage

Table 2 shows the share of today’s and tomorrow’s pensioners respectively of the second and third pillar both by gender and education group. First, both for men and women and both for existing and future pensions, coverage rates are highest for the highly educated and lowest for the less educated. If one looks to education as a proxy for income, this means that individuals with a higher income during their career are better covered by supplementary pension schemes than low-income earners.

<table>
<thead>
<tr>
<th>Today’s pensioners</th>
<th>Primary</th>
<th>Secondary</th>
<th>Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Man</td>
<td>Woman</td>
<td>Man</td>
</tr>
<tr>
<td>2nd pillar</td>
<td>10.83</td>
<td>8.17</td>
<td>22.26</td>
</tr>
<tr>
<td>3rd pillar</td>
<td>1.76</td>
<td>2.76</td>
<td>2.84</td>
</tr>
<tr>
<td>Obs. tot</td>
<td>1,789</td>
<td>1,902</td>
<td>1,320</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Future pensioners</th>
<th>Primary</th>
<th>Secondary</th>
<th>Tertiary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Man</td>
<td>Woman</td>
<td>Man</td>
</tr>
<tr>
<td>2nd pillar</td>
<td>24.93</td>
<td>30.20</td>
<td>32.98</td>
</tr>
<tr>
<td>3rd pillar</td>
<td>23.39</td>
<td>27.49</td>
<td>41.44</td>
</tr>
<tr>
<td>Obs. tot</td>
<td>1,246</td>
<td>1,176</td>
<td>1,662</td>
</tr>
</tbody>
</table>

*Table 2* Share of pensioners of 2nd and 3rd pillar by gender and education group (in %)

Note: We purge age effects considering today’s recipients with age between 55 and 70 (SHARE 2006)

Second, the gender gap for second pillar coverage of today’s pensioners clearly shows within each education group. Similarly, the vanishing of this gap for future retirees also seems to apply equally to all education groups. Thus, while the gender gap seems to vanish for future retirees, differences among education groups in supplementary coverage rates seem to persist. These findings are basically true for all SHARE countries.

Conclusions

Supplementary pension schemes

- are still more spread in the Northern European SHARE countries,
- are in most countries more common among younger and future pensioners,
- still generally imply a gender gap (at least for the second pillar) among today’s pensioners while this gap quasi vanishes for future retirees, and
- are still more common among the higher educated.

The degree at which countries allow for a policy mix of the three pillars still varies greatly in the European SHARE countries. Here, the SHARE data provides a unique opportunity to better understand how different demographic groups would be affected by certain reforms and which incentives could be set.
In this chapter we focused solely on coverage rates of the three pension pillars. Two issues will be addressed in later research. First, coverage does not necessarily reflect the income situation in old-age. The SHARE dataset with its detailed section on earnings and pensions will allow a thorough analysis of this topic. Second, pension issues always relate to a life-course-perspective. Thus, more waves of SHARE data are needed for deeper insights in this field.

References
6.4 Changes in Health Status and Work Disability
Axel Börsch-Supan

One of the great advantages of the SHARE data is the combination of very detailed data on health and equally detailed data on employment status. This permits innovative analyses of the bi-directional interaction between health and employment: deteriorating physical and mental health precipitates early retirement; on the other hand, having a place in life and doing a good job appears to be a source of subjective and objective good health. From a societal point of view, maintaining good health, e.g., through prevention, is an investment in employability; preventing work disability may offset, through the additional labour income, part of the costs associated with the health care system.

A second advantage of the SHARE data is their cross-national breadth, reflecting the different health and employment institutions in 15 countries. In the midst of the intersection of health and employment institutions is the disability insurance, the insurance against the loss of the ability to work due to health reasons. The SHARE data are ideal to study transitions between employment and work disability, to understand the causes for such transitions, and to explore the effects of the different health and employment institutions in the 15 SHARE countries on transitions from employment to work disability.

In an earlier analysis (Börsch-Supan, 2005), we have shown that there is a striking variation across European countries in the number of persons who receive disability insurance benefits. Figure 1 augments these earlier findings with new SHARE data collected after 2004, and merges data from the British and American sister surveys, ELSA and HRS:

![Disability insurance enrolment in Europe, 2004](image)

**Figure 1** Disability insurance enrolment in Europe, 2004

Figure 1 and the data in this paper are based on comparable definitions of disability insurance institutions, see Box 1. Nevertheless, disability insurance take-up various enormously between the very high enrolment rates in Denmark, Sweden and the Netherlands (between 14 and 16 percent of individuals aged between 50 and 65, the age group in which disability insurance may serve as an early retirement device) and rather low rates in Austria and Greece where less than 3 percent of individuals in this age group receive disability insurance benefits.
Changes in Health Status and Work Disability

<table>
<thead>
<tr>
<th>Country</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria (AT)</td>
<td>Staatliche Invaliditätspension</td>
</tr>
<tr>
<td>Belgium (BE)</td>
<td>Assurance invalidité légale/Wettelijke uitkering wegens arbeidsongevallen of beroepsziekte/Pension de maladie, d’invalidité, maladie professionnelle/Wettelijke uitkering wegens ziekte of invaliditeit of tegemoetkoming aan personen met een handicap</td>
</tr>
<tr>
<td>Denmark (DK)</td>
<td>Offentlig sygedagpenge, offentlig förtidspension</td>
</tr>
<tr>
<td>England (UK)</td>
<td>Incapacity benefits</td>
</tr>
<tr>
<td>France (FR)</td>
<td>Prestation publique d’invalideité</td>
</tr>
<tr>
<td>Germany (DE)</td>
<td>Erwerbsminderungsrente, Beamtenpension wegen Dienstunfähigkeit</td>
</tr>
<tr>
<td>Greece (GR)</td>
<td>Σύνταξη αναπηρίας</td>
</tr>
<tr>
<td>Italy (IT)</td>
<td>Assicurazione pubblica di disabilità (anche assegno di accompagnamento), pensione pubblica di invalidità o di inabilità</td>
</tr>
<tr>
<td>Netherlands (NL)</td>
<td>Waz of invaliditeitspensioen, algemene bijstandswet, aanvullende bijstandsuitkering, toeslagenwet</td>
</tr>
<tr>
<td>Spain (ES)</td>
<td>Pensión pública contributiva y no contributiva de invalidez/incapacidad</td>
</tr>
<tr>
<td>Sweden (SE)</td>
<td>Förtidspension (sjukersättning), yrkesskadepension, sjukbidrag</td>
</tr>
<tr>
<td>Switzerland (CH)</td>
<td>Invalidenrente aus IV/assurance invalidité légale/Rendità invalidità</td>
</tr>
<tr>
<td>United States (US)</td>
<td>SSDI and SSI disability pensions</td>
</tr>
</tbody>
</table>

Box 1 Disability Insurance in Europe and the United States

Cross-National Differences in Disability Insurance and Health

A thorough understanding why these strikingly different enrolment rates have emerged is of obvious policy relevance. Did preventive health policies fail in the high-enrolment countries and generate high prevalence of work disability? What are the economic costs of work disability – the direct cost of disability insurance, but also the loss of employment? And, analogously to the widely quoted OECD and NBER studies by Blöndal and Scarpetta (1998) and Gruber and Wise (1999): have the complex institutional arrangements for early retirement (old-age pensions, special arrangements for older unemployed, and disability insurance) created incentives to claim work disability status even if health is reasonably good?

The earlier study by Börsch-Supan (2005) based on the first wave of SHARE data in 2004 could not explain the large cross-national differences in disability insurance take-up by equally large differences in health. As a matter of fact, the opposite could be shown: countries with high disability insurance enrolment – the Scandinavian countries and the Netherlands – had, on average, better health than the countries with low enrolment, e.g., in the Mediterranean South. Hence, differences in disability insurance take-up are even larger, once differential health has statistically been corrected for. This finding is reproduced with the additional countries in Figure 2.

It is based on a two-stage procedure. First, we exploit the richness of the SHARE data to relate individual disability insurance enrolment probabilities to age, gender and a broad set of health measures ranging from self-reported health to more objective measurements of the functional physical and mental health status. We then predict how enrolment rates would look like if age, gender and all health measures were equal across the 13 countries. If...
age, gender and health differences were the main cause to enrol in disability insurance, enrolment rates should be very similar after taking health and demographic differences out.

As one sees in Figure 2, this is not the case at all. This gives rise to the speculation that institutional differences, such as the generosity of disability insurance benefits and the ease by which one can obtain those, are more important determinants of disability insurance enrolment than failing physical or mental health.

Figure 2 Predicted disability insurance enrolment if age, gender and health status were identical in all countries
Note: Based on logistic regression of disability insurance enrolment on demographic and health variables

We continue our analysis in this paper by adding two further steps. First, we use another great advantage of the SHARE data, its emerging longitudinality, to follow individuals who were enrolled in disability insurance over time and observe their changing health status. We also look at the transitions between 2004 and 2006: Who became enrolled into disability insurance during those two years, and who exited from disability insurance? Secondly, rather than speculating about incentive effects exerted by the generosity of, and easy eligibility for, disability insurance benefits, we use new data merged to SHARE to actually prove that case.

