

What do we learn about redistribution effects of pension systems from internationally comparable measures of Social Security Wealth?

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The importance of being comparable

- In most European countries Social Security is the prevailing form of insurance and assistance to protect the well-being of individuals at older ages
- Within and between country variability in the degree of protection provided by public pension systems depends on
 - **Institutional characteristics**, such as eligibility rules, pension benefit computation rules, indexation rules
 - **Individual characteristics**, such as labour force participation, earnings and longevity prospects
- All these factors are not time-invariant
 - Population ageing deeply changes life expectations of individuals
 - Financial stability concerns led to the implementation of several pension reforms around Europe that reduced their generosity
- Assessing within and between country differentials in pension provision distribution requires an internationally comparable measure of this concept

Redistribution aspects of Social Security

- Wide literature on the redistribution outcomes produced by general taxation
- Social Security systems can be seen as mechanisms transferring resources
 - Over time (even for the same individual)
 - Between different generations (if benefits of current retirees are paid by current workers)
 - Among individuals of the same generation. We will focus on this latter aspect
- Individuals experiencing low(er) labour incomes might be protected by Social Security by relatively more generous pension benefits to preserve their financial well-being
- **Redistributive** aspects of Social Security are important since they affect financial well-being during all the retirement years

This paper

- In this paper we use an internationally comparable measure of individual Social Security Wealth (SSW) to analyse the **cross-country differences** in the redistributive features of the **public** pension systems
- To what extent is the inequality in labour income **preserved** in the SSW distribution?
- To what extent does the degree of **generosity** of SSW vary with the position held by the individual in the labour income distribution?
 - Is the degree of generosity higher for the worse-off?
- We provide descriptive evidence on the substitutability between SSW and household private wealth

Measuring Social Security Wealth

- Our measure of SSW has been developed by Belloni et al. (2016) based on the wave 4 of SHARE and SHARELIFE
- It follows the definition used in Feldstein (1974), Stock and Wise (1990) and Gruber and Wise (1998, 2004 and 2007)
- To the best of our knowledge Belloni et al. (2016) is the first attempt of providing an internationally comparable measure of individual SSW based on survey data
- The SSW measure in Belloni et al. (2016)
 - includes first pillar pension benefits plus minimum pension benefits (if any)
 - does not include survivor benefits
 - is based on pension benefits net of income and payroll taxes
 - is measured in PPP-adjusted 2010 Euros

Social Security Wealth for retirees

- SSW is calculated separately depending on the employment status of individuals
- SSW of a retired respondent i is defined as follows:

$$SSW_i = \sum_{j=a}^{\Omega} P_{i,j} \pi(j|a)(1+r)^{a-j}$$

- where
 - a is the respondents' age at the time of the interview
 - Ω is the maximum attainable age. it is set to 109
 - $\pi(\cdot)$ are country and gender specific conditional survival probabilities according to the Human Mortality Database
 - r is a financial discount rate. It is set to 2% as in OECD (2013)
 - P is the **self-reported** public old age pension benefit annualized and net of pension income taxation

Social Security Wealth for workers

- SSW of the worker i is defined as follows:

$$SSW_i = \sum_{j=R}^{\Omega} \hat{P}_{i,j}(R) \pi(j|a) (1+r)^{a-j}$$

- where $\hat{P}(R)$ is the **computed** public old age pension benefit annualized and net of pension income taxation
- We assume that i will retire from the labor market at current age a and will start receiving pension income from the old age retirement age R , which is country-specific
- SSW for workers is defined only if minimum eligibility conditions for insurance or/and contribution years are met at the time of the interview, but i is not yet age eligible
 - We measure the “accrued” SSW: we do not make any projections of future labour supply and of future wages of workers in the sample but simply compute the pension rights based on the past and current contributions

SHARE, SHARELIFE and JEP

- Data are drawn the wave 4 of SHARE and SHARELIFE
- SHARE is a multidisciplinary, cross-national longitudinal micro dataset on health, socio-economic status and social and family networks. The SHARE sample is representative of the populations of individuals aged 50 or over living in Europe
- The **wave 4 of SHARE** has been carried out in 2011
- **SHARELIFE** data has been collected in 2008/9 and are based on a life history interview, which collects the main events occurring throughout SHARE respondents' lives
- We take advantage of the **Job Episodes Panel (JEP)**, which is a retrospective panel based on SHARELIFE, in which each respondent contributes as many observations as her years of age at the time of the SHARELIFE interview
 - Among the others, it contains information wage and contribution history

SHARE, SHARELIFE and JEP

- The distinction between workers and retirees is based on the self-declared employment status in the wave 4
- The pension benefit of retirees P used to compute their SSW is observed in the wave 4 data
- The pension benefit of workers \hat{P} has been computed by combining
 - working history information (wages, contributory years) from SHARE and JEP
 - institutional information provided by *Mutual Information System on Social Protection* tables to recover country-specific computation rules

Brugiavini A., Cavapozzi D., Pasini G. and Trevisan E. (2013), *Working Life Histories from SHARELIFE: A Retrospective Panel*. SHARE Working Paper Series, 11

