



2 Comparison Between SHARE, ELSA, and HRS

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2.1 Overview of Available Aging Data Sets

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SHARE was not developed in a vacuum. In fact, its development closely follows its sibling studies HRS (Health and Retirement Study; USA) and ELSA (English Longitudinal Study of Ageing; England). Apart from the savings on development costs, this has the important implication for researchers that we can not only compare countries within SHARE, but also compare across studies with the USA and England. Other countries have realized the same advantages and have instigated similar studies. In this chapter, we exploit this and rather than compare countries within SHARE, we compare SHARE results with results from (some of) the other studies. As an introduction to the empirical sections, which look at specific topics, in this section we give a brief overview of available and planned aging studies. We will focus on studies that have been developed after 1990 and which are intended to be closely comparable to the HRS.

Table 1 lists the most important data sets that are closely related to the HRS (and thus to SHARE) that are currently widely available, the country or countries they represent, and their websites. Note that for historical or logistic reasons, not all studies cover the whole (geographic) country represented. From this table, we see that SHARE, HRS, and ELSA represent Western developed countries; The Mexican Health and Aging Study (MHAS) adds a Latin American country, and the Korean Longitudinal Study on Aging (KLoSA) a developed Asian country.

Name	Country/countries	Website
SHARE	Continental Europe + Israel	http://www.share-project.org/
HRS	USA (excl. territories)	http://hrsonline.isr.umich.edu/ RAND-HRS: http://www.rand.org/labor/aging/dataproduct/
ELSA	England (not the whole UK)	http://www.ifs.org.uk/elsa/
KLoSA	South Korea (excl. Jeju)	http://klosa.re.kr/KLOSA/default.asp
MHAS	Mexico	http://www.mhas.pop.upenn.edu/english/home.htm

Table 1 Available data sets similar to the Health and Retirement Study HRS

There are numerous aging studies that are older and less comparable to the HRS, post-1990 studies that are also less comparable to the HRS (e.g., because they mainly concentrate on health issues and do not cover socio-economic aspects in detail), and a few smaller and/or less widely available studies. Additionally, there are (of course) numerous other surveys that may contain useful information for researchers studying aging, but which were not initiated to study aging (e.g., Panel Study of Income Dynamics (PSID), The National Health Interview Survey (NHIS), Survey of Income and Program Participation (SIPP), and The Current Population Survey (CPS) in the USA). Links to the websites of several of these additional surveys are provided at <http://agingcenters.org/data.html> and <http://www.rand.org/labor/aging/resources.html>.

In addition to the studies for which data are already available, a number of additional HRS-based aging studies are being developed in other countries. These will cover more Asian countries, Russia, and African countries:

- The Japanese Health and Retirement Study (JHRS) conducted its first wave in 2007.
- The Chinese Health and Retirement Longitudinal Survey (CHARLS) is scheduled to conduct a pilot in 2008 and is planning its first full wave in 2010.
- The Longitudinal Aging Study in India (LASI) is planning a pilot in 2009 and its first full wave in 2010 or 2011.
- HART (Thailand) is “partially funded but at an early stage of preparation” (Smith, 2007).
- The WHO Study on Global Ageing and Adult Health (SAGE; <http://www.who.int/healthinfo/systems/sage/>) focuses more specifically on health and well-being than HRS and SHARE, which are more multidisciplinary, but it derives a large part of the questionnaire from the other aging studies. Pilot data from 2005 (1,500 respondents from Ghana, India, and Tanzania) are available. For the first full wave (2007-2008), its core countries are China, Ghana, India, Mexico, the Russian Federation, and South Africa.

For reasons of availability of comparable data at comparable time points, 2004 and 2006, we will focus on the comparison of SHARE with HRS and ELSA in this chapter, although in the current section we will present some characteristics of several of the other aging studies as well.

U.S. Health and Retirement Study HRS

The HRS is the first of the “modern” aging studies that are considered in this chapter. Earlier studies were typically limited in sample size or not nationally representative, or covered only a limited set of topics. An important example of this is the Retirement History Survey (RHS), which was a longitudinal study conducted between 1969 and 1979 in the United States. The RHS only included men and unmarried women in a very limited age range (58-63 in 1969). It provided a lot of information about socio-economic characteristics (labor force participation, income), but did not measure other characteristics, such as health, in detail. In contrast, the HRS was set up to cover a wide range of demographic, economic, and social characteristics, as well as physical and mental health and cognitive functioning. The background of the HRS and an overview of its design is given by Juster and Suzman (1995).

The first wave of HRS (1992) sampled individuals born between 1931 and 1941 (inclusive) and also interviewed their spouses of any age, as well as any other age-eligible household members. Core interviews have been conducted biannually since then. A companion study, the Study of Asset and Health Dynamics of the Oldest Old (AHEAD), sampled the cohort born in 1923 or earlier. Two waves of these were conducted (1993 and 1995). In 1998, these two cohorts were combined and supplemented with additional cohorts to cover the whole population of 51 years and older. The combined study is also called the HRS. New cohorts have been and will be added every third wave (six years) to keep the sample representative of the population roughly 50 and older. Table 2 gives an overview of the cohorts present in Wave 8 (2006) of the HRS.

Cohort	Birth years	Year of sampling	Ages at sampling	Ages in 2006
AHEAD	- 1923	1993	70 +	83 +
CODA	1924 - 1930	1998	68 - 74	76 - 82
HRS	1931 - 1941	1992	51 - 61	65 - 75
War Babies	1942 - 1947	1998	51 - 56	59 - 64
Early Boomers	1948 - 1953	2004	51 - 56	53 - 58

Table 2 HRS cohorts and years of sampling

The HRS sample is drawn using a multistage area probability sample of households. Three groups are oversampled: African Americans, Hispanics, and Floridians, but territories (Puerto Rico, Virgin Islands, etc.) are excluded. Only noninstitutionalized individuals (but including those in retirement homes) are considered at baseline. However, respondents entering nursing homes are followed in later waves. Given the relatively young ages at sampling and higher mortality in nursing homes (and the addition of cross-sectional sampling weights for nursing home residents), recent waves of the HRS are believed to be representative of the nursing home population as well, but this does not hold for the first two or three waves of the AHEAD and CODA samples. NIA (2007) contains an introduction to the development of the HRS since 1992, its status in 2006, and plans for post-2006, as well as many descriptive statistics and references to the literature using the HRS.

The HRS covers a wide range of topics in great detail. An unfortunate result of this extraordinary richness has been that it has become very difficult to use. This problem has been tackled by the introduction of the RAND HRS. This is a user-friendly longitudinal data set containing a (large) subset of the HRS with cleaned and imputed data from all waves, consistent variable names across waves, and spousal information merged in. See St.Clair et al. (2008) for details. For researchers who need to use HRS variables that are not included in the RAND HRS, RAND also produces the RAND Enhanced Fat files. These files are wave-specific and contain all publicly available HRS variables of a wave, but already with the imputations and in a way that makes it easy to merge them with the RAND HRS. The RAND HRS web site contains more details.

The English Longitudinal Study of Ageing ELSA

Like SHARE, ELSA was designed in close cooperation with key investigators affiliated with the HRS, to make the study not only useful and important for England, but to allow cross-country comparisons as well. Hence, its design largely follows the HRS design. The first wave was conducted in 2002, and later waves are conducted biannually. Unlike the HRS, ELSA sampled from the whole 50+ population from the outset. The target sample consisted of all respondents in the earlier Health Survey for England (HSE), from the years 1998, 1999, and 2001, who were 50 years or over. The HSE interviews of these are called Wave 0 of ELSA. Like the HRS, additional cohorts will be added periodically to keep the sample representative of the 50+ population. The first such refreshment sample was drawn in Wave 3 (2006), covering the 50-53 years old. These were drawn from the 2001-2004 samples of the HSE.

ELSA samples private households and thus excludes nursing homes at baseline. However, following the HRS example, respondents are followed when they enter nursing homes,

although data of respondents in nursing homes are not available yet. As its name indicates, ELSA only covers England, and not the whole UK. When respondents move to other parts of Great Britain (Wales or Scotland), they remain in the sample, but respondents are not followed outside Great Britain.

The HSE has an equal probability design, which means that it is self-weighting, i.e., weights are not needed for statistical analyses. Because all eligible HSE respondents were in the ELSA target sample, weights are not needed to correct for the sampling design as well, unlike HRS and SHARE. However, weights are still necessary to correct for selective nonresponse in ELSA.

The background and design of ELSA is described in more detail in Marmot et al. (2003), which also contains many results from the first wave (2002). A similar description of the second wave (2004) is provided by Banks et al. (2006).

Comparison of Characteristics of Available and Planned Aging Data Sets

Here, we give an impression of some of the key characteristics of the available and planned aging data sets, and the similarities and differences between them. Table 3 gives the years in which the studies are conducted, eligibility age (for the primary respondent), and most recent household and individual sample sizes. All studies are biannual, so this is not mentioned in the table. The Asian studies use a somewhat lower age eligibility criterion, because of lower life expectancy, large labor market disturbances among employees in their forties, and comparability with each other. An interesting characteristic of SAGE is the addition of a younger comparison sample.

Study	First wave	Last wave	Eligibility age	Sample size		
				Year ^a	Households	Individuals
SHARE	2004	ongoing	50+	2006 ^b	22,255	32,442
HRS	1992	ongoing	51+	2006	12,288	18,469
ELSA	2002	ongoing	50+	2006	6,484 ^c	9,718 ^c
KLoSA	2006	ongoing	45+	2006	6,171	10,254
MHAS	2001	2003	50+	2003	8,614	13,497
CHARLS	pilot 2008	ongoing	45+	2008	1,500 ^d	2,700 ^d
LASI	pilot 2009	ongoing	45+	2009		2,000 ^d
JHRS	2007	ongoing	45 - 75	2007		10,000 ^d
SAGE	2007	ongoing	50+/ ^e 18 - 49 ^e	2007	5,000/1,000 ^{d,e}	

Table 3 Basic characteristics of HRS-like data sets

Note: Representative year of the latest wave (or first planned wave).

^b Wave 2; Israel has Wave 1 interviews conducted in 2006 as well, but these are not included in the table.

^c Excluding the institutionalized (nursing homes) who are not available yet

^d Target. Sources: SAGE website, RIETI website (JHRS), CHARLS and LASI proposals

^e Core sample/Comparison sample

Some design characteristics of interest, in addition to the ones mentioned for HRS and ELSA above and for SHARE in Börsch-Supan and Jürges (2005), are

- All use geographic stratification and/or multistage sampling. Often, a distinction between urban and rural areas is also taken into consideration in the sampling. MHAS oversampled six states with high migration to the USA.
- MHAS only interviewed sampled persons (primary respondents) and their spouses, not other eligible household members.
- KLoSA will add nursing home residents in Wave 2 (2008), but they are not included in Wave 1.

Table 4 presents some key statistics regarding the sample composition of the studies for which data are already available. Note that these statistics are unweighted and thus describe the sample and are not necessarily estimates of population quantities of interest.

Study	Year	Female (%)	Living with spouse/ partner (%)	Age group			
				< 50	50 - 64	65 - 74	75+
SHARE	2006	56%	75%	3%	52%	26%	19%
HRS	2006	59%	64%	3%	35%	34%	28%
ELSA	2006	56%	71%	4%	51%	24%	21%
KLoSA	2006	56%	78%	18%	42%	26%	14%
MHAS	2003	58%	70%	6%	54%	25%	15%

Table 4 Sample composition of HRS-like data sets (unweighted)

Note: "Year" defined as in Table 3, i.e., wave. waves can span multiple years and vice versa

This table mainly shows the effect of the different sampling history of the HRS, in which different cohorts were sampled in different years, thus effectively stratifying by age group. Because the sampling proportions are not proportional to the sizes of these age groups in the population, the HRS has a more equal distribution of age than the other samples, with more respondents 65 years and older. From a statistical standpoint, this has the advantage that it allows more detailed analyses of the older age groups, but it also implies that weighting the sample by age is more critical to obtain population-representative results.

Furthermore, this table shows a much higher percentage of respondents younger than 50 years old in KLoSA, which reflects the different eligibility age (45) for KLoSA. Differences in the distributions of gender and marital status are presumably mostly due to these different age compositions between the studies, and do not necessarily reflect population differences between the countries.

Versions of Data Sets Used in this Chapter

In this chapter, we use the following versions of the data sets: For the SHARE data, we use Wave 1, release 2.0.1, July 2007, and Wave 2, preliminary release 0, March 4, 2008. The latter also includes some updates and corrections to the Wave 1 data. For the HRS, we use the RAND HRS, Version H (St.Clair et al., 2008) and additional variables from the RAND Enhanced Fat files (see the RAND HRS website). For ELSA, we use the 9th

edition, which includes (in addition to Wave 1 and Wave 2 data) the Wave 3, phase 1 preliminary data set (Marmot et al., 2008).

