

**somewhat
different**

The role of reinsurers in longevity risk transfer

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Agenda

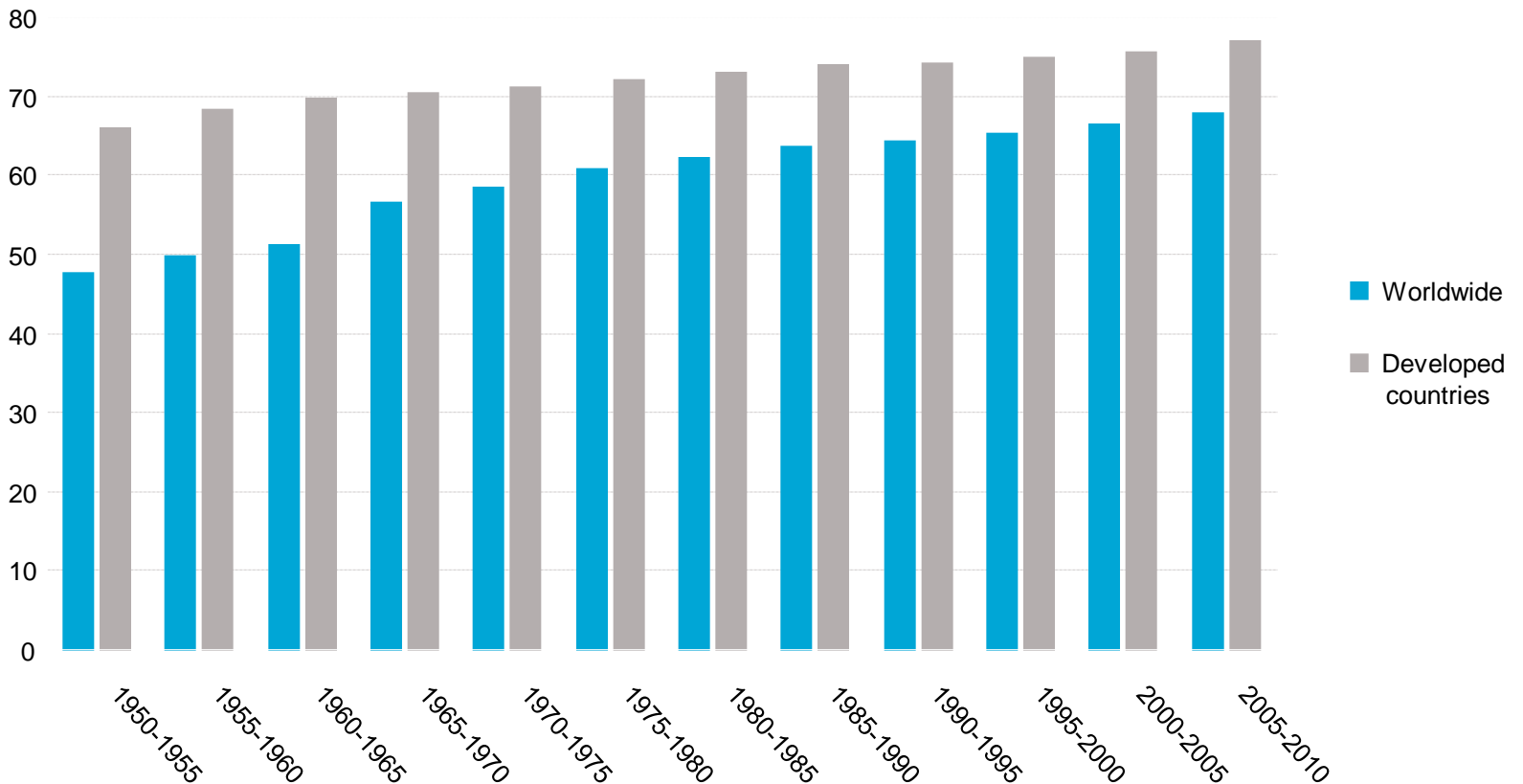
- ▶ Demographic Challenge
- ▶ Longevity and Pension Market
- ▶ Longevity-Risks and beyond
- ▶ The role of the reinsurer
- ▶ Structures
- ▶ Conclusions