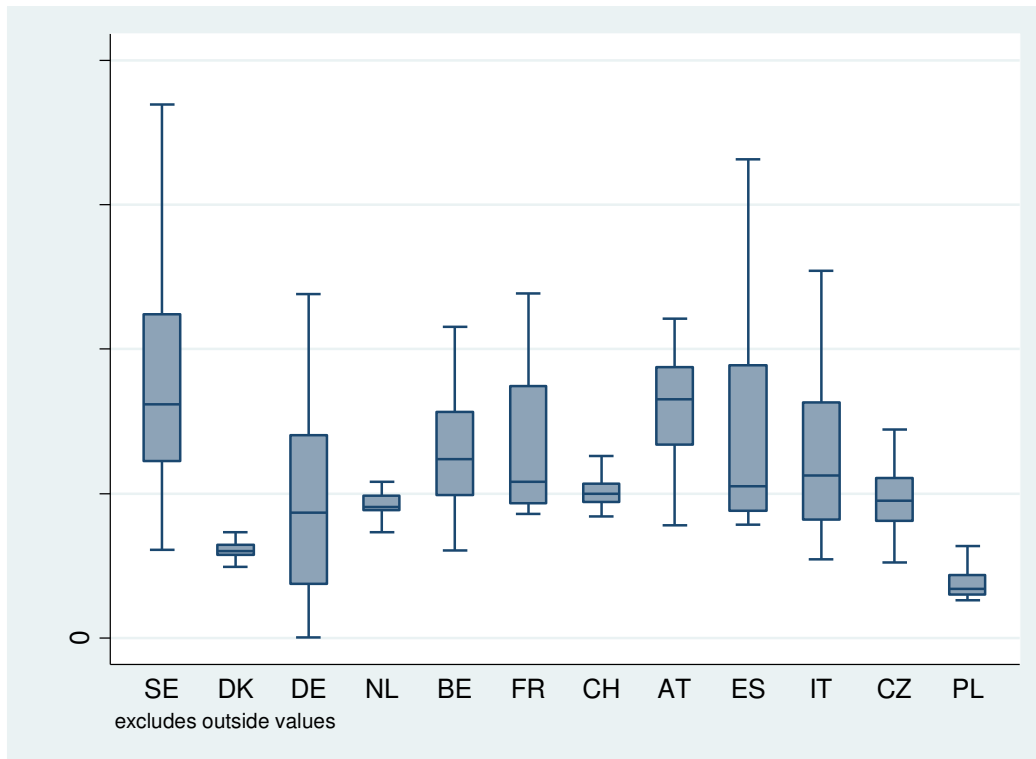
Antonova L., Aranda L., Pasini G. and Trevisan E. (2014), *Migration, Family History and Pension: the Second Release of the SHARE Job Episodes Panel*. SHARE Working Paper Series, 18

Data

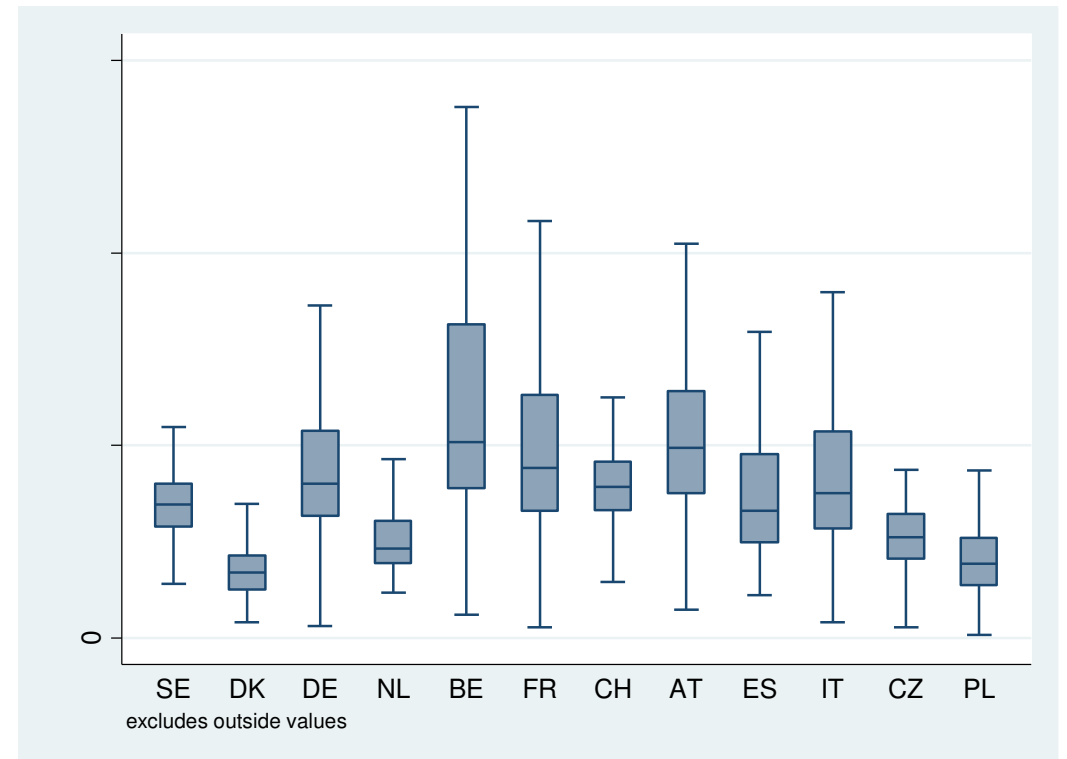
- Our analysis is based on individuals living in Sweden, Denmark, the Netherlands, Belgium, France, Germany, Switzerland, Austria, Spain, Italy, Poland and Czech Republic. These countries joined both wave4 and SHARELIFE
- Regardless of being classified as employed or retired, our analysis will require to develop a lifetime measure of labour income, which crucially requires JEP data. Only wave4 respondents interviewed in JEP are kept
- We excluded individuals aged 75 and above in 2010 in order to
 - reduce the excessive heterogeneity in pension outcomes of different generations due to the different regimes experienced by the retirees
 - limit the effect of selectivity bias and attrition due to mortality
- Our final sample consists of
 - 2,603 workers (1,181 men and 1,422 women)
 - 5,124 retirees (2,588 men and 2,536 women)

