Session 039: IFRS 17 is Coming! Let's Talk About Discount Rates and Economic Scenario Generation

2019 SOA Annual Meeting

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Let's Talk About Discount Rates and Economic Scenario Generation

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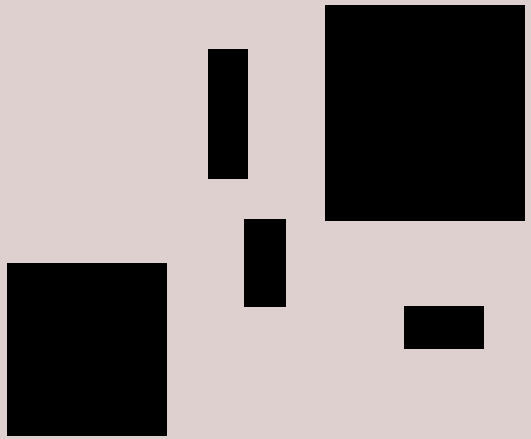
Moderator and Presenters

Moderator / Presenters	Background
 **Lisa Giancola** **FSA, FCIA** **Director** **Willis Towers Watson** Toronto, ON 416.960.2639 Lisa.Giancola@willistowerswatson.com	■ Lisa is a director with the Willis Towers Watson's Insurance Consulting & Technology practice. She has more than twenty-five years of life (re)insurance industry experience. Lisa provides consulting services to life and health insurers in a number of areas, including appointed actuary work, actuarial valuations, financial reporting and regulation, capital and risk management, reinsurance, and peer reviews. She advises on multiple valuation bases and solvency regimes, across various jurisdictions. ■ Currently, Lisa is a member of the CIA's Life Insurance and Financial Reporting Committee, and a number of IFRS 17 working groups.
 **Dan Kim** **FSA, CERA, MAAA** **Director** **Willis Towers Watson** Atlanta, GA 678 684 0617 Dan.Kim@willistowerswatson.com	■ Dan is a Director with the Insurance Consulting & Technology business of Willis Towers Watson in Atlanta, U.S. Dan has consulted life insurance companies in relation to financial reporting and risk management by implementing or reviewing embedded value (EEV, MCEV), pricing and economic capital models (Solvency II, ICS, Bermuda BSCR). Dan currently leads an Economic Scenario Generation initiative for the firm's Americas Life Practice. ■ Dan's IFRS 17 related experience includes trainings, developing and reviewing guidance notes/technical papers, and financial impact analysis.
 **Ruth Moore** **FIA** **Product Manager** **Moody's Analytics** Edinburgh, UK Ruth.Moore@moodys.com	■ Ruth is an Associate Director in the Insurance division at Moody's Analytics, where she works within the Scenario Generator Advisory Services team. Ruth joined Moody's Analytics in 2014 and has worked in both the Advisory Services and Product Management teams, focusing on the Scenario Generator and associated product suite. ■ In her current role, Ruth leads advisory services for clients using the Scenario Generator within their capital modelling and valuation functions. In this role, Ruth has gained a broad understanding of the regulatory challenges facing insurers, in particular, the challenges posed by regulatory capital regimes and, more recently, IFRS 17. Ruth has supported a wide range of life and general insurance clients in the implementation of the ESG and the delivery of bespoke modelling and calibration solutions.

Agenda

- Estimating the discount rate
- Considerations in applying the discount rate
- Financial analysis and sensitivity
- Introduction to stochastic modelling

Estimating the discount rate



IFRS 17 Standard – Discount rates

Paragraph 36

Adjust estimates of future cash flows to reflect the time value of money and the financial risks related to those cash flows, to the extent that financial risks are not included in the cash flow estimates.

B74 - Characteristics of Insurance Contract Cash Flows

Shall be consistent with other estimates used to measure insurance contracts to avoid double counting or omissions. Cash flows that do not vary based on the returns on any underlying items shall be discounted at rates that do not reflect any such variability, and vice versa.

B78 - Market Consistent

Be consistent with observable current market prices (if any) for financial instruments with consistent cash flow characteristics, in terms of, for example, timing, currency and liquidity.
Shall not contradict any available and relevant market data or observable market variables.

B79 – Liquidity Characteristics

Adjusted to reflect the liquidity characteristics of the insurance contracts. That (liquidity) adjustment shall reflect the difference between the liquidity characteristics of the insurance contracts and the liquidity characteristics of the assets used to determine the yield curve .

