

Can the Longevity Risk Alleviate the Annuitization Puzzle?

Empirical Evidence from Dutch Data

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1. Introduction and Motivation

Life expectancy has improved substantially since the past decades and it has accelerated in the recent years in all developed countries.

In NL:

- 1 Life expectancy at birth: from 74 years in 1990 to 78 years in 2008 for males, and from 80 years in 1990 to 82 years in 2008 for females.
- 2 Adult mortality rate (probability of dying between 15 and 60 years): from 11.6 percent to 7.8 percent for males, and from 6.7 percent to 5.7 percent for females

In an increasingly ageing society the need to provide with adequate insurance for late-life consumption has become a high priority item in the agenda of policy makers.

1. Introduction and Motivation

- As the only contract that acts as insurance against longevity risk, the annuity should always be chosen by risky individuals, even in presence of bequest motives (Yaari 1965; Davidoff *et al.* 2005)
- Yet the empirical evidence from several countries shows that only a minor fraction of individuals voluntarily buys annuities (James and Song 2001; Johnson *et al.* 2004; Beatrice and Drinkwater 2004)
- The combination of these two facts is known as the “annuitization puzzle” .

1. Introduction and Motivation

1 Supply side motives

- highly priced annuities due to adverse selection and administrative costs (Brown *et al.* 1999, 2001 for the USA; Cannon and Tonks 2004, Finkelstein and Poterba 2004 for the UK),

2 Demand side motives

- intra-family risk sharing (Kotlikoff and Spivak 1981)
- liquidity constraints and large out-of-pocket health expenditures (Palumbo 1999; De Nardi *et al.* 2010)
- preference for bequests (Friedman and Warshawsky 1990; Vidal-Melia and Lejarraga-Garcia 2006)

3 Behavioural reasons

- default effects (Bütler and Teppa 2007)
- framing effects (Brown *et al.* 2008)

1. This paper

1 Methodology

- subjective survival probabilities as measures of perceived longevity risk
- simple model for individual preferences over annuities and lump sum payments based on hypothetical questions posed in the DHS

2 Main findings

- people (especially women) systematically underestimate their true longevity
- people expecting to live longer do claim to prefer the annuity (robust to bequest motives)

3 Relevance and policy implications

- delivers an important empirical result on the role of the SSP that is still not directly tested in the literature
- combined with the empirical evidence that on average individuals tend to systematically underestimate their life expectancy, the annuitization puzzle may be alleviated by helping individuals in better assessing their longevity risk
- relevant findings in a context of overannuitized retirement system as in NL

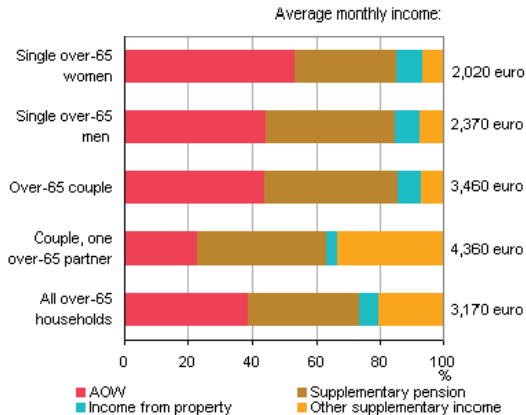
Outline

- 1 Introduction and Motivation
- 2 Pension system in NL
- 3 SSP
- 4 Data
- 5 Results
- 6 Concluding remarks

2. Pension system in NL

- 1 PAYG old age state pension
 - unrelated to labour history and to other income sources
 - depends on having lived in the Netherlands and on household composition
 - 40% of the gross incomes of over-65 hhs (CBS, 2012)
- 2 DC mandatory (between employer and employees) occupational career-average pension
 - pension fund and superannuation payments
 - 35% of the gross incomes of over-65 hhs (CBS, 2012)
- 3 individual retirement savings schemes held on a purely voluntary basis

All pension income as annuity!



2. SSP

- parental longevity
- subjective survival probabilities (SSP)

Please indicate your answer on a scale of 0 to 10, where 0 means “no chance at all” and 10 means “absolutely certain” .

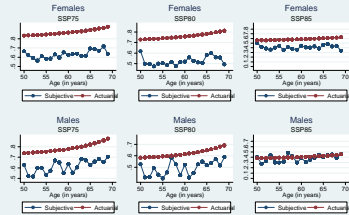
SSPXX : How likely is it that you will attain (at least) the age of XX?

same as HRS, ELSA, SHIW

Table 2: SSPs and socio-economic factors (mean values)