SSW dispersion

Male workers

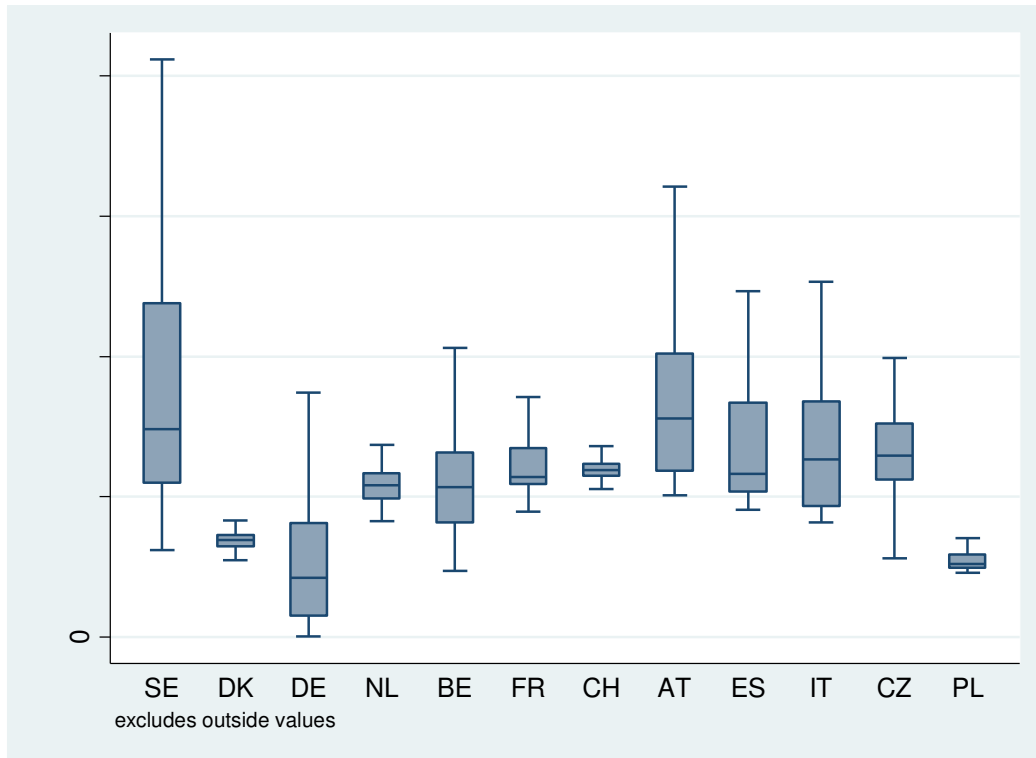


Male retirees

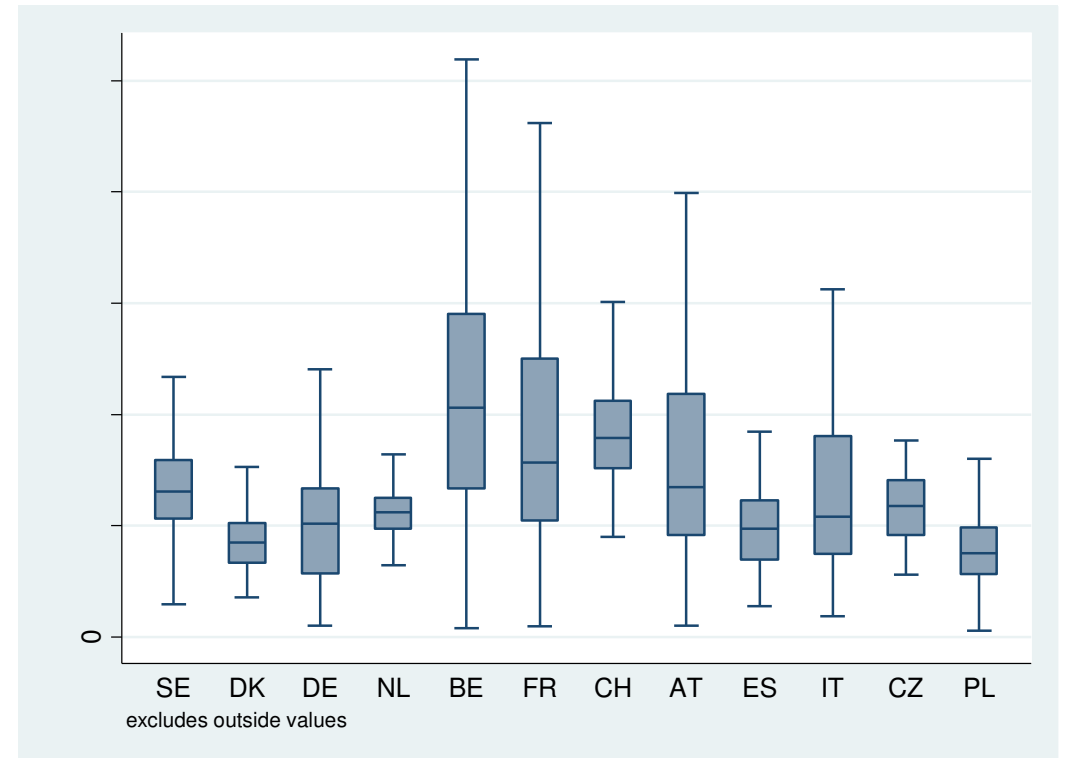


SSW dispersion

Female workers



Female retirees



Progressivity of Social Security system

- The cross-country heterogeneity in the within-country dispersion in SSW is a result of cross-country differences in the volatility of lifetime earnings and in the architecture of the pension system
- The interplay between these two components is embedded in the pension formula:
 - Netherlands: the first pillar benefit (AOW) depends mostly on residential life histories and does not depend on earning life histories (Kapteyn and de Vos, 1999)
 - Germany social security provisions (“earnings points system”, Börsch-Supan and Wilke, 2006) are fully based on lifetime relative earnings
- We aim at disentangling these two sources of heterogeneity to understand the contribution of the pension systems in shaping within-country SSW inequality