IFRS 17 Standard references:

- *Paragraph 36*
- *Appendix B - Application Guidance B72 – B85*
- *Basis for Conclusions BC185 – BC205*
- *Illustrative Examples*

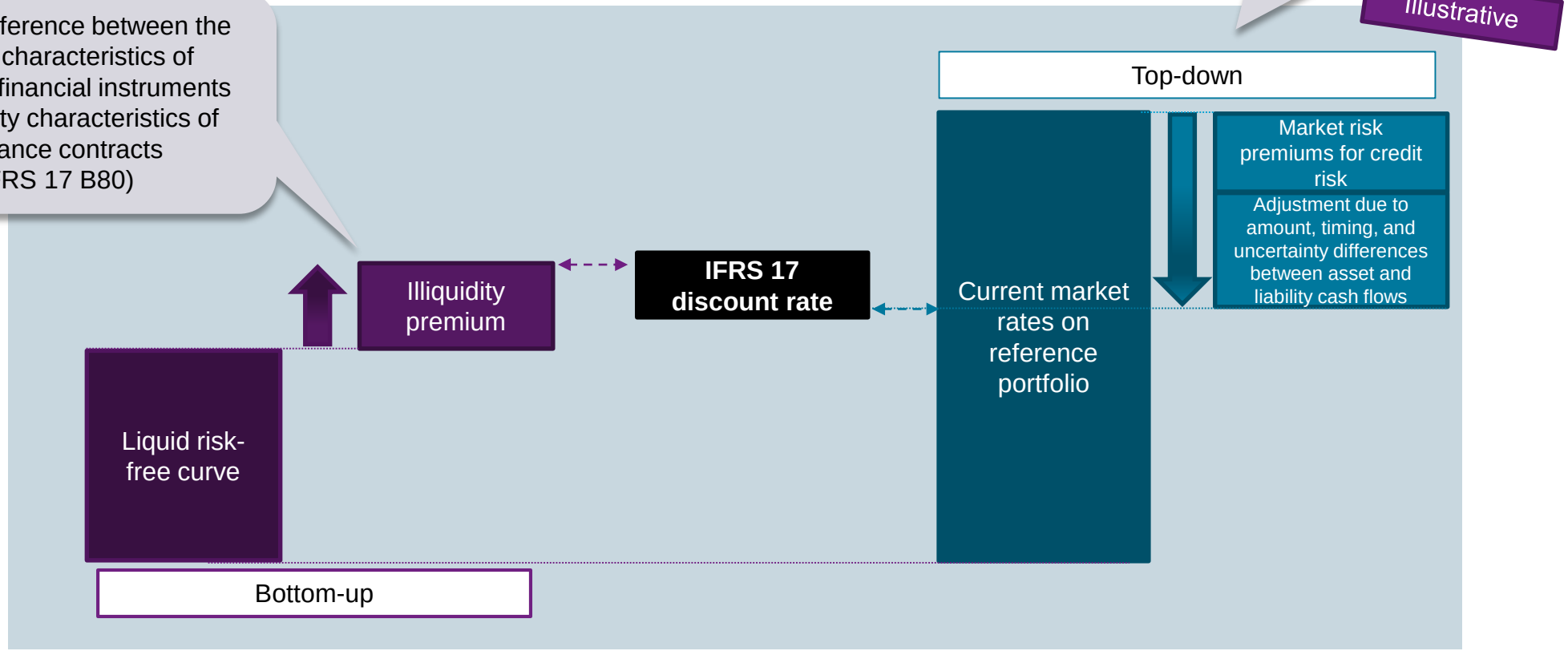
Estimating the discount rate

Two approaches: Bottom-up and Top-down

Adjust current market rates of a reference portfolio of assets (IFRS 17 B81)

Illustrative

Reflects difference between the liquidity characteristics of underlying financial instruments and liquidity characteristics of insurance contracts (IFRS 17 B80)



An entity is not required to reconcile the discount rate between the two approaches

