



# Introduction to Capital Motivated Longevity Solutions

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# Longevity Indemnity Reinsurance

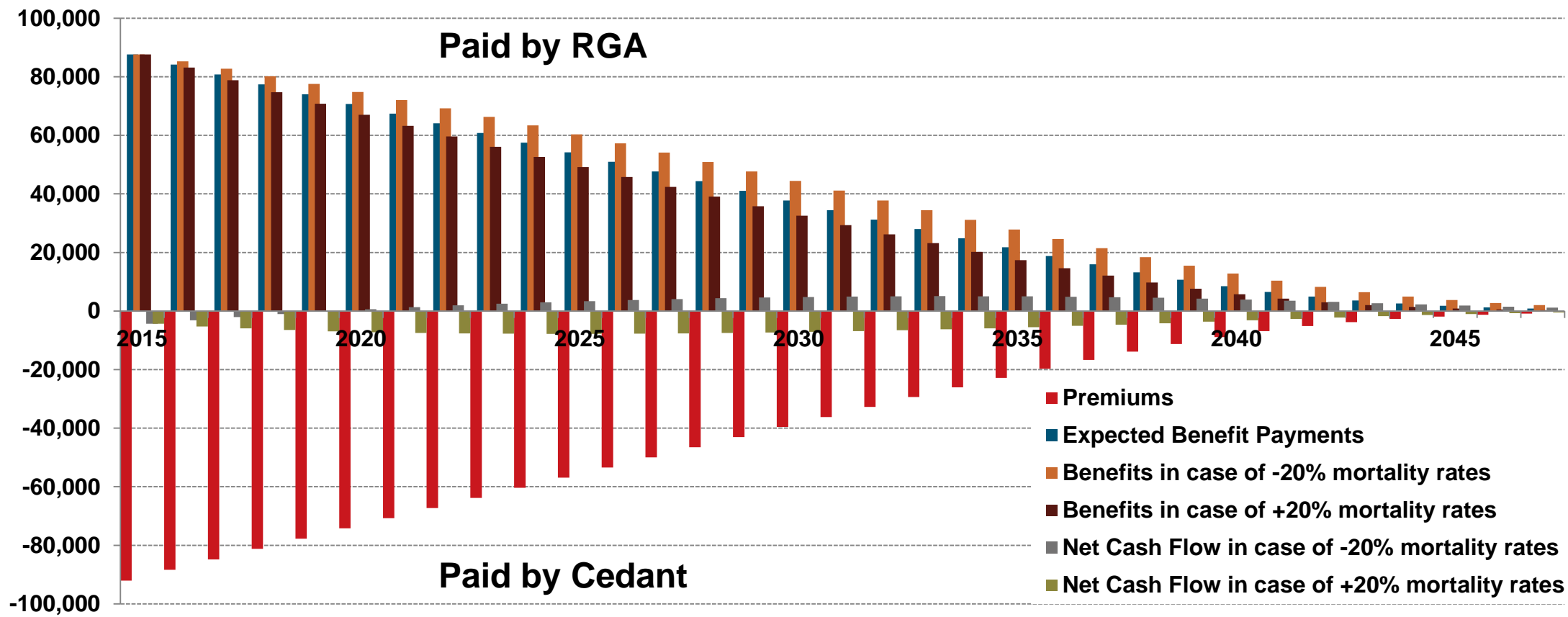
## “Longevity Swap”

- Indemnity reinsurance contract, but “swap” is helpful analogy
- Premiums = Expected Annuities + Loading (“**fixed**”)
- Benefits = Actual Annuities (“**floating**”) based on survival of annuitants



# Cash Flows under Longevity Swap

Illustrating impact of different mortality scenarios



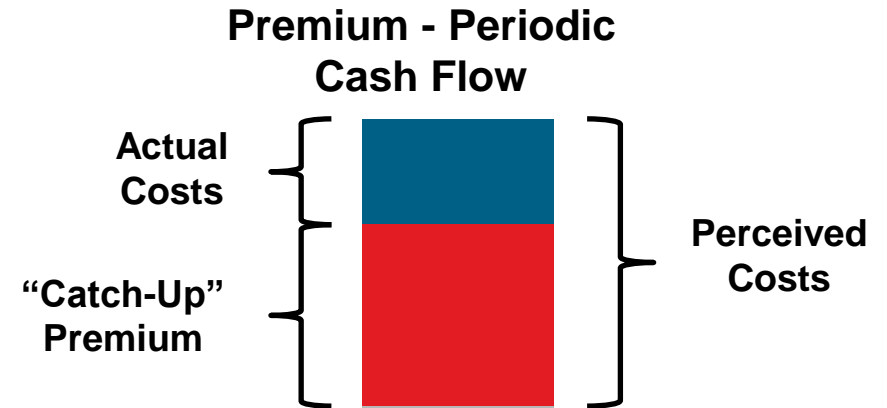
# Main Challenge in Transferring Longevity Risk

- Price can be decomposed in three parts:

1. Starting Mortality Rates
2. Mortality Improvement Rates
3. Compensation for Capital and Costs

- Actual versus Perceived Costs:

- “Catch-Up” Premium



# Longevity Risk Transfer in the Netherlands to Date

Based on General Dutch Population Mortality

Ceding Company	Risk Takers	“Size”	Date
AEGON	Capital Markets	EUR 12 bln of Reserves	February 2012
AEGON	Capital Markets and Reinsurer(s)	EUR 1.4 bln of Reserves	December 2013
Delta Lloyd	<b>RG A</b>	EUR 12 bln of Reserves	August 2014
Delta Lloyd	<b>RG A</b>	EUR 12 bln of Reserves	June 2015
AEGON	Reinsurer(s)	EUR 6 bln of Reserves	July 2015

Source: [http://www.artemis.bm/library/longevity\\_swaps\\_risk\\_transfers.html](http://www.artemis.bm/library/longevity_swaps_risk_transfers.html)

# Indemnity versus General Population

## Type of Longevity Cover

	Indemnity	General Population
Reference	Actual Annuity Payments	Model Portfolio with General Population Mortality
Settlement	Difference between Actual Annuities and Premium	Difference between Initial and Ultimate Projection
Type of Contract	Like Reinsurance	Like Derivative
Parties	For Institutions that are not comfortable bearing basis risk	For institutions that can bear basis risk
Duration	Unlimited	Limited
Including Deferrals	Very Limited	Possible
Transfers	Challenging	Easier
Due Diligence	Extensive	Hardly

