Private Wealth and Pensions across European Countries

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Motivations

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

- An old issue in the literature (Feldstein, 1974)
- Ambiguous overall effect: displacement effect and early retirement effect

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

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

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

❑ **This paper: estimates the effect of pension wealth on private non-pension wealth for 7 euro area countries.**

=> Heterogeneity in the euro zone : are there differences in households' portfolio and wealth across euro area countries due to differences in pension schemes ?

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.

❑ **Recent empirical analysis**: Individual data. Regressions derived from a simple life-cycle model of consumption, and account for the planning horizon and wealth effect of pension. e.g. Gale 1998, Engelhardt and Kumar 2011, Hurd et al. 2012, Alessie et al. 2013.

❑ **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.

This paper (1)

❑ Effect of mandatory pension wealth on private net wealth in **BE, DE, FR, GR, IT, LU, PT**

❑ Cross-section data from a cross-country harmonized wealth survey (HFCS-ECB) combined with pension wealth estimates (OECD pension models). **Reference year: 2014**.

❑ Standard reduced form equation of wealth accumulation based on the life-cycle (Gale, 1998)

❑ Due to large cross-country heterogeneities: country-by-country regressions =>**Identification provided by non linarites in pension schemes**

This paper (2)

❑ **Harmonized cross-country approach**

- sample selection: cross-country differences in entry into the labour market/transition from work to retirement (individuals aged 30-54)

- instrumental variable definition (based on NRA in each country)

❑ **Our contribution compared with previous cross-country papers for Europe** (Alessie et al. 2013, Hurd et al. 2012 based on SHARELIFE)

 - Wealth accumulation during working life (30-54 instead of 54-75 or 65-75)

- New data : harmonized Wealth survey (HFCS) OECD pension wealth simulations. More observations to do country-by-country analysis

- Year 2014 (after the financial crisis)

- Only cross-section information (wage), no retrospective information on careers. Detailed control variables (education, household composition, credit constraints, gift and inheritances received)

This paper: main results

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

❑ 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))

❑ **Substantial cross-country heterogeneity**: crowd in/crowd out effects:

    - depending on the country

    - depending on the type of assets (financial assets, housing assets)

Underlying issues: Continental versus Mediterranean welfare states? The role of housing as a store of value for old age? Financial crisis and reforms across country?

Presentation outline

- Empirical model
- Data: wealth survey (HFCS) and OECD pension simulations
- Results
- Conclusion

Empirical model (1)

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

❑ We estimate :

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

i : the individual index,

W_i : non pension wealth

Y_i: income

P_i: pension wealth (mandatory pensions for the private sector)

Q: 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.

❑ 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 (2)

❑ **Identification: non linarites in pension schemes and differences in individuals' pension enrollment**

Due to cross-country heterogeneities: country-by-country regressions

❑ **Endogeneity issue and instrumental variable**

- Unobservable factors such as preference for leisure may affect both pension and saving (See e.g. Engelhardt and Kumar 2011, Hurd et al. 2012, Alessie et al. 2013)

- 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**

DATA

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

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

- Compared to SHARE: covers the full population (not only 50+) + detailed information on wealth composition

- 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.

❑ **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

❑ **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%)

