

Longevity risk management: Prospects for a broader longevity risk market



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Investor/market view

Index Linked Structure

1. Define

Exposure
Experience ratios
Commutation
Discount curve
Attachment
Exhaustion

2. Observe

Population qx data for each age and gender

3. Commute

Re-parameterise model, e.g. CBD M6 and value remaining post-term cash flows

4. Settle

Compare final index value with attachment and exhaustion points

Final index value at $T = 10$ (for a 10-year trade)

Accumulated liability during the risk period

+

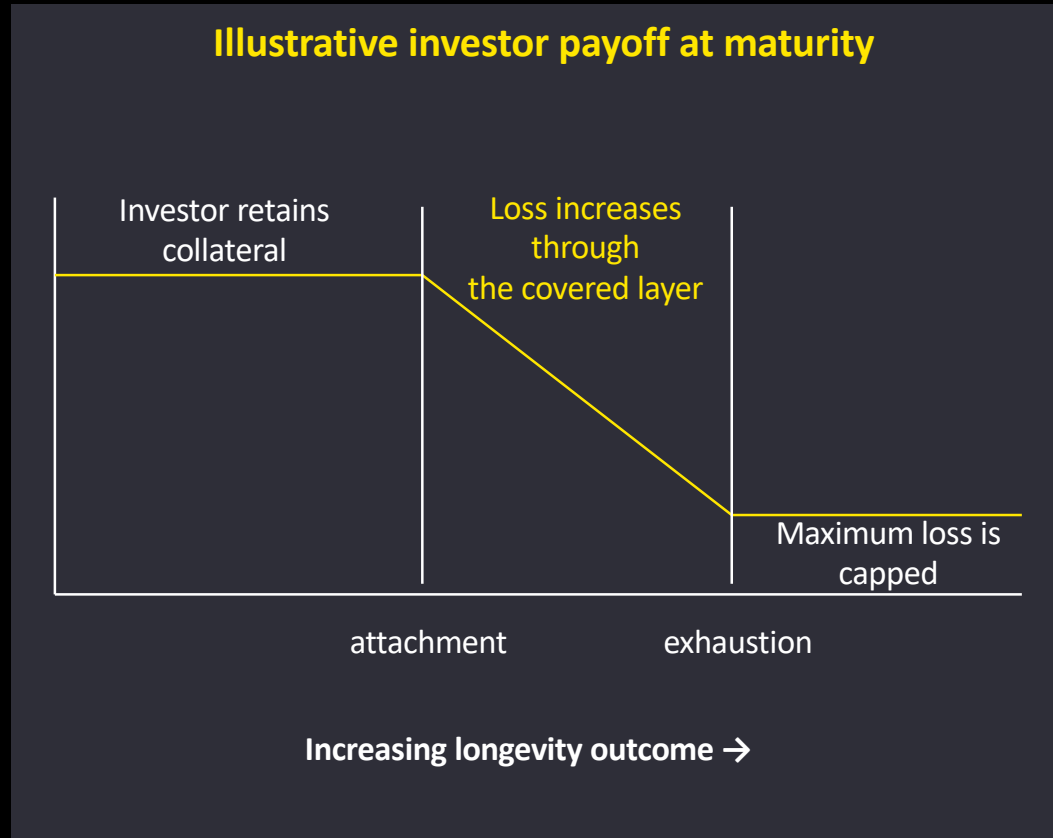
Commutation value of remaining post-term cash flows

The payout is zero below attachment, increases through the covered layer and is capped at exhaustion.

Key considerations

- Basis risk between index and insured population
- Age, gender and exposure calibration
- Model and re-parameterisation governance
- Data publication and cleaning timetable
- Collateral, counterparty and documentation
- Transition plan at hedge maturity

What would the payoff look like?



