Private Wealth and Pensions across European Countries

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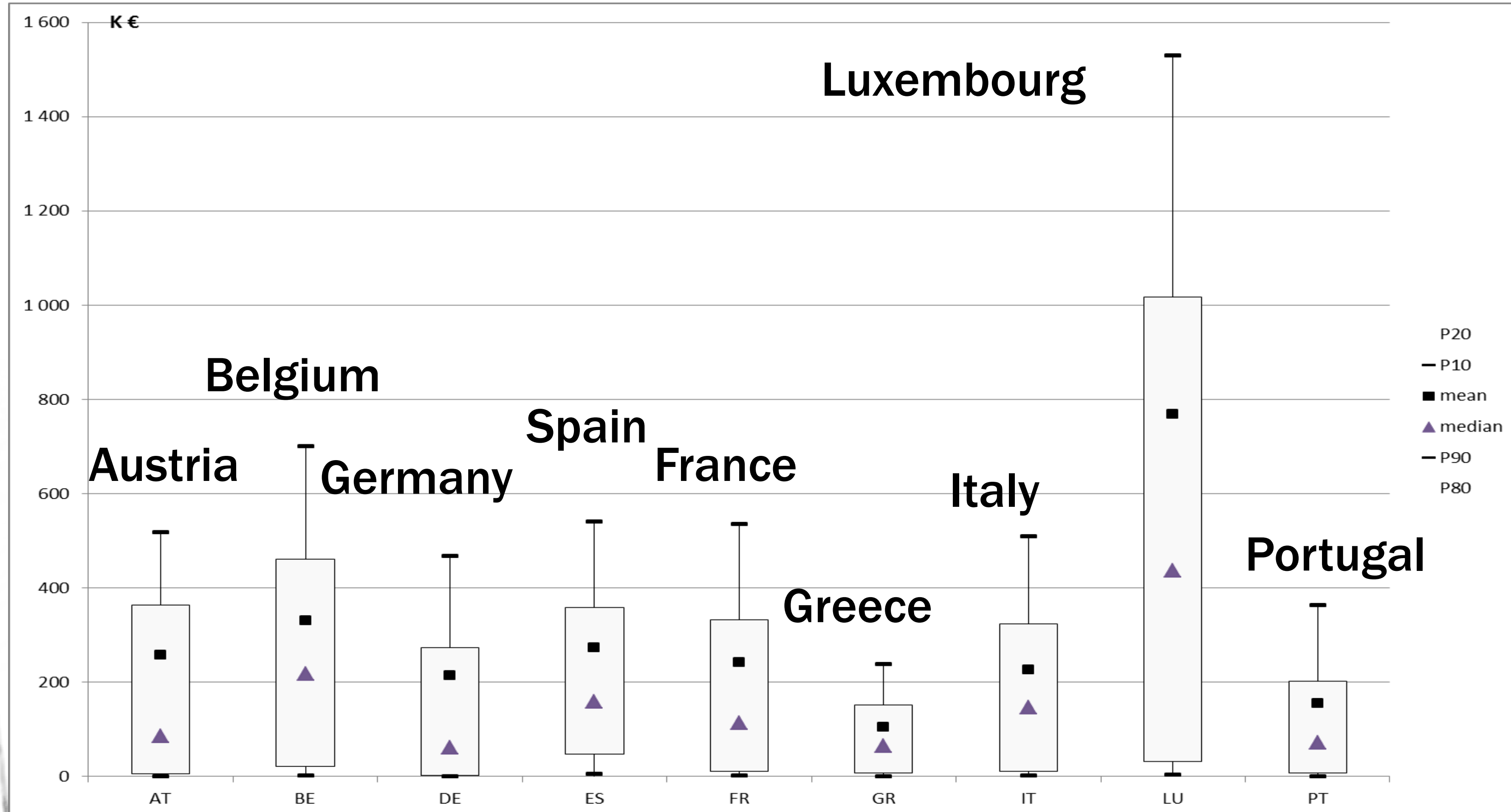
Motivations

- Adequacy of the households' saving to their retirement needs.
- Link with pension schemes: do people adapt their behaviour to changes in the pension schemes ? If they do, how do they do it ?
- Heterogeneity in the euro zone : are differences in households' portfolio and wealth in the European countries due to differences in the pension schemes ?

Net Wealth distributions



Source: HFCS wave 2

Motivations

- **The effect of pension on savings:**

- An old issue in the literature
- Ambiguous overall effect: displacement effect, early retirement effect, life expectancy

↗public benefits=>↗consumption over the life-cycle =>↘private savings

↗ public benefits=>↗ Earlier retirement=> ↗ private savings

↗public benefits=>↗Retirement spell expectancy =>↗private savings

=> Related policy issue: Adequacy of savings to retirement needs.

Related literature

- **No consensus** on the magnitude of the effect. Papers differ in terms of country, time period, identification strategy, endogeneity bias, sample selection, etc.

- **Identification strategies**
  - Pension reforms. Attanasio and Rohwedder 2003, Attanasio and Brugiavini 2003
  - Cross-country differences and non linearity of pensions within country. See Engelhardt and Kumar 2011, Hurd et al. 2012, Alessie et al. 2013.
  - Endogeneity issues related to individual heterogeneity in taste of saving: instrumental variable regression. See Engelhardt and Kumar 2011, Hurd et al. 2012, Alessie et al. 2013.

Main results

- Need to account for the **endogeneity between pension wealth and non pension wealth arising from individual expectations about at what age to retire** (Instrument in the spirit of Engelhardt and Kumar (2011))

- Need to account for **heterogeneous effects across the net wealth distribution** (quantile regressions) and **across country**

- **Significant displacement effect of pension** (62-72 cents) at the mean (Pooled sample)

Main results

- **Substantial cross-country heterogeneity**: crowd in/crowd out effects:
  - depending on the country and wealth decile
  - depending on the type of assets (financial assets, housing assets)

→ Underlying issues: Differences in replacement rate, progressivity ? The role of housing as a store of value for old age? Financial crisis and reforms across country?

Presentation outline

Empirical model

Data & Pension

Results

Conclusion

Empirical Model

- Estimation of the displacement effect of mandatory pension wealth on net wealth, accounting for the heterogeneity of the displacement effect.

- Data from a cross-country harmonized wealth survey combined with estimates of pension wealth from the OECD pension models.

- Standard reduced form equation of wealth accumulation based on the life-cycle.

- Identification provided by legislation variation across schemes.

DATA

- **Household Wealth survey : Household Finance and Consumption Survey - HFCS (ECB)**

- Harmonized household level information on wealth and income for European countries

- Covers the full population (not only 50+)

- Detailed information on wealth composition, household composition, current income but not on wage history

- Cross section. Wave 2. Reference year : 2014 (except for Spain: 2011). 20 countries.

DATA

- **OECD pension model**

- Harmonized methodology and assumptions across country (inflation, growth)

- Pension wealth: discounted sum of all future pension benefits taking into account residual life expectancy and indexation of pension benefits (by country)

- **Main national basic, minimum and mandatory schemes (both public and private pensions) for private-sector workers under pension rule of 2014 .**

- Computed considering various multiple of average earnings and retirement ages

DATA

- **Matching household non pension wealth (HFCS) with individual pension wealth (OECD model)**

Based on:

- gender, age, income (as a multiple of the average income of the age group)
- The age at which the individuals expect to retire
- whether the individuals declare in the HFCS to be eligible in the future to public or private pension

DATA

- **Sample selection**

  - **Reference person aged 30-54** and **in employment** (cross-country heterogeneity in entry into the labour market, transition to retirement)

  - **Self-employed people excluded** (pension wealth not available in OECD simulations)

  - Countries for which we have the required information (7).

