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The role of institutions and health in European patterns of work and retirement

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Summary This article 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. The key novelty of our article is a careful account of the health status of the respondents. We provide new evidence on the extent of health-adjusted 'unused capacity' in the labour force, on the institutional determinants of the pathways to retirement, and on the relationship between actual health status and disability-benefit reciprocity. 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.

Key words disability, institutions, retirement, SHARE, work

Introduction

This article sheds light on the complex retirement patterns which have emerged in Europe during recent decades. They are very different among European countries, in spite of similar trends in mortality. There are two major competing explanations for this: institutional differences and health differences. They are not necessarily mutually exclusive. The aim of this article is to examine the relative weight of these two explanations by exploiting the richness of the first two waves of the *Survey of Health, Ageing and Retirement in Europe* (SHARE).

The first explanation for the complexity and multitude of retirement patterns is the different institutional arrangements in each country (see for example Kohli et al., 1991). They affect both the supply of, and the demand for, labour 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 labour contracts still impose rising wages. Generally, it is often cheaper to dismiss older rather than younger workers when a company is forced to restructure because severance payments can be lower to older workers than younger workers when early retirement and disability benefits are generous.

The other explanation is the cross-national variation in morbidity and invalidity. Healthy life expectancy varies more than standard life expectancy, and invalidity rates are very different across countries (see e.g. World Health Organization, 2001). Although physical work conditions have dramatically improved over recent decades, it is claimed that there is more work-related stress leading to a higher prevalence of mental disorders than a generation ago. In many

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countries, depression is the main reason for work-related disability, and its incidence varies a great deal across countries.

Understanding the relative weight of these two competing explanations is important for social policy. 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. In fact, among scholars, there is a widely held view that there is 'unused capacity' for active work at older ages (c.f. Gruber and Wise, 1999; 2004; Kalwij and Vermeulen, 2008). This view would imply that deteriorating health is not an obstacle to increasing the retirement age, a view which is not shared by the public and many policymakers as evidenced by Boeri et al. (2002). It is widely believed that older workers are physically and mentally worn out, such that early retirement payments, partially through unemployment and disability provisions, are badly needed. According to this latter view, the costs of early retirement in terms of lost production and strain on the pay-as-you-go financed old-age-related welfare programmes may be large but worth it.

The concept of 'unused capacity' has been defined in economic terms and relates to a suboptimal usage of human capital, leading to less output being produced than in a first best equilibrium. We document the extent of this unused capacity in a more complete and precise way than previously presented in the literature because our data permit us to relate the current work status of an individual to their current health condition as well as to institutional features of the economy determining their economic decisions.

This article therefore focuses on the role of health versus the role of institutions in explaining work and retirement patterns in Europe. It is by no means the first article on retirement patterns in a European or broader international context; see, for example, the work by Kohli et al. (1991), the OECD study by Blöndal and Scarpetta (1998), and the team around Gruber and Wise (1999; 2004; 2007). Our work features two key novelties. First, we use the strictly harmonized data from the *Survey of Health, Ageing and Retirement in Europe* (SHARE).¹ The ex-ante and ex-post harmonization permits a much more precise comparison of work and retirement patterns across countries than was possible with earlier data sets. This is important because retirement is not precisely defined: exit from the labour force can come earlier,

at the same time, or later than the entry into the pension system. The SHARE data permit a better distinction between exit from the labour force and entry into the pension system than earlier data, and thus a better understanding of the transition period. Second, SHARE includes not only socio-economic characteristics, but also a rich set of health data. Health, although obviously a *prima facie* important driver of retirement, has rarely been used as a quantifiable and multidimensional factor in internationally comparable retirement analyses, including the studies quoted above.

After this Introduction, the following section describes the work and retirement patterns in Europe, as emerging from the second wave of SHARE collected in 2006–07. We observe strikingly different retirement patterns with the proportion of workers out of the total sample ranging between 16 percent (Poland) and 40 percent (Sweden), while the share of retired individuals ranges between 37 percent (the Netherlands) and 64 percent (Austria and the Czech Republic). In most countries, exiting from the labour force does not necessarily lead to receipt of a public pension but to various forms of pre-retirement and partial retirement.

The third section investigates the role of health by restricting the attention to individuals who are in 'good health'. We observe an astoundingly 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.

The fourth section weaves the two preceding sections together by providing a detailed multivariate econometric analysis. We investigate the role played by social security and pension rules on the one hand and by several dimensions of health on the other hand in shaping old-age labour supply decisions. Such a detailed analysis is possible only now, since the SHARE data contain all necessary dimensions of the individuals' decision framework, including a detailed account of work patterns as well as subjective and objective measures of physical and mental health.

In the concluding section a clear picture emerges. First, institutions play a very large role in shaping retirement patterns. They explain most of the international variation. Cross-national health differences, in turn, are largely irrelevant. Second, within each country, given the national institutions, health and

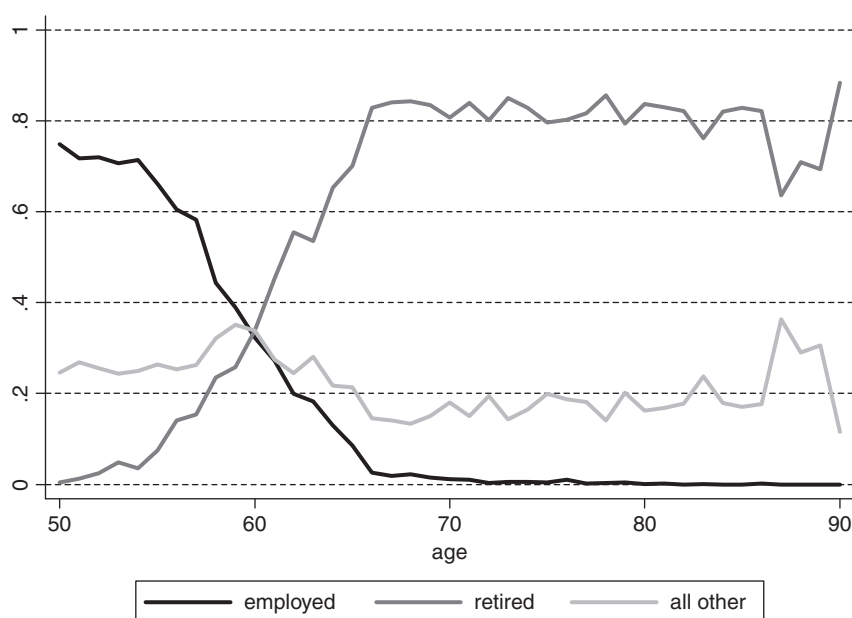


Figure 1 Self-reported economic activity by age

Note: Fraction of individuals who self-report as being employed, retired or other activity status.