Progressivity of Social Security system

- We assess to what extent the cross-country differences in SSW dispersion previously documented result from cross-country differences in the
 - dispersion of lifetime earnings
 - pension system architectures
- We develop a lifetime earnings measure defined as the Average LifeTime Income of each individual (ALTI) based on JEP and wave4
- Follow Biggs et al. (2009) and OECD (2009, 2011, 2013), we use our data to calculate a **progressivity index** to measure the redistribution properties of the pension system
- It is defined as the difference between 1 and the ratio between the **G-index for SSW** and the **G-index for ALTI**, normalized to 100
 - The lower the inequality in SSW compared to the inequality in average lifetime income, the higher is the progressivity of the pension system and the higher the progressivity index
 - It varies from 100 in pure flat schemes (maximum redistribution) to negative values for regressive pension systems

Gini Index for <u>SSW</u>					Gini Index for <u>ALTI</u>				Progressivity Index			
Workers		Retirees			Workers		Retirees		Workers		Retirees	
Men	Women	Men	Women		Men	Women	Men	Women	Men	Women	Men	Women
SE	0.30	0.32	0.19	0.29	0.30	0.31	0.42	0.41	0.00	-3.23	54.76	29.27
DK	0.05	0.05	0.21	0.18	0.23	0.27	0.33	0.39	78.26	81.48	36.36	53.85
DE	0.41	0.48	0.26	0.34	0.26	0.28	0.28	0.29	-57.69	-71.43	7.14	-17.24
NL	0.08	0.09	0.19	0.12	0.24	0.32	0.37	0.41	66.67	71.88	48.65	70.73
BE	0.16	0.19	0.60	0.59	0.28	0.25	0.36	0.33	42.86	24.00	-66.67	-78.79
FR	0.19	0.14	0.27	0.36	0.31	0.30	0.73	0.78	38.71	53.33	63.01	53.85
CH	0.05	0.04	0.21	0.25	0.22	0.28	0.27	0.31	77.27	85.71	22.22	19.35
AT	0.18	0.22	0.31	0.39	0.23	0.37	0.42	0.42	21.74	40.54	26.19	7.14
ES	0.26	0.20	0.27	0.28	0.38	0.42	0.66	0.65	31.58	52.38	59.09	56.92
IT	0.24	0.21	0.26	0.35	0.29	0.31	0.52	0.58	17.24	32.26	50.00	39.66
CZ	0.14	0.15	0.22	0.20	0.25	0.31	0.29	0.24	44.00	51.61	24.14	16.67
PL	0.20	0.11	0.25	0.24	0.84	0.49	0.92	0.92	76.19	77.55	72.83	73.91

- The same pension system can be found to be more progressive/regressive depending on the underlying lifetime income distribution
- A meaningful comparison of the index across countries can be performed for countries with similar values of the G-index for ALTI

	Gini Index for <u>SSW</u>				Gini Index for <u>ALTI</u>				Progressivity Index			
	Workers		Retirees		Workers		Retirees		Workers		Retirees	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
SE	0.30	0.32	0.19	0.29	0.30	0.31	0.42	0.41	0.00	-3.23	54.76	29.27
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BE	0.16	0.19	0.60	0.59	0.28	0.25	0.36	0.33	42.86	24.00	-66.67	-78.79
FR	0.19	0.14	0.27	0.36	0.31	0.30	0.73	0.78	38.71	53.33	63.01	53.85
CH	0.05	0.04	0.21	0.25	0.22	0.28	0.27	0.31	77.27	85.71	22.22	19.35
AT	0.18	0.22	0.31	0.39	0.23	0.37	0.42	0.42	21.74	40.54	26.19	7.14
ES	0.26	0.20	0.27	0.28	0.38	0.42	0.66	0.65	31.58	52.38	59.09	56.92
IT	0.24	0.21	0.26	0.35	0.29	0.31	0.52	0.58	17.24	32.26	50.00	39.66
CZ	0.14	0.15	0.22	0.20	0.25	0.31	0.29	0.24	44.00	51.61	24.14	16.67
PL	0.20	0.11	0.25	0.24	0.84	0.49	0.92	0.92	76.19	77.55	72.83	73.91

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Within-country measures of progressivity

- The progressivity index provides an overall country-level measure of redistribution determined by the pension system
- It is silent about which part of the earnings distribution is more affected by the public pension redistributive rules
- It cannot be used to assess the extent to which the pension system of a given country protects individuals who are “lifetime poor” vis-à-vis those who are “lifetime rich”
- We introduce the concept of Relative Social Security Wealth (RSSW)