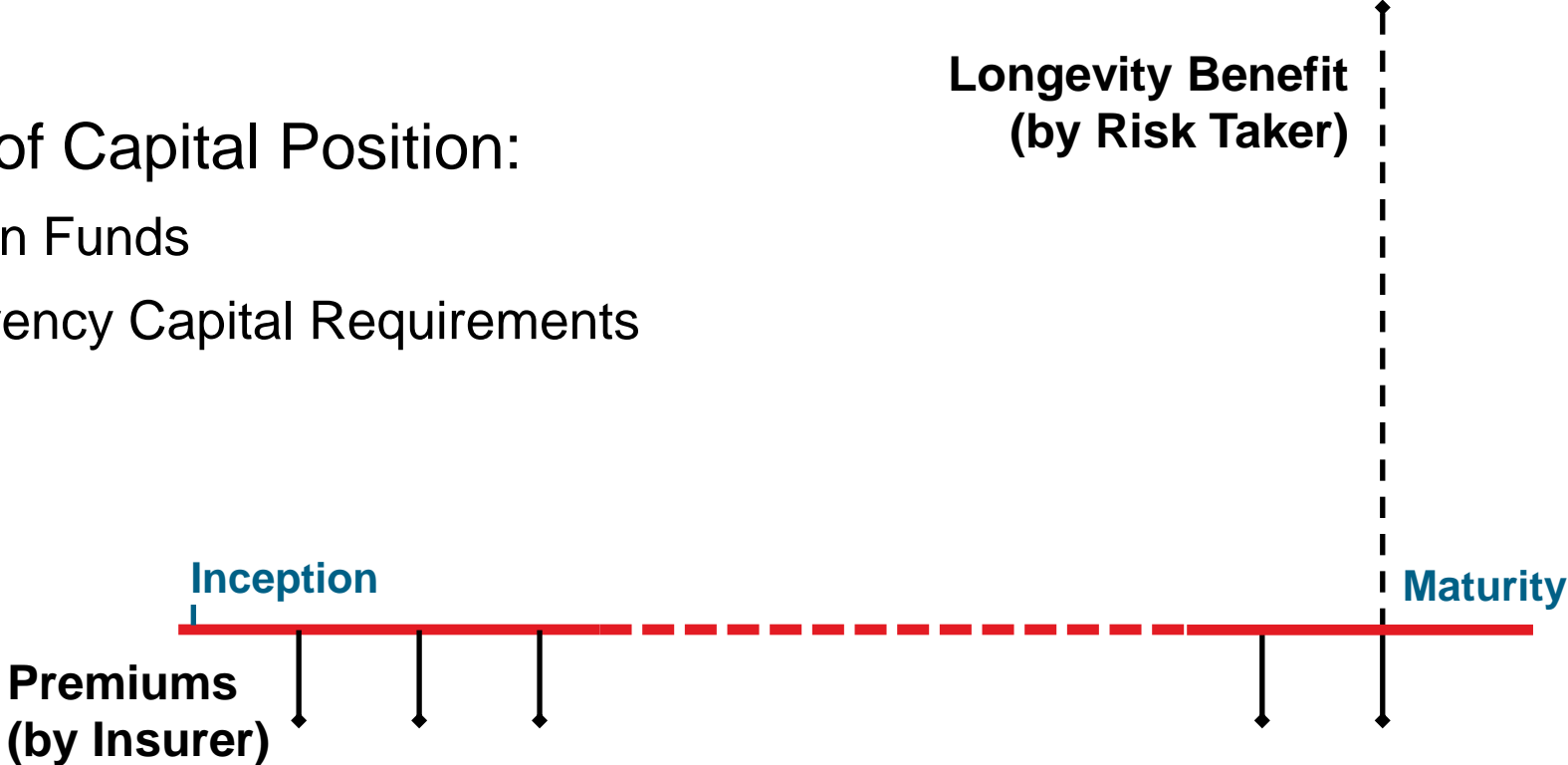
# Capital Motivated Longevity Solutions

“Longevity Shock Absorber” = LSA

- Striking Balance between Costs and Benefits

- Improvement of Capital Position:
  - Increasing Own Funds
  - Reducing Solvency Capital Requirements

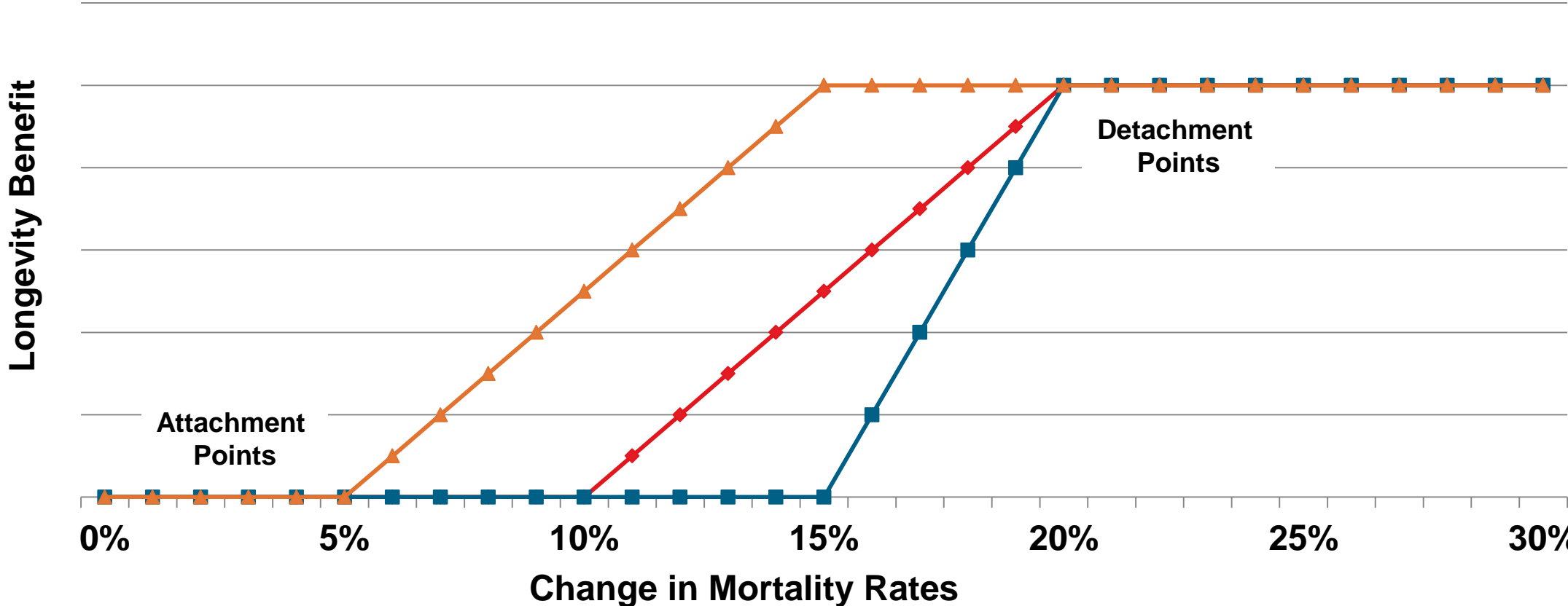
- Cash Flows:



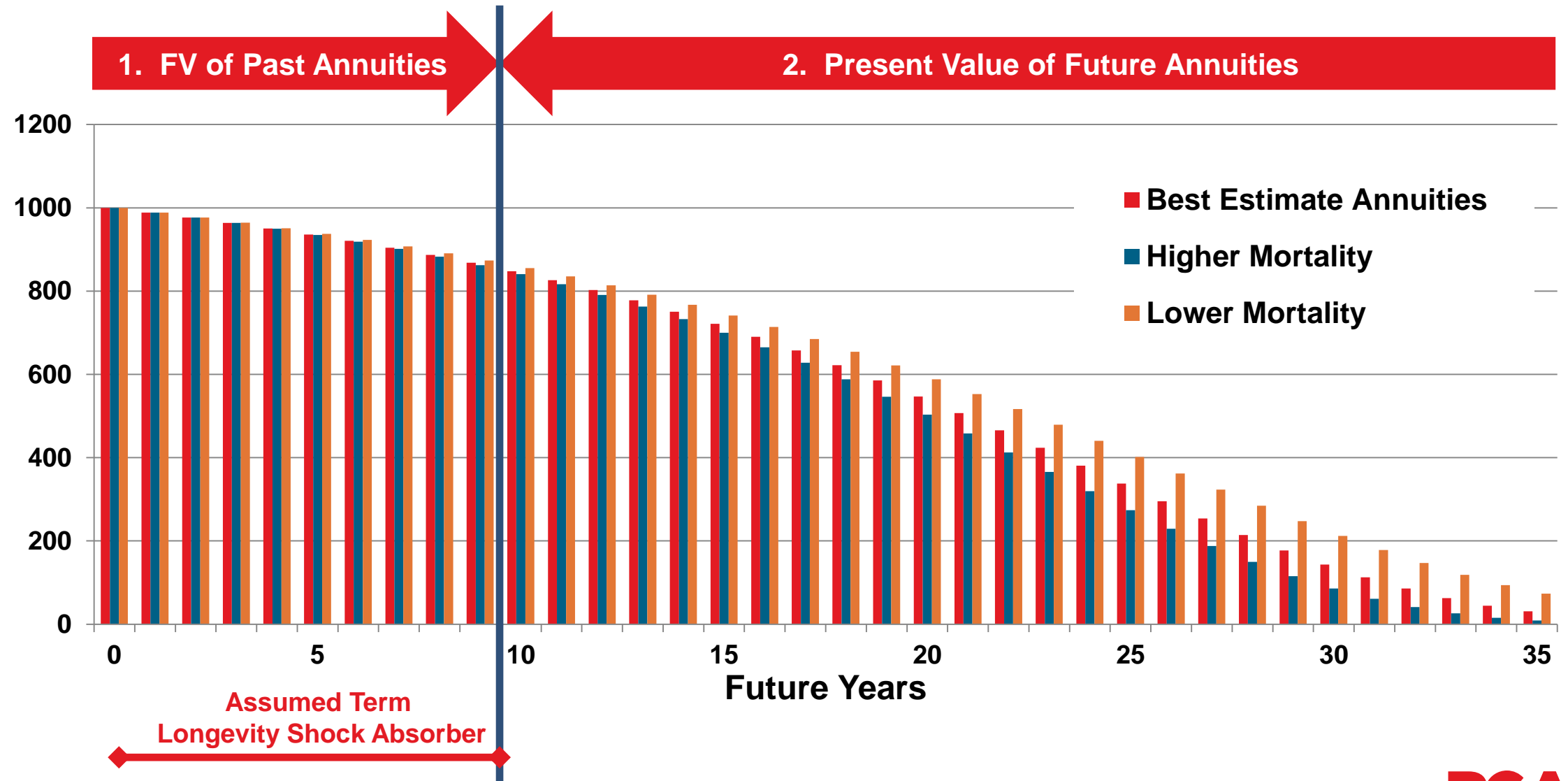
# Tailoring Longevity Risk Transfer



# Change in Mortality Rates

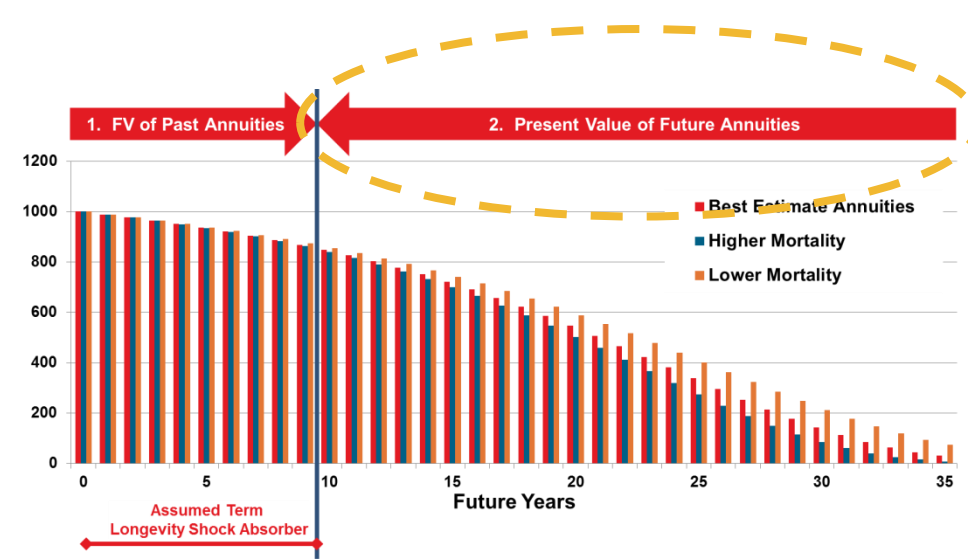


# Two Components underlying Longevity Benefit



# Including Annuities beyond Term

- To increase benefit of LSA
- Take account of change in annuities **beyond term** based on **mortality experience during term**
- Based on difference between:
  - Projected PV of annuities beyond term **at inception** of LSA
  - Projected PV of annuities beyond term **at maturity** of LSA



