THE ROLE OF INSTITUTIONS IN EUROPEAN PATTERNS OF WORK AND RETIREMENT

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Abstract

This paper uses the Survey of Health, Ageing and Retirement in Europe (SHARE) to investigate the role of pension and social security institutions in shaping the European patterns of work and retirement. We provide evidence on the extent of "unused capacity" in labor force, on pathways to retirement and on the relationship between actual health status and disability take up. We find that institutional differences between countries explain much of the cross-national differences in work and retirement, while differences in health and demographics play only a minor role.

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1. Introduction

Welfare provisions for the older population occupy much of the political debate around the sustainability of social security programs in Europe and their reforms.[1] On the one hand, a higher life expectancy calls for a later retirement age in order to keep the balance between time spent working and time spent in retirement approximately constant. On the other hand, early retirement, partially through unemployment and disability provisions, are widespread benefits of social policy that workers do not want to give up easily. Since the increase in longevity has been accompanied with a decline in age-related morbidity, the costs of this social achievement in terms of lost production work and strain on the pay-as-you-go financed pension systems and old-age related welfare programs has become large. A widely held view amongst economists is that there is "unused capacity" for active work (see for example Gruber and Wise 1999 and 2004).

This paper sheds light on the complex retirement patterns that have emerged in Europe during the recent decades. They are very different among European countries, in spite of very similar trends in mortality and morbidity. One obvious explanation for the complexity and multitude of retirement patterns are the different institutional arrangements in each country. They affect both the supply of, and the demand for, labor at older ages. On the supply side, social security and pension arrangements create opportunities to retire at various ages, using pathways created by old-age pensions, disability pensions, sickness and unemployment benefits. On the demand side, it might be optimal for firms to discharge older workers when their productivity does not increase anymore but labor contracts still impose rising wages. In addition, it is often cheaper to dismiss older rather than younger workers when a company is forced to restructure because severance payments to older workers are effectively subsidized by early retirement and disability benefits.

This paper is by no means the first paper on retirement patterns in a European or broader international context, see e.g. the work by Kohli et al. (1991) and work by the team around Gruber and Wise (1999, 2004, 2007). Our paper, however, features two key novelties. First, we use the strictly harmonized data from the Survey of Health, Aging and Retirement in Europe

[1] See, for instance, European Commission (2004).

(SHARE).[2] The ex-ante and ex-post harmonization permits a much more precise comparison across countries than possible with earlier data sets. Moreover, the SHARE data permit a better distinction between exit from the labor force and entry into the pension system than earlier data. Exit from the labor force can come earlier, at the same time, or later than the entry into the pension system. Second, SHARE includes not only socio-economic characteristics, but also health data. Health, although obviously a *prima facie* important driver of retirement, has rarely been used as a quantifiable factor in internationally comparable retirement analyses.

Section 2 of this paper provides an overview of retirement patterns in Europe. We classify individuals according to a set of mutually exclusive self-reported labor force states. In addition, we ask whether individuals receive a pension and whether individuals receive labor income. This allows a detailed analysis of multi-staged retirement transitions. We observe strikingly different retirement patterns, with the proportion of workers ranging between 20% (Italy and Austria) and 40% (Switzerland and Sweden), while the share of retired individuals ranges between 36% (the Netherlands and Spain) and 62% (Austria).

Section 3 studies the various pathways of retirement in detail. In most countries, exiting from the labor force does not necessarily lead to receipt of a public pension. In some countries, there is some substitutability between different forms of inactivity. For example in the Netherlands, the percentage of disabled people peaks in the 60-64 age group to reach 15%, and this is clearly a substitute to unemployment or early retirement.

Section 4 investigates the role of health by restricting the attention to individuals who are in "good health". We observe a strikingly high frequency of individuals who are healthy and/or have no limitations but classify themselves as fully retired. This percentage is particularly high in Austria, France and Italy, and it holds even for individuals younger than age 60. These findings strengthen the "unused capacity" view of many economists.

Section 5 provides a detailed multivariate econometric analysis. We investigate the role played by social security and pension rules in shaping labor supply decisions and analyze the comparative relevance of institutional and individual determinants of transitions through the different routes leading to effective retirement. Such detailed analysis is possible since the SHARE data contain all necessary dimensions of the individuals' decision framework.

[2] For a description see Börsch-Supan et al. (2005) and Börsch-Supan and Jürges (2006). See also www.share-project.org.

Section 6 concludes. After assembling all the pieces of the puzzle, a clear picture emerges. First, institutions play a very large role in shaping retirement patterns. They explain most of the international variation. A brief longitudinal analysis shows that there are pathways to retirement which are also largely due to institutional differences. Second, within each country, i.e. given the national institutions, health and subjective survival probability explain a substantial share of the remaining within-country heterogeneity of retirement patterns. Third, there is no doubt that there is considerable "unused capacity" in some countries in which they can tap into if they wish to alleviate the strain on their social security systems.

2. Economic activities of older Europeans: an overview

The analysis in this paper uses three different concepts of economic activity. The first concept is self-reported activity status. The SHARE questionnaire has each respondent classify herself into one of six mutually exclusive labor force states: "worker", "retired", "unemployed", "disabled", "homemaker", or "other". Note that we force respondents to decide whether they feel themselves e.g. as "retired" rather than "working"; there is no option of an in between.

The second concept is based on the receipt of income. We ask all respondents whether they receive labor income ("working"), either from employment or self-employment; public transfer payments, including public pensions ("retired"), disability benefits ("disabled"), and/or unemployment compensation ("unemployed"). We also ask respondents whether they receive private pensions, including private early retirement and disability pensions.

Finally, the third concept is based on actual working hours. The SHARE questionnaire asks every respondent how many hours she actually works. We use this information to distinguish the states "not working" and "any work at all".

The three concepts are independent from each other. Of course, many respondents will fall in the two conventional categories: (a) self-reported working, full time working hours, receipt of labor income and no transfer income, or (b) self-reported retired, zero working hours, receipt of a public pension and no labor income. But many other combinations are possible, e.g. (c) a respondent may receive disability benefits (concept 2), feels retired (concept 1), but is working some hours anyway from time to time (concept 3), or (d) a recipient of unemployment benefits (concept 2) who has been unable to find work for some time (concept 3) and therefore feels retired (concept 1). This set of three independent concepts permits a detailed analysis of multi-staged retirement transitions.

Figure 1 gives a broad impression of the first concept: self-reported activity status. The data refer to all respondents of the first wave, encompassing both "age-eligibles" (persons born in or before 1954) and their spouses. We focus on workers and retired individuals and group all other categories in the residual ("all other"). Two observations catch the eye: First, work and retirement are the two prevalent activity states reported in the SHARE sample. Second, already at age 61 more SHARE respondents classify themselves as retired rather than working.

Table 1 provides the details behind Figure 1. It lists the distribution of all six self-reported activity categories, separately by country. The entries are weighted to represent the population aged 50 and older using weights provided with the SHARE data set. The differences in the distribution of self-reported activities across countries are very large, with the proportion of workers ranging between 20% (Italy and Austria) and 41% (Switzerland), while the shares of individuals reporting to be "retired" range between 36% (the Netherlands and Spain) and 62% (Austria). Striking is also the large difference in the proportion of respondents classifying themselves as "disabled" which is 1% in Italy but more than 8% in the Netherlands. In Denmark, Germany and Belgium there are particularly many respondents who classify themselves as "unemployed". This fraction is much lower in Italy and Greece, but also in the Netherlands. Finally, there is a surprisingly large variation in the share of respondents who classify themselves as "homemaker". It is particularly small in Sweden (just 1%), very large in Spain (over 32%) and the other Mediterranean countries, but also the Netherlands (around 21%).

These stark differences may have several, not mutually excluding explanations. The explanation which interests us most in this paper is that the pension policies, in particular early retirement regulations, adopted by the different countries are an important determinant of labor force participation decisions at older ages. Table 1 yields evidence to this hypothesis insofar as countries which feature large shares of one early exit route (say, unemployment) have low shares of alternative routes to labor force exit (say, disability). The gender-age stratification in Figure 2 provides some additional evidence: less than one out of ten men over 65 classify themselves as working in all countries (except for Switzerland). Austrians and Italians, both men and women, seem to exit the labor force at earlier ages than other Europeans. In particular, only 10% of Austrian men between age 60 and age 64 define themselves as working, compared to almost 60% of Swedish men. This is perfectly in line with the applicable statutory retirement ages in the two countries. We will provide a more detailed analysis in section 3.

A second explanation are national customs which may drive the type of self-reports visible in Table 1. Evidence for this may be the strikingly large cross-national variance in the share of "homemakers". Figure 2 therefore also adds the gender dimension. The prevalence of self-reported "working" is generally lower for women than for men, mostly because of the relatively large fraction of women who report their status as "homemaker".[3] It is highly probable that "homemaker" women never had a labor market experience during their lifetime. Section 3 will exploit the other two economic activity concepts to better understand potential differences between self-reports and hard answers. Finally, there are many other personal characteristics which are likely to drive retirement behavior. Section 4 focuses on health as a determinant of age and pathway of retirement, and section 5 will provide a multivariate analysis in which all quantifiable characteristics available in the SHARE data are included.

3. Partial retirement, unemployment, disability, and other forms of pre-retirement

Self-reported activity status could be affected by individual perceptions and also by institutional features of the pensions systems. For example, in some countries individuals may be allowed to work while collecting pension benefits (possibly subject to an earnings test) and classify themselves as retired even if working. One could define this situation "partial retirement" and it is most likely to occur (where allowed) in the years just preceding full retirement.[4] To investigate further the impact of these different arrangements on actual choices of workers we exploit the different concepts of "working" but also the different concepts of being "retired" or being "disabled".

Table 2 shows how self-reported activity status is not uniquely associated to a single source of income. Not surprisingly, 90% of Europeans who self-report as retired receive at least one public or private old-age or early retirement pension. But some of them also receive disability benefits or labor income. Most respondents who self-report as disabled receive disability benefits (67%). However, one out of ten of those who self-report as disabled receive labor income, and a similar fraction receives at least one public or private old-age or early retirement pension. One every two respondents who self-report as unemployed receives unemployment benefits, but one out of five receives labor income from employment or self-employment.

[3] A detailed table by gender and age of all activities is available upon request.

[4] See Börsch-Supan, Brugiavini and Croda (2008) for a synopsis of the main institutional features relevant for the elderly in the SHARE countries.

Figure 3 compares the three different notions of working and retirement. Figure 3a compares the prevalence of the self-reported definition of worker with the definition based on receiving labor income and the definition of "actual worker" i.e. having worked even if for a few hours. For all countries receiving labor income or doing some hours of work is more prevalent than the corresponding self-reported case. This result suggests that although many people do not regard themselves as workers they have some "bridge jobs" in old age.

Figures 3b-d show the prevalence of retirement according to the first (self-reported labor market status) and the second concept (receiving pension income). In Figure 3b, we observe an apparently counterintuitive fact that in all countries (apart from the Netherlands) the fraction of recipients is lower than the fraction of self-reported retired. However this is because we limit the definition of pension receipt to old age or early retirement provisions.[5] Once we allow for survivor's benefits or even for disability benefits the results are reversed (Figures 3c and 3d). This evidence simply suggests that the retirement condition is perceived as a more general condition than just "being retired from work": it stresses once more the impact that institutions have on economic behavior.