Transitions
The longitudinal feature of SHARE gives insights in the dynamics of disability insurance enrolment. More than two thirds of the individuals who were enrolled in disability insurance in 2004/05 remained enrolled also in 2006/07. 28.4%, however, left disability insurance. What happened to these individuals? How many managed to return to work? How many transitioned into old-age pensions or other transfer programs?

In turn, about 4.3% of the individuals who were not enrolled in 2004/05 took up disability insurance two years later. What happened to those who newly enrolled? How many experienced a shock of bad health?

We will first look at those who left disability insurance, and then turn to the new entrants.
Exits from Disability Insurance

Only few individuals leaving disability insurance go back to the labour market: 13.6% are working and 1.7% actively seek work. The largest category consists of individuals who transit from disability insurance into old-age pensions (almost 43%). Another 31% remain sick or disabled and rely on family transfers. The remaining 11% are homemakers.

Figure 3 shows the distribution of those who left disability insurance.

Entries Into Disability Insurance

Of those who were not enrolled in disability insurance in the first wave of data, 4.3% took up disability insurance two years later. This percentage is an average over all involved SHARE countries. It was much higher in Sweden; also Austria, Greece, Switzerland and Belgium show significant increases, while France experienced a significant decline in disability insurance enrolment. Why did these individuals take up disability insurance?

Figure 4 depicts the relationship between disability insurance entrance and changes in self-rated help. Negative numbers represent a worsening of the self-assessed health status, positive numbers an improvement. There are, as one might expect, more individuals reporting a worsening of health who enter disability insurance. The differences between those who entered disability insurance, however, are not very large compared to those individuals who exited disability insurance: in both groups, the most frequent category is no change at all.

The influence of more objectively ascertained health measures is even weaker. Figure 5 displays the change in grip strength, a measure which has proven to be an excellent indicator of declining health. Negative numbers indicate weaker grip strength, positive numbers a tighter grip. The correlation is very weak, and only visible in the categories -5 and +3.
Figure 4: Disability insurance enrolment and changes in self-rated health.

Figure 5: Disability insurance enrolment and changes in grip strength.
A similarly weak association emerges from the EURO-D depression test:

![Graph showing disability insurance enrolment and changes in depression](image)

**Figure 6 Disability insurance enrolment and changes in depression**

A more formal multivariate analysis confirms the results of Figures 4-6. Self-assessed functional limitations and self-reported health have significant effects on new disability enrolment. Objective measures, however, such as a test for depression symptoms and the grip strength measure, do not contribute in explaining disability insurance entrance. Moreover, the significance of the subjective health measures is driven by a very few countries (Denmark, Belgium, Spain, and Greece).

It is not unlikely that the difference between objective and subjective health differences is generated by “justification bias”, i.e., the desire by respondents to motivate their entrance into disability insurance by reporting a subjectively felt worse health status.

Summarizing the results of this section, changes over time, like changes across countries, do not show any convincing case for a significant correlation between health and disability insurance enrolment.

**Institutions and Incentives**

Demographic and health-related differences do not explain the cross-national differences in disability insurance enrolment. This puts more weight on the speculation that institutional differences are their cause, specifically the enrolment and eligibility rules that make disability insurance benefits easier to receive and more generous in some countries than in others. Such rules may create incentive effects similar to those exerted by old-age pensions which often provide a financial incentive to retire early. In many countries, health requirements for disability insurance eligibility are weak. Under such circumstances, disability insurance may work as a labour market exit route to early retirement. Many countries have established very lenient work disability eligibility rules under the conditions of high unemployment.
In order to go beyond speculation, we use a set of variables characterizing the institutional features of the disability insurance in each country (coverage, minimum disability level required for full benefits, benefit generosity, medical assessment, vocational assessment, generosity of unemployment benefits). These variables have been computed by OECD (2003, Annex A.2.1) for a few countries. They are scored between 0 (no support) to 5 (generous benefits and/or lenient eligibility). We extend these variables to all 13 countries in SHARE, ELSA and HRS by using national descriptions of disability insurance.

We then apply the same methodology as in Figure 2 and relate individual disability insurance enrolment probabilities to age, gender, a broad set of health measures, and this set of institutional features. The institutional variables are jointly highly significant in explaining disability insurance take-up. For instance, the strictness of a medical exam significantly reduces disability uptake. Similarly, countries which have enacted a low minimum disability level to be eligible for claiming benefits have higher disability insurance take-up.

Coverage is a particularly interesting variable. The highest score for coverage is given if disability insurance covers the entire population; the lowest score if only employees are covered. A broad coverage increases disability enrolment, as expected, but the effect is smaller than those of medical examination and minimum disability benefit. The influence of coverage, however, is very large for women and individuals with poor health. The large impact for women is most likely the result of low labour force participation of European women who have difficulties to be eligible for a normal old-age pension and thus seek disability pensions. This corresponds to the very high female enrolment in some countries, especially Sweden and Denmark, where enrolment is almost twice as high among women as among men; in Germany, a lenient eligibility to disability insurance for women was explicitly a policy instrument in the early 1980s. The interaction between coverage and poor health indicates that disability insurance does work as designed in protecting workers with poor health.

Another interesting finding is the large positive effect of the generosity of benefits for the older part of the sample (age 60 and over), once health is taken into account. Most of these individuals are also eligible for old-age pensions; however, they choose disability benefits because they are more generous.

The interaction with other branches of the social security net is an important consideration when analysing disability insurance. We therefore also measure the duration and benefit level of unemployment compensation, a possible alternative to disability insurance as an early retirement device. We find that tight unemployment insurance increases disability insurance enrolment in a highly significant and quantitatively important way.

Quite clearly, the institutional design of disability insurance plays an important role in explaining disability insurance enrolment – but does it also explain the cross-national differences depicted in Figure 1? We follow the methodology applied in Figure 2 and predict how enrolment rates would look like if all individuals in our cross-national sample were facing the same institutional features. In other words, we predict the enrolment into disability insurance by counterfactually giving all sample individuals the same scores for coverage, minimum disability level, benefit generosity, medical assessment, etc. of their national disability insurance system. The results are striking, see Figure 7:
The counterfactual simulation, holding eligibility and benefit generosity constant across countries, produces much more similar disability enrolment rates than correcting for demographics and health. The only outlier is Switzerland, where uptake rates would be very low if Switzerland had average generosity.

In fact, relating the enrolment rates in the 13 countries on the five most important institutional indicator variables (coverage, minimum disability level required to receive benefits, benefit generosity, medical assessment, and vocational assessment) explains 78 percent of the cross-national variation in enrolment rates, see Figure 8:

![Figure 8](image_url)  
*Figure 8* Cross-national variation in disability insurance enrolment as explained by institutional features of national disability insurance systems

*Note: Based on the 13 countries depicted in Figures 1, 2 and 3*
Conclusions

- The variation in disability insurance take-up rates across European countries is striking. It reaches from some 15 percent of individuals aged between 50 and 65 in Denmark, Sweden and the Netherlands to less than 3 percent in Austria and Greece.
- The relationship between entrance into disability insurance and health changes over time does not show any convincing case for a causal role of health in explaining the striking cross-national differences in disability insurance enrolment. There is no significant correlation with objective health measures. The weak correlation with self-rated health, however, is influenced by “justification bias”, i.e., the desire by respondents to motivate their entrance into disability insurance by reporting a subjectively felt worse health status.
- Institutional features, in turn, have a very large explanatory power. Coverage, minimum disability level required to receive benefits, benefit generosity, medical and vocational assessment explain more than three quarter of the cross-national variation in enrolment rates.

References

Spawned by the greater availability of adequate micro-data sources and a growing interest in the topic of ‘productive ageing’, the number of empirical studies dealing with elders’ formal and informal voluntary engagement has been increasing rapidly. Two strands of this research seem of particular interest:

First, recent cross-national studies showed that the individual-level determinants of activity are fairly stable across different institutional contexts, but that older people’s overall probability of engaging in non-market productive activities varies substantially by country (e.g., Erlinghagen and Hank, 2006; Hank and Stuck, forthcoming). Irrespective of the specific activity under investigation, similar cross-country patterns were found, which have been suggested to result from differences in a variety of contextual factors affecting individuals’ productive engagement in general. More specifically, Hank and Stuck (2007) showed that higher levels of religious and political freedom as well as government social spending bear a positive relationship with older European’s propensity to engage in non-market productive activities.

Second, research taking a life-course perspective on individuals’ decision to volunteer (e.g., Rotolo, 2000) investigated the role of life events, such as changes in partnership, health, or employment, with the transition into retirement being of particular interest in the context of analysing engagement at older ages. The scarce empirical evidence dealing with the latter issue suggests that entering retirement has some positive effect on the probability of taking up (formal) volunteer work, but shows that previous civic engagement has an even stronger influence on elders’ receptivity to volunteering in the immediate post-retirement period (cf. Erlinghagen, 2008; Mutchler et al., 2003).

Newly available longitudinal data from the ‘Survey of Health, Ageing and Retirement in Europe’ (SHARE) allow us to combine both of these perspectives in our study of the dynamics of volunteering in the population aged 50 or older across eleven Continental European countries. Our descriptive analysis also includes cross-sectional information from three countries that did not participate in the 2004 baseline data collection and could thus not be considered in previous studies of voluntary engagement using SHARE (e.g., Erlinghagen and Hank, 2006): data in Israel were collected during the years 2005-06 and are available with the most recent public release of SHARE, while fieldwork in the Czech Republic and Poland was conducted in parallel to the first longitudinal round of SHARE in 2006-07.