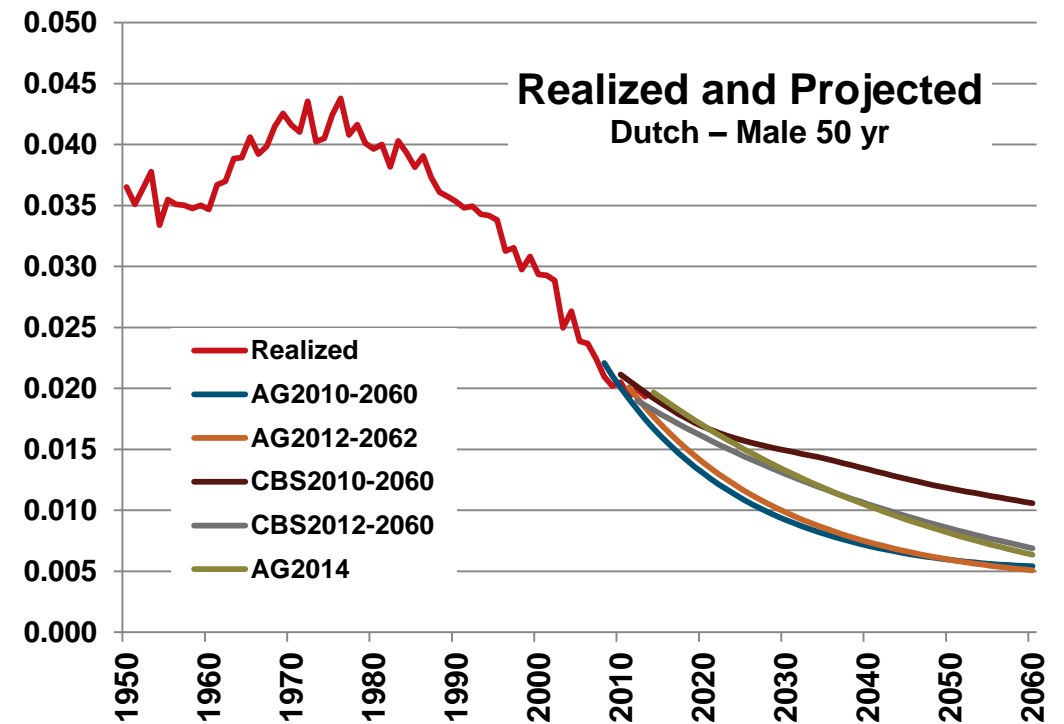
# Determining Present Value of Future Annuities

Also referring to as “Commutation”

## Mortality Model

- Annuities Beyond Term
- Crucial Component
- Pre-agreed Model
- Also relevant for Attachment and Detachment Points
- Recalibrated at Maturity
- Based on Objective Data