Pension wealth on Net non-pension Wealth

		OLS	IV	Q			IVQ		
				Q1	Q2	Q3	Q1	Q2	Q3
Belgium	Coeff	-0.040	-0.130	0.030	-0.184	-0.015	0.057	**-0.378 ****	-0.111
	Lower	-0.789	-0.901	-0.251	-0.524	-0.545	-0.420	-0.827	-0.682
	Upper	0.710	0.641	0.310	0.156	0.515	0.303	-0.018	0.442
Germany	Coeff	0.048	-0.072	0.030	**0.210 ****	**0.139 ****	-0.014	0.037	-0.808
	Lower	-0.754	-1.238	-0.065	0.054	-0.273	-0.330	-0.086	-1.666
	Upper	0.850	1.093	0.126	0.366	0.551	0.076	0.539	0.960
France	Coeff	0.379	0.234	-0.132	0.078	-0.066	-0.293	**-0.162 ****	-0.207
	Lower	-0.011	-0.386	-0.343	-0.128	-0.454	-0.540	-0.524	-0.729
	Upper	0.768	0.854	0.078	0.284	0.322	0.047	-0.007	0.139
Greece	Coeff	0.101	0.073	-0.002	-0.075	-0.109	-0.049	-0.094	0.123
	Lower	-0.438	-0.518	-0.067	-0.234	-0.370	-0.109	-0.316	-0.084
	Upper	0.641	0.664	0.062	0.084	0.151	0.024	0.008	0.606
Italy	Coeff	**-0.581 *****	-0.378	0.097	0.112	0.099	0.130	0.113	0.070
	Lower	-0.969	-0.782	-0.132	-0.184	-0.318	-0.061	-0.117	-0.309
	Upper	-0.194	0.026	0.326	0.408	0.515	0.340	0.438	0.423
Luxembourg	Coeff	-5.404	-4.334	0.081	-0.056	-0.732	**0.638 ****	0.491	0.170
	Lower	-13.471	-12.291	-0.564	-0.381	-2.064	0.189	-0.173	-1.472
	Upper	2.664	3.622	0.726	0.269	0.600	0.833	1.200	0.899
Portugal	Coeff	-0.021	-0.734	**-0.216 *****	-0.105	-0.042	**-0.797 ****	**-0.632 ****	0.295
	Lower	-0.560	-2.914	-0.310	-0.322	-0.262	-1.167	-0.885	-0.608
	Upper	0.518	1.446	-0.122	0.112	0.178	-0.447	-0.021	0.920

Pension wealth on net non-pension wealth

		OLS	IV	Q			IVQ		
				Q1	Q2	Q3	Q1	Q2	Q3
Belgium	Coeff	-0.040	-0.130	0.030	-0.184	-0.015	0.057	**-0.378 ****	-0.111
	Lower	-0.789	-0.901	-0.251	-0.524	-0.545	-0.420	-0.827	-0.682
	Upper	0.710	0.641	0.310	0.156	0.515	0.303	-0.018	0.442
Germany	Coeff	0.048	-0.072	0.030	**0.210 ****	**0.139 ****	-0.014	0.037	-0.808
	Lower	-0.754	-1.238	-0.065	0.054	-0.273	-0.330	-0.086	-1.666
	Upper	0.850	1.093	0.126	0.366	0.551	0.076	0.539	0.960
France	Coeff	0.379	0.234	-0.132	0.078	-0.066	-0.293	**-0.162 ****	-0.207
	Lower	-0.011	-0.386	-0.343	-0.128	-0.454	-0.540	-0.524	-0.729
	Upper	0.768	0.854	0.078	0.284	0.322	0.047	-0.007	0.139
Greece	Coeff	0.101	0.073	-0.002	-0.075	-0.109	-0.049	-0.094	0.123
	Lower	-0.438	-0.518	-0.067	-0.234	-0.370	-0.109	-0.316	-0.084
	Upper	0.641	0.664	0.062	0.084	0.151	0.024	0.008	0.606
Italy	Coeff	**-0.581 *****	-0.378	0.097	0.112	0.099	0.130	0.113	0.070
	Lower	-0.969	-0.782	-0.132	-0.184	-0.318	-0.061	-0.117	-0.309
	Upper	-0.194	0.026	0.326	0.408	0.515	0.340	0.438	0.423
Luxembourg	Coeff	-5.404	-4.334	0.081	-0.056	-0.732	**0.638 ****	0.491	0.170
	Lower	-13.471	-12.291	-0.564	-0.381	-2.064	0.189	-0.173	-1.472
	Upper	2.664	3.622	0.726	0.269	0.600	0.833	1.200	0.899
Portugal	Coeff	-0.021	-0.734	**-0.216 *****	-0.105	-0.042	**-0.797 ****	**-0.632 ****	0.295
	Lower	-0.560	-2.914	-0.310	-0.322	-0.262	-1.167	-0.885	-0.608
	Upper	0.518	1.446	-0.122	0.112	0.178	-0.447	-0.021	0.920

Results: cross country heterogeneity

❑ **Similar conclusions for all countries (net wealth and financial wealth)**

- Heterogeneous effects along the wealth distribution (Quantile regressions)
 - Large confidence intervals at the top of the distribution