Measuring Dynamics of Volunteering and Their Determinants

The analysis of volunteer dynamics we present here is based on the question “Have you done any of these activities in the last month?” referring to a list of possible answer categories which included “done voluntary or charity work” (formal volunteering) and “provided help to [family,] friends or neighbours” (informal volunteering). Note that help provided to family was included SHARE’s definition of informal volunteer activities in Wave 1 only and was dropped for reasons of greater conceptual clarity in the distinction between support for kin and non-kin social networks in Wave 2. This change in the questionnaire needs to be taken into account when interpreting the empirical findings on the dynamics of informal volunteering described below.
To identify the role of specific individual characteristics in determining the dynamics of volunteering net of effects that confounding characteristics might have, we ran multivariate logistic regressions on a set of binary dependent variables indicating transitions from active volunteering to inactivity, and vice versa. The selection of explanatory variables was guided by previous research suggesting that individual resources are important determinants of voluntary engagement (e.g., Erlinghagen, 2008; Hank and Stuck, forthcoming). All these variables were coded as binary time-constant (gender, cohort, level of education) or time-varying (partnership, employment, self-rated general health) indicators. We also take into account the potential role of societal contexts by including three binary indicators of the individual’s country (region, respectively) of residence, distinguishing clusters characterized by overall ‘high’, ‘medium’, or ‘low’ levels of volunteering (see Hank and Stuck, 2007, for a detailed discussion). Finally, we control for the time-lag (in months) between Wave 1 and Wave 2 interviews. While in the majority of countries the average time between baseline and longitudinal interview was 30-32 months, this lag was substantially shorter in Belgium and France (21-22 months).

Patterns of Continuity and Change in Volunteering

As expected, substantial changes in the magnitude of formal volunteering or in the rank order of countries with regard to elders’ civic engagement did not occur between the first two waves of SHARE, although the proportion of volunteers in some countries is somewhat higher in Wave 2, see Table 1. On average, 10 percent of the population 50+ engaged in formal volunteer activities during the month preceding the SHARE interview(s). The highest rates of volunteering are observed in Denmark, Sweden, and the Netherlands, whereas the Mediterranean countries are characterized by clearly below-average proportions of older volunteers (cf. Erlinghagen and Hank, 2006). While the share of older Israelis performing voluntary work corresponds to the Continental European average, the respective numbers in Poland and the Czech Republic are very close to those observed in Greece and Spain.

Greece and Austria exhibit the greatest instability of formal voluntary engagement across time. Only about one-third of those who volunteered in Wave 1 also did so in Wave 2. This is very different in the two Scandinavian countries as well as in Belgium and the Netherlands, where about two-thirds of volunteers were continuously active. These countries are not only characterized by the greatest stability of engagement, but also exhibit the greatest dynamics in the sense that as many as 9-10 percent of the population aged 50+ took up voluntary work between waves (compared to merely 1-2 percent in Greece and Spain).
Table 1 Participation in formal volunteering across SHARE Waves 1 and 2 in percent

<table>
<thead>
<tr>
<th>Country</th>
<th>Active in Wave 1</th>
<th>Active in Wave 2</th>
<th>Active in both waves</th>
<th>Inactive in both waves</th>
<th>Inactive → active</th>
<th>Active → inactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>17.8</td>
<td>21.5</td>
<td>11.7</td>
<td>70.3</td>
<td>9.7</td>
<td>6.6</td>
</tr>
<tr>
<td>Denmark</td>
<td>17.4</td>
<td>21.2</td>
<td>11.7</td>
<td>66.9</td>
<td>10.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Germany</td>
<td>10.1</td>
<td>13.1</td>
<td>7.5</td>
<td>78.0</td>
<td>7.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Netherl.</td>
<td>20.8</td>
<td>25.5</td>
<td>16.2</td>
<td>65.2</td>
<td>9.5</td>
<td>7.7</td>
</tr>
<tr>
<td>Belgium</td>
<td>15.5</td>
<td>17.3</td>
<td>11.0</td>
<td>75.7</td>
<td>6.1</td>
<td>6.0</td>
</tr>
<tr>
<td>France</td>
<td>14.1</td>
<td>15.3</td>
<td>8.8</td>
<td>75.5</td>
<td>6.2</td>
<td>7.2</td>
</tr>
<tr>
<td>Switzerl.</td>
<td>14.5</td>
<td>16.6</td>
<td>7.8</td>
<td>73.6</td>
<td>9.1</td>
<td>7.9</td>
</tr>
<tr>
<td>Austria</td>
<td>8.3</td>
<td>8.7</td>
<td>3.3</td>
<td>84.2</td>
<td>5.2</td>
<td>6.5</td>
</tr>
<tr>
<td>Italy</td>
<td>6.8</td>
<td>8.3</td>
<td>3.7</td>
<td>88.0</td>
<td>4.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Spain</td>
<td>2.4</td>
<td>2.7</td>
<td>1.1</td>
<td>94.7</td>
<td>1.9</td>
<td>1.6</td>
</tr>
<tr>
<td>Greece</td>
<td>2.9</td>
<td>2.3</td>
<td>1.2</td>
<td>95.8</td>
<td>0.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Israelb</td>
<td>12.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Czechia</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Poland</td>
<td>-</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>All countries</td>
<td>10.0</td>
<td>10.8</td>
<td>7.9</td>
<td>79.2</td>
<td>6.1</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Note: a) Cross-sectional weights applied, b) No weights applied

Most of the decline in informal volunteering suggested by the numbers in Table 2 – down from an average of 18 to 14 percent across all countries – should be attributed to the change in the related question in SHARE’s Wave 2. The cross-country pattern of engagement remained unaffected, however: in both waves we observe much higher proportions of informal volunteers in northern Europe than in the South, which matches almost exactly with the regional pattern identified in our analysis of formal volunteering (for detailed investigations using the SHARE baseline wave see Hank and Stuck (2007); forthcoming). Israel and the Czech Republic match the average observed in Wave 1 and Wave 2, respectively, whereas the share of Polish elders being engaged in informal voluntary activities is among the lowest in Continental Europe.

While the overall stability in informal volunteering is substantially lower than for formal volunteering, similar differences between groups of countries are found. Among those who were active at baseline in Belgium, Denmark, and the Netherlands about 40 percent, and even 60 percent in Sweden, also reported to be active in the consecutive wave. In contrast, only slightly more than 10 percent of previously engaged Spaniards and about 20 percent of older Italians exhibited continuous engagement across both waves. Moreover, higher percentages of northern Europeans started to perform informal voluntary work than their southern European counterparts.
Our findings on the determinants of (formal and informal) volunteer dynamics are consistent with expectations derived from both cross-sectional analyses of SHARE data (e.g., Hank and Stuck, forthcoming) and longitudinal single-country studies (e.g., Erlinghagen, 2008).

The probability of taking-up formal voluntary work was lowest among those who were born in the oldest cohorts (1929 or earlier), whose health was less than very good in both waves (or whose health deteriorated between waves), and among those living in Mediterranean countries (that is, in a social context characterized by overall ‘low’ levels of voluntary participation), see Figure 1a. More highly educated individuals as well as those being retired in both waves (or those who entered retirement between waves), and those living in one of the ‘high’ participation countries (Denmark, Sweden, and the Netherlands) exhibited a higher propensity to start formal volunteering than their counterparts in the reference categories. Turning to giving-up formal volunteering, see Figure 1b, we find that a high level of education, being retired in both waves, and living in the Netherlands or Scandinavia is associated with a reduced probability of quitting. Older respondents, those who newly entered a partnership, whose health was less than very good throughout and those living in Greece, Italy, or Spain, however, were more likely to withdraw from formal volunteering.

Table 2 Participation in informal volunteering across SHARE Waves 1 and 2 in percent

<table>
<thead>
<tr>
<th>Country</th>
<th>Active in Wave 1</th>
<th>Active in Wave 2</th>
<th>Active in both waves</th>
<th>Inactive in both waves</th>
<th>Inactive → active</th>
<th>Active → inactive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>37.4</td>
<td>40.0</td>
<td>22.7</td>
<td>41.6</td>
<td>16.9</td>
<td>17.1</td>
</tr>
<tr>
<td>Denmark</td>
<td>32.2</td>
<td>26.8</td>
<td>14.2</td>
<td>49.6</td>
<td>12.8</td>
<td>20.1</td>
</tr>
<tr>
<td>Germany</td>
<td>16.1</td>
<td>15.2</td>
<td>5.1</td>
<td>65.3</td>
<td>11.0</td>
<td>17.0</td>
</tr>
<tr>
<td>Belgium</td>
<td>29.0</td>
<td>24.2</td>
<td>5.3</td>
<td>54.7</td>
<td>10.2</td>
<td>20.4</td>
</tr>
<tr>
<td>France</td>
<td>28.0</td>
<td>23.9</td>
<td>7.2</td>
<td>57.4</td>
<td>11.2</td>
<td>17.8</td>
</tr>
<tr>
<td>Switzerland</td>
<td>21.5</td>
<td>19.3</td>
<td>6.0</td>
<td>62.7</td>
<td>13.8</td>
<td>16.0</td>
</tr>
<tr>
<td>Austria</td>
<td>21.6</td>
<td>17.6</td>
<td>7.1</td>
<td>65.2</td>
<td>9.7</td>
<td>17.2</td>
</tr>
<tr>
<td>Italy</td>
<td>12.4</td>
<td>6.8</td>
<td>2.9</td>
<td>82.0</td>
<td>4.0</td>
<td>10.9</td>
</tr>
<tr>
<td>Spain</td>
<td>5.7</td>
<td>3.4</td>
<td>0.7</td>
<td>91.0</td>
<td>2.3</td>
<td>5.3</td>
</tr>
<tr>
<td>Greece</td>
<td>15.1</td>
<td>7.0</td>
<td>5.5</td>
<td>83.7</td>
<td>1.1</td>
<td>9.6</td>
</tr>
<tr>
<td>Israela</td>
<td>17.1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Czechia</td>
<td>-</td>
<td>14.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Poland</td>
<td>-</td>
<td>4.7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>All countries</td>
<td>17.6</td>
<td>13.7</td>
<td>9.6</td>
<td>64.6</td>
<td>9.1</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Note: a) Cross-sectional weights applied, b) No weights applied

