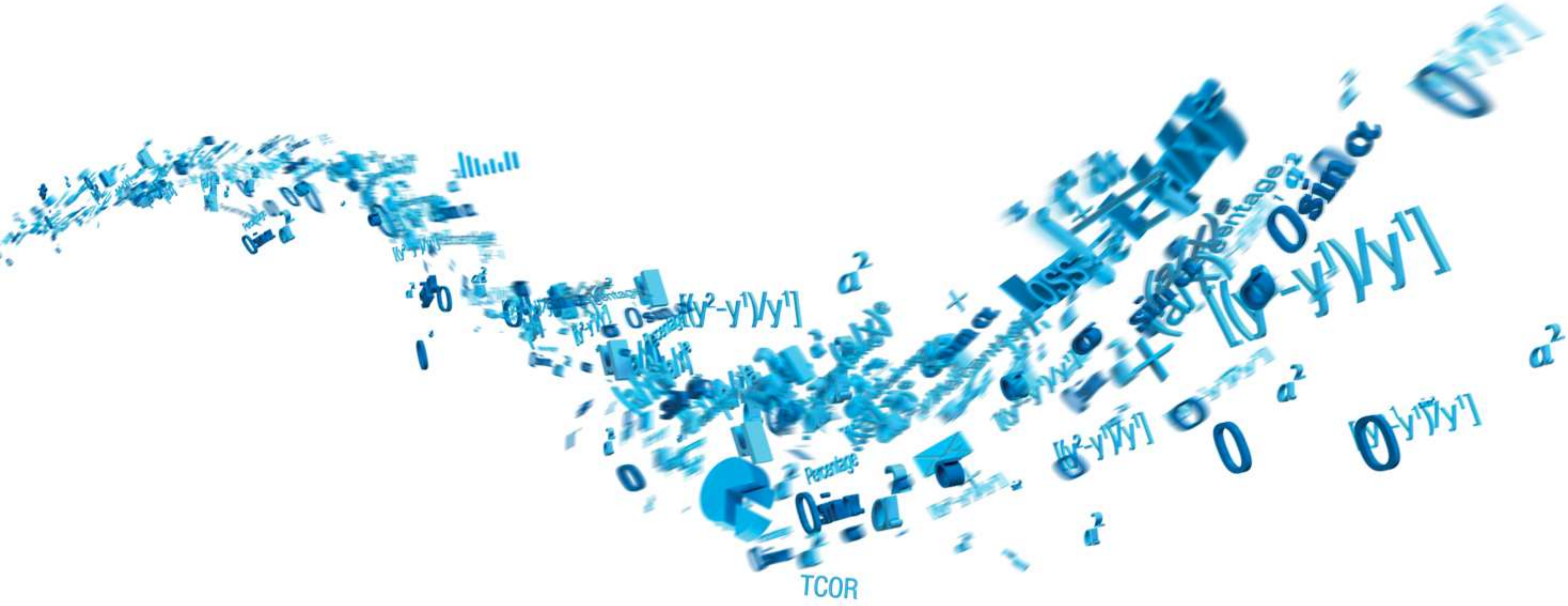

Reinsurance solutions for long term savings products in the new regulatory environment

A Presentation to the 2016 Bermuda International Life & Annuity Conference

Marc Beckers, Aon Benfield ReSolutions, Bermuda, 27 September 2016

Prepared by Aon Benfield

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Trends impacting insurers

	Continuing Themes	Industry Implication	Insurance Impact/Size	Profit Impact		Industry Outcome
B	Low interest rates	More reliance on U/W income	Massive	High	↑	Greater emphasis on underwriting profits
B	Longevity and Pensions	More capital flows to insurance industry	Massive	Low	↑	Generate non-correlated insurance lines
B	Healthcare	More uncertainty and opportunity	Massive	Medium	↑	Compliant compulsory product
B	Big Data	More insight and more granular prices	Massive	High	↑	More risks will become insurable
C	Cyber	Insurers become cyber underwriters	Massive	High	↑	Becomes a significant new line of business
P	Safer / Autonomous Cars	Less personal liability risk	Massive	High	↓	Transition to lifestyle policy / decommoditization
B	Softening rate environment	Less underwriting income	Significant	Medium	↑	Generate underwriting profits
B	Urbanization	More concentration	Significant	Moderate	↑	Primary liability and personal property
B	Alternative Capital	More capital enters industry	Significant	Moderate	↑	Lower catastrophe exposed underwriting capital
B	Hedge Fund Re	More capital enters industry	Significant	Low	↑	Generates new low volatility business
C	Corporate Giga Liability	Growth in limits	Significant	Moderate	↑	Specialization in Liability Catastrophes
C	Corruption Implications	Trust and transparency intervener	Significant	Low	↑	Specialization in securing funds flows
C	Augmented reality	Better safety	Significant	Moderate	↓	Specialization in safety advances and risk
C	Robotics	Higher insured values and productivity	Significant	Low	↑	Specialization in robotics risks and protection
C	Drones	New line of business	Significant	Moderate	↑	Specialization in commercial drone coverage
P	Sharing Economy	Several new line opportunities	Significant	Moderate	↑	Specialization in sharing economy risks
P	Peer to Peer	Fronting and service	Significant	Moderate	↑	Service opportunity is here or near
P	Smart Homes	Better homeowners risk segmentation	Significant	Moderate	→	Specialization in smart home protections
C	Infrastructure Replacement	Previously un-/under-insured class	Moderate	Moderate	↑	Greater insurance specialization still needed
C	Alternative Energy	New assets and new risks	Moderate	Moderate	↑	Greater insurance specialization still needed
C	Energy Independence	More domestic energy assets	Moderate	Moderate	↑	Greater insurance specialization still needed

Source: Aon Risk Study

The top trends are driven by economic environment, demographics and digitalisation

EIOPA Financial Stability Report shows #1 trend = #1 risk

Risk assessment for the Insurance sector

Main risks are market risks. With German 10 yr Bund rates below 0%, low interest rates are problem #1

