Forced savings and annuitisation with cross-subsidies: a mutation of the beast

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Forced savings and annuitisation with cross-subsidies: a mutation of the beast

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Background: the ‘annuity puzzle’

The ‘annuity puzzle’ stems from the following:

- Economic theory (Yaari, 1965; Davidoff et al., 2005, to cite a few) suggests that annuitisation is the optimal choice of consumption flow in terms of utility but

- There surprisingly small demand for voluntary lifetime annuities throughout the world (Purcal and Piggott, 2008):
  - U.K.: a big annuities market, but they are compulsory
  - U.S.: most of tax-sheltered deferred annuities are withdrawn as lump sums
  - Australia: only 61 annuities sold (for some AUD 11.9 mio) in 2008! (Plan for Life Research, 2008)

Switzerland is an exception: the Swiss choose to annuitise...

How does this system work?
A two-tiered economic approach with annuitisation and cross-subsidies

- a system for retirement income provision belongs to the most basic agenda of governments around the world
- mandating a minimum level of saving is part of a strategy to protect the old endorsed by the World Bank (1994)
- often, additional savings are encouraged, which leads *de facto* to two tiers:
  - a tier of mandated savings (first tier), and
  - a tier of non-mandated savings (second tier)
- we allow for annuitisation and cross-subsidies, which explains why both tiers are modeled together
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Economy: a proportion $\alpha_k$, $1 \leq k \leq n$, of agents in contribution year $k$

**Accumulation phase**
- $\beta_k w_k$ (contribution)
- $\gamma w_k$ (contribution)
- $M$: mandated savings
- $NM$: non-mandated savings

**Decumulation phase**
- On retirement:
  - $\xi$ as an annuity if $\Delta > 0$
  - lump sum if $\Delta < 0$
  - On retirement:
    - $\xi - \Delta$ as an annuity
    - or lump sum

The rate $\xi - \Delta$ is the actuarially fair conversion rate for a life annuity
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Economy: a proportion $\alpha_k$, $1 \leq k \leq n$, of agents in contribution year $k$

\[ \beta_k w_k \] (contribution)

M mandated savings

On retirement:
- $\xi$ as an annuity if $\Delta > 0$
- lump sum if $\Delta < 0$

\[ \gamma w_k \] (contribution)

NM non-mandated savings

On retirement:
- $\cdot(\xi - \Delta)$ as an annuity
- or lump sum

The rate $\xi - \Delta$ is the actuarially fair conversion rate for a life annuity
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Cross-subsidisation in the two tiers

With no subsidies to or leakages from the scheme, we have

\[ r^*(M + NM) = rM + \Delta \rho M + r' NM, \]

where \( \rho M \) are the mandated savings that are converted into a lifetime annuity each year.

We get

\[ r' = r^* - \frac{\pi M}{NM}, \]

where

\[ \pi = \rho \Delta + r - r^* \]

is the rate of subsidisation of \( M \) by \( NM \).
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\[
\pi = \rho \Delta + r - r^* \]

Economy: a proportion \(\alpha_k, 1 \leq k \leq n\), of agents in contribution year \(k\)

\[
\beta_k w_k \text{ (contribution)}
\]

\[
\gamma w_k \text{ (contribution)}
\]

\[
M \text{ mandated savings}
\]

\[
NM \text{ non-mandated savings}
\]

\[
\Delta = 0
\]

\[
\begin{align*}
\pi & = 0 \\
\pi & > 0 \\
\pi & < 0
\end{align*}
\]

On retirement:
- \(\bar{\xi} - \Delta\) as an annuity
- or lump sum

The rate \(\bar{\xi} - \Delta\) is the actuarially fair conversion rate for a life annuity
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A taxonomy of the beast

\[
\pi = \rho \Delta + r - r^* \]