❑ **Cross-country heterogeneity: « main » cases**

✓ **« Crowd 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

✓ **« Crowd in » effect : Bottom of the distribution**
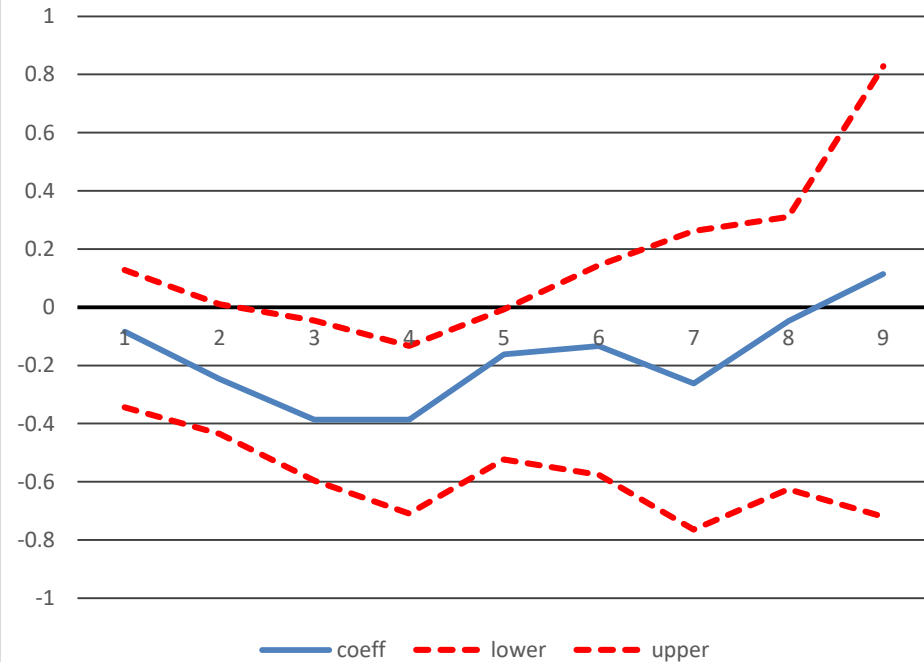
DE (FW), LU (NW, FW)

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)
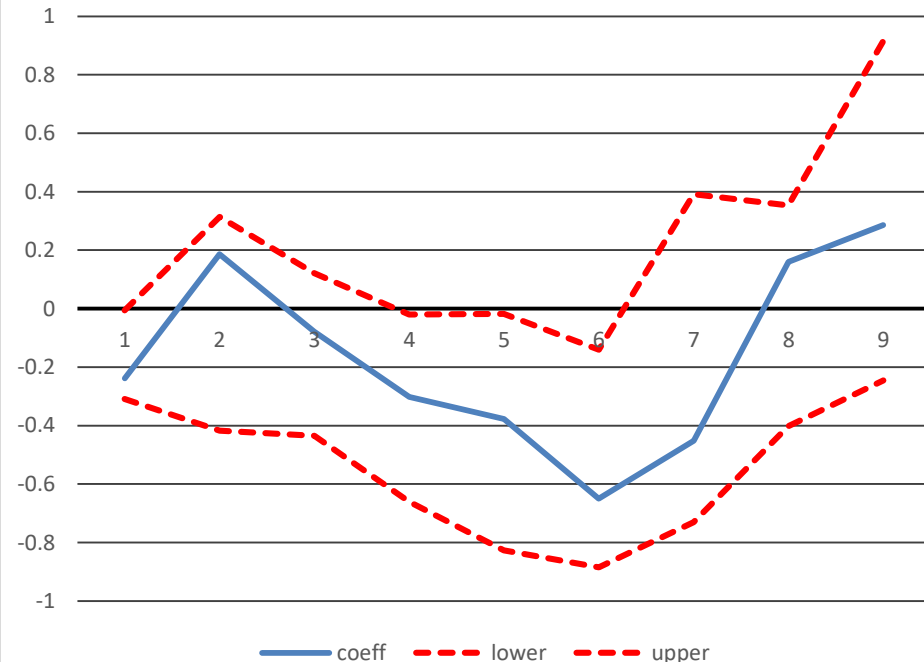
✓ **PT: Crowd out at the bottom (NW, FW) and crowd in at the top (FW)**