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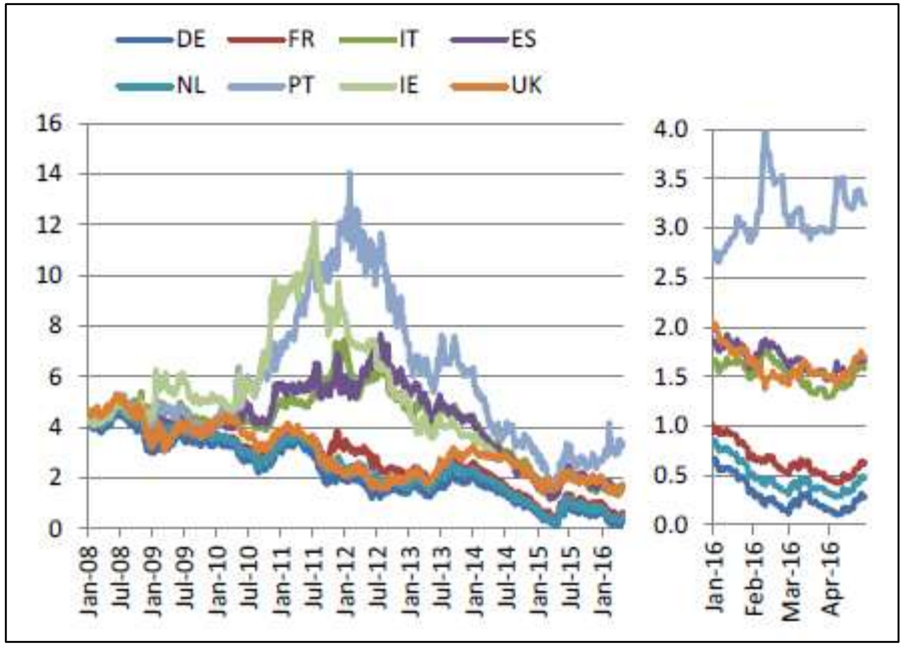
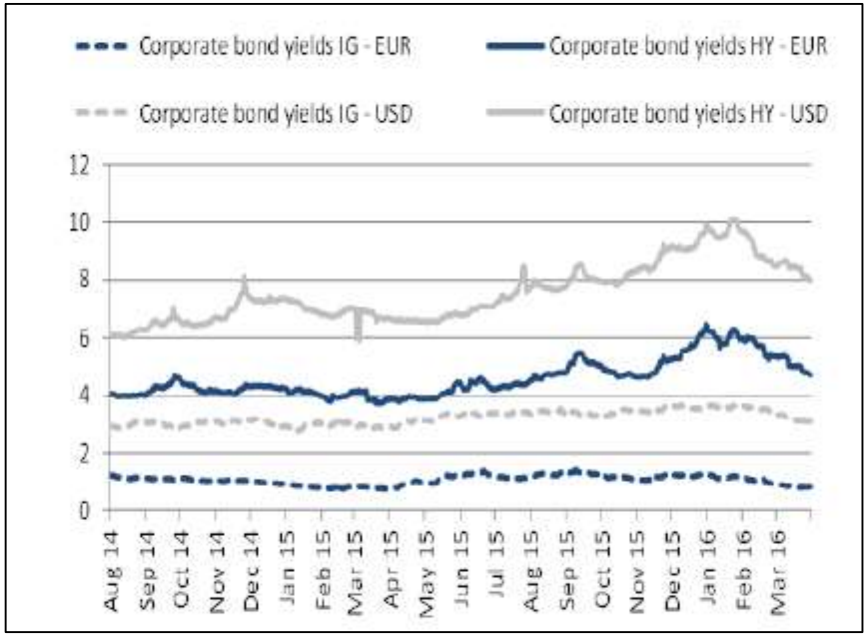
EIOPA forces life insurers to discount at a “conservative” yield curve

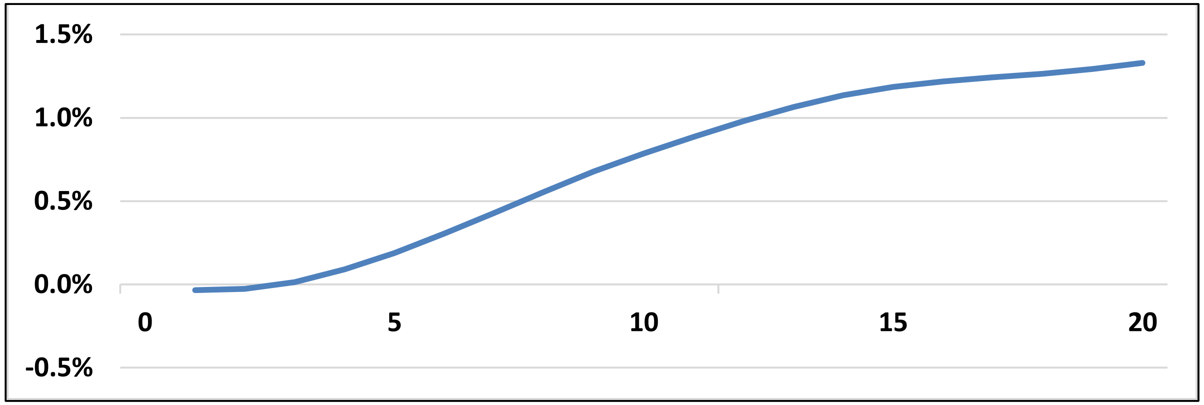
10-year government bond yields (in %)



Corporate bond yields and indices (in %)