Source: Authors' calculations using SHARE 2006. Whole sample. Population-weighted data.

subjective survival probability explain a substantial share of the remaining within-country heterogeneity of retirement patterns. Third, in spite of the widespread view held by the public and many policy-makers, there is considerable 'unused capacity' in some countries which can be tapped into in order to alleviate the strain on their social security systems.

Work and retirement patterns of older Europeans

Figure 1 provides the familiar picture of work and retirement in Europe. The data refer to all respondents of the second SHARE wave (2006/07), encompassing both 'age-eligibles' (persons born in or before 1954) and their spouses. The SHARE questionnaire has each respondent classify herself into one of six labour force states: 'worker', 'retired', 'unemployed', 'disabled', 'homemaker', or 'other'. The categories are mutually exclusive; that is, respondents must decide whether they consider themselves as 'retired' rather than 'working', for example, with no option of an in-between. 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 than working.

Table 1 provides the cross-national patterns behind Figure 1. The differences in the distribution of self-reported activities across countries are very large, with the proportion of workers ranging between 16 percent (Poland) and 40 percent (Sweden), while the shares of individuals reporting to be 'retired' range between 37 percent (the Netherlands) and 64 percent (Austria and the Czech Republic). Also striking is the large difference in the proportion of respondents classifying themselves as 'disabled', which is 1 percent in Austria but more than 7 percent in the Netherlands and in Poland. In Poland, Germany and Belgium there are particularly many respondents who classify themselves as 'unemployed'. This fraction is much lower in Italy and Greece, and also in the Netherlands. Finally,

Table 1 Self-reported labour market status by country

	<i>Employed</i>	<i>Retired</i>	<i>Unemployed</i>	<i>Disabled</i>	<i>Homemaker</i>	<i>Other</i>
SE (N=2,486)	39.6 (1.2)	55.1 (1.2)	2.0 (0.4)	2.1 (0.3)	0.7 (0.2)	0.4 (0.1)
DK (N=2,437)	38.6 (1.0)	50.7 (1.1)	2.7 (0.3)	6.5 (0.5)	0.9 (0.2)	0.6 (0.2)
DE (N=2,361)	26.5 (1.0)	56.2 (1.1)	5.4 (0.5)	2.4 (0.3)	8.4 (0.6)	1.1 (0.3)
NL (N=2,443)	31.9 (1.1)	37.5 (1.1)	1.3 (0.3)	7.6 (0.7)	18.9 (0.9)	2.7 (0.4)
BE (N=2,954)	23.8 (0.8)	49.8 (1.0)	4.4 (0.4)	4.8 (0.4)	15.9 (0.7)	1.4 (0.2)
FR (N=2,726)	32.2 (1.4)	50.7 (1.4)	3.4 (0.5)	2.8 (0.5)	9.3 (0.8)	1.7 (0.2)
CH (N=1,395)	38.1 (1.3)	50.0 (1.4)	1.8 (0.4)	2.3 (0.4)	11.8 (0.9)	1.0 (0.3)
AT (N=1,258)	19.7 (1.3)	64.0 (1.5)	2.1 (0.5)	0.7 (0.3)	12.0 (0.9)	1.5 (0.3)
IT (N=2,851)	18.9 (1.0)	54.0 (1.2)	1.3 (0.3)	3.0 (0.4)	21.9 (1.0)	0.9 (0.2)
ES (N=1,997)	21.3 (1.1)	38.5 (1.3)	2.8 (0.4)	5.0 (0.6)	30.3 (1.2)	2.1 (0.4)
GR (N=3,059)	27.0 (0.9)	44.6 (1.0)	0.9 (0.2)	1.8 (0.3)	24.4 (0.8)	1.3 (0.3)
PL (N=2,352)	16.4 (0.8)	61.0 (1.1)	4.1 (0.5)	10.5 (0.7)	3.8 (0.4)	4.1 (0.5)
CZ (N=2,699)	30.2 (1.2)	64.1 (1.3)	3.7 (0.6)	1.8 (0.3)	0.04 (0.02)	0.3 (0.1)

Notes: Based on a sample of 31,018 individual 50+ respondents who reported their current situation. Percentage values. Standard errors in parentheses. All figures, except for sample sizes, are population-weighted.

Source: Authors' calculations using SHARE 2006.

there is a surprisingly large variation in the share of respondents who consider themselves 'homemakers'. It is particularly small in Sweden (smaller than 1%), very large in Spain (over 30%) and the other Mediterranean countries, but also considerable in the Netherlands (around 18%).

What drives these cross-national differences? We first rule out statistical artefacts generated by different definitions of what constitutes 'working' versus 'being retired'. Self-reported activity status reflects individual perceptions about work status and institutional features of the pensions systems. 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. Figure 2 therefore reports two other concepts of economic activity. In addition to a self-reported activity status, the second concept measures the receipt of labour income, either from employment or self-employment. The third concept is based on actually working a positive number of hours. These three concepts are independent from each other. Many respondents fall into the two conventional categories: (a) self-reported working, full-time working hours, and receipt of labour income; and (b) self-reported retired, zero working hours, and no labour income. However, many other combinations are found in the SHARE data, for example: (c) a respondent receives disability benefits, feels retired, but is working some hours anyway from time to time; or (d) a recipient of unemployment

benefits who has been unable to find work for some time and therefore feels retired.

Figure 2 shows that there is substantially less retirement if it is measured by receiving labour income or working at least some hours rather than using a self-reported activity status. For all countries, receiving labour income or doing some hours of work is more prevalent than the corresponding self-reported case. This result is important as it shows that previous estimates of 'unused capacity' may be exaggerated. It suggests that although many people do not regard themselves as workers, they have some 'bridge jobs' in old age. One could define this situation as 'partial retirement' and it is most likely to occur in the years just preceding full retirement. In a companion article, Börsch-Supan et al. (2008a) 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 retirement. 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.