$$\text{RSSW} = \text{SSW} / \text{ALTI}$$

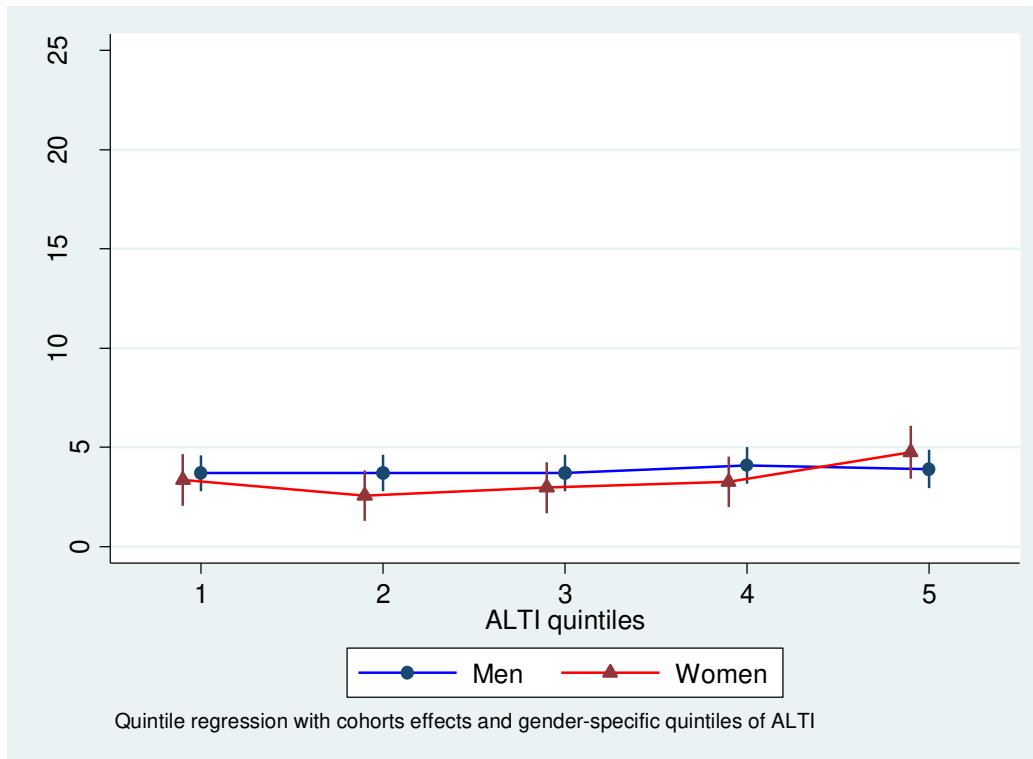
- The higher is the SSW of a worker relatively to her average lifetime income, the higher is the generosity of the pension system for this worker

Within-country measures of progressivity

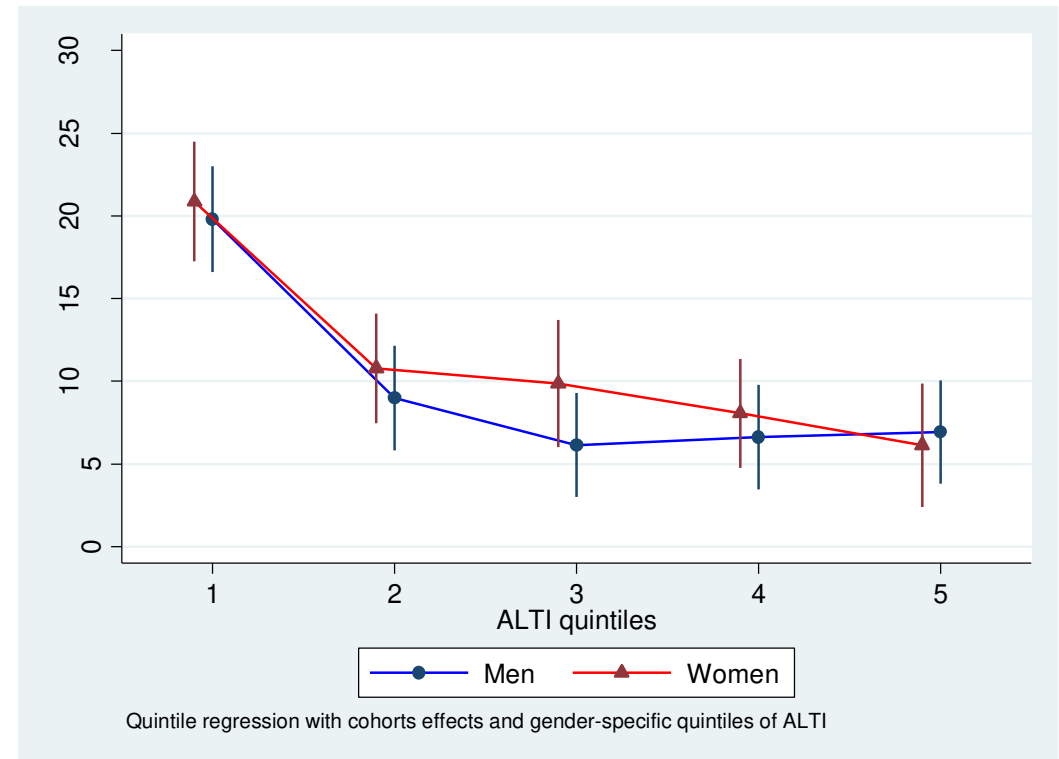
- We assess the redistributive properties of pension systems along the average lifetime income distribution of individuals
- The median ratio $RSSW$ at each average lifetime income quintile is predicted by performing a set of country-specific median regressions for the four samples of interest
- Our specifications control for cohort dummies since individuals from different birth-cohorts might
 - have been exposed to different pension regimes
 - might have faced different phases of the business cycle in different stages of their working careers producing cohort-differentials in their earnings age profiles
- Both numerator and denominator of $RSSW$ vary with the cohort/age of individuals

