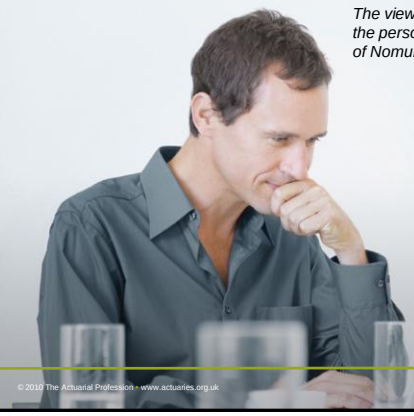
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Session 2
Longevity Management

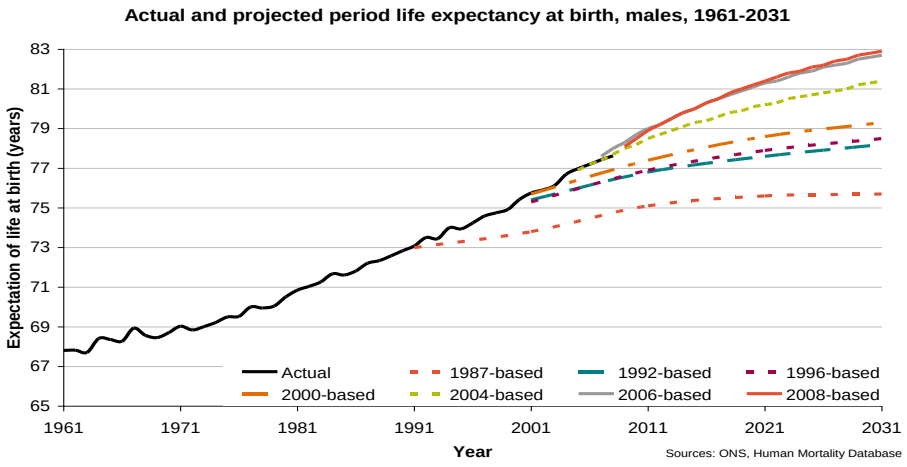


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Paul Kitson FIA

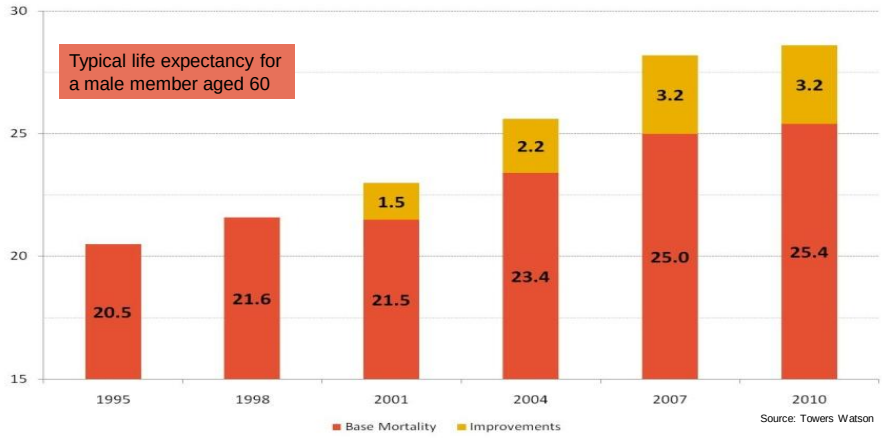
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Longevity – the expert's viewpoint



1

Longevity – the pension scheme's viewpoint



These changes have added around 15% to pension scheme liabilities over the last 10 years. Low discount rates make the impact of longevity changes even more costly

2

Understanding the longevity risk

- Longevity risk is both the risk that members live longer than expected **and** the risk that current estimates of longevity change periodically.
- Longevity risk comprises three elements
  1. **Base table risk** is the risk that the assessment of the membership's mortality today is incorrect
  2. **Trend risk** is the risk that mortality rates do not improve as assumed
  3. **Idiosyncratic risk** is the risk that, even if average current and future mortality rates were known with certainty, individual scheme members live longer than expected

Not all longevity hedging solutions remove all the risks.

3

Quantifying Longevity Risk

- VaR analysis
- Stochastic longevity modelling
- Scenario testing
- Other external models
- Scheme sponsor capital analysis (for certain industries)

4

How can longevity risk be managed?

