Longevity De-Risking:
Lessons Learned & Suggestions for the Future

Avery Michaelson, Founding Partner, Longitude Solutions
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What is Longitude Solutions?

Longitude Solutions is a transaction-oriented advisor with expertise in longevity risk.

- Founded in 2016 to advance the market for longevity risk hedging
- Nominated for Life Transaction of the Year by Trading Risk Awards
- Exclusive advisor to NN on index-based longevity hedge in 2017
- 3 Senior Partners in New York and Amsterdam with broad expertise and capabilities
The Longitude Solutions Team

Avery Michaelson  
Founding Partner

- Founded Longitude Solutions in 2016
- Exclusive Advisor to NN on longevity hedge in 2017
- Former Head of Longevity at Société Générale
- Expert at structuring and distributing longevity risk

Alan J Rae  
Senior Partner

- Former Co-head of Capital Management for Achmea, leading annuity reinsurance and longevity derisking investigations
- Non Executive Director at Friends First in Ireland 2009-2018
- Former Partner of Watson Wyatt and leader of Insurance M&A team

David Schrager  
Senior Partner

- Former Head of Pricing and Hedging solutions at Dutch Life company of NN Group
- Expert at structuring and pricing pension buy-outs and longevity swaps
- Experience hedging and reinsuring European and Japanese VA portfolios
The **Law of Conservation of Mass** states...

*Mass can neither be created, nor destroyed – it can only be rearranged in space, or transformed.*

The **Theory of Conservation of Longevity** states...

*Longevity Risk can neither be created, nor destroyed – it can only be transferred to others, or transformed.*
The **Second Law of Thermodynamics** states that the total entropy of an isolated system can never decrease over time.

Entropy is increasing in the **longevity market** due to a variety of structures designed spread this risk to new counterparties.
Highly ordered solid – low probability

Disordered liquid – higher probability

This change tends to be spontaneous
An improbable way for bricks to fall

A more probable way for bricks to fall

(b)
We will examine these topics:

1. Value Chain of De-risking
2. Type of Risk (Index / Indemnity)
3. Duration of Contract
4. Risk Level of Contract
5. Structures & Forms of Contracts

For each topic, we will consider:

i. Where has the market been?
ii. Where is (should) the market go?
iii. Considerations for Hedgers
iv. Considerations for Risk Takers
Value Chain of De-risking

- Where has the market been?
  Linear & Incomplete

- Where is the market going?
  Chutes & Ladders

- Considerations for Hedgers
  Increase capacity, ensure competitive pricing

- Considerations for Risk Takers
  Increase capabilities to encourage more transactions
OLD Value Chain:
• Pensions transacting with Insurers
• Insurers reinsuring to Reinsurers
• Minimal Capital Markets participation
NEW Value Chain:

- More connections at all parts of the value chain
- Greater Capital Markets participation

- PENSIONS
- INSURERS
- REINSURERS
- CAPITAL MARKETS

Captive Solutions

Index Hedges

New Buyout Players
Type of Risk (Index vs. Indemnity)

- Where has the market been?
  Screw drivers and hammers invented

- Considerations for Hedgers
  Optimizing risk and capital for business model

- Where is the market going?
  Selecting the right tool for the job

- Considerations for Risk Takers
  Available information, and capabilities required
Indemnity Longevity Swaps

Indemnity longevity swaps are a precise tool. They require some skill/dexterity to use.
Index-based hedges also get the job done. Almost anyone can swing a hammer.
Both tools are useful. They accomplish similar things. You have to select the right tool for the job!
Duration of Hedging Contracts

- Where has the market been?
  - Experimentation with maturities
- Considerations for Hedgers
  - Getting real risk transfer, regulatory approval
- Where is the market going?
  - Moving to longer duration contracts
- Considerations for Risk Takers
  - What’s permitted by business model? Liquidity?
20-year Index Hedge + Commutation

Actual Mortality Rates

Projected Mortality Rates = re-parameterized commutation taking account mortality experience during the risk period

Beginning of Risk Period

End of Risk Period

Historical Mortality Rates
Actual Mortality Rates

Projected Mortality Rates = re-parameterized commutation taking account mortality experience during the risk period

More Risk in Commutation & Greater Basis Risk
Projected Mortality Rates = re-parameterized commutation taking account mortality experience during the risk period

Longer Risk Period = More Risk Transfer

Continued Innovation & Greater Precision

Beginning of Risk Period

End of Risk Period

Historical Mortality Rates

Actual Mortality Rates

Actual Mortality Rates

Continued Innovation & Greater Precision
Risk Level of Contracts

- Where has the market been?
  - Full Longevity Swaps & Tail Risk Index Covers

- Considerations for Hedgers
  - Cost of Capital, First Loss vs. Extreme Downside

- Where is the market going?
  - Dissecting the risk (and maturity) spectrum

- Considerations for Risk Takers
  - Risk / Return? Capital invested? Collateralization?
Full Longevity Swap

Full longevity swaps cover all downside, but transfer away all upside.
Longevity tail risk protection has been offered in index format.
Market segmentation may exist in the longevity market. Recent experience has shown longevity upside has value.
Where has the market been?

Reinsurance & Swaps (Derivatives)

Considerations for Hedgers

Function determines the form

Where is the market going?

Increasing use of Fully-Collateralized Notes

Considerations for Risk Takers

Business model drives decision making
Fully-collateralized Notes Reduce Credit Risk

A-rated Insurer

AAA-rated, liquid collateral

SPV / Trust

Unrated Investors

Hedge Payout

Hedger’s Premium

Note Purchase Price

Note Payout
Lessons Learned & Suggestions

- Experimentation... with lessons learned
- Different solutions meet different objectives
- Risk takers are flexible, there's a market for most ideas
- Longevity market entropy is increasing, and we should encourage this
- A larger, more diverse and liquid market benefits all business models