

# Institute & Faculty of Actuaries Life Conference 2020

**Milliman Topical Issues Webinar**

26 November 2020

# Agenda

## Insurance Capital Standard & Solvency Reform

Phil Simpson



## Solvency & Covid Updates

Neil Christy



## M&A, Consolidation, & Outsourcing Trends

Stuart Reynolds



## IFRS 17: Risk Adjustment & Disclosure of Confidence Level

John Jenkins, Russell Ward







# Insurance Capital Standards & Solvency Reform

Phil Simpson

# Why should we care about ICS?

The shape of post Brexit insurance supervision in the UK remains unclear. If it diverges away from Solvency II then we may look to other international standards as a future template. For example in 2018 the PRA in its response to the Treasury Select Committee's inquiry into Solvency II commented that:

**“We agree with the Committee on the importance of having regard to the broader international context of insurance regulation when considering any changes to domestic rules. The PRA will continue to consider the consistency of UK insurance regulation with international capital standards and emerging accounting standards.”**

Both the regulators and industry bodies have recently expressed interest in how some areas of Solvency II might look if a different supervisory regime were followed, for example the risk margin.

Those working in the industry that may be affected by ICS fall broadly into three groups:

- Those working for UK based Internationally Active Insurance Groups (IAIG)
- Those working for the UK subsidiaries or branches of IAIGs
- Those working for all other insurers in the UK who might one day be regulated in an ICS like regime.

**We expect that many viewers of today's session will be in the last category. So ICS may not just be something that affects only other people.**



# Known Issues with Solvency II

The PRA has previously highlighted a number of areas of Solvency II where improvements could be made in its response to the Treasury Select Committee's inquiry into Solvency II. There are also a number of other areas that are known concerns for the insurance industry with respect to Solvency II

Areas of Solvency II that are known areas of potential improvement by the regulators/industry:

- Risk Margin ✓
- Matching Adjustment eligibility criteria ✓ ?
- Volatility adjustment and in particular use of a Dynamic Volatility Adjustment
- Lack of an equity volatility stress ✓
- Insufficient interest rate stresses for negative interest rate environments ✓
- Regulatory reporting burden

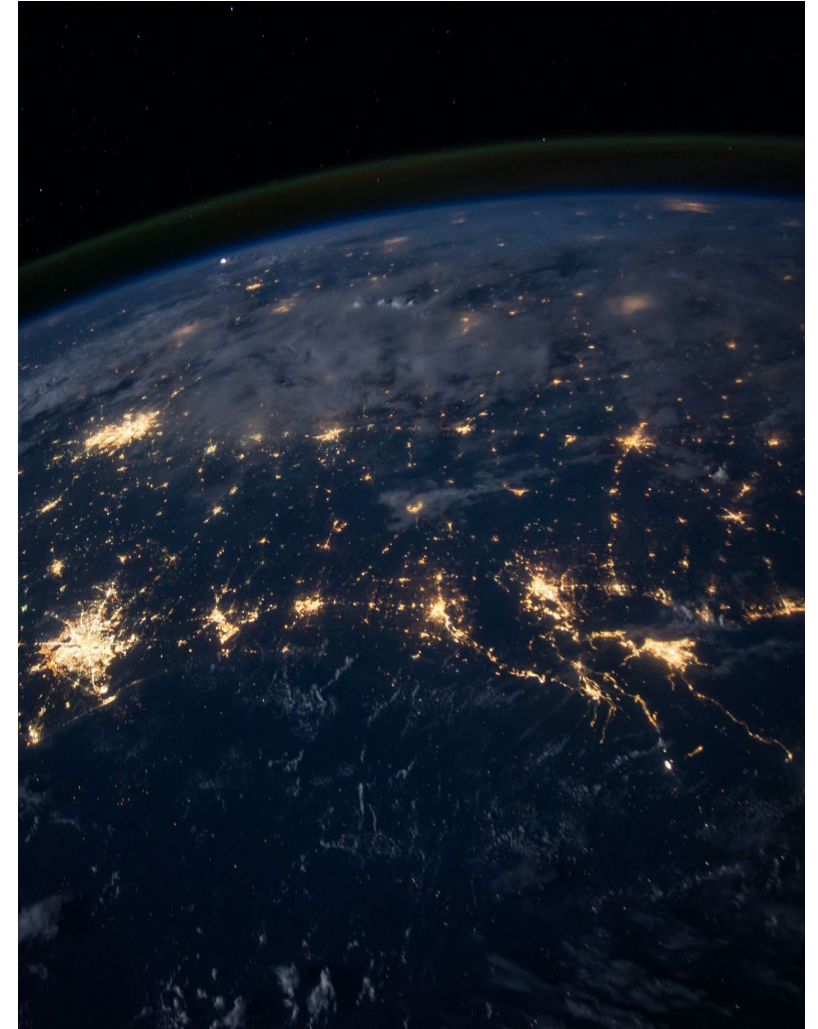
ICS may be a potential solution to some of these issues



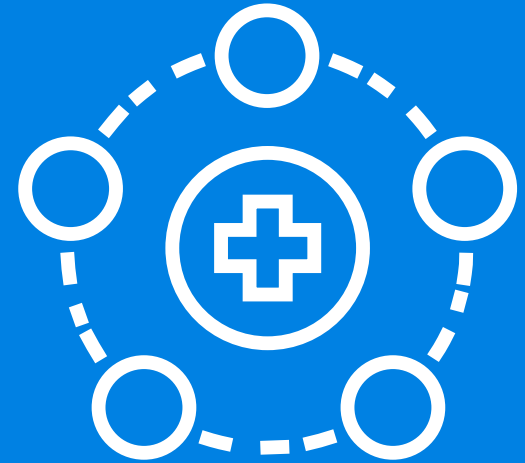
# The IAIS Global Frameworks for Supervision of IAIGs

- The IAIS has been conducting consultations with stakeholders and field testing of ICS between 2014 and 2019. Many aspects of the ICS have evolved over the course of field testing.
- The ICS were formally adopted at the end of 2019.
- There is a 5 year monitoring period from the start of in 2020. The IAIS does not expect material revisions to standard ICS methodology during the monitoring period.
  - Regulators will collect information on the ICS standard model, internal models, and other alternate measures (e.g., GAAP plus or aggregation method)
- Implementation as a prescribed capital requirement will occur at the end of the monitoring period, starting in 2025. It is possible that the final implementation may include approaches other than the ICS standard model (reference ICS):
  - For example Internal models may be allowed to replace the ICS standard model.

**The ultimate goal of the ICS monitoring period is to achieve a single ICS for an insurer that can be comparable across jurisdictions and meet the needs of the different regulators.**