The results presented in the remaining sections of this chapter all use sampling weights, at either the respondent or household level, whichever appropriate. Results for a specific year use that year's cross-sectional weights, except for Wave 3 results for ELSA, for which no cross-sectional weights are available yet. Therefore, following the guidelines provided with the ELSA release, we have used Wave 2 weights for that as well. This implies, however, that the refreshment sample of 50-53 year olds in ELSA Wave 3 is not included in the results. For results that are based on individual changes between waves, we use the cross-sectional weights of the earlier of the two waves.

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2.2 Health Comparisons

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As health status represents a major component of well-being, the decline in health with age is an important issue in the study of ageing. Key trends in developed countries over the course of the last half century include increased longevity, lower disability rates and growing health care sectors. While it is hypothesized that cross-country variation in health status may stem from underlying differences in social and institutional structures affecting socioeconomic status, health care systems and health behaviors, few studies have documented this empirically (Feinstein 1993; van Doorslaer et al., 1997; Banks et al., 2006; Blanchflower et al., 2007).

Several health-related measures in SHARE parallel those in HRS and ELSA or can be adapted in order to allow for cross-country comparisons. In this section we describe health status in Europe, the United States and England and the relationship with health care choices and retirement decisions. As the measures analyzed in this section are self-reported, there may be important cross-survey discrepancies in reporting due to cultural differences and survey mode. By analyzing change between 2004 and 2006 and patterns within a cross-section, we begin to investigate how meaningful cross-country comparisons can be made with these surveys.

Measures of Self-Reported Health

Respondents are asked to rank their health on a five-point scale in all three surveys. This survey question has been widely used in health surveys and is meant to reflect overall health status. In 2004, all three surveys include the US version of this self-reported health scale (excellent, very good, good, fair and poor) for all respondents, whereas in addition, SHARE also includes the European scale (very good, good, fair, bad and very bad) for all respondents. This mimics ELSA in Wave 1 (2002), which also included both scales. In 2006, SHARE and HRS use the US scale and ELSA uses the European scale, and additionally SHARE asks a general health rating on a scale from 0 (worst possible health) to 10 (best possible health). Because of easier comparability, we focus on the US scale here, and only include the European scale for ELSA in 2006 in the comparisons. From analyzing the distribution of self-reported health from both scales in Wave 1 of ELSA, we conclude that responses are partly based on the order of response options, but also partly based on the specific words in the response options. So there is not an easy mapping between the scales.

While there is no one-to-one mapping between the scales, we constructed a binary measure of self-reported health that makes the European and American scale responses as comparable as possible: Those who report excellent, very good or good health on the American scale are considered to be in “good” health, whereas those who report to be in fair or poor health are classified as being in “bad” health. Using the European scale, those in very good or good health are classified as being in “good” health while those reporting fair, bad or very bad health are considered to be in “bad” health.

Table 1 presents the percent of the population in SHARE, HRS and ELSA with “good” health by gender. The fraction of the 50+ population reporting “good” health is substantially lower in Europe than in the United States and England. A higher fraction of men report “good” health in SHARE, whereas the difference is smaller (but in the same direction) in HRS and negligible in ELSA. Fractions in “good” health are substantially lower in

2006 than in 2004 in SHARE. The difference is smaller, though still noticeable when we only include countries that are in both waves. For the HRS, we do not see such a change. In ELSA, a similar drop is observed, but this is most likely largely due to the different scale used in 2006, which has only two “good” categories and three “bad” ones, as opposed to the scale used in 2004, which has three “good” categories and two “bad” ones.

	2004		2006	
	% “Good”	<i>n</i>	% “Good”	<i>n</i>
SHARE (all countries)^b				
male	67.6	13,624	62.3	14,213
female	59.8	16,252	55.0	17,116
total	63.3	29,876	58.4	31,329
SHARE (11 countries)^c				
male	67.7	12,491	64.5	11,990
female	59.7	14,893	57.2	14,241
total	63.3	27,384	60.5	26,231
HRS				
male	74.2	8,172	74.5	7,464
female	72.7	11,090	72.1	10,449
total	73.4	19,262	73.2	17,913
ELSA				
male	71.0	4,013	66.6	3,223
female	70.6	5,029	66.0	4,165
total	70.8	9,042	66.3	7,388

Table 1 Percentage reporting “good”^a health by gender, 2004 and 2006

^a “Good” = very good or good (European scale, ELSA 2006) / excellent, very good, or good (US scale, all others)

^b All countries sampled in Wave 1 and/or Wave 2 are included

^c Only the 11 countries that are sampled in both waves are included

Figure 1 shows that the gender gap regarding the proportion reporting “good” health largely vanishes when controlling for age. However, a gender gap is still noticeable for SHARE, especially in the 65-74 age groups.

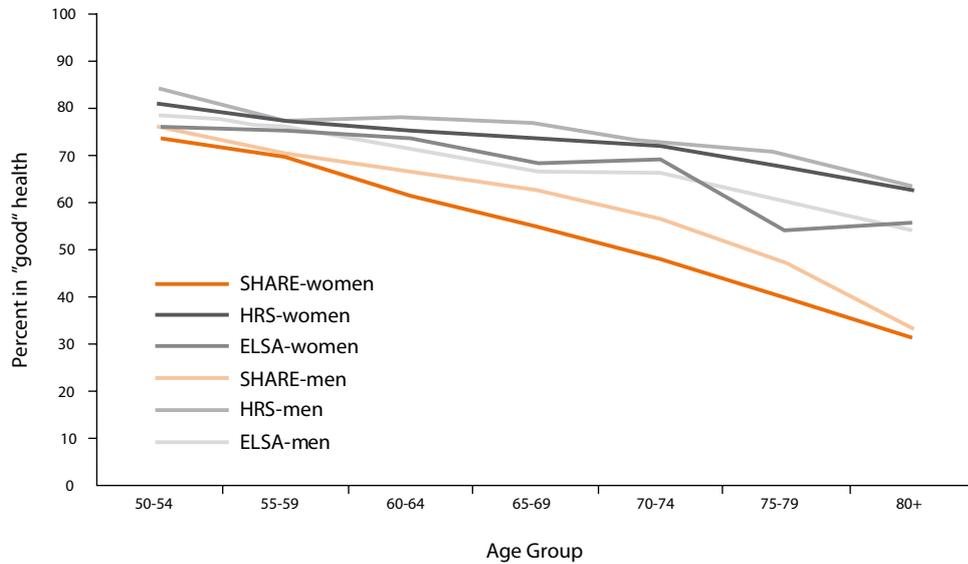


Figure 1 Percentage reporting “good” health by age group and gender, 2006

Comparing respondents who were sampled in both 2004 and 2006, we compute the fraction who reported “good” health in both waves, “good” health in the first wave but “bad” health in the second wave, “bad” health in the first wave but “good” health in the second wave, and “bad” health in both waves. Our estimates are presented in Table 2. As an individual must fall into one of the four categories, the sum of each row is 100%.

Estimates from all surveys are quite similar and we find a significant level of movement between “good” and “bad” health between 2004 and 2006. About 20% of the population in any survey experiences movement. There is a net flow into “bad” health; however, “bad” health is not an absorbing state as a significant share of the population experience a change from “bad” to “good” health. Another interpretation can be gained by calculating transition probabilities. For men in SHARE the transition probability from good to bad health is $14.1 / (14.1 + 56.3) = 20\%$ as compared to $7.4 / (7.4 + 22.2) = 25\%$ for the transition probability of “bad” to “good” health. Thus the likelihood from transitioning is higher conditional on the original state being “bad”, but since the majority of respondents are in “good” health in 2004, the net change at a population level is from “good” to “bad”.

	2004	Good		Bad	
	2006	Good	Bad	Good	Bad
SHARE					
male		56.3	14.1	7.4	22.2
female		46.6	15.0	8.8	29.6
HRS					
male		67.2	8.9	7.2	16.7
female		65.4	8.8	6.5	19.3
ELSA					
male		61.2	13.3	5.3	20.2
female		59.6	13.6	6.5	20.4

Table 2 Percentage reporting “good”^a or “bad” health in 2004 and 2006 by gender

^a“Good” = very good or good (European scale, ELSA 2006) / excellent, very good, or good (US scale, all others).

“Bad” = not “good”

Measures of Disability

Measures of disability are included in all three surveys. SHARE, HRS and ELSA include questions regarding functional limitations (FLs), activities of daily living (ADLs) and instrumental activities of daily living (IADLs). The FL measure captures the physical ability of the respondent. Items in this category include difficulty walking 100 meters, sitting for 2 or more hours, climbing one or more flights of stairs, stooping, reaching, pulling, lifting and picking up a coin. ADLs are basic daily activities an individual must undertake on one’s own or with the help of another. Items included in this category include difficulty dressing, walking, bathing, eating, getting in or out of bed and using the toilet. IADLs refer to skills that require skilled physical abilities as well as cognitive skills. Items in this category include difficulty using a map, preparing a hot meal, shopping for groceries, making telephone calls, taking medications, doing work around the house or garden.

There are several cross-survey differences regarding the measures of disability, but some are due to efforts to improve comparability. The net effect of the biases is unclear as some would be expected to lead to higher amounts of disability while others would be expected to give lower amounts. In both SHARE and ELSA respondents are shown visual aid cards which list the possible response options while respondents in HRS are asked about each potential difficulty separately over the telephone. Different modes of data collection may affect response choices. Slight differences in question wording may also affect responses. In SHARE respondents are asked about “any difficulty” in relation to FLs and ADLs while the preamble to these corresponding questions in ELSA and HRS is: “because of a health problem...”. For IADLs, HRS respondents are asked: “Here are a few other activities which some people have difficulty with...” while SHARE respondents are asked: “please tell me if you have any difficulty...”. All three surveys instruct respondents to respond only if the difficulty has lasted or is expected to last three months or more.

Another issue in comparing disability measures across surveys are the response options. “Doing work around the house or garden” is listed as an IADL in SHARE and ELSA, but not in HRS for either wave. In order to make cross-country comparisons, we exclude this IADL in our investigation. While SHARE and ELSA response options are limited to “yes” or “no” (corresponding to whether or not the option was picked from the showcard),

HRS has two additional options “can’t do” and “never do”. There are few responses to the HRS additional options and we fold these responses into the “no” response option. Wording of responses sometimes varies across surveys, but this appears to be due to making the surveys more comparable rather than creating bias. For example, the phrase “5p coin” is used in ELSA while “dime” is used in HRS. Similarly, “one block” in HRS and “100 yards” in ELSA are used to convey a short distance that can be readily understood by the respondent.

Table 3 presents reports of FLs, ADLs and IADLs. Respondents in HRS report considerably more difficulty with climbing stairs and stooping. Cross-country rates for ADLs are more similar, but HRS respondents are much more likely to respond that they have trouble using a map and managing money. It is unlikely that this is due to differences in cognitive abilities as HRS respondents perform relatively well on other cognitive measures (see section 3).

	Do You Have Difficulty... ^a	SHARE	HRS	ELSA
Functional Limitations				
	walking 100 meters	11.8	14.8	12.1
	sitting for 2 hours	12.1	19.6	14.5
	getting up from a chair	17.3	39.7	25.4
	climbing several flights of stairs	24.4	47.5	35.0
	climbing one flight of stairs	10.7	18.8	14.4
	stooping or kneeling	26.0	46.0	35.7
	extending arms above shoulder	9.7	15.8	11.1
	pulling/pushing large objects	14.6	28.1	17.8
	lifting objects	24.3	22.9	23.8
	picking up a small coin	4.3	6.8	5.4
Activities of Daily Living:				
	dressing	8.8	8.8	12.7
	walking across a room	3.0	6.1	3.4
	bathing or showering	7.2	5.9	10.9
	eating	2.5	2.9	2.3
	getting in and out of bed	4.5	6.0	6.2
	using the toilet	2.8	5.3	3.6
Instrumental Activities of Daily Living:				
	using a map	9.2	19.5	5.0
	preparing a hot meal	4.5	9.3	4.7
	grocery shopping	8.2	11.6	9.7
	making a telephone call	2.8	3.9	2.4
	taking medications	2.2	3.4	2.0
	managing money	3.9	8.6	3.4

Table 3 Percentage Reporting Specific FLs, ADLs and IADLs

^a Item wording is from the SHARE questionnaire

Table 4 presents summary measures for FLs, ADLs and IADLs. Respondents in HRS appear to have the highest level of disability followed by those in ELSA. This contrasts sharply with the previous finding that the elderly in the United States have a higher fraction reporting “good” health.