Countries excluded because of too small sample size, or because some crucial information is missing (expected retirement age in the HFCS or simulation of OECD pension), or because of reference year (Spain 2011 in the HFCS)

DATA: sample composition (mean of the main variables)

	Belgium	Germany	France	Greece	Italy	Luxembourg	Portugal
Net wealth	148,651	123,454	140,303	38,528	92,736	353,845	68,531
Financial assets	40,951	38,528	33,630	4,052	10,461	87,208	12,235
Real estate properties	133,615	108,914	126,408	36,875	84,715	343,471	82,282
Housing wealth owners (Y/N)	0.78	0.62	0.72	0.61	0.66	0.82	0.86
Adjusted Pension wealth	107,677	92,848	115,777	68,387	73,644	372,605	51,462
Adjusted and instrumented pension wealth	97,895	90,314	140,159	69,409	72,911	383,034	58,510
Wage	45,401	52,731	38,892	17,674	24,549	73,348	18,843
Age	44	44	43	42	45	43	43
Men (Y/N)	0.65	0.71	0.63	0.70	0.68	0.71	0.59
Married couples (Y/N)	0.55	0.66	0.49	0.70	0.63	0.63	0.69
Education							
% Upper secondary	0.34	0.48	0.37	0.58	0.48	0.32	0.22
% Tertiary	0.56	0.48	0.53	0.27	0.17	0.47	0.35
Nber of employed people	1.67	1.71	1.61	1.33	1.42	1.72	1.62
% of individuals with inheritances	0.29	0.30	0.44	0.27	0.27	0.21	0.28
% of individuals with credit constraint	0.03	0.06	0.09	0.07	0.03	0.10	0.08
Number of individuals	**532**	**1,260**	**3,700**	**732**	**1,852**	**714**	**1,905**

=>Wealthier people than in the country representative sample

Main variables definitions

Net (non-pension) wealth=total assets (real assets + financial assets)-total liabilities

Financial assets= deposits, mutual funds, bonds, non-self employment private businesses, publicly traded shares, money owned to household, private pension plans and whole life insurance policies)

Real estate properties=household main residence + other real estate properties

Adjusted pension wealth= discounted sum of all future pension benefits multiplied by the gale's Q factor (with r=2%)

Results: pooled sample

Estimated effect of adjusted pension wealth on net wealth, financial wealth and on the probability to hold real estate property

	Net wealth		Financial wealth		Probability to hold real estate property	
	OLS	IV	OLS	IV	Probit	IV-Probit
Coeff	-0.728 ***	-0.620 ***	-0.758 ***	-0.811 ***	-1.05e-07	-4.21e-06 ***
Lower	-0.895	-0.844	-0.883	-0.978	-4.75e-07	-5.94e-06
Upper	-0.561	-0.396	-0.633	-0.644	2.64e-07	-2.47e-06

Notes: Estimated coefficient and lower and upper bonds of the confidence interval (95%). Dependent variable: private net wealth, financial wealth or a dummy variable equals to one when the household holds a real estate property.

Control variable: current gross employee income, age and education of the reference person, household composition (number of adults, number of children), dummy variable for substantial gifts and inheritances received, country fixed effects. Number of observations: 10,632.

Country by country results: Q and IV Q estimates

	Net wealth						Financial wealth					
	Q			IVQ			Q			IVQ		
	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3	Q1	Q2	Q3
	0.030	-0.184	-0.015	0.057	**-0.378** **	-0.111	0.011	-0.030	-0.121 **	**-0.011**	**-0.104** **	**-0.148** **
Belgium	-0.251	-0.524	-0.545	-0.420	-0.827	-0.682	-0.037	-0.087	-0.233	-0.058	-0.223	-0.279
	0.310	0.156	0.515	0.303	-0.018	0.442	0.058	0.026	-0.009	0.032	-0.043	-0.015
	0.030	**0.210** **	**0.139** **	-0.014	0.037	-0.808	0.043 **	0.066 *	0.123 **	**0.099** **	0.006	-0.349
Germany	-0.065	0.054	-0.273	-0.330	-0.086	-1.666	0.003	-0.001	0.024	0.007	-0.199	-0.729
	0.126	0.366	0.551	0.076	0.539	0.960	0.084	0.132	0.223	0.128	0.219	0.263
	-0.132	0.078	-0.066	-0.293	**-0.162** **	-0.207	-0.051	-0.115 **	-0.109	-0.014	-0.094	-0.089
France	-0.343	-0.128	-0.454	-0.540	-0.524	-0.729	-0.102	-0.190	-0.249	-0.076	-0.171	-0.210
	0.078	0.284	0.322	0.047	-0.007	0.139	0.001	-0.039	0.031	0.045	0.044	0.194
	-0.002	-0.075	-0.109	-0.049	-0.094	0.123	0.000	-0.002	0.001	**-0.009** **	**-0.025** **	-0.007
Greece	-0.067	-0.234	-0.370	-0.109	-0.316	-0.084	-0.003	-0.015	-0.020	-0.018	-0.041	-0.049
	0.062	0.084	0.151	0.024	0.008	0.606	0.003	0.011	0.021	-0.002	-0.006	0.034
	0.097	0.112	0.099	0.130	0.113	0.070	-0.003	0.017	0.019	-0.002	0.020	0.039
Italy	-0.132	-0.184	-0.318	-0.061	-0.117	-0.309	-0.016	-0.015	-0.056	-0.022	-0.008	-0.050
	0.326	0.408	0.515	0.340	0.438	0.423	0.010	0.049	0.093	0.015	0.053	0.103
	0.081	-0.056	-0.732	**0.638** **	0.491	0.170	0.116 ***	0.078 ***	-0.050	**0.130** **	**0.182** **	0.031
Luxembourg	-0.564	-0.381	-2.064	0.189	-0.173	-1.472	0.073	0.011	-0.276	0.068	0.007	-0.376
	0.726	0.269	0.600	0.833	1.200	0.899	0.160	0.146	0.176	0.163	0.311	0.352
	-0.216 ***	-0.105	-0.042	**-0.797** **	**-0.632** **	0.295	0.031 **	0.093 **	0.259 **	0.004	0.038	**0.336** **
Portugal	-0.310	-0.322	-0.262	-1.167	-0.885	-0.608	0.020	0.072	0.188	-0.070	-0.090	0.151
	-0.122	0.112	0.178	-0.447	-0.021	0.920	0.043	0.113	0.330	0.050	0.125	0.532

Results: cross country heterogeneity

❑ Cross-country heterogeneity: « main » cases

- ✓ **« Crowding out » effect : bottom or middle of the distribution**

BE (NW, FW), FR (NW), GR (FW)

BE, FR: also a negative effect of pension wealth on the probability to hold real estate property

