The Displacement Effect of Compulsory Pension Savings on Private Savings

Evidence from the Netherlands, Using Institutional Differences across Occupations

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Introduction

Central research question

What is the impact of (compulsory) second pillar pensions on private household wealth?

Literature

- Line of literature started with Feldstein (1974), developed with Gale (1998).
- Attanasio et al (2003): displacement effect: –55% to –75%.
- Engelhardt and Kumar (2011): –60% (IV), +23% (OLS)
- resulting in a wide range of estimates for the displacement effect, due to:
  - Heterogeneity: differences in observation period, country, pension scheme, etc.
  - Measurement error and omitted variables

Our additions to the literature

- We use unique administrative data on Dutch second pillar pension wealth and participation
- We present separate – but comparable – estimates of the displacement effect for self-employed and for wage employed
- We make use of a quasi-natural experiment, based on pension fund performance during the crisis

Institutional setting – Occupational choice and second pillar pension participation (I)

Second pillar pensions in the Netherlands

- Consist of the (capital funded) occupational pension schemes.
- No general obligation to participate, but when social partners provide a pension scheme, the government can make this scheme mandatory for an entire sector or profession.
- About 90% of all employees participate in the second pillar (CBS, 2010).
- There are also mandatory professional pension funds for independent (self-employed) professionals, e.g. medical specialists, physiotherapists and notaries.
- And there is one industry pension fund – for painters, carpenters and glaziers – that includes self-employed.
- In total, about 5-10% of all self-employed participate in the second pillar.

Institutional setting – Occupational choice and second pillar pension participation (II)

	Wage employed	Self-employed	Total
Participation in 2nd pillar	WEP ("81%")	SEP ("1%")	"82%"
No participation in 2nd pillar	WEN ("9%")	SEN ("9%")	"18%"
Total	"90%"	"10%"	"100%"

The model

We estimate the displacement effect (β_1), using this basic model:

$$HW_i = \beta_0 + \beta_1 PW_i + \boldsymbol{X}_i'\boldsymbol{\beta}_x + \varepsilon_i$$

With HW_i=household wealth, PW_i=pension wealth, $\boldsymbol{X}_i'$ =controls

Common sources of bias in this type of analyses (following Gale, 1995; Alessie et al., 1997):

- Omitted variables, e.g. saving propensity, life expectancy, retirement age
- Measurement error, e.g. narrow wealth measures, gross vs. net, estimated vs. observed pension wealth, income vs. total compensation.
- Methodological issues: within group preference heterogeneity, measurement error and causality, are alleviated using PSM, IV, and diff-in-diff.

Estimation of displacement effect

We explore the displacement effect for the separate groups, using several estimation techniques. The following table presents an overview of this:

	Wage-employed		**Self-employed**
	couples	singles	couples
1)	DID (2007-2010)	DID (2007-2010)	(x)
2)	OLS (2010)	OLS (2010)	OLS (2010)
	- Income quintiles	- Income quintiles	- Income quintiles
	- IV (+ income quintiles)	- IV (+ income quintiles)	- Construction sector only
3)	PSM (2010)	PSM (2010)	PSM (2010)

Data

Sources of data:

1. IPO Wealth (1998-2012)
2. CBS Pensioenaanspraken (2005-2011)
3. CBS 'witte vlek': 2nd pillar pension participation of employees (2007-2010)
4. Pension funds balance sheet data of DNB, for recovery plans

Available info on sample (N=100.000 households):

- Background characteristics: gender, age, household composition, employee/self-employed, urbanization level, country of origin, etc.
- Financial information: income, assets (incl. home, stocks/bonds, current and saving accounts), debts
- Pension information
  - *Second pillar*: current annuity value, potential annuity value at retirement, number of years of participation, pension scheme (DC/DB)
  - *Third pillar*: fiscally facilitated pension premiums 2000-2012

Descriptive statistics (x 1000 €) – couples (I)

Variables	WEN	WEP	t-test	SEN	SEP	t-test
Means						
Household Wealth (HW)	172	154	***	301	398	***
o/w Net Primary residence	80	88	***	118	122	
o/w Financial wealth	66	48	***	59	141	***
o/w Saving account	48	39	***	45	107	***
o/w Shares	17	9	***	13	31	***
o/w HH 3rd pillar pension wealth	11	9	***	23	50	***
HH occupational pens. wealth (imputed)	111	142	***	52	133	***
HH occupational pension wealth (PW)	50	103	***	34	120	***
HH net income 2010	50	45	***	46	82	***
HH net total compensation 2010	51	51	**	47	97	***

Descriptive statistics (x 1000 €) SE couples within the construction sector

Variables	SEN	SEP	t-test
Means			
Household Wealth (HW)	235.2	210.9	
o/w Net Primary residence	120.8	110.7	
o/w Financial wealth	41.3	45.3	
o/w Saving account	32.1	31.7	
o/w Shares	8.8	13.5	
o/w HH 3rd pillar pension wealth	20.1	17.8	
HH occupational pens. wealth (imputed)	54.0	75.3	***
HH occupational pension wealth (PW)	39.6	62.3	***
HH net income 2010	40.4	43.3	
HH net total compensation 2010	41.1	49.6	***