This apparent contradiction may be resolved if we consider self-reported health to be an indicator of relative health rather than absolute health. While absolute health would refer to one’s health status as compared to the health of any other person in the world, relative health would be one’s health relative to someone else in the same country and possibly in the same age cohort. It is generally found that response scales tend to differ by country as a result of language and cultural differences. It is for that reason that we have concentrated more on changes than levels when we compared self-reported health. The surveys contain vignette questions in which respondents are asked to rate the health of hypothetical persons. So in future work these can be used to correct for different response styles (Kapteyn et al., 2007).

	SHARE	HRS	ELSA
Average:			
functional limitations	1.6	2.6	2.0
activities of daily living	0.3	0.3	0.4
instrumental activities of daily living	0.3	0.6	0.3
One or more, %:			
functional limitation	51.6	69.3	55.8
(instrumental) activities of daily living	19.5	36.9	26.5

Table 4 Disability in SHARE/HRS/ELSA, 2006

Table 5 shows the relations between limitations and self-reported health. Within all surveys, those who report “bad” health report more disability than those in “good” health, thereby confirming the within-country validity of both measures of health.

	SHARE		HRS		ELSA	
	Good	Bad	Good	Bad	Good	Bad
Average:						
functional limitations	0.6	2.8	1.7	4.9	1.0	3.8
activities of daily living	0.0	0.6	0.1	1.0	0.1	0.8
instrumental activities of daily living	0.1	0.6	0.3	1.2	0.1	0.6
One or more, %:						
functional limitation	31.2	79.7	61.0	92.1	42.5	83.3
(instrumental) activities of daily living	7.1	36.6	26.1	33.9	12.9	53.8

Table 5 Disability in SHARE/HRS/ELSA by self-reported health, 2006

“Good” = very good or good (European scale, ELSA) / excellent, very good, or good (US scale, SHARE, HRS).

“Bad” = not “good”

Americans may report higher levels of disability because overall population health is lower, or because the decline in health is more acute for them relative to Europe and England. Figure 2 shows the change in reported functional limitations between 2004 and 2006 by age. The change in FLs increases with age group. While we would expect a close correspondence between Figures 1 and 2, this is not evident. For SHARE, there is almost no change in functional limitations regardless of age group, whereas for the HRS there is a slight increase that is not strongly related to age group. But for ELSA there is a stark and steady increase with age group, suggesting an accelerating decline in health. The trend for ELSA suggests that there may be a potential for intervention, although the lower line for the HRS may be the result of a higher level of disability to start with, so that the USA does not necessarily perform “better”.

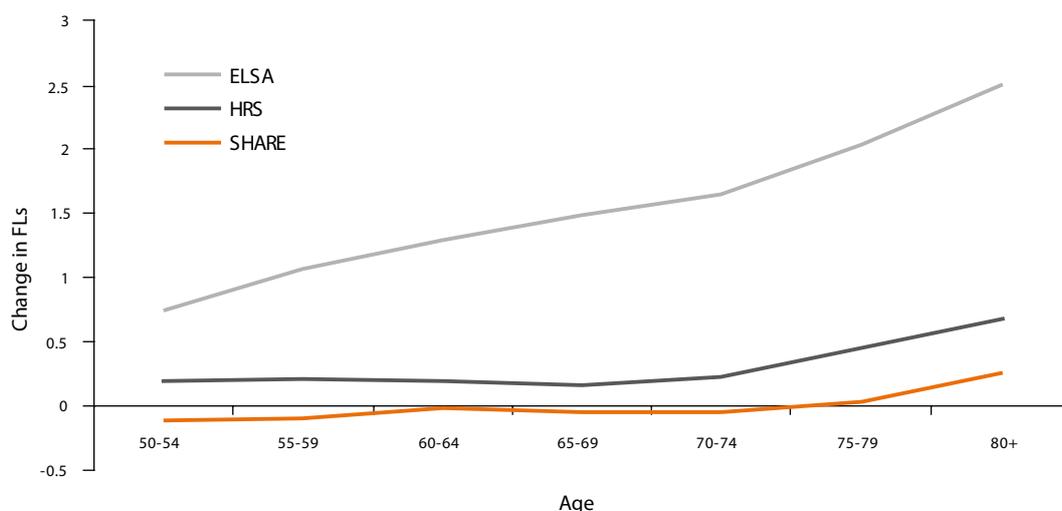


Figure 2 Change in number of reported FLs between 2004 and 2006 by age group

Relationship Between Retirement and Health

Retirement may affect health through several mechanisms. In the United States, the normal retirement age corresponds with eligibility for Medicare, the national health insurance program for the elderly. While some studies suggests that retirement worsens health (Casscells et al., 1980; Gonzalez, 1980), others studies have found that it may lead to better health (Thompson and Streib, 1958; Coe and Zamarro, 2007). Some individuals find work a source of mental or physical stress. For these, retirement may lead to better health. Alternatively, health could decline in retirement if individuals engage in physical exercise and mental stimulation at work, but not when they are home. Retirees may also suffer from feeling less engaged with society or may have changing perceptions due to different peer groups (Macbride, 1976; Bradford, 1986).

A substantial fraction of respondents from all surveys retire between 2004 and 2006 (see section 4). Figure 3 shows the percentage of “good” health in 2004 and 2006 for two sub-groups: those who reported working in 2004 and 2006 (“not retired”) and those who reported working in 2004 and being retired in 2006 (“retired”). Health appears to worsen more for retirees than for the not retired across all surveys. However, the difference between the two groups is smallest in SHARE. We also see that health decline itself is more prevalent in SHARE and especially ELSA than in the HRS. Note, however, that this figure

does not control for the endogeneity of the retirement decision, and does not adjust for age. In contrast, after controlling for age and other confounding factors and taking account of the endogeneity of retirement through an instrumental variables approach, Coe and Zamorro (2007) find a significant positive effect of retirement on health.

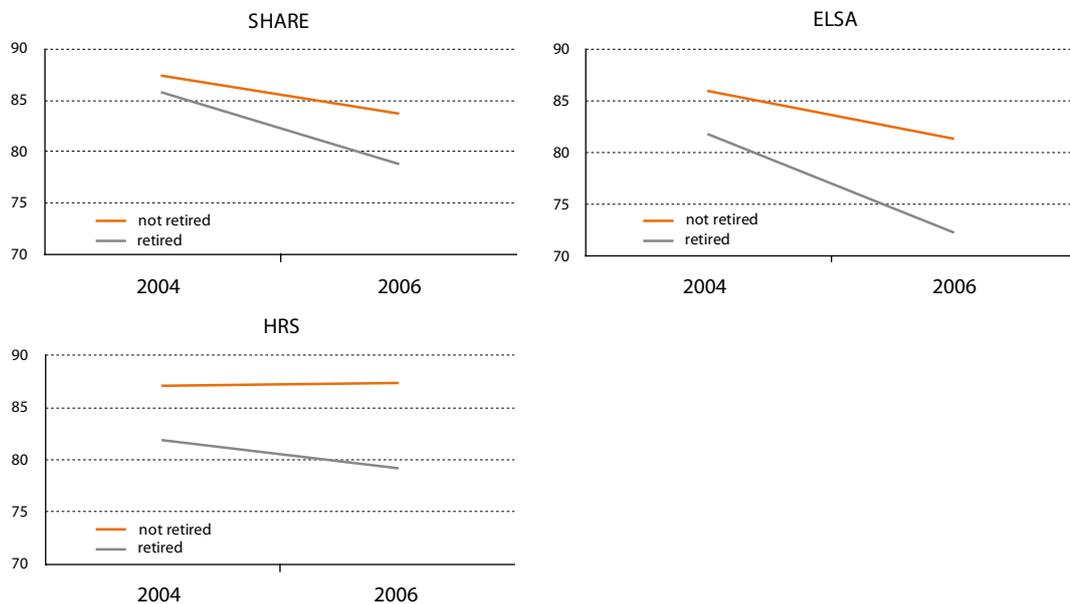


Figure 3 Percentage in "good" health by retirement status^a in 2006

Note: The "not retired" are those who report working in 2004 and 2006 and the "retired" are those who report working in 2004 and retired in 2006

Health Care Utilization

Health care systems and utilization vary significantly across countries and may contribute to cross-country health disparities. Utilization is particularly high in the United States relative to Europe and it is unclear how this may relate to health status, because quality of care may also play a big role. For example, health care costs per person in 2003 in the United States were estimated to be \$5,711 as compared to \$2,317 in England, \$3,048 in France and \$2,314 in Italy (OECD 2006).

SHARE includes a measure on the number of doctor visits in the past year while HRS includes a measure about whether or not the respondent visited a doctor in the past year. By collapsing the SHARE measure into a binary variable, the measures are comparable. No measure on doctor visits is available in ELSA.

Table 6 shows that the vast majority of the elderly in Europe and the US visit a doctor at least once a year. Respondents in the HRS are more likely to report having gone to the doctor and women are more likely to have visited the doctor in the past year than men in both surveys. Those who have visited the doctor in the previous year are more likely to report more disabilities in both surveys. Health status appears to be stronger related to the likelihood of visiting a doctor for SHARE than for the HRS.

		SHARE		HRS	
		men	women	men	women
Self-reported health^a					
	Good	81.3	87.8	91.6	96.0
	Bad	93.0	96.1	94.9	97.1
Functional limitations					
	No FLs	81.3	86.9	89.7	94.2
	At least one FL	92.0	94.7	94.3	96.9
(Instrumental) Activities of Daily Living					
	No ADLs/IADLs	84.6	90.4	92.4	96.6
	At least one ADL/IADL	92.9	95.3	92.6	95.8
Overall		85.7	91.6	92.5	96.3

Table 6 Percentage with at least one doctor visit in previous year by health status (2006),

Note: "Good" = very good or good (European scale, ELSA) / excellent, very good, or good (US scale, SHARE, HRS).

"Bad" = not "good"

Mortality

Mortality can be considered as another indicator of health. However while death itself implies a reduction in health, it is unclear how much age at death relates to health status at death unless we know about the quality of life. Certain measures have been designed to capture this, notably quality-adjusted life years (QALY), but we cannot construct such measures in SHARE, HRS, or ELSA. Investigating mortality by the disease burden at death and marital status, two variables available in all surveys, may provide some information regarding the quality of life prior to death.

Here we present preliminary results for mortality. Such results are not available for ELSA yet, so we limit ourselves to SHARE and HRS. However, it must be noted that due to the preliminary nature of the data, there are a large number of SHARE 2004 respondents that are not in the sample in 2006, for whom it is not yet known whether they had died in between waves, so the following results should be considered as tentative at best, see section 3.1 on the oldest old for further details. Between 2004 and 2006, a smaller fraction of SHARE respondents died as compared to HRS. Age at death for females is higher than for males in both surveys. The difference between age at death for females in HRS as compared to those in SHARE is particularly striking. Those who died had higher level of functional limitations than those who survived. Given our previous finding that HRS respondents report an overall higher level of FLs, it is unclear if HRS respondents at death had proportionally more disability than SHARE respondents at death relative to those who survived.

	SHARE		HRS	
	alive	dead	alive	dead
Gender, %				
men	43.2	2.3	43.3	2.5
women	52.2	2.3	51.9	2.3
Age, average				
men	64.0	73.5	63.3	73.2
women	65.8	80.5	64.7	77.4
Functional limitations, average				
men	1.0	2.9	1.8	4.3
women	1.9	5.0	2.8	5.3

Table 7 Characteristics in 2004 of respondents who were still alive in 2006 and those who died in between waves

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2.3 Mental Health and Cognitive Ability

Gema Zamarro, Erik Meijer, Meenakshi Fernandes

Adding life to years may be as important as adding years to life. As the population ageing process continues around the world, the relevance of quality of life, particularly in the later stages of life, is becoming more and more important for an increasing percentage of the population. Therefore, in order to gain some insight into cross-country differences in the quality of life of 50+, in this section we compare mental health and cognitive ability measures in Europe, the U.S., and England. For this we have used information from SHARE, HRS and ELSA for the years 2004 and 2006. For the case of SHARE we concentrate on information pertaining to the 11 original countries in the survey (Austria, Germany, Sweden, The Netherlands, Belgium, Spain, Italy, France, Denmark, Greece, and Switzerland).

Mental Health

Depression is currently the leading cause of disability in the world. In fact, Murray and Lopez (2006) estimate that by 2020 depression will be the second most burdensome illness in the world. Late-life depression is one of the most common mental health problems in adults aged 60 and over (Reker, 1997). Depression among the near-elderly and elderly can arise from the loss of self-esteem (helplessness, powerlessness, alienation), loss of meaningful roles (work productivity), loss of significant others, declining social contacts due to health limitations and reduced functional status, dwindling financial resources, and a decreasing range of coping options (Cole, Bellavance, and Monsour, 1999). According to the U.S. Agency for Health Care Policy and Research, depression is twice as prevalent among women as among men.