Top-down approach

Current market rates of a reference portfolio – market prices

Estimating the yield curve under a top-down approach

Top-down approach

Examples of reference portfolio

IFRS 17 does not specify nor restrict the reference portfolio of assets

Investment Policy

- Easily explained and followed
- Mismatch in duration and cashflow

Current investment portfolio

- Readily available
- Mismatch in duration and cashflow

Replicating portfolio

- Use the fair value of the assets to measure the relevant fulfilment cash flows
- *Exactly* match duration and cashflow
- Difficult and costly to design

Other portfolio

- Designed to match cash flow and duration
- Possibly uncertainty doesn't match
- Possibly less adjustment on credit risk

IFRS 17 Standard references:

- *Appendix B - Application Guidance B46 – B48*
- *Basis for Conclusions BC204 – BC205*
- *Illustrative Examples*

Constructing the discount rate – observable period

Practical Considerations

- Bottom-up or Top-down
- Risk-free curve
  - Market yields are available up to 30 years for U.S. Treasuries, 50 years for USD swaps
  - Market yields are available up to 30 years for Canadian government bond and CAD swaps
- Asset spreads (over risk-free) of a reference portfolio of assets
  - Market spreads
  - Level or curve
  - Fixed income assets versus non-fixed income assets
- Adjustment for market risk premiums for credit risk
  - Eliminate from the total bond yield the effect of credit risk and other factors that are not relevant to the insurance contracts (B85)
  - Calibration may include expected and unexpected credit loss allowance, while the unexpected credit loss component may not be explicit
- Adjustment for differences in amount, timing, and uncertainty between asset and liability cash flows
  - One approach is to use application ratios or predictability ratios to adjust for the level of asset and liability mismatch
  - Discount rate = Risk-free rate +
    (Market spread of a reference portfolio of assets – market risk premiums for credit risk) x **Application Ratio%**
  - A bucketing approach may be used to determine the application ratio by “bucket”

Constructing the discount rate – unobservable period

Practical Considerations

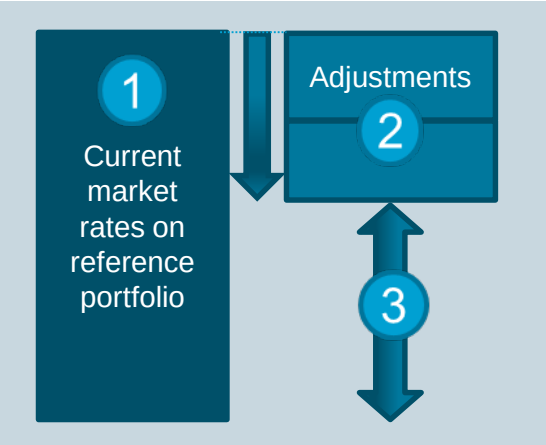
- Requires judgement since “no observable liquid market”
- Considerations include using historical data, view of the long-term future
- Ultimate risk-free forward rates
  - An example is to consider long-term expected inflation, real GDP growth, and risk premia
  - Another example is to use historical averages
- Ultimate illiquidity premium and adjustments
  - Some view that insurance contracts are very illiquid instruments and would demand a higher illiquidity premium at later periods
  - Some view that there is increased uncertainty of ALM at later periods; hence apply little or no illiquidity premiums after allowing for differences in amount, timing, and uncertainty between asset and liability cash flows
- Grading period to ultimate rate
  - Mostly relies on judgment; e.g., 30-40 years from last observable (liquid) point
- Extrapolating methods
  - Linear, Smith-Wilson, Nelson-Seigel-Svensson, Cubic-Spline
- Spot versus forward rates

Recall: When there is no active market or observable rates; apply an estimation technique consistent with paragraph 89 of IFRS 13

- *use the best information available in the circumstances*
- *inputs might include the entity’s own data*
- *might place more weight on long-term estimates than on short-term fluctuations*
- *adjust the data to reflect all information about market participant assumptions that is reasonably available*

Using top-down approach – example for observable period

Reference Portfolio of Assets: 50% U.S. Corporate A bonds + 50% U.S. Corporate BBB bonds



Adjust further for differences in timing, and uncertainty between asset and liability cash flows?