- ✓ **« Crowding in » effect : Bottom of the distribution**

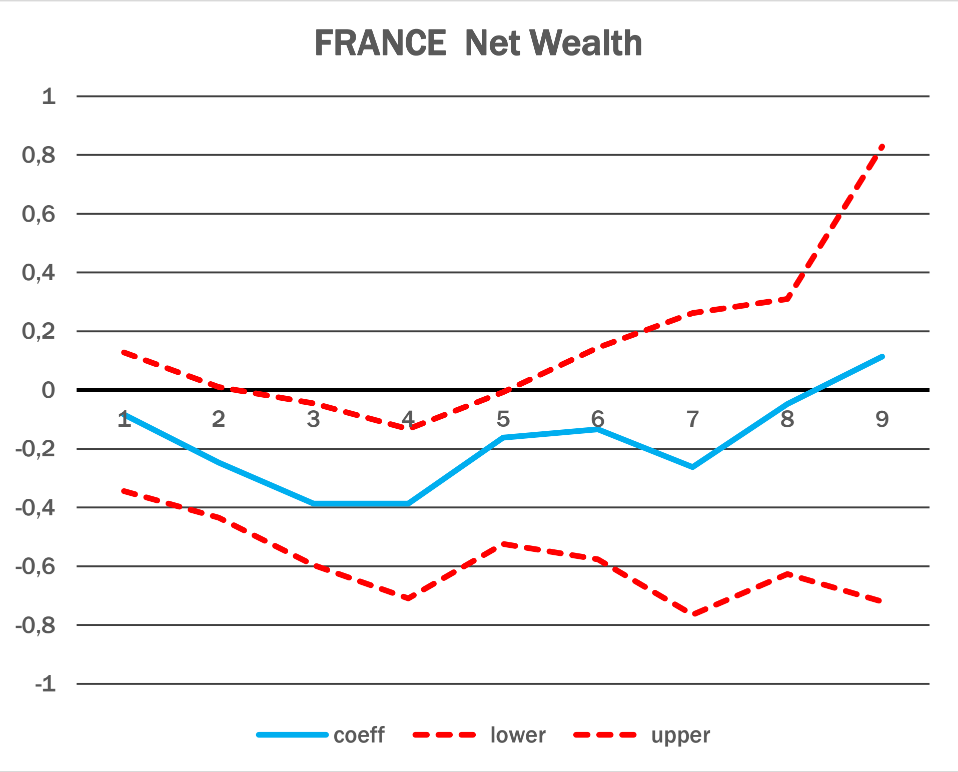
DE (FW), LU (NW, FW)

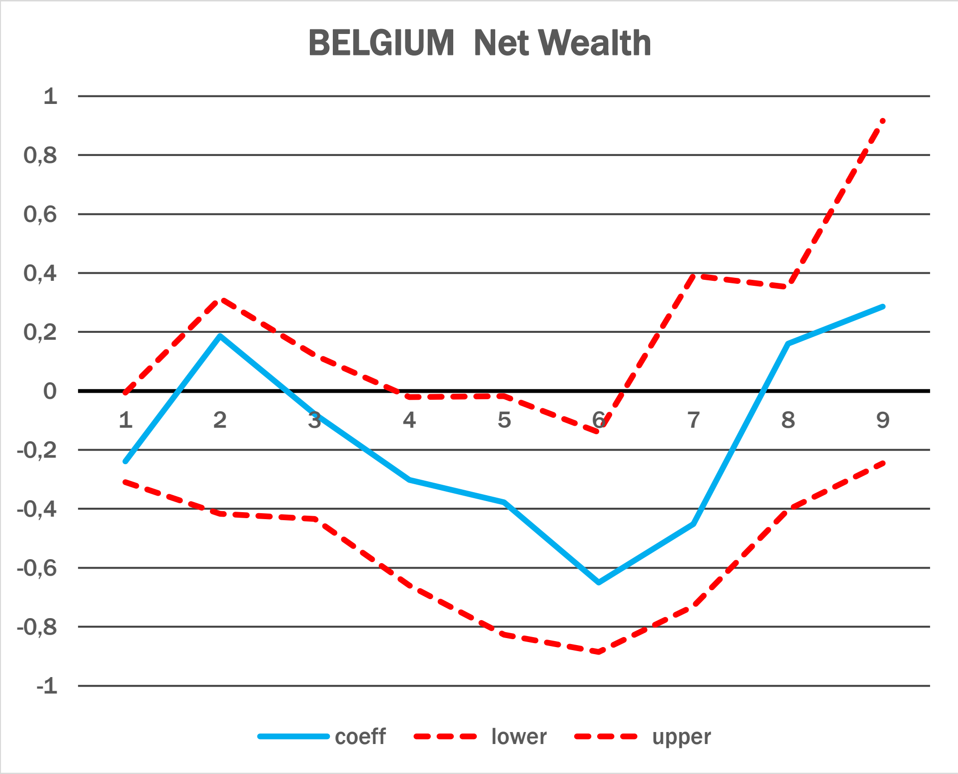
DE: also a positive effect of pension wealth on the probability to hold real estate property

Remark: when both significant effects for NW and FW: larger effect for NW than for FW (BE, LU)