April 2016
EIOPA Term Structure
including
Volatility Adjustment



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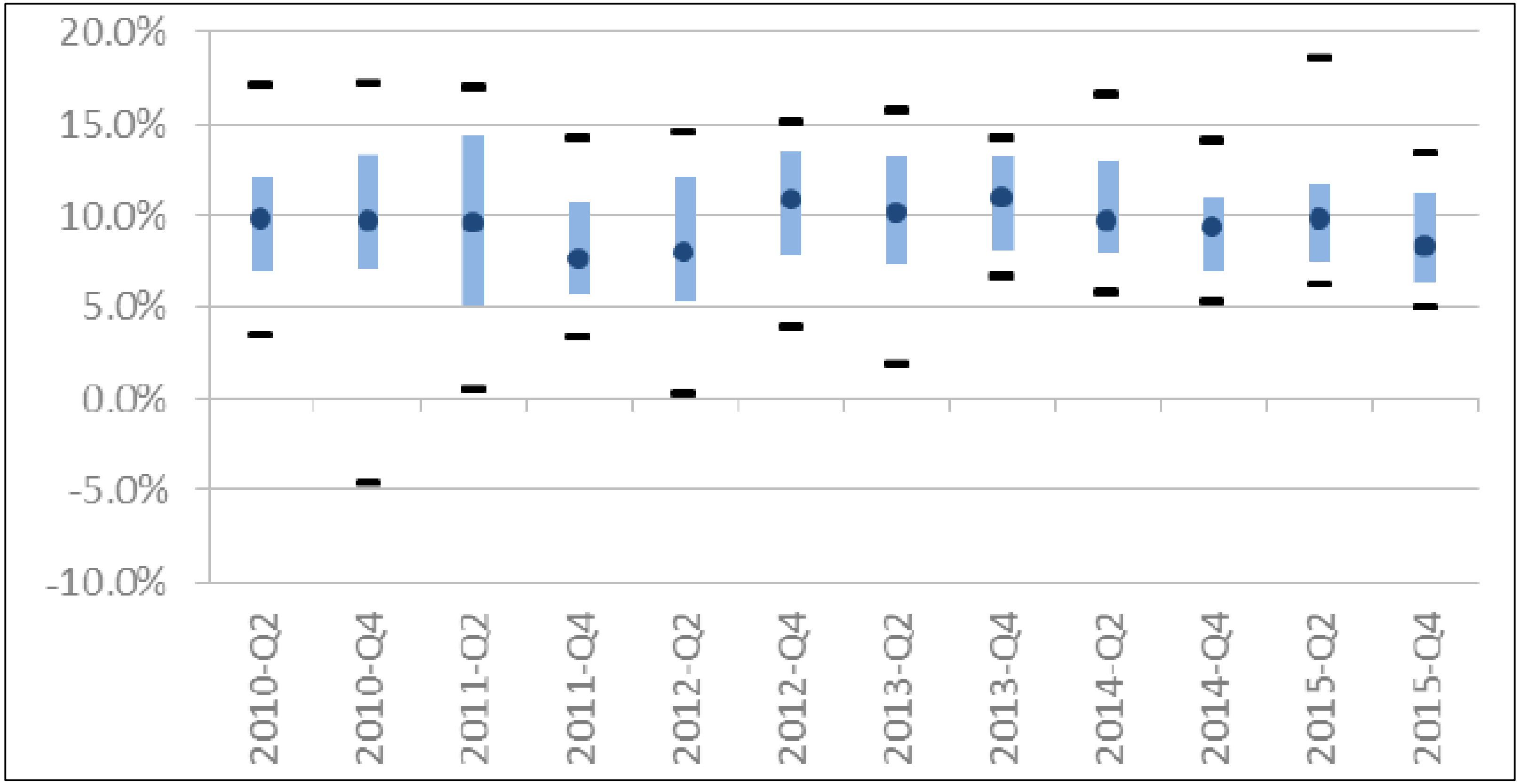
Life Insurance ROE below cost of capital

- Non-Life Combined Ratio 94.6% for the median company in Q4 2015
- Overall ROE 8.3% in Q4 2015

ROE Life and Non-Life (in %; median, interquartile range and 10th and 90th percentile)



Source: EIOPA (sample based on 32 large insurance groups in EU and Switzerland)

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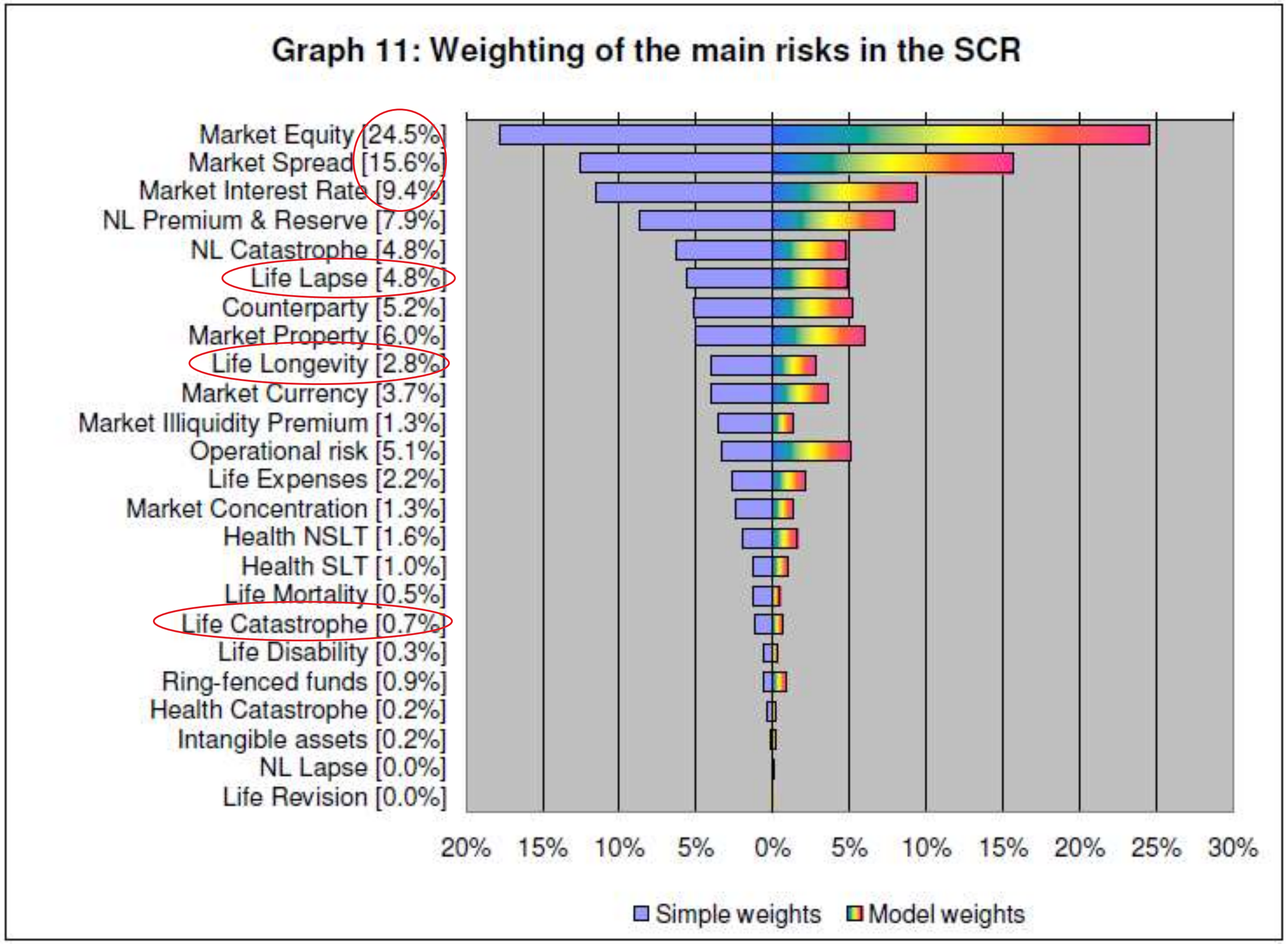
Putting Solvency II capital in perspective for a composite insurer