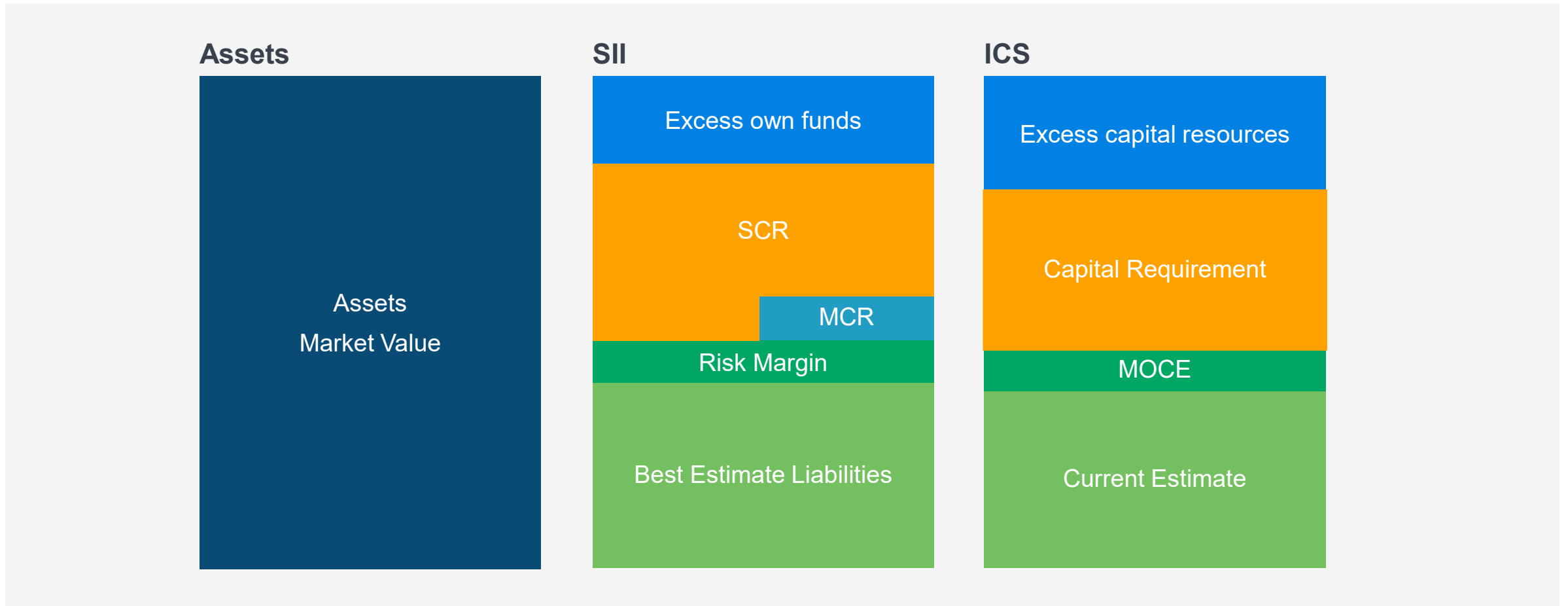


# Solvency II vs ICS



# Solvency II vs ICS balance sheets

## Assets





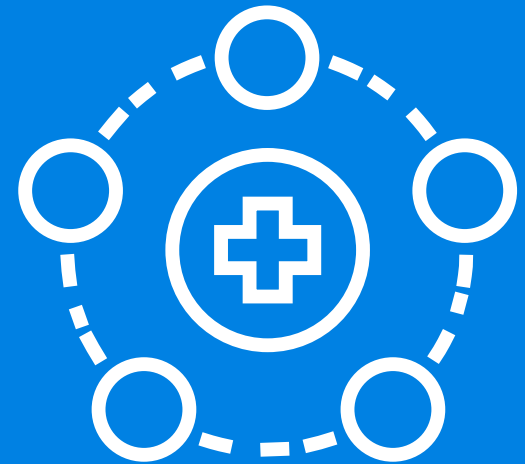
## Solvency II vs ICS Stresses (Similarities)

Risk	Solvency II Standard Formula	ICS
Mortality	+15% mortality rates	+10/12.5% (country dependent)
Longevity	-20% mortality rates	-17.5% mortality rates
Lapse Up/Down	+50% long-term rates	+20%/40% (country dependent)
Mass Lapse	-40% retail/-70% non-retail	-30% retail/-50% non-retail
Expense	+10% expenses/+1% inflation	+6-8% expenses/+1-3% inflation (country and time dependent)
Life Catastrophe	+0.15% mortality rates	Terrorism: property, mortality and morbidity impacts Pandemic: 1 per 1000 death increase
Property	-25% property value	-25% property value
Equity	Type 1: -(39% + SA) Type 2: -(49% + SA) Strategic: -22%	Listed shares: -35%/-48% Hybrid debt: stress based on rating Other equity: -49% Volatility increase scenario
Currency	More onerous of +/-25%	More onerous of two defined scenarios based on currency held and long or short position.

# Solvency II vs ICS Stresses (Key Differences)

Risk	Solvency II Standard Formula	ICS
Interest Rate Risk	Most onerous of interest rate up and down stresses	<p><b>Formula based on 5 scenarios:</b></p> <ul style="list-style-type: none"> <li>▪ Mean reversion (MR)</li> <li>▪ Level Up (LU)</li> <li>▪ Level Down (LD)</li> <li>▪ Twist Up-to-Down (TD)</li> <li>▪ Twist Down-to-Up (TU)</li> </ul> <p style="text-align: right;">} Level/Twist (LT)</p> <p><b>Combined by:</b> <math>\max\left(0, \sum_i MR_i + \text{VaR}_{99.5}\left(\sum_i LT_i\right)\right)</math></p>
Spread Risk	<p>One directional stress for corporate bonds</p> <p>Dependent on credit quality step (CQS) and duration to maturity</p> <p>Stress covers default and illiquidity risks associated to corporate bonds</p>	<p><b>Non-Default Spread Risk (NDSR)</b></p> <ul style="list-style-type: none"> <li>▪ Spread Up and Down stresses</li> <li>▪ Flow into market risk correlation as two separate stresses</li> <li>▪ Dependent on the ICS rating category (RC)</li> </ul> <p><b>Credit Risk</b></p> <ul style="list-style-type: none"> <li>▪ One directional stress</li> <li>▪ Different stresses for different asset types</li> <li>▪ Stress factors dependent on the RC and duration to maturity</li> </ul>

# Modelling Results



# Our Model

MG-ALFA annuity model calculating both the Solvency II and ICS balance sheet

## Assumptions



- Representative annuity portfolio constructed using CMI data - assuming a 10% UK market share.
- Level in-payment annuity liabilities
- Assets assumed to be zero coupon bonds
- Asset portfolio composition based on typical portfolios from EIOPA QRT analysis
- Assets assumed MA eligible

## Limitations



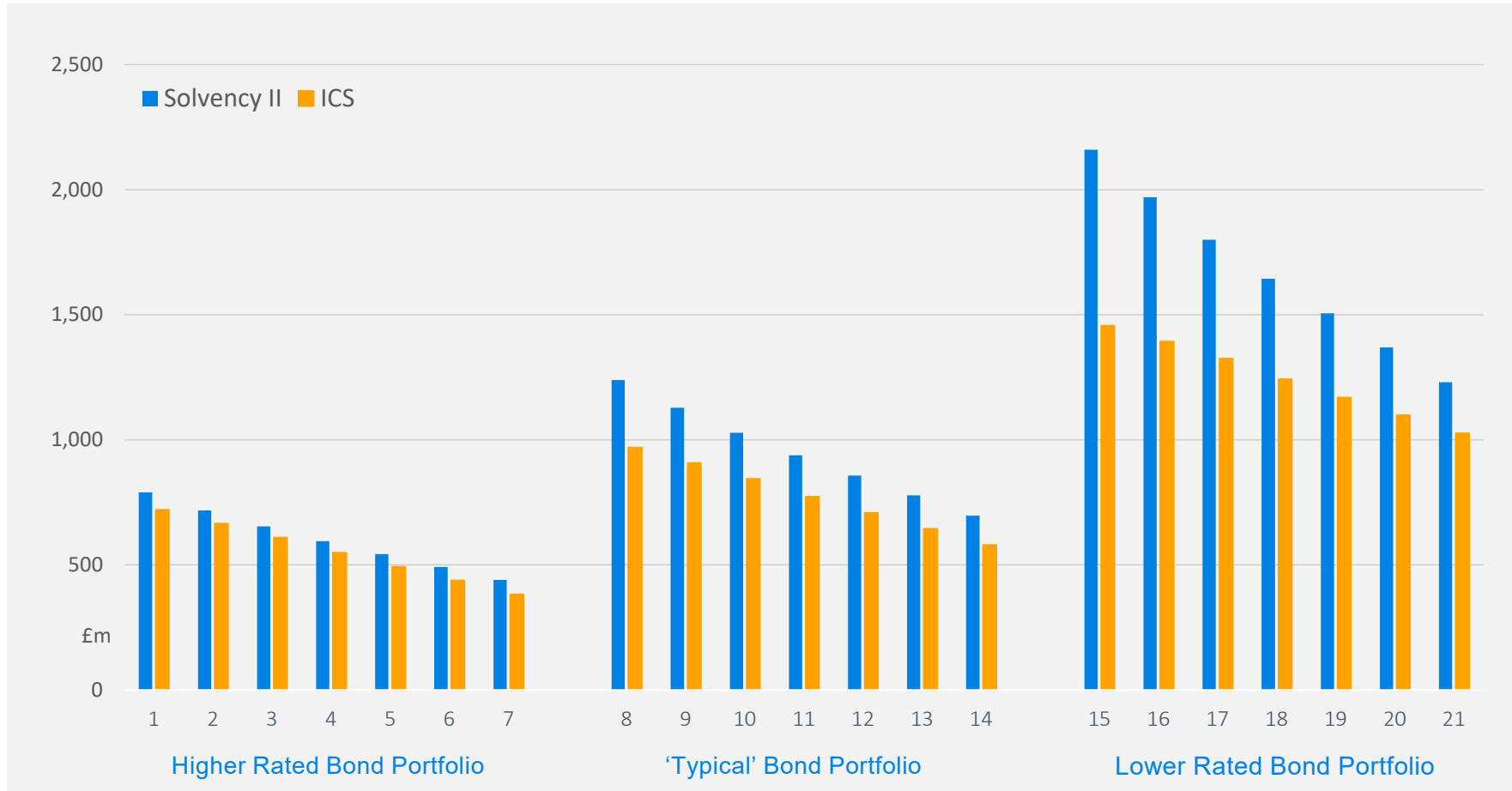
- Effect of illiquidity premia on available capital estimated from a simplified Excel annuity model.
- Second order effects of illiquidity premia on stresses aren't allowed for.