Demographic Challenge

Increasing Life-Expectancy

Period life expectancy

in years



Source: United Nations, 2011

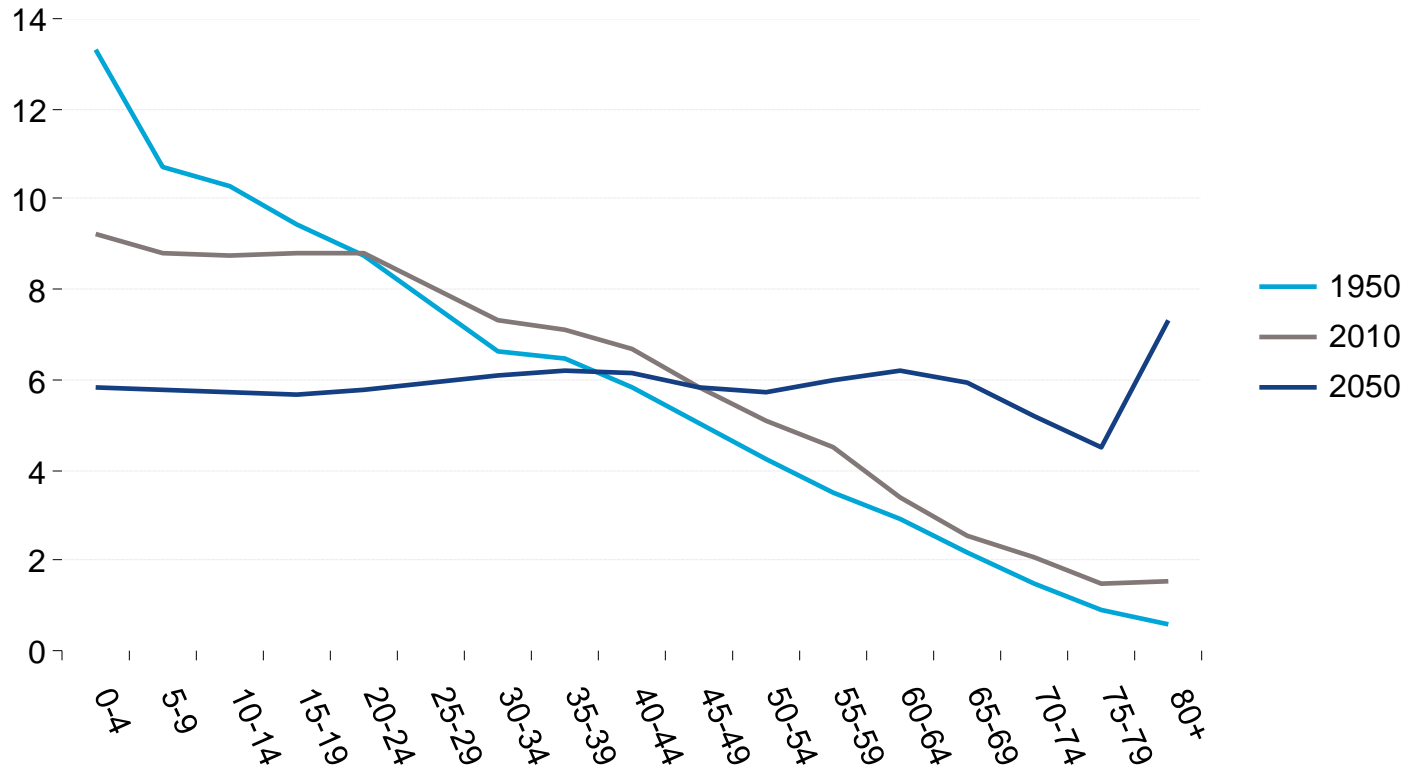
Life expectancy increases in developed countries, but also worldwide

Development of the demographic structure

Dramatic changes

Proportion of age group

in %



Source: United Nations, 2011

▶ Longevity will be the major risk for the life assurance industry

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Holders of Longevity Risks

Pension markets

- ▶ Many developed countries have a pension system consisting of
 - State pension
 - Occupational pension
 - Private pension
- ▶ State pension often insufficient to ensure adequate income at retirement
- ▶ Pensioners additionally rely on income from occupational schemes or private pensions
- ▶ Pension liabilities held by pension funds, corporates or insurance companies
- ▶ Corporates and pension funds seek to lay off parts of their risks inherent in the liabilities