- ✓ **PT: Crowding out at the bottom (NW, FW) and crowding in at the top (FW)**

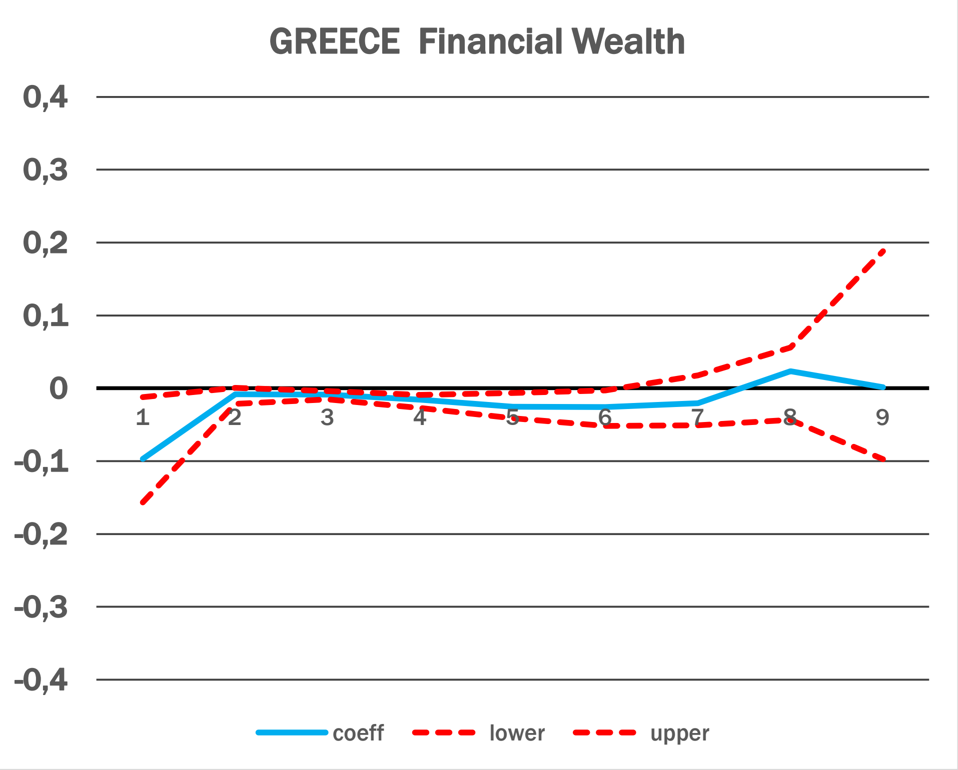
Crowding out effect
Net wealth

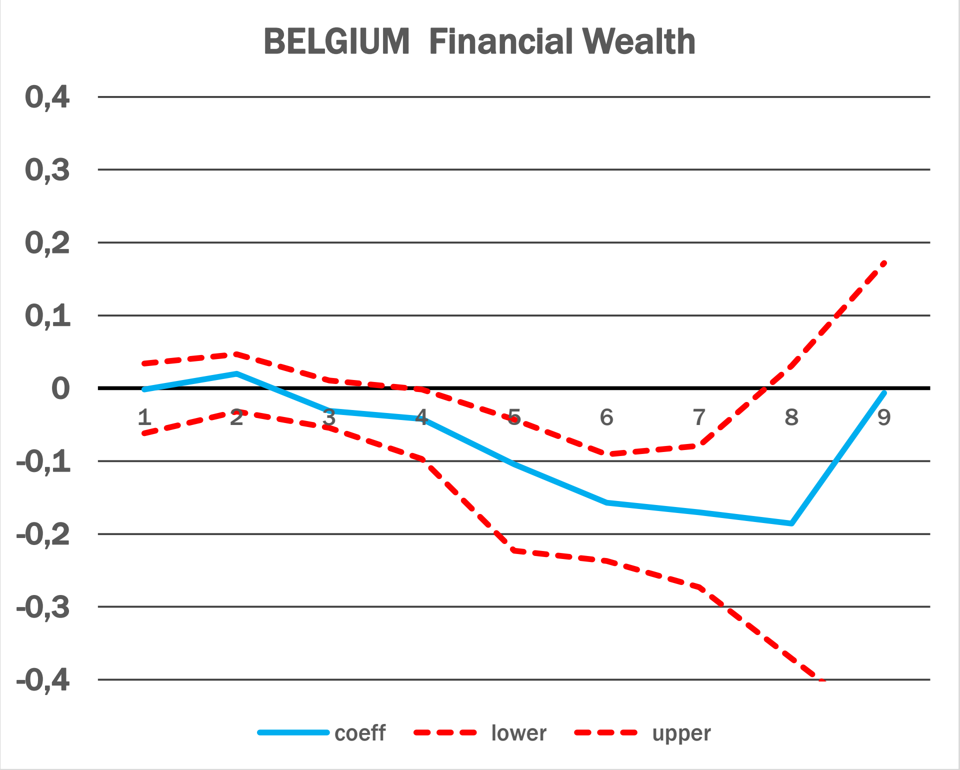




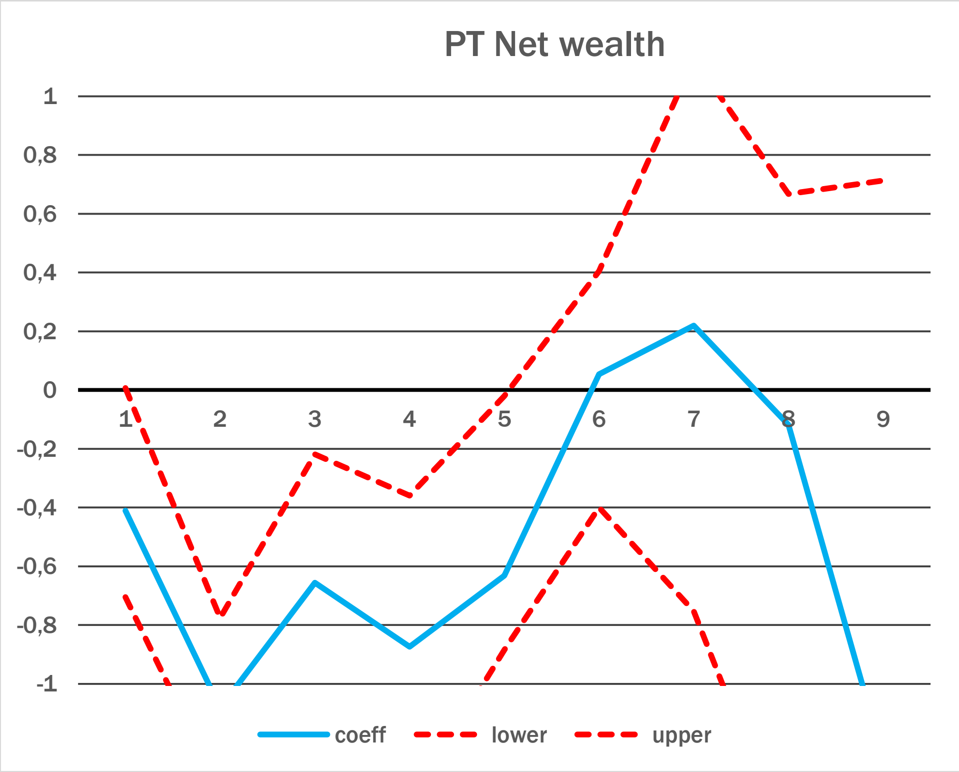
- ❑ **Additional results with housing wealth**
- ❑ BE and FR : also a **negative effect of pension wealth on the probability to hold real estate properties** (IV Probit) : real estate property as a store of value for old ages.