Excludes market risk premiums for credit risk

Illustrative

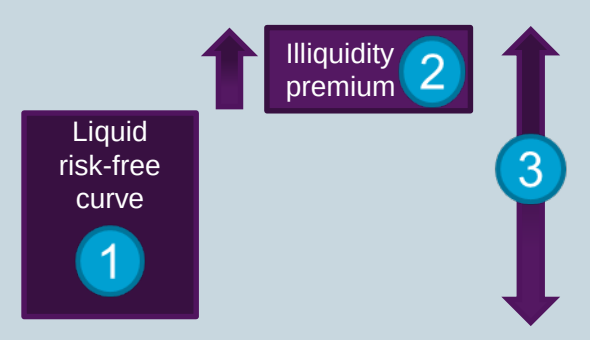
Term	Reference portfolio (1) Corp A	Corp BBB	Weighted average	Adjustments (asset credit risk) (2) Corp A	Corp BBB	Weighted average	(3) IFRS 17 discount rates	*Implied Illiquidity Premium*
1	3.02	3.38	3.20	0.09	0.19	0.14	3.06	*0.47*
2	3.18	3.59	3.38	0.09	0.19	0.14	3.24	*0.71*
3	3.27	3.73	3.50	0.09	0.19	0.14	3.36	*0.87*
5	3.44	3.99	3.72	0.09	0.19	0.14	3.58	*1.04*
7	3.65	4.28	3.97	0.12	0.22	0.17	3.80	*1.19*
10	3.89	4.58	4.23	0.14	0.24	0.19	4.04	*1.32*
20	4.44	5.16	4.80	0.18	0.32	0.25	4.55	*1.65*
30	4.38	5.09	4.73	0.22	0.40	0.31	4.42	*1.38*

Observable period 30 yrs (market prices from active market)

All rates/yields are effective rates/par yields
Implied illiquidity premium is IFRS 17 discount rates less risk-free yield curve

Using bottom-up approach – example for observable period

Using corporate bond spreads that underlie the market rates



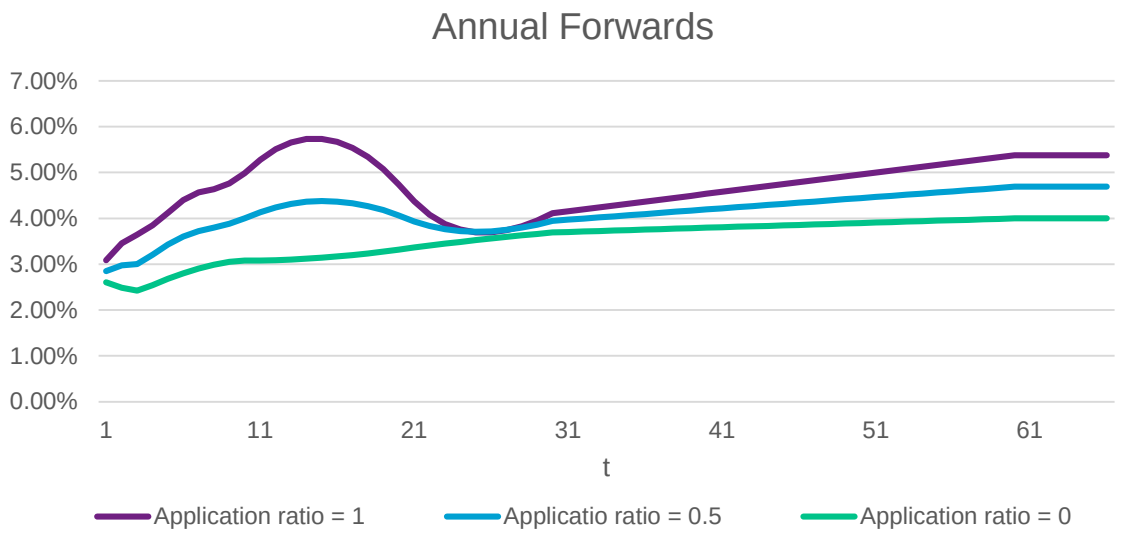
Adjusted the U.S risk-free yield curve for differences between the liquidity characteristics of underlying rates observed in the market and those of the insurance contracts