Figure 4 performs a similar exercise for the unemployment and the disability conditions. The results are striking as there are wide cross countries differences between the two concepts: Belgium and the Netherlands stick out. In the former there are many more people collecting unemployment benefits than self-reported unemployed (presumably these people define themselves retired) while in the latter there are more people collecting disability benefits than self-reported disabled.

Figure 5 strengthens this evidence by focusing on the boundary between people who report themselves as "working" (either employed or self-employed) and those self-reporting "retired". We introduce the category of people who are "retired but working". These are respondents who report themselves as "retired" according to concept 1 but who have done some paid work during the last month as classified by concept 3, as defined in Section 2. The share of individuals aged 50 to 69 that can be considered as "retired but working" fluctuates between approximately 1% in Italy and 9% in Switzerland. In a companion paper, Börsch-Supan, Brugiavini and Croda (2008) examine how these states evolve as people age and show that the Scandinavian countries, Germany and Austria are characterized by a flexible transition between work and retire-

[5] We take into account both public and private old age pensions and early retirement pensions. War pensions are also included where they apply.

ment. This flexible transition extends far into the older ages. In particular, Denmark sticks out as a country with an especially high prevalence of "retired but working" respondents, but also Austria and Italy have a large share in the older age ranges. [6]

The availability of two waves of SHARE data allows us to explore the transitions out of the labor market over a two year period. Table 3 shows the transitions in self-reported economic activity for respondents that were interviewed in both waves. The row and the columns of the table correspond to the (self-reported) labor force participation status in the 2004 and the 2006 wave, respectively. Over the two year period between SHARE interviews, a substantial fraction of employed respondents, almost 20%, moved out of the labor force, into unemployment, disability or retirement. However, retirement is not the only absorbing state. There are several exit routes which appear to be relevant. Notice also that more than 7% of respondents move back from disability or retirement into employment, and more than 20% of respondents who self reported being unemployed in the 2004 wave, are back into employment by the 2006 wave. Clearly, these patterns are largely dominated by the legislation adopted in each country.

So far we have combined the first concept of retirement (self-reported activity status) with the second concept (labor income) and the third concept (working hours). However, even for people who are totally inactive and define themselves "retired", this does not necessarily correspond to retirement in the sense of the second concept (receiving an old-age pension). In the different countries, an important role is played by non standard -- but sometimes dominant -- forms of transitions between employment and full retirement. These pathways are generally classified in three main categories defined by the type of transfer income received:

- One pathway is *unemployment*: people are laid-off from their last job before being eligible to normal pension benefits. They are therefore forced to spend some time in unemployment before being considered or considering themselves as retired.
- A second pathway is *sickness or disability insurance*. This route should only apply to people for whom early exits from the labor force result from objective health problems. But some countries have also tended to use these benefits as a device for managing general cases of "uneasiness" about work or even obsolescence of the worker, due for in-

[6] One may think that such flexible transition into retirement is dominated by part-time occupations. This is not the case. Table 4 in Börsch-Supan, Brugiavini and Croda (2008) shows that among those, who work a positive number of hours, there is surprisingly little part time work.

stance to the fact that the skills of an old worker are no more recognized or demanded by employers.

- Finally, some countries have created *pre-retirement schemes*. Sometimes these are sector-specific (for managing large scale redundancies in some declining industries), sometimes these are nation-wide programs.

Figure 6 shows the enormous variability in the prevalence of disability and unemployment at older ages, as defined by the self-reported activity status (concept 1).[7] Among the Northern countries, the Danish and the Dutch cases provide a clear illustration of the substitutability between pathways. While in Denmark the prevalence of unemployment is far higher than in the other countries (particularly at ages 55-60), the importance of the disability route for the Netherlands is a well-known and well-documented aspect of the management of older workers in this country: the percentage of disabled people in the 60-64 age group peaks to reach almost 20%. The Dutch unemployment rate in this age group is quite low, one of the lowest in the entire sample of countries. In addition, the fraction of disabled people drops to about 2% around age 65, which is the age at which the majority of Dutch people, including the disabled, move to the "retired" category.

Among the mid-European countries, Germany is a country where unemployment is highly relevant as a pathway to retirement, while disability is very low – in a striking contrast to the neighboring Netherlands. France has a peak in self-reported disability status at early ages (around 56) while Switzerland has a late peak (at about age 63).

In the ages which typically precede retirement, a variety of patterns emerges for the southern countries. Disability is almost non existent for Italy and Greece before age 60. It remains so also after age 60 in Italy. This may be due to the prevalence of early retirement at a very young age: Italy displays low or very low rates for both unemployment and disability. In Greece, disability increases rather than decreasing at the age where people move into retirement: a puzzle to be further investigated. Spain is atypical: the profile of unemployment is relatively flat.

As much as the self-reported activity status does not necessarily correspond to the receipt of labor income or hours worked, the self-reported activity status shown in Figure 6 does not fully correspond to the receipt of the transfer income associated with that status. This holds especially

[7] The age profiles in Figure 6 are smoothed to remove the sampling variability that is observed in the raw data.

for the Nordic countries where self-reported disability is less frequent than the receipt of a disability pension (this was called concept 2 in section 2). Figure 7 therefore shows the prevalence of disability insurance benefits among respondents between ages 50 and 65.[8] Again, the cross-national differences are striking. We can distinguish four country groups. Very high enrolment rates exist in Denmark, the Netherlands and Sweden. Between 13 and 16 percent of individuals aged between 50 and 65 receive disability insurance benefits in this first group of countries. The second group has enrolment rates around the average enrolment rate of 7.5%. This group consists of Switzerland, and Spain. Here the enrolment ranges from 6 to almost 10 percent. Belgium, Germany, France, and Italy, the third group, have below average enrolment rates between 4 and 6 percent. In Austria and Greece less than 3 percent of individuals aged between 50 and 65 receive disability insurance benefits.

The evidence presented so far exhibits a puzzling feature of the European welfare state. First, the differences among the three concepts of retirement are remarkable. There are cleavages between self-reported activity status and actual activities, and, even more impressive, there are large cleavages between status and public transfer receipt. Second, the cross-national differences among the variants of "the" European welfare state are striking. They are very unlikely generated by differences in the underlying socio-economic and health characteristics of the respondents; rather, these different patterns suggest institutional differences and their power to shape retirement decisions:[9] depending on national arrangements, access to the various pathways may be relatively straightforward, and financially more or less attractive also resulting from the labor market configuration and in particular from labor demand.

4. Retirement age and reasons for retirement: Is there unused capacity?

A widely held view amongst economists is that there is "unused capacity" for active work.[10] While the analysis in the previous sections yields strong evidence that institutional factors play a dominant role in shaping retirement transitions, this section takes a closer look at health before

[8] For a precise definition of disability insurance in each SHARE country, see Börsch-Supan (2007).

[9] More detailed descriptions of the institutional arrangements that could affect these patterns can be found in Blöndal and Scarpetta (1998) or Gruber and Wise (2004).

[10] The idea of "unused capacity" has been first elaborated by Gruber and Wise (1999) who argue that there is an implicit tax on labor providing the incentive to retire early.

rushing to premature conclusions.[11] Only if bad physical or mental health can be ruled out as an explanation for high inactivity rates at relatively young ages can we speak of "unused capacity".

Direct evidence of the reasons for retirement for the self-reported retirees is provided in Figure 8. The original SHARE question provides 9 answer categories that are not mutually exclusive. We have regrouped these answers into five major headings:

(1) "normal" transition due to the fact that people had become eligible either for a public or private pension;

(2) early retirement including undesired early retirement, such as in the case of people to whom a early retirement option or a pre-retirement has been proposed or imposed (e.g. because of a redundancy);

(3) retirement due to personal health reasons;

(4) retirement in order to "enjoy life" or retire at the same time as the spouse does;

(5) all other reasons, including various family or personal reasons.

The first one of these five motives dominates in the older age class. Striking, however, is the large international variation, particularly in the youngest age category (Figure 8b). In Börsch-Supan, Brugiavini and Croda (2008) we show that early retirement is chosen by 66% of Swiss males in the 55-59 age range and 50% males in the Netherlands. In Sweden and Greece it is less than 11%. At age 65+, eligibility for a pension is chosen as a reason for retirement among 86% of Greek and 83% of Spanish males, but only by 32% of Dutch males. Health, in turn, is reported by 22% of Danish males, 21% of German males and only 8% of Greek males aged 65+ as a reason to retire. This very large cross-national variation is the role of health as a self-reported driver of retirement also extends to women.

It is notable that the international pattern of health as retirement motive does not fit obvious explanations. For instance, it seems natural to find that health reasons are less frequently reported in a country like Italy where age at retirement is low: since health declines with age, health constraints should weigh less in countries where retirement is offered at lower ages.

The role of health as a main driver of retirement is further put into doubt by Figure 10, which shows the distribution of actual work and retirement by restricting the attention to individuals in "good health". Being in "good health" is defined on the basis of two indicators: (i) self-reported

[11] See also Kalwij and Vermeulen (2008).

absence of health conditions that limit the ability to work ("healthy"), and (ii) absence of any limitation in doing fourteen activities or instrumental activities of daily living (ADL and IADL, "functioning"). In order to make the comparison sharper we focus on three groups of individuals: those who self-report as working and are actually currently active; those who self-reported retired and have no hours of work (retired); and those who self-report as retired but do some hours of work (retired but work). A strikingly high frequency of Austrians, French, Italians and Belgians have no limitations or are "functioning", but report themselves fully retired. This is true even for people in early retirement (i.e., younger than 60). In the following, we will show that health plays a role of explaining exit from employment, but that this role is more limited than one might think, especially when taken to the country level.

Taking advantage of the longitudinal character of SHARE, Table 4 shows the (self-reported) economic activity transitions undergone by respondents who were "healthy" at the time of the 2004 wave and are still "healthy" at the time of the 2006 wave (upper figure), and for respondents whose health status has worsened from "healthy" to not "healthy" in this time interval (lower figure). In particular, a comparison of the upper with the lower figures highlights how exit from employment (row B) is more prevalent for individuals whose health has deteriorated. About 16% of respondents aged 50-69 at the time of the 2004 interview and whose health deteriorated are retired by the time of the 2006 interview, compared to 13% of those who had remained "healthy". 4% have moved into unemployment, compared to 2% who had remained healthy.[12] Hence, self-assessed health clearly influences the patterns of retirement of older Europeans.

Our next piece of the puzzle turns to what might be considered the clearest case in which health should play a major role: receipt of disability insurance benefits (the second concept in section 2). Figure 10 continues to exploit the longitudinal character of the SHARE data and relates take-up of disability insurance between waves 1 and 2 to changes in health status. We find a significant deterioration of self-assessed health among those who took up disability insurance (left panels). The health differences, however, are much less pronounced when measured more objectively as grip strength (right panels), hinting at justification bias of self-assessed health (Sen,

[12] The precision of the estimates in the disability category is low due the small sample size. The category has thus been omitted as a separate row.

2002): individuals who have enrolled in disability insurance may justify this by reporting a lower health status than what can be measured more objectively by grip strength.[13]

These findings are even more disturbing when carried to the country level. The left panel of Figure 11 correlates the percentage of respondents aged 50-64 who are enrolled in disability insurance with the percentage of same aged respondents who self-report very good or excellent health. The correlation is actually positive: Denmark with a high percentage of respondents reporting good health has also the highest share of respondents in disability insurance. This perverse correlation vanishes once objective health measures are used (such as grip strength and other indicators), see the right panel of Figure 11. One would, however, expect a strong negative correlation if health were the main driver of receiving disability benefits.