Determinants of Volunteer Dynamics

Our findings on the determinants of (formal and informal) volunteer dynamics are consistent with expectations derived from both cross-sectional analyses of SHARE data (e.g., Hank and Stuck, forthcoming) and longitudinal single-country studies (e.g., Erlinghagen, 2008).

The probability of taking-up formal voluntary work was lowest among those who were born in the oldest cohorts (1929 or earlier), whose health was less than very good in both waves (or whose health deteriorated between waves), and among those living in Mediterranean countries (that is, in a social context characterized by overall ‘low’ levels of voluntary participation), see Figure 1a. More highly educated individuals as well as those being retired in both waves (or those who entered retirement between waves), and those living in one of the ‘high’ participation countries (Denmark, Sweden, and the Netherlands) exhibited a higher propensity to start formal volunteering than their counterparts in the reference categories. Turning to giving-up formal volunteering, see Figure 1b, we find that a high level of education, being retired in both waves, and living in the Netherlands or Scandinavia is associated with a reduced probability of quitting. Older respondents, those who newly entered a partnership, whose health was less than very good throughout and those living in Greece, Italy, or Spain, however, were more likely to withdraw from formal volunteering.
Figure 1 Dynamics of formal volunteering between SHARE Waves 1 and 2 – results of multivariate logit models (log odds)

Note: Light orange (dark orange) bars indicate negative (positive) correlations significant at levels of 5% or higher; coefficient of control variable for time between interviews not displayed.
Taking-up informal voluntary work, is positively related to having a higher educational degree, to having been retired in both waves (as well as to having entered retirement from paid work between waves), and is also more likely to happen, if the respondent lives in Denmark, Sweden, or the Netherlands, see Figure 2a. Respondents from ‘low’ participation countries, with relatively ‘poor’ health across both waves, who were born in older cohorts, and women exhibited lower probabilities to start informal voluntary activities than

Figure 2 Dynamics of informal volunteering between SHARE Waves 1 and 2 – results of multivariate logit models (log odds)
Note: Light orange (dark orange) bars indicate negative (positive) correlations significant at levels of 5% or higher; coefficient of control variable for time between interviews not displayed
the reference group. The gender effect observed here is likely to result – at least in part – from the exclusion of family support in the definition of informal volunteering in Wave 2. The same holds for the corresponding effect in our model for giving-up informal volunteering, see Figure 2b. In addition to women’s higher probability of quitting, we detect positive associations between stopping to be active and age (cohort, respectively), continuously ‘poor’ health (as well as improvements in self-rated health!), and living in a Mediterranean country. Those who lived without a partner in both waves and those residing in ‘high’ participation countries exhibited the lowest propensity to terminate their engagement.

Conclusions

This analysis of longitudinal data from the first two waves of the ‘Survey of Health, Ageing and Retirement in Europe’ provided us with three main findings:

• Formal volunteering is a dimension of ‘productive ageing’ characterized by greater stability over time than informal volunteering.

• Volunteer transitions among older Europeans were affected by both time-invariant individual resources, such as one’s level of education, as well as by changes in the individual’s resources (e.g. health status or time availability).

• The societal context in which older persons live not only has a significant impact on the prevalence of volunteering at a given point in time, but the dynamics of volunteering also vary by country. Comparing, for example, Scandinavian and Mediterranean countries suggests that social environments characterized by higher proportions of older volunteers cross-sectionally also fare well in establishing opportunity structures which stabilise elders’ voluntary activity and foster taking-up new engagement.

Future studies should address three issues in particular:

• The relationship between life-course transitions at older ages, such as entering retirement, and earlier life events and experiences in determining elders’ voluntary engagement deserves further attention (cf. Erlinghagen, 2008). Future waves of SHARE, and especially the retrospective SHARELIFE data, will provide an important basis for such research.

• The dynamics of volunteering in the context of changes in older people’s partnership status – when, for example, entering widowhood – are yet underinvestigated. SHARE is a particularly suitable data source for this kind of analyses, because full interviews are conducted with both partners in a household.

• The relationship between health and volunteering – with the former being both a barrier to and a benefit resulting from the latter – remains an important topic that has rarely been addressed in cross-national research. The SHARE data provide unique opportunities to study the role of different social and welfare state contexts in shaping the relationship between productive ageing and individuals’ well-being.
References


Retirement and Mental Health

Agar Brugiavini, Emirca Croda, Michael Dewey

Poor health has long been established as one of the most critical determinants of retirement behaviour and more generally a clear pattern emerges of inactivity being associated to poor health conditions. The existing literature has focused primarily on the role of physical health. Although physical health is certainly important for a person’s functioning in daily life, including working for pay, mental health also plays a role. More than 27% of adult Europeans are estimated to experience at least one form of mental ill health during any one year. Mental ill health is estimated to cost the EU about 3-4% of GDP, mainly trough lost productivity. The most common form of mental illness in the EU is anxiety and depression. By 2020, depression is expected to be the highest ranking cause of diseases in the developed world (WHO, 2001).

Few studies have documented the relationship between mental health (defined either as clinical depression, depressive symptoms, or self assessed mental health) and labour force participation, particularly retirement behaviour. Given the wave of pension reforms in Europe, establishing the nexus between mental health and labour market status is particularly relevant.

To date, the research on mental health and retirement behaviour has been limited by the availability of datasets containing the necessary information. SHARE uniquely resolves these data limitation problems because it includes rich information on mental health and other health domains as well as a wide array of socioeconomic status and demographic characteristics on individuals aged 50 and over, in thirteen EU countries ranging from Scandinavia, through Western and Central Europe, to the Mediterranean, to Israel. Moreover the panel design of SHARE allows the exploration of dynamic processes relating health and labour force participation of older adults.

Mental Health and Employment Status

One underlying question is whether individuals who are more likely to exhibit symptoms of depression are also more likely to be out of the labour force or, in a dynamic context, to exit the labour force. However we cannot rule out an alternative interpretation by which the onset of depression follows retirement in a significant number of individuals.

Figure 1 shows the prevalence of depression by gender and country, based on the 2006 SHARE sample for the age group 50-64. It is this group that is particularly relevant in this paper as it is at risk of retirement. Depression is defined on the basis of the EURO-D symptom scale which measures current depression and can be constructed from questions in the mental health module of the SHARE questionnaire as a composite index of twelve items covering the following domains: depressed mood, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment and tearfulness. The index is scored by summing binary items. We construct a binary indicator which takes value one if the EURO-D scale is above three and zero otherwise, which has been demonstrated to indicate a clinically significant level of depression.

In all countries, women are consistently more likely to be depressed than men. This is an empirical regularity, consistent with other findings in psychiatric epidemiology (Dewey and Prince, 2005). However, there exist important cross countries differences captured by the EURO-D. Poland stands out as the country with the largest fraction of older adults showing clinically significant symptoms of depression (more than 50% of women, com-
pared to about 33% of men). Poland, together with most Mediterranean countries (Italy, Spain and Israel), France and Belgium shows significant higher levels of the EURO-D score than Nordic countries both for men and women. At the other extreme we find Greece, with 19% of women, and 8% of men showing symptoms of depression. It is interesting to notice the difference in the prevalence of depression between Poland and the Czech Republic, which shows rates similar to the Nordic countries in the sample.

The gender difference is apparent also in the prevalence of depression by self-reported labour market status, depicted in Figure 2 for five possible states: retired, employed, unemployed, disabled and homemaker (“other” is not shown). Not surprisingly, depression is prevalent amongst the sick and disabled, followed by people who are not engaged in labour market activities: unemployed, homemakers and retired individuals show all higher rates of prevalence than those who are still working.
Focusing on retirees only, Figure 3 shows the main reasons why they retired. The SHARE questionnaire contains a set of not mutually exclusive reasons, which we aggregated in four categories: becoming eligible for a (public or private) pension, being offered some form of early retirement, retiring because of own health problems, and retiring to enjoy life. In most countries, becoming eligible for a pension is the prevalent reason for retirement, cited by at least one of two retirees as a reason for retirement, with Greece and Italy standing out by having almost 9 out of 10 retirees citing it. Institutions definitely play a role, as confirmed, for instance, by the fact that in the Netherlands the most cited motive for retirement is being offered early retirement. In many countries, “health problems” also play a role, being cited, for instance, by more than one every four retirees in Sweden and Austria. These health problems may include mental health problems. Of those who retired for health problems, retired individuals in Poland, France and Belgium are more likely to suffer from depression as shown in Figure 4.