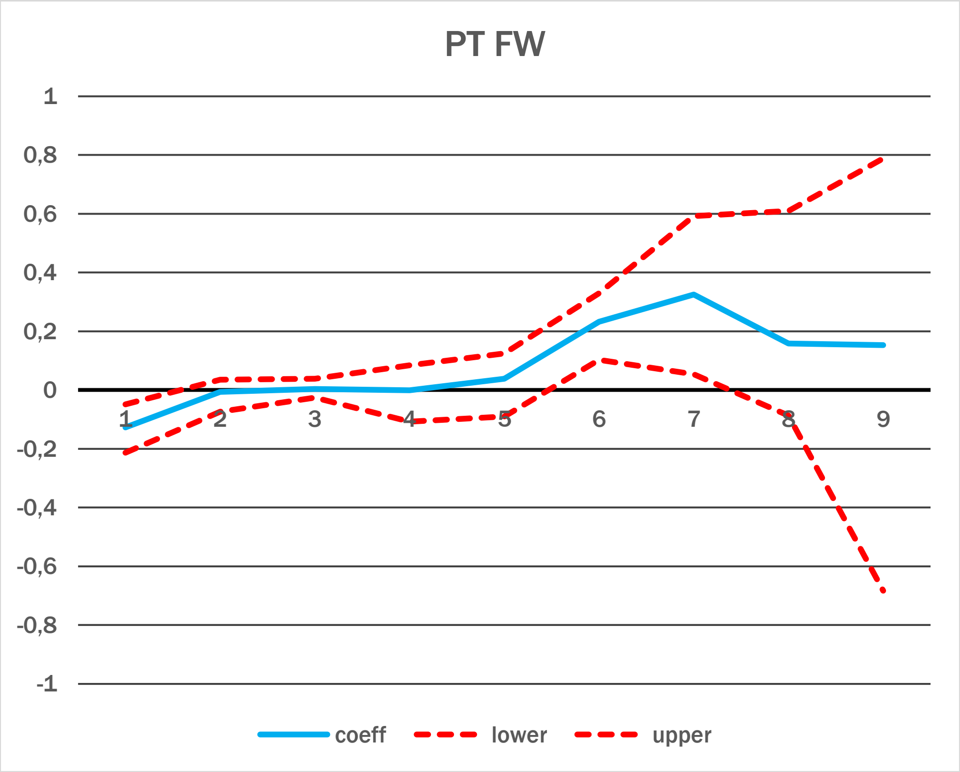
Crowding out effect
Financial wealth



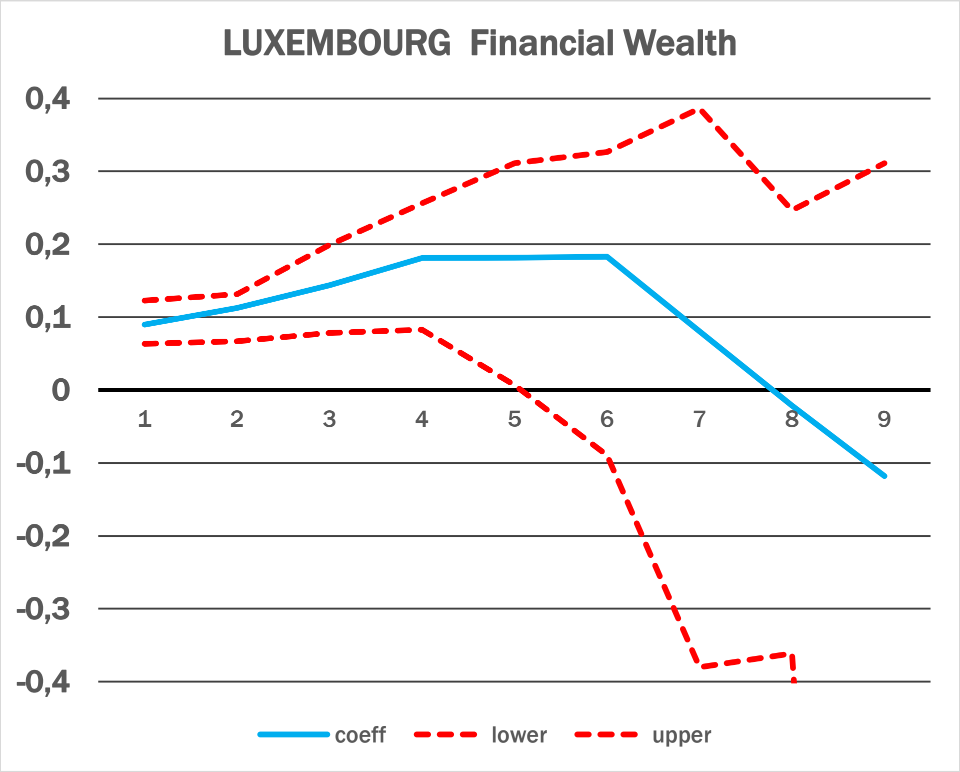


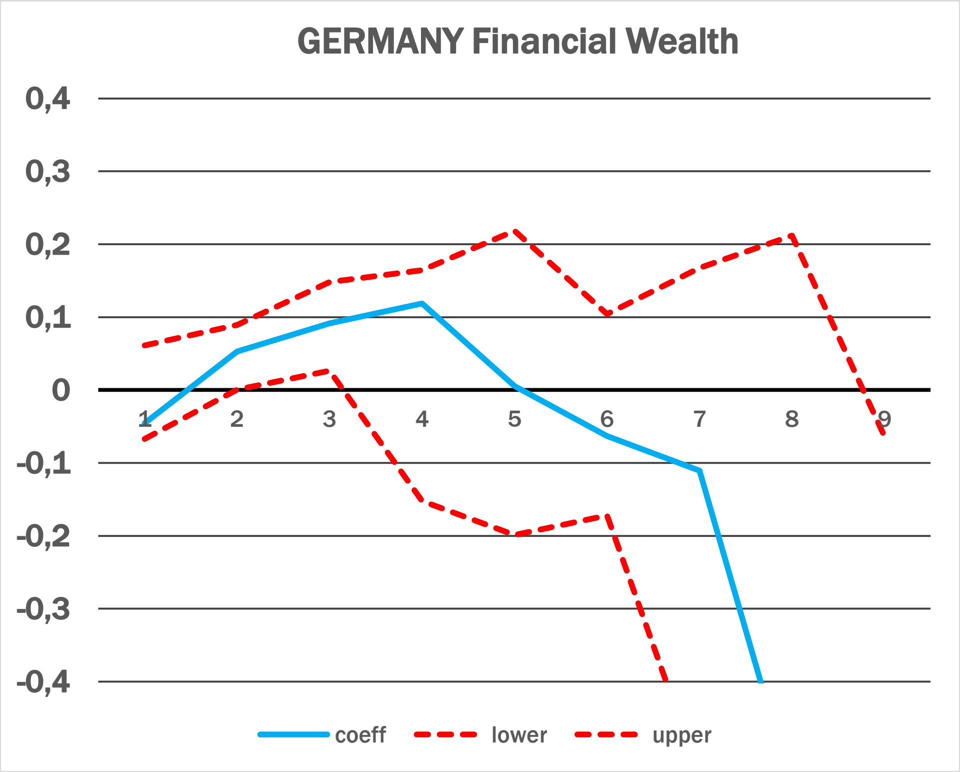
Crowding *out* at the bottom crowding *in* 6 and 7 deciles Portugal