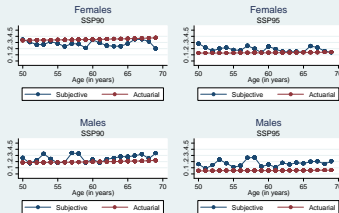
Variable	SSP75	SSP80	SSP85	SSP90	SSP95	SSP100
GENDER						
Women	6.92	5.82	5.11	3.22	3.62	0.67
Men	6.87	5.56	5.31	3.77	2.52	0.56
<i>Difference</i>	<i>0.05</i>	<i>0.26 **</i>	<i>-0.20</i>	<i>-0.55</i>	<i>1.10</i>	<i>0.11</i>
EDUCATION LEVEL						
Low level	6.60	5.50	5.01	3.34	3.34	0.83
Mid/high level	6.99	5.74	5.37	3.78	2.28	0.46
<i>Difference</i>	<i>-0.38 ***</i>	<i>-0.23 *</i>	<i>-0.36</i>	<i>-0.43</i>	<i>1.05 **</i>	<i>0.37</i>
SAH						
Good/Very good	7.19	5.98	5.74	4.25	3.11	0.57
Fair/Bad/Very bad	5.78	4.58	3.91	1.86	1.79	0.58
<i>Difference</i>	<i>1.41 ***</i>	<i>1.40 ***</i>	<i>1.83 ***</i>	<i>2.39 ***</i>	<i>1.32 **</i>	<i>-0.01</i>
LT ILLNESS						
Yes	6.36	5.17	4.90	3.08	2.37	0.60
No	7.08	5.86	5.47	4.01	2.84	0.56
<i>Difference</i>	<i>-0.72 ***</i>	<i>-0.69 ***</i>	<i>-0.57 **</i>	<i>-0.92 **</i>	<i>-0.46</i>	<i>0.04</i>
SMOKE						
Yes	6.48	5.24	5.08	3.72	4.00	0.00
No	7.05	5.82	5.26	3.61	2.53	0.64
<i>Difference</i>	<i>-0.56 ***</i>	<i>-0.58 ***</i>	<i>-0.17</i>	<i>0.10</i>	<i>1.46</i>	<i>-0.64</i>
DRINK						
Yes	6.24	4.93	5.11	2.16	1.75	0.00
No	6.94	5.73	5.24	3.69	2.70	0.64
<i>Difference</i>	<i>-0.69 ***</i>	<i>-0.79 ***</i>	<i>-0.13</i>	<i>-1.53 *</i>	<i>-0.95</i>	<i>-0.64</i>
HOUSEHOLD INCOME						
Larger than 40,000 euros	6.86	5.59	5.29	3.60	2.63	0.64
Lower than 40,000 euros	6.82	5.72	5.25	3.74	2.85	0.40
<i>Difference</i>	<i>0.32</i>	<i>-0.13</i>	<i>0.04</i>	<i>-0.14</i>	<i>-0.22</i>	<i>0.24</i>

Actuarial and subjective survival probabilities



Sources: DHS 2009 for subjective survival probabilities; CBS 2009 for actuarial survival probabilities

Actuarial and subjective survival probabilities

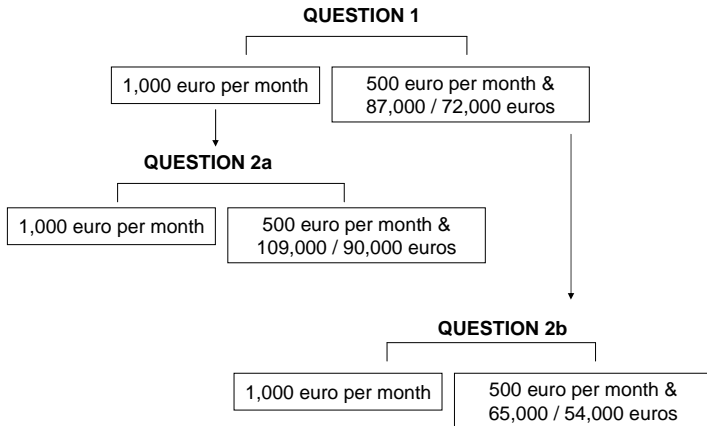


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3. The dependent variable

Imagine you are 65 years old, and you are receiving 1,000 per month in state pension. Suppose you were given the choice to lower that benefit by half, to 500 per month. This one-half benefit reduction would continue for as long as you live. In return you would be given a one-time, lump sum payment of [87,000 (for females) / 72,000 (for males)].

Would you take the 1,000 monthly benefit for life, or the lower monthly benefit combined with the lump sum payment?



4. Research questions

- 1 Does the annuity demand respond to longevity risk?
- 2 Do different time horizons in measuring longevity risk matter?