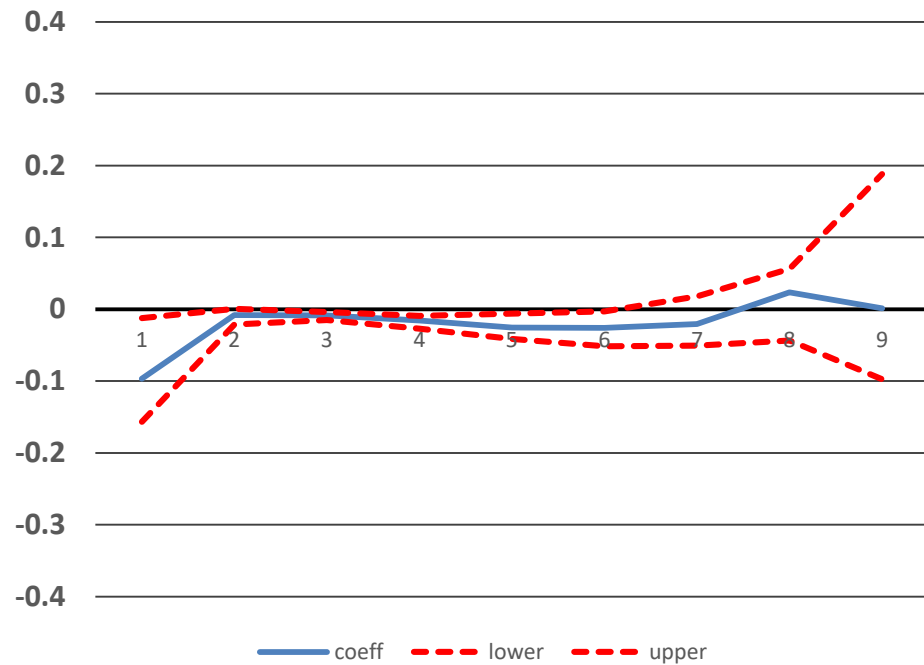# Crowd out
Net wealth

FRANCE Net Wealth

BELGIUM 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.
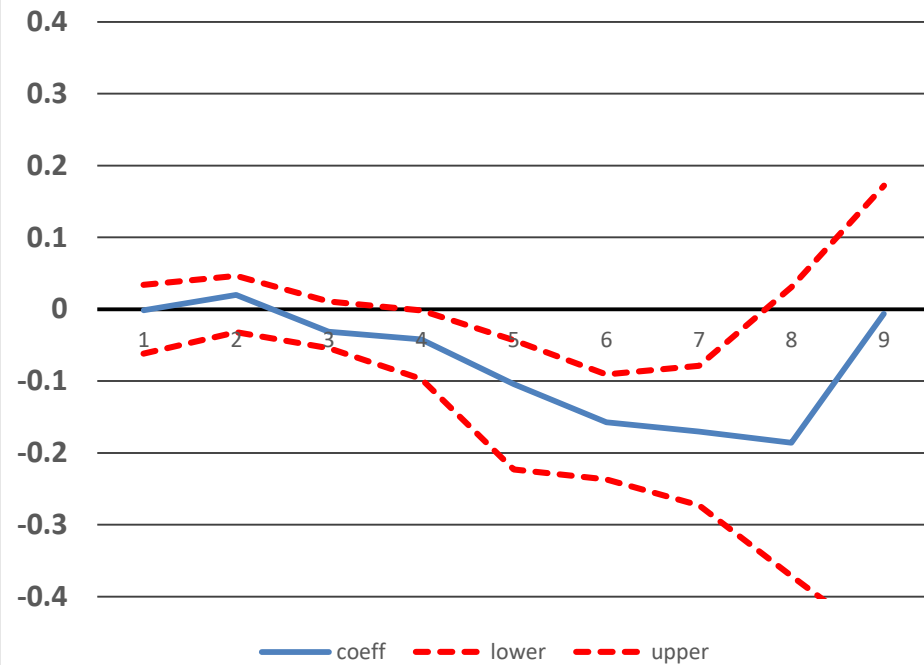
Crowd out (Financial wealth)