RSSW index by quintile of ALTI

German workers

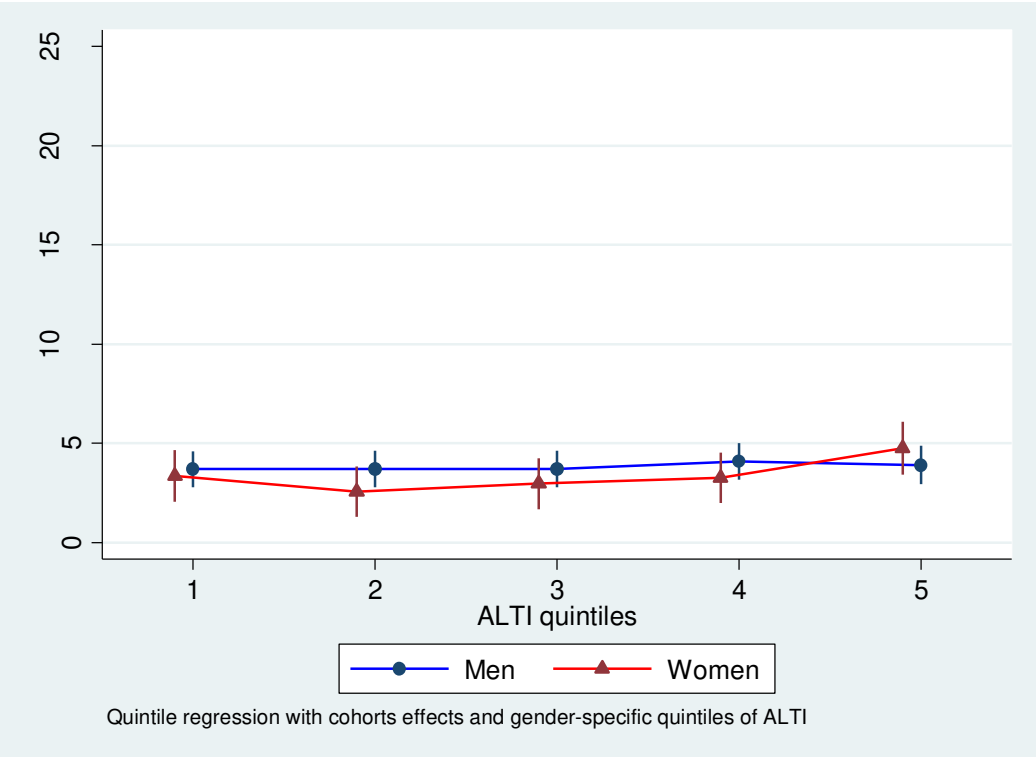


Spanish workers

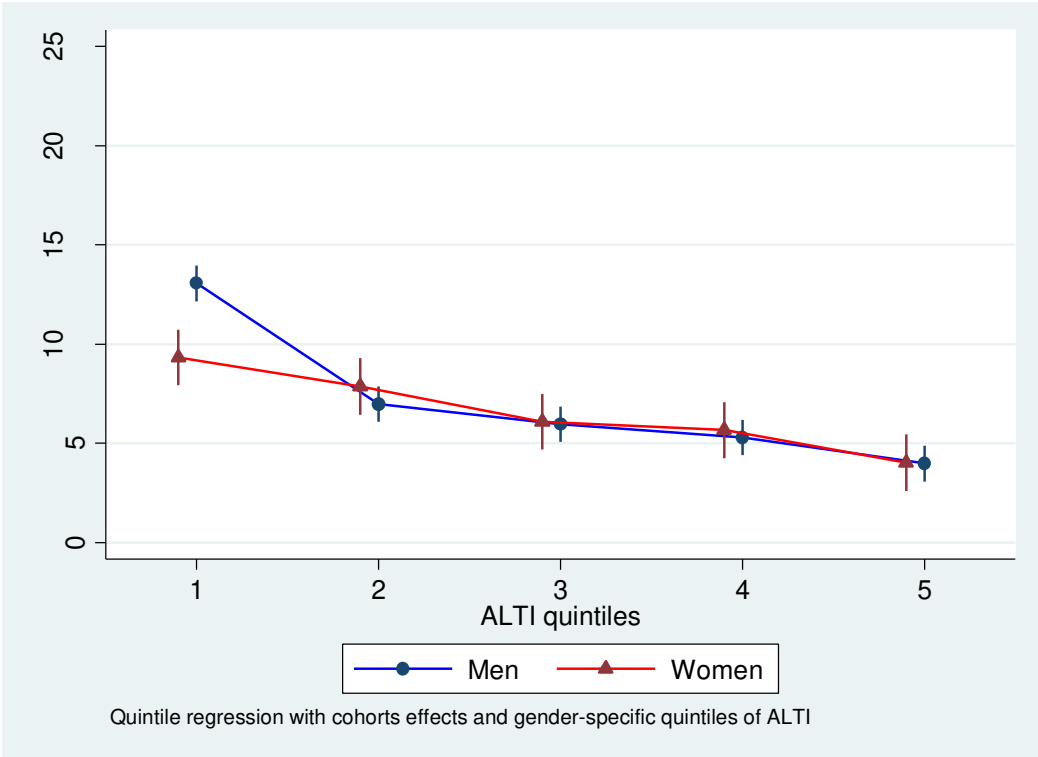


RSSW index by quintile of ALTI

German workers



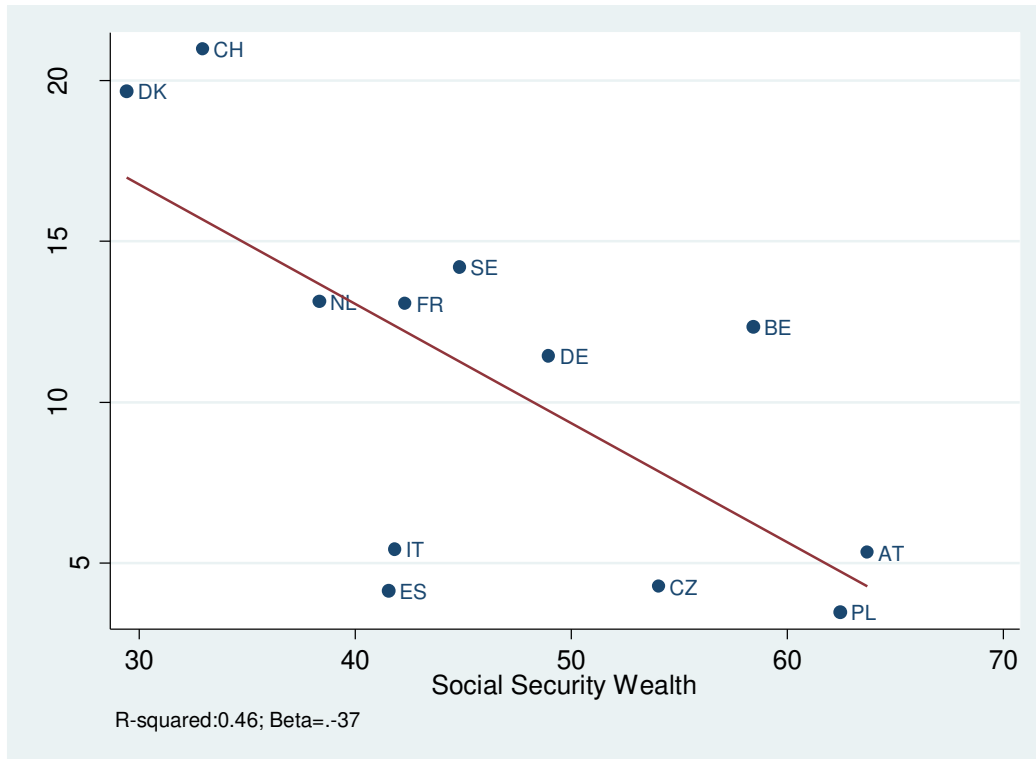
German retirees



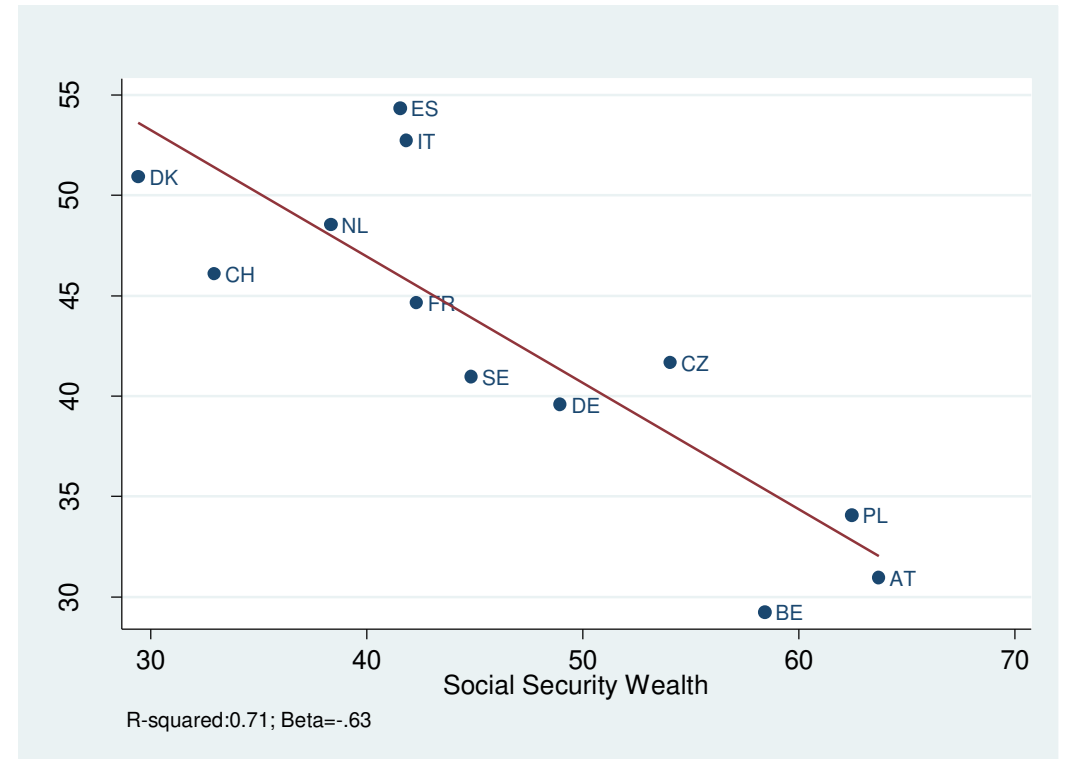
Displacement effect

- Forward-looking agents who expect lower levels of SSW might have stronger incentives to save and cumulate private wealth in order to guarantee adequate standards of living during their retirement years (see, e.g., Alessie, Angelini, Van Santen, 2013; Attanasio and Brugiavini, 2003)
- Households endowed with higher SSW levels might be less prone to participate in financial markets or to save in order to buy a house
- We assess the correlation between the household SSW and private wealth (distinguishing between financial and real assets)
- Household private wealth is provided by the wave4 of SHARE