Figure 3 Reasons for retirement by country
Note: Sample of 5,349 SHARE 2006 respondents aged 50-69 who self report as being retired. Brackets on top of each bar represent 95% confidence intervals. Weighted observations

Figure 4 Prevalence of depression among retirees who retired for health reasons
Note: Sample of 664 SHARE 2006 respondents aged 50-69 who self report as being retired and retired for own health problems. Brackets on top of each bar represent 95% confidence intervals. Weighted observations
Work and Retirement

A more direct way to investigate the relationship between labour market status and mental health is provided in Table 1 where we selected only respondents who are either retired or employed and cross-tabulate this characteristic with a binary indicator denoting whether respondents manifest signs of clinically significant depression, “depressed” (EURO-D score > 3) or not, separately for men and women.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Depressed</td>
<td>Depressed</td>
<td>Total</td>
<td>Not Depressed</td>
</tr>
<tr>
<td>Retired</td>
<td>3,356</td>
<td>602</td>
<td>3,958</td>
<td>2,820</td>
</tr>
<tr>
<td></td>
<td>84.79%</td>
<td>15.21%</td>
<td>100%</td>
<td>69.87%</td>
</tr>
<tr>
<td>Employed</td>
<td>4,394</td>
<td>518</td>
<td>4,912</td>
<td>3,325</td>
</tr>
<tr>
<td></td>
<td>89.45%</td>
<td>10.55%</td>
<td>100%</td>
<td>76.93%</td>
</tr>
<tr>
<td>Total</td>
<td>7,750</td>
<td>1,120</td>
<td>8,870</td>
<td>6,145</td>
</tr>
<tr>
<td></td>
<td>87.37%</td>
<td>12.63%</td>
<td>100%</td>
<td>73.52%</td>
</tr>
</tbody>
</table>

Table 1 Labour force participation and depression by gender
Note: Sample of 17,228 SHARE 2006 respondents aged 50-69 who self report as being either retired or employed and for whom the information regarding the components of the EURO-D score is not missing.

Each cell contains the frequency (count) and percentage of respondents in an employment status (retired or employed) who are depressed or not. Again, women are more likely to be depressed than men, across employment states: 26 percent of women, compared to 15 percent of men in this sample show significant signs of depression. The percentage of depressed individuals is significantly higher amongst the retirees if compared with the working population, both for men and women: 30 percent of retired women show signs of depression, compared to 15 percent of retired men. These percentages become 23 percent for women and 11 percent for men among the employed respondents. Obviously these results may be dominated by age and cohort effects, which is why we resort to the probit analysis summarized in Figure 5, which reports the marginal effects of a probit regression to study the static determinants of the probability of suffering from depression. The explanatory variables included in the analysis are an indicator for whether the respondent is retired, an indicator for whether the respondent has at least one limitation with an activity or with an instrumental activity of daily living, the respondent’s years of education, a set of demographic characteristics such as respondent’s age, gender (equal to 1 if respondent is male), an indicator for whether the respondent is married, and a set of country dummies. All the explanatory variables in Figure 5 have a statistically significant effect on the probability of suffering from depression. In particular, after controlling for all the other characteristics, being retired increases the probability of suffering from depression by about 4 percentage points. Having a functional limitation strongly increases the probability of being depressed. The probit results confirm that men are less likely than women to show signs of depression, and that married individuals are also less likely to be depressed.
Retirement and Mental Health

The cross-sectional analysis is bound to be affected by the age composition and more generally by the demographic characteristics of the sample, also across the different countries. Turning the attention to the panel data of 2004 and 2006 we examine transitions from employment to other labour market states and also changes in mental health controlling for these characteristics. We consider the sample of individuals observed both in SHARE 2004 and SHARE 2006: this induces problems of selection that may affect the representativity of the sample, though results will be internally consistent.

Table 2 shows the distribution (frequencies and row percentages of transitions) of individuals according to the “depressed” or “not depressed” characteristics in the 2004 (rows) and in the 2006 wave of SHARE (columns) by distinguishing two groups: respondents who were (observed as) employed in 2004 and are again (observed) in employment in 2006 (left panel) and those who change from (being observed as) employed in 2004 to (being observed as) retired in 2006 (right panel). The relevant figure is the percentage of those who change mental health status and at the same time change employment status (8.67%, in the left panel) as opposed to the same figure for those who do not change employment status (8.68%, in the right panel). The difference between these two figures is not significant (also due to the small sample size) and we cannot conclude that there are important concomitant effects from changes in employment status to changes in symptoms.

Figure 5 Static probit analysis of the probability of suffering from depression

Note: Marginal effects obtained from a probit regression on a sample of 15,948 SHARE 2006 respondents aged 50-69 who self report as being either retired or employed and for whom the information regarding the explanatory variables is not missing. The probit regression includes also a set of country dummies.

Retirement and Mental Health

The cross-sectional analysis is bound to be affected by the age composition and more generally by the demographic characteristics of the sample, also across the different countries. Turning the attention to the panel data of 2004 and 2006 we examine transitions from employment to other labour market states and also changes in mental health controlling for these characteristics. We consider the sample of individuals observed both in SHARE 2004 and SHARE 2006: this induces problems of selection that may affect the representativity of the sample, though results will be internally consistent.

Table 2 shows the distribution (frequencies and row percentages of transitions) of individuals according to the “depressed” or “not depressed” characteristics in the 2004 (rows) and in the 2006 wave of SHARE (columns) by distinguishing two groups: respondents who were (observed as) employed in 2004 and are again (observed) in employment in 2006 (left panel) and those who change from (being observed as) employed in 2004 to (being observed as) retired in 2006 (right panel). The relevant figure is the percentage of those who change mental health status and at the same time change employment status (8.67%, in the left panel) as opposed to the same figure for those who do not change employment status (8.68%, in the right panel). The difference between these two figures is not significant (also due to the small sample size) and we cannot conclude that there are important concomitant effects from changes in employment status to changes in symptoms.
However, the time elapsed between the two first waves of SHARE might be too short a time-lag to capture any significant change, hence we resort to an additional source of information that comes from a retrospective question asked in SHARE 2006 on the year in which retirees actually retired. Figure 6 shows the prevalence of significant symptoms of depression among young retirees (aged 50-59) as a function of the years passed since they retired. The evidence suggests that depression may kick in with some delay after retirement.

<table>
<thead>
<tr>
<th></th>
<th>Transitions from Employed in the 2004 wave</th>
<th></th>
<th>Transitions from Employed in the 2006 wave</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>to Employed in the 2006 wave</td>
<td>to Retired in the 2006 wave</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Depressed</td>
<td>Depressed</td>
<td>Total</td>
</tr>
<tr>
<td>Not Depressed</td>
<td>3,018</td>
<td>287</td>
<td>3,305</td>
</tr>
<tr>
<td>Depressed</td>
<td>409</td>
<td>289</td>
<td>698</td>
</tr>
<tr>
<td>Total</td>
<td>3,427</td>
<td>576</td>
<td>4,003</td>
</tr>
<tr>
<td></td>
<td>85.61%</td>
<td>14.39%</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Table 2: Depressions Transition by Employment Transitions**

Note: Balanced sample of 4673 SHARE respondents aged 50-69 in the 2006 wave who self-report as being employed in the 2004 wave and either retired or employed in the 2006 wave and for whom the information regarding the components of the EURO-D score in both waves is not missing. Respondents from Poland, the Czech Republic and Israel are excluded because only one wave is available for these countries.

To investigate further this issue, we resort to a probit analysis of the probability of suffering from depression as a function of the time elapsed since retirement, in addition to other variables. The explanatory variables included in the analysis are indicators for whether the respondent has been retired for one year or for 2 years or more (using as reference the
fact that the respondent has retired in the same year of the SHARE 2006 interview), the respondent’s years of education, a set of demographic characteristics such as respondent’s age, gender, marital status, and a set of country dummies. The results of the probit analysis, reported in Figure 7, show that the probability of being depressed increases as time since retirement elapses, even after controlling for other factors. However, the statistical significance of this finding is not too strong. The effect of gender, marital status and years of education are consistent with the results discussed in the static analysis, providing additional evidence that men are less likely than women to show signs of depression, married individuals are less likely to be depressed than unmarried ones, and that additional years of education are associated with a lower probability of being depressed.

Figure 7 Probability of suffering from depression as a function of retrospective information
Note: Marginal effects obtained from a probit regression on a sample of 7,384 SHARE 2006 respondents aged 50-69 who self-report as being retired and for whom the information regarding the explanatory variables is not missing. The probit regression includes also a set of country dummies.