Other control (dummy) variables for couples

Variables	WEN	WEP	t-test	SEN	SEP	t-test
Personal Characteristics						
HH Stock ownership (d)	0.37	0.29	***	0.31	0.38	**
HH 3rd pillar pension wealth (d)	0.44	0.46	*	0.52	0.71	***
Sector						
Public service and education	0.02	0.20	***	0.03	0.00	***
Construction	0.01	0.11	***	0.18	0.39	***
Business services	0.22	0.10	***	0.17	0.07	***
Health care	0.00	0.04	***	0.02	0.53	***
Partner Characteristics						
WEP: WE with pension (d)	0.54	0.63	***	0.35	0.38	
WEN: WE without pension (d)	0.09	0.06	***	0.05	0.05	
SEP: SE with pension (d)	0.01	0.01		0.06	0.20	***
SEN: SE without pension (d)	0.05	0.03	***	0.26	0.06	***

Difference-in-difference: a quasi-experiment (I)

- Over 2007-2010: a strong reduction in the funding ratios of almost all pension funds.
- DNB required a recovery plan to increase the funding ratio
  - No recovery plan in 2007
  - Recovery plans started in: 2008, 2009 or 2010
- Funds can cut pension entitlement, raise premiums and/or refrain from indexation. In either case, this means a negative wealth shock for participants in these funds.

Difference-in-difference: a quasi-experiment (II)

- The impact differs by pension fund. We look at the differences in private wealth accumulation between:
  - o those who are member of funds *with* a recovery plan and
  - o those who are member of funds *without* a recovery plan.
- We included the Top 20 largest pension funds, or 41% of all WEP households.

$$HW_{it} = \beta_0 + \beta_1 D_{it}^{treatment} + \beta_2 D_{it}^{pensionfund} + \beta_3 D_t^{year} + \boldsymbol{X}'_{it}\boldsymbol{\beta}_x + \varepsilon_{it}$$

Difference-in-difference: results

Wage-employed	Couples
Displacement effect (diff in diff)	- € 3,468 **
	(1,725)
NxT	32,665

NB: magnitude of average pension fund ‘shock’:

(actual funding ratio - required funding ratio) * household pension wealth = € 25,000

OLS analysis – wage employed (attenuation bias?)

Wage-employed	Couples	Singles
All income levels	**-0.089*** **	**-0.071** **
	(0.014)	(0.028)
Income quintile 1 (lowest incomes)	-0.016	-0.049
	(0.040)	(0.115)
Income quintile 2	-0.075**	-0.196***
	(0.034)	(0.075)
Income quintile 3	-0.125***	0.113*
	(0.035)	(0.061)
Income quintile 4	-0.139***	-0.156***
	(0.030)	(0.052)
Income quintile 5 (highest incomes)	-0.059**	-0.070
	(0.029)	(0.068)
N	20,142	4,085

Displacement effects wage-employed

Instrumental Variable (IV) analysis:

- Goal: using an instrument to determine if there is causal relationship between PW and HW.
- Instruments: company size and sector
  - First stage: strongly significant relationship with PW
  - But: perhaps also directly related with HW?

IV analysis

Wage-employed	Couples	Singles
All income levels	**-0.332*** **	**-0.378*** **
	(0.040)	(0.092)
Income quintile 1 (lowest incomes)	-0.105	-0.945**
	(0.121)	(0.427)
Income quintile 2	-0.337***	-0.372*
	(0.092)	(0.196)
Income quintile 3	-0.394***	-0.026
	(0.092)	(0.175)
Income quintile 4	-0.608***	-0.247
	(0.092)	(0.209)
Income quintile 5 (highest incomes)	-0.214**	-0.094
	(0.098)	(0.163)
N	18,740	3,597

Propensity score matching

- Here, we use the occupational *pension scheme participation* instead of the *pension wealth* measures.
- We match the most comparable WEP to WEN (and SEP to SEN), to identify the effect of participating in a second pillar pension scheme of household wealth accumulation.
- Goal is to mitigate :
  - potential measurement errors in PW and
  - possible selection effects, by focusing on the most similar individuals
- But: we can still only match on observable characteristics, so unobserved heterogeneity is still a potential problem.

Propensity score matching

Wage-employed	Couples	Singles
ATT – Matched difference in household wealth	**- € 11,430 ***	**- € 21,203 *****
(i.e. the HW of WEP minus the HW of WEN)	(7,177)	(9,537)
Matched difference in HH occupational pension wealth	€ 47,793 ***	€ 26,506 ***
	(3,161)	(4,592)
Tentative displacement effect of PW on HW	**- 24%**	**- 80%**
N	18,740	3,597

Results for self-employed

Displacement effect	Couples	N
All income levels (OLS)	-0.520***	3,084
	(0.103)	
Income quintile 1 (lowest incomes)	0.195	
Income quintile 2	-0.482*	
Income quintile 3	-0.098	
Income quintile 4	-0.194	
Income quintile 5 (highest incomes)	-0.837***	
All income levels (Construction sector only)	-0.612***	615
ATT – Matched difference in total household wealth	- € 68,647	3,050
(i.e. SEP minus SEN, through PSM)	(92,109)	
Matched difference in HH occupational pension wealth	€ 82,138***	
Tentative displacement effect of PW on HW	- 84%	

Conclusions

- Quasi-experiment: the wage-employed couples whose pension fund did not require a recovery plan accumulated about 3,500 euro less HW.
- Our preferred (IV) analysis for wage-employed couples shows a displacement effect of -33%.
- Our preferred (Construction sector) analysis for self-employed couples shows a larger displacement effect of -61%.
- Potential explanations for higher displacement among SE:
  - SE are more aware of the pension entitlements they do or do not accrue than WE, especially than WEN. Higher awareness leads to higher displacement effect (Card and Ransom, 2011; Bottazzi et al., 2006).
  - SE are less risk-averse than WE and thus, ceteris paribus, would hold less precautionary savings.