Several questions to determine mental health are included in SHARE, HRS and ELSA. Both HRS and ELSA include questions necessary for construction of the Center for Epidemiological Studies-Depression Scale (CES-D); a 20-item scale developed by the National Institute of Mental Health (NIMH). The CES-D has four separate components: Depressive affect, somatic symptoms, positive affect, and interpersonal relations. In contrast, the SHARE main interview collects the necessary information for constructing the Euro-D scale, while CES-D is asked in a separate drop off questionnaire. Unlike the CES-D, the Euro-D scale runs from 0 to 12, counting whether the individual reported having problems in a list of negative feelings. As we do not find the Euro-D and CES-D measures to be comparable, we instead consider a simple indicator variable for whether or not an individual reports being sad or depressed. For SHARE, this question is asked in reference to the last month while for HRS and ELSA it is the last week. As depression in the last week is likely to be different than depression in the last month, we do not consider the results from SHARE to be directly comparable with those from HRS and ELSA. However, we believe that important information can still be obtained by studying the patterns of responses in these three surveys. For example, we are still able to study how depression varies by gender, age, health status, etc.

Figure 1 shows the proportion of the population who stated to feel sad or depressed by gender for SHARE, HRS and ELSA for the year 2006. As we can see in this graph, these proportions are much higher in SHARE than in HRS or ELSA. This is a result we find in all our statistics on depression and that is probably due to the different time frame used in this question in SHARE (last month) in comparison with HRS and ELSA (last week).

Women are more likely to say that they are feeling sad or depressed than men. This result is in line with the literature as we described above. Gender differences are higher in SHARE (around 19 percentage points) than in HRS (10 percentage points) or ELSA (11 percentage points). This can be due either to bigger gender differences in depression in Europe or, greater differences when reporting depression during a longer period of time.

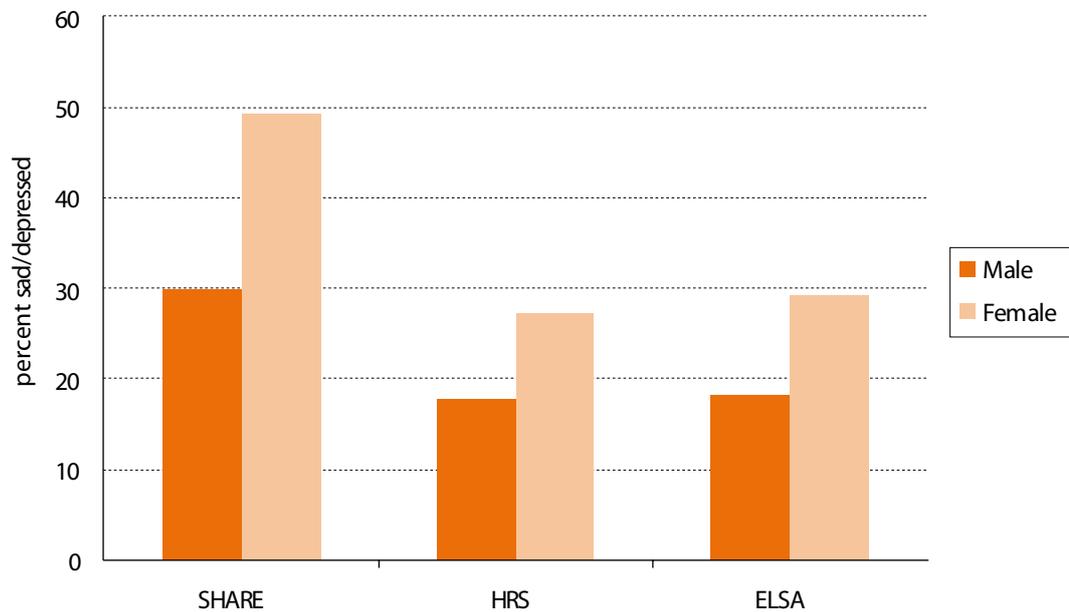


Figure 1 Percentage Sad or Depressed by gender (2006)

Figure 2 shows the proportion of the sample who reported to feel sad or depressed for different age groups. As we can see in this graph there is no clear pattern in this proportion by age. Only in Europe and England, the proportion of 70+ who declared to be sad or depressed was higher than for other age groups. This is remarkable in light of the general consensus in the literature that depression increases with age. In addition, we see that in all three studies there is a peak in the proportion of the population feeling sad or depressed in the age category 55-59.

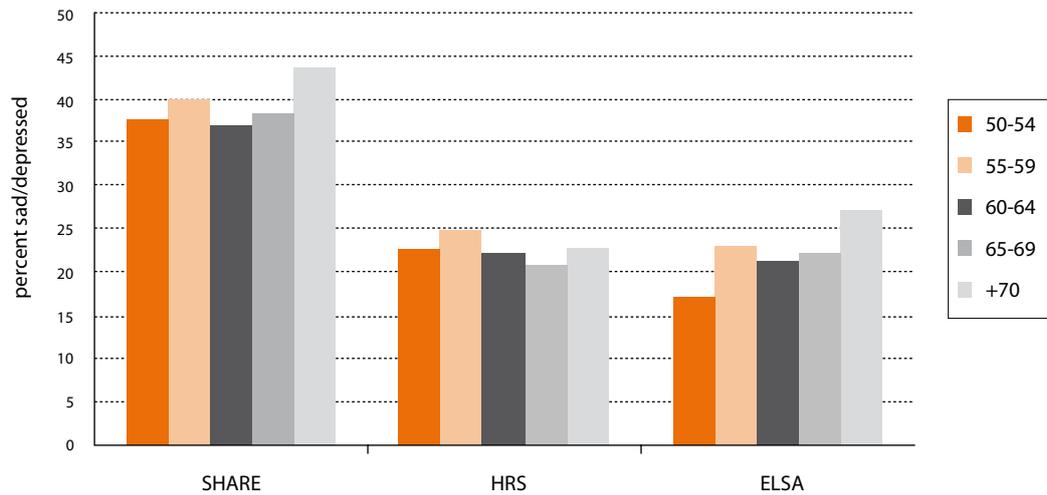


Figure 2 Percentage Sad or Depressed by age (2006)

Depression often occurs jointly with other serious illnesses, such as heart disease, stroke, diabetes, cancer, and Parkinson’s disease. This may create difficulties for diagnosis of depression as both health care professionals and patients may conclude that depression is a normal consequence of these problems. Figure 3 shows the percentage of the sample who reported being sad or depressed for different self reported health status. As we can see in this graph, in all surveys, those who reported to have bad health also reported to be sad or depressed in a much higher proportion than those who reported good health. There are two possible explanations to this result: Bad health may lead to depression or, it is possible that those who are depressed have a more negative self image leading to worse health status reports.

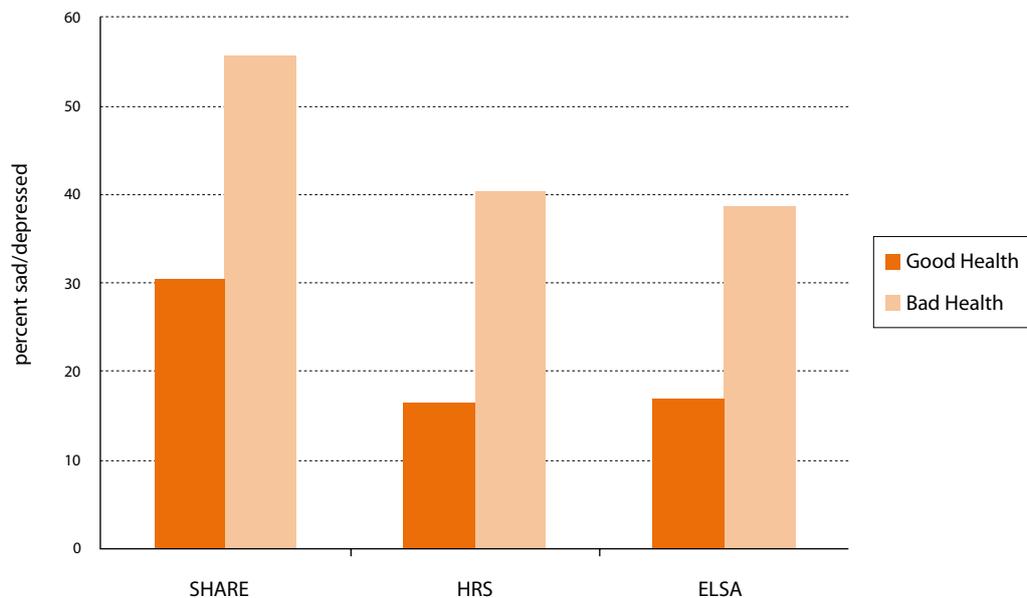


Figure 3 Percentage Sad or Depressed by self reported health status (2006)

Finally, the notion that retirement harms health is an old, and persistent hypothesis (See Minkler, 1981 for a review). Many argue that retirement itself is a stressful event (Carp, 1967; Eisdorfer and Wilkie, 1977; MacBride, 1976; Sheppard, 1976). Retirement can also lead to a break with support networks and friends, and may be accompanied by emotional or mental impacts of “loneliness,” “obsolesce,” or “feeling old” (Bradford, 1979; MacBride, 1976). Others believe that retirement is a health-preserving life change. Anecdotal evidence suggests that many discussions about the retirement decision include the idea that work is taxing to the individual, thus retirement would remove this stress and preserve the health of the retiree (Ekerdt et al., 1983). Figure 4 compares the proportion of people who reported feeling sad or depressed among those who retired between 2004 and 2006 with those who continued working. As we can see in the figure, the proportion of individuals who reported feeling sad or depressed is higher among those who retired than among those who continued working, in continental Europe (SHARE) and the U.S. The difference is higher in the U.S. (4 percentage points) than in Europe (2 percentage points). This suggests that in the U.S. retirement might be related with more negative feelings than in Europe. Surprisingly, the opposite pattern is observed in England. In this case, this proportion sad or depressed is higher for those still working in comparison with those who retired.

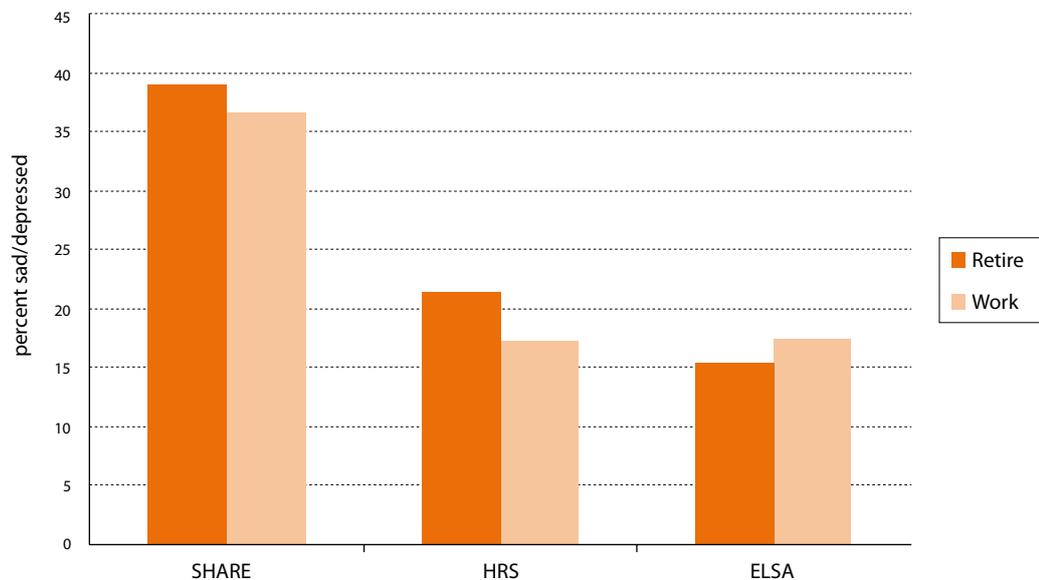


Figure 4 Percentage Sad or Depressed (2006) by retirement transition between 2004 and 2006

Cognitive Ability

The cognitive reserve is defined in the neuro-psychological literature as the individuals' capacity to use brain networks more efficiently or, in other words, to process tasks in a more efficient manner (Stern, 2002). The decline in cognitive function with age is associated with structural changes in the brain (Raz, 2004). In addition, this cognitive decline is associated with diseases such as Alzheimer's.