The two waves of SHARE data permit a stringent test to show that the 'retired but working' status is not a statistical artefact. Table 2 shows the transitions in self-reported economic activity for respondents who were interviewed in both waves. The row and the columns of the table correspond to the (self-reported)

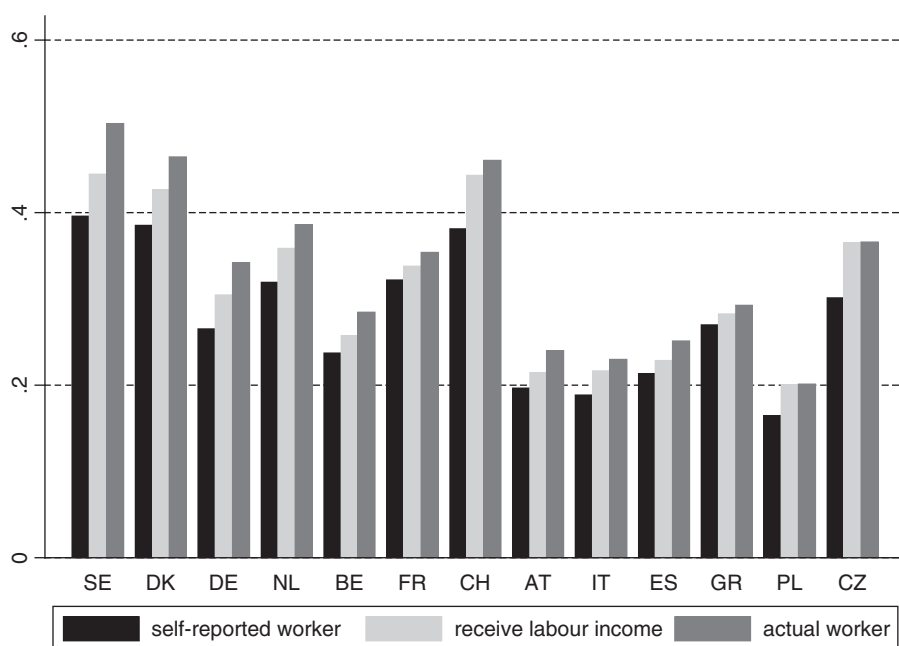


Figure 2 Different concepts of economic activity

Note: Different notions of working. Fraction of individuals who self-report as being employed or self-employed, receive labour income, or work a positive number of hours.

Source: Authors' calculations using SHARE 2006. Whole sample. Population-weighted data.

Table 2 Transitions in self-reported economic activity

<i>Economic activity in the 2004 wave</i>	<i>Economic activity in the 2006 wave</i>					<i>All</i>
	<i>Retired</i>	<i>Employed</i>	<i>Unemployed</i>	<i>Disabled</i>	<i>Homemaker</i>	
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

Note: Absolute numbers and row percentages.

Source: Authors' calculations using SHARE 2004 and SHARE 2006.

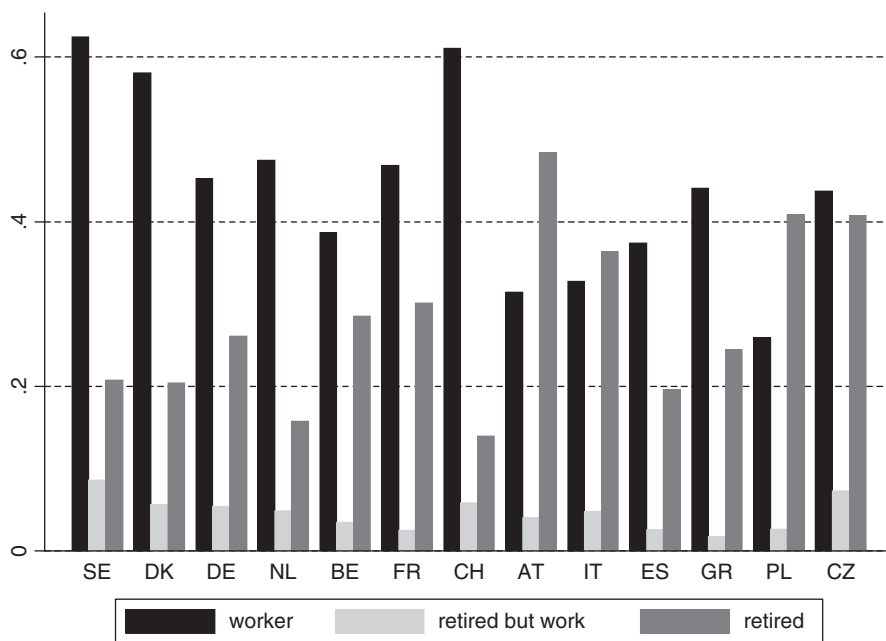


Figure 3 Prevalence of work, retirement and 'retirement with some hours of work'

Note: Fraction of individuals who self-report as being employed or self-employed and work a positive number of hours, self-report as being retired but work a positive number of hours, or are fully retired (self-report as being retired and do not work at all).

Source: Authors' calculations using SHARE 2006. Age 50–69. Population-weighted data.

labour force participation status in the 2004 and 2006 wave, respectively. Over the two-year period between SHARE interviews, a substantial fraction of employed respondents, almost 20 percent, moved out of the labour force into unemployment, disability or retirement. The other direction, however, is also important: more than 7 percent of respondents moved back from disability or retirement into employment, and more than 20 percent of respondents who self-reported being unemployed in the 2004 wave are back into employment by the 2006 wave.

Nevertheless, correcting for partial retirement and returns from retirement into the labour market does not change the international variability and the cross-national patterns of high versus low old-age labour force participation. Figure 3 shows quite clearly that individuals who are 'retired but working' do not dominate the European patterns of work and retirement. These are respondents who classify themselves as 'retired' but who have done some paid work during the last month. The share of individuals

aged 50 to 69 who can be considered as 'retired but working' fluctuates between less than 2 percent in Greece, where self-reported activity is anyway relatively low, and approximately 9 percent in Sweden, where self-reported activity is high.

Health and retirement

The SHARE data permit a much better understanding of the relation between activity status of older individuals and health because they provide a broad battery of self-reported and objectively measured physical and mental health indicators. Figure 4 provides the reasons for retirement of the self-reported retirees, grouped by five major headings:

1. Normal retirement once an individual has become eligible for a public or private old-age pension;
2. Early retirement, including undesired early retirement and imposed pre-retirement, e.g. by becoming redundant;

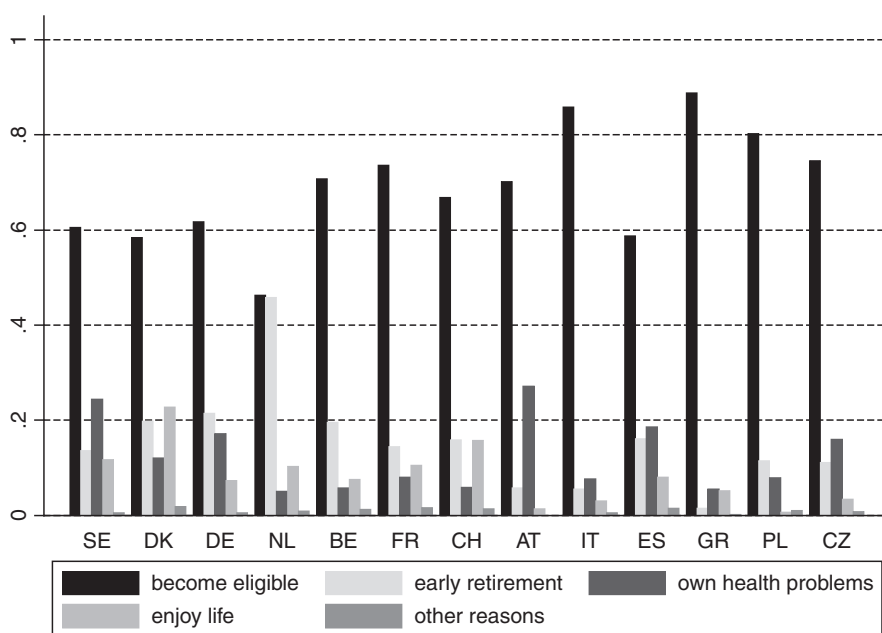


Figure 4 Reasons for retirement by country

Note: Fraction of retirees having retired because they became eligible, they were offered early retirement, because of own health problems, to enjoy life or because of other reasons.