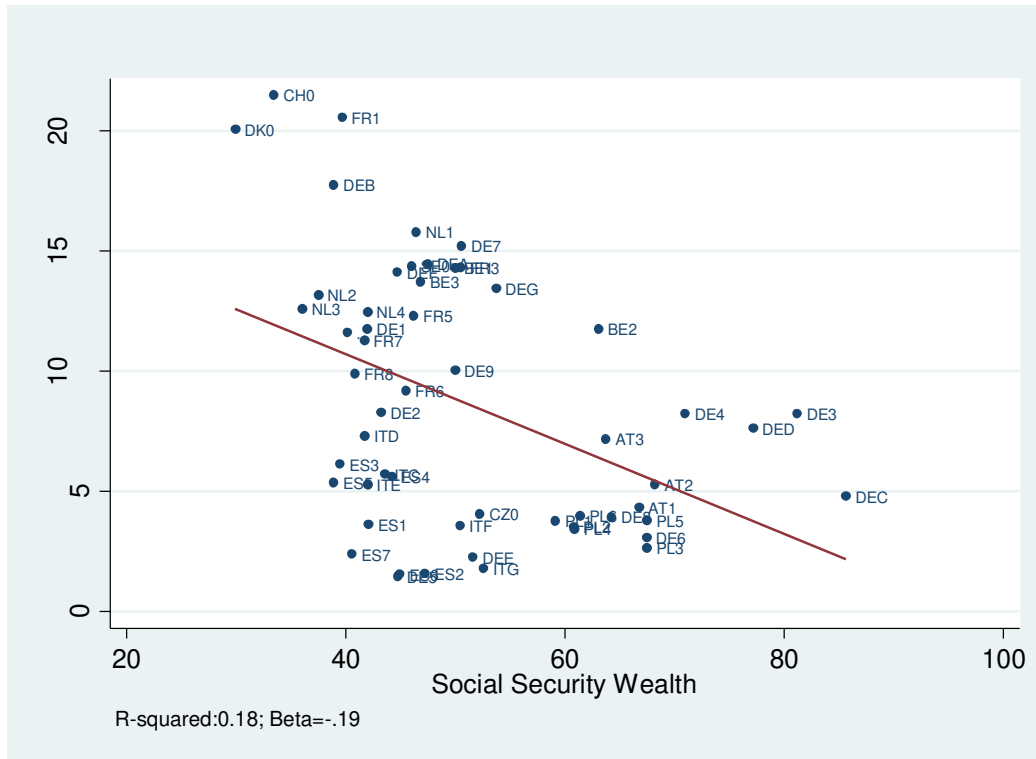
Household SSW and financial wealth at the country level



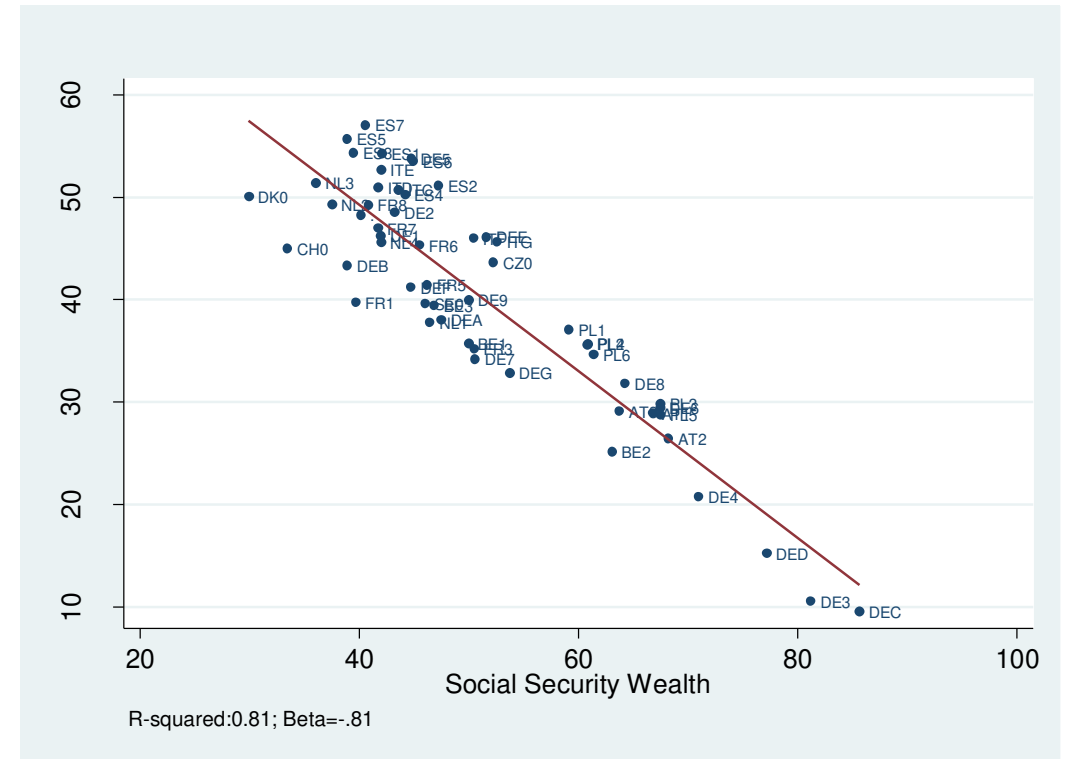
Household SSW and real wealth at the country level



Household SSW and financial wealth at the regional level (NUTS-1)



Household SSW and real wealth at the regional level (NUTS-1)



Conclusions

- We present a novel measure of individual Social Security Wealth (SSW) based on SHARE data
- We analyze to what extent the cross-country differences in the SSW dispersion found in the data can be ascribed to heterogeneity in pension systems
- Micro-data are exploited to assess whether and how redistributive properties of pension systems vary along the average lifetime income distribution of individuals
- Finally, we provide descriptive evidence on the negative correlation between SSW and private wealth