Life underwriting risks and corresponding market risk represent almost 60% of the total capital requirement for a composite insurer.

In addition, market risk is the main consumer of capital

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Different types of capital

SAM
Solvency II
RBC
…

Regulatory

Risk Based : ORSA !!
Fair Value?
Contract Boundaries

Financial Statements
Basis for KPIs
Financial markets

Accounting

IFRS
IFRS II

S&P
AM Best
Fitch

Rating Agency

Importance?
Stochastic approach

Huge inconsistencies in calculation of capital

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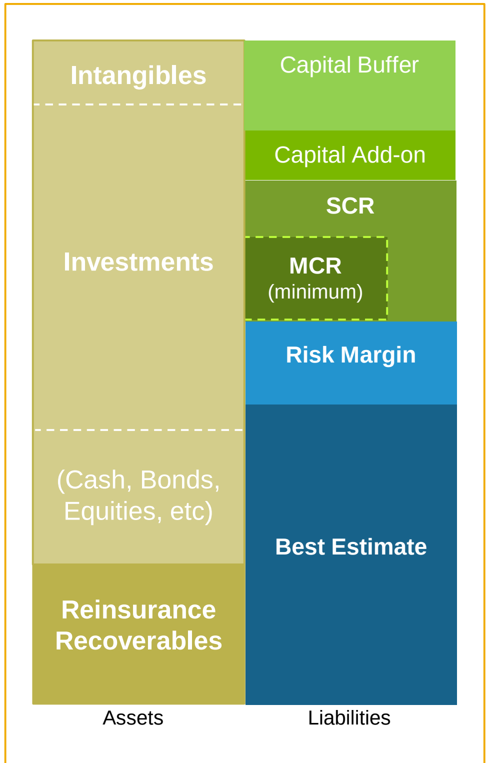
Available Capital vs Required Capital (SCR)

Available capital equals

- Fair value of assets

Minus

- Best Estimate Liab (**not** fair value) + Risk Margin

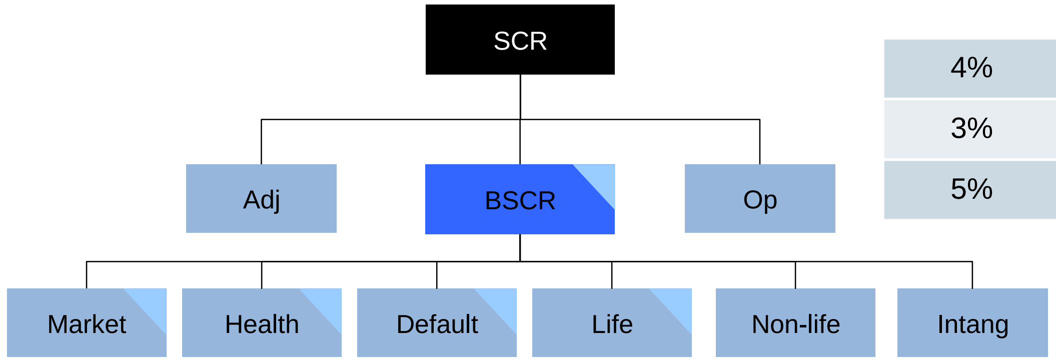


Solvency II Balance Sheet

Required capital reflects 1:200 impact on either asset or liability side of balance sheet

Required Capital (SCR) calculated on

1. Impairments to Assets:
   Market Risk
   (Counterparty) Default Risk
   Intangibles
2. Deterioration of Existing Liabilities (Reserves):
   Life Business: longevity (20% lower q_x), cat (q_x + 0.15%), lapse (50% up/down)…
   Non-Life Business
   Health Business
3. Proposed New Business Liabilities (Premiums):
   Life Business
   Non-Life Business
   Health Business
4. Operational Risks



	Market	Health	Default	Life	Non-life	Intang
Non-Life Mutual	34%	10%	11%	0%	41%	0%
Life Co	68%	5%	3%	21%	0%	0%
Average EU Group	58%	5%	4%	17%	16%	0%

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Non-traditional life reinsurance capital solutions

Potential Solvency II alternative capital solutions

De-risking Life Savings Portfolios

Your Risk

- De-risk savings book of guaranteed interest rates
- Timeline: 4-6 months

Solutions

- Aggregate stop loss to cover lapse risk
- Coinsurance with collateral trust deposit (control of assets transferred, but title ownership remains with cedant)
- PathWise as “the” tool for complex Solvency II stochastic scenario modelling

Lock in future mortality profits (VIF monetisation)

Your Risk

- Lock-in margins in mortality rates and hedge pandemic and lapse risk simultaneously (VIF monetisation)
- Timeline: 2-4 months

Solutions

- Traditional quota share structure
- Reinsurer pays upfront commission for future profits
- Pandemic, lapse and terrorism covered
- Can be executed on an annual basis

Hedge Longevity Risk

Your Risk

- Hedge adverse longevity development
- Timeline: 4- 6 months

Solutions

- Traditional longevity swap
- Optimise mix longevity vs mortality risk through structured QS or stop loss