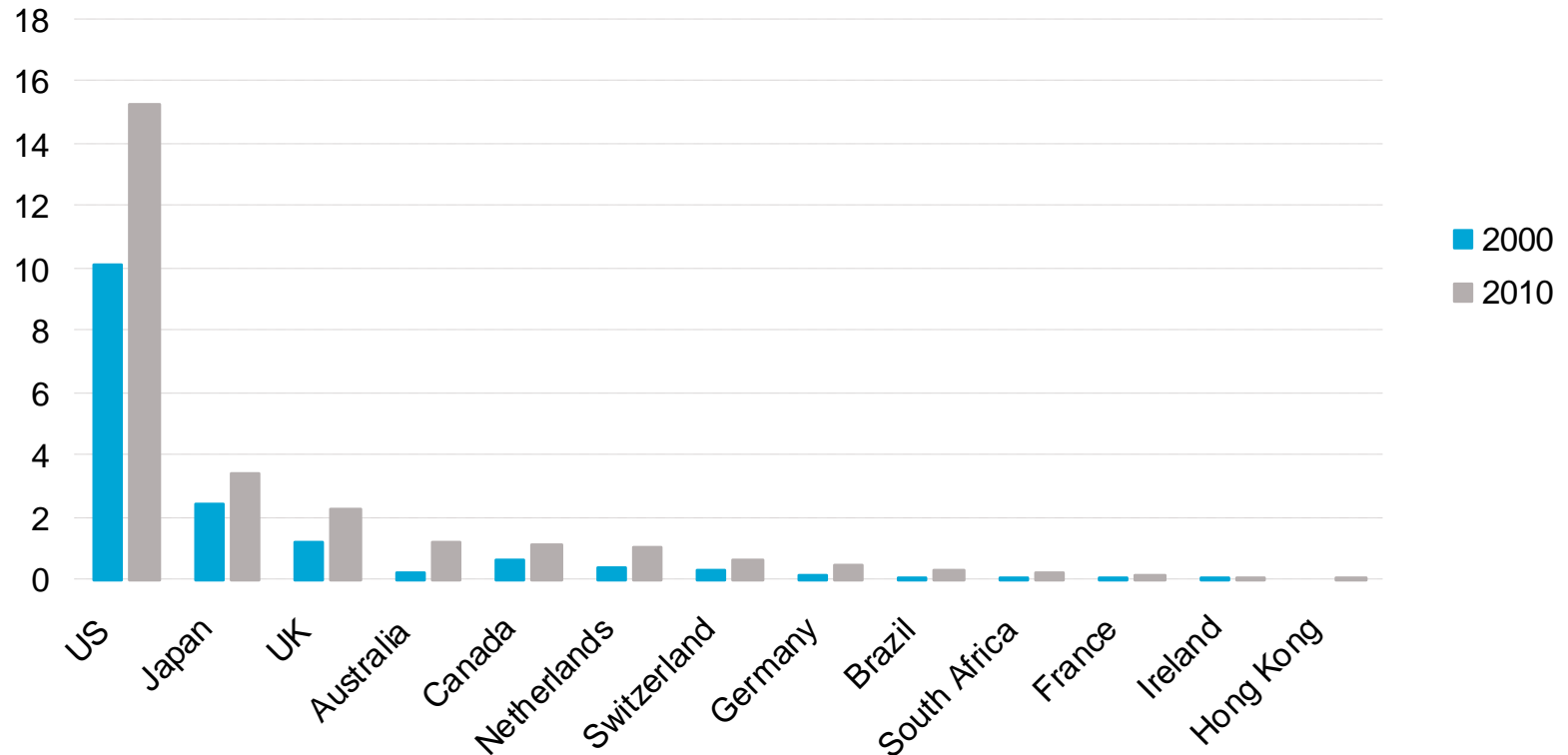
▶ Substantial longevity risks currently held outside the insurance industry

Longevity and Pension Markets

Assets in the Pension Market

Assets

in tn. USD



Source: Towers Watson 2011

Pension assets now amount to 76% of the GDP of these economies and increased 12% from 2009

Longevity Block Transactions spreading

Substantial demand on worldwide basis

▶ Sample Requests

- Miners in South Africa
- Teachers in USA
- Car manufacturers in UK
- Individual Irish annuities
- Bankers in Germany