Source: Authors' calculations using SHARE 2006. Sample of self-reported retired respondents. Population-weighted data.

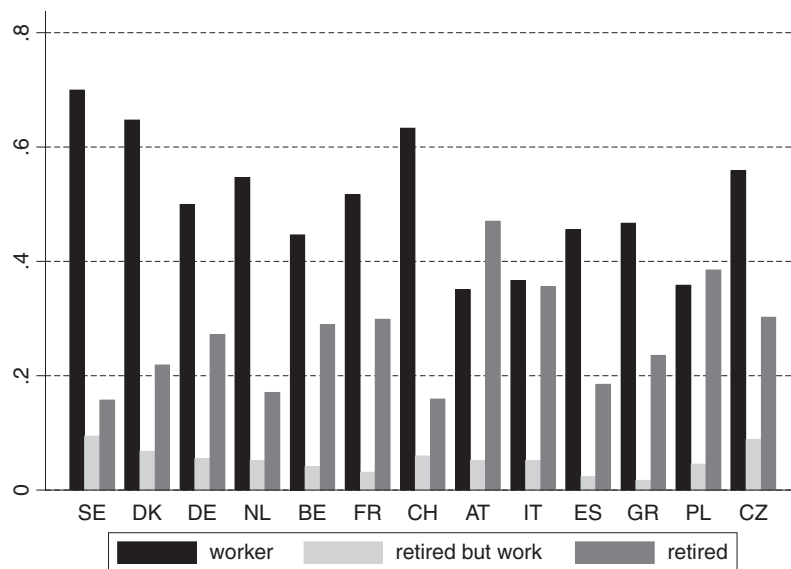
3. Retirement due to personal health reasons;
4. Retirement in order to 'enjoy life' or to retire at the same time as the spouse does;
5. All other reasons.

The first of these five motives dominates in the older age class (for respondents older than 65, data not shown). Striking, however, is the large international variation, particularly in the youngest age category (for respondents younger than 55, the data are not shown). The very large cross-national variation in the role of health as a self-reported driver of retirement is especially puzzling, as shown in Börsch-Supan et al. (2008a).²

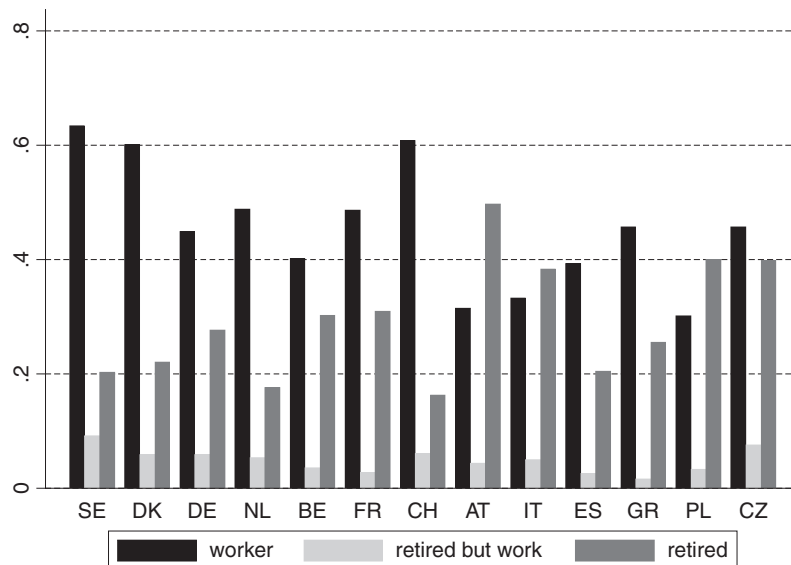
It is notable that the international pattern of health as retirement motive does not fit obvious explanations. For instance, it seems natural to find that health reasons are less frequently reported in a country like Italy where age at retirement is low. Health declines with age, so health constraints 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 5, 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: (a) self-reported absence of health conditions which limit the ability to work ('healthy'); (b) absence of any limitation in doing 14 activities or instrumental activities of daily living (ADL and IADL, 'functioning').³ 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-report being 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, Polish, and Italians have no functional limitations but report themselves as 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 in explaining exit from employment, but that this role is more limited than one might think, especially when taken to the country level.

Panel a: Economic activity of 'healthy' respondents



Panel b: Economic activity of 'functioning' respondents

**Figure 5** Economic activity and physical health

Note: Fraction of 'healthy' (Panel a) and 'functioning' (Panel b) individuals who self-report as being employed or self-employed and work a positive number of hours, self-report as being retired but work a positive number of hours, or are fully retired.

Source: Authors' calculations using SHARE 2006. Age 50–69. Population-weighted data.

Table 3 Transitions in self-reported economic activity by change in health status

<i>Economic activity 2004 wave and health status change Between waves 2004 and 2006</i>	<i>Economic activity 2006 wave</i>				<i>All</i>
	<i>(A) Retired</i>	<i>(B) Employed</i>	<i>(C) Unemployed</i>	<i>(D) Disabled</i>	
(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

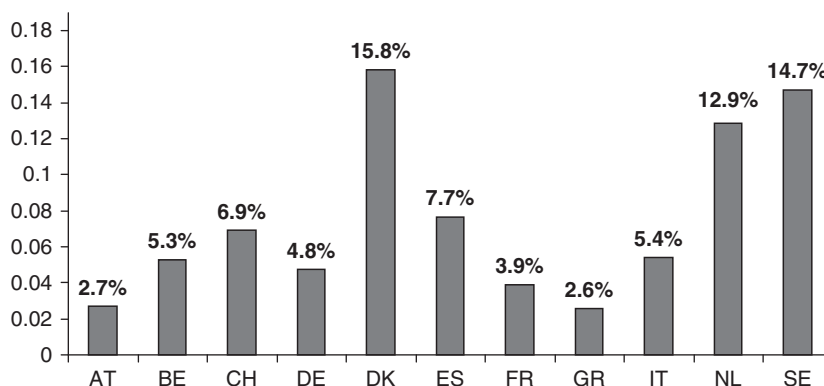
Notes: Based on a sample of respondents who in Wave 1 were 50–69, 'healthy', and self-reported as retired, employed or unemployed. 5,267 respondents reported being 'healthy' in both waves (upper figures), and 1,229 respondents who reported being 'healthy' in Wave 1, and not 'healthy' in Wave 2 (lower figures). Row percentages.