Hedge Tail Risks

Your Risk

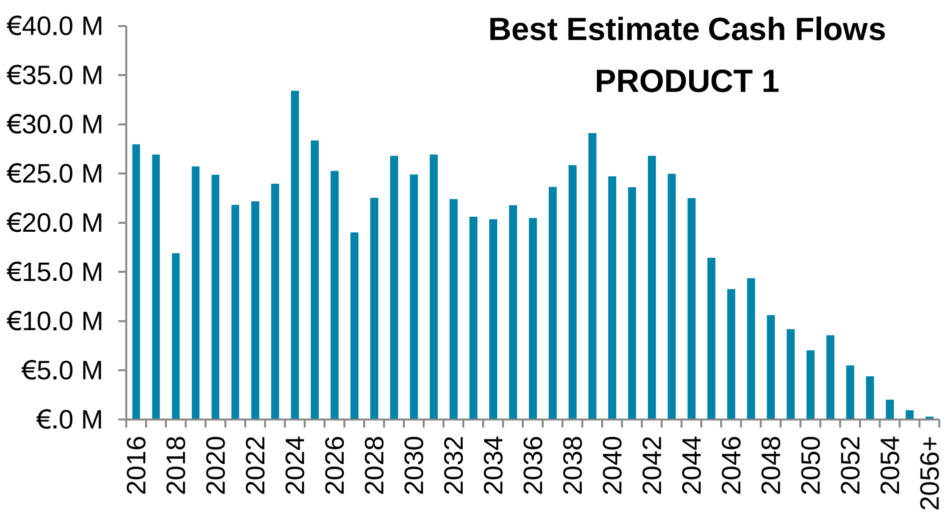
- Hedge tail risk exposures for lapse, pandemic and longevity risks
- Timeline lapse tail risk: 1-2 months

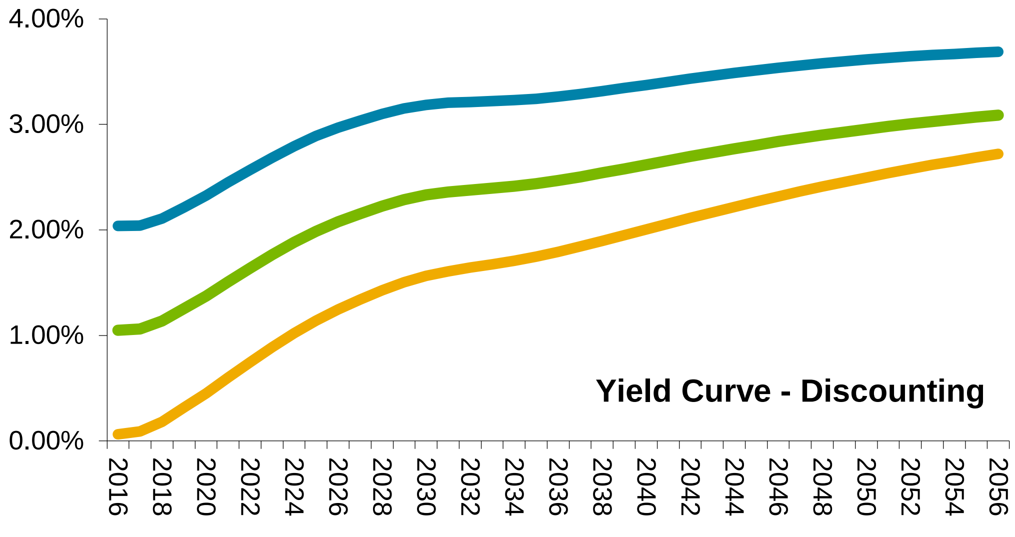
Solutions

- Out of the money lapse risk cover
- Out of the money pandemic cover

Reinsuring market risk has largest impact

Discounted Cash Flows under economic view





Impact of discounting with a higher yield curve

	Nominal CF's	Discounted EIOPA (BE)	Alternative 1	Alternative 2
	€ 800 M	€ 600 M	€ 570 M	€ 550 M
Delta with EIOPA Best Estimate		**€ 0 M**	**€ 30 M**	**€ 50 M**

The Best Estimate of € 600 M represents approx. **33% of Total BE Reserves**

New market entrants are driving annuity M&A activity

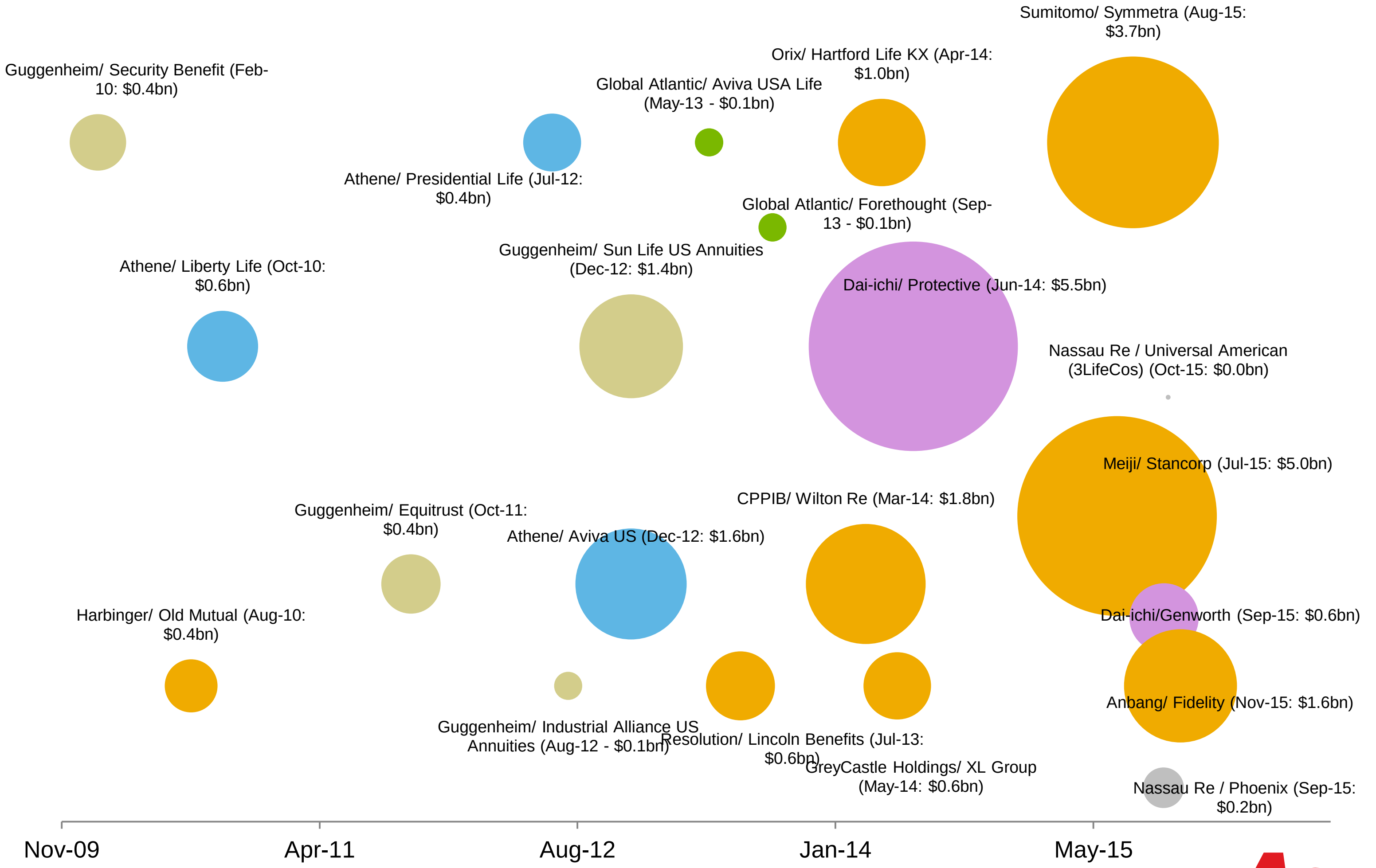
There have been a second wave of life start-ups in Bermuda targeting the US life reinsurance and annuity market . Their attentions are turning to Europe as the impacts of Solvency II come into force and competition increases from Asian buyers for US assets

