



International Association for the
Study of Insurance Economics

Études et Dossiers

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**3rd Health and Ageing Conference on
Longevity – a Medical and Actuarial Challenge**

**Hosted and co-organised by
GE Insurance Solutions**

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Layout & Distribution: Pascal Clerc

Is Longevity reinsurable?

Florian Boecker

Is Longevity reinsurable?

... or:

- Is there a need for longevity reinsurance?
- Do viable reinsurance products exist?
- Is there a fit between what primaries want and what reinsurers are prepared to provide?

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Is there a need for longevity reinsurance?

Why should an insurer buy annuity reinsurance?

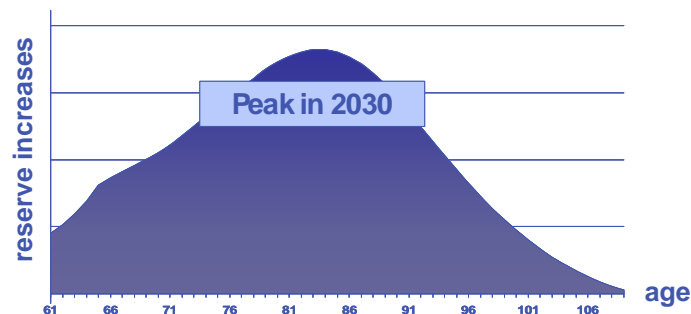
- **Risk Cover**
 - Trend risk vs. Long-term guarantees
 - Pooling of inhomogeneous portfolios
 - Investment risk
- **Services**
 - Actuarial / Product Development
 - Data Pooling
 - Underwriting (Impaired Annuities)
- **Capital Management**
 - Block assumption deals
 - Financing of new business



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Example: Long-term guarantees

- Homogeneous German annuity portfolio
 - Male, age at issue of policy (in 1985): 40 years
 - Payment starts in 2010
- Stressed by an immediate mortality reduction
- Pattern of reserve increases:



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Example: Inhomogeneous portfolio

- One female life, age 90
- “Reverse Mortgage” product
 - Benefit: life-long annuity
 - Premium: Insurer receives house of insured person after her death

Jeanne Calment (1875 – 1997)

- signed an "en viager" deal in 1965 to sell her apartment against monthly payments to lawyer François Raffray, then 47.
- Value of the apartment was estimated to be equal to ten years of payments
- Raffray died first, in 1995 at the age of 77. His widow had to continue the payments.



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Example: Data Pooling Service of GE Frankona

- Introduced in 2001
- >10 participating companies
- > 500k insured lives, growing
- Analysis:
 - Benchmarking of mortality against pool and industry table
 - Mortality by insured annuity
 - Selection effects
 - Trend analysis



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Potential Longevity Reinsurance Structures

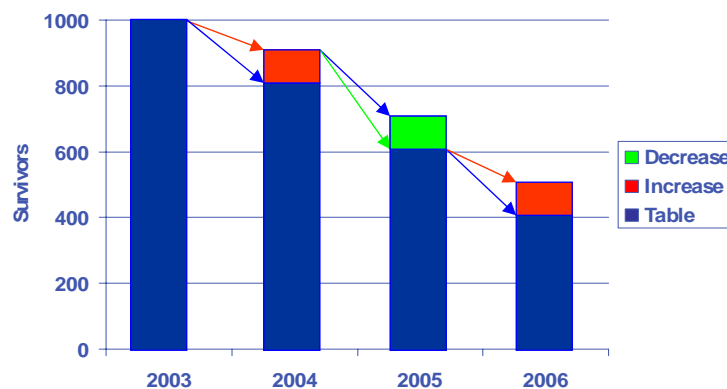
- **Quota Share**
Primary shares all risks proportionally with reinsurer
- **Surplus**
Reinsurer participates in high annuities only
- **Excess of Loss type cover**
For annuities XL can mean “Excess of time”
i.e. reinsurer covers all risks above a certain age
- **Stop Loss**
e.g. reserve increases above a certain level



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Example Product - Reserve Swap

Swap of calculated reserves and reserves for actually surviving insured persons:

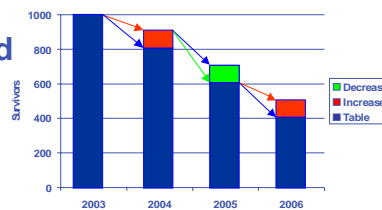


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Reserve Swap - Customization

Variants of the basic structure:

- **Symmetric vs. Asymmetric Swap**
(Does the reinsurer participate in reserve releases?)
- **“Excess of Time”**
(When does the swap start?)
- **Deferred vs. Payment period**
(Are annuities in the deferred period covered?)



Derivation of GE Frankona Calculation Basis

- Analysis of main causes of mortality improvements
- Future Population Mortality
 - ages 0 - 89: Partial Cause Elimination Method
(assumptions of medical department; second order effects)
 - ages 90+: Kannisto Extrapolation
- Modification to insured lives
- Safety Loading for random fluctuations
- Final smoothing using Whittaker-Henderson

Innovative Bottom-Up Approach

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What do customers want?

Depends on

- Regulatory environment
- Market requirements
- Products offered
- Size and structure of portfolio
- New business growth rate
- Risk averseness
- ...



Customer Survey of GE Frankona



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What are reinsurers prepared to provide?

Depends on

- Regulatory environment
- Market and product strategy
- Risk appetite
- Hedging opportunities
- Expertise and resources
- ...



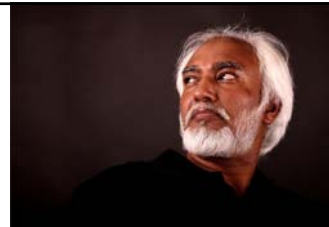
There is no „natural fit“ between interests of reinsurers and their customers



GE imagination at work

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Is Longevity reinsurable?



- There is a need for Longevity reinsurance, but the value added differs from Life and Living Benefits
- Suitable reinsurance products exist or can be developed
- Is there a gap between customer requirements and interest of reinsurers?

Thank You for Your Attention!