## Scenarios (valuation date 31/12/2019)

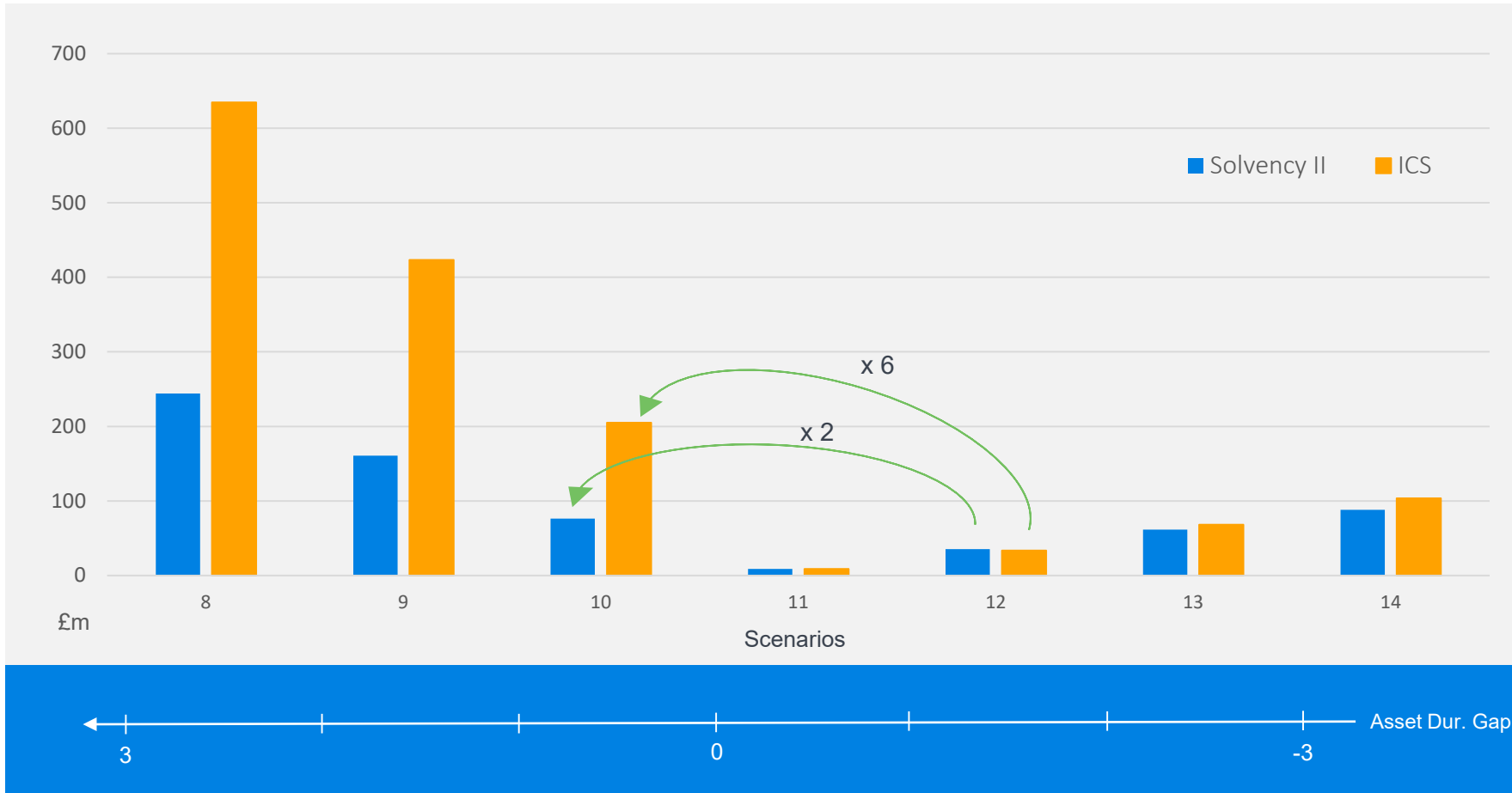
	Asset Dur. Gap	Asset portfolio composition	ICS Bucket	SII Bucket
1	3	Skewed in favour of higher rated bonds	General	RFR
2	2		General	RFR
3	1		Top	MA
4	0		Top	MA
5	-1		Top	MA
6	-2		General	RFR
7	-3		General	RFR
8	3	Typical portfolio	General	RFR
9	2		General	RFR
10	1		Top	MA
11	0		Top	MA
12	-1		Top	MA
13	-2		General	RFR
14	-3		General	RFR
15	3	Skewed in favour of lower rated bonds	General	RFR
16	2		General	RFR
17	1		Top	MA
18	0		Top	MA
19	-1		Top	MA
20	-2		General	RFR
21	-3		General	RFR

# Spread and Credit Risk



- Solvency II is more onerous across all scenarios.
- ICS becomes increasingly less onerous as the credit quality declines
- Some liquidity pickup for all liabilities – unlike Solvency II

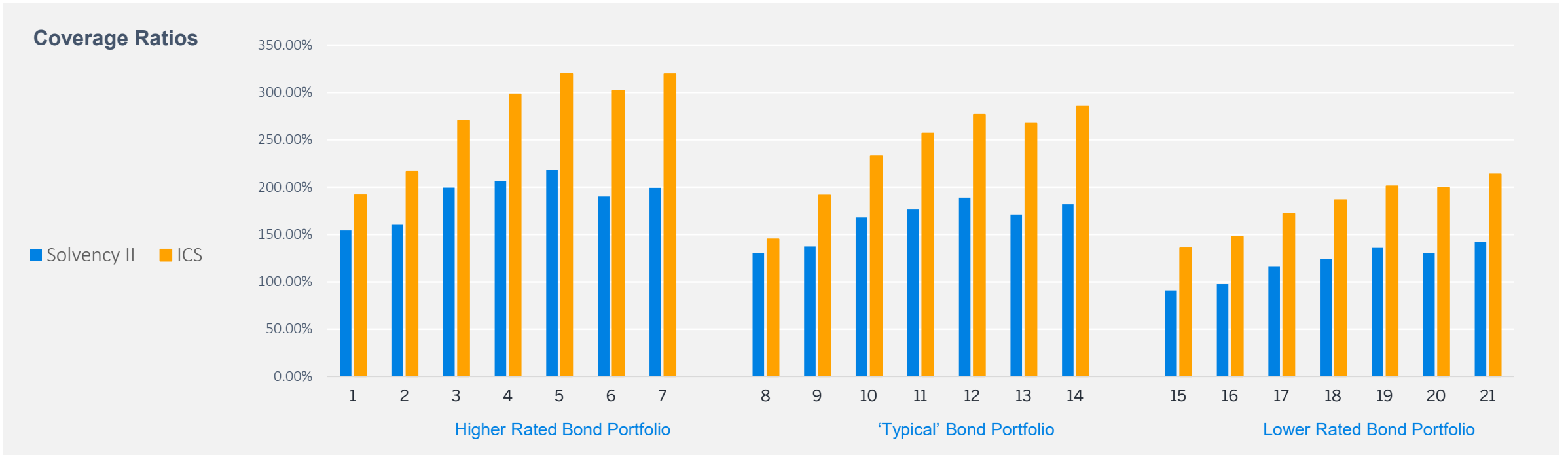
# Interest Rate Risk



- Assets long => IR up bites => MR stress double hit.
- Assets short => IR down bites
- No floor on the down stress under ICS
- ICS includes twist stresses
- Potential capital volatility

# Other Balance Sheet Components and Coverage Ratios

Longevity Risk	Expense Risk	Operational Risk	Capital Requirement (scenario 10)	Risk Margin Vs MOCE
c15% higher under SII	c25% higher under SII	Similar	Pre Div: c5% higher under SII Post Div: c15% higher under SII	c50% higher under SII





# Concluding remarks

Based on our analysis to date, we note the following key observations:

Application of illiquidity premia appears **more generous** under ICS, leading to lower reserves (BEL vs. CE) under ICS compared with Solvency II

Capital for spread/credit risk on bonds is generally lower under ICS compared with Solvency II, in particular for portfolios tilted towards lower credit ratings

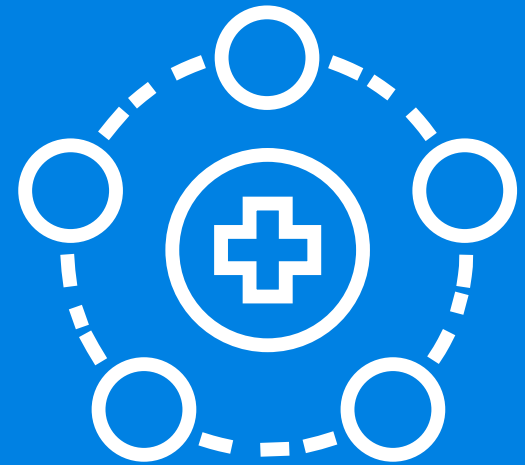
Separation of credit risk on bonds into its own risk module leads to **greater diversification** under ICS

Combination of mean reversion and level/tilt stresses for rates introduces a gearing effect on capital in the current environment where interest rates up bites. This may increase capital volatility where the biting direction of the stress switches between rates up and down