While health may not be the main concern, respondents quite definitely feel relieved when they retire. Evidence is provided by Figure 12. It presents answers to the question whether retired people have viewed their retirement as a positive or a negative event. Retirement is described as a relief by a large majority of respondents. Only between 2% and 13% of retired respondents see it as an essentially negative experience ("a concern"). This is concentrated in the "Club Med" countries: more than 13% of Greek retirees, and more than 10% of Spanish and Italian retirees, see retirement as a concern.

In conclusion, then, this section suggests the presence of a well-known social policy dilemma. In many countries, pathways to early retirement, such as pre-retirement schemes, unemployment compensation or disability insurance, are frequently taken. This frequency does not correlate well with health. This gives the notion that some countries introduced early-retirement institutions that create "unused capacity" much weight. The fiscal and economic costs associated with these early-retirement institutions are large and pressing. Most early retirees, however, express gratitude for the early relief through retirement, an indicator for the large political costs of reforming the early-retirement institutions.

5. Multivariate Analysis

The descriptive evidence of the preceding sections, while suggestive of important correlations between early retirement and institutional driving forces, does not allow for causal inference. In this section, therefore, we summarize multidimensional analyses accounting for various deter-

[13] See also Jürges (2007).

minants simultaneously.[14] We focus on the self-reported activity status (concept 1), in particular on the decision to work or retire, in the first subsection, while we take a closer look at disability insurance enrolment (concept 2) in subsection 2. Our main interest is to measure the influence of institutions, and compare this with the influence of other potential determinants such as age, gender, health, and education. The effect of institutions and labor market configuration is captured in several ways. In the analysis of the retirement decision, we use country-dummies and a measure of the generosity of the social security systems. In the analysis of disability enrolment, we make use of a full set of country-specific indicators which characterize the generosity of the disability insurance systems.

5.1. The retirement decision

The generosity of the social security system is measured through the so called "social security and pension wealth", defined as the present discounted value of expected future benefits from social security and pensions divided by total household income (SSWREL), in order to measure the generosity of the pension system relative to this individual's economic status. Total household income is a good indicator of resources available to an individual and at the same time it does not strictly correlate with her earnings or social security benefits.

The second important explanatory variable is health. Health conditions are captured by two indicator variables. They are defined exactly as in the preceding section: first, as the self-reported absence of problems hindering work, and second as the absence of any among 14 ADL and IADL limitations.

Other potential determinants of retirement are age, education, gender, but also preferences. We introduce a variable that captures a feature of preference which has been proved relevant in studies of retirement-saving, particularly in the USA.[15] This is the "expected life horizon", which is related to the planning horizon of the individual. Some authors also interpret this variable as the rate of impatience. We measure this variable either as the subjective probability of surviving to a target age or as the product of this probability with the length of the proposed target lifespan.

[14] Details on variable construction and estimation techniques can be found in Börsch-Supan, Brugiavini and Croda (2008).

[15] For the studies on saving see for example Gustman and Steinmeier (2000) and Munnell et al (1999). The informational content of subjective survival probability has been appraised, among others, by Hurd and McGarry (1997).

Finally, a set of country dummies picks up all dimensions of country-specific effects that are not captured by country-specific differences in the included variables (e.g., health and education).

Table 5 shows estimation results when the outcome variable takes the value 1 for a person self-reporting "retired" according to concept 1, and 0 for self-reporting "working". Our estimation rests on 13,244 SHARE respondents who are working or retired. We exclude "homemaker", disabled, unemployed and "other activities" cases, and restrict the sample to individuals between age 50 and age 69 because very few respondents are active after age 70.

Health makes a difference. Individuals who are "functioning" are – other things being equal – less likely to be retired while the presence of limitations in daily activities increases the probability of being retired. The other socio-economic characteristics also affect retirement as one might expect. Of special interest may be our preference measures: both the subjective survival probability and the expected lifespan have a negative effect on such a probability (i.e. the longer the planning horizon the more the chance of being a worker).

The main result, however, is that, even controlling for all these characteristics, the variable SSWREL, which captures the generosity of the social security and pension system, is significantly and positively associated to the retirement probability – i.e. institutions play a significant role. Differences in health and other socio-economic characteristics do not explain the cross-national variation in activity rates between age 50 and 69, in spite of including a full set of country dummies: the generosity of the pension system itself matters a great deal in making individuals retire or keep on working.

5.2. Enrolment in disability insurance

To indicate the power of institutions, we make use of previous work by the OECD and include a set of variables which characterize the generosity of the disability insurance system in each country. These variables measure coverage, minimum disability level required for full benefits, benefit generosity, medical assessment, vocational assessment, and the generosity of unemployment benefits.[16]

We include a broad set of health measures, ranging from self-reported health (SRH) to more objective measurements of the functional physical (as above, ADL: activities of daily living, IADL: instrumental activities of daily living) and mental health status (CES-D test battery of

[16] These variables are taken from Annex A.2.1 in OECD (2003).

mental health).[17] We include similar socio-demographic characteristics (such as age, gender, and education) as in the previous subsection, and use the same probit specification.

Table 6 presents the results in four blocks: demographic variables, health variables, institutional variables, and interactions among them. A first finding is the large unexplained variation. The (Pseudo-)R^2 is only slightly higher than 0.25, in spite of a rich specification of health. This is in line with the findings of OECD (2003) where only little correlation between "medical disability status" and "disability enrolment status" was found.

Demographic variables are jointly significant. Women have a lower probability to enrol into disability insurance, conditional on health. Older age increases to probability to be enrolled until about age 63. We apply a piecewise linear specification, with breakpoints at ages 55 and 60. Notable is the sharp increase in the enrolment probability between ages 50 and 55.

All health variables are strongly significant. Noteworthy is the significant effect of mental illness, measured by the CES-D battery, conditional on physical health, and the strong effect of instrumental activities of daily living (IADLs) probably picking up work-related disability. Given these functional measures, self-reported health remains highly significant and quantitatively large. Nonetheless, demographics and health explain, in isolation, only about a sixth of the total variation.

The institutional variables are highly jointly significant. All measures are scored by the OECD from 0 to 5. Coverage measures on a 0 to 5 scale which population groups are eligible for insurance. The highest score is given if disability insurance covers the entire population; the lowest score if only employees are covered. A broad coverage increases disability enrolment, but the effect is surprisingly small and insignificant. A lenient minimum disability level to claim benefits has more influence on disability insurance uptake and is significant in all three specifications. The generosity of benefits is significant, but with an unexpected negative sign, as is the disability level required for full benefits. The strictness of a medical exam reduces disability uptake. Whether vocational considerations play a role in the eligibility process or not is insignificant, as is the permanence of benefits. The last institutional variable measures the duration and benefit level of unemployment compensation, a possible alternative to disability insurance as an early retirement device. Indeed, tight unemployment insurance increases disability insurance enrolment in a highly significant and quantitatively important way.

[17] SHARE collects EURO-D as depression measure in the main survey and CES-D in the drop off. We have used CES-D where available and imputed CES-D from EURO-D where necessary.

We also interact the institutional variables with selected demographic and health variables. These interactions explain some of the surprising finding discussed above. For example, the surprisingly small influence of coverage turns into a very large effect for women and those of poor health. The latter is straightforward to explain; the former maybe a result of the low labor force participation of European women who have difficulties to be eligible for a normal old-age pension and thus may seek disability pensions. This corresponds to the very high female enrolment in some countries; in Germany, a lenient eligibility to disability insurance for women was explicitly a policy instrument in the early 1980s. Another example for the importance of interaction effects is the generosity variable, which carries an unexpected negative sign in the overall regression, but is strongly positive for the older part of the sample (age 60 and over).

The somewhat abstract regression results receive life in the following exercise: we predict in a counterfactual simulation exercise which share of our sample individuals would take up disability insurance if all countries had the same demographic composition, the same distribution of health, and/or the same institutional characteristics as the average of the SHARE countries. By counterfactually wiping out one kind of difference among countries, we can graphically display the influence of the variable having created those differences in the first place. Take the example of health. If health were the main driver of disability insurance enrolment, making health counterfactually equal across all countries should also make disability insurance enrolment rates close to equal in all countries.

The results of this exercise are striking, see Figure 13. The counterfactual simulation holding eligibility and benefit generosity indicators constant produces much more similar disability uptake rates than holding demographics and health constant. Hence, most cross-national variation in enrolment rates can be explained by the institutional factors embedded in the five OECD indicators, much more than demographics and health.

6. Conclusions

The variation in retirement behavior, old-age labor force participation and disability insurance take-up rates across European countries is striking. In Austria and Italy, the age at which a normal pension is first received is about 6 years earlier than in Denmark and Sweden. In turn, disability insurance enrolment reaches from some 15 percent of individuals aged between 50 and 64 in Denmark, Sweden and the Netherlands to less than 3 percent in Austria and Greece. There is clearly substitution among pathways to retirement, but also an overall effect on labor force

participation: In Sweden, Denmark and Switzerland, almost 40% of individuals aged 50+ classify themselves as working, while only about 20% do this in Italy and Austria.

While health is an important determinant of earlier retirement, it does not explain the large cross-national variation. This is explained by institutional differences in welfare systems, which clearly affect the distribution and the age pattern of participation to the labor market and of retirement. Countries where early retirement is allowed and/or is generous see a prevalence of early retirees (typically Southern countries, but also Austria and France). Furthermore, in countries where other exit routes are allowed as form of early retirement (disability and unemployment) these substitute for retirement. The most influential institutional variable to explain disability enrolment is the minimum level of disability to obtain full benefits. This variable alone explains more than 60% of the cross-national variation. It seems to be the most powerful policy variable when countries such as the Netherlands, Denmark and Sweden want to bring their disability insurance enrolment rates closer to the average European level.

There is potentially huge unused labor capacity in countries such as Austria, Italy and France where “healthy” individuals are not in the labor force. Econometric evidence corroborates the early findings: even controlling for health characteristics, age, gender and country effects, the generosity of the social security and pensions systems helps explaining the pattern of retirement (or disability) vis-à-vis work.

The social policy implications are clear. If Europeans want to reduce the already high tax and contribution burdens in the light of population aging, they should exploit the unused capacity of individuals who self-report to enjoy a good functional health status. The current retirement institutions provide generous early retirement options, partially through lenient disability and unemployment insurance rules. Employers and employees cannot be blamed taking these options up, even if the workers are happy and healthy. Rather, it is the task of politicians and lawmakers to align institutions with the necessity to make our social security systems more sustainable: to align early retirement ages with an increased life expectancy, to adapt disability insurance to actual functional disability, and to devote unemployment insurance to those who are temporarily out of work and actively search for a new job.

