Understanding and managing longevity risk
Introductions

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Agenda

- Longevity modelling
- Measuring longevity risk
- Longevity risk transfer solutions
- Practicalities of a longevity hedge
- Market outlook
Evolution of mortality modelling

Standard tables
- No cohort analysis
- Immature schemes
- High net interest rates = defer thinking

Mortality improvements analysed by cohort
- Fading mortality improvements still the norm

Mortality treated as base + improvement
- Continued future mortality improvement taken seriously

Mortality rating by address
- Initially only bulk annuities, now individuals

Per person mortality rating is standard
- Longevity risk understood, routinely priced, even traded

But what if experience is different?

LONGEVITY RISK
Longevity risk vs economic risk

Mortality and most other economic risks are fundamentally different:

Economic risks:
- The longer I run the risk, the more predictable (in relative terms) the outcome
- “Funnel of doubt” expands at a lower rate further into the future.
- “in the long term, risky assets outperform”

Longevity risk:
- The longer I run the risk, the more extreme the outcome could be
- “Funnel of doubt” diverges
- “once longevity starts to move against me, it will probably get even worse”

Economic risk over time

Longevity risk over time
The components of longevity risk

**Trend Risk**
Changes in a general longevity for a big population (e.g. England and Wales, insured lives, or SAPS)

“First person to live to 1,000 might be 60 already”

**Basis Risk**
How your scheme differs from the big population, and the difficulty of measuring this and its implications

**Idiosyncratic Risk**
Even if you knew the “correct” mortality rate, experience will differ, particularly in small schemes
A look to the past - UK

P-spline smoothed improvement rates for biплes
UK Projection

P-spline smoothed improvement rates for males

CMI 2010 model with a long term rate of improvement of 1.25%
Irish experience

P-spline smoothed improvement rates for Ireland males (from HMD)
Typical Irish projections

P-spline smoothed improvement rates for Ireland males (from HMD) 0.00% p.a. with an overlay of 100% of CSO Irish population projections
Outlook for Irish mortality

Irish mortality experience is heavier than many European countries with similar economic status.

There remains scope for further improvements in Irish life expectancy based on data from other European countries.

Recent improvements in life expectancy in Ireland have been faster than those in many other countries.

In summary — we expect people to live longer!
Possible shape of things to come

Short term trend risk

Long term trend risk

P-spline smoothed improvement rates for Ireland males (from HMD) 0.00% p.a. with an overlay of 100% of cso Irish population projections
Decision to retain longevity risk

- Attitude towards longevity risk between pension funds is divided:

  “Whilst I am actively taking investment risk, I can’t see the point spending money removing longevity risk which is acting as a diversifier for me”

  “I am actively seeking rewarded investment risk as part of my financing strategy….but I keep getting derailed by ever-increasing longevity which I don’t like or understand.

  How do I get rid of it?”

  “I am trying to run my scheme like an insurer might with minimal risk. What are my options?”

Growing number of funds are thinking this way
Managing pension liability risks – the broad options

Buy-out
- Transfer all liabilities to an insurance company
- Limited risk remains with the Fund

Buy-in
- Purchase bulk annuity contract held as an asset of the scheme in respect of some or all of the members of the scheme
- Fund retains Insurer credit risk

Longevity insurance plus LDI
- LDI plus longevity hedging
- Some investment, inflation and credit risk

Optimised flightpath
- Remove unrewarded risks
- Moderate (targeted) asset risk

Traditional pension scheme investment
- Mixture of equities and bonds
### Longevity swaps

- **PENSIONER**
  - Monthly payment until pensioner dies

- **PENSION FUND**
  - **Floating Leg**
  - **Fixed Leg**

- **PROVIDER**
  - Monthly payment to scheme until pensioner dies
  - Monthly pension payment to provider for fixed term
Providers

**Investment Banks**
- Provide longevity swaps or “synthetic” buy-in
- Will provide “derivative” solutions
- Distribute risk to both reinsurers and capital markets
- Hedge typically for 50 years
- Subject to aggregate bank solvency capital

**Insurers**
- Provide buy-in / buy-out or longevity swaps
- Will provide “insurance solutions”
- Will keep some risk and reinsure some (the majority, usually)
- Hedge typically for “whole of life”
- Subject to FSA reserving requirements
The longevity risk transfer chain

- **Reinsurance markets:**
  - Are “long” on mortality risk
  - Can use longevity risk to diversify
  - Freeing up capital to write new business
  - Capacity limited to ~€30bn p.a

- **Capital markets:**
  - Have no existing life exposure
  - Seeking return earning, diversified portfolios
Anatomy of a longevity hedge

- Commercial Proposition / Decision making
- Assets and collateral
- Benefits
- Data
- Legal
- Communication
The cast

- Investment Adviser
- Collateral manager
- Scheme Actuary
- Company Actuary
- Trustees
- Company
- Scheme lawyer
- Company Lawyer
- Administrator
- Project Manager
- Scheme Auditor
- Company auditor
- PR/Communications
Irish appetite

<table>
<thead>
<tr>
<th>Providers</th>
<th>Funds</th>
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</thead>
<tbody>
<tr>
<td>• Analogous market to UK</td>
<td>• Interested in your views</td>
</tr>
<tr>
<td>• Benefits understood</td>
<td>• Ours:</td>
</tr>
<tr>
<td>• Demographics understood</td>
<td>• Mortality tables represent</td>
</tr>
<tr>
<td>• “Politics” familiar</td>
<td>reasonable best estimate</td>
</tr>
<tr>
<td>• Attractive market to enter –</td>
<td>• Pricing likely to be attractive for</td>
</tr>
<tr>
<td>subject to enough volume</td>
<td>funds to consider</td>
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<td></td>
<td>• However, is the focus</td>
</tr>
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<td></td>
<td>elsewhere (funding)</td>
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<tr>
<td></td>
<td>• Has the risk been understood?</td>
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