ICS MOCE is a **simpler calculation** that would be less sensitive to interest rates compared with the Risk Margin under Solvency II – for annuity business, its quantum also seems likely to be lower

Overall, under ICS, there is an improvement in Own Funds, reduction in Capital Requirement and hence a double boost to the Solvency Coverage Ratio

# Q&A







# Solvency & Covid Updates

Neil Christy



# What happened initially?

In July 2020 Milliman published an article on what firms said about COVID-19 in their SFCRs

**One of the conclusions of this paper was that:**

“Most insurers considered that their capital positions and operational resilience remained strong at this stage”

MILLIMAN WHITE PAPER

## COVID-19: What have we learnt from SFCRs of UK life insurers

Paul Fulcher, FIA  
Sihong Zhu, FIA  
Samuel Burgess



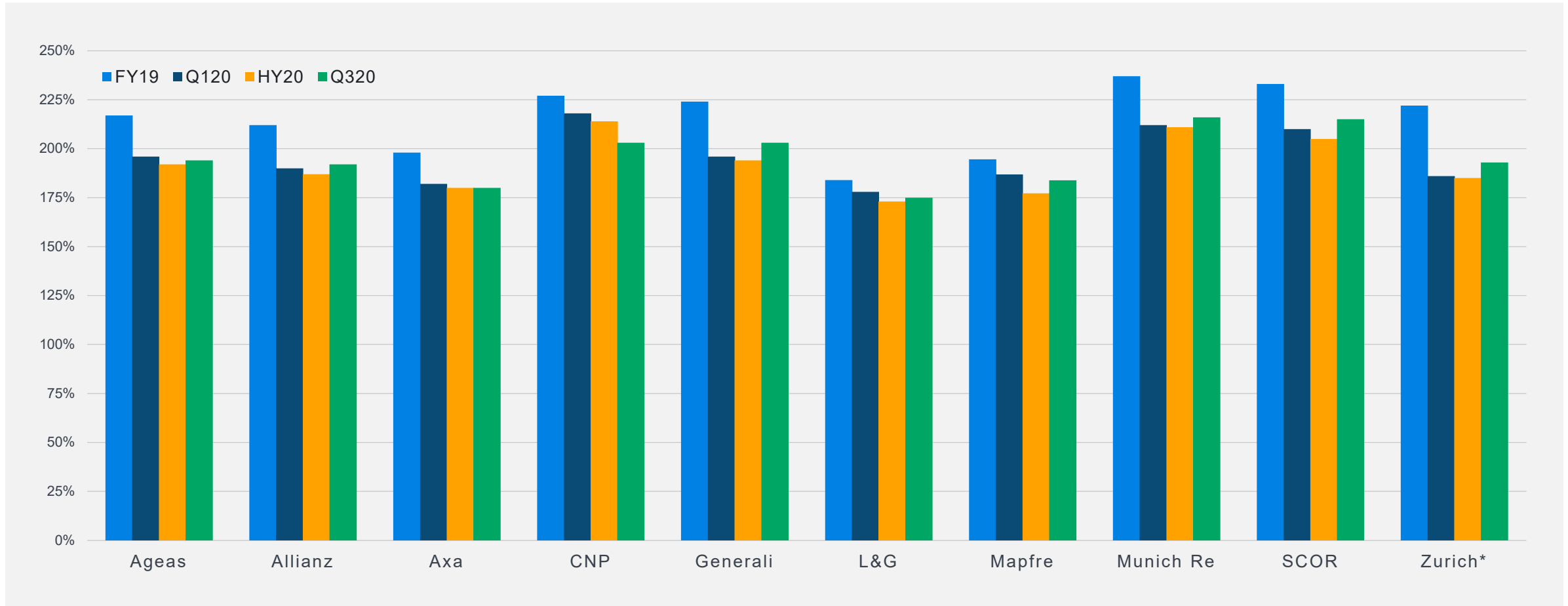
The spread of COVID-19 has had a profound impact on public health, but also on the economy. Both are expected to have implications for the operations, financial stability and business continuity of life insurers globally.

We have reviewed the Solvency and Financial Condition Reports (SFCRs) that were recently published by major life insurers in the United Kingdom to examine the disclosures made on the impact of COVID-19.

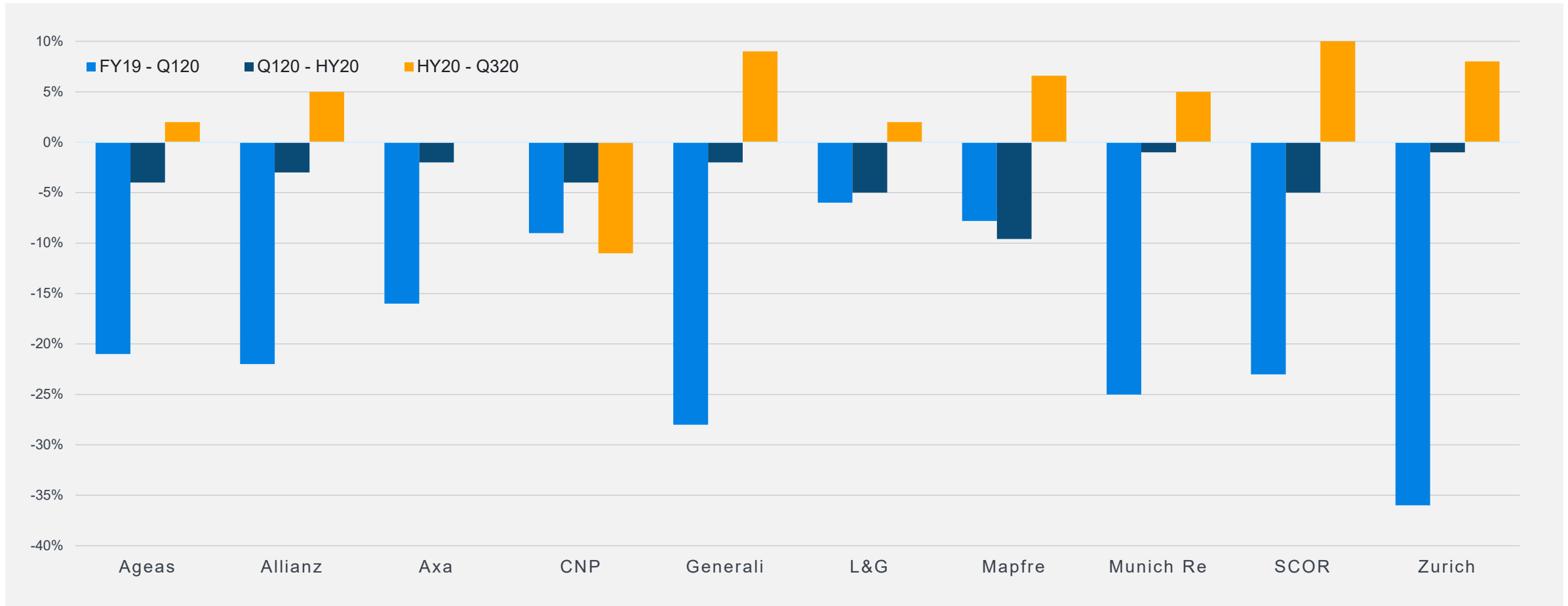
- **Operational risk**, as a result of business disruption, such as providing support to existing customers; or as a result of any delay in asset transactions due to information technology (IT) or process-related issues