There are four basic management options for longevity risk:

Retain	**Regular analysis and monitoring**	• Monitor changes in longevity and aim to reserve prudently.
Remove	**Reduce future exposure to risk**	Scheme redesign, including: • Moving to DC / cash balance plans • Risk sharing
Mitigate	**Reduce exposure via member options**	• Pension Increase Exchange (PIE) exercises • Pension Reshaping Transfers • Minimum Income Requirement (MIR) flexibility
Transfer	**Transfer the risk to a third party**	• Enhanced Transfer Values – transfer risk to members • Bulk annuities – transfer to insurance market • Longevity hedging – transfer risk to banks or insurers

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UK pension scheme longevity hedging transactions to date

Date	Pension Scheme	Counterparty	Type	Members Covered	Lives Referenced	Size (£)
Jun-09	Devonport Royal Dockyard	Credit Suisse	Derivative	Pensioner	Actual	330m
Jul-09	RSA Insurance Group*	Rothesay Life	Insurance	Pensioner	Actual	1,900m
Sep-09	Rosyth Royal Dockyard	Credit Suisse	Derivative	Pensioner	Actual	200m
Dec-09	Royal County of Berkshire	Windsor Life / Swiss Re	Insurance	Pensioner	Actual	1,000m
Dec-09	Babcock International Group	Credit Suisse	Derivative	Pensioner	Actual	220m
Feb-10	BMW	Abbey Life / Deutsche Bank	Insurance	Pensioner	Actual	3,000m
Jul-10	British Airways*	Rothesay Life	Insurance	Pensioner	Actual	1,300m
Feb-11	Pall	JP Morgan	Derivative	Deferred	Index**	70m
Aug-11	ITV	Credit Suisse	Derivative	Pensioner	Actual	1,700m
Nov-11	Rolls Royce	Deutsche Bank	Derivative	Pensioner	Actual	3,000m
Dec-11	Pilkington	Legal & General	Insurance	Pensioner	Actual	1,000m
Dec-11	British Airways	Rothesay Life	Insurance	Pensioner	Actual	1,300m
Total business written to end 2011						**15.0 billion**

* These transactions involved a longevity hedge and asset swaps being executed simultaneously
** Value hedge using the Life Metrics Index

Source: Nomura, based on public domain information 6

Who is in the market to take longevity risk?

- Current market place comprises a range of providers:

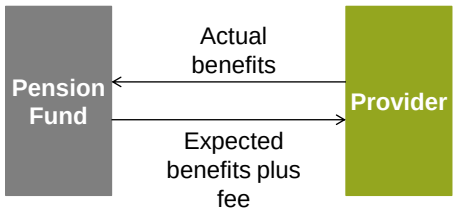
Banks **Insurers** **Reinsurers**

- Some recent exits from the market, as well as some recent new entrants
- There are two main types of longevity derisking solution:
  1. **Cashflow indemnity longevity swap**
     - Typically used by larger pension plans to remove longevity risk in respect of their pensioner (in payment) population
     - Structured as a contract of difference
  2. **Index based value longevity swap**
     - Can be used by smaller plans to hedge longevity trend risk
     - Based on a population index
     - Typically shorter term with a commutation payment

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Simple longevity swap structure

- A typical indemnity longevity swap will be structured as a contract of difference:
  - **Fixed leg**: Expected benefits at outset plus a fee
  - **Floating leg**: Actual benefits



- As there is potential for counterparty default exposure in either direction, collateral and/or additional security terms are normally easier to include in the contract than for a buy-in
- Collateral assessment at any point in time is a key area of consideration

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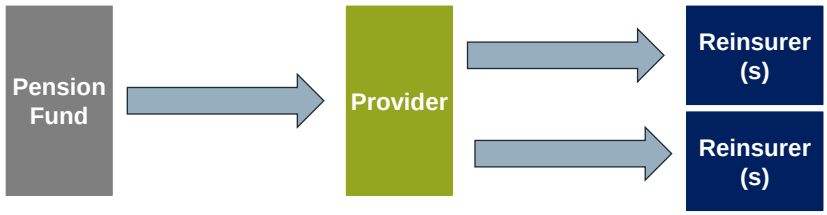
Contract differences