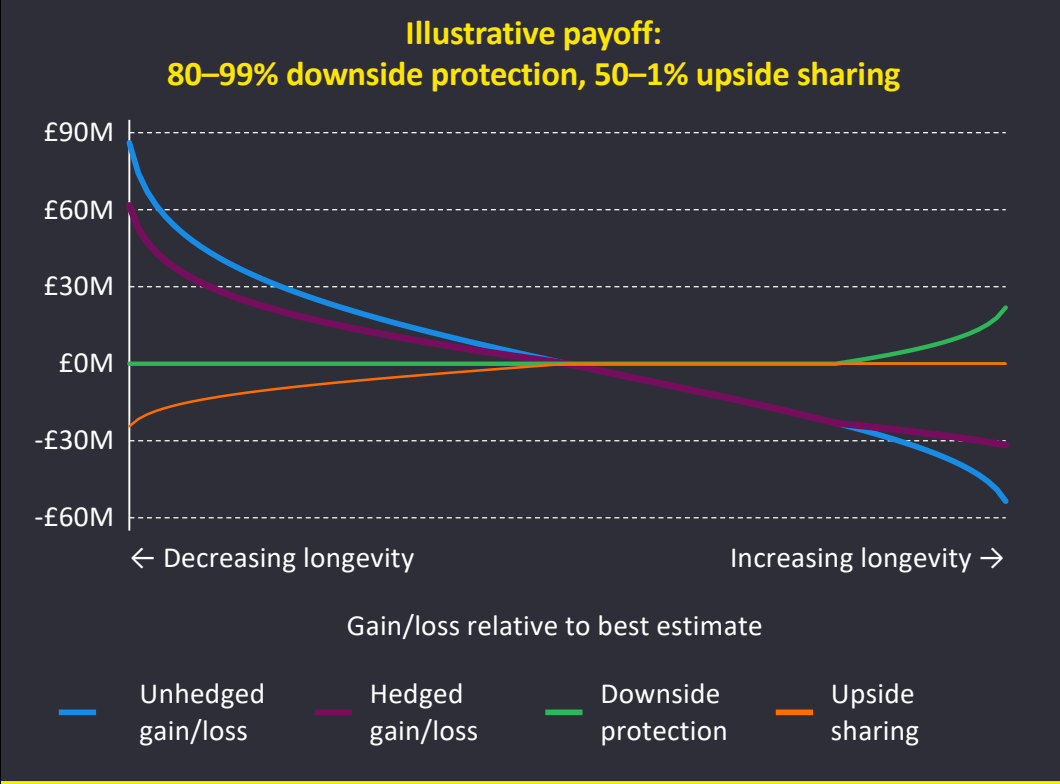
**Attachment point
sets when protection begins.**

**Exhaustion point
caps the maximum hedge payout.**

**Layering allows cost
to focus on the most painful outcomes.**

What would the payoff look like?

Upside and downside protection



Downside protection	
Attachment point	80%
Exhaustion point	99%
Notional	£20M
Upside sharing	
Attachment point	50%
Exhaustion point	1%
Notional	£20M
Cost of the hedge	
Hedge premium per annum	£0
Future value of premiums	£0
Expected payout to hedger	-£2.9M
Expected net cost	-£2.9M

What do we need to make this a reality?

01 Finite maturity

A fixed, e.g. 10-year term with a defined commutation date, so exposure has a clear end point.

02 Defined layer

Attachment and exhaustion points set the exact band of longevity outcomes covered.

03 Full collateral

Collateral posted at inception removes counterparty credit risk from the trade.

04 Transparent index

A published, rules-based population index both sides can independently reproduce.

05 Clear expected-loss methodology

Stochastic modelling of the index gives a defensible expected loss and price.

AND ... Regulatory Support for the market via appropriate treatment in insurer capital and risk calculations

Regulatory views — Two potential perspectives

1. Basis risk determines whether, and how much, mitigation credit is available

Standard formula

No material basis risk allowed

If basis risk is material, the risk-mitigation technique cannot be taken into account.

The practical question is whether the index exposure corresponds sufficiently closely to the book's own risk exposure?

Internal model

Explicit allowance for basis risk

Needs an agreed approach with the PRA or relevant local regulator that captures residual basis risk.

A key uncertainty is how prudently the hedge performs under potentially extreme scenarios.

2. Separate risk-margin treatment

DNB's (Dutch Regulator's) 2016 Q&A distinguished financial instruments from reinsurance contracts.

SCR

Credit may be available where the reduction in capital requirements is proportionate to the reduction in the risk profile.

Risk margin

Specific financial instruments are not taken into account in the capital requirements underlying the risk margin. Reinsurance contracts can be.

Key implication: SCR recognition does not automatically mean equivalent risk-margin recognition.

Basis risk — considerations



Single individual

Outcome is dominated by idiosyncratic risk. A population index is a poor match.

Growing block

Random variation diversifies. The common longevity trend becomes more important.

Population-sized exposure

The index and underlying are closely aligned. Residual basis risk is small, not necessarily zero.

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