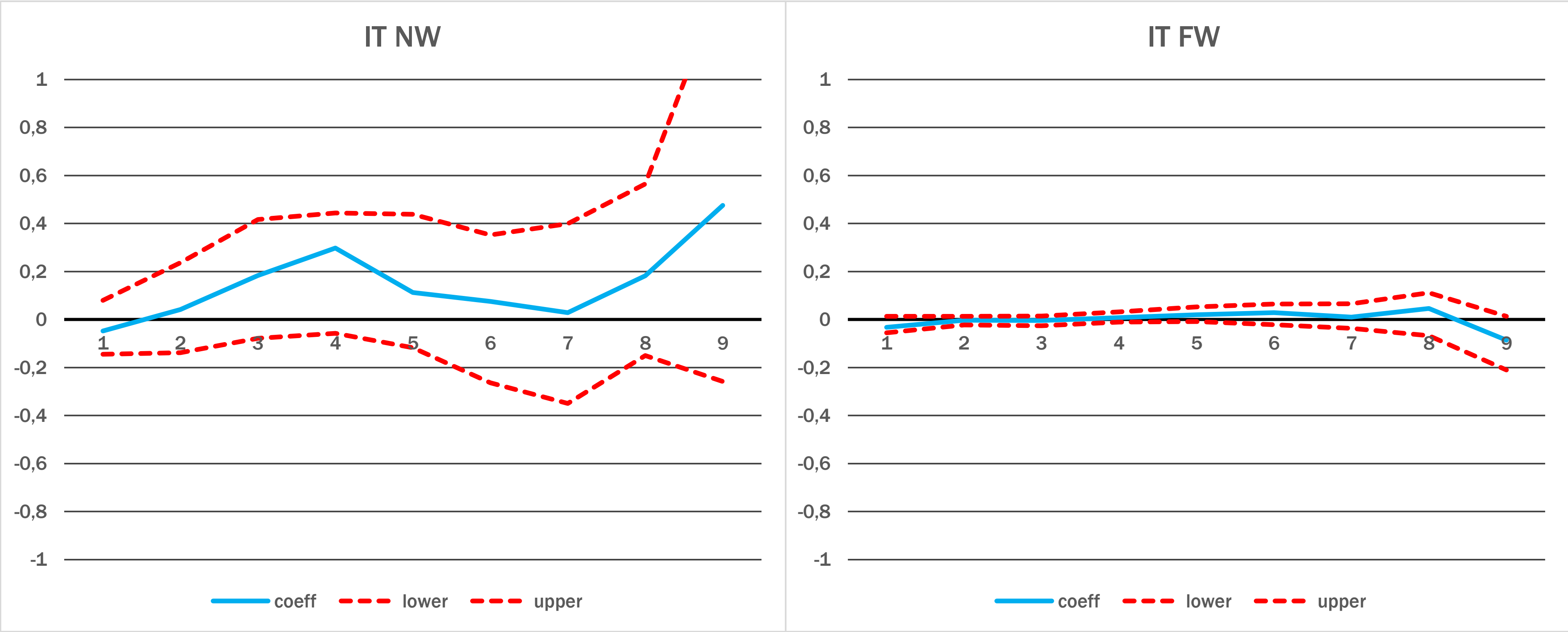
Crowding in effects
Financial wealth





- ❑ **Additional results with housing wealth**
- ❑ DE: also a **positive effect of pension wealth on the probability to hold real estate properties** (IV Probit)

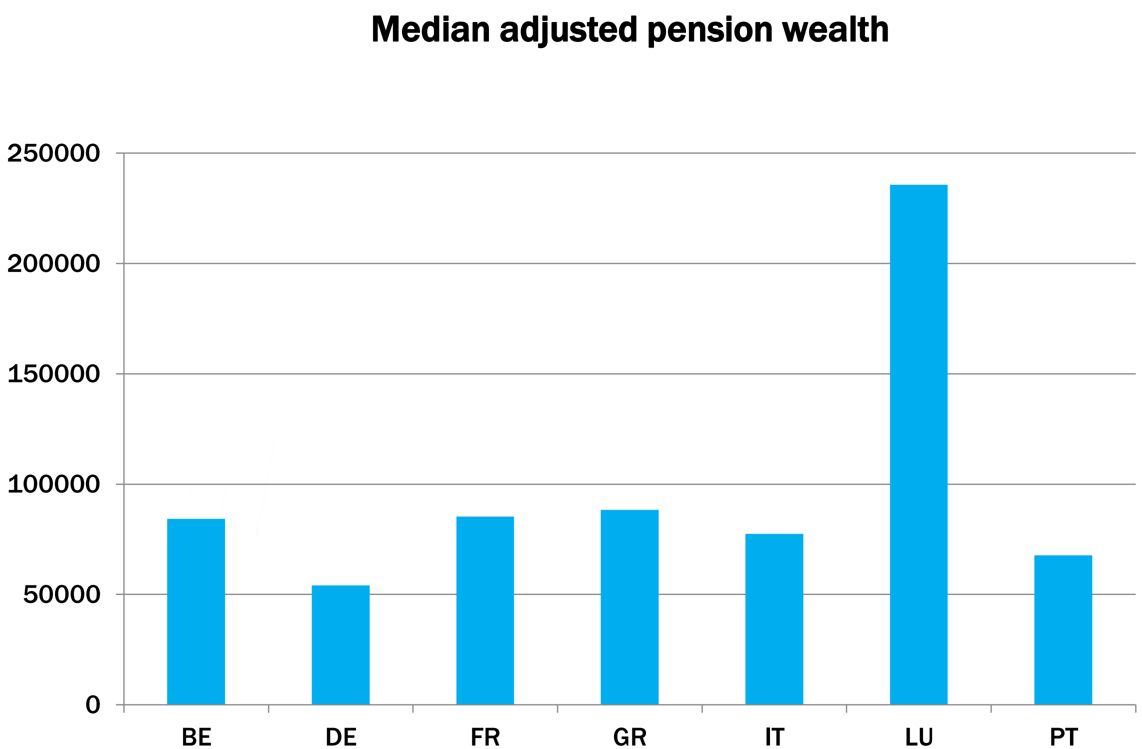
Results for Italy



- No significant estimates with IV Quantile regression
- While Attanasio and Brugiavini (2003) were able to find a substituability effect between pension wealth and saving. Differences in the methodology (1992 reforms), but also in the time period?

Why similar results in some countries?

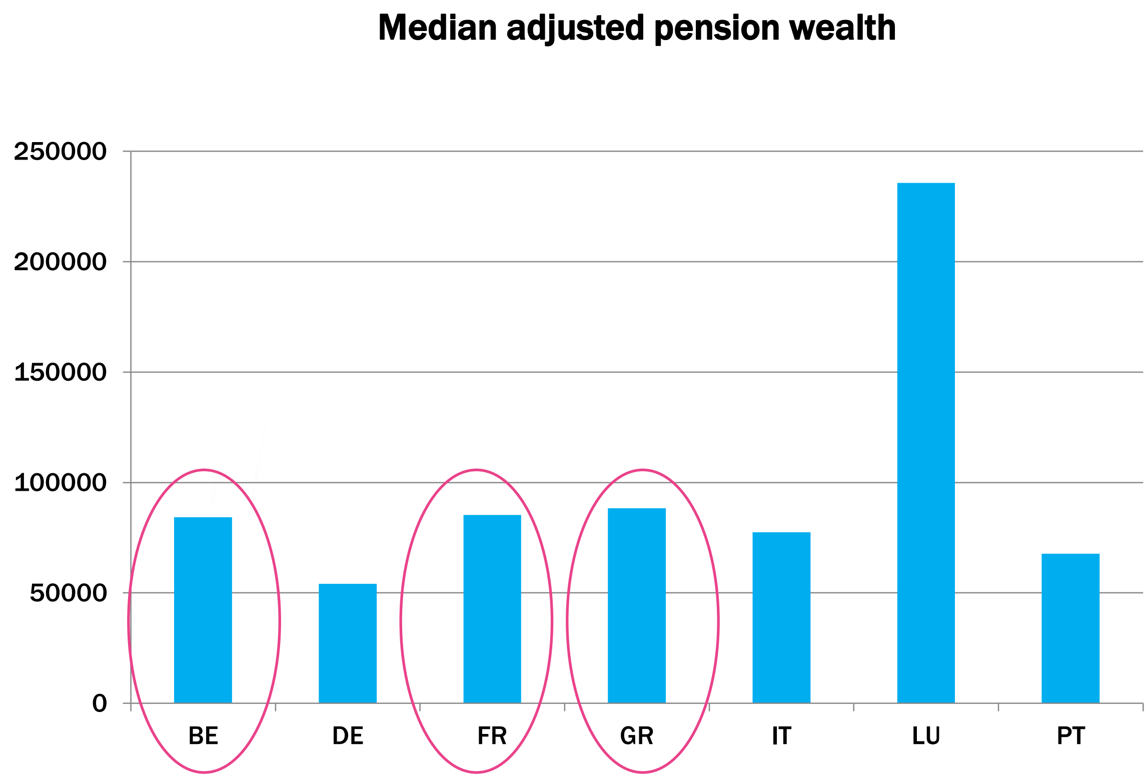
- Generosity of the pension system



Source: HFCS-wave 2, OECD pension simulations (2014). Sample restricted to households with a reference person aged between 30 and 54 in employment and without any self-employed person.