Illustrative

Term	1 Risk-free yield curve	Corporate bond spreads		Credit risk adjustment		Net spread	Illiquidity premiums 2			IFRS 17 discount rates 3		
		Corp A	Corp BBB	Corp A	Corp BBB		AR=1	AR=0	AR=0.5	AR=1	AR=0	AR=0.5
1	2.59	0.43	0.79	0.09	0.19	0.47	*0.47*	-	*0.24*	3.06	2.59	2.83
2	2.53	0.65	1.06	0.09	0.19	0.71	*0.71*	-	*0.36*	3.24	2.53	2.89
3	2.49	0.78	1.25	0.09	0.19	0.87	*0.87*	-	*0.44*	3.36	2.49	2.92
5	2.53	0.91	1.46	0.09	0.19	1.04	*1.04*	-	*0.52*	3.58	2.53	3.06
7	2.61	1.03	1.67	0.12	0.22	1.19	*1.19*	-	*0.59*	3.80	2.61	3.21
10	2.72	1.17	1.86	0.14	0.24	1.32	*1.32*	-	*0.66*	4.04	2.72	3.38
20	2.90	1.54	2.26	0.18	0.32	1.65	*1.65*	-	*0.83*	4.55	2.90	3.72
30	3.04	1.33	2.04	0.22	0.40	1.38	*1.38*	-	*0.69*	4.42	3.04	3.73

Risk-free yield curve = U.S. Treasuries
AR = Application Ratios

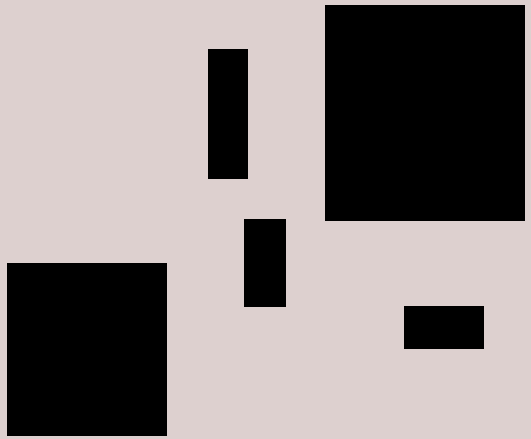
IFRS 17 – examples of discount curves



- Observable period
  - Consistent with market rates (par rates)
  - Application ratio of 1 has largest illiquidity premium, and the most variability in the observable period (year 20 vs year 30 illiquidity premium
- Unobservable
  - Grades to 4% risk-free forward rate from yr 30 to yr 60
  - Constant 30-yr illiquidity premium

- Does the shape of the curve matter?
  - **The example is based on current market rates where available (observable period)**
  - **Depends on how ultimate rate is calibrated**

Considerations in applying the discount rate



Application of Discount Rates

B72 – An entity shall use the following discount rates in applying IFRS 17

Current Discount Rates

- To measure the fulfilment cash flows[1]

Locked-in Discount Rates *(determined at date of initial recognition)*[1]

- To determine the interest to accrete on the contractual service margin for insurance contracts without direct participation features[2]
- To measure the changes to the contractual service margin for insurance contracts without direct participation features
- For groups of contracts applying the premium allocation approach that have a significant financing component, to adjust the carrying amount of the liability for remaining coverage
- To determine the amount of insurance finance income or expenses included in profit or loss, if an entity chooses to disaggregate insurance finance income or expenses between profit or loss and other comprehensive income (i.e., OCI option)
    - When changes in assumptions that relate to financial risk do not have a substantial effect on the amounts paid to policyholders
    - When applying the premium allocation approach

1 - discount rates applying paragraph 36
2 - to nominal cash flows that do not vary based on the returns on any underlying items

Application of Discount Rates

Practical considerations

- Level of granularity: entity, portfolio, other
  - Some products may use top-down, while others use bottom-up
  - There may be multiple liquidity “buckets”
- New business (initial recognition)
  - Over what time period (e.g., annual vs. quarterly vs. monthly)
  - B73...to determine the discount rates at the date of initial recognition of a group of contracts…an entity may use weighted-average discount rates over the period that contracts in the group are issued…which cannot exceed one year.
- Cash flows that vary based on returns of underlying items
  - B57… discounted using rates that reflect that variability, or to be adjusted for the effect of that variability and discounted at a rate that reflects the adjustment made
  - B77… does not require an entity to divide estimated cash flows into those that vary based on the returns on underlying items and those that do not. If an entity does not divide the estimated cash flows in this way, the entity shall apply discount rates appropriate for the estimated cash flows as a whole
- Transition
  - Full retrospective approach – historical discount rates for each valuation date and issue cohort
  - Modified retrospective approach – use observable yield curve that, for at least 3 years immediately before transition, approximates the yield curve estimated by applying par 36, if available. Otherwise determine an average spread (over preceding three years) and apply to the observable yield curve.
  - Fair value approach – estimate a discount rate at a transition date applying IFRS 17 and 13