▶ Longevity risks very different

▶ Insufficient capacity in the long run and for large sponsors

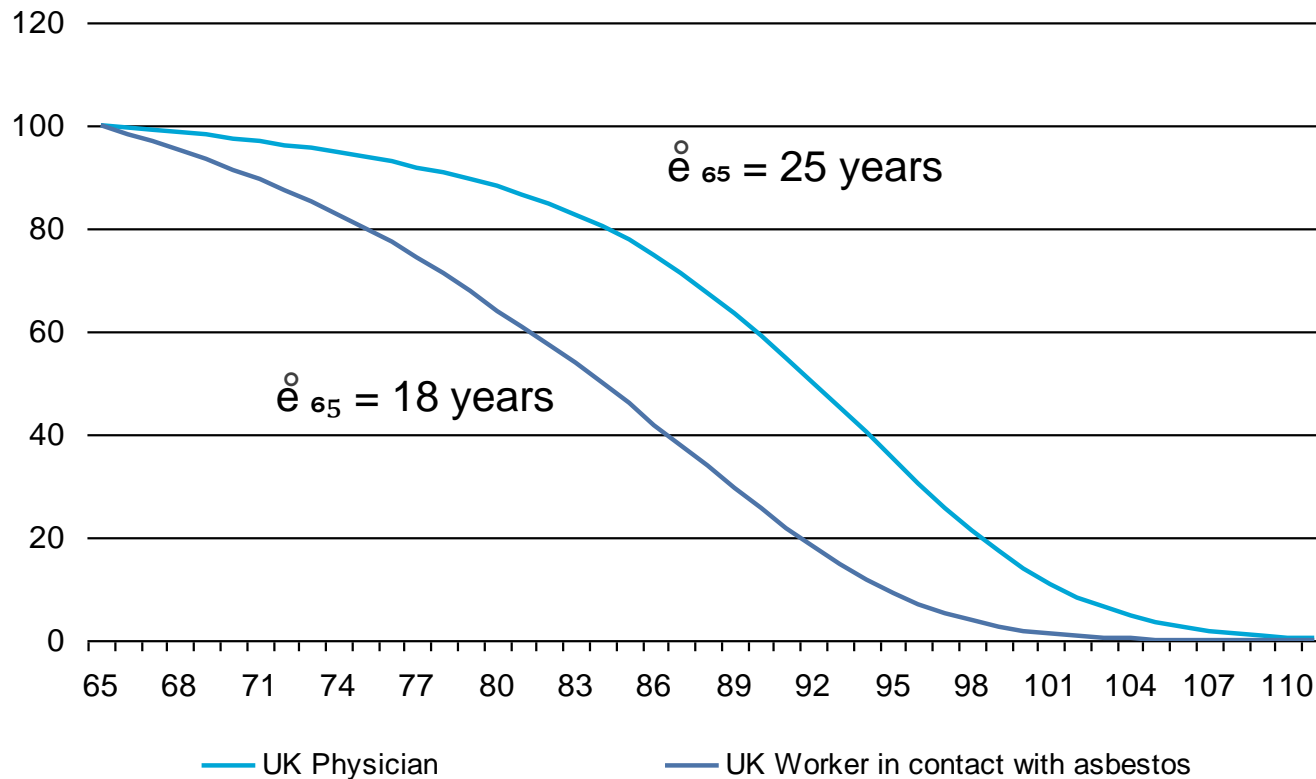
▶ Involvement of the capital market becomes more important



Survival curves for males aged 65

Survival probability

in %



Individual assessment of risk is important

Capital Market Transactions

Recent activities in the market

- ▶ European Investment Bank (EIB) (2004)
 - Issued a longevity bond of GBP 540 million
 - Duration 25 years
 - Covers mortality of 65 year old UK males
 - Withdrawn in 2005

- ▶ Kortis (2010)
 - International Bank for Reconstruction and Development issued longevity trend bond of USD 50 million
 - Duration 8 years
 - Covers improvements experienced by older UK males against younger US males

- ▶ Pall UK Pension Fund (2011)
 - JP Morgan takes on GBP 70 million of risk of improving longevity
 - Duration 10 years

- ▶ Pandemic Bonds
 - Vita Cat Bonds (2003, 2005, 2006)
 - Nathan (2008)

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Longevity-Risks

Inherent Risks

- ▶ Mortality risk
 - Unsystematic (level, shape, stochastic)
 - Systematic (improvement risk, seasonality)

- ▶ Ancillary Benefits
 - Spouses (e.g. proportion married, age of spouse, benefit proportion)
 - Special benefits (e.g. guarantees, lump sum)

- ▶ Investment Risk
 - Asset risks (e.g. market risk, credit risk, foreign exchange risk)
 - Inflation (of benefits)

- ▶ Regulatory Changes (e.g. unisex, taxation, Solvency II)

- ▶ Data

Who can manage which risks?

Pension Scheme

- ▶ Regulatory changes
- ▶ Data

Insurer/Reinsurer

- ▶ Mortality risk
 - Unsystematic
 - Level
 - Shape
 - Stochastic
- ▶ Ancillary benefits
 - Spouses
 - Special benefits

Capital Market/Investor

- ▶ Investment risk
 - Asset risks
 - Benefit inflation
- ▶ Mortality risk
 - Systematic
 - Improvement
 - Seasonality

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- ▶ Structures
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Longevity Solutions

Reassurer as a long-term partner for mortality/longevity risk

- ▶ Covering risks related to mortality is at the heart of life reinsurance business
 - Accepting unsystematic risk and systematic risk
 - Providing Know-How for assessment

- ▶ Transform to longevity/mortality index

- ▶ Reassurer underwrites risks globally
 - Knowledge transfer from other markets
 - Diversification across markets