Source: Authors' calculations using SHARE 2004 and SHARE 2006.

Taking advantage of the longitudinal character of SHARE, Table 3 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 percent 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 percent of those who had remained healthy; 4 percent have moved into unemployment, compared to 2 percent who had remained healthy.⁴ Hence, self-assessed health clearly influences the patterns of retirement of older Europeans at the individual level.

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 benefits. Figure 6 shows the prevalence of disability benefits among respondents between ages 50 and 65.⁵

**Figure 6** Disability benefit reciprocity in Europe, 2004

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

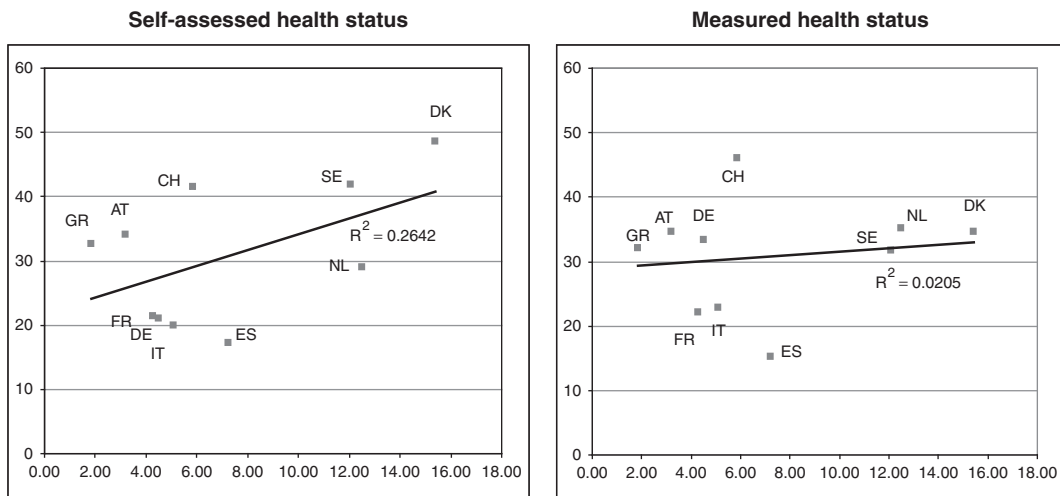


Figure 7 Health and disability benefit reciprocity by country
Source: Authors' calculations using SHARE 2004.

The cross-national differences are striking. We can distinguish four country groups. Very high reciprocity rates exist in Denmark, the Netherlands and Sweden. Between 13 percent and 16 percent of individuals aged between 50 and 65 receive disability benefits in this first group of countries. The second group has reciprocity rates around the average rate of 7.5 percent. This group consists of Switzerland and Spain. Here, the reciprocity ranges from 6 percent to almost 10 percent. Belgium, Germany, France and Italy, the third group, have below-average reciprocity rates between 4 percent and 6 percent. In Austria and Greece fewer than 3 percent of individuals aged between 50 and 65 receive disability benefits.

The left panel of Figure 7 correlates the percentage of respondents aged 50–64 who receive disability benefits 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 receiving disability benefits. This perverse correlation vanishes once objective health measures are used (such as grip strength and other indicators), as shown in the right panel of Figure 7. One would, however, expect a strong negative correlation if health were the main driver of receiving disability benefits. Our data do not bear this out.

Figure 8 exploits the longitudinal character of the SHARE data and relates the reciprocity of disability benefits between Waves 1 and 2 to changes in health status. One would expect to find a significant deterioration of self-assessed health among those just starting to receive disability benefits, and this is indeed the case (left panels). The deterioration in health, however, is much less pronounced when health is measured more objectively than by self-assessment; for example, as a deterioration of measured grip strength (right panels). This is a clear indication of justification bias in self-assessed health (Sen, 2002): individuals who have started receiving disability benefits may justify this by self-reporting a lower health status than what can be measured more objectively; for example, by grip strength (see also Jürges, 2007).

While health may not be their main concern, most respondents appear to be relieved when they retire (see Figure 9). Only between 3 percent and 15 percent of retired respondents see it as an essentially negative experience ('a concern'). Puzzling, however, is that this is concentrated in the 'Club Med' countries which feature particularly low old-age activity rates: about 15 percent of Greek retirees, 12 percent of Spanish and 10 percent of Italian ones, see retirement as a concern.

In conclusion, this section highlights a well-known social policy dilemma. On the one hand, the