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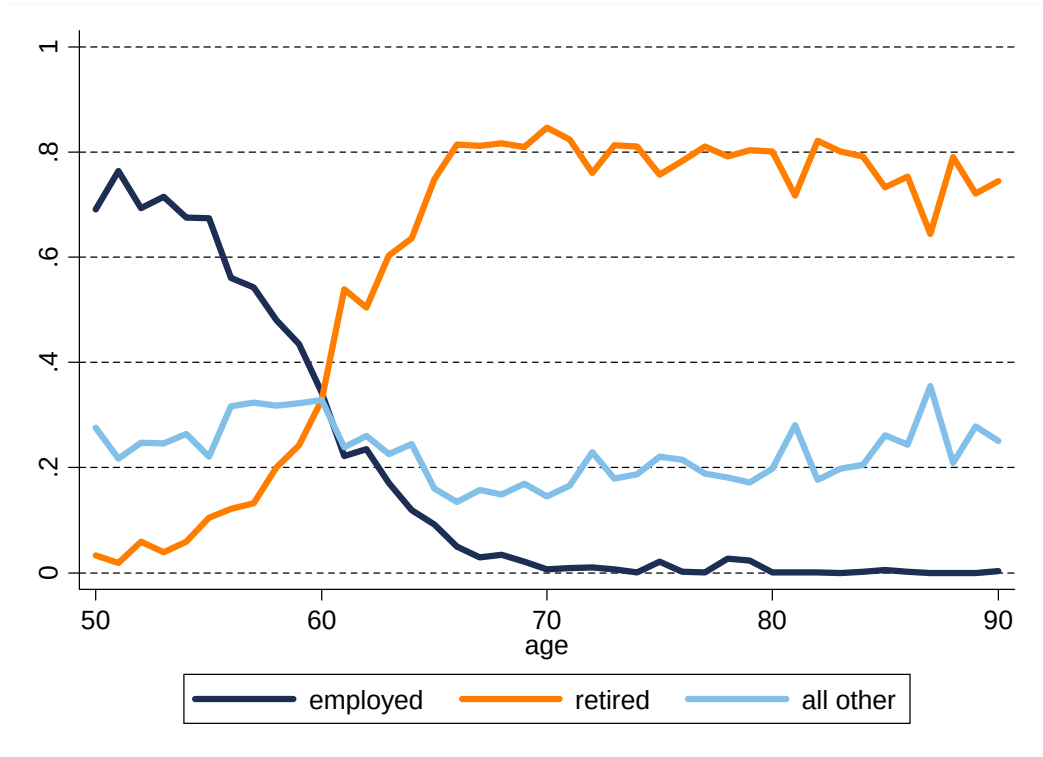
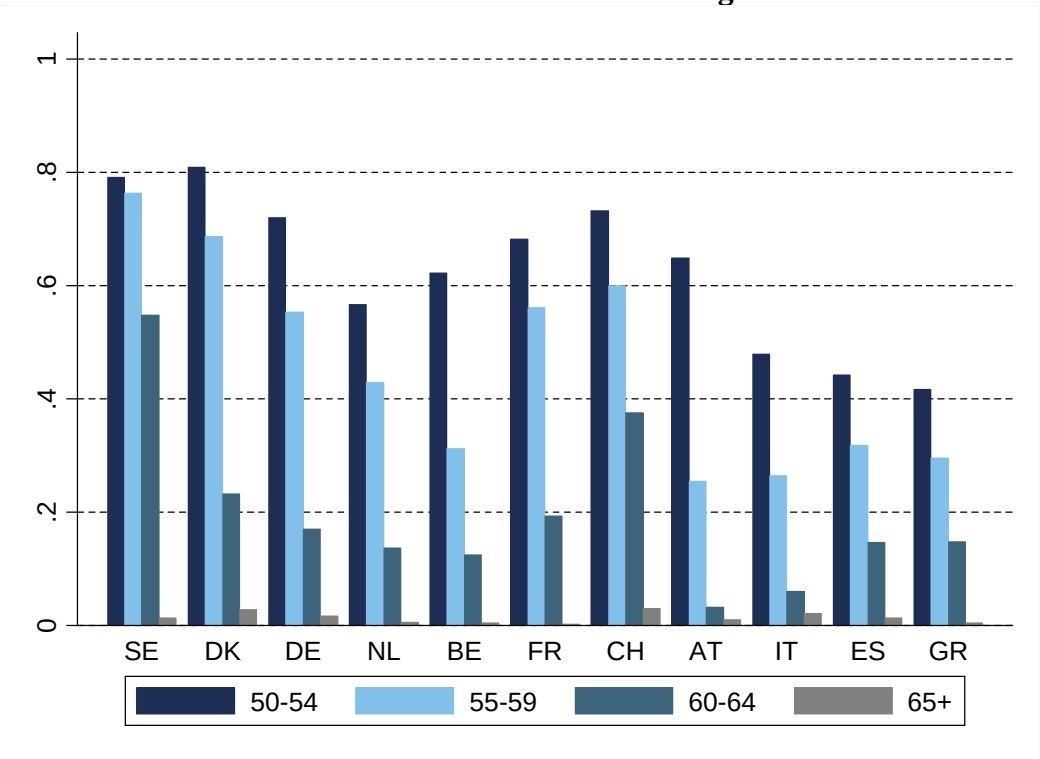
Figure 1: Self-reported economic activity by age



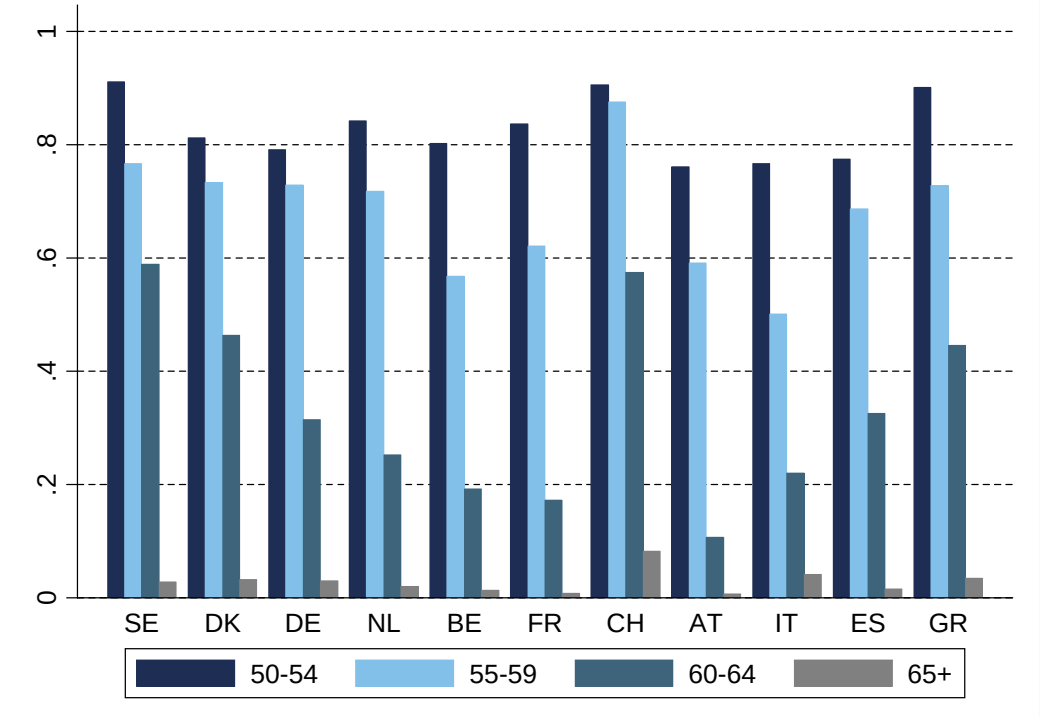
Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 2: Distribution of economically active individuals by gender, age class and country

Women working



Men working



Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 3: Different concepts of economic activity: workers and retirees
Figure 3a: Workers

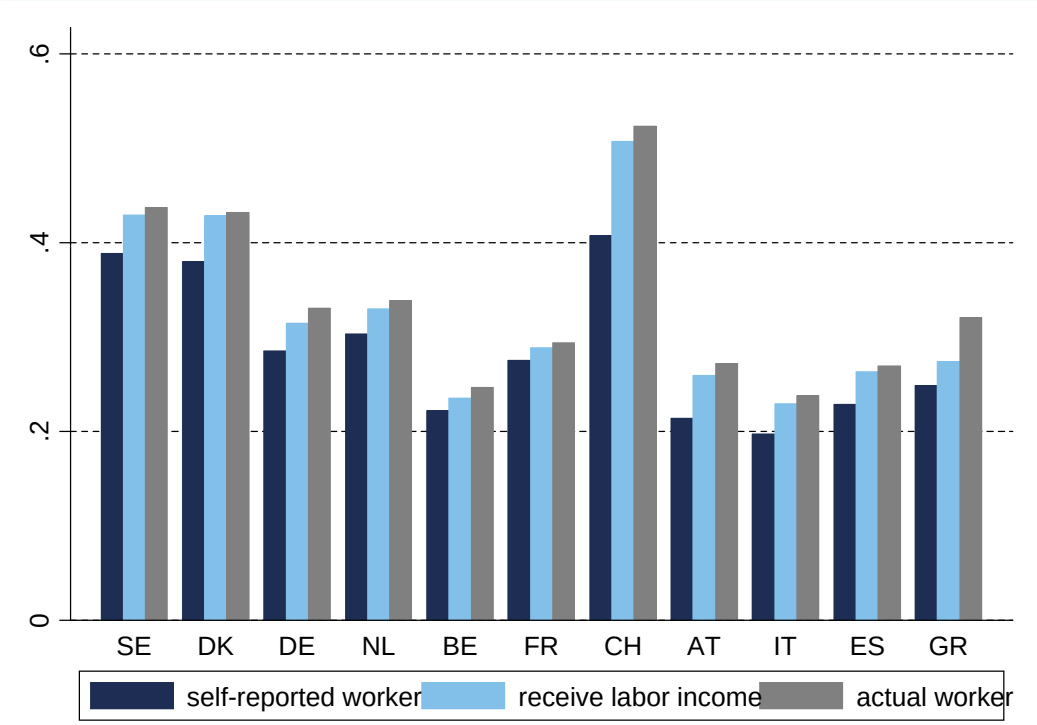


Figure 3b: Retirees and receipt of public/private old age or early retirement pension

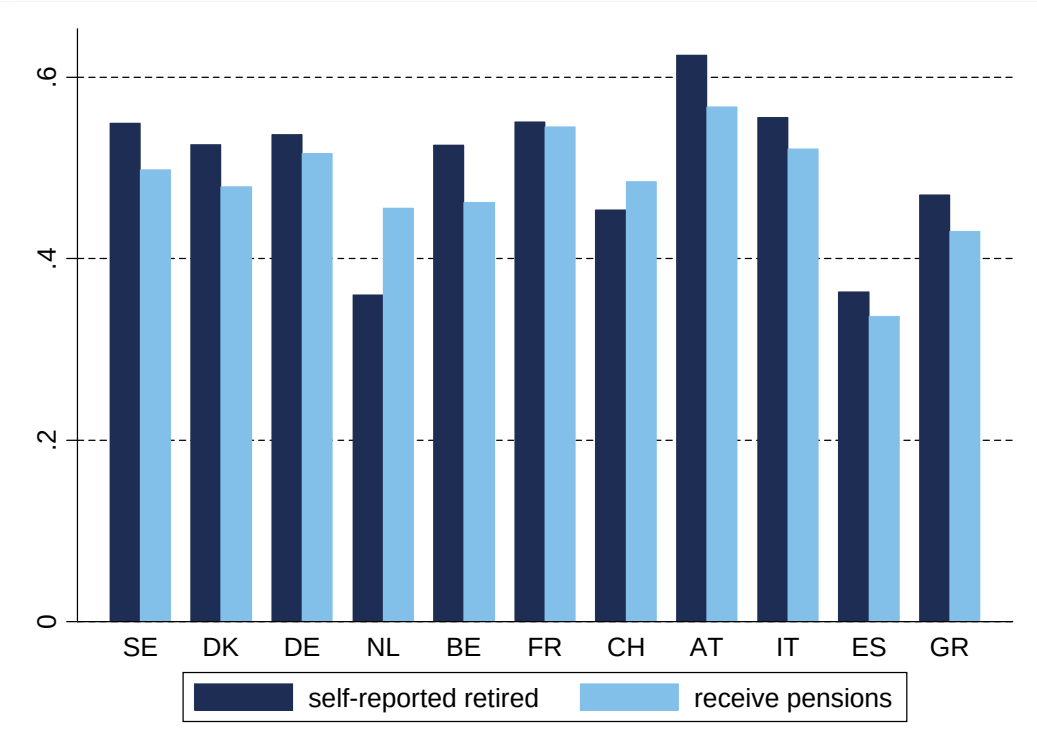


Figure 3c. Retirees and receipt of public/private old age, early retirement or survivor pension