Why similar results for BE, FR and GR?

- Generosity of the pension system

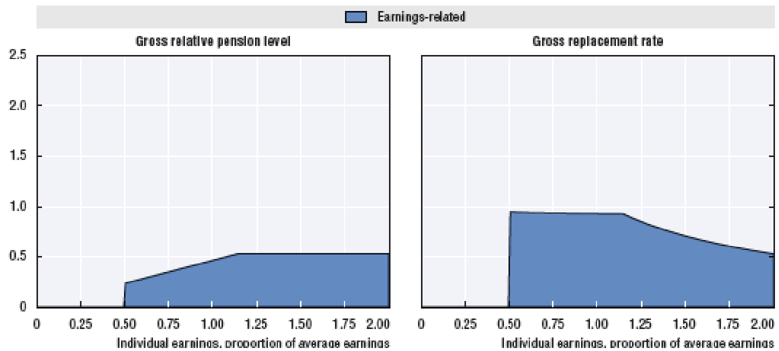


Source: HFCS-wave 2, OECD pension simulations (2014). Sample restricted to households with a reference person aged between 30 and 54 in employment and without any self-employed person.

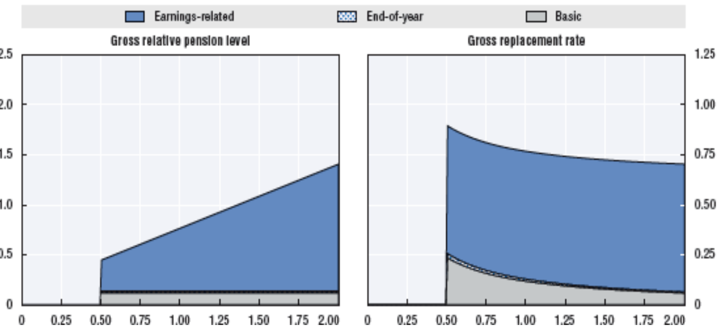
Why similar results in some countries?

- **Similar design in terms of pension level and replacement rate over the wage distribution**

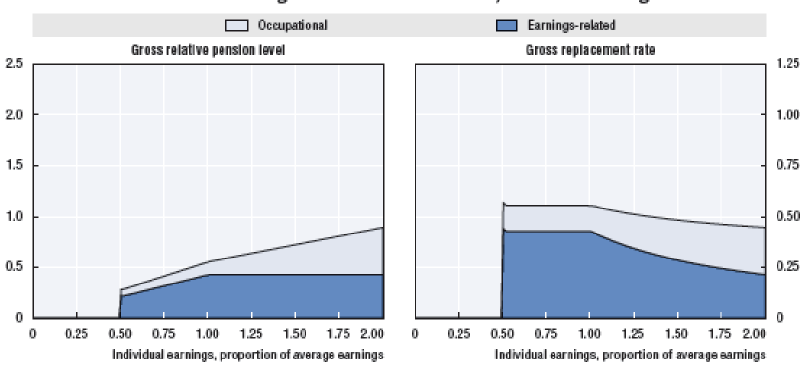
Pension modelling results: Belgium in 2059, retirement at age 65



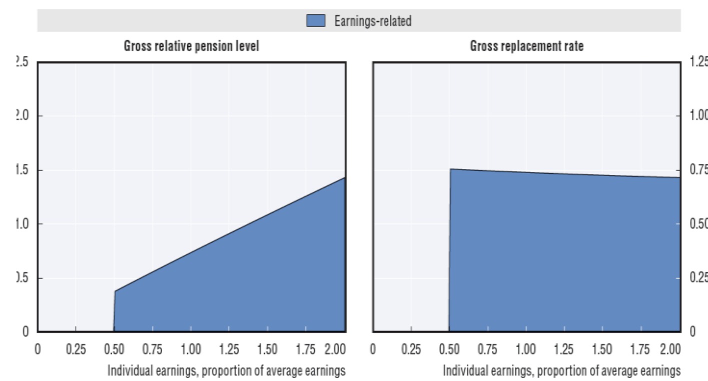
Pension modelling results: Luxembourg in 2054, retirement at age 60



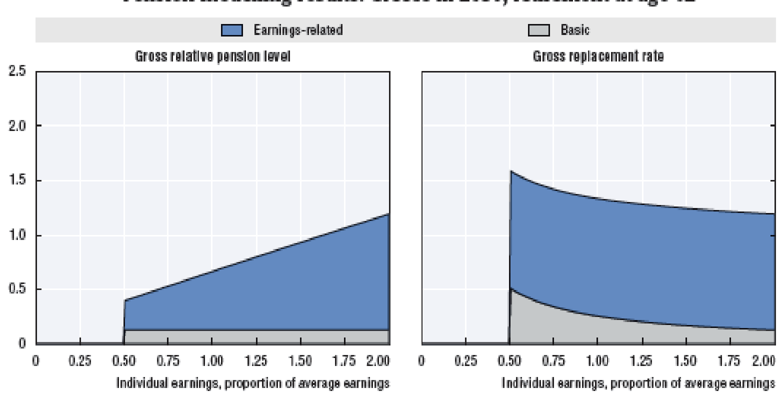
Pension modelling results: France in 2057, retirement at age 63



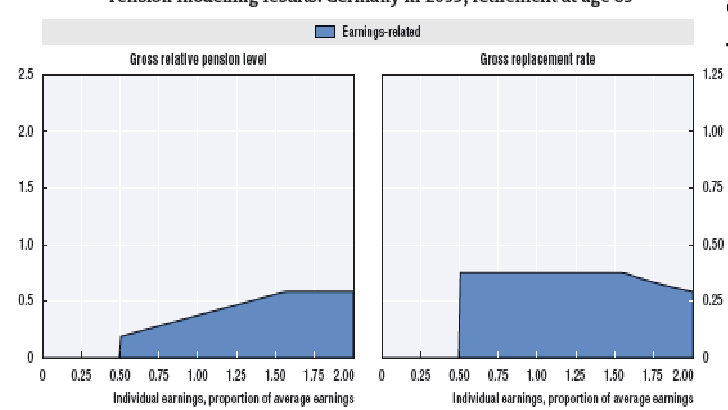
Pension modelling results: Portugal in 2060, retirement at age 66



Pension modelling results: Greece in 2056, retirement at age 62



Pension modelling results: Germany in 2059, retirement at age 65



- FR, BE: replacement rate <0,5 below median earnings, and then decreasing

- LU, PT: pension benefits increase with earnings, high replacement rates (but lower wages in PT)

- DE : very low replacement rate: may explain some complementarity at the bottom

Source:
« Pensions at a Glance 2015: OECD and G20 indicators », OECD publishing

CONCLUSION

- ❑ **Crowding out/crowding in estimates** of pension wealth on non-pension wealth for 7 European countries
- ❑ Focus on population in employment – Year 2014
- ❑ **Cross-country heterogeneity**

- ✓ **Crowding *out* effects** in the bottom or middle of the distribution in BE (NW, FW), FR (NW), GR (FW), PT (NW, FW)
- ✓ **Crowding *in* effects** in LU (NW, FW), DE (FW)
- ✓ **No significant effect in IT** [large confidence intervals]

CONCLUSION

- **How to interpret the cross-country heterogeneity?**

- Welfare states (Mediterranean versus Continental countries)? Our results do not match with the standard Esping-Andersen classification.