Variable	I Coefficient [Marg.eff.] (Std. Err.)	II Coefficient [Marg.eff.] (Std. Err.)	IIa Coefficient [Marg.eff.] (Std. Err.)	IIb Coefficient [Marg.eff.] (Std. Err.)	III Coefficient [Marg.eff.] (Std. Err.)
SSP75	0.116 *** [0.041] (0.019)	0.132 *** [0.045] (0.021)	0.128 *** [0.043] (0.031)	0.117 *** [0.041] (0.026)	0.134 *** [0.045] (0.022)
Age 17-30 years		-0.493 *** [-0.170] (0.164)	-0.942 ** [-0.315] (0.429)	-0.741 *** [-0.258] (0.272)	-0.735 *** [-0.250] (0.254)
Age 31-40 years		-0.470 *** [-0.162] (0.130)	-0.492 *** [-0.164] (0.176)	-0.476 *** [-0.165] (0.156)	-0.482 *** [-0.164] (0.131)
Age 41-50 years		-0.339 *** [-0.117] (0.121)	-0.381 ** [0.127] (0.170)	-0.406 *** [-0.141] (0.145)	-0.365 *** [-0.124] (0.122)
Age 51-60 years		-0.284 ** [-0.098] (0.115)	-0.190 [-0.063] (0.161)	-0.392 *** [-0.136] (0.138)	-0.307 *** [-0.104] (0.115)
Female indicator		-0.226 *** [-0.077] (0.086)	-0.265 ** [-0.088] (0.128)	-0.266 ** [-0.092] (0.104)	-0.273 *** [0.093] (0.092)
HH gross income (categories)		-0.022 [-0.007] (0.015)	-0.036 * [-0.012] (0.022)	-0.021 [-0.007] (0.018)	-0.030 * [-0.010] (0.016)
Chances of bequest (in %)		-0.019 * [-0.006] (0.010)	-0.034 ** [-0.011] (0.015)	-0.013 [-0.004] (0.012)	-0.012 [-0.004] (0.011)
Chances of bequest* *Importance of bequest					-0.024 * [-0.008] (0.013)
Log-likelihood	-1327.029	-1142.190	-533.684	-783.121	-1054.773
Pseudo R ²	0.013	0.024	0.032	0.024	0.030
N.Obs.	1000	871	411	596	808

For any additional 10 percent-point increase in the SSP75 the probability to annuitize increases by 4.1 percent on average

4. Model - Three specifications

- Chance of Bequest - *What is the chance that you will leave an inheritance (including possessions and valuable items) of more than 10,000?*

We then split the sample of respondents between those who answered that for them it is important or very important any of the following statements (Regression IIa), and those who answered that for them it is not important or not very important any of the following statements (Regression IIb):

- (-) *To save so that I can help my children if they have financial difficulties*
- (-) *To save so that I can give money or presents to my children and/or grandchildren*

Variable	I Coefficient [Marg.eff.] (Std. Err.)	II Coefficient [Marg.eff.] (Std. Err.)	IIa Coefficient [Marg.eff.] (Std. Err.)	IIb Coefficient [Marg.eff.] (Std. Err.)	III Coefficient [Marg.eff.] (Std. Err.)
SSP95	0.097 *** [0.034] (0.016)	0.109 *** [0.037] (0.018)	0.108 *** [0.036] (0.026)	0.084 *** [0.029] (0.022)	0.106 *** [0.036] (0.018)
Age 17-30 years		-0.478 *** [-0.164] (0.168)	-1.026 ** [-0.340] (0.430)	-0.771 *** [-0.269] (0.274)	-0.772 *** [-0.262] (0.255)
Age 31-40 years		-0.575 *** [-0.197] (0.132)	-0.623 *** [-0.206] (0.180)	-0.556 *** [-0.194] (0.160)	-0.591 *** [-0.201] (0.134)
Age 41-50 years		-0.415 *** [-0.142] (0.123)	-0.483 *** [0.160] (0.172)	-0.472 *** [-0.165] (0.149)	-0.443 *** [-0.150] (0.124)
Age 51-60 years		-0.307 *** [-0.105] (0.116)	-0.202 [-0.067] (0.163)	-0.417 *** [-0.145] (0.141)	-0.334 *** [-0.113] (0.117)
Female indicator		-0.214 ** [-0.073] (0.087)	-0.271 *** [-0.090] (0.130)	-0.241 ** [-0.084] (0.105)	-0.248 *** [0.084] (0.092)
HH gross income (categories)		-0.013 [-0.004] (0.015)	-0.029 [-0.009] (0.022)	-0.013 [-0.004] (0.018)	-0.019 [-0.006] (0.016)
Chances of bequest (in %)		-0.015 [-0.005] (0.010)	-0.040 *** [-0.013] (0.015)	-0.007 [-0.002] (0.012)	-0.008 [-0.002] (0.011)
Chances of bequest* *Importance of bequest					-0.027 ** [-0.009] (0.013)
Log-likelihood	-1298.135	-1115.798	-528.483	-767.741	-1035.474
Pseudo R ²	0.013	0.025	0.037	0.021	0.029
N.Obs.	978	851	407	583	793

6. Concluding remarks

- 1 SSPs convey reasonably meaningful information on individual longevity, and relate relatively well with a number of background and socio-economic characteristics, on average.
- 2 SSPs are systematically lower (esp. for females) than actuarial SP
- 3 SSPs are consistent, significant and robust predictors of the individual annuity choice.
- 4 SSPs do not lose their predictive power when controlling for bequest motives, which is the other main determinant of the choice.
- 5 All other controls (e.g. education, household income (net and gross), household wealth (net and gross), children, marital status) are totally irrelevant for the choice.
- 6 The annuitization puzzle may be alleviated by helping individuals in better assessing their longevity risk
- 7 Findings support the possibility of relaxing annuitization constraint in NL, via welfare improving policies