- ▶ Reassurer accepts risks until natural expiry

▶ Currently most long-term mortality risks are underwritten by reassurers

Optimising Solutions

The Role of the Reinsurer

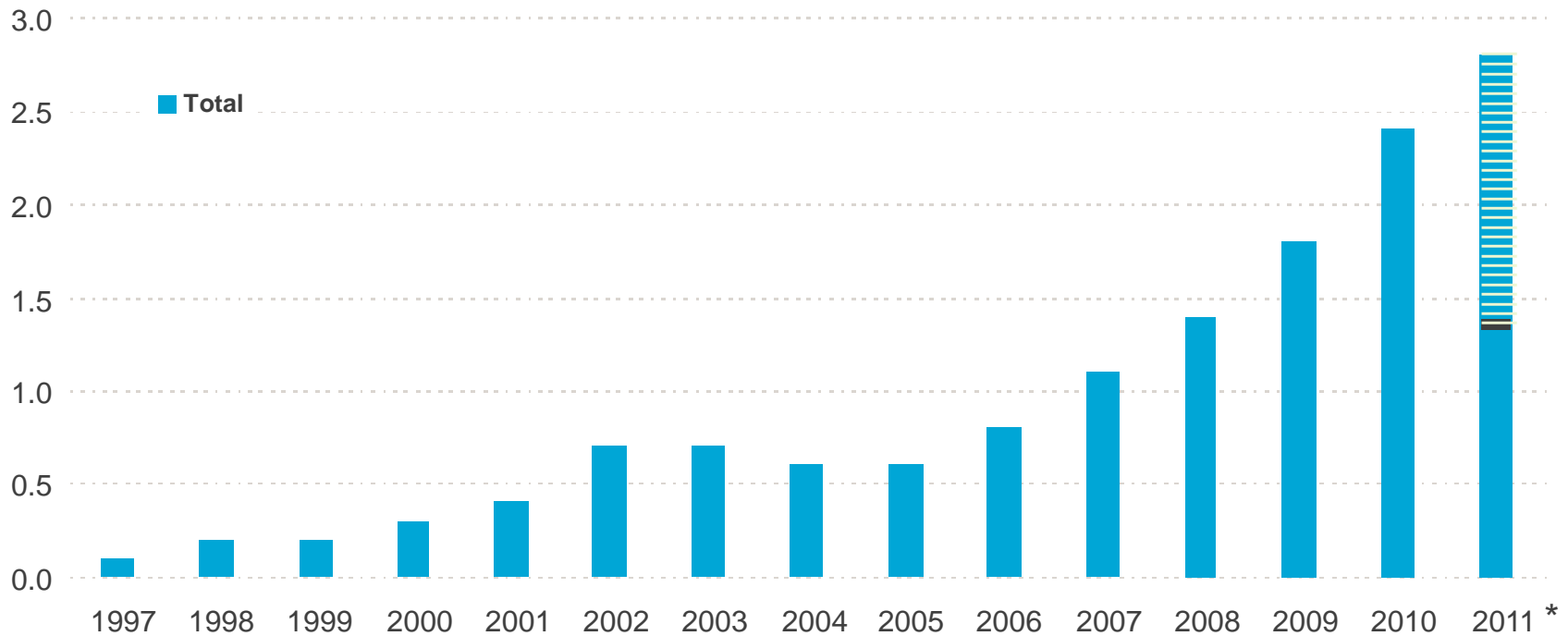
- ▶ Balance sheet optimisation
 - Different capital costs (diversification, internal model)
 - Swapping mortality and longevity
- ▶ Product solutions
 - Reassurance is a well known form
 - Legal departments familiar with reassurance form
 - Reporting to stakeholders (shareholders, regulator, public) well understood
 - Reducing volatility (e.g. through enhanced annuities)

Product Solutions

Enhanced annuities: Impressive growth of a niche market

Development UK Enhanced Annuity Market

in bn. GBP



Source: Towers Watson

*Estimation based on first half year

In 2010 enhanced annuities represented 22% of the total UK single premium immediate annuity market

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Structures

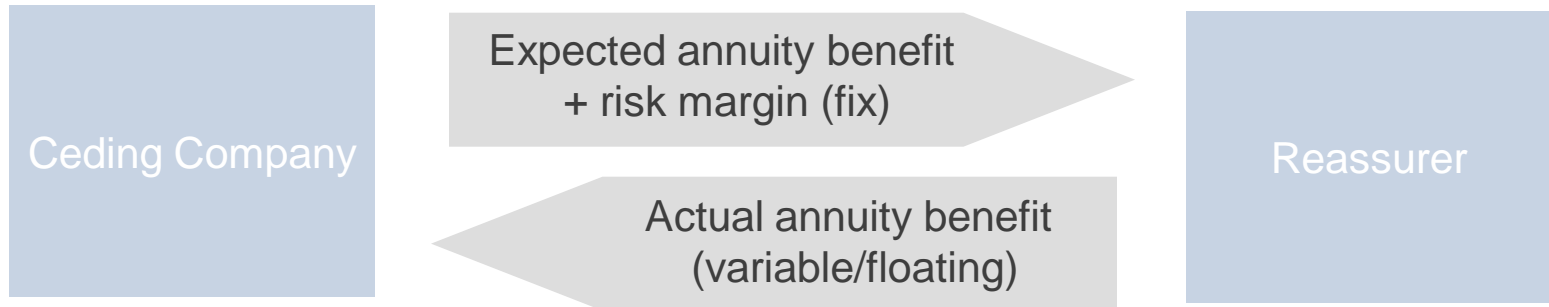
Important Examples

- ▶ Various Structures
 - Single Premium
 - Survivor Swap
 - Risk Premium

- ▶ Alternative Longevity products
 - Longevity linked derivatives based on index or portfolio