Bermuda 1st wave
Wilton Re
Athene
Guggenheim
Global Atlantic

Bermuda 2nd wave
Aurigen
Frontstreet
GreyCastle
Safeharbour
Weisshorn

Asian outbound
Orix
Dai-ichi
Sumitomo
Meiji
Anbang

New entrants are driving M&A activity



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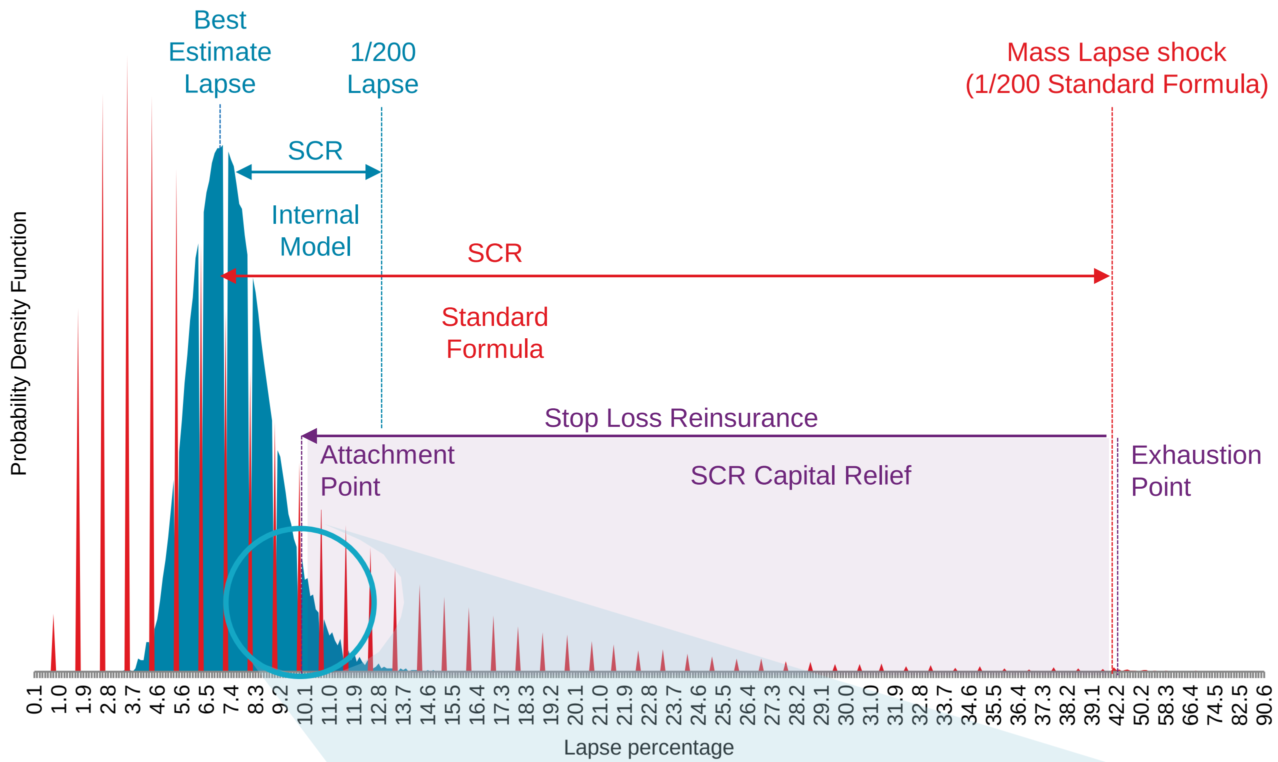
Lapse covers are the flavour of the day

Stochastic model allowing for optimal structuring

Probability density function of the lapse rate



It is important that the attachment point falls within the blue curve to demonstrate risk transfer

Graph shapes describe Lapse Rate Probabilities based on: Company Data | SII Standard Formula

Modelling aspects

- Data quality – and granularity – will drive the price
- ReMetrica® for Life, Health and Pensions and is frequently updated and calibrated to Aon Benfield EMEA pricing benchmark
- The model allows
  - To determine the optimal structure of the cover
  - A pre- and post transaction view of the capital position
- Sufficient risk transfer is required to get the expected capital relief

The observed price range is 1% - 2% of the limit purchased and depending on the attachment point

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Reinsurers have appetite for longevity swaps

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Longevity hedge spectrum

The objective should be to optimise capital by finding the right mix between risk transfer and capital benefit. Currently the customised indemnity cover has been the most popular cover and it also is the most effective one.