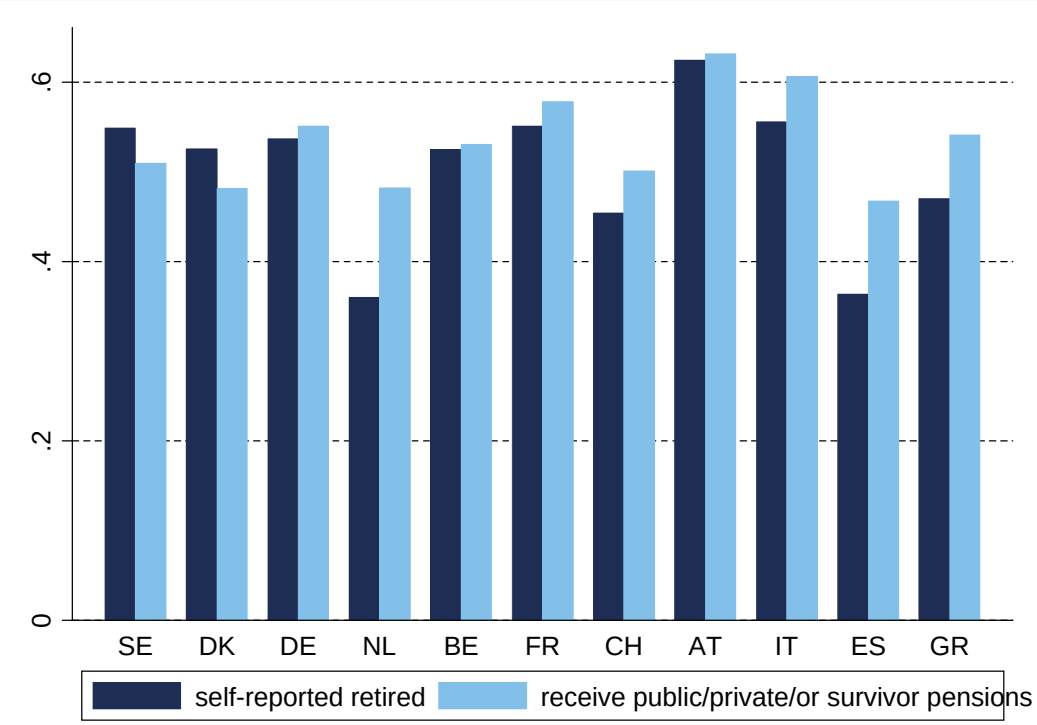


Figure 3d: Retirees and receipt of any benefit or pension

Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 4: Different concepts of economic activity: unemployed and disabled
Figure 4a: Unemployed

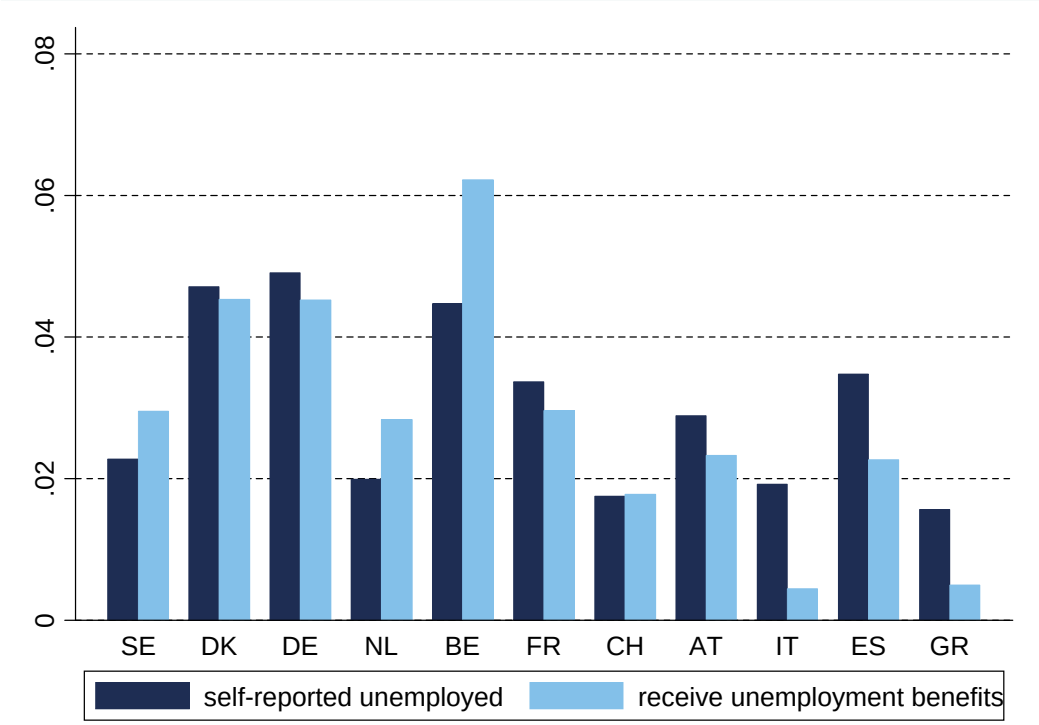
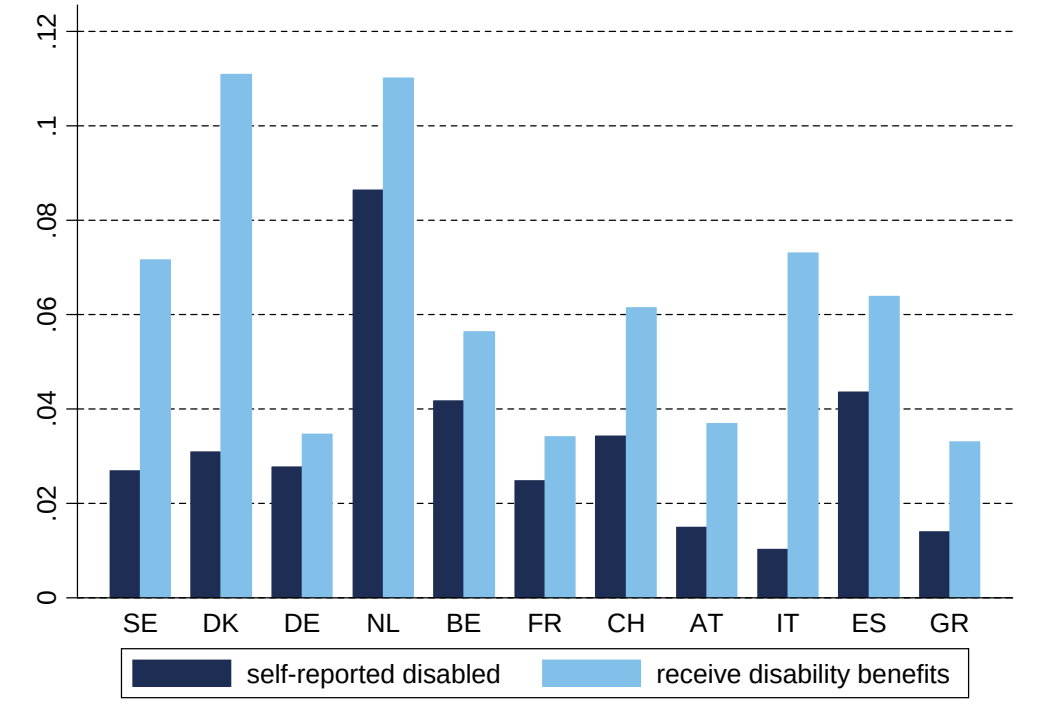
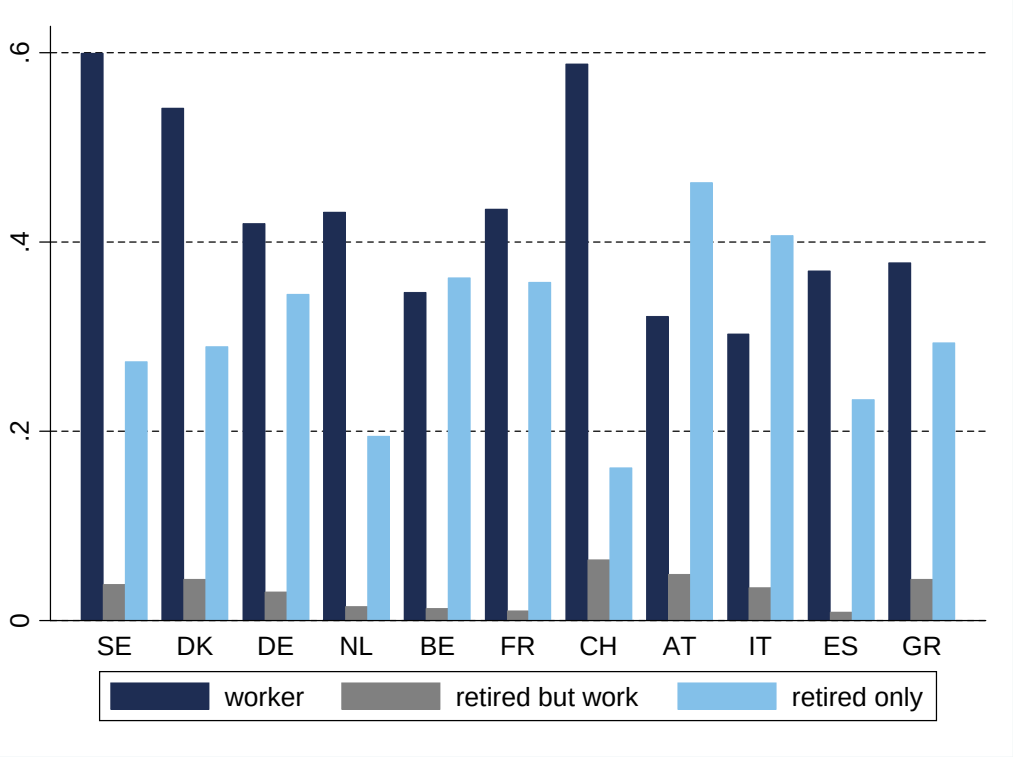