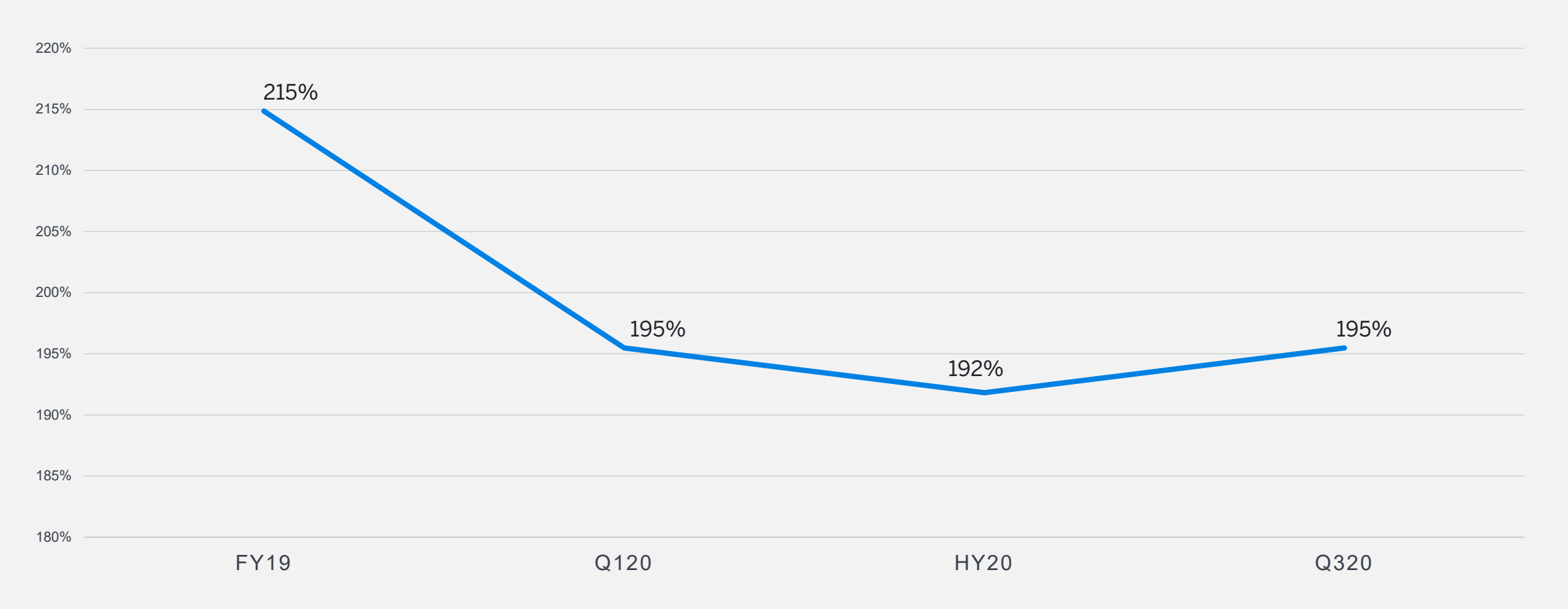
# Solvency in 2020



# Solvency Movements Quarter to Quarter



# Solvency Movements Quarter to Quarter



## What do firms say?

### **AXA**

“AXA’s strategic choices in recent years, favoring technical risks over financial risks, have positioned the Group well for the future and are confirmed by the Group’s strong performance in the context of Covid-19”

### **CNP Assurances**

“CNP Assurances demonstrated its resilience over the first nine months of 2020, ending the period with very high third quarter business volumes, especially in Brazil. The Covid-19 financial and public health crisis has had limited impact at this stage.”

### **SCOR**

“SCOR Global Life absorbs the shock of Covid-19 and demonstrates the resilience of its business model”

### **Zurich**

“Over the third quarter, the Group continued to successfully manage the unprecedented challenges of COVID-19”

# How has Solvency II performed?

Did Solvency II hold up under its first major test?

## Key Objectives



- Improved protection of policyholders and beneficiaries
- Harmonisation
- Effective risk management
- Financial Stability

## Areas for improvement



- Volatility Adjustment – did not work as expected?
- Interest Rate Stresses – interest rate down stresses too low?
- Equity Symmetric Adjustment – lower limit came into play

# Summary remarks

Solvency is lower relative to year-end 2019

However, solvency coverage remains high for the firms in the sample, never falling below 170% for any of the firms

There was a small recovery in the third quarter of 2020 for these firms on average

Firms own statements suggest a strong year despite COVID-19

Solvency II has overall met its objectives and has held up under its first major test

There are areas for improvement, including the Volatility Adjustment



# Q&A





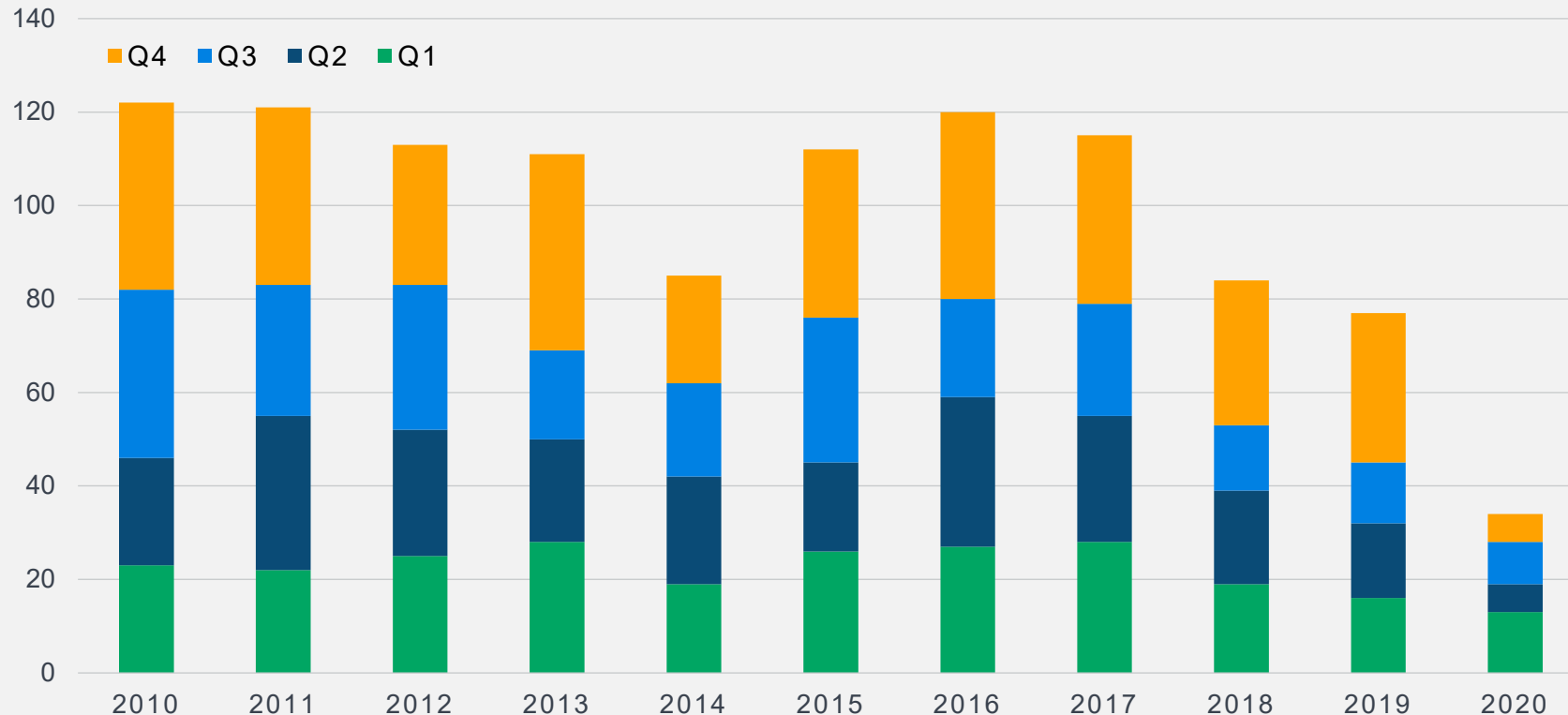
# M&A, Consolidation, and Outsourcing Trends

Stuart Reynolds

# European M&A Activity – Life Insurance Market



Number of Transactions (Announced)



- Number of announced deals **stable** Q1 2019 (16) to Q1 2020 (13)
- **Reduction** in number of announced deals Q2 2019 (16) to Q2 2020 (6)
- **Reduction** in number of announced deals Q3 2019 (13) to Q3 2020 (9)

# Strategic Reviews by Insurance Groups

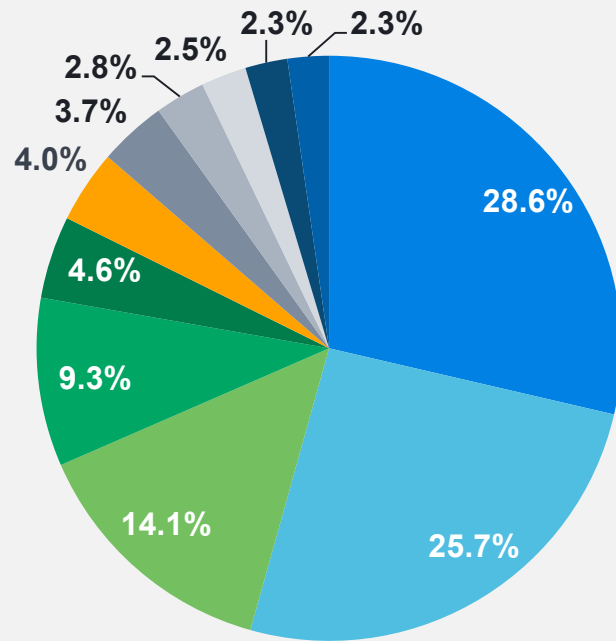


<b>Strategic Reviews</b> <ul style="list-style-type: none"> <li>▪ Help work through change</li> <li>▪ Look to the future – risks &amp; opportunities</li> <li>▪ New external environment             <ul style="list-style-type: none"> <li>▪ Economic</li> <li>▪ Regulation</li> </ul> </li> </ul>	<b>Aegon</b>	<p><b>“Transform our organisation to become simple, digital, and scalable”</b></p> <p>Press comment on possible sale of Eastern European business</p>
	<b>Aviva</b>	<p><b>“We will focus the portfolio”</b></p> <p>Press comment on sales of various businesses. Recent announcement - "exploring options"</p>
	<b>AIG</b>	<p><b>“Simplified structure will unlock significant value”</b></p> <p>Planned separation of Life &amp; Retirement business</p>
	<b>Prudential</b>	<p><b>“Jackson will need access to additional investment, which we believe would best be provided by 3rd parties”</b></p> <p>Preparing for full separation and divestment of US business</p>
	<b>Generali</b>	<p><b>“..four key strategic actions have been taken: ... targeted in-force disposals which enable resilient margins”</b></p> <p>Significant funds available for acquisitions</p>
	<b>Phoenix Group</b>	<p><b>“..European business..... it is assessing a range of strategic options to maximise value for shareholders”</b></p> <p>Press comment on possible sale of European business</p>