Conclusions
• This contribution shows that – as found in previous studies – depression is more prevalent amongst women than amongst men and that Mediterranean countries seem more affected by symptoms.
• An interesting finding is that the prevalence of depression observed in Poland is similar to that of the Mediterranean countries, while this is not the case for the Czech Republic.
• Our paper documents the existence of a correlation between mental health and retirement. As for the retirement decision we cannot conclude that mental health plays a role on its own, but it is certainly one major component of the effect of the overall “health status” that partly determines the exit from the labour force. We find a significant association between retirement and mental health when controlling for other characteristics, including age, in a static regression framework.
• Looking at the dynamic dimension or at retrospective questions on the time elapsed since retirement reveals that the impact of retirement on depression symptoms is captured typically after a few years after the event.
• The main finding is that retirement may induce – together with other determinants– the onset of depression symptoms, even if with a delay. This result provides one more reason for policy makers to make it possible for individuals to work longer, in a favourable working environment.
References


Compared to the other main regions of the world, the region of Europe is often perceived as a socio-economically rather homogeneous association of countries. This view is supported by the development of a unifying social and economic policy among member states of the European Community which is currently composed by the large majority of all European states. However, at this stage, considerable variations in economic, social and health-related conditions still exist across Europe. For instance, a North-South gradient of economic growth and welfare state development has been observed for many years, with Nordic and Western European countries ranging at the top and Mediterranean countries ranging at the bottom. More recently, with the political and economic transformation of former communist countries a second gradient of wealth and health became obvious, an East-West gradient with substantially poorer living conditions in Central and Eastern compared to Western European countries. This gradient in wealth is reflected in a gradient of health, documenting a gap in mean life expectancy of about ten years between the least developed Eastern and the most developed Western countries (Marmot and Wilkinson, 2006). Differences in labour market participation, wages and working conditions contribute to the explanation of this gradient, but comparative studies monitoring these latter conditions in detail with standardized measures are still scarce (Parent-Thirion et al., 2007).

In this chapter we set out to compare one aspect of the socio-economic development of European countries, quality of work and employment. Given their exposure time over years or even decades, people’s working conditions exert a strong influence on their quality of life, their health and well-being. An adverse physical and psychosocial work environment was shown to increase the risk of morbidity, early retirement and premature (Marmot and Wilkinson, 2006). Importantly, this impact is not restricted to less privileged labour market groups confined to precarious work, but extends to skilled and higher educated segments of employment as well. With the major shift of employment from the agricultural and industrial sector to the service and administrative sector the quality of work has undergone substantial change. Today, fewer jobs are defined by physical demands and more by mental and emotional demands. Computer-based information processing is becoming a part of a growing number of job profiles, and employment in the service sector continues to rise. As a result, psychological and social stressors are becoming more prevalent, and their contribution to health and well-being is likely to parallel or even outweigh the contribution of more traditional occupational stressors.

To measure an adverse psychosocial work environment theoretical models are needed that delineate particular stressful job characteristics at a level of generalization that allows for their use in a wide range of different occupations. Several such concepts were developed (Antoniou and Cooper, 2005), but two models received special attention in occupational research in recent past, the demand-control model (Karasek et al., 1998) and the effort-reward imbalance model (Siegrist et al., 2004). The former model identifies stressful work by job task profiles characterised by high demand in combination with low control (decision latitude), whereas the latter model claims that an imbalance between high efforts spent and low rewards received in turn (money, esteem, career opportunities, job security) adversely affects health.
Here, we answer the following questions:

- What is the prevalence of low quality of work, in terms of these two models, in the European countries under study in SHARE? Can we observe a North-South and East-West gradient in quality of work?
- To what extent does quality of work vary according to socio-economic position, age, gender, and employment sector?
- Does low quality of work assessed at first measurement predict well-being at second measurement, two years later?

Variations in Quality of Work Between Countries

Quality of work was assessed by a short battery of items derived from (a) the Job Content Questionnaire measuring the demand-control model (Karasek et al., 1998) and (b) from the effort-reward imbalance model questionnaire (Siegrist et al., 2004). With regard to the first model, the measurement was restricted to the control dimension as this dimension proved to be of particularly high predictive power in a number of studies (Karasek et al., 1998; Pikhart et al., 2004). Low control at work was measured by the sum score of two Likert-scale items ranging from 2 to 8, with higher scores indicating lower control at work. Scores in the upper tertile were defined as representing poor quality of work in terms of low control for each country separately. To measure effort-reward imbalance, we first analysed its core dimension, reward (5 items ranging from 5 to 20), and additionally composed a ratio of the two scales ‘effort’ (2 items) and ‘reward’ (5 items; the ratio being adjusted for unequal number of items). This ratio is assumed to mirror the crucial hypothesis of this model, i.e. the imbalance between high ‘cost’ and low ‘gain’, with higher ratios indicating poorer quality of work. For cross-country analyses, tertiles of the ratio were calculated for each country separately. Participants scoring in the upper tertiles of this ratio of imbalance were considered experiencing poor quality of work.

As demographic and socioeconomic factors we included age and gender, as well as income and education. Income information was based on the total annual household income that we categorised into country specific tertiles (high, medium, low). Education was measured according to the International Standard Classification of Educational Degrees (ISCED-97) that we categorised into ‘low education’ (pre-primary, primary or lower secondary education), ‘medium education’ (secondary or post-secondary education), and ‘high education’ (first and second stage of tertiary education). Additionally, information on employment sector was included.

We introduced two indicators of well-being. First, ‘depressive symptoms’ were measured using the EURO-D scale of depression with an established cut-point indicating the presence of clinically relevant depressive (Dewey and Prince, 2005). Second, ‘decreased self-rated health’ was measured by a single question: “Compared with your health when we talked with you in [[month and year previous interview]], would you say that your health is better now, about the same, or worse?” ‘Decreased self-rated health’ was present if people reported worse health.

The analyses are based on release 2.0.1 data of Wave 1 and preliminary data of the second wave (release 0) of the SHARE study. The sample is restricted to people who were still in regular employment or self-employed at the time of the interview (Wave 1: N=9142; Wave 2: N=9,135). The analyses of effects on prospective well-being are limited to the longitudinal data from employed people answering all questions at both waves (N=5403).
Figure 1. Quality of work across SHARE countries (mean scores of reward at work (range 5-20) and standard error) in Wave 1 and Wave 2.

Figure 2. Quality of work across SHARE countries (mean scores of low control at work (range 2-8) and standard error) in Wave 1 and Wave 2.
As can be seen from Figures 1 and 2, quality of work varies according to the country under study. For both models, we observe an overall lower quality of work in Southern and Eastern European countries, compared to Northern and Western European countries. Concerning reward at work, differences are largest between Switzerland (top) and Poland (bottom). Poland also ranks lowest with regard to control at work where scores in Sweden are at the top. A second finding that is obvious from Figures 1 and 2 concerns the relative stability of measures of quality of work over the two measurement waves. Although some minor improvements or deteriorations are visible from single countries the scores, taken together, do not really differ.

**Variations in Quality of Work Within Countries**

The second question of interest is whether quality of work varies within the countries under study according to main population characteristics, such as age, gender, socio-economic position and employment sector. To answer this question we conducted both bivariate and multivariate analyses with ‘effort-reward ratio’ (upper tertile) and ‘low control’ (upper tertile) as criteria. In a majority of countries the percentage of participants with a high effort-reward ratio is higher among men then among women, with exceptions in Denmark and Sweden. Conversely, low control at work is more often reported in women in almost all countries. Yet, in either case, these differences are relatively small (results not shown).

With regard to age findings are less consistent. In general, younger age groups exhibit poorer quality of work compared to the group 60 plus. Yet, to some extent this might reflect a healthy worker effect. Additionally, in countries with a high employment participation rate beyond age 60, this decline of poor quality of work is less visible (results not shown). We also explored variations in quality of work according to employment sector. Interestingly, scores were relatively highest among self-employed people and relatively lowest among civil servants. As the percentage of self-employed was quite high in some Southern European countries, this effect may in part explain the poorer quality of work observed in these countries (results not shown).

The most robust and significant differences in quality of work were observed with respect to socio-economic position. Given the consistency of these trends across all countries we grouped countries into four categories (Northern, Western, Southern, Eastern) and calculated the scores of the two work models according to two different measures of socio-economic position, education and income (tertiles). Figures 3 and 4 display the results indicating a gradient in quality of work according to education and income. The gradient is steepest in Southern European countries. Overall findings indicate that within the ageing European workforce there are large differences in quality of work according to socio-economic position. If low quality of work affects health and well-being, this finding has direct implications for socially graded risks of early retirement and disability pension. Yet, whether quality of work contributes to the prediction of reduced well-being in our data set remains to be seen (see below).
Quality of Work and Well-being: First Prospective Results

Results derived from a prospective epidemiological study design have higher scientific credibility than those derived from cross-sectional investigations. This is due to the fact that both the exposure of interest (in our case quality of work) and the health condition under study (in our case depressive symptoms and self-rated health) are measured at study onset (Wave 1), whereas health is measured again at Wave 2, and is subsequently related to the
exposure. If a consistent 'dose-‘effect' relationship between quality of work and well-being is observed, after appropriate adjustments in multivariate statistical models, there is some indication that this association can be interpreted in terms of a causal relation. Here, we present findings from bivariate analyses, but discuss additional results derived from multivariate analyses.