Figure 4b: Disabled



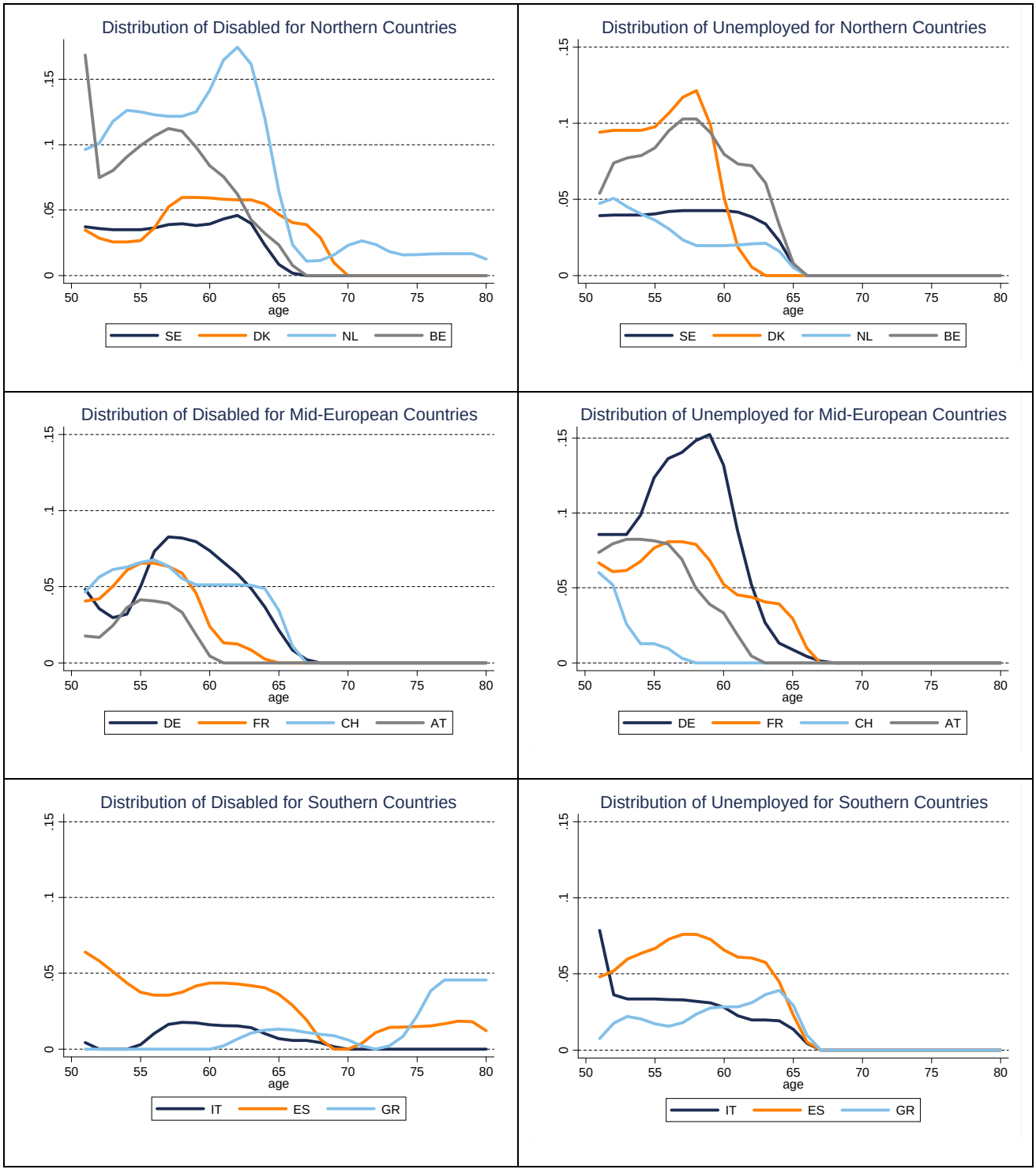
Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 5: Prevalence of work, retirement and "retirement with some hours of work"



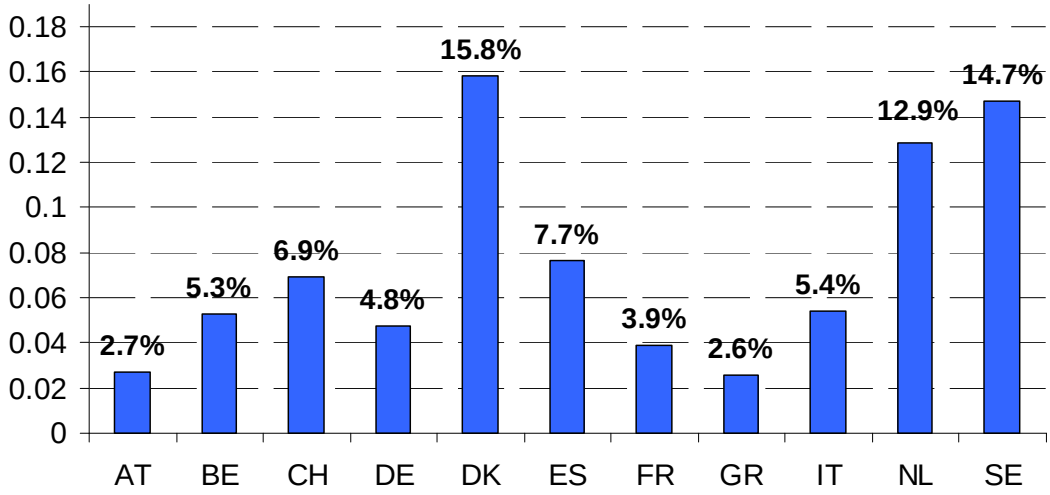
Source: Authors' calculations using SHARE 2004. Age 50-69. Population-weighted data.

Figure 6: Distribution of self-reported disability and unemployment



Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 7: Disability insurance enrolment in Europe, 2004



Source: Authors' calculations using SHARE 2004. Age 50-65. Population-weighted data.

Figure 8: Reasons for retirement
Figure 8a: Reasons for retirement by country

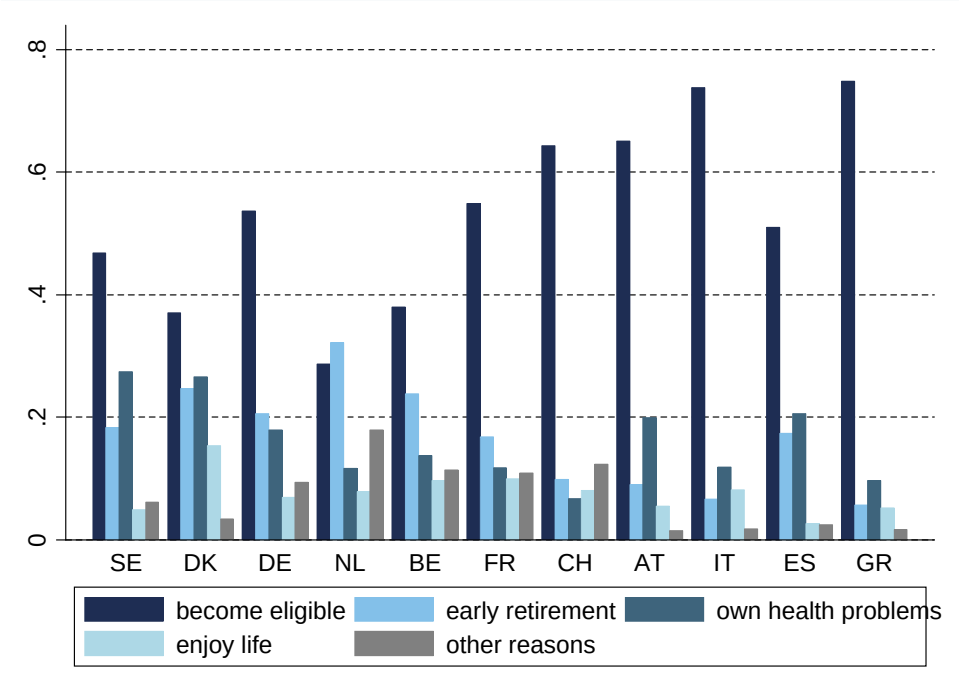
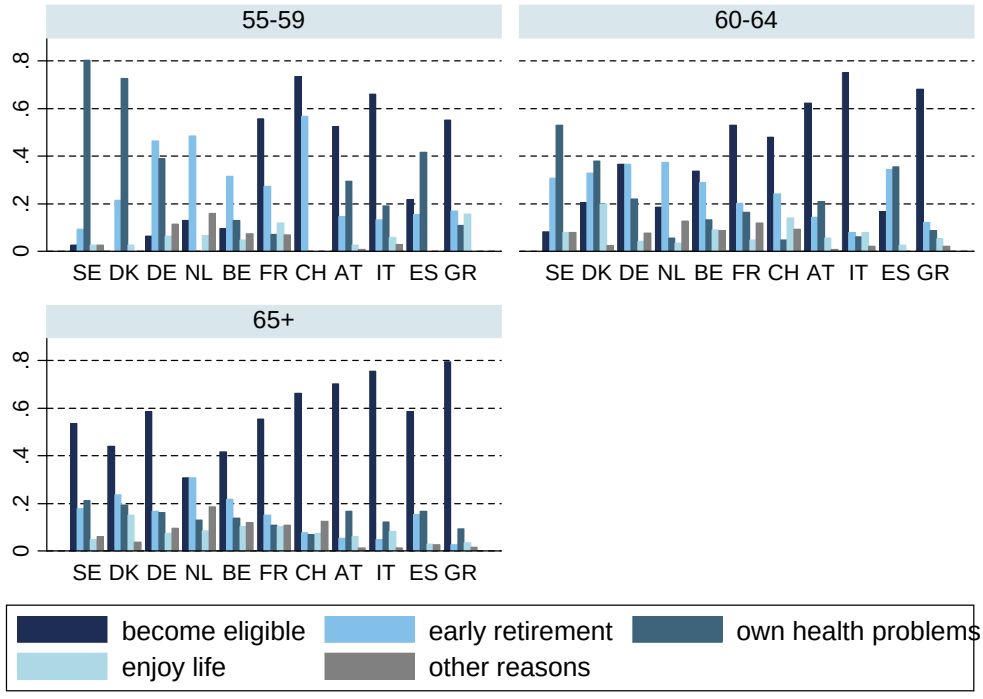


Figure 8b: Reasons for retirement by country and age classes



Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 9: Economic activity and physical health