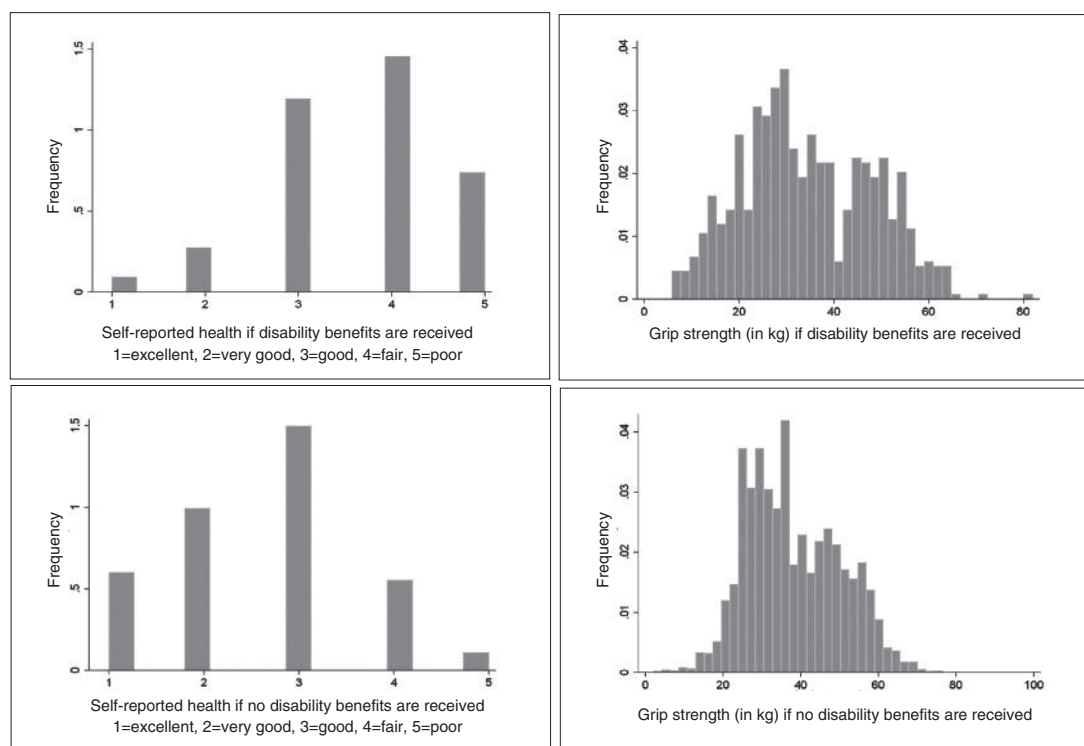


Figure 8 Health by disability benefit reciprocity, across all countries

Note: The figures depict the frequencies of self-reported health status (in five categories, left) and grip strength (in kilograms, right) if disability benefit status remains unchanged (top) versus if disability benefit receipt started (bottom). *Source:* Authors' calculations using SHARE 2004 and SHARE 2006. Age 50–65. Population-weighted data.

frequency of early retirement does not correlate well with health. This gives more weight to the scholarly view that early-retirement institutions have created unused capacity than to the alternative view held by the public and many policymakers that individuals are worn out and unhealthy when they enter early retirement. The former view calls for reform in order to lower the fiscal and economic costs associated with these early-retirement institutions. However, most early retirees express gratitude for the early relief through retirement, which is a good indicator that the political costs of reforming the early-retirement institutions are large.

Multivariate analysis

The descriptive evidence of the preceding sections, while suggestive of important correlations between

early retirement and country-specific institutional driving forces, does not allow for causal inference. In this section, therefore, we present multivariate analyses accounting for various determinants simultaneously.⁶ First, we focus on the self-reported activity status, in particular on the decision to work or retire. Second, we take a closer look at disability-benefit reciprocity. Our main interest is to measure the influence of institutions and to compare this with the influence of other potential determinants, in particular health. The effects of institutions and labour-market configurations are captured in several ways. In the analysis of the retirement decision, we use country-specific dummy variables and a measure of the generosity of the pension systems. In the analysis of disability-benefit reciprocity, we make use of a full set of country-specific indicators which characterize the generosity of the disability-benefit systems.

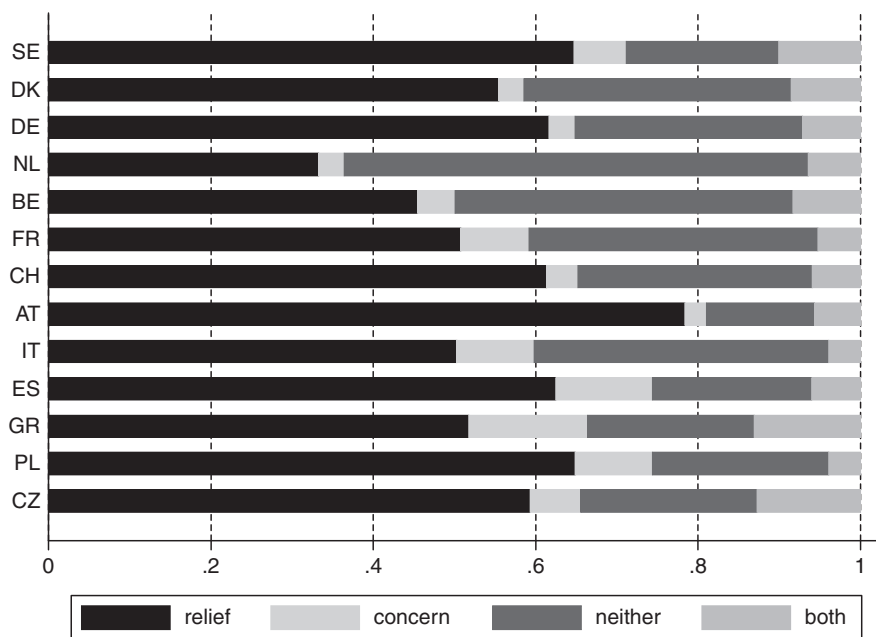


Figure 9 Is retirement a relief or a concern?

Note: Sample of self-reported retired respondents. Population-weighted data.

Source: Authors' calculations using SHARE 2006.

The retirement decision

The generosity of the pension system is measured through a variable called 'social-security and pension wealth' (SSW), defined as the present discounted value of all expected future benefits from the social security and pension system, taking into account mortality prospects. We construct this variable for each individual. Thanks to the detailed SHARE data, we can infer the expected pension benefits for each worker. We also observe the actual pension benefits of all pensioners. We compute SSW as the sum of the discounted stream of these benefits, each future benefit being weighted by the probability of survival. We then divide SSW by total household income in order to measure the generosity of the pension system relative to the individual's general economic status. We call the resulting variable 'relative social-security wealth' (SSWREL). The denominator of this ratio, total household income, is a good indicator of resources available to an individual and at the same time does not strictly correlate with earnings or social security benefits of the individual.

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 limitation in 14 activities (or instrumental activities) of daily living.

Other potential determinants of retirement included in the analysis are age, education, gender and preferences. We introduce a variable which captures a feature of preferences which has been proved relevant in studies of retirement saving, particularly in the USA.⁷ 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. The SHARE questionnaire asks respondents what the chances are that they will live to be a certain age T or more, where the proposed target age T depends on each respondent's current age.⁸ We use this information to construct two variables: the subjective probability of surviving to a target age, and the product of this probability with the length of the proposed target lifespan. The former variable is a

Table 4 Probit regression results: decision to retire

	<i>Specification 1</i>		<i>Specification 2</i>	
	<i>Probit estimate</i>	<i>Std. error</i>	<i>Probit estimate</i>	<i>Std. error</i>
Respondent is male	-0.084	(0.032)	-0.084	(0.032)
(Age/10)	-3.297	(0.929)	-3.751	(0.912)
(Age/10) squared	0.482	(0.079)	0.513	(0.077)
Respondent is married	0.053	(0.042)	0.052	(0.042)
Years of schooling	-0.034	(0.004)	-0.034	(0.004)
No functional limitations	-0.259	(0.036)	-0.261	(0.036)
IADL-limited	0.312	(0.063)	0.314	(0.063)
Subjective survival probability	-0.267	(0.064)		
Subjective lifespan			-0.015	(0.004)
Relative soc. security wealth	0.052	(0.031)	0.051	(0.03)
Sweden	-0.509	(0.061)	-0.509	(0.061)
Denmark	-0.239	(0.071)	-0.242	(0.071)
Netherlands	-0.212	(0.062)	-0.213	(0.062)
Belgium	0.355	(0.06)	0.356	(0.06)
France	0.239	(0.063)	0.24	(0.063)
Switzerland	-0.678	(0.09)	-0.678	(0.09)
Austria	0.868	(0.069)	0.867	(0.069)
Italy	0.545	(0.074)	0.543	(0.074)
Spain	-0.309	(0.09)	-0.312	(0.09)
Greece	0.186	(0.074)	0.186	(0.074)
Constant	3.012	(2.735)	4.599	(2.691)
(Pseudo-)R ²	0.5376		0.5376	