Index-based protection ⟷ Customised indemnity cover

Regulatory play

- Out of the money
- Typically shorter duration
- Locked-in commutation basis
- Lower cost (often)

Issues

- Basis risk (capital relief only if minimal)
- Efficacy drift
- Model risk
- Regulator view on risk transferred is key

Longevity risk protection

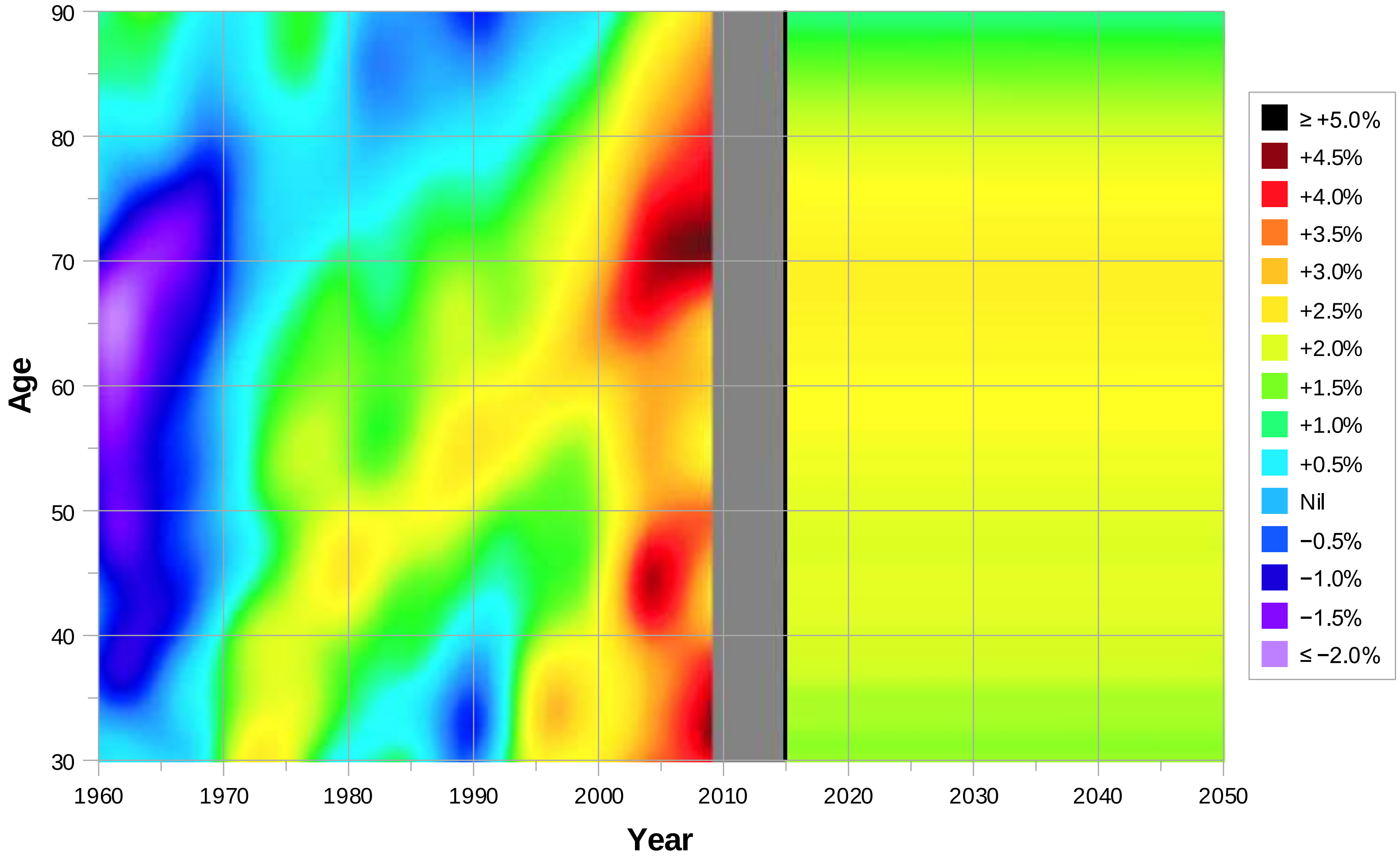
- Longer duration
- Full cover of longevity risk
- Requires high quality data

Issues

- More expensive – paying for full protection
- Requires credible experience
- Running cost

