Reinventing the life annuity

Catherine Donnelly
Risk Insight Lab, Heriot-Watt University

http://risk-insight-lab.com

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Overview

• Background

• Focus on life annuity

• Mortality risk pooling – features and some ideas
Setting

Value of pension savings

Time

19 April 2018
Setting

Value of pension savings

Contribution plan

Time
Setting

Value of pension savings

Investment strategy

Contribution plan

Time
Setting

Value of pension savings

Investment strategy

Contribution plan

Time

Life annuity? Drawdown? Something else?
The present in the UK – DC on the rise

• DB plans are closing (87% are closed in 2016 in UK).

• Most people are now actively in defined contribution plans, or similar arrangement (97% of new hires in FTSE350).

• Contribution rates are much lower in DC plans (~21% for DB vs 4% for DC, total, albeit DB includes deficit correcting contributions).
## Size of pension fund assets in 2016
*(Willis Towers Watson)*

<table>
<thead>
<tr>
<th>Country</th>
<th>Value of pension fund assets (USD billion)</th>
<th>As percentage of GDP</th>
<th>Of which DC asset value (USD billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>22,480</td>
<td>121.1%</td>
<td>13,488</td>
</tr>
<tr>
<td>UK</td>
<td>2,868</td>
<td>108.2%</td>
<td>516</td>
</tr>
<tr>
<td>Japan</td>
<td>2,808</td>
<td>59.4%</td>
<td>112</td>
</tr>
<tr>
<td>Australia</td>
<td>1,583</td>
<td>126.0%</td>
<td>1,377</td>
</tr>
<tr>
<td>Canada</td>
<td>1,575</td>
<td>102.8%</td>
<td>79</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1,296</td>
<td>168.3%</td>
<td>78</td>
</tr>
</tbody>
</table>
Income drawdown
Drawdown

Value of pension savings

Investment strategy

Investment strategy II

Contribution plan

Time
Drawdown

Value of pension savings

Investment strategy

Investment strategy II

Contribution plan

Time
Drawdown

Value of pension savings

Investment strategy

Investment strategy II

Contribution plan

Time

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Life annuity
Life annuity

Value of pension savings

Investment strategy

Contribution plan

Time
Life annuity

Value of pension savings

Investment strategy

Contribution plan

Time
Life annuity contract

Insurance company

Purchase of the annuity contract

Annuity income

Insurance company
Life annuity contract

Insurance company

Annuity income

Insurance company

Annuity income
Life annuity

Value of pension savings

Investment strategy

Contribution plan

Time
Life annuity

Value of pension savings

Investment strategy

Contribution plan

Longevity risk

Time
Life annuity

Value of pension savings

Investment strategy

Contribution plan

Time

Mortality pooling

Longevity risk

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Life annuity

Value of pension savings

+ investment guarantees
+ mortality guarantees

Mortality pooling

Investment strategy

Contribution plan

Time

Longevity risk
Life annuity contract

- Income drawdown vs life annuity: if follow same investment strategy then life annuity gives higher income*
*ignoring fees, costs, taxes, etc.

- Pooling mortality gives a higher income.

- Everyone in the group becomes the beneficiaries of each other, indirectly.
Annuity puzzle

• Why don’t people annuitize?

• Can we get the benefits of life annuities, without the full contract?

• Focus on mortality pooling.
Drawdown

Value of pension savings

Investment strategy

Contribution plan

Longevity risk

Time
Drawdown

Value of pension savings

Investment strategy

Contribution plan

Longevity risk

Time
Drawdown

Value of pension savings

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Drawdown

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Time

Longevity risk
Mortality risk pooling

Pool risk over 10 years

Individuals make their own investment decisions

Individuals withdraw income from their own funds

However, when someone dies at time $T$...
Mortality risk pooling

Share out remaining funds of Bob.
Mortality risk pooling – [DGN]

• $\lambda^{(i)}$ = Force of mortality of $i^{th}$ member at time $T$.

• $W^{(i)}$ = Fund value of $i^{th}$ member at time $T$.

• Payment (longevity credit) to $i^{th}$ member:

$$\frac{\lambda^{(i)} \times W^{(i)}}{\sum_{k \in \text{Group}} \lambda^{(k)} \times W^{(k)}} \times \{\text{Bob’s remaining fund value}\}$$
Mortality risk pooling - features

- Increase expected lifetime income
- Reduce risk of running out of money before death
- Non-negative return, except on death
- Update force of mortality, periodically.
Mortality risk pooling - features

• Actuarially fair for any group of people (via payment to Bob, too)

• “Cost” is paid upon death, not upfront like life annuity.

• Mitigates longevity risk, but does not eliminate it.

• Anti-selection risk remains, as for life annuity.
Mortality risk pooling - features

• Under certain conditions*, can re-create a life annuity.
  *e.g. correct forces of mortality, Law of Large Numbers holds,...

• Comparing:
  a) Mortality risk pooling, versus
  b) $\lambda^{(i)} \times W^{(i)}$ less Fees,

Fees have to be $<0.75\% \times W^{(i)}$ for b) to have higher expected return in a moderately-sized, heterogeneous group [DGN].
Mortality risk pooling - features

• Splits investment return from mortality “return” – enable:
  • Fee transparency,
  • Product innovation.
Simple example

- £100 at age 67, withdraw £5 per annum until funds exhausted.

- Decide at age 67 how much of asset value to pool for rest of life.

- 0% investment return, mortality table S1PMA.

- Longevity credit=its expected value.

- Longevity credit paid at start of each year.
Simple example

Amount of money left to live on

- 100% of assets
- 50% of assets
- 35% of assets
- 0% of assets
Simple example

- On death after age 81, higher bequest with only 35%-50% of assets in pool compared to not pooling.
Mortality risk pooling – some ideas

• Insurer removes some of the longevity credit volatility, e.g. guarantees a minimum payment for a fee [DY].

• Allow house as an asset – monetize without having to sell it before death [DY].
Mortality risk pooling – some ideas

• Pay out a regular income with the features:
  • Each customer has a ring-fenced fund value.
  • Explicitly show investment returns and longevity credits on annual statements.
  • Long waiting period before customer’s assets are pooled, to reduce adverse selection risk, e.g. 10 years.
  • More income flexibility.
  • Opportunity to withdraw a lumpsum from asset value.
  • Update forces of mortality periodically.
Summary

• Motivation is to provide a higher income in retirement.

• May also result in a higher bequest.

• Reduces chance of running out of money in retirement.

• Transparency may encourage more people to “annuitise”.
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www.actuaries.org.uk/arc
Bibliography


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• Purple Book 2016, Pension Protection Fund, UK

The views expressed in this presentation are those of the presenter.