Figure 9a: Economic activity of "healthy" respondents

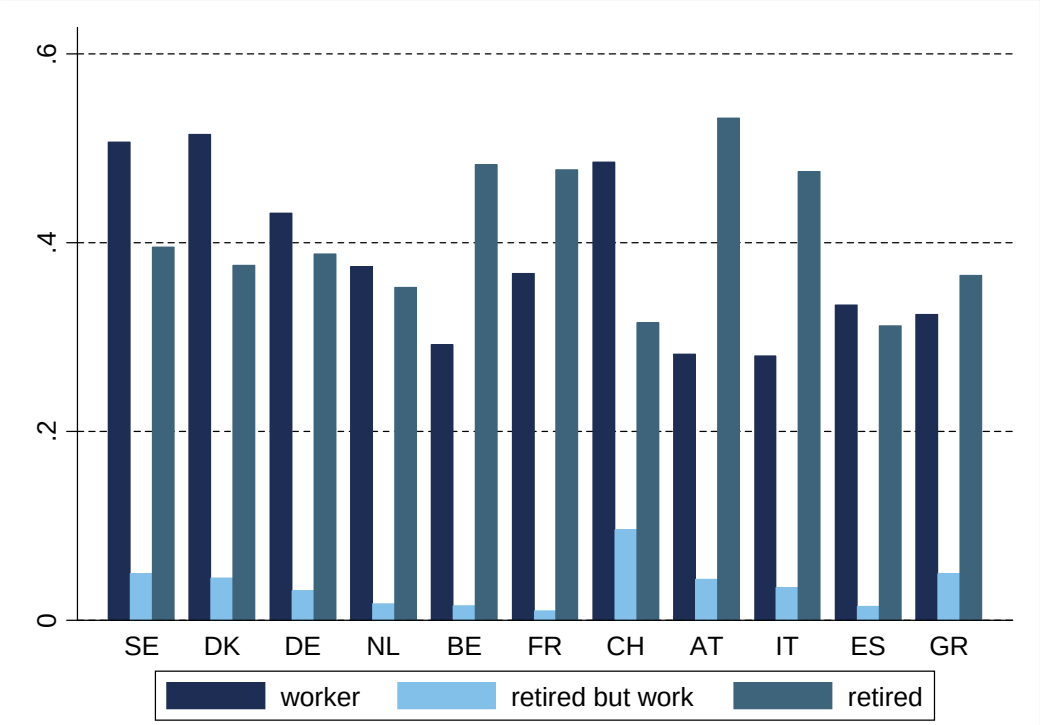
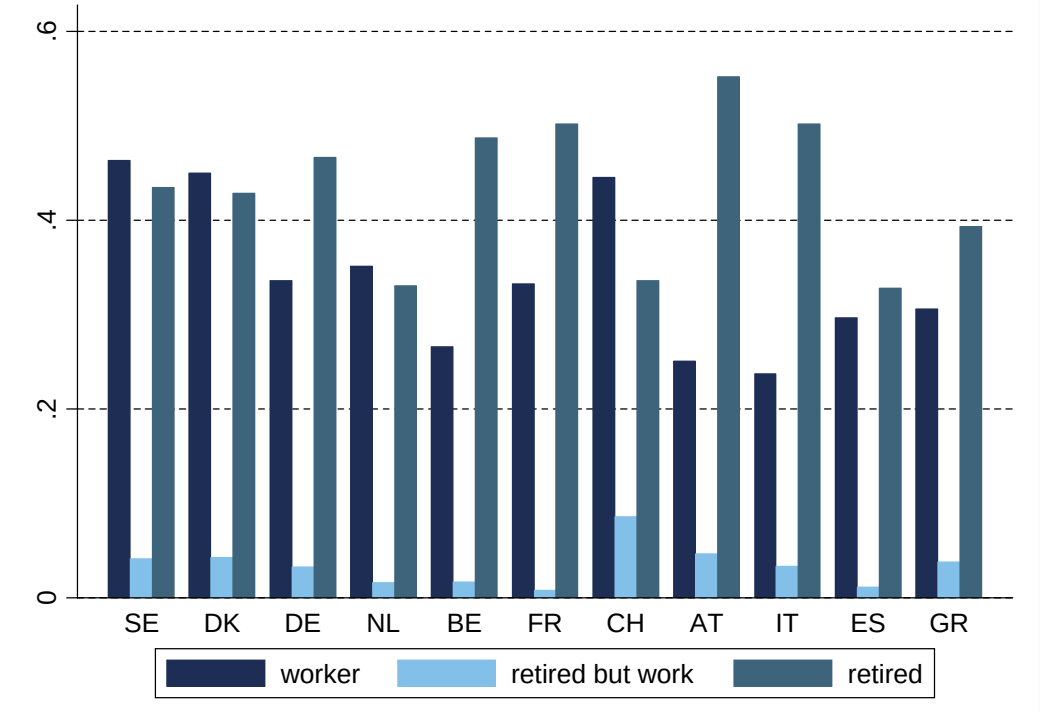
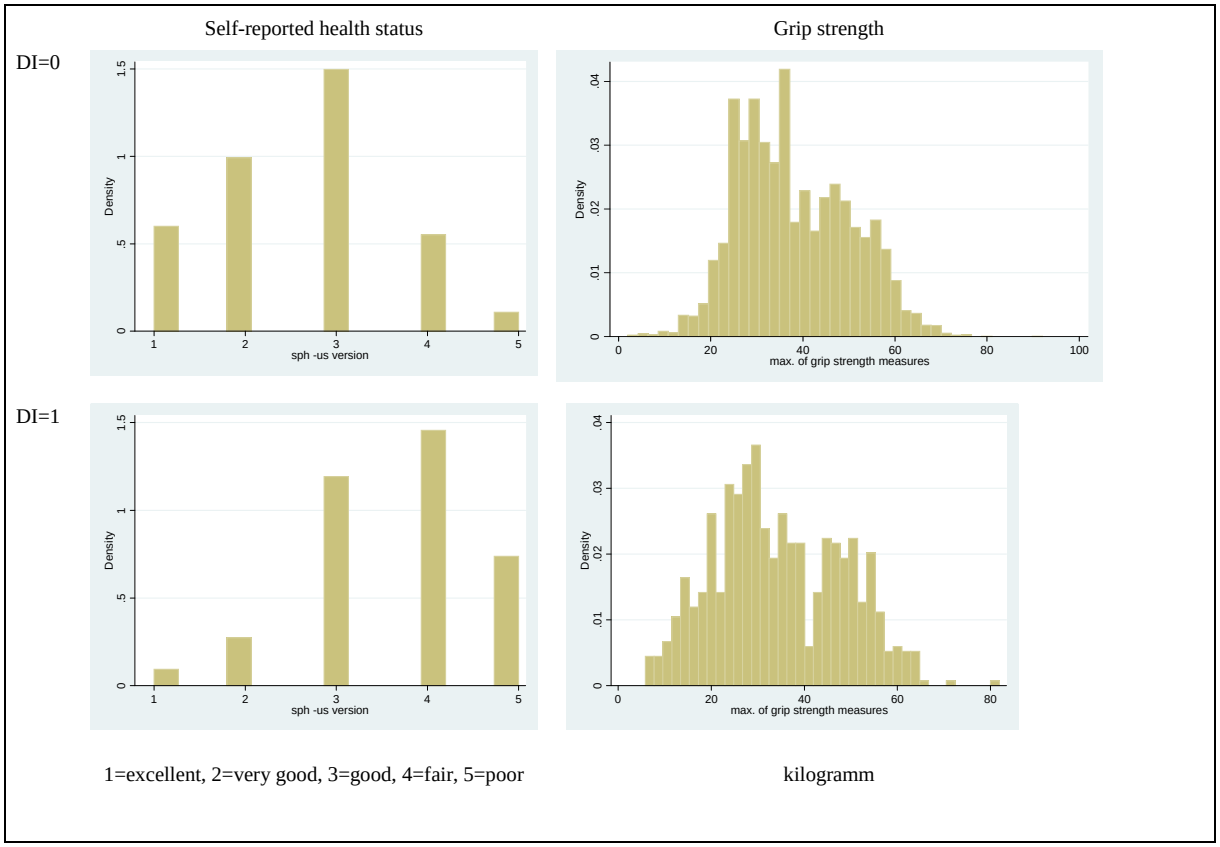


Figure 9b: Economic activity of "functioning" respondents



Source: Authors' calculations using SHARE 2004. Population-weighted data.

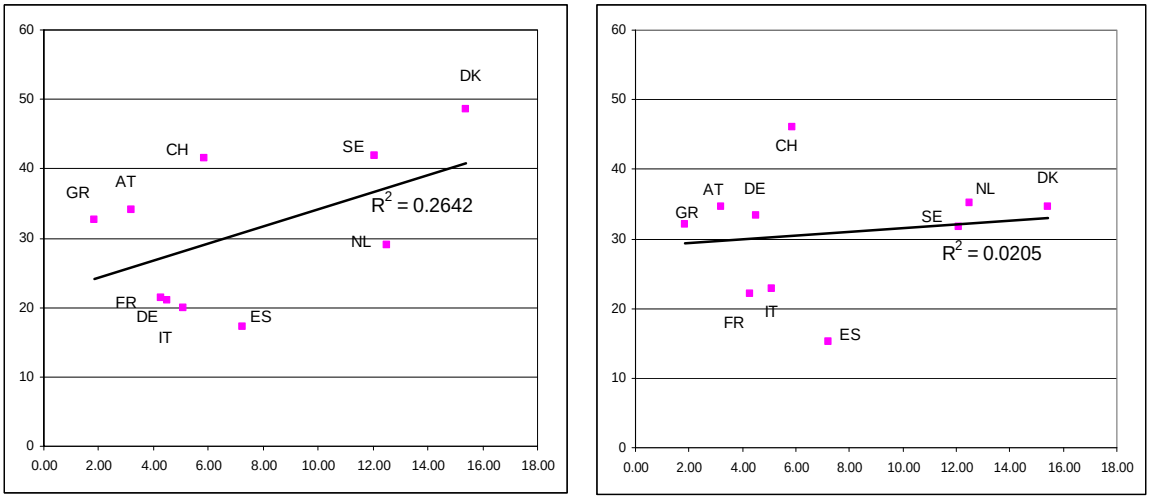
Figure 10: Health by disability insurance enrolment, across all countries



Source: Authors' calculations using SHARE 2004. Population-weighted data.

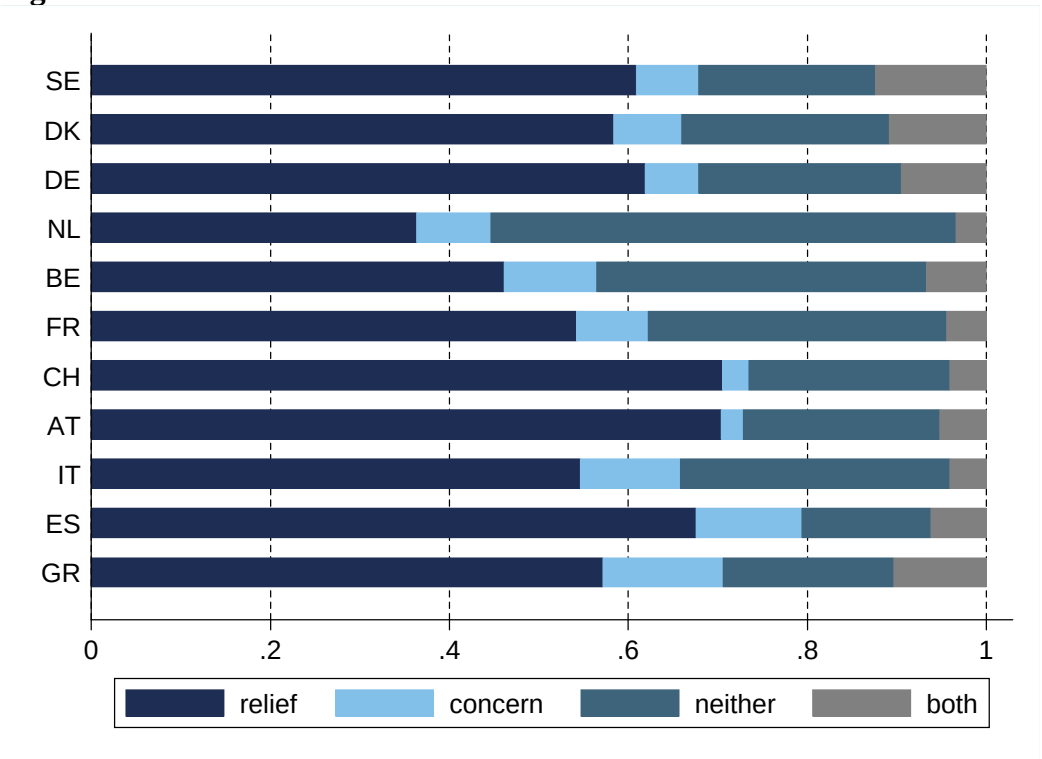
Figure 11: Health and disability insurance enrolment, by country