Notes: Based on a sample of 13,244 respondents aged 50 through 69 in 2004 who reported being workers or retired. Dependent variable: 1 if retired, 0 otherwise. Mean dependent variable: 0.487. The first specification makes use of the subjective survival probability. The second specification includes the expected lifespan in the specification. The omitted country is Germany. Relative social security wealth is not available for Poland and the Czech Republic. Robust standard errors in parentheses.

normalization of the answer to the question. The latter variable multiplies this measure of the perceived chance to reach a target age by the difference between the proposed target age and the current age of a respondent.

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 4 shows probit-estimation results. The outcome variable takes the value 1 for a person self-reporting 'retired', and 0 otherwise.⁹ Our estimation rests on 13,244 SHARE respondents who are working or are retired. We exclude homemakers, disabled and unemployed individuals, and all cases reporting 'other activities'. We also restrict the sample to individuals between ages 50 and 69 because very few respondents are active after age 70.

The first column of Table 4 makes use of the subjective survival probability while the second column includes the expected lifespan. Both specifications yield very similar estimation results.

Health makes a difference. Individuals who are 'functioning' in the sense previously defined 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. *Ceteris paribus*, single men are less likely to be retired, while married respondents are more likely to be retired. 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, implying that a longer planning horizon increases the probability of working.

The main result, however, is that even controlling for all these characteristics, the variable SSWREL (relative social-security wealth) which captures the generosity of the social security and pension system is significantly and positively associated to the retirement probability: institutions play a significant role. Differences in health and other socio-economic

characteristics do not explain the cross-national variation in activity rates between ages 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.

The significance of the 'relative social-security wealth' variable is especially noteworthy because our specification includes a full set of country dummies. All country dummies show significant marginal effects. Germany is the reference country: compared to Germans, Italian, Austrian and Greek respondents are more likely to be retired, while Swedish, Swiss and Spanish respondents are more likely to be still working. These results suggest that the 'relative social-security wealth' variable is important in spite of other cultural and institutional differences between countries which affect the retirement decisions over and above the financial incentives imbedded in the social-security systems.¹⁰

Receipt of disability benefits

The clearest case in which health should play a major role is the receipt of disability benefits. We therefore regress the receipt of disability benefits on a large set of health indicators and, at the same time, a broad set of institutional features characterizing the disability-benefit system in each SHARE country.

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-benefit 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.¹¹

We include a broad set of health measures, ranging from self-reported health (SRH) to more objective measurements of the functional physical (as above, activities of daily living [ADL]; instrumental activities of daily living [IADL]) and mental health status (CES-D test battery of mental health, geared towards measuring depression).¹² We include similar sociodemographic characteristics (such as age, gender and education) as in the previous subsection, and use the same probit specification.

Table 5 presents the results in four blocks: demographic variables, health variables, institutional

Table 5 Probit regression results: disability benefit reciprocity

	<i>Probit estimate</i>	<i>Std. error</i>
Female	-0.661	(0.3461)
Age <55	-1.068	(1.8414)
Age >60	0.385	(3.8500)
Age (if age <55)	0.027	(0.0132)
Age (if age between 55 and 60)	0.006	(0.0400)
Age (if age >60)	-0.006	(0.0667)
Self-assessed health excellent	-0.896	(0.1306)
Self-assessed health very good	-0.534	(0.1248)
Self-assessed health fair	-0.007	(0.1167)
Self-assessed health poor	0.361	(0.1450)
Depression (sum of CES-D items)	0.058	(0.0119)
Activities of daily living (sum)	0.054	(0.0406)
Instrumental activities of daily living (sum)	0.221	(0.0480)
Coverage	0.039	(0.0574)
Min. benefits	0.361	(0.0822)
Full benefits	-0.184	(0.0844)
Generosity	-0.329	(0.0654)
Permanent	0.049	(0.0262)
Medical	0.069	(0.0255)
Vocational	-0.121	(0.0676)
Unemployment insurance benefits	0.106	(0.0264)
Coverage * female	0.205	(0.0421)
Min. Benefits * female	0.015	(0.1000)
Full_benefits * female	-0.086	(0.0735)
Generosity * female	-0.018	(0.0783)
Coverage * age >60	-0.032	(0.0348)
Min. Benefits * age >60	-0.118	(0.0715)
Full benefits * age >60	-0.048	(0.0429)
Generosity * age >60	0.173	(0.0636)
Coverage * fair/poor health	0.110	(0.0209)
Min. Benefits * fair/poor health	0.091	(0.0429)
Full benefits * fair/poor health	0.063	(0.0477)
Generosity * fair/poor health	-0.036	(0.0379)
Constant	-1.827	2.5732
(Pseudo)-R ²		

Notes: Based on 9,388 individuals aged 50 through 65 in 2004. Dependent variable: 1 if benefit recipient, 0 otherwise. Robust standard errors in parentheses.

variables, and interactions between 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 'receipt of disability benefits' was found.

Demographic variables are jointly significant. Women have a lower probability of receiving disability benefits, conditional on health. Older age increases the probability of being enrolled until about age 63. We apply a piecewise linear specification, with breakpoints at ages 55 and 60.¹³ Notable is the sharp increase in the probability of receiving disability benefits 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 one-sixth of the total variation.

The institutional variables are highly jointly significant. All measures are scored by the OECD from 0–5. Coverage measures on a 0–5 scale which population groups are eligible for benefits. The highest score is given if the disability-benefit system covers the entire population; the lowest score if only employees are covered. A broad coverage increases the probability of receiving disability benefits, but the effect is surprisingly small and insignificant. A lenient minimum disability level which an applicant must be able to demonstrate in order to claim benefits has more influence on disability-benefit reciprocity 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 the probability of receiving disability benefits. 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 benefits as an early retirement-financing device. Indeed, tight unemployment

insurance increases the probability of receiving disability benefits in a highly significant and quantitatively important way.