Longevity Swap

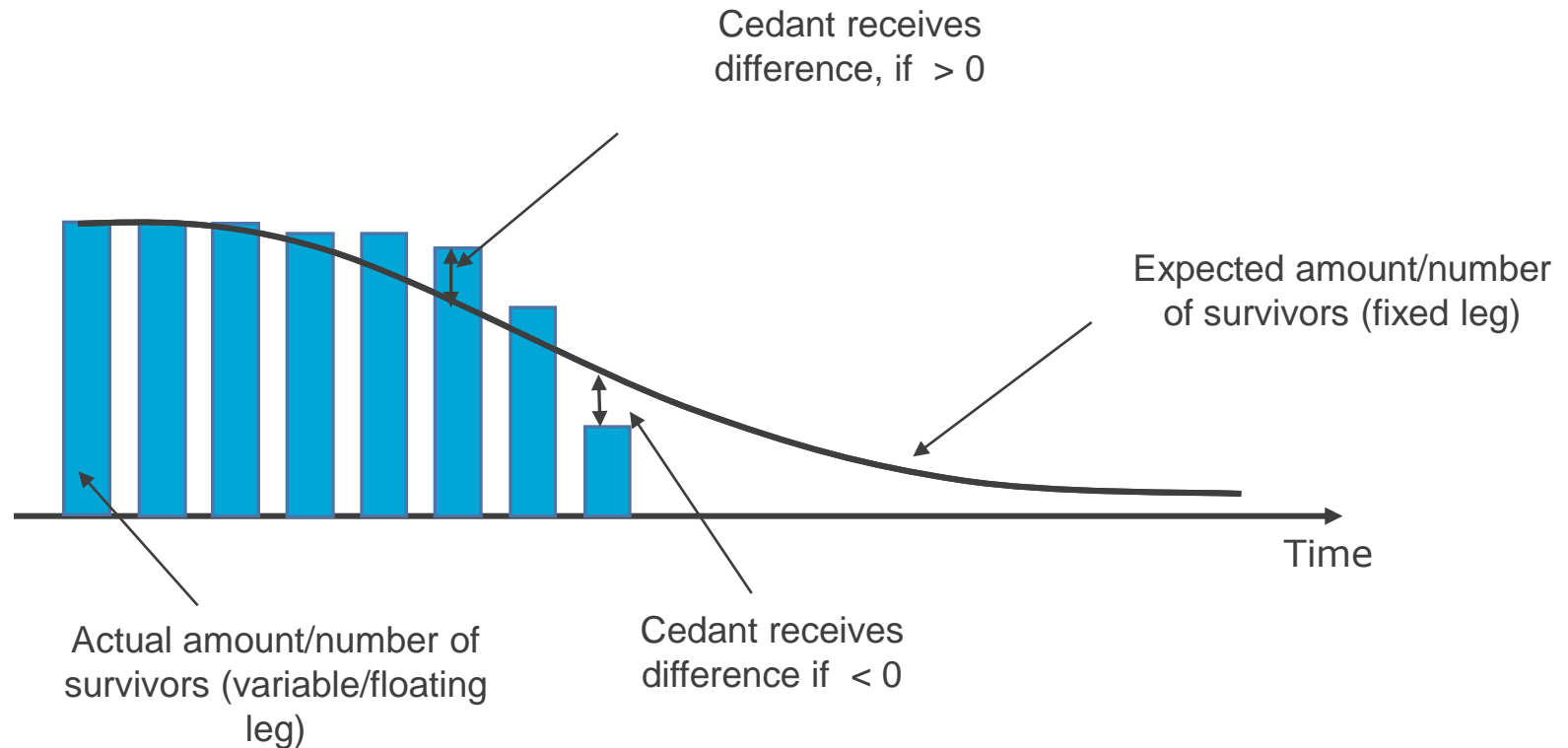
Swapping expected and actual cash flows



- ▶ Cedant receives actual annuity benefits from the reassured business
- ▶ Cedant pays expected annuity benefits and risk margin
- ▶ Reassurance premium basis: expected mortality and expected mortality improvements