# Level of Consolidation in European Markets



Split of Life Technical Provisions by Country (2019)

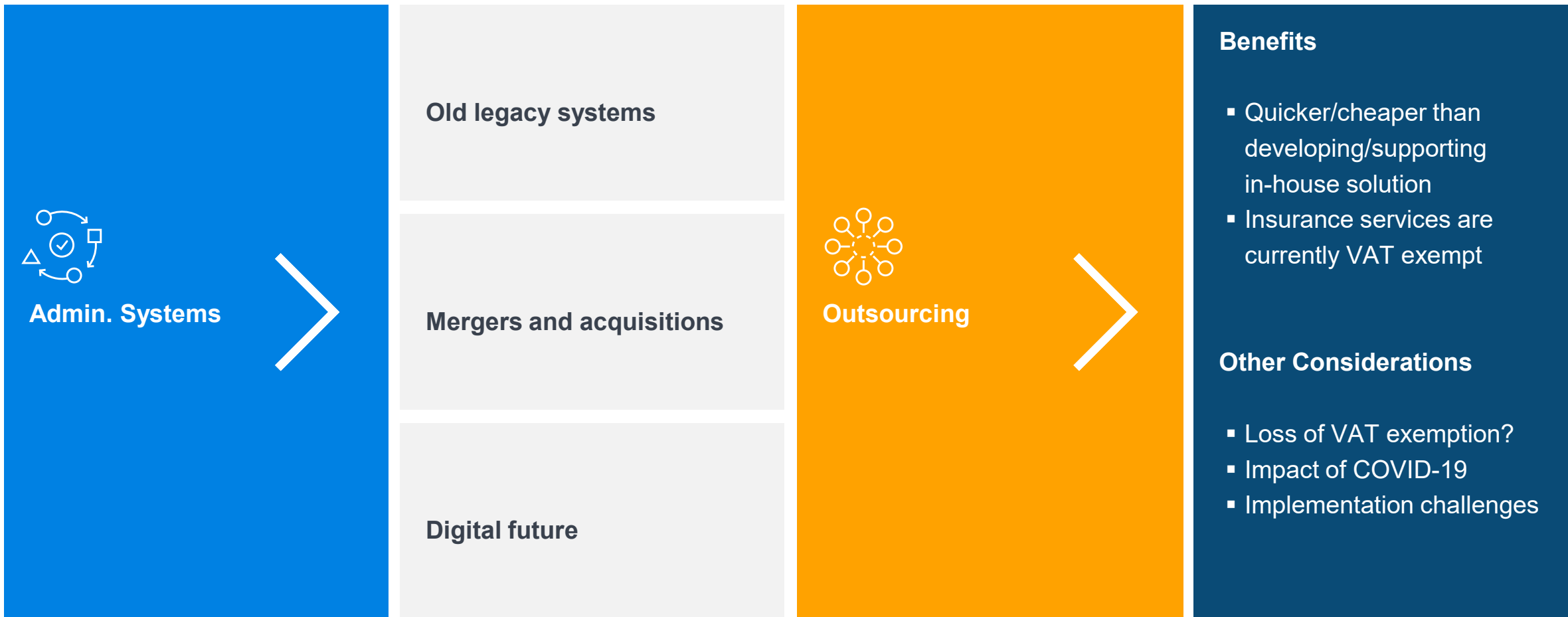
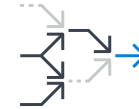


Total 2019 Life Technical Provisions £7.4 trillion

Country	Number of Firms	Life TPs (£bn)	Number firms cover 80% TPs	Number firms cover last 20% TPs
UK	98	2,010	14	84
France	224	1,804	16	208
Germany	184	992	24	160
Italy	45	653	15	30
Netherlands	29	320	4	25
Denmark	25	282	9	16
Ireland	52	263	13	39
Belgium	26	195	7	19
Sweden	56	176	10	46
Luxembourg	43	164	9	34
Spain	91	160	13	78

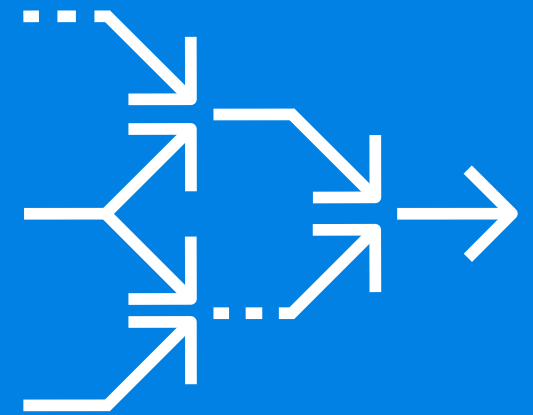
■ Potential for consolidation?

# Outsourcing Administration





# Q&A





# IFRS 17: Risk Adjustment & Disclosure of Confidence Level

John Jenkins, Russell Ward

# IRS17 Risk Adjustment – Deriving the Confidence Level

IFRS17  
requirements

Alternative  
approaches

Closed form  
solution

Annuity based  
illustration



### IFRS 17 Standard; Paragraph 37, Risk Adjustment:

“An entity shall adjust the estimate of the present value of the future cash flows to reflect the compensation that the entity requires for bearing the uncertainty about the amount and timing of the cash flows that arises from non-financial risk.”

### IFRS 17 Standard; Paragraph 119, Disclosure Requirement,

“An entity shall disclose the confidence level used to determine the risk adjustment for non-financial risk. If the entity uses a technique other than the confidence level technique in determining the risk adjustment for non-financial risk, it shall disclose the technique used and the confidence level corresponding to the results of that technique.

*Disclosed confidence level likely to be picked up on and benchmarked by analysts.*

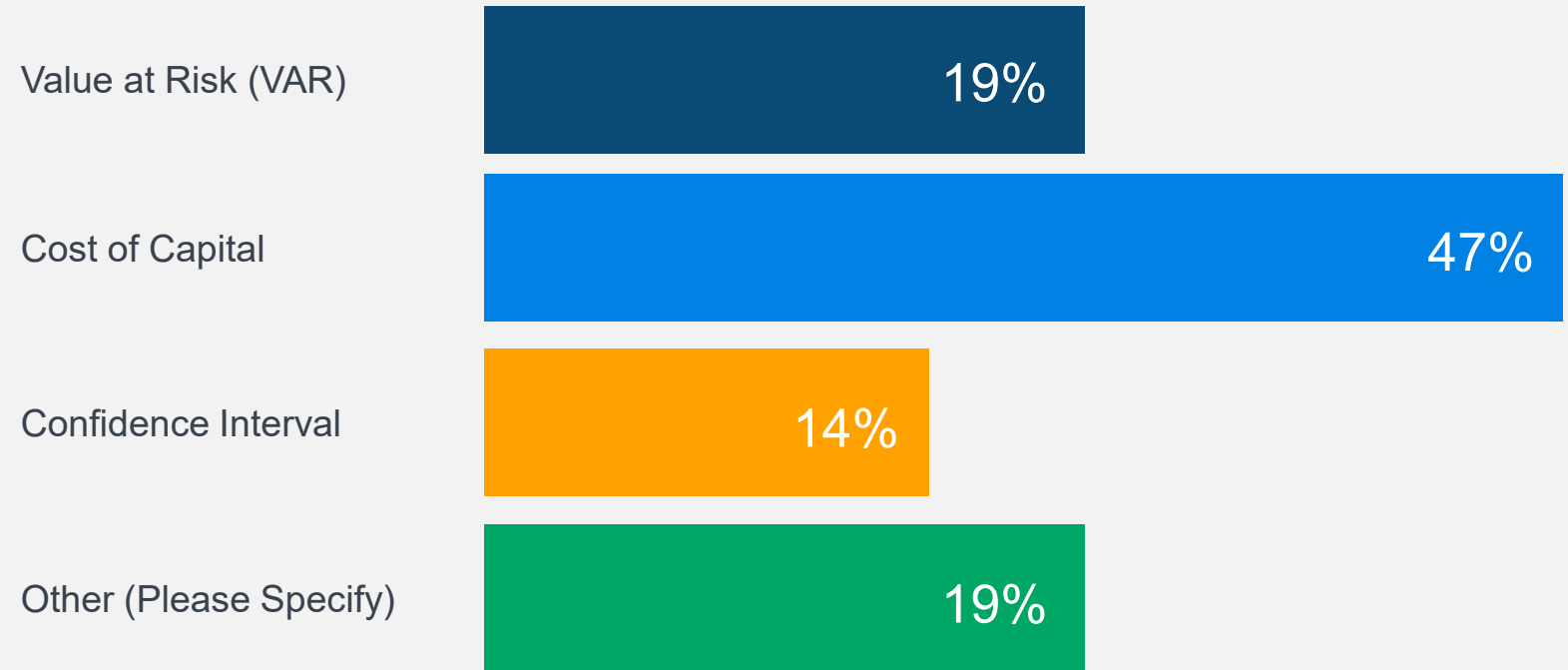
# Alternative RA approaches

Alternative risk adjustment (“RA”) approaches shown below from Milliman Survey.