We also interact the institutional variables with selected demographic and health variables. These interactions explain some of the surprising findings discussed above. For example, the surprisingly small influence of coverage turns into a very large effect for women and those with poor health. The latter is straightforward to explain; the former may be a result of the low labour force participation of European women who are less likely to be eligible to a normal old-age pension and therefore may seek disability pensions. This corresponds to the very high share of women receiving disability benefits in some countries; in Germany, a lenient eligibility to disability benefits for women was explicitly a policy instrument in the early 1980s. Another example of 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 meaning in the following exercise: we predict in a counterfactual simulation which share of our sample individuals would receive disability benefits 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 between 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 receiving disability benefits, making health counterfactually equal across all countries should also make disability-benefit reciprocity rates close to equal in all countries.

The results of this exercise are striking, as shown in Figure 10. The counterfactual simulation holding eligibility and benefit generosity indicators constant produces much more similar disability-benefit reciprocity rates than holding demographics and health constant. Hence, most cross-national variation in disability-benefit reciprocity rates can be explained by the institutional factors embedded in the five OECD indicators, much more than demographics and health.

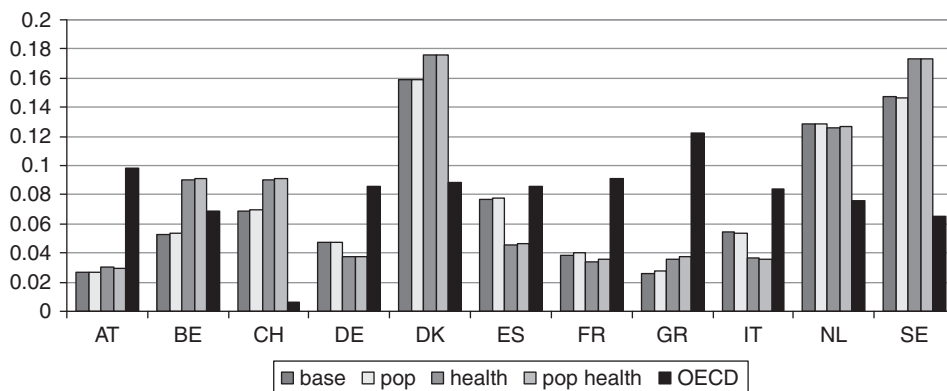


Figure 10 Baseline reciprocity rates and counterfactual simulations

Note: Based on linear regression specification in Table 5.

Conclusions

The variation in retirement behaviour, old-age labour force participation and disability-benefit reciprocity rates across European countries is striking. In Austria and Italy, the age at which a normal old-age pension is first received is about six years earlier than in Denmark and Sweden. In turn, disability-benefit reciprocity 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 labour force participation: in Sweden, Denmark and Switzerland, almost 40 percent of individuals aged over 50 classify themselves as working, while only about 20 percent do this in Italy and Austria, and only 16 percent in Poland.

The main contribution of this article is to simultaneously take account of health and institutional determinants of early retirement. While health is an important determinant of earlier retirement within each country, it does not explain the large cross-national variation. Rather, institutional differences in welfare systems almost exclusively drive the distribution and the age pattern of labour-force participation and retirement. Countries in which early retirement is easy and carries generous benefits generate a high prevalence of early retirees (typically Southern European countries, but also Austria and France). In countries in which other exit routes are easily accessible (e.g. through disability and

unemployment benefits), these alternative exit routes substitute for the normal or early retirement pathways (e.g. in the Netherlands and in Denmark).

The most influential institutional variable to explain disability-benefit reciprocity is the minimum level of disability which an applicant must demonstrate in order to obtain full benefits. This variable alone explains more than 60 percent of the cross-national variation. It seems to be the most powerful policy variable if countries such as the Netherlands, Denmark and Sweden want to bring their disability-benefit reciprocity rates closer to the average European level.

Unused labour capacity is especially large in countries such as Austria, Italy and France, in which many healthy individuals are not in the labour force. Our econometric evidence corroborates the findings from the early literature, now also controlling for health characteristics, age, gender and country effects: the generosity of the social security and pensions systems is a dominant cause for the patterns of retirement vis-a-vis work. More specifically, our econometric analysis shows that an increase in social-security wealth is significantly associated with an increase in the probability of being retired.

The social policy implications are clear. If Europeans want to reduce the already high tax and contribution burdens in the light of population ageing and make their pension systems more sustainable, they should exploit the unused capacity of individuals who self-report enjoying a good functional health status. The current retirement institutions provide generous

early retirement options, partially through lenient disability-insurance and unemployment-insurance rules. Employers and employees cannot be blamed for taking up these options, 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 pension systems more sustainable: to align early retirement ages with an increased life expectancy, to confine disability benefits to those who have functional disabilities, and to devote unemployment insurance to those who are temporarily out of work and are actively searching for a new job.

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Notes

- 1 For a description, see Börsch-Supan et al. (2005; 2008b). Methodological aspects are detailed in Börsch-Supan and Jürges (2006). See also [www.share-project.org] and the Introduction to this Special Issue. See also National Research Council (2001) on the case for cross-national research on ageing.
- 2 In Börsch-Supan et al. (2008a), we show that early retirement is chosen by 66% of Swiss males in the 55–9 age range and 50% of 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 large cross-national variation also extends to women.
- 3 Activities of daily living (ADL) are those tasks usually performed for oneself in the course of everyday life, including bathing or showering, dressing, eating, getting in and out of bed or a chair, using the toilet and other personal care activities. Instrumental activities of daily living (IADL) are those daily tasks that enable an individual to live independently and include preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house or garden, using a map to figure out how to get around in a strange place, and managing money, such as paying bills and keeping track of expenses.
- 4 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.

- 5 For a precise definition of disability benefits in each SHARE country, see Börsch-Supan (2007).
- 6 Details on variable construction and estimation techniques can be found in Börsch-Supan et al. (2008a).
- 7 For the studies on saving see e.g. Gustman and Steinmeier (1999) and Munnell et al. (2000). The informational content of subjective survival probability has been appraised, by, among others, Hurd and McGarry (1997).
- 8 For instance, for respondents younger than 65, the proposed target age is 75, for respondents aged 66–70 it is 80, and so on. See Börsch-Supan et al. (2005; 2008b) for details.
- 9 Probit regression models are nonlinear regression models specifically designed for situations in which the outcome of interest is discrete and can take only one of two values, such as retired (1) or not (0). The coefficients indicate the probability that the outcome of interest takes the value of 1.
- 10 A full account of these institutional differences is provided in an Appendix to Börsch-Supan (2008a).
- 11 These variables are taken from Annex A.2.1 in OECD (2003).
- 12 SHARE collects information which allows researchers to construct two widely used measures of depression, EURO-D and CES-D. The EURO-D depression measure can be obtained by a set of questions asked in the main survey. The CES-D depression measure can be obtained by a set of questions asked in the drop-off. We have used CES-D where available and imputed CES-D from EURO-D where necessary.
- 13 That is, we estimate separate age coefficients for the age ranges of 50–4, 55–60, and 61–5, respectively.

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