Life Annuities
What, Why, When, Who

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Agenda

1. Introduction
2. What
3. Why
4. When
5. Who
6. Final remarks
1 INTRODUCTION

The “Annuity puzzle”

Theorem by M. E. Yaari (1965)

\[ \Downarrow \]

low propensity to annuitize

On the one hand:

- to maximize individual utility \( \Rightarrow \) annuitize all the available wealth (real estate included)

on the other:

- low propensity to annuitize, even in countries with high propensity to purchase insurance (life and non-life insurance)
The life annuity: a difficult product

The first question:
- *What* is a life annuity? What are its basic features?

The other questions:
- *Why* people annuitize, or should annuitize?
- *When* should people annuitize?
  - at retirement time?
  - later?
- *Who* is the “typical” buyer of a standard life annuity? And who might be the buyer in an extended range of life annuities?

Purpose of this presentation: just a “primer”, focussing on significant problems of post-retirement product choice (from retiree’s perspective) and product design (from insurer’s perspective)
2 WHAT

*The key question*

Investment or insurance?

To provide an answer:
- look at following pictures
- focus on the main features of (standard) life annuities
SPIA (Single premium immediate life annuity): mathematical reserve;
\[ b = 100, \ x = 65, \ i = 0.02, \]
projected life table

Drawdown process: non-annuitized fund;
\[ b = 100, \ i = 0.02 \]
Annual variation of the SPIA reserve

Annual variation of the fund

Mutuality mechanism ⇒ mortality credits (or mortality dividends)
What (cont’d)

Financing the annual benefit
Technical and financial features of (standard) life annuities

1. The life annuity is based on the mutuality mechanism; hence:
   (a) amounts (reserves) released by annuitants who are no longer alive are shared among annuitants still alive
   (b) at the annuitant death, nothing is credited to his/her estate

2. A life annuity provides an *inflexible* sequence of benefits: the amounts cashed by the annuitant must be in line with the time profile of benefits as stated by the policy conditions

3. Purchasing a life annuity is an *irreversible* decision

Features 1(b), 2 and 3 perceived as disadvantages ⇒ weakening the propensity to annuitize the whole amount available at the time or retirement
3 WHY

*The retiree’s perspective*

Main purpose of the life annuity: to obtain a post-retirement income

Lifelong income ⇒ hedge against the (individual) longevity risk, that is, risk of outliving assets available at retirement

*The insurer’s perspective*

Longevity guarantee provided by the insurer: to pay the stated benefit

▷ whatever the individual lifetime (*individual* longevity risk ⇒ *idiosyncratic* risk)

▷ whatever the lifetimes in the annuity portfolio (*aggregate* longevity risk ⇒ *systematic* risk)

Following figure: *rectangularization* does not affect the lifetime distribution over 65
Lifetime distribution over 65  (Source: ISTAT - Italian male population)
4 WHEN

*The retiree’s perspective*

“To annuitize or not to annuitize”: a wrong question, if looking for protection against the individual longevity risk

“When (and how much) to annuitize”: a reasonable question

Looking at the lifetime probability distribution:

- high probability of being alive at old ages (say 80, 85, \ldots)
- significant tail

Reasonable choices, consistent with the lifetime distribution:

1. Delayed annuitization
   - Get income via drawdown, up to a chosen age
   - Purchase a life annuity
2. Purchase, before retirement, an old-age deferred life annuity (example: ALDA, see Milevsky [2005])
   ▶ Get income via drawdown, up to the end of the deferred period
   ▶ Get life annuity benefits
   ⇒ life annuity as an insurance product with deductible (that is, the drawdown period)

Various advantages and disadvantages in both choice 1 and 2

The insurer’s perspective

What about the (individual and aggregate) longevity risk taken by the annuity provider?

Old-age life annuity ⇒ smaller premium (according to the equivalence principle), but tail risk
Common situation, due to strong self-selection effect: only people in very good health conditions purchase a (standard) life annuity

Result:

- size of the annuity portfolio small w.r.t. the number of potential clients (propensity to annuitize should also be considered)
- probably, very low degree of (unobservable) heterogeneity
Who (cont’d)

Larger and more heterogeneous portfolio, hence:

• larger size $\Rightarrow$ contributes to lower variance in portfolio results (as regards the idiosyncratic risk)

• higher heterogeneity, because of non-observable risk factors $\Rightarrow$ contributes to raise variance in portfolio results

• what about the trade-off?

Unrealistic situation: a lower annuity price would be required to attract more clients and enlarge the annuity portfolio
A more realistic situation: the portfolio consists of

- standard annuities
- *special-rate annuities* (or *underwritten annuities*), sold to people in non-optimal health conditions
Larger and heterogeneous portfolio, hence:

- larger size $\Rightarrow$ contributes to lower variance in portfolio results (as regards the idiosyncratic risk, i.e. risk of random fluctuations)

- heterogeneity in the combined portfolio $\Rightarrow$ contributes to raise variance in portfolio results
  - heterogeneity among sub-portfolios
  - some degree of residual heterogeneity inside each sub-portfolio, because of residual non-observable risk factors (the underwriting process only provides a proxy)

- what about the trade-off?

Possible better portfolio risk profile; see Olivieri and Pitacco [2016]
6 FINAL REMARKS

Besides “What, Why, When, Who”, a final question: Where?
Where you live ⇒ Postcode life annuities

▷ What about the impact on mortality of socio-geographic conditions?
See, for example, Howse et al. [2011]

▷ Is the postcode a good proxy?
See, for example, Edwards [2008]

Life Annuities: topic of a EAA seminar in 2018

Project: book on life annuities, with M. Sherris and others
References

For a more complete list of references, the Reader is referred to Pitacco [2017]