Other than where a direct Confidence Interval approach is used, disclosure calculations will be needed.

## Q37: Select method you expect to use.

For respondents who selected ‘Other,’ a majority of the insurers have indicated the method is under consideration. One respondent mentioned the use of deterministic prudence margin.





# How to work out the Confidence Level

## Two fundamental alternatives:

### Make use of full cashflow distributions for all risk factors

- Possible for large entities with internal models and full distributions/aggregations covering all risks
- This will produce the “correct” result, consistent with the internal models and distributions
- But still onerous to do within IFRS WDT?
- And potentially volatile or not-easily-explainable results?

### Make use of a closed form solution to derive/approximate the confidence level

- Akin in principle to using Black-Scholes to value guarantees as opposed to a full stochastic model
- Doable for Standard Formula firms or those without full distributions
- Doable within IFRS WDT, as can set up all parameters/formulae in advance
- Advantage of control over changes to distribution/aggregation parameters, explainable and less volatile results?

Surveys show a number of companies have not yet fully defined or developed their approach in this area.

# Closed form methodology - 1

- Identify the **risks** relevant to each class of business, and select appropriate **models** for these risks taking into account factors such as:
  - Portfolio experience, analysis, and variability over time
  - Internal risk/ORSA-type analysis
  - Industry/market/regulator studies where relevant
- For each risk, determine closed form approximations for the first **three moments** of the distribution of deviations in the liability cash flows (i.e. mean, variance, skewness). Determination of moments can take into account portfolio characteristics such as product type, age, term and duration.
- Determination of moments can be done using company's standard **cash flow** models or alternatively using simpler **side-models**.
- Using a correlation structure between the risk factors, determine the **aggregate** cash flow risk profile and corresponding moments.
- Use the moments derived to convert the initial RA amount into a confidence level.

## Key Issue/Judgement

What is the Risk Horizon for these calculations? 1-year, full-term, something in-between?

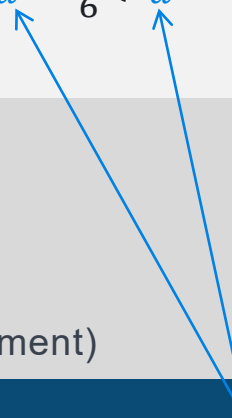
- Theoretically full-term but industry views differ
- Fortunately, the closed form method can be generalised to work whatever the risk horizon



## Closed form methodology - 2

Percentile conversion method: example of Cornish-Fisher

**Cornish-Fisher expansions:** The Cornish-Fisher expansion is a technique aimed to approximate a distribution of interest based on its moments up to some order. The expansion in its simple form states the following approximation:

$$VaR_{\alpha}(X) \approx \mathbb{E}[X] + \sqrt{Var(X)} \left( z_{\alpha} + \frac{1}{6} (z_{\alpha}^2 - 1) S(\tilde{X}) \right)$$


where

- $z_{\alpha}$  is the  $\alpha$ -percentile of the standard Normal distribution,
  - $S(\tilde{X})$  is the skewness function,
  - We assume here that the Value At Risk is an input (i.e. the Risk Adjustment)
- 
- With knowledge of the moments only, the percentile can be recovered by solving a second order equation for  $z_{\alpha}$ .
  - $\alpha$  is the unknown which we are solving for – the Confidence Level.

# Illustration – annuity in payment block

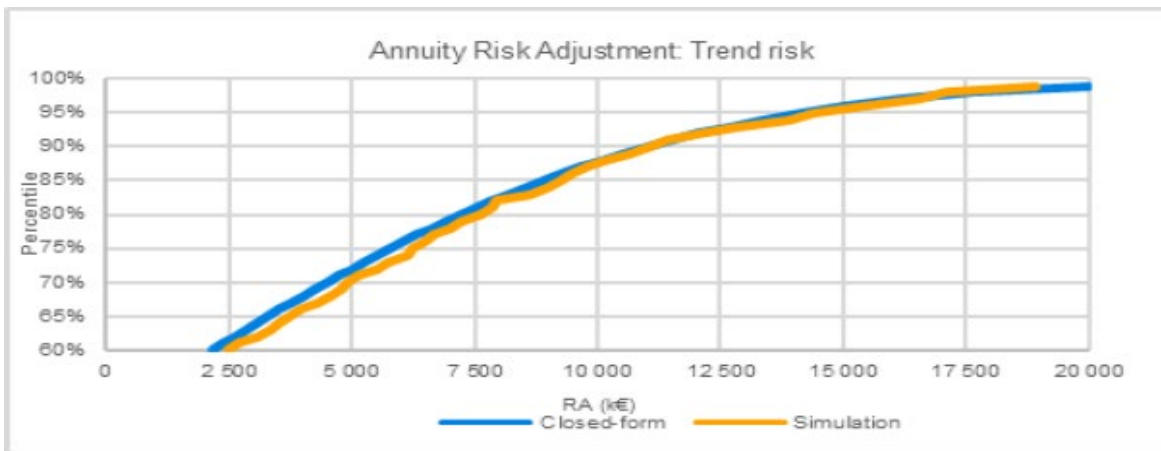
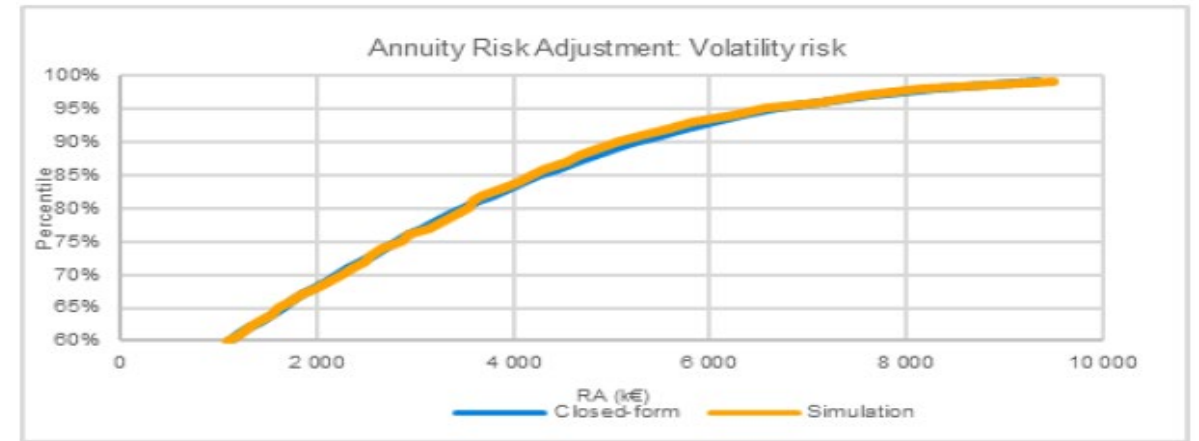
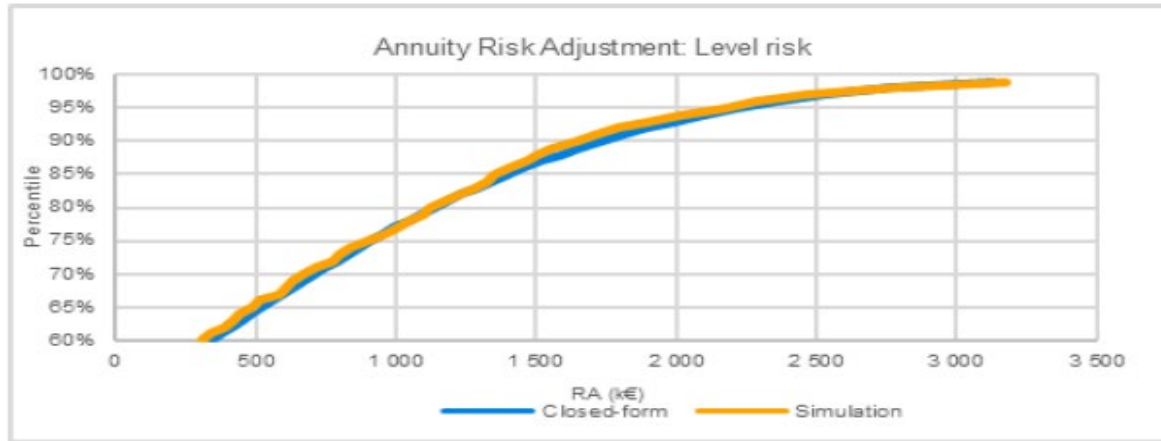
Consider the mortality/longevity risk on an annuity in payment block with the following risk components. The table shows possible distributions for each risk component:

Risk Component	Distribution
Level Risk	Poisson
Volatility Risk	Binominal
Trend Risk	Lee-Carter type time series model with normal distribution variations

- Risk Horizon (Key judgement) – 5 years (so no risk/variation) after 5 years
- Following graphs show outcome for each risk component for both:
  - Closed form solution
  - Full risk distribution approach
- Results very close for each risk component
- Also still close for 1-year and 10-year risk horizons

# Illustration – annuity in payment block

Results for different risk components

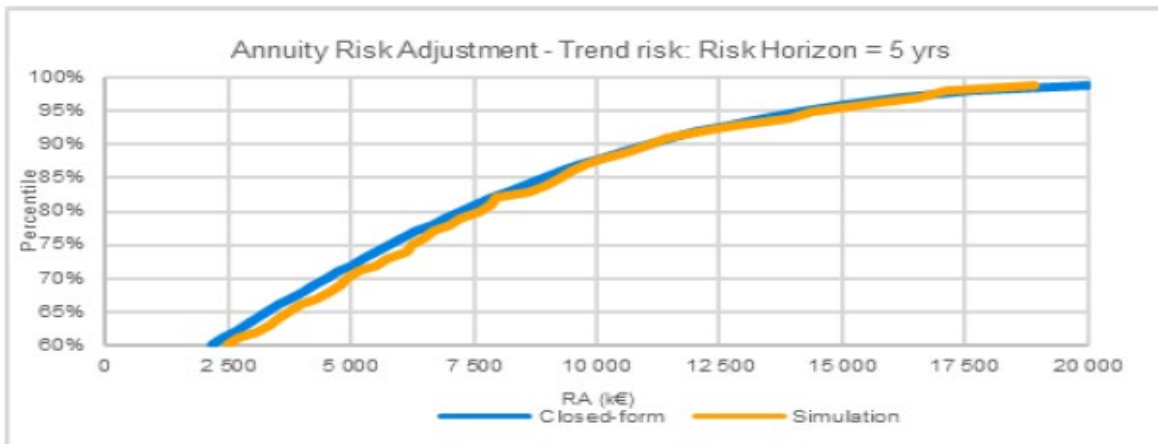
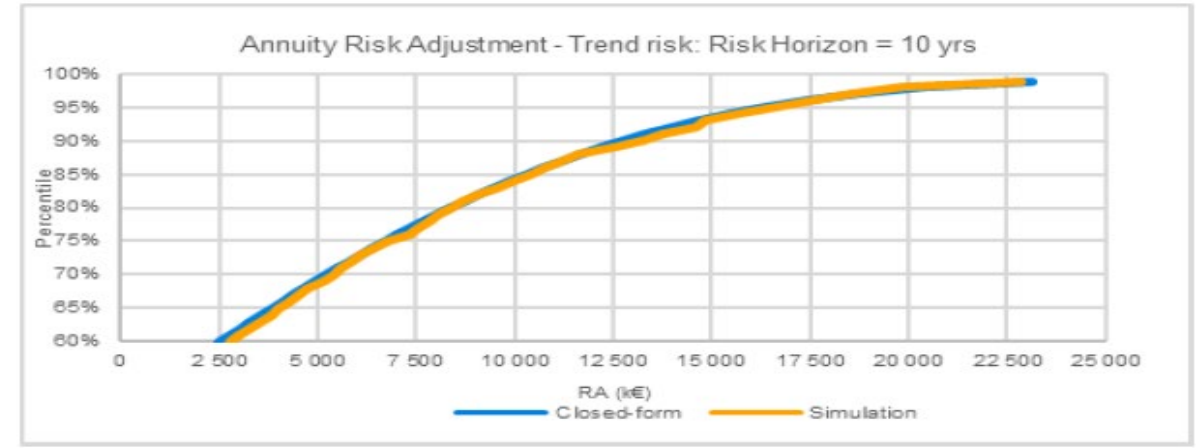
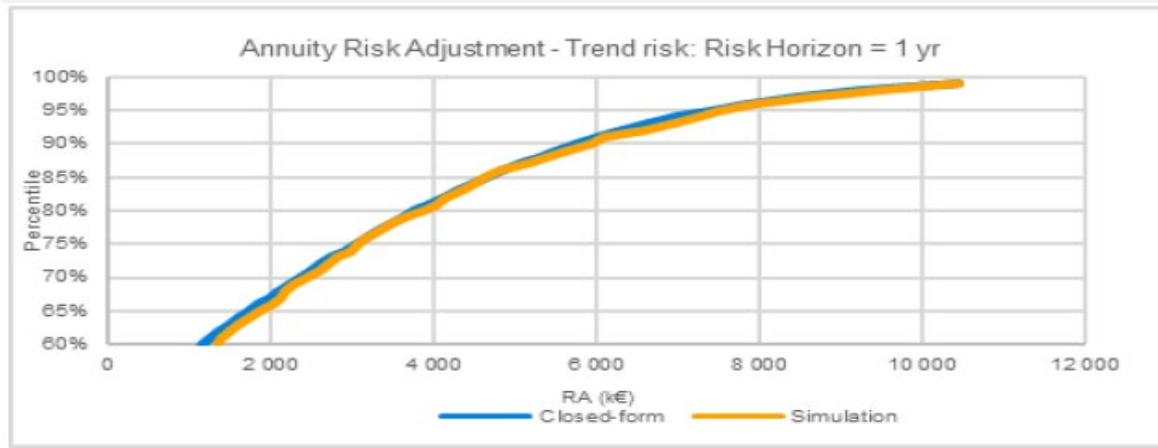


## Key takeaway:

A closed form approach can deliver an accurate estimate of the implied confidence level for different risks.

# Illustration – annuity in payment block

Results for different risk horizons



## Key takeaway:

A closed form approach can work well irrespective of the choice of risk horizon.



# Summary

Where the Risk Adjustment approach does not directly use or lead to the Confidence Level to be disclosed, a workable and practical Closed Form Solution can be developed and used

## Several advantages including:

- Can do the hard work off-cycle, and hence meet Working Day Timetable
- Robust and controllable

Clearly needs some up-front work to set up the approach

## Further details set out in Milliman paper:

[https://fr.milliman.com/fr-fr/insight/IFRS-17-Deriving-the-confidence-level-for-the-Risk-Adjustment-A-case-study-for-life-reinsurers](https://fr.milliman.com/fr/fr/insight/IFRS-17-Deriving-the-confidence-level-for-the-Risk-Adjustment-A-case-study-for-life-reinsurers)



# Q&A





# Speaker Contact Details

**Chair: [john.jenkins@milliman.com](mailto:john.jenkins@milliman.com)**

Insurance Capital Standard & Solvency Reform  
[philip.simpson@milliman.com](mailto:philip.simpson@milliman.com)

Solvency & Covid Updates  
[neil.christy@milliman.com](mailto:neil.christy@milliman.com)

M&A, Consolidation, and Outsourcing Trends  
[stuart.reynolds@milliman.com](mailto:stuart.reynolds@milliman.com)

IFRS 17: Risk Adjustment and Disclosure of Confidence Level  
[john.jenkins@milliman.com](mailto:john.jenkins@milliman.com), [russell.ward@milliman.com](mailto:russell.ward@milliman.com)



# Thank you

This presentation has been prepared for illustrative purposes only. It should not be further distributed, disclosed, copied or otherwise furnished to any other party without Milliman's prior consent. The information herein shall not constitute specific advice and shall not be relied on.

Nothing in this document is intended to represent a professional opinion or be an interpretation of actuarial standards of practice. Its contents are not intended by Milliman to be construed as the provision of investment, legal, accounting, tax or other professional advice or recommendations of any kind, or to form the basis of any decision to do or to refrain from doing anything. Milliman and the authors of this document expressly disclaim any responsibility for any judgements or conclusions which may result therefrom.

This document is based on information available to Milliman at the date of issue, and takes no account of subsequent developments after that date.

Where the authors of this document have expressed views and opinions, their views and opinions are not representative of others in Milliman, and do not relate specifically to any particular products. Milliman and its affiliates and their respective directors, officers and employees shall not be liable for any consequences whatsoever arising from any use or reliance on the contents of this document including any opinions expressed herein.

This document may not be reproduced or distributed to any other party, whether in whole or in part, without Milliman's prior written permission, except as may be required by law.