- Differences in replacement rate, progressivity of the system ?

- Interaction with housing markets ? Housing as a store of value for old age in some countries

APPENDIX

Financial wealth

		OLS	IV	Q Q1	Q Q2	Q Q3	IVQ Q1	IVQ Q2	IVQ Q3
	Coeff	-0.100	-0.154	0.011	-0.030	-0.121 **	-0.011	-0.104 **	-0.148 **
Belgium	Lower	-0.434	-0.467	-0.037	-0.087	-0.233	-0.058	-0.223	-0.279
	Upper	0.234	0.158	0.058	0.026	-0.009	0.032	-0.043	-0.015
	Coeff	-0.229	-0.454	0.043 **	0.066 *	0.123 **	0.099 **	0.006	-0.349
Germany	Lower	-1.148	-1.813	0.003	-0.001	0.024	0.007	-0.199	-0.729
	Upper	0.691	0.906	0.084	0.132	0.223	0.128	0.219	0.263
	Coeff	0.174	0.246	-0.051	-0.115 **	-0.109	-0.014	-0.094	-0.089
France	Lower	-0.137	-0.249	-0.102	-0.190	-0.249	-0.076	-0.171	-0.210
	Upper	0.485	0.741	0.001	-0.039	0.031	0.045	0.044	0.194
	Coeff	0.096	0.052	0.000	-0.002	0.001	-0.009 **	-0.025 **	-0.007
Greece	Lower	-0.179	-0.198	-0.003	-0.015	-0.020	-0.018	-0.041	-0.049
	Upper	0.372	0.301	0.003	0.011	0.021	-0.002	-0.006	0.034
	Coeff	-0.318 ***	-0.276 ***	-0.003	0.017	0.019	-0.002	0.020	0.039
Italy	Lower	-0.447	-0.411	-0.016	-0.015	-0.056	-0.022	-0.008	-0.050
	Upper	-0.189	-0.142	0.010	0.049	0.093	0.015	0.053	0.103
	Coeff	-4.347	-3.770	0.116 ***	0.078 ***	-0.050	0.130 **	0.182 **	0.031
Luxembourg	Lower	-10.508	-9.778	0.073	0.011	-0.276	0.068	0.007	-0.376
	Upper	1.814	2.238	0.160	0.146	0.176	0.163	0.311	0.352
	Coeff	0.178	-0.100	0.031 **	0.093 **	0.259 **	0.004	0.038	0.336 **
Portugal	Lower	-0.050	-1.295	0.020	0.072	0.188	-0.070	-0.090	0.151
	Upper	0.406	1.096	0.043	0.113	0.330	0.050	0.125	0.532

Endogeneity issue (pension wealth)

- In our case: pension wealth computed accounting for the expected retirement age (elicited through the HFCS)
- Instrumental variable: pension wealth computed using the country specific NRA

Instrumented Pension Wealth : Retirement age

BE	DE	FR	GR	IT	LU	PT
67	65	67	67	67	65	66

Empirical model (1)

- Standard empirical specification derived from a simple life-cycle model, following Gale (1998) (e.g. Alessie et al. 2013).

- We estimate :

$$W_i = \beta_0 + \beta_1 Y_i + \beta_2 P_i + \gamma Z_i + u_i$$

i : the individual index,

W_i : non pension wealth

Y_i: income

P_i: pension wealth (mandatory pensions for the private sector), adjusted by the Gale's Q factor (with r=2%)

X_i : Additional controls (age, gender, household composition, education, credit constraints, gifts and inheritances received)

u_i the error term.

Empirical model (2)

- We run OLS, IV and Quantile and IV Quantile regressions

Instrumented Quantile regressions with CQIV – stata module of Chernozhukov et al.(2015))

The error term u is defined, for $X = (1, Y, P, Z)$ as:

- $E(u|X) = 0$ in the case of standard OLS
- $q_\tau(u_\tau|X) = 0$ with q_τ the conditional τ-quantile for the quantile regressions

Empirical model (3)

❑ Identification:

- Cross-country differences in pension scheme (Alessie et al., 2013; Hurd et al. 2012)
- Non linearities in pension scheme and differences in pension enrolment across individuals within countries.

❑ Endogeneity issue and instrumental variable

- Unobservable factors such as preference for leisure may affect both pension and saving

- Our pension wealth variable : simulated pension benefits using gender, year of birth, number of years of contribution and the mean earning histories by cohort and wage level.
- Endogeneity arising from individual expectations “at what age they will retire”. **=>Pension wealth instrumental variable: considering the country specific normal retirement age instead of the individual expectations**

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❑ Identification:

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Empirical model (4)

- **Endogeneity issue and instrumental variable**

- Unobservable factors such as preference for leisure may affect both pension and saving

- Our pension wealth variable : simulated pension benefits using gender, year of birth, number of years of contribution and the mean earning histories by cohort and wage level.
- Endogeneity arising from individual expectations "at what age they will retire". **=>Pension wealth instrumental variable: considering the country specific normal retirement age instead of the individual expectations**

The background model (1)

Following Alessie & al. (2013), we derive the empirical equation from a discrete time simple life cycle model with no uncertainty and liquidity constraint. The within period utility function is assumed to have constant relative risk aversion. We assume also perfect capital market with a constant real interest rate r.

The consumer maximisation program :

$$max_{c_t} \sum_{t=1}^{T} (1+\rho)^{1-t} \frac{c_t^{1-\gamma}}{1-\gamma}$$

$$s.t. \sum_{t=1}^{T} (1+r)^{1-t} c_t = \sum_{t=1}^{R} (1+r)^{1-t} E_t + \sum_{t=R}^{T} (1+r)^{1-t} B_t$$

With c_t the instantaneous consumption at age t, E_t the income at age t, B_t the pension benefit at age t, R the retirement age, T the maximum age, ρ is the discount rate and γ the coefficient of relative risk aversion.

The background model (2)

The wealth W_t at a given age t is defined as:

$$W_t = \sum_{\tau=1}^{t}(1+r)^{t-\tau}\,(E_t - c_t) \qquad (1)$$

with E_t the income at age t, corresponding to wage before retirement and pension after retirement. We set the value of the discount rate at the interest rate level, i.e. ρ=r. The consumption at age t is equal to:

$$c_t = \left(\sum_{\tau=1}^{T}\left(\frac{1}{1+r}\right)^{\tau-1}\right)^{-1}\left(\sum_{\tau=1}^{R}(1+r)^{1-\tau}E_t + \sum_{\tau=R}^{T}(1+r)^{1-\tau}B_t\right) \qquad (2)$$

The background model (3)

Substitution of (2) in (1) provides the value of wealth at age t

$$W_t = \sum_{\tau=1}^{t}(1+r)^{t-\tau}E_t - Q(t)\sum_{\tau=1}^{R}(1+r)^{t-\tau}E_t - Q(t)\sum_{\tau=R+1}^{T}(1+r)^{t-\tau}B_t \qquad (3)$$

With Q-factor:

$$Q(t) = \frac{\sum_{\tau=1}^{t}\left(\frac{1}{1+r}\right)^{\tau-1}}{\sum_{\tau=1}^{T}\left(\frac{1}{1+r}\right)^{\tau-1}}$$