In SHARE, HRS and ELSA cognitive ability is measured through several questions. One of these questions measures cognitive ability in relation with memory. The episodic memory task integrated in these surveys consists of testing for verbal learning and recall, where the participant is asked to memorize a list of ten common words. In order to avoid problems of comparability due to a different number and nature of questions between the immediate recall phase and the delayed recall phase, we computed memory scores for this task considering only the number of target words recalled in the immediate recall phase (score ranging from 0 to 10). It should be pointed out that non-response was higher in HRS (10% in 2004 and 8% in 2006) than in SHARE (2% in both 2004 and 2006) and in ELSA (2% in 2004 and 3% in 2006). On the other hand, the proportion of respondents who have zero words recalled was higher in SHARE (2% in both 2004 and 2006) than in HRS (less than 1% both in 2004 and 2006) and in ELSA (also less than 1% both in 2004 and 2006).

Conceivably, these differences are due to different protocols for recording non-participation. Possibly a code of zero words indicates true zero recall or no participation in the question. In this section zero words records are considered to be true zero recall. Alternatively, we recoded zero words as missing values and patterns observed were the same. Figure 5 shows the average number of words recalled by gender in the different surveys. As we can see in this graph, the number of words recalled by people in Europe is considerably less than in the U.S. or England. No difference is observed in number of words recalled by gender in Europe while in the U.S. and England the average number of words recalled is higher for women than for men.

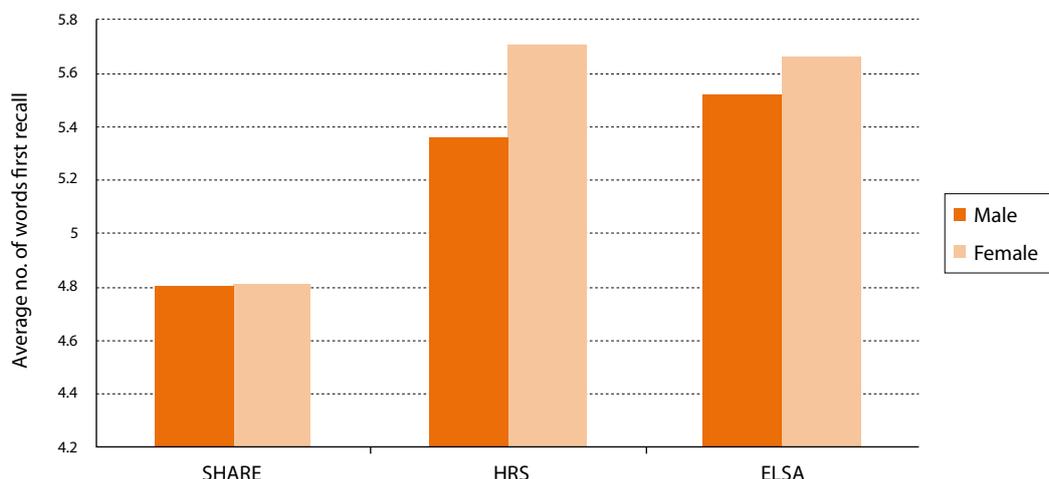


Figure 5 Average number of words recalled by gender (2006)

Figure 6 shows the average number of words recalled by age. As we can see in this graph the average number of words recalled decreases with age in a non-linear fashion. In all cases, decline is higher for those in age categories beyond 65-69.

As Figure 6 was based on cross-sectional data for 2006, the effects may include both age and cohort effects. Alternatively, one way of eliminating cohort effects consists of looking at individual changes in the number of words recalled between 2004 and 2006. Of course, with this latter approach we can only concentrate on those individuals for whom we have observations on both 2004 and 2006. Thus, attrition between the two years may influence the results.

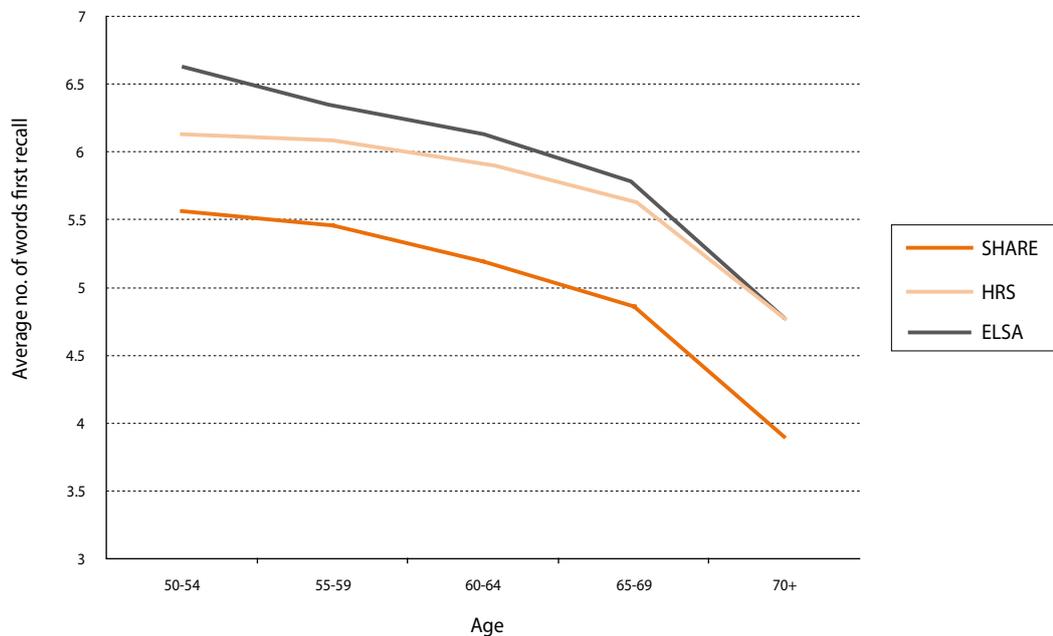


Figure 6 Average number of words recalled by age (2006)

Figure 7 shows the average individual changes in the number of words recalled between 2004 and 2006 as a function of age in 2004. As we can see in this graph, memory loss in the U.S. starts in the age category 55-59 years and increases with age. A similar pattern is observed in ELSA but only when individuals are 65 or older. Remarkably, we do not observe a similar pattern in SHARE. In this case, we observe memory gains until an individual is 75 years old. This result may be due in part to attrition of those with low memory. Those who did not reply this question in 2006 but who replied in 2004 have on average a lower memory score (4.51) than those who replied in the two waves (4.93). In addition, any differences in the interviews' protocol between 2004 and 2006 will affect the results.

Adam et al. (2005) found that occupational activities, including paid work and non paid work as well as, sport practice and other physical activities, are highly correlated with cognitive ability. Figure 8 shows the average number of words recalled by labor status. In all cases those employed recalled a higher number of words than those retired. However, this may be due in part to the decline in memory by age as those retired would be on average older than those employed.

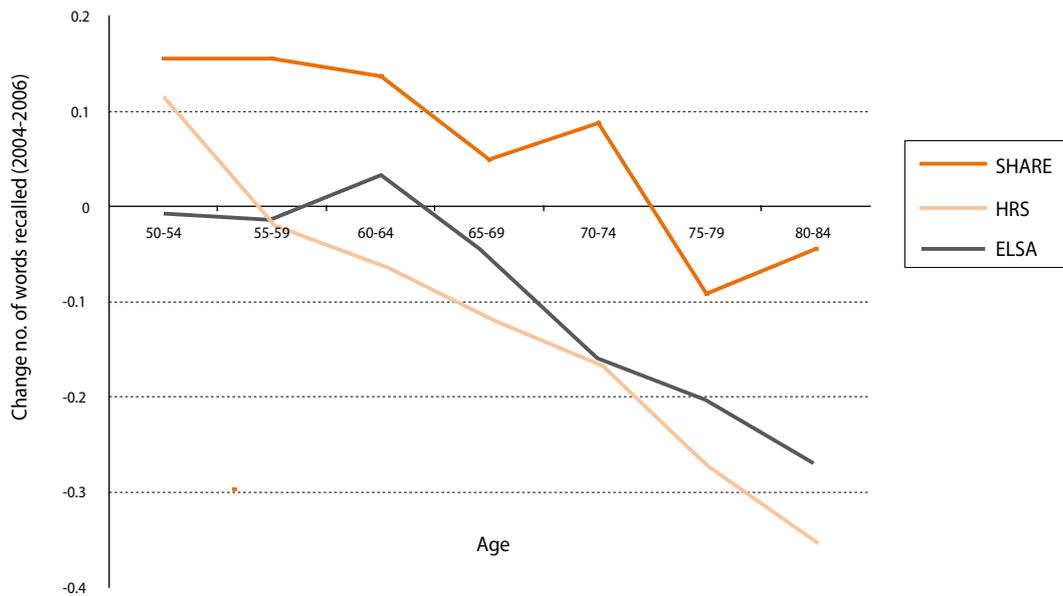


Figure 7 Memory change 2004-2006 by age (2004)

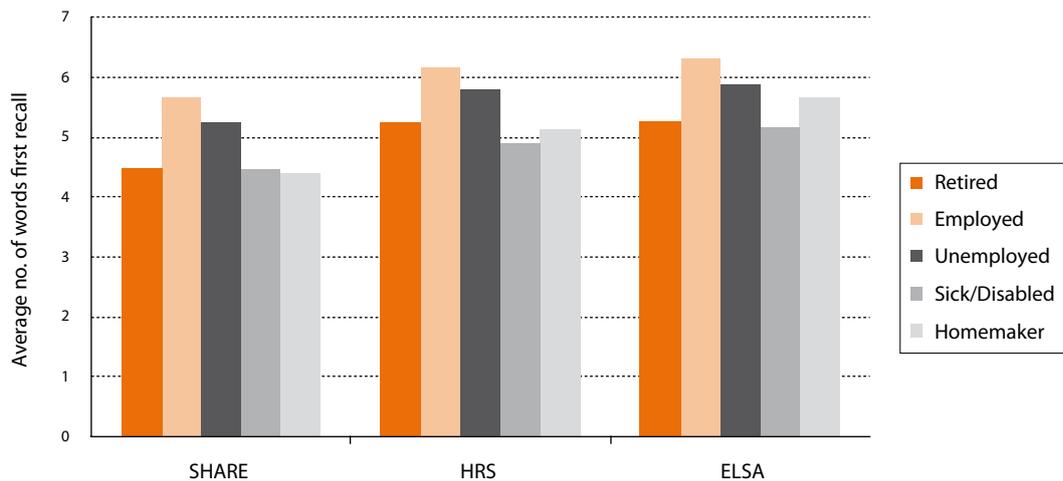


Figure 8 Average number of words recalled by employment status (2006)

Finally, Figure 9 shows the average individual differences in number of words recalled between 2006 and 2004 for those working in 2004 but retired in 2006 and for those who continued working in 2006. As we can see in this graph, in all cases, those who retired are also those who experience higher losses in the number of words recalled compared to those who continued working. Especially negative is the change in number of words recalled in the case of the U.S. It should be pointed out that for those who continued working we observe an average gain in memory for both SHARE and HRS. This suggests the possibility of differences in the protocol for this question in the years 2004 and 2006. However, this does not invalidate our retire-work comparisons.



Figure 9 Average change in number of words recalled by retirement status (2006-2004)

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2.4 Labor Force Participation and Retirement

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Labor market participation of 50+ individuals is currently an important policy concern. While the population is ageing, many countries are introducing policies with the objective of encouraging labor force participation and/or delaying retirement. These policies include, for example, increasing retirement ages or restricting access to non-standard routes out of the labor force. In this section we compare labor market outcomes for Europeans, Americans and English using data from the 2004 and 2006 waves of SHARE, HRS and ELSA. For SHARE we concentrate on information pertaining to the 11 original countries in the survey (Austria, Germany, Sweden, The Netherlands, Belgium, Spain, Italy, France, Denmark, Greece, and Switzerland).

Labor Force Participation

Labor force participation of those 50 years and over has changed dramatically over the past four decades in the U.S. and Europe. A substantial literature on the determinants of retirement in the United States (e.g. Hurd, 1990 and Lumsdaine and Mitchell, 1999) suggests that the increasing generosity of Social Security, notably the windfall gains during the 1960s and 1970s, may have played a significant role in the trend among male workers in the postwar period toward early retirement (Costa, 1998; Hurd and Boskin, 1984; Ippolito, 1990). Recent evidence, however, indicates that labor force participation rates among older men have stabilized and have begun to increase (Quinn, 2002; Karoly and Panis, 2004). Among 55-64 year old American women, labor force participation rates increased substantially between 1950 and the mid 1970s, after which there was a period of stability followed by rapid increases again since 1990. Labor force participation rates of American women 65 and older remained stable throughout this period. Trends among women are harder to interpret, because of the presence of substantial cohort effects. Table 1 shows labor force participation rates of men and women 55 and over for the most recent decade (1995-2006) for the U.S. and The Netherlands. The Netherlands was chosen as a representative of a European country. Labor force participation rates in the Netherlands (and in Europe in general) were much lower relative to the U.S. in 1995 but have increased much faster relative to the U.S. over the last decade.