Crowd out
Portugal

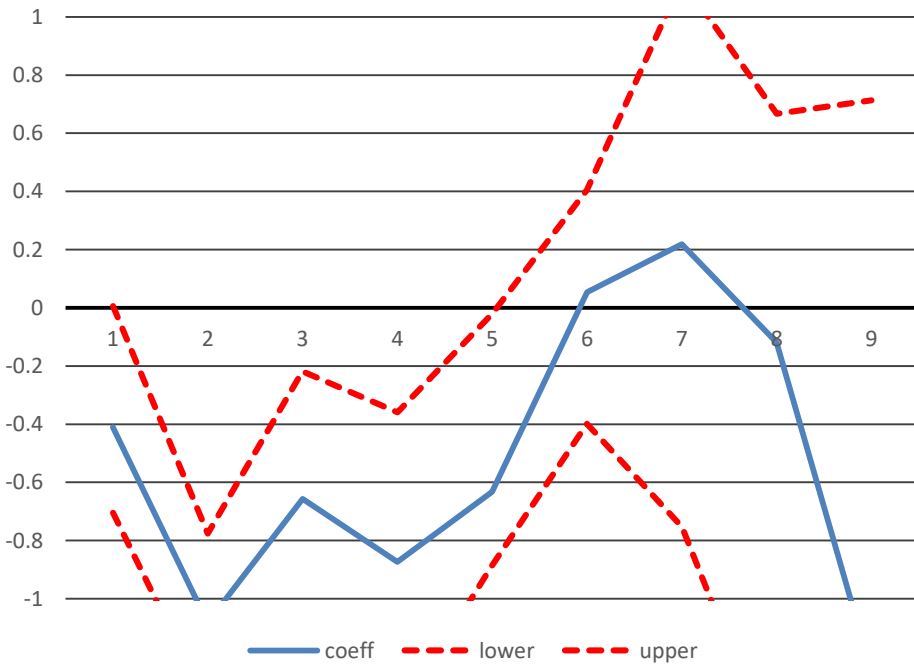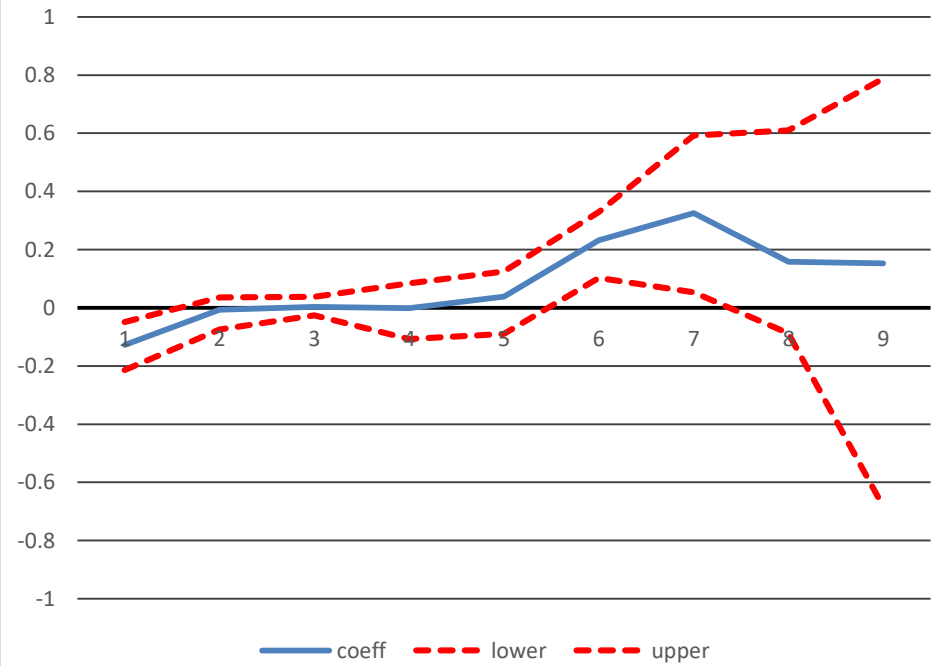# Crowd in (Financial wealth)