Figure 5 Prevalence of depressive symptoms in Wave 2 (EURO-D) according to low quality of work in Wave 1 (effort-reward ratio or low control upper tertile)

Figure 6 Prevalence of decreased self-rated health in Wave 2 according to low quality of work in Wave 1 (effort-reward ratio or low control upper tertile)

Again, given a high consistency of results across the countries under study, we present the results according to groups of countries. As data from Eastern Europe are restricted to one measurement point they are excluded from this analysis. Figure 5 demonstrates the prevalence of depressive symptoms (Wave 2) according to whether participants experience poor quality of work or not at Wave 1. Despite variations in the prevalence of
depressive symptoms – with a higher percentage in Western compared to Northern and Southern countries – clear-cut differences are obvious for effort-reward imbalance and for low control at work. The same holds true for the second measure of well-being, ‘decreased self-rated health’. Results of Figure 6 indicate a higher proportion of participants with decreased self-rated health among those experiencing high effort and low reward at work and among those with low control at work, compared to the remaining participants.

These findings were further analysed in multivariate logistic regression models. A remarkable outcome of these latter analyses indicates that the robust association of socio-economic position with well-being (not shown in this chapter) is considerably diminished if measures of quality of work are introduced into the model. This observation may indicate that poor quality of work accounts for some of the effect of low socio-economic position on reduced well-being. In the final model, odds ratios of depressive symptoms and decreased self-rated health remain elevated for poor quality of work, and in particular for effort-reward imbalance.

The results of these analyses are supported by those evolving from a number of prospective and cross-sectional investigations testing associations of the two models of a health-adverse psychosocial work environment with depressive symptoms and poor self-rated health (Dragano et al., 2008; Kivimaki et al., 2007; Stansfeld and Candy, 2006). These studies were conducted in all regions of Europe and beyond, including employed men and women of different age groups and a variety of occupational categories, thus adding to the validity of the trends reported here. It is likely that continued exposure to effortful work that is not reciprocated by appropriate rewards as well as exposure to job tasks with little freedom and decision latitude in the long run undermine the well-being and health of working people by eliciting recurrent stressful experience and by reducing positive emotions and motivations in daily working life.

**Conclusions**

‘Modern’ work is more often characterized by mental, emotional and psychosocial demands and threats than by physical demands. These changes in quality of work are taken into account by models of a health-adverse psychosocial work environment, such as the demand-control and the effort-reward imbalance model.

- We found significant differences in mean quality of work between different regions of Europe, indicating a North-South and an East-West European gradient, with relatively lowest quality of work in Eastern and Southern Europe.
- We observed variations in quality of work according to age, gender, employment sector and socio-economic position within each country. These variations became most obvious if stratified according to education and income, the two indicators of socio-economic position. In all European regions under study, low socio-economic position was associated with low quality of work.
- Low quality of work of older participants in the workforce predicts a higher prevalence of depressive symptoms and a higher proportion of subjects reporting decreased self-perceived health two years later. This holds true for either measure of poor quality of work, effort-reward imbalance and low control.

What are the policy implications of these findings?
• First, it is obvious that considerable efforts are needed from responsible bodies in order to achieve a more homogeneous level of quality of work across European regions. Within the EU member states, respective frameworks and regulations have been developed and in part implemented. It is hoped that economic growth and social policy developments in post-communist countries and in the Mediterranean region contribute to this aim in the forthcoming years.

• Second, as we observe a social gradient of quality of work within all countries, including the most advanced ones, special attention should be directed towards target populations characterized by low level of qualification and low income. Educational efforts and initiatives of continued training are needed to increase the proportion of skilled and trained workforce.

• In addition, wage policies should take account of less privileged groups of older workers within the labour market to offer them appropriate earnings.

Within single branches and companies, structural measures of organisational and personnel development that are informed by the theoretical models mentioned could provide a starting point of improving health and well-being of employees. Such interventions were already shown to improve health and to reduce the economic burden of poor quality of work. It is hoped that an implementation of such measures may ultimately result in a more healthy older workforce and, thus, in marked reductions of early retirement from regular work across Europe.

References


The prevalence of age-related health problems in European countries is high. Mackenbach et al. (2005) show that around 40 percent of respondents of the first wave of SHARE in ten European countries reported to have some degree of activity limitation due to health problems and almost 50 percent reported to have some long-term health problems. Furthermore, many of them reported some limitations with ADLs (around 10 percent) or with IADLs (around 17 percent). Therefore, the demand for care by the elderly in Europe is high and is likely to increase because of the ongoing population ageing.

One of the most important sources of care to the disabled elderly is the help received from family members, which are traditionally daughters in their middle-age (Attias-Donfut et al., 2005). However, the current demographic and economic trends have raised important concerns about the difficulties these women face to combine care-giving responsibilities with other time uses. On the one hand, the increase in life expectancy implies that the probability that an adult child will face a decision on the provision of informal care to an elderly parent is also increasing. On the other hand, given the continuous increase in the female labour force participation taking up informal care may imply important economic costs in terms of reduced employment. These opportunity costs are relevant in the debate about the role of governments in the provision of care to the elderly and in the implementation of programs to support informal caregivers.

The goal of this note is to study the relationship between parental ill-health, intensive informal care-giving and employment of mid-life European women and to estimate the causal effect of changes in the health status of elderly parents on employment of their daughters, mediated through the provision of intensive informal care. We use longitudinal data from Wave 1 (release 2.0.1) and Wave 2 (release 0) of SHARE for those countries that participated in both waves. These data are of special interest for this analysis for several reasons. First, SHARE provides very detailed information on informal care-giving activities and employment status of all respondents, as well as information on their natural parents’ health status. Second, the cross-national dimension of the data allows us to compare our results across countries that strongly differ in terms of their long-term care systems and this comparison is informative in the afore-mentioned policy debate. For instance, cross-country variation in the availability of alternative sources of care-giving should be reflected in variation in the prevalence of informal care as well as in variation in the employment effects of the provision of informal care. And third, the longitudinal dimension of the data allows us to better control for common factors confounding the relationship between informal care and employment in observational data. The correlation between these two variables in cross-sectional data may be driven by their joint dependence on unobservable variables such as labour market opportunities or the fact that preferences over informal care and labour market status can be correlated. For instance, women who value their careers more may be both less likely to provide intensive care, and more likely to work when they provide care. We exploit changes in the health status of parents between the 2004 and 2006 waves, as a source of variation in the care-giving and labour supply choices in 2006 which is independent of those common confounding factors. In modern econometric parlance, we use adverse shocks to the health of parents as an instrumental variable to identify a local average treatment effect (LATE), which is the causal effect of informal care on labour force participation for a particular group of women.
Sample and Main Variables of Interest

In this analysis we focus on the group of women aged between 50 and 60 years old, interviewed in both waves and with at least one living parent in good health at the time of the interview in 2004. As Attias-Donfut et al. (2005) note, between the age of 50 and 65 individuals are involved in personal care mainly with their elderly parents. Therefore, women in this range of age are more likely to be at risk of dealing with the burden associated with combining paid employment and the provision of help to their elderly parents. However, we restrict the sample to those aged 60 at most to minimize the influence of retirement decisions.

The resulting sample has 1565 women but samples sizes are too small at the country level. Therefore, we group countries according to the availability and generosity of public formal care services and long-term care benefits, a source of variation which is very relevant to the behaviour under study. The results provided by the European Commission and the Council (2003) show that there is a clear North-South gradient with respect to these criteria, with the northern countries having extremely generous and universal long-term care systems and the southern countries covering only basic needs of the poorest elderly. Based on this we group the SHARE longitudinal countries into the following pools: the northern countries (NC) including Denmark, Sweden and The Netherlands; the central countries (CC), including Austria, Belgium, France, Germany and Switzerland; and the southern countries (SC) including Greece, Italy and Spain.

Regarding labour supply decisions, we focus on the participation decision in 2006 which we measure by an indicator variable, Labour Force Participant (LP). This variable is equal to 1 if the woman reports a positive number of weekly hours of work and 0 otherwise. In Wave 2, information about hours worked is asked only to those women who report either being employed or self-employed at the moment of the interview or having been working continuously between both waves.

Parental care-giving activities are identified from the information reported by each respondent about the provision of help provided to elderly parents living inside or outside the household in the last twelve months. With respect to this, respondents that reported to have provided care to someone living outside the household also report information about the frequency or intensity of this care (i.e., almost daily, almost every week, almost every month, less often). For those that reported to have provided care to an elderly parent living in the same household, we assume that they did it on a daily basis since this question refers to daily or almost daily help. We will focus our analysis on those care-giving activities that are more likely to represent a competing demand on daughters’ time. Therefore, we construct an indicator variable, Intensive Caregiver (IC), that is equal to one if the woman reports to have taken care of at least one living parent on a daily or weekly basis in the last twelve months and 0 otherwise.

Finally, SHARE respondents rate their living parents’ health status according to a categorical variable. However, different versions of this item are applied in Wave 1 and Wave 2. Whereas in Wave 1 the EU (European) version (Very Good, Good, Fair, Poor, and Very Poor) is used, in Wave 2 the U.S. (United States) version (Excellent, Very Good, Good, Fair, and Poor) is applied. Based on results shown in Jürges et al. (2007), a simple and quite accurate way of mapping one scale into the other is to collapse the two top categories of the U.S. version as category “Very Good”, and the two bottom categories of the EU version as category “Poor”. This results in a four-point comparable scale (Very Good, Good, Fair, Poor).
Our measure of the existence of negative shocks to the health status of parents between the two waves is defined by a binary variable, Negative Health Shock ($\Delta PH$). This indicator equals 1 if either of the following conditions holds. First, at least one parent went from a very good, good, or fair health status to a poor health status and the other parent – if alive – did not improve his/her health status from poor to one of the other categories. Second, if one the parents died between both interviews and the surviving one has poor health in Wave 2.