In order to have a comparable measure of labor force status in SHARE, HRS and ELSA we combined labor market information in HRS and ELSA to mimic the categories used in SHARE (retired, employed, unemployed, sick or disabled and, homemaker). Our measure of labor force status for HRS involves recoding working part time and full time as employed, retired and partly retired as retired and, not in the labor force as homemaker. In ELSA, we combined the “employed” and “self-employed” in one category “employed”.

Figure 1 shows labor force status reported by men in 2006 in SHARE, HRS and ELSA while Figure 2 shows the same statistics for women. These figures corroborate that employment rates among elderly workers are much higher in the U.S. than in Europe and, conversely, that more people are retired in Europe. Other salient features are the high percentage of female homemakers and higher unemployment rates in continental Europe as well as the higher percentage of disabled in England. These results may be due to the different labor market regulations in different countries.

	Men		Women	
	Netherlands	U.S.	Netherlands	U.S.
55-59				
1995	59.3	74.6	23.4	53.7
2000	68.7	75.3	37.9	59.9
2004	73.6	74.2	45.2	62.7
2005	74.3	73.9	47.3	63.4
2006	75.4	73.7	50.7	64.8
60-64				
1995	20.5	51.3	7.9	34.6
2000	26.7	53.5	11.2	39.2
2004	30.8	54.8	16.2	43.7
2005	29.0	56.2	17.3	44.3
2006	32.4	57.0	19.8	45.6
65-69				
1995	8.2	25.8	2.1	16.9
2000	9.7	29.3	2.8	18.9
2004	11.8	31.4	4.2	22.5
2005	12.4	32.5	5.0	22.9
2006	13.0	33.3	4.8	23.5

Table 1 Employment of Men and Women aged 55 and Older

Source: Authors tabulations from OECD Labor Market Statistics

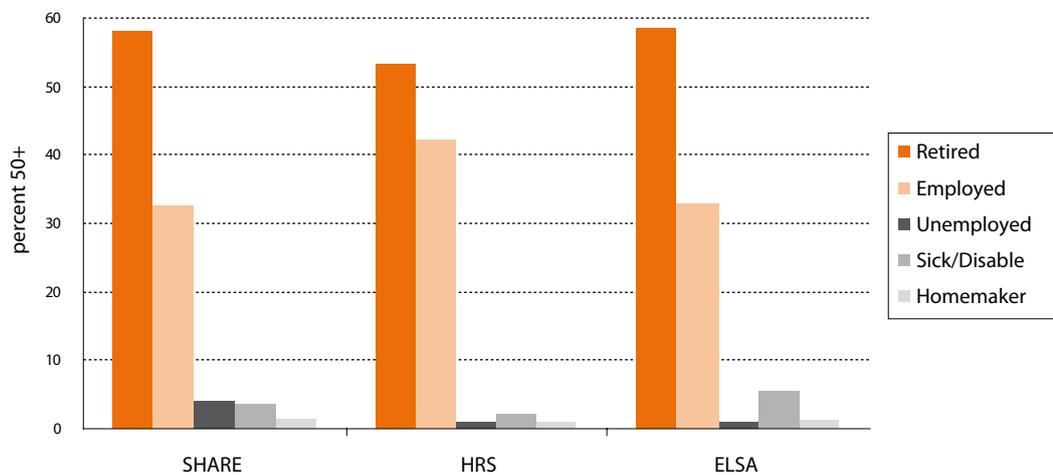


Figure 1 Labor force status (2006) Males

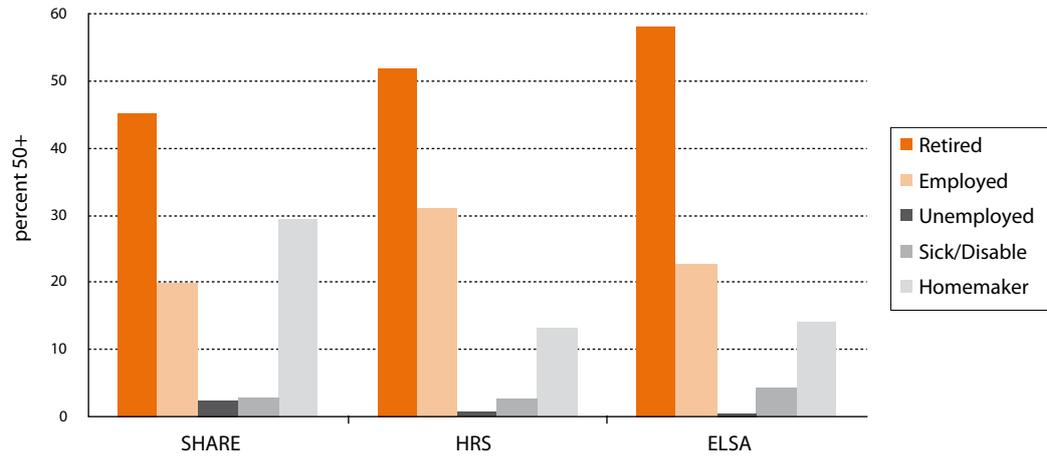


Figure 2 Labor force status (2006) Females

Figure 3 shows labor force participation rates by age for the year 2006. As we can see in this graph, labor force participation in SHARE is lower than in HRS for all age groups. The biggest difference is for those who are between 60 and 64 years old. Labor force participation in this group is 43% in HRS and only 20% in SHARE. SHARE labor force participation rates are also below those in ELSA. However, the difference narrows once respondents are 65 or more years old.

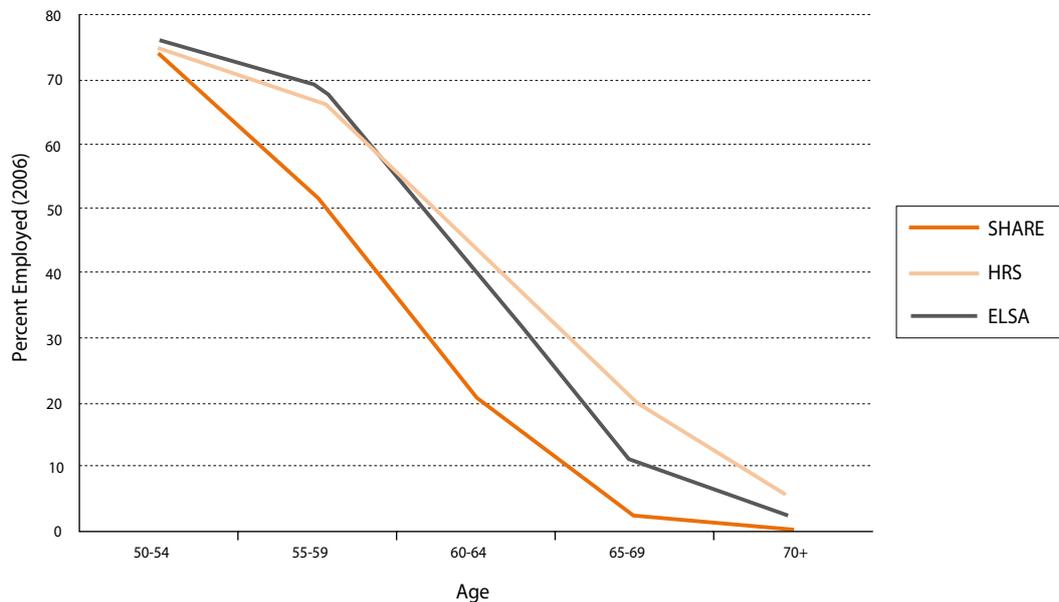


Figure 3 Labor force participation (2006) by age

Retirement Patterns

As many countries around the world face an aging population, understanding the determinants of retirement decisions is of high public policy relevance. In this section, we concentrate on those respondents who reported to be employed in 2004 and describe how their retirement hazard is related to age, health status in 2004 and eligibility rules for public pensions. We define the retirement hazard as the percentage of workers in 2004 who reported to be retired in 2006.

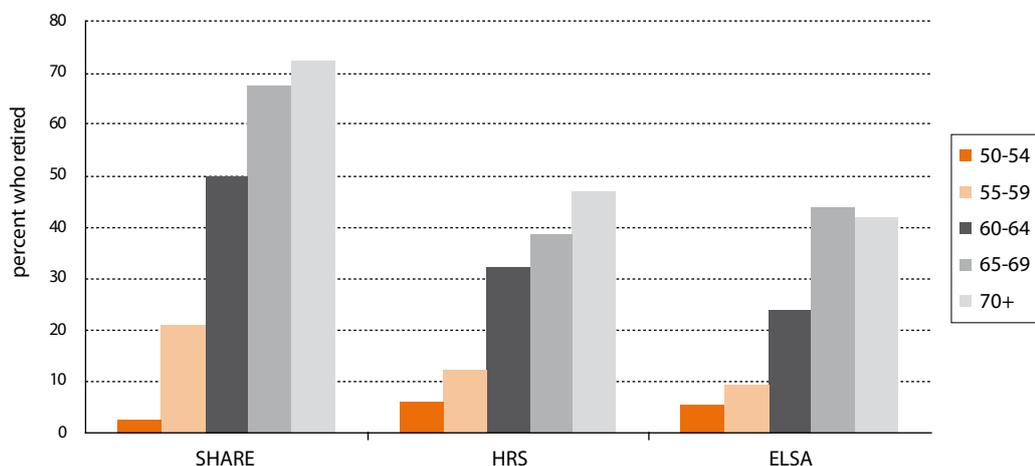


Figure 4 Retirement hazard (2004-2006) by age (2004)

Figure 4 shows for different age groups the proportion of those working in 2004 who retired in 2006. As we can see in this graph, the proportion of people who retired during this two year interval is higher in SHARE than in HRS and ELSA for all age groups except those between 50 and 54. We see a substantial increase in the retirement hazard between the age categories 55-59 and 60-64 (in 2004) in all three datasets. Moreover, particularly in ELSA we observe another substantial increase when we move from 60-64 to 65-69.

An important determinant of the timing of retirement are the incentives imbedded in the rules determining Social Security pension benefits, as well as employer-provided pension benefits (see Hurd, 1990 and Lumsdaine and Mitchell, 1999 for reviews and Zissimopoulos, Maestas and Karoly 2007; Poterba, Venti and Wise 2004; Anderson, Gustman and Steinmeier, 1999; Samwick, 1998). Likewise, the studies in the volumes edited by Gruber and Wise (1999, 2004) note that there is a strong negative correlation between labor force participation at older ages and the generosity of early retirement benefits. Table 2 shows the cross national variation in eligibility ages for public old-age benefits. These are the normal and early retirement ages used in the construction of Figures 5 and 6.

Country	Early (normal) retirement age for all workers	
	Males	Females
Austria	65 (65)	60 (60)
Belgium	60 (65)	60 (65)
Denmark	65 (65)	65 (65)
France	60 (60)	60 (60)
Germany	63 (65)	63 (65)
Greece	57 (65)	57 (65)
Italy	60 (65)	60 (65)
Netherlands	60 (65)	60 (65)
Spain	60 (65)	60 (65)
Sweden	61 (65)	61 (65)
Switzerland	63 (65)	62 (64)
England	65 (65)	60 (60)
United States	62 (65)	62 (65)

Table 2 Eligibility for Public Retirement Benefits

Source: OECD (2005). Ages in United States based on Social Security System for those retiring in 2003

Figure 5 shows how the proportion of retirees changes as a function of years to normal retirement age while Figure 6 shows how this proportion changes as a function of years to early retirement age.