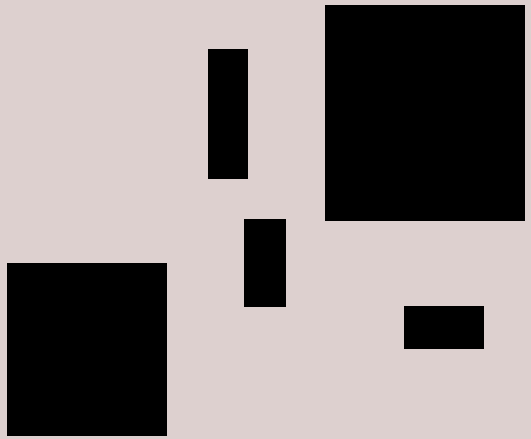
Practical Considerations

Modeling - The discount rate repository will get larger over time as new business cohorts accumulate

Discount rate repository

- Product granularity
- Valuation date
  - Last valuation date
  - Current valuation date
  - Issue cohort (e.g., quarterly) – including the locked-in discount rates for in-force business as of the last valuation date and new business during the current reporting period
- Currency
- Projected time (term structure)
- Number of scenario (more than one if using stochastic scenarios)

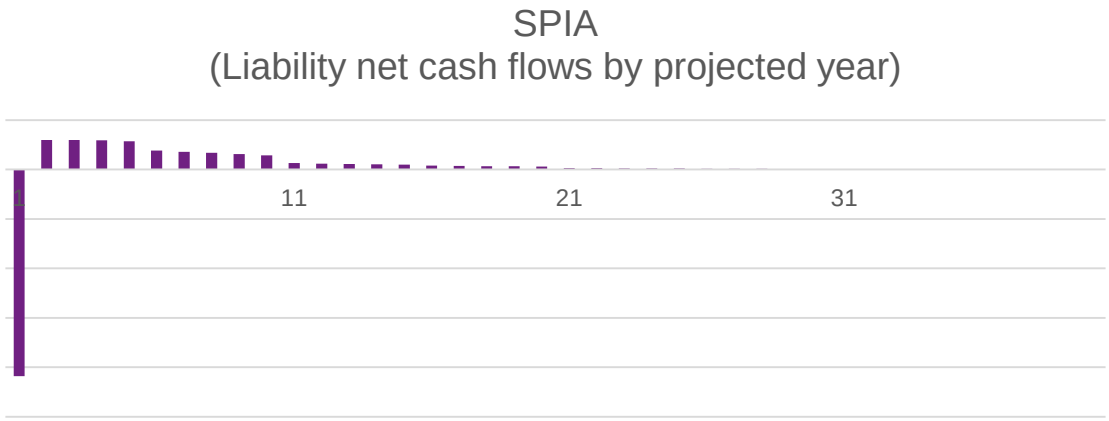
Financial analysis and sensitivity



Discount rate analysis and sensitivity

Background

- The analysis illustrates the potential effect on the IFRS 17 financials of applying various levels of discount rates
- We chose a Single Premium Immediate Annuity (SPIA) to illustrate the sensitivity