LUXEMBOURG Financial Wealth
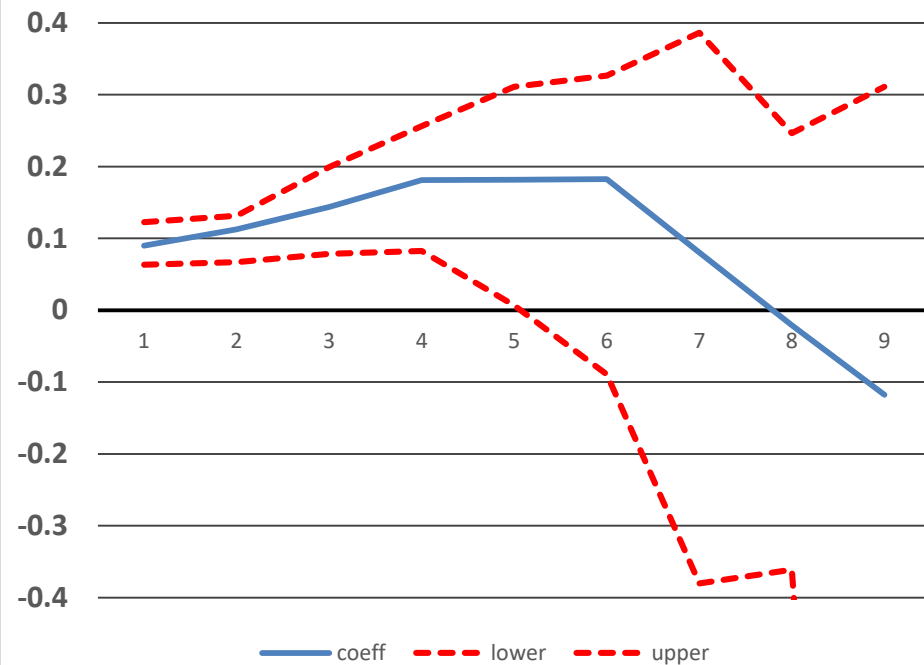
GERMANY Financial Wealth

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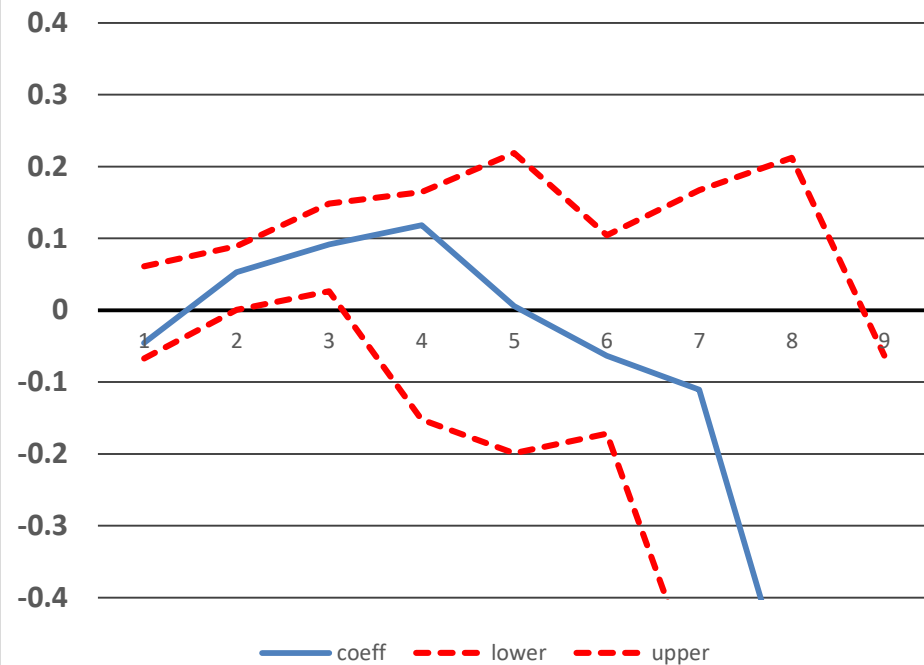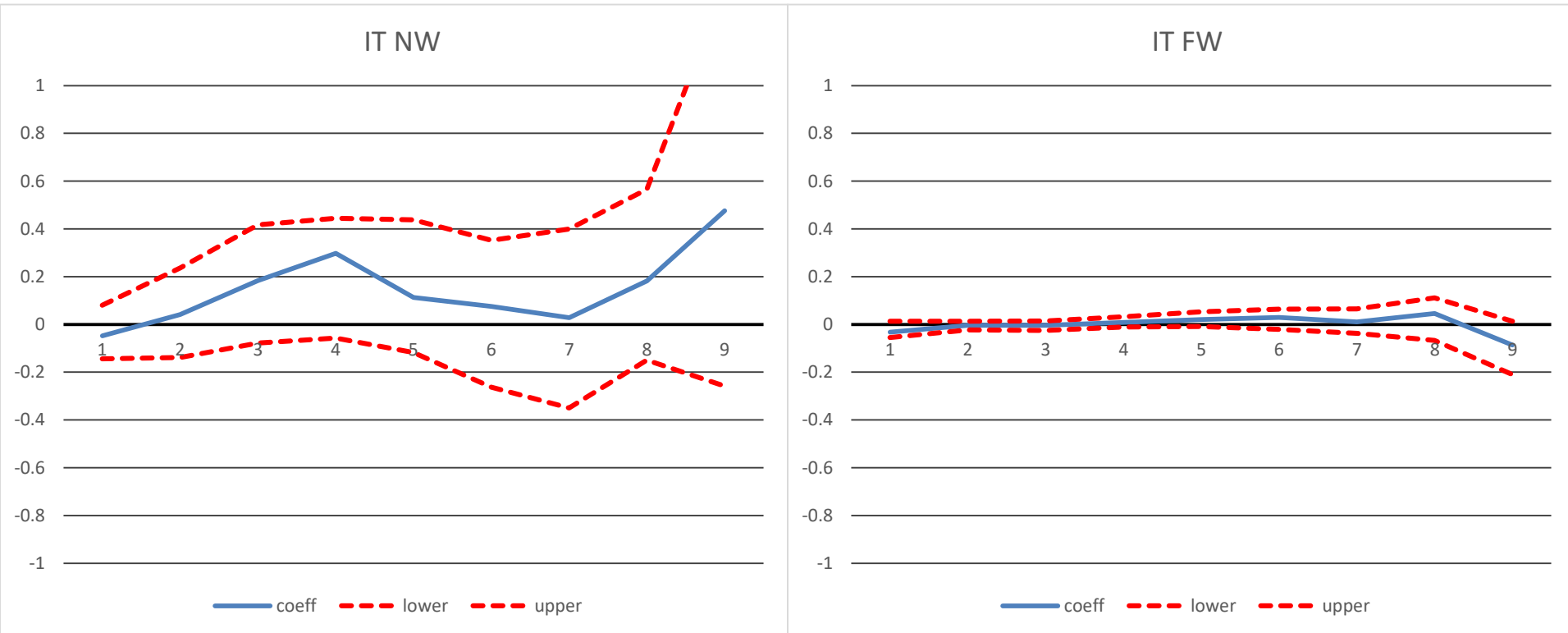
❑ **Additional results with housing wealth**
❑ DE: also a **positive effect of pension wealth on the probability to hold real estate properties** (IV Probit)