## Projecting Mortality Rates



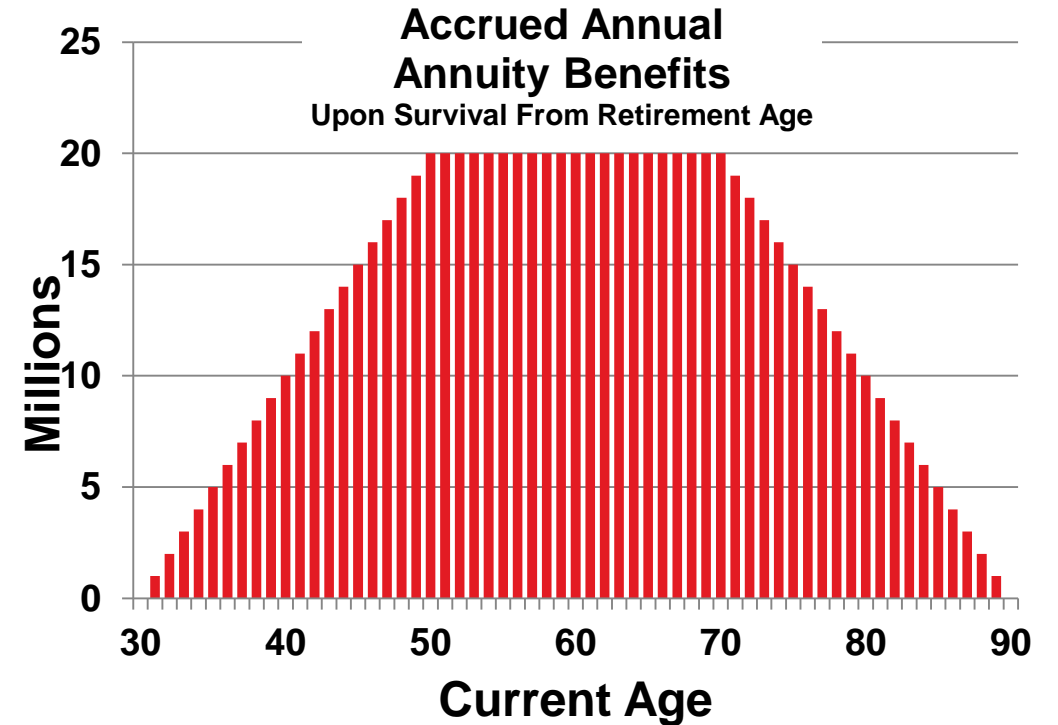
# Numerical Example

## Projected Capital Relief of Longevity Shock Absorber

### Objective

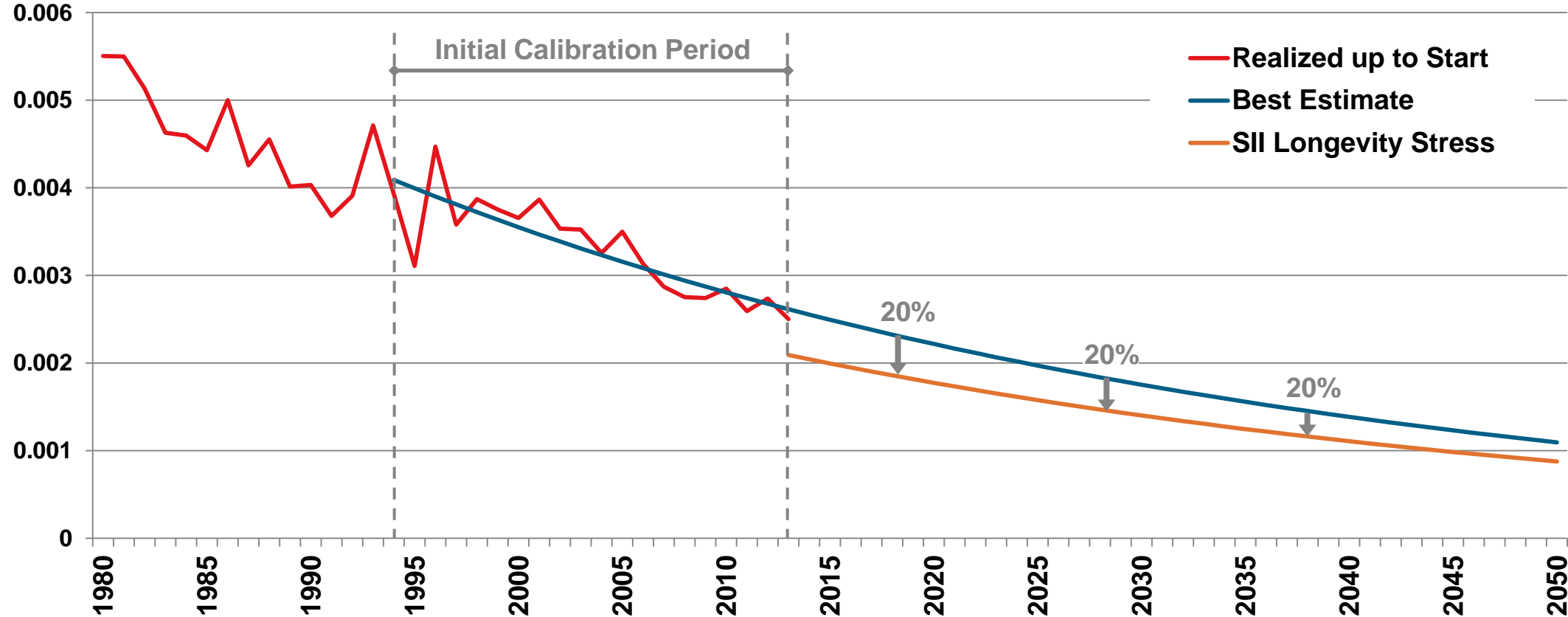
- Determine Projected Reduction in SCR Longevity
- Other aspects ignored:
  - Risk Margin
  - SCR Counterparty Default
  - Reinsurance Recoverable
- Longevity Shock Absorber (LSA):
  - 10 yr Term
  - Attachment Point of 5%
  - Detachment Point of 10%