Economy: a proportion \( \alpha_k \), \( 1 \leq k \leq n \), of agents in contribution year \( k \)

accumulation phase

\begin{align*}
\beta_k w_k & \text{(contribution)} \\
M & \text{mandated savings} \\
& \text{Cross-subsidies } \pi M \\
& r \\
& \text{On retirement:} \\
& - \cdot (\xi - \Delta) \text{ as an annuity} \\
& - \text{or lump sum}
\end{align*}

non-mandated savings

\begin{align*}
\gamma w_k & \text{(contribution)} \\
NM & \text{non-mandated savings} \\
& r' \\
& \text{On retirement:} \\
& - \cdot (\xi - \Delta) \text{ as an annuity} \\
& - \text{or lump sum}
\end{align*}

\[ \Delta = 0 \]

\begin{itemize}
  \item \( \pi = 0 \)
  \item \( \pi > 0 \)
  \item \( \pi < 0 \)
\end{itemize}

The rate \( \xi - \Delta \) is the actuarially fair conversion rate for a life annuity
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\( \pi = \rho \Delta + r - r^* \)

Economy: a proportion \( \alpha_k, 1 \leq k \leq n \), of agents in contribution year \( k \)

- \( \beta_k w_k \) (contribution)
- \( \gamma w_k \) (contribution)

\( M \) mandated savings

\( NM \) non-mandated savings

Cross-subsidies \( \pi M \)

\( \Delta = 0 \)
- \( \pi = 0 \)
- \( \pi > 0 \)
- \( \pi < 0 \)

On retirement:
- \( -\cdot(\xi - \Delta) \) as an annuity
- or lump sum

The rate \( \xi - \Delta \) is the actuarially fair conversion rate for a life annuity
A taxonomy of the beast

Economy: a proportion $\alpha_k$, $1 \leq k \leq n$, of agents in contribution year $k$

accumulation phase

$\beta_k w_k$ (contribution)

$M$
mandated savings

$r$

On retirement:
$- \cdot \xi$ as an annuity

decumulation phase

$\gamma w_k$ (contribution)

$NM$
non-mandated savings

$r^*$

On retirement:
$- \cdot (\xi - \Delta)$ as an annuity
$- \cdot$ or lump sum

The rate $\xi - \Delta$ is the actuarially fair conversion rate for a life annuity

$(\pi = \rho \Delta + r - r^*)$

$\Delta > 0$

$\Rightarrow \pi = 0$

$\Rightarrow \pi > 0$

$\Rightarrow \pi < 0$
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Economy: a proportion \( \alpha_k, 1 \leq k \leq n \), of agents in contribution year \( k \)

\[ \pi = \rho \Delta + r - r^* \]

\( \Delta > 0 \)

- \( \pi = 0 \)
- \( \pi > 0 \)
- \( \pi < 0 \)

The rate \( \xi - \Delta \) is the actuarially fair conversion rate for a life annuity
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\( \pi = \rho \Delta + r - r^* \)

Economy: a proportion \( \alpha_k, 1 \leq k \leq n \), of agents in contribution year \( k \)

\( \beta_k w_k \) (contribution)

\( \gamma w_k \) (contribution)

\( M \) mandated savings

\( r \)

\( r' \)

\( NM \) non-mandated savings

Cross-subsidies \( \pi M \)

Internal redistribution

On retirement:
- \( \xi \) as an annuity
- \( (\xi - \Delta) \) as an annuity
- or lump sum

The rate \( \xi - \Delta \) is the actuarially fair conversion rate for a life annuity

\( \Delta > 0 \)

- \( \pi = 0 \)
- \( \pi > 0 \)
- \( \pi < 0 \)
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Economy: a proportion $\alpha_k$, $1 \leq k \leq n$, of agents in contribution year $k$

\[
\pi = \rho \Delta + r - r^* \]

\[
\Delta = 0
\]

\[
\Delta > 0
\]

The rate $\xi - \Delta$ is the actuarially fair conversion rate for a life annuity
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Bern: $\pi > 0$ and $\Delta > 0$

- high level of annuitisation (Bütler, 2003)
- high level of savings, $> \text{GDP}$ (Gerber and Weber, 2007)
- presence of a liquid market of privately sourced annuities
- BUT: complex system, difficult to understand and monitor, as shown by current difficult issues the system is facing

Canberra: $\pi = 0$ and $\Delta = 0$

- annuities market is very close to being dead
- Swiss situation is a desired one in Canberra
- would it be possible to implement $\pi > 0$ and $\Delta > 0$?
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