Longevity Swap

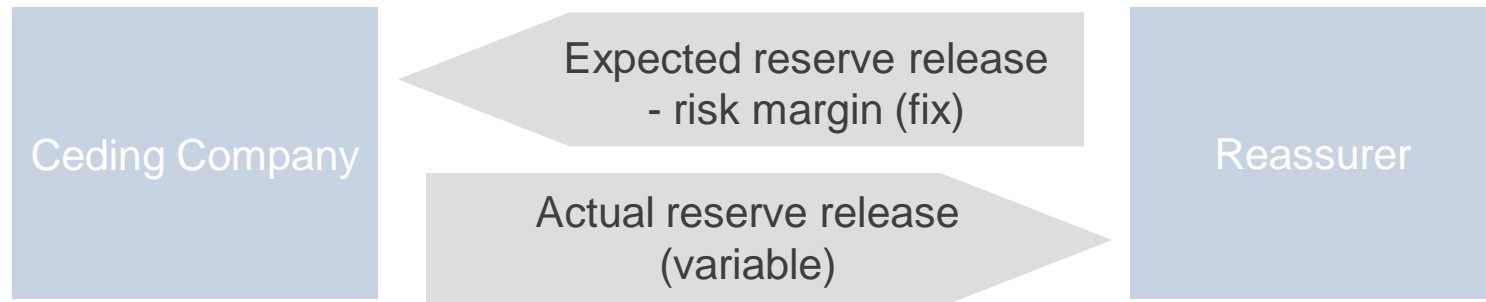
Swapping expected and actual cash flows



▶ Fixed leg includes a risk margin

Risk Premium

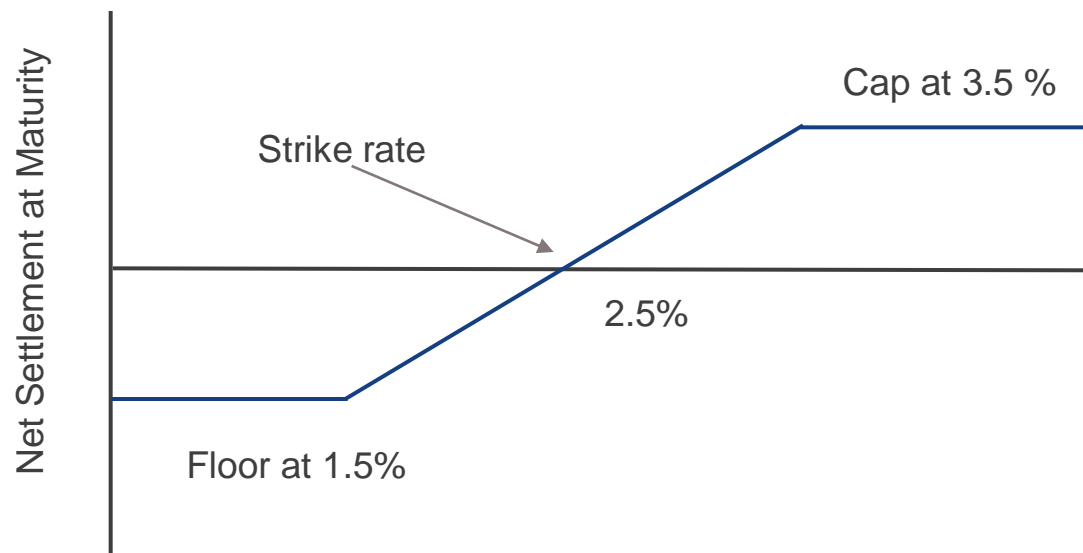
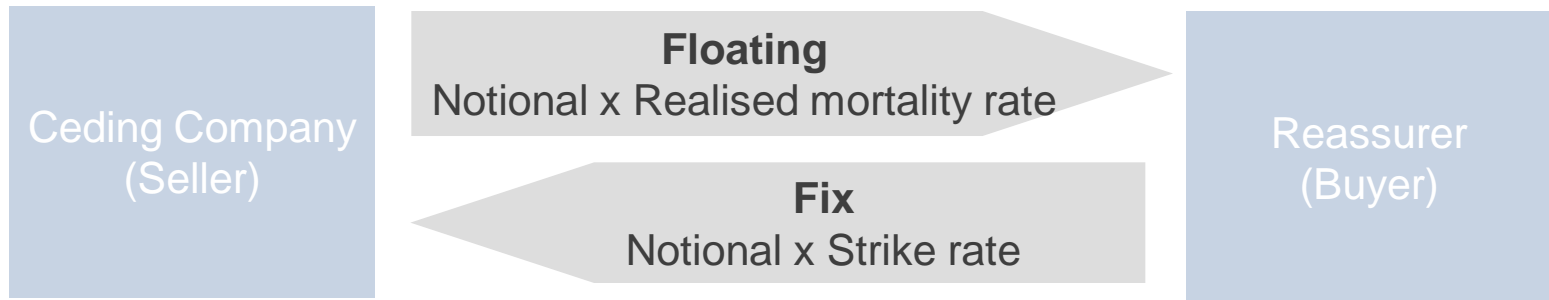
Swapping actual and expected gains on death



- ▶ Cedant receives expected reserve release caused by death
- ▶ Cedant pays actual reserve release caused by death
- ▶ Risk premium = Expected reserve release
= Mortality rate x Reserve
- ▶ Reassurance:
 - Contract period and coverage between 1 year and natural expiry