### Sample Portfolio

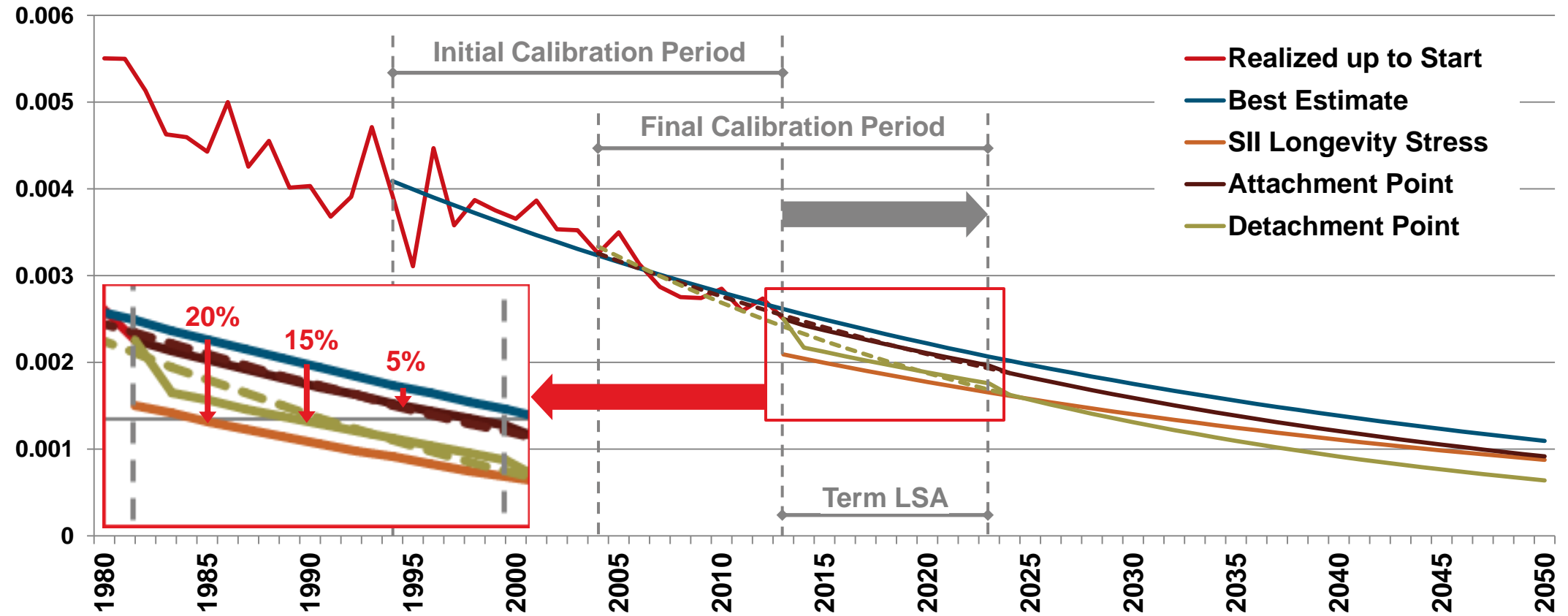


# Projecting Mortality Rates

## General Dutch Population – Male 50 yr

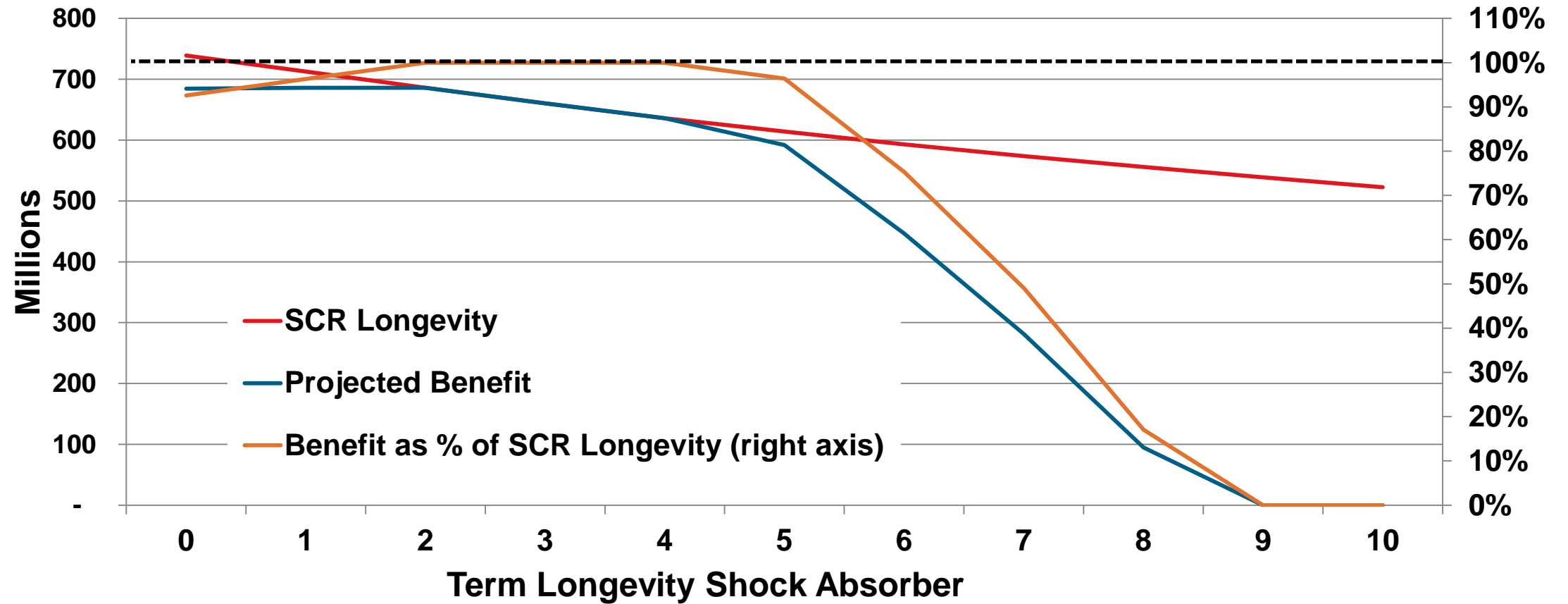


# Projecting Mortality Rates (continued)



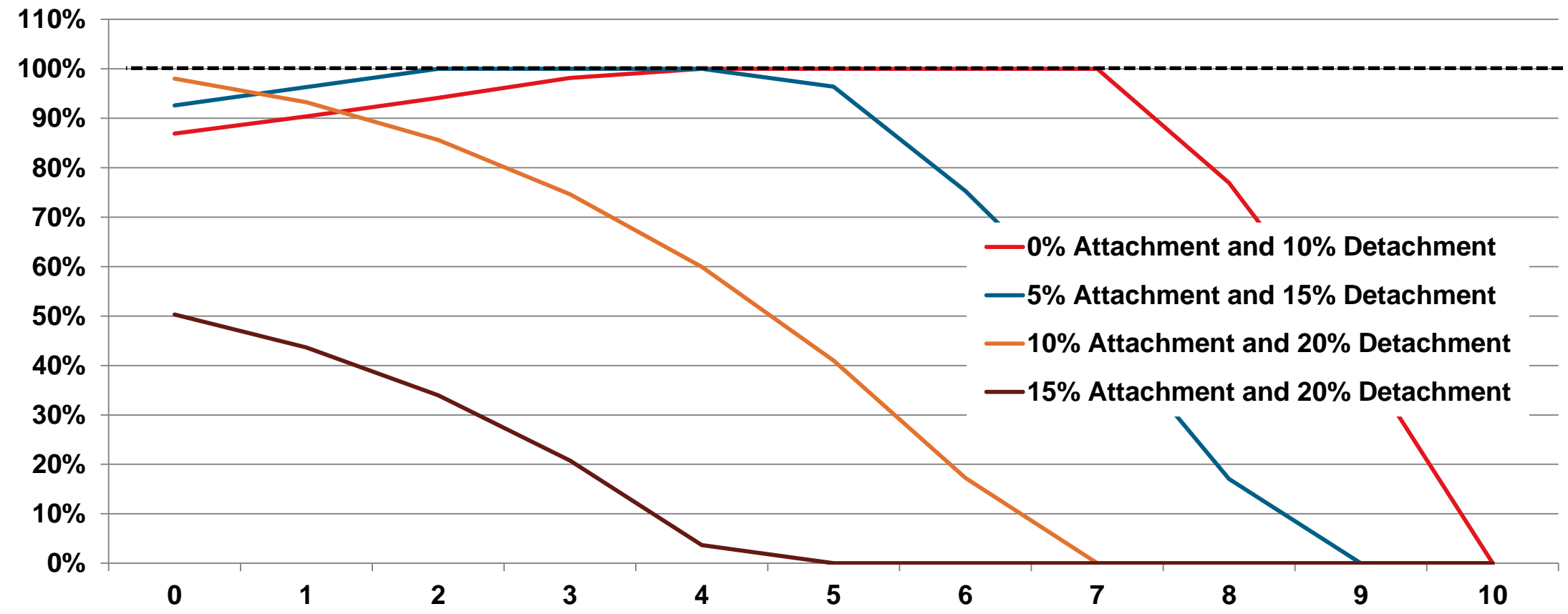
# Projected Capital Relief

## Expected Reduction in Current and Future Longevity SCR

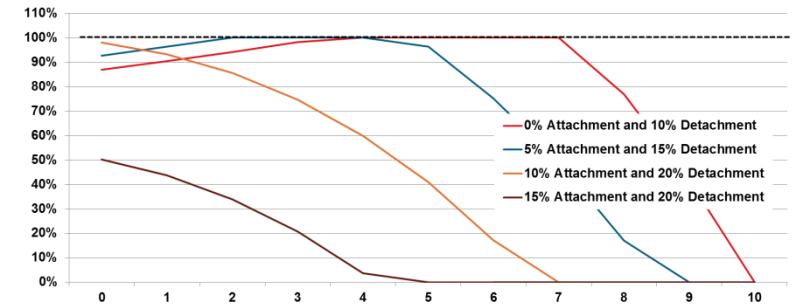


# Different Attachment and Detachment Points

## Expected Reduction in Current and Future Longevity SCR



# Conclusion



- Longevity Shock Absorber transfers remote longevity risk and thereby improves capital position under Solvency II
- Improves both sides of the Solvency Ratio:
  - Increasing Own Funds
  - Decreasing Solvency Capital Requirement
- Attractive price relative to other capital management solutions



## Solvency II: Change Brings Opportunity

With 12 Case Studies on How Reinsurance with RGA can Help



# Questions, Comments?

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