Reducing basis risk is key for an index-based longevity swap

Projecting male longevity improvement – Smoothed past then new mortality table



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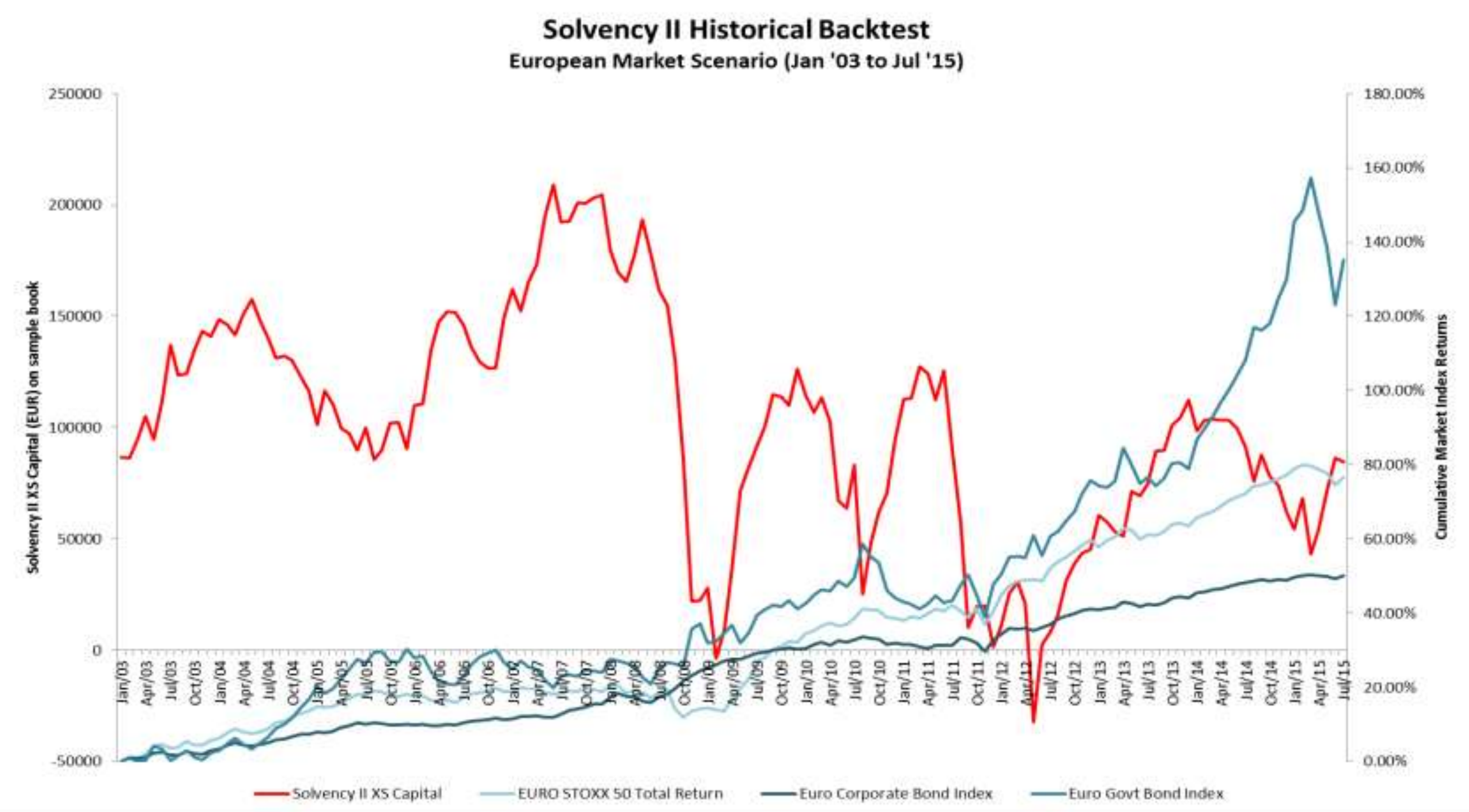
How to solve the modelling challenge?

Solvency II solutions – Capital backtesting

Capabilities in projecting Solvency II capital (Internal Model and Standard Formula) over historical and stress test scenario



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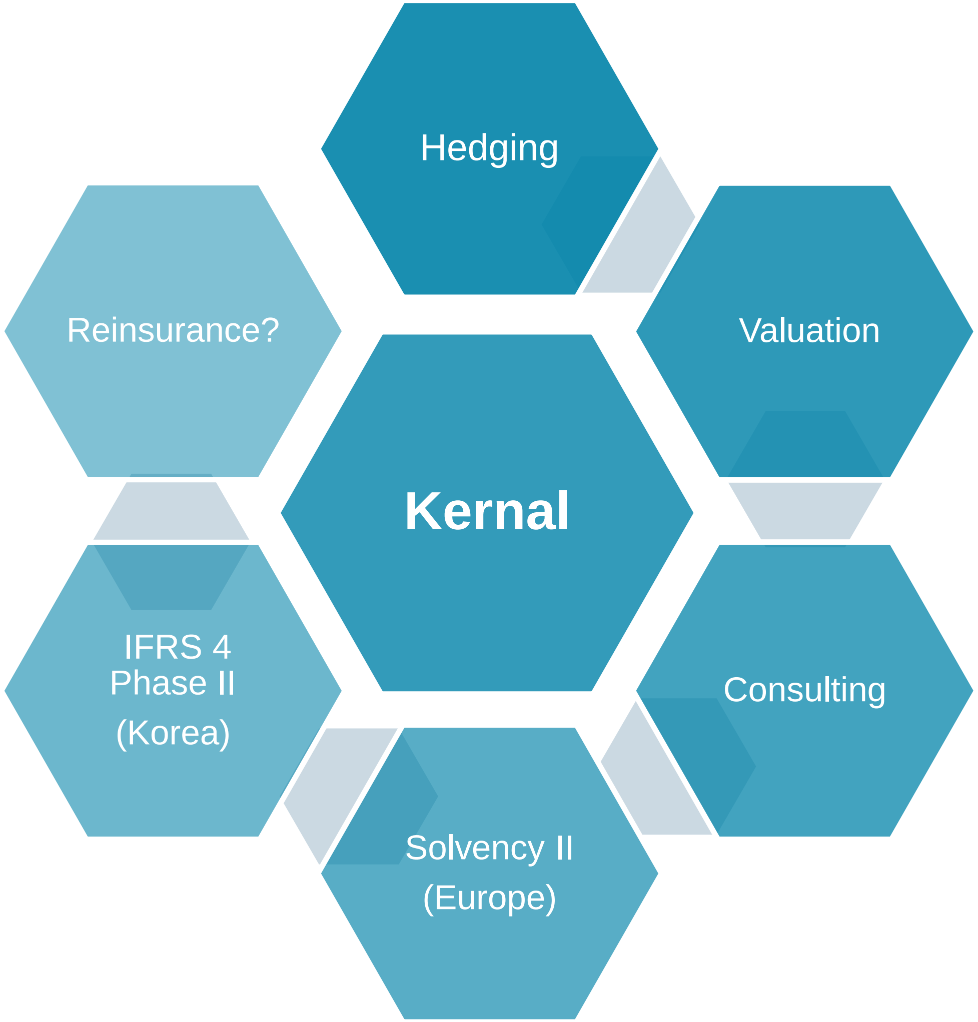
Software solution should be very wide



Find software that is TRANSPARENT, FLEXIBLE, FAST and INTEGRATED

Find the right software

30x

to

300x

faster decisions

$200 billion+

Variable Annuity insurance risks managed through **Software**

Scaled to

1 million+

computational cores

100%

code transparency

for higher confidence

3,000

Variable Annuity products modeled

90%

reduction

in manual processing time for

actuarial users

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