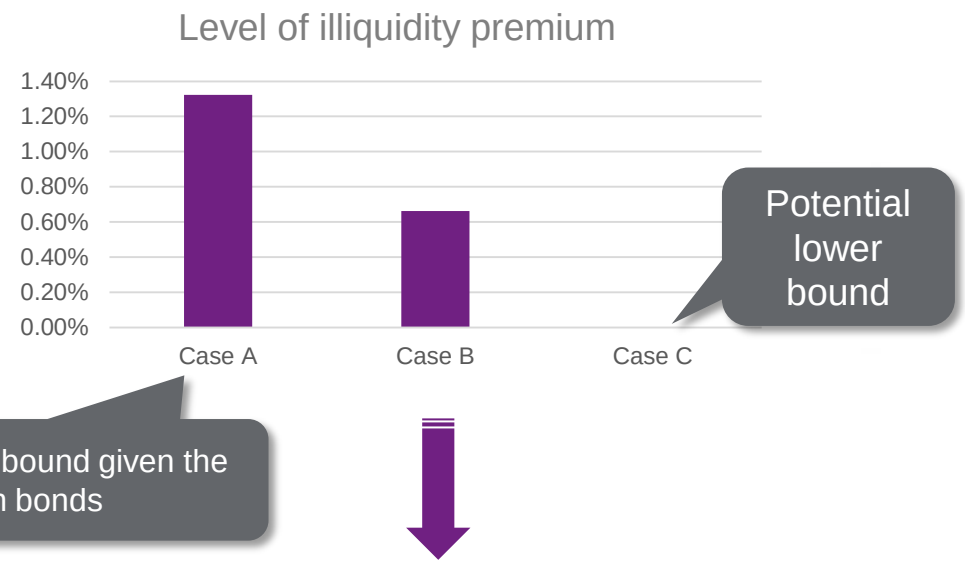


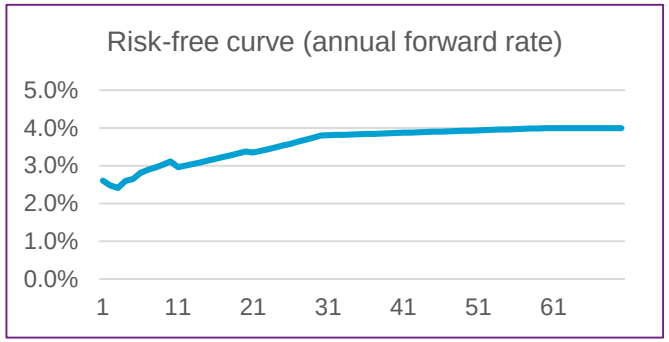
- Simplifying assumptions were made for illustrative purposes
- Results and analysis shared are applicable to the examples and circumstances only, and may vary depending on
  - Economic environment
  - Underlying actuarial assumptions, asset portfolio and investment strategy
  - The pattern of insurance contract cash flows
  - IFRS 17 methodology

Test three discount rate cases

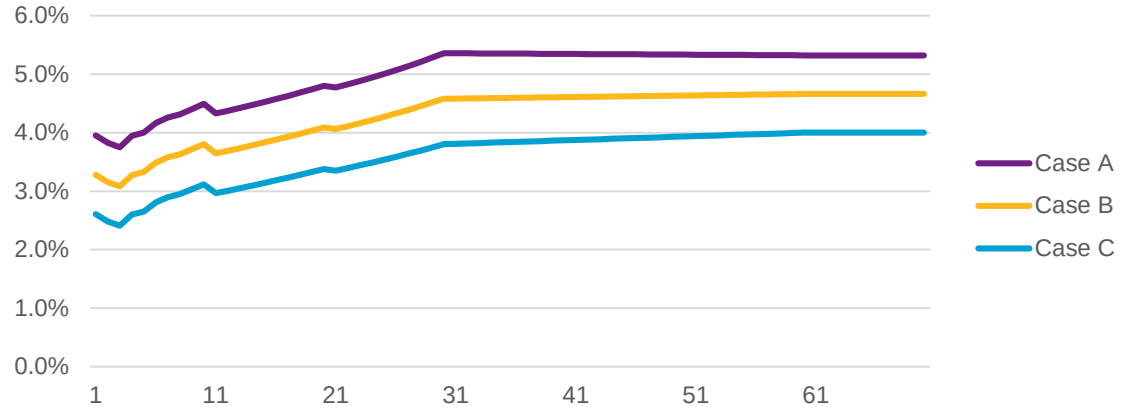
A bottom-up approach

- Illiquidity premium is assumed level over the entire projection period
  - Case A: Corporate bond spread (10 year A and BBB U.S. bonds) less expected default
  - Case B: Corporate bond spread adjusted by credit risk allowance and asset/liability mismatch
  - Case C: Zero illiquidity premium
- Risk-free rate:
  - U.S. Treasury curve (up to year 30)
  - Grade to ultimate risk-free forward rate (4%) over the next 30 years





Discount rates (annual forward rate)
= Risk-free + illiquidity premium (from the previous slide)



Impact on IFRS 17 components

- How will insurance contract liabilities at initial recognition (Day 1) differ depending on the level of discount rate?
- How will subsequent measurement, especially the profit/loss and total comprehensive income differ?