Self-assessed health status **Measured health status**



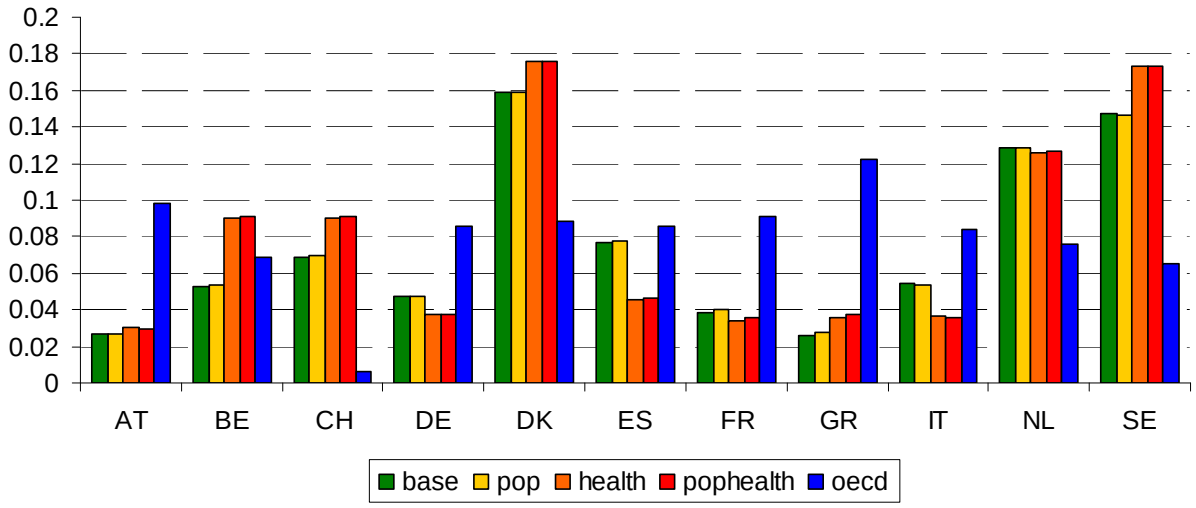
Source: Authors' calculations using SHARE 2004.

Figure 12: Retirement: Is it a Relief or a Concern?



Source: Authors' calculations using SHARE 2004. Population-weighted data.

Figure 13: Baseline enrolment rates and counterfactual simulations



Note: Based on linear regression specification in Table 6.

Table 1: Self-reported labor market status by country

	Employed	Retired	Unemployed	Disabled	Homemaker	Other
SE	38.9	54.9	2.3	2.7	1.0	0.3
(N=2,988)	(1.0)	(1.0)	(0.3)	(0.3)	(0.2)	(0.1)
DK	38.0	52.6	4.7	3.1	1.6	0.0
(N=1,695)	(1.3)	(1.3)	(0.6)	(0.4)	(0.3)	(0.0)
DE	28.5	53.7	4.9	2.8	10.1	0.0
(N=2,920)	(0.9)	(1.0)	(0.4)	(0.3)	(0.6)	(0.0)
NL	30.3	36.0	2.0	8.6	21.3	1.8
(N=2,850)	(0.9)	(1.0)	(0.3)	(0.6)	(0.8)	(0.3)
BE	22.2	52.5	4.5	4.2	16.5	0.1
(N=3,603)	(0.7)	(0.8)	(0.3)	(0.3)	(0.6)	(0.1)
FR	27.5	55.1	3.4	2.5	11.3	0.3
(N=2,937)	(0.9)	(1.0)	(0.3)	(0.3)	(0.6)	(0.1)
CH	40.7	45.4	1.8	3.4	8.7	0.0
(N=940)	(1.6)	(1.6)	(0.5)	(0.6)	(0.9)	(0.0)
AT	21.4	62.4	2.9	1.5	11.8	0.0
(N=1,840)	(1.0)	(1.2)	(0.4)	(0.3)	(0.8)	(0.0)
IT	19.7	55.6	1.9	1.0	21.7	0.0
(N=2,495)	(1.0)	(1.2)	(0.3)	(0.2)	(0.9)	(0.0)
ES	22.9	36.4	3.5	4.4	32.2	0.7
(N=2,320)	(1.0)	(1.1)	(0.4)	(0.5)	(1.0)	(0.2)
GR	24.9	47.0	1.6	1.4	24.9	0.3
(N=2,654)	(0.8)	(1.0)	(0.3)	(0.2)	(0.9)	(0.1)

Source: Authors' calculations using SHARE 2004. Based on a sample of 27,152 individual 50+ respondents who reported their current situation. Percentage values. Standard errors in parentheses. All figures, except for sample sizes, are population-weighted.

Table 2: Self-reported economic activity and income receipt

	Labor Income	Pension	Unemployment benefit	Disability benefit
Retired	4.4 (0.2)	89.2 (0.4)	0.9 (0.1)	4.4 (0.3)
Employed	97.1 (0.3)	2.6 (0.3)	1.9 (0.2)	1.9 (0.2)
Unemployed	20.6 (2.0)	2.0 (0.6)	50.9 (2.4)	2.6 (0.5)
Disabled	11.3 (1.5)	10.0 (1.4)	2.2 (0.6)	67.4 (2.3)
Homemaker	2.6 (0.3)	15.3 (0.8)	0.5 (0.1)	3.5 (0.4)
Other	9.4 (4.1)	27.3 (5.4)	0.3 (0.3)	14.6 (4.8)

Source: Authors' calculations using SHARE 2004. Based on a sample of 27,100 individual 50+ respondents who reported their current situation. Percentage values. Standard errors in parentheses. All figures are population-weighted.

Table 3: Transitions in self-reported economic activity

Economic Activity in the 2004 wave	Economic activity in the 2006 wave					
	Retired	Employed	Unemployed	Disabled	Homemaker	All
Retired	8,000	59	11	126	361	8,557
	93.49	0.69	0.13	1.47	4.22	100.00
Employed	714	4,251	143	90	115	5,313
	13.44	80.01	2.69	1.69	2.16	100.00
Unemployed	145	121	224	29	55	574
	25.26	21.08	39.02	5.05	9.58	100.00
Disabled	152	33	6	274	32	497
	30.58	6.64	1.21	55.13	6.44	100.00
Homemaker	481	96	31	77	2,183	2,868
	16.77	3.35	1.08	2.68	76.12	100.00
All	9,492	4,560	415	596	2,746	17,809
	53.30	25.61	2.33	3.35	15.42	100.00

Source: Authors' calculations using SHARE 2004 and SHARE 2006. Absolute numbers and row percentages.

Table 4: Transitions in self-reported economic activity by change in health status

Economic activity 2004 wave and health status change between waves 2004 and 2006	Economic activity 2006 wave (A) Retired	(B) Employed	(C) Unemployed	(D) Disabled	All
(A) Retired					
- no change in health status	97.79	1.50	0.35	0.35	100.00
- health deteriorated	96.45	1.29	0.16	2.10	100.00
(B) Employed					
- no change in health status	13.19	84.31	2.30	0.20	100.00
- health deteriorated	15.89	74.77	4.11	5.23	100.00
(C) Unemployed					
- no change in health status	28.76	27.88	42.92	0.44	100.00
- health deteriorated	28.00	16.00	45.33	10.67	100.00
All					
- no change in health status	45.89	50.54	3.30	0.27	100.00
- health deteriorated	57.20	34.17	4.64	3.99	100.00

Source: Authors' calculations using SHARE 2004 and SHARE 2006. Based on a sample of respondents who in wave 1 were 50-69, “healthy”, and self reported as retired, employed or unemployed. 5,267 respondents reported being “healthy” in both waves (upper figures), and 1,229 respondents who reported being “healthy” in wave 1, and not “healthy” in wave 2 (lower figures). Row percentages.

Table 5: Probit Estimates of the Decision to Retire - Marginal Effects

	(1)	(2)
Respondent is male	-0.034	-0.033
	(0.013)	(0.013)
(Age/10)	-1.313	-1.495
	(0.369)	(0.363)
(Age/10) squared	0.192	0.204
	(0.031)	(0.031)
Respondent is married	0.021	0.021
	(0.017)	(0.017)
Years of schooling	-0.014	-0.014
	(0.002)	(0.002)
No functional limitation	-0.103	-0.103
	(0.014)	(0.014)
IADL-limited	0.122	0.123
	(0.024)	(0.024)
Subjective survival probability	-0.106	
	(0.026)	
Subjective lifespan		-0.006
		(0.002)
SSWrel	0.021	0.020
	(0.012)	(0.012)
SE	-0.199	-0.199
	(0.023)	(0.023)
DK	-0.095	-0.096
	(0.028)	(0.028)
NL	-0.084	-0.085
	(0.025)	(0.024)
BE	0.139	0.139
	(0.023)	(0.023)
FR	0.094	0.095
	(0.024)	(0.024)
CH	-0.257	-0.257
	(0.030)	(0.030)
AT	0.309	0.309
	(0.020)	(0.020)
IT	0.207	0.207
	(0.026)	(0.026)
ES	-0.122	-0.123
	(0.035)	(0.035)
GR	0.074	0.074
	(0.029)	(0.029)
Mean of dependent variable	0.487	0.487
Number of observations	13244	13244

Based on individuals aged 50 through 69 in 2004.

Table 6: Regression results disability insurance enrolment

	Probit	z
Female	-0.661	-1.91
Age<55	-1.068	-0.58
Age>60	0.385	0.1
Age-lin1	0.027	2.05
Age-lin2	0.006	0.15
Age-lin3	-0.006	-0.09
SRH-excellent	-0.896	-6.86
SRH-very good	-0.534	-4.28
SRH-fair	-0.007	-0.06
SRH-poor	0.361	2.49
CES-D (sum)	0.058	4.88
ADL (sum)	0.054	1.33
IADL (sum)	0.221	4.6
Coverage	0.039	0.68
Min. benefits	0.361	4.39
Full benefits	-0.184	-2.18
Generosity	-0.329	-5.03
Permanent	0.049	1.87
Medical	0.069	2.71
Vocational	-0.121	-1.79
UI-Benefits	0.106	4.02
covg_fem	0.205	4.87
minl_fem	0.015	0.15
Full_fem	-0.086	-1.17
geno_fem	-0.018	-0.23
covg_old	-0.032	-0.92
minl_old	-0.118	-1.65
full_old	-0.048	-1.12
geno_old	0.173	2.72
covg_hfpoor	0.110	5.27
minl_hfpoor	0.091	2.12
full_hfpoor	0.063	1.32
geno_hfpoor	-0.036	-0.95
Constant	-1.827	-0.71
(Pseudo-)R2		0.2588

Note: Based on 9388 individuals aged 50 through 65 in 2004.