Results for Italy

IT NW   IT FW

coeff — lower — upper

- ❑ 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?

CONCLUSION

❑ **Crowd out/crowd in estimates** of pension wealth on non-pension wealth for 7 European countries

❑ Focus on population in employment – Year 2014

❑ **Cross-country heterogeneity**

✓ **Crowd *out* effects** in the bottom or middle of the distribution in BE (NW, FW), FR (NW), GR (FW), PT (NW, FW)

✓ **Crowd *in* effects** in LU (NW, FW), DE (FW)

✓ **No significant effect in IT** [large confidence intervals]

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

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

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

APPENDIX

Financial wealth

		OLS	IV	Q			IVQ		
				Q1	Q2	Q3	Q1	Q2	Q3
Belgium	Coeff	-0.100	-0.154	0.011	-0.030	-0.121 **	-0.011	-0.104 **	-0.148 **
	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
Germany	Coeff	-0.229	-0.454	0.043 **	0.066 *	0.123 **	0.099 **	0.006	-0.349
	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
France	Coeff	0.174	0.246	-0.051	-0.115 **	-0.109	-0.014	-0.094	-0.089
	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
Greece	Coeff	0.096	0.052	0.000	-0.002	0.001	-0.009 **	-0.025 **	-0.007
	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
Italy	Coeff	-0.318 ***	-0.276 ***	-0.003	0.017	0.019	-0.002	0.020	0.039
	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
Luxembourg	Coeff	-4.347	-3.770	0.116 ***	0.078 ***	-0.050	0.130 **	0.182 **	0.031
	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
Portugal	Coeff	0.178	-0.100	0.031 **	0.093 **	0.259 **	0.004	0.038	0.336 **
	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

The background model

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 wealth W_t at a given age t is defined as:

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

with y_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

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

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

With Q-factor:

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