Table 1 shows averages of these binary variables at the country group level:

<table>
<thead>
<tr>
<th></th>
<th>NC (DK,SE,NL)</th>
<th>CC (AT,BE,FR,DE,CH)</th>
<th>SC (GR,IT,ES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta PH=1$</td>
<td>9.49</td>
<td>9.51</td>
<td>7.40</td>
</tr>
<tr>
<td>$\Delta PH=1$</td>
<td></td>
<td>$\Delta PH=0$</td>
<td>$\Delta PH=0$</td>
</tr>
<tr>
<td>Labour Participant=1 ($^*$)</td>
<td>60.87</td>
<td>71.58</td>
<td>56.96</td>
</tr>
<tr>
<td>Intensive Caregiver=1 ($^{**}$)</td>
<td>30.43</td>
<td>21.98</td>
<td>35.44</td>
</tr>
<tr>
<td>Sample sizes</td>
<td>46</td>
<td>79</td>
<td>419</td>
</tr>
<tr>
<td>(total)</td>
<td>419</td>
<td>722</td>
<td>424</td>
</tr>
</tbody>
</table>

Table 1 Prevalence of parental health shocks, employment and intensive care-giving (%)
Note: ($^*$) Adverse parental health shock between 2004 and 2006. ($^{**}$) In 2006.

The first row measures the prevalence of negative shocks in parents’ health status between the two waves. Overall, almost 9 percent of women had a parent that experienced a negative health shock as defined above. The following two rows show the percentages of labour force participants and informal caregivers in Wave 2 for women whose parents experienced a negative shock ($\Delta PH=1$) and for women whose parents did not experience such shock ($\Delta PH=0$). These simple cross-tabulations show that in all countries women whose parents experienced an adverse health shock participate less on average than women who did not experience the shock. This difference is particularly remarkable for southern countries where only 11.8 percent of women that had a negative parental health shock participate in the labour market, compared to 38.0 percent for women with no such shock. In addition to this, the results confirm a clear North-Central-South gradient in the female labour force participation running from the highest percentages of labour force participants in northern countries to the lowest percentages in the southern countries, regardless of whether parents experienced a health shock or not.

With respect to the provision of intensive informal care, we see that there is not a large variation across these three groups of countries in the prevalence of this type of service. In particular, even though northern middle-aged women participate much more in the labour market, they are not less likely to provide intensive care to an elderly parent. In addition to this, the table clearly shows that there exists a positive relationship between the occurrence of a negative change in parental health status and providing intensive care in Wave 2 for all countries, especially for the South.
Empirical Strategy and Results

We now go from the correlations in Table 1 to very simple estimates of parameters which have a causal interpretation. Under plausible assumptions, these estimates provide quantitative answers to the following questions: Does a negative change in the health of parents lead to increased intense informal care by mature women, and does this in turn cause a reduction in employment? Are these responses different across countries? With this aim we compute a simple instrumental variable (IV) or Wald estimator, which is the ratio of the following two differences in means. In the numerator we obtain the difference in the proportions of labour force participants in 2006 for women with and without a shock to the health of their parents. Likewise, in the denominator we have the difference in the proportions providing care in 2006 for these two groups. Therefore, both numerator and denominator correspond respectively to the difference in the proportions of labour force participants and intensive caregivers for women with $\Delta PH=1$ and women with $\Delta PH=0$ which are shown in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>NC</th>
<th>CC</th>
<th>SC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerator</strong> (Difference in LP)</td>
<td>-0.1071</td>
<td>-0.0120</td>
<td>-0.2618***</td>
</tr>
<tr>
<td></td>
<td>(0.0758)</td>
<td>(0.0591)</td>
<td>(0.0606)</td>
</tr>
<tr>
<td><strong>Denominator</strong> (Difference in IC)</td>
<td>0.0845</td>
<td>0.1149**</td>
<td>-0.2054**</td>
</tr>
<tr>
<td></td>
<td>(0.0713)</td>
<td>(0.0565)</td>
<td>(0.0857)</td>
</tr>
<tr>
<td><strong>Wald Estimate</strong></td>
<td>-1.2676</td>
<td>-0.1046</td>
<td>-1.2746*</td>
</tr>
<tr>
<td></td>
<td>(1.4242)</td>
<td>(0.5118)</td>
<td>(0.7053)</td>
</tr>
<tr>
<td><strong>Sample Size</strong></td>
<td>419</td>
<td>722</td>
<td>424</td>
</tr>
</tbody>
</table>

Table 2: Wald Estimates

Note: Standard errors robust to heteroskedasticity in parentheses. (*) Significant at 10%. (**) Significant at 5%. (***) Significant at 1%. Similar results are obtained when controlling for age and education.

In order to interpret our estimates we follow the framework in Imbens and Angrist (2004), which we describe in the Appendix. We make the following two assumptions about the causal mechanisms linking the variables LP, IC and $\Delta PH$. First, we argue that a negative parental health shock influences the employment choices of women only through its effect on the decision to provide (or not) intense informal care. Second, we assume that any woman who would provide care in the absence of negative parental health shock would also provide care if a negative shock happened, which seems highly plausible. In the language of econometrics, the first assumption states that $\Delta PH$ is a valid instrument for IC and the second assumption states that it is a monotone instrument.

Imbens and Angrist (2004) show if these assumptions are valid the Wald estimate can be interpreted as a local average treatment effect (LATE) specific to the instrument. More specifically, the LATE parameter is the average effect of intensive care on the probability of employment for the so-called compliers. These are the women whose care-giving decision is changed by the value of the health instrument. In particular, they would not provide intensive care in the absence of a negative shock to the health of their parents, but they choose to provide care when there is such a shock. Note that women who are driven to provide intensive care because their parents suffer an adverse health shock are precisely the group of women that is at risk of paying an opportunity cost in the form of reduced
employment. Compliers are the group that would be targeted by any new policy aimed at reducing the opportunity costs of informal care, and therefore the number of compliers is clearly interesting from a policy perspective. Under our assumptions about the health instrument the denominator of the Wald estimator is an estimate of the proportion of compliers.

The second row in Table 2 reports the denominator of the estimator. This estimate of the proportion of compliers is positive in all three groups of countries, ranging between 21% in southern countries and 8% in northern countries. The point estimate is significantly different from zero in southern and central countries at the 5 percent level. We thus find a North-South gradient in the proportion of compliers which mirrors the negative North-South gradient in the development of public long-term care systems. One may interpret these differences in the number of compliers as evidence that the greater the availability of formal care services, the less prominent the role of parental ill health in the intensive care-giving choices of middle-aged women. However, it should be noted that the gradient in the proportion of compliers may also arise from other sources such as differences in the labour market attachment or preferences of the average woman.

The first row of the table shows the numerator, which is the difference in the labour force participation rates of women with and without an adverse parental health shock. This difference is negative for all three groups of countries but it is significant only for southern countries. In particular, for this group, women whose parents experienced a substantial deterioration between 2005 and 2006 years are 26 percent less likely to be at work in 2006. Moreover, this difference is significant at the 1 percent level.

The Wald estimate, which results from dividing the first two rows of Table 2, attributes any effect of a negative parental health shock on the employment rate of women to its effect on the provision of intensive informal care. The average effect of intensive care-giving on labour force participation for these women whose care-giving decision would be affected by negative parental health shocks is significant, negative and very large in southern countries. Note that the true LATE parameter is bounded between -1 and 1 and estimates outside this range are an artifact of small samples. The Wald estimates for central and northern countries are also negative but standard errors are large. Therefore, it is only in southern countries that we find statistically significant evidence (at the 10 percent level) of an important trade-off between care-giving and employment. We can think of at least two reasons why this local average treatment effect is not significant for northern and continental countries. First, the higher accessibility to part-time jobs or more flexible working schedules in northern and central European countries may facilitate the compatibility of these two activities. Second, given the higher availability of public formal care services in northern countries, it may be that only women who can more easily combine both activities will take up care-giving activities in the event of parental ill-health, which could lead to a smaller or non-significant effect.

**Main Conclusions**

- Middle-aged European women who reported a deterioration of the health of their elderly parents between 2004 and 2006 were less likely to be working and more likely to be providing intensive informal care in 2006. These correlations grow in size and significance from North to South. This North-South gradient mirrors the negative North-South gradient in the development of long-term formal care systems.
The number of mid-life women whose care-giving and employment behavior is potentially affected by parental ill-health seems quite large in southern European countries. Our first estimates, obtained under plausible assumptions about counterfactual scenarios, imply that in 2006 around 20% of women would provide intensive care if and only if an adverse shock to the health of their parents occurred in the previous two years. In that event, most of these women would choose not to work because of the burden of care-giving. Further research is needed to check the robustness of these results, to exploit other measures of labour supply, health and care available in the SHARE data and to provide a framework to interpret cross-country differences in the correlations between these variables.

References