- There are a number of important points to consider when looking at a longevity swap
- Typical issues that come up when comparing longevity swap products from different providers are:
  1. Term
  2. Strength of counterparty
  3. Collateral and/or other additional security provisions
  4. Flexibility (for example the ability to rebalance the contract for changes in members benefits)
  5. Ability to move to buy-in (or buy-out)
  6. Benefits covered (for example covering financial dependents)
  7. Ability of the provider to hold/warehouse risk
- Understanding the experience of the counterparty team and their execution calibre is crucial to a successful longevity swap process

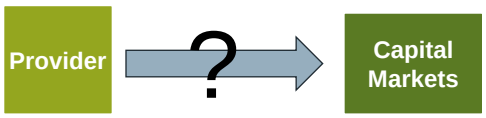
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Who is ultimately taking the longevity risk

- For longevity swaps, currently most risk is ending up with reinsurers



- Reinsurers are keen to take longevity risk as an uncorrelated or offsetting risk (and regulatory diversifier) to their mortality exposures
- Some transactions involving pension funds are considering accessing capital markets, but this market is more immature



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Where do providers add value

- Many reinsurers are unable (and have no desire) to transact directly with UK pension plans
- Provide a strong balance sheet and capital
- Provide innovation and structuring capability (for example enhancing the security provisions offered to the pension plan)
- Ability to process, reconcile and monitor data flows
- Provide a counterparty within the UK insurance or banking FSA authorised regime
- Ability to hold risk and act as a principal
- Ability to pool risks
- Provide a single counterparty for transactions involving multiple reinsurers (e.g. £1bn+ transactions)
- Hedge all other risks for a buy-in and buy-out

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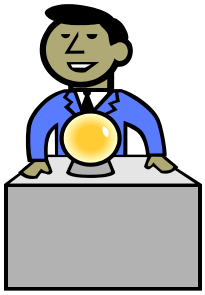
Who may longevity swaps suitable for

- A sponsoring employer who has a high pension liability to market capitalisation ratio
- Trustees who have already carried out significant de-risking of the scheme's investment strategy
- …but also those about to start financial risk hedging
- Where a buy-out/buy-in may not be immediately affordable
- Where the scheme has the ability to manage the governance requirements of running a longevity swap
- For an indemnity cashflow longevity swap a minimum size of c£250m (PV of liabilities covered) is normally required to provide sufficient experience data to set the base table – although this requirement is changing
- Clean and credible experience data is crucial to the process
- Indemnity longevity swaps also normally provide a hedge against:
    1. Proportion married risk
    2. Spouse age difference risk
    3. Inflation exposure on any increase in longevity (second order inflation exposure)

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Current topical discussion points and predictions for 2012

1. Which is best – an insurance or derivative based swap?
2. How do you allow for changes in future longevity improvements?
3. How easy is it for the pension scheme to move to buy-in (or buy-out) after the longevity swap is executed?
4. Is it best to remove longevity risk now or later?
5. How will the reinsurance and capital market appetite for longevity risk change?
6. Blue collar vs White collar pricing?
7. Remove deferred or pensioner longevity risk first?
8. Impact of Solvency II and Basel III?
9. Standardisation (LLMA)?
10. Solutions for smaller schemes?
11. Clever ways to structure the premium leg?



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Appendix – Other ways of removing longevity risk

Other ways of removing longevity risk
(table is illustrative only)

	Benefits received by pension plan (floating leg)	Premium paid by pension plan (fixed leg)	Risks removed by pension plan	Risks retained by pension plan	May be attractive if?
Indemnity cashflow longevity swap	Actual benefits*	Expected benefits plus a fee	Longevity	Counterparty default** Investment / Inflation Asset Default	Desire to reduce longevity risk only
Traditional buy-in	Actual benefits*	Single premium paid at inception	Investment / Inflation Longevity Asset default	Counterparty default**	Desire to significantly derisk and ultimately move to buy-out
Synthetic buy-in	Actual benefits*	Premium based on expected proceeds of pre-agreed asset portfolio	Investment / Inflation Longevity	Counterparty default** Asset default	Desire to derisk but with a limited budget
Deferred premium buy-in	Actual benefits*	Pre agreed premium schedule (for example over 10 years)	Investment (part only) Longevity	Counterparty default** Investment (part only) Asset Default	Desire to derisk but with a limited budget

*As agreed at contract inception and defined in the contract. Based on the agreed covered members.
**Counterparty default is mitigated by collateral and other security provisions.

Source: Nomura

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