Index Solutions

Example Mortality Forward

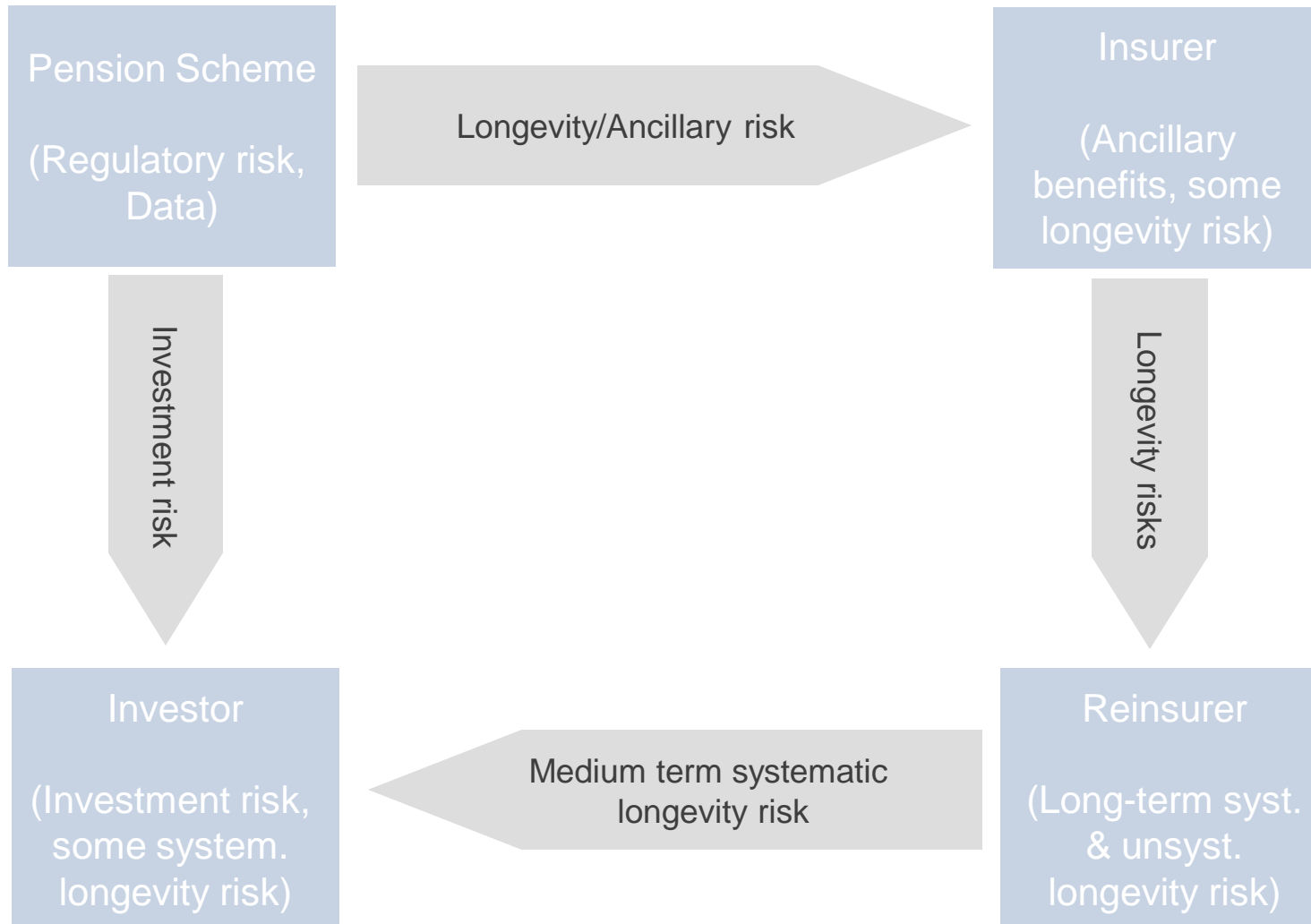


Index Solutions

Example Mortality Forward

- ▶ Payout (strike rate less realised mortality rate) mortality
- ▶ No basis risk
- ▶ During the lifetime of the contract an index is published
- ▶ Mortality rate higher than expected: seller has to pay,
mortality rate lower than expected: buyer has to pay
- ▶ Fixed limited duration of trade

Putting it all together



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Conclusion

Traditional role of taking risks related to mortality and longevity

- ▶ Risk taker
 - Current: most of the longevity risk transferred to the reinsurer
 - Future: concentrate on unsystematic mortality/longevity risk and long-term improvement risk

- ▶ Shaping the future longevity business
 - Product development
 - Optimising solutions with regard to regulatory requirements

- ▶ Intermediary/Arranger
 - Innovation (product/structure) to separate risks
 - Hedging pandemic/longevity exposure
 - Hedging risks globally
 - Separation of risks by duration (e.g. up to 10 years, more than 10 years)
 - Anchor investor

Thank you for your attention!