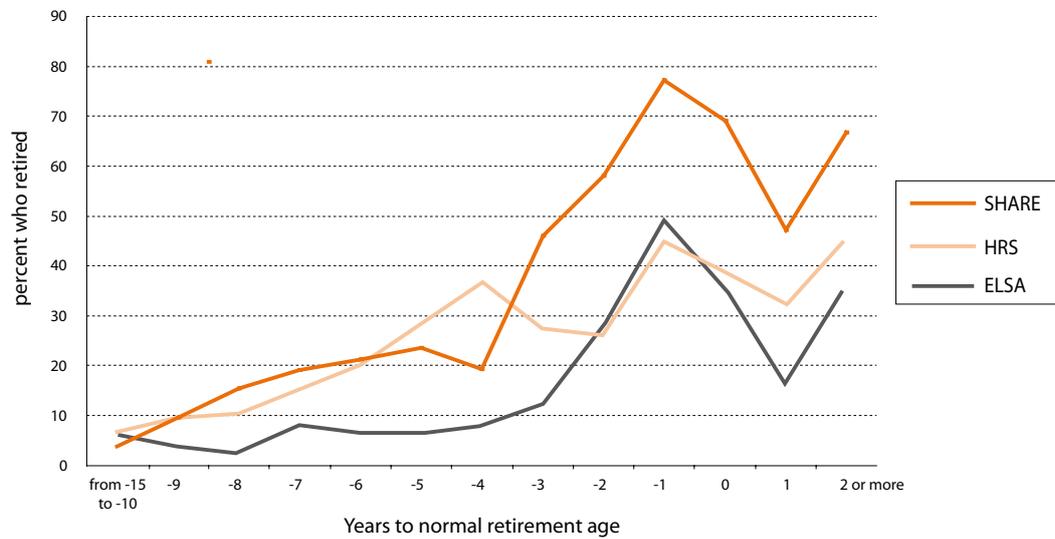


Figure 5 Retirement hazard (2004-2006) by years to standard retirement age (2004)

As we can see in Figure 6 there is a jump in the proportion of people who retire when they reach the normal retirement age (-1 years to normal retirement age in 2004). The jump in this proportion is higher in England, around 21 percentage points, than in Europe and in the U.S. where it is around 19 percentage points.

Compared to England, the retirement hazard is always higher in continental Europe. The retirement hazard in the U.S. is higher than in England, until about three years before the normal retirement age. After that differences appear to be small.

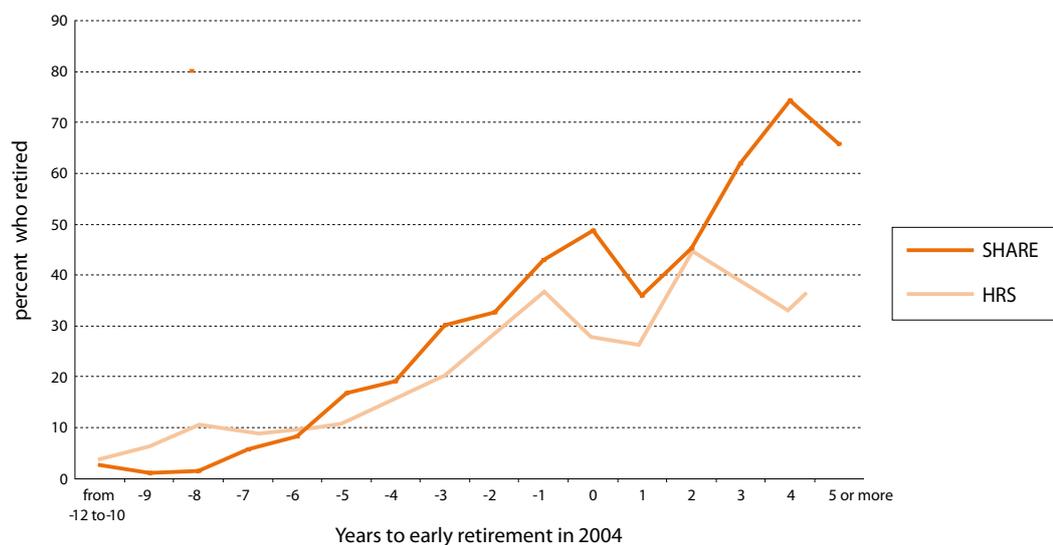


Figure 6 Retirement hazard (2004-2006) by years to early retirement age (2004)

Figure 6 shows how the proportion of retirees among those working in 2004 changes as a function of years to early retirement age. England is not included in this graph because to our knowledge there is no clear early retirement age in England. For those countries in SHARE with no early retirement age, the standard retirement age was considered instead. This has been done to avoid changes in the composition of countries included in SHARE. As we can see in this graph there is a jump in the retirement hazard once individuals reach 1 year prior to early retirement age (in 2004). The jump is 1 percentage point higher in Europe than in the U.S. A second jump is observed in continental Europe for those who are at the early retirement age in 2004 (0 years to early retirement age). Figures 5 and 6 suggest the major role of normal and early retirement ages (and the associate eligibility for several kinds of benefits) as a policy tool for influencing retirement patterns.

Another factor determining the choice of a retirement date is a worker's health. Bad health can lead to less attractive employment opportunities as a result of decreases in productivity and hence possibly lower wages. In addition, bad health can make work more burdensome, increasing the preference for retirement. On the other hand, if health insurance availability is related to employment then the effect of health on retirement becomes ambiguous. See, for example, Currie and Madrian (1999) for an overview of the literature on the relationship between health, health insurance and labor market outcomes. Figure 7 shows retirement hazard rates for those working in 2004 as a function of self reported health status in 2004. As we can see in this graph, those who reported bad health in 2004

were more likely to retire than those who reported good health, in all 3 surveys. The difference in the proportion of those retiring among the two health statuses was about 6 percentage points in SHARE and HRS and, 5 percentage points in ELSA.

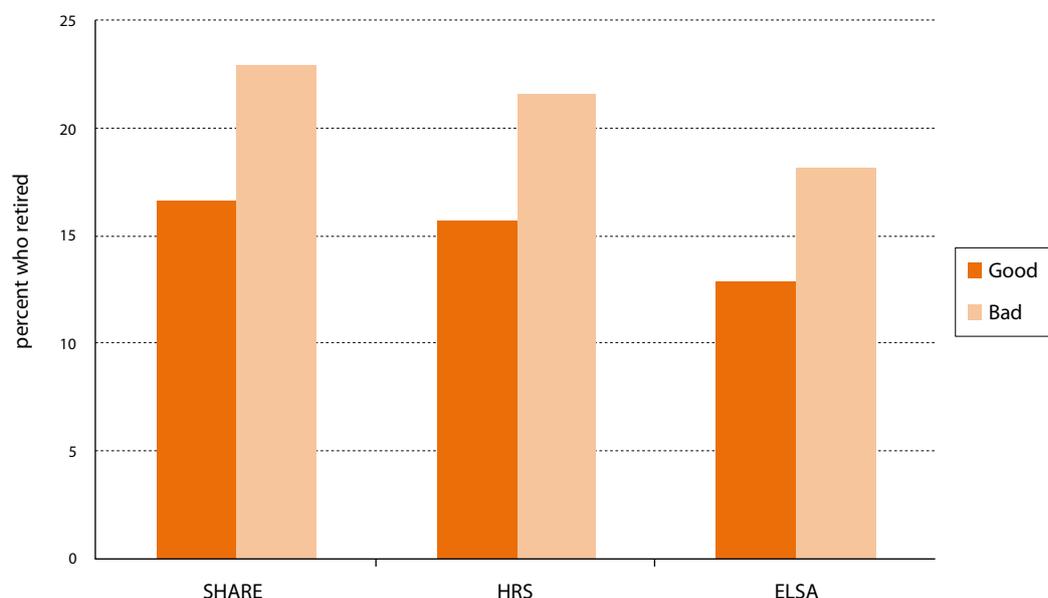


Figure 7 Retirement hazard (2004-2006) by health status (2004)

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2.5 Income and Replacement Rates

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Incomes of the elderly form one of the main research and policy issues in the area of aging. On the one hand, aging populations imply that in pay-as-you-go systems the incomes of more retirees have to be paid by fewer workers, which may put an unacceptable burden on the younger generations, and may lead to concerns about the affordability of pension systems. On the other hand, there are also concerns about whether individuals have accumulated enough pension wealth to secure an acceptable retirement income. In this section, we will compare income distributions and income changes, especially those related to retirement, in SHARE, HRS, and ELSA, and will briefly look at changes in income inequality related to retirement.

Definitions and Construction of Income Variables

In all three surveys, income is asked in great detail. Because in this section we compare overall household income, the answers to the large numbers of questions about detailed income components have to be combined into a single measure. Apart from a relatively straightforward but tedious programming effort to sum the individual components, taking account of different routings through the questionnaire depending on answers to previous questions, this also requires a non-negligible amount of imputation. The latter is necessary, because respondents sometimes do not know a specific amount, in which case they often are able to indicate a range through an unfolding brackets sequence, or they refuse to answer a certain question. Given the large number of questions that the total household income depends on, even a small fraction of missing data or bracket responses implies that for a relatively large fraction of households, an exact total cannot be directly computed. Paccagnella and Weber (2005) discuss these issues in detail.

Although there are some differences, the imputation methods used are fairly similar across studies and across waves. Therefore, we will not discuss these here in detail. A description of the method used for SHARE is given in Brugiavini et al. (2005, 2008), a summary of the imputation methods for the RAND HRS is given in chapter 3 of St.Clair et al. (2008), and the imputation methods used for ELSA are documented in Taylor et al. (2003).

There are, however, substantial differences in the definitions of the income variables provided. Gross income was asked in SHARE Wave 1, which consequently provided gross household income, both nominal and purchasing power parity (ppp) adjusted, using a weighted mean of the 11 original SHARE countries in 2004 as a basis. In contrast, net income components were asked in SHARE Wave 2. From these, both nominal and ppp-adjusted net household income have been generated by the imputations team of SHARE. The basis for the ppp adjustments is Germany in 2004. The reasons for changing the basis for ppp adjustments are explained in Christelis (2008a, 2008b), who also outlines how the ppp adjustments should be performed. As argued in Paccagnella and Weber (2005), for comparisons of income levels across countries it is preferable to use ppp-adjusted income.

A preliminary version of the generated (and imputed) ppp-adjusted net income data for SHARE Wave 2 has kindly been made available to us by Omar Paccagnella. The change from gross to net and to a different base for the ppp adjustments means that the generated income variables from the public releases of SHARE Wave 1 cannot be used for compari-

son with Wave 2 data. Therefore, tentative conversions from gross to net have been made for Wave 1 by the same team, and these have been made available to us as well.

The HRS asks about gross income. The RAND version of the HRS thus includes generated (and imputed) variables for nominal gross total household income for each wave. In order to make HRS income comparable to SHARE income, we have to convert gross income to net income and then convert the latter from nominal dollars to ppp adjusted euros. The first task was accomplished for the 2000, 2002, and 2004 waves of the HRS by Rohwedder et al. (2006), who submitted HRS data to the NBER Internet TAXSIM calculator (<http://www.nber.org/~taxsim/>; see also Feenberg & Coutts, 1993). A preliminary version of an update of this, which includes HRS 2006 income data, was kindly made available to us by Philip Pantoja. However, several states in the USA levy state income taxes. State information is not available in the public release data of the HRS. Therefore, the resulting data set contains 51 records for each respondent (50 states and DC). By restricting the data to only those states that are in the Census Division the respondent lives in (which is available in the public data), we could narrow this down to 3-9 states per household. The statistically correct way to use these data would be to do a multiple imputation using posterior probabilities of living in each state. This, however, requires the total number of respondents from each state in the HRS, which is not available. Therefore, we have opted for a practical approximation, which treats the different records per household as independent observations, but keeps their combined sampling weight equal to the original sampling weight of the household by multiplying the original weight by a state population size (within the age-gender-race-ethnicity cell of the respondent) based proportion.

We then converted nominal dollars to ppp-adjusted euros by augmenting a spreadsheet, kindly provided to us by Dimitris Christelis, which computes the ppp adjustment factors for the SHARE countries, with OECD data on price levels, inflation rates, and exchange rates for the USA and computing ppp adjustment factors using the same formulas as used for the SHARE countries (Christelis, 2008a, 2008b).

Finally, ELSA provides net income (in English pounds per week) in its financial derived variables data set. At the time of writing, this data set was not yet available (not even a preliminary version) for 2006. Hence, when we compare cross-sectional income distributions below, we only include ELSA for the 2004 comparisons. For the income change analyses, we used the changes from 2002 to 2004 in ELSA to compare with 2004-2006 changes in SHARE and HRS. The ELSA amounts were ppp adjusted using the same OECD sources and the spreadsheet used for the HRS as well.

Despite the efforts to arrive at income measures that are closely comparable, some problems with the definitions and calculations of these variables remain. To mention the most salient of these: (1) The income measure in ELSA is more aimed at measuring disposable income than simply net (after tax) income. One of its components is “take home pay”, which subtracts, among others, union fees and “etc.” from gross earnings. These components are not subtracted from gross earnings in the other studies. (2) For the HRS data, the TAXSIM program occasionally returns very large (positive) tax amounts, resulting in negative incomes. Sometimes it also returns large negative tax amounts, especially of state taxes. (3) The preliminary net income variable for SHARE Wave 1 is based on very crude computations and may therefore be subject to occasional substantial errors. (4) The ppp adjustments are based on OECD estimates of price levels, inflation rates, and exchange rates. These estimates are updated frequently and occasionally result in substantial changes.

Hence, the results presented in this section are tentative and should only be used with considerable caution. As time progresses, experience with using the derived variables will probably lead to substantial improvements in these variables. Stronger conclusions about similarities and differences between countries and studies can then be drawn.

In the following, all analyses are performed at the household level, on a data set from which net household incomes (ppp adjusted towards 2004 German euros) of less than 1,000 euros or more than 1 million euros have been removed. The 1 million threshold only affects a handful of observations in the HRS, with one observation with a net income of more than 14 million euros in 2006. Although a detailed study does not give rise to a suspicion of reporting errors, and this may well reflect an aspect of the US economy that is rarely observed in Europe, this particular case increases mean income substantially (10%) and the standard deviation almost without bound, so that we cannot expect that these results give an accurate picture of the US income distribution. The restriction to only households with net incomes of 1,000 euros or more was imposed for similar reasons, although here the mere fact that incomes are below 1,000 euros is itself reason for concern about the accuracy of the data. This holds especially for incomes that are zero or negative. Small positive incomes tend to have effects on the distribution of relative income changes that are similar to the effect of the single outlier on the US income distribution, if their next wave's income is well above 1,000 euros. This restriction removes about 1.5% of HRS households, 2.5% from SHARE Wave 1 and 5.5% from SHARE Wave 2, and 2.5% from ELSA.

Income Distributions in 2004 and 2006

We first compare income distributions within the three studies separately for 2004 and 2006. Table 1 presents a few key characteristics of these distributions. The distributions all share the typical characteristics of income distributions: the mean is considerably higher than the median and the amount of variation is very large. This is the result of the asymmetry and long right tails of the distributions. The large skewnesses and kurtoses (not reported here) confirm this.

Study	2004				2006			
	Median	Mean	s.d.	Gini	Median	Mean	s.d.	Gini
SHARE	22,000	35,000	42,000	0,49	17,000	23,000	22,000	0,44
HRS	32,000	45,000	52,000	0,47	30,000	43,000	51,000	0,47
ELSA	18,000	24,000	26,000	0,41				

Table 1 Distribution of real net total household income, PPP adjusted (in 2004 Euros)

More striking in this table are, however, the sizes of the differences in the income distributions from different studies and, especially for SHARE, the large drop in incomes between 2004 and 2006. Some of the qualitative patterns in the differences are well known or easy to explain. For example, the smaller variation in ELSA and the corresponding smaller Gini coefficient (less inequality) are to be expected because the population is much more homogeneous than all SHARE countries combined or the much larger and diverse USA. Also the higher median and mean incomes and larger variation in the USA than in Europe are well known. In addition to just generally higher incomes in the USA, this also

reflects the much higher labor force participation of women in this age group, as shown in the previous section.

The drops in median and average income in the HRS do not necessarily reflect an income drop in the population, because the HRS does not contain a refreshment sample in 2006. Hence, the 2006 sample is typically two years older than the 2004 sample and contains largely the same respondents (except for some nonresponse patterns). The cross-sectional weights included with the HRS are only partially able to correct for this. In fact, we will see below that median and mean income differences at the individual level in the HRS are of a similar order of magnitude. Income drops at the individual level are to be expected, because a non-negligible fraction of the sample (and population) will have retired between waves, which is generally associated with a significant income drop. We will study this below.

The differences in median and mean income in SHARE between 2004 and 2006 are partially due to differences in sample composition, in particular the inclusion of Poland and the Czech Republic in Wave 2 of SHARE. If we exclude these from the 2006 computations, the median and mean each increase by about 2,000 euros and the Gini coefficient decreases to 0.42. However, this still leaves a large income drop to be explained. Apart from true declines in (real) income, a prime candidate explanation for this is the imperfection in the algorithm used to compute net income from gross income components in SHARE Wave 1. Indeed, there are some indications that the subtracted tax amounts are too small. Most likely, this will be improved in a future release, where more detailed tax calculations may be performed. Another potential explanation could be nonrandom nonresponse, which could make the refreshment samples in Wave 2 very different from the Wave 1 respondents who are not present in the Wave 2 sample. The latter can typically be corrected to a large extent by computing attrition-corrected weights and using these corrected weights to compute estimates of interest. This has been done for the HRS by Kapteyn et al. (2006), but they did not find any noticeable bias due to selective nonresponse that was not already corrected for by the HRS-provided cross-sectional weights. Therefore, we have used the standard HRS weights in this chapter. Perhaps such an analysis for SHARE will show that corrections are more important. We leave this for further research.

Changes in Household Income and their Relation with Retirement

Table 1 above presented differences between 2004 and 2006 that reflect differences between overall distributions, but not necessarily average differences at the household level, because the figures are based on partially different samples. Even in the HRS, where no refreshment sample was added in 2006, there are households that were present in earlier waves but not in 2004 who returned to the sample, and households that were present in 2004 but not in 2006. Different cross-sectional weights in the two waves are then used to make each sample representative of the population in the same year. In contrast, we turn our attention to income changes at the household level. That is, we select only the households that are present in both waves, compute their income changes, and study the distributions of these. Where the differences between marginal distributions mainly (should) reflect economic growth and inflation, the analyses here mainly reflect income changes as a result of the aging process, i.e., reflect income difference across the life cycle. This is especially interesting for individuals who have retired between waves. Retirement is often accompanied by a drop in income, because pensions tend to be lower than final earnings. A priori, we would expect this effect to be larger on average in the USA than in

Europe, because participation in a pension plan is often mandatory in Europe, whereas it is often voluntary in the USA, while there has been some concern about whether Americans save enough for their retirement.

Table 2 presents some overall statistics. This table and all results presented below are based on a (large) subsample of households, in which the respondent was single in both waves, or in which the respondent lived with the same spouse or partner in both waves. Hence, this filters out changes due to changes in household composition. From Table 2, we see that indeed at the median, incomes decline in the age group studied. The decline is smallest in ELSA, which may be related to the fact that income is lowest there already. The decline is largest in SHARE. The figures for percentage change are, however, somewhat difficult to interpret because the median and mean have different signs. Therefore, we have plotted the densities of percentage change for the three studies in Figure 1, separately for households in which at least one of the spouses retired between waves and for households in which this was not the case (already retired or not yet retired).

Study	Absolute Change			Percentage Change		
	Median	Mean	s.d.	Median	Mean	s.d.
SHARE	-1,100	-6,900	36,000	-8%	+27%	210%
HRS	-1,000	-3,100	46,000	-5%	+18%	140%
ELSA	-200	-1,200	25,000	-2%	+25%	190%

Table 2 Distribution of net household income changes (PPP adjusted 2004 Euros)

Note: ELSA results refer to changes between 2002 and 2004

Figure 1 shows some expected common patterns: The distribution of income change tends to peak at about 0% (no change) if there is no change in retirement status, and has more of its mass below zero (income decline) if people retired in between waves. For the “no-change” households, the HRS is most closely concentrated around zero, and SHARE has the widest spread around this number. This may be the result of the crudeness of the gross to net conversion for Wave 1 of SHARE, leading to both positive and negative errors, so that the density is more dispersed than the true density. Later refinements of this variable may shed more light on this. For the households that retired between waves, the graphs for ELSA and SHARE are qualitatively similar, with a peak at about -35% and a long tail to the right. The HRS picture is different, because the largest peak is at 0%, but with a second peak at -35%.

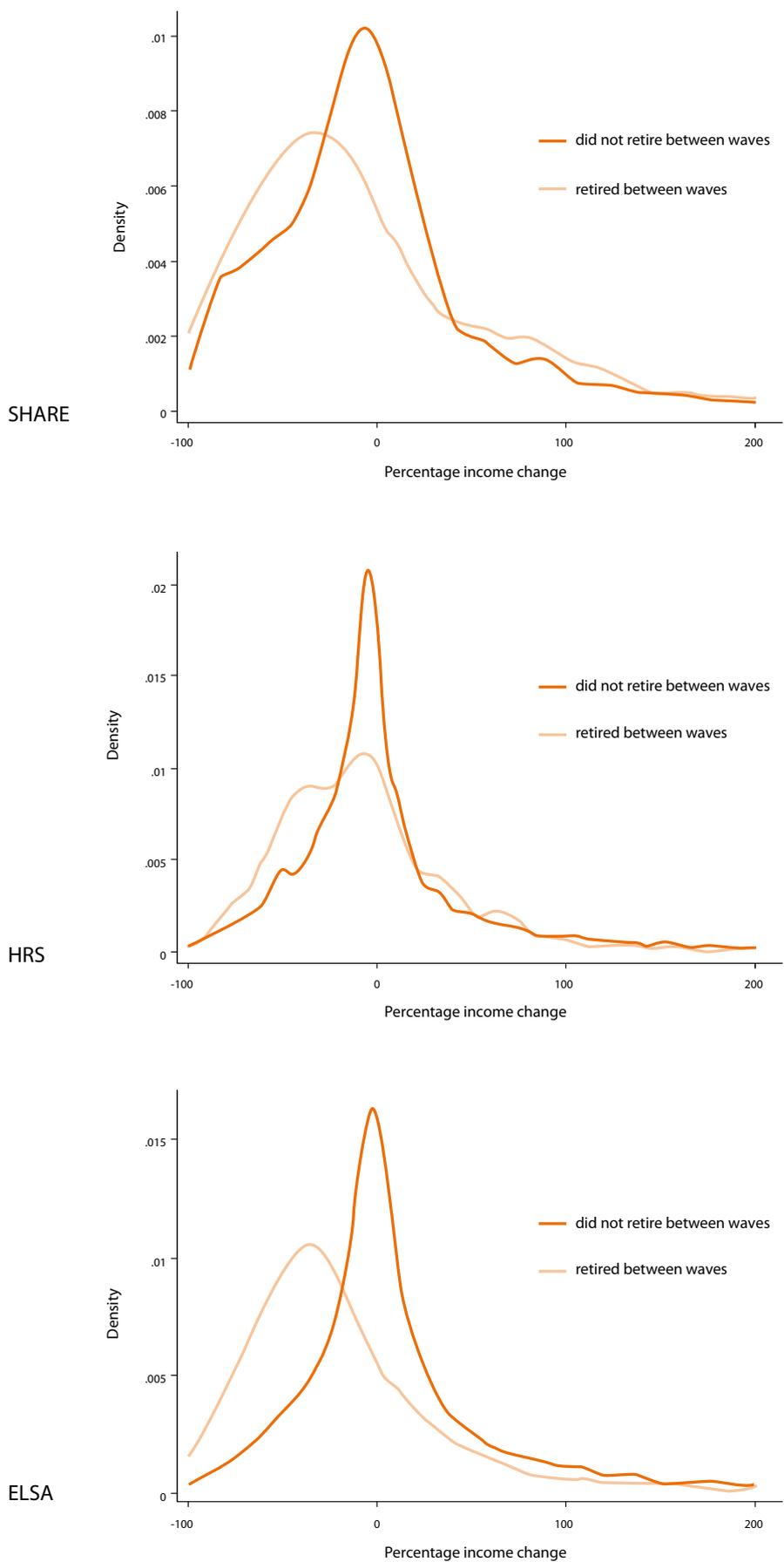


Figure 1 Distributions of relative income changes

The Relation between Retirement and Income Inequality

Retirement can have two different effects on income inequality: (1) If there is a sizeable fraction of the population without a satisfactory pension and another group that does have a decent pension, then individuals with similar earnings before retirement may have widely different incomes after retirement, and this may substantially increase income inequality. On the other hand, if either almost all individuals have a satisfactory pension, or almost all individuals only have a (usually minimal) public pension, then income inequality may decrease substantially. For the case where all individuals only receive a (usually homogeneous) public pension, this is obvious. The case where all individuals have a decent private pension also leads to a decrease in income inequality, because private pensions are typically based on a smoothed version of earnings before retirement. Earnings variations across the lifecycle may then lead to contemporaneous inequality while working, but may lead to similar pensions.

To study the net effect of retirement on income inequality, we restrict our sample to the households in which the respondent and/or the respondent's spouse retired between waves, and compute the Gini coefficient before retirement (2004) and after retirement (2006). Table 3 presents the results. Note that the Gini coefficients are smaller than the ones in Table 1, because the restricted sample is more homogeneous than the whole 50+ population. We see that retirement has no discernable effect on income inequality in the HRS and ELSA, but has a substantial inequality-reducing effect in SHARE.

Study	Gini Coefficient	
	2004	2006
SHARE	0.47	0.37
HRS	0.42	0.43
ELSA	0.37	0.37

Table 3 Income inequality before and after retirement (for those who retired between waves)

Note: ELSA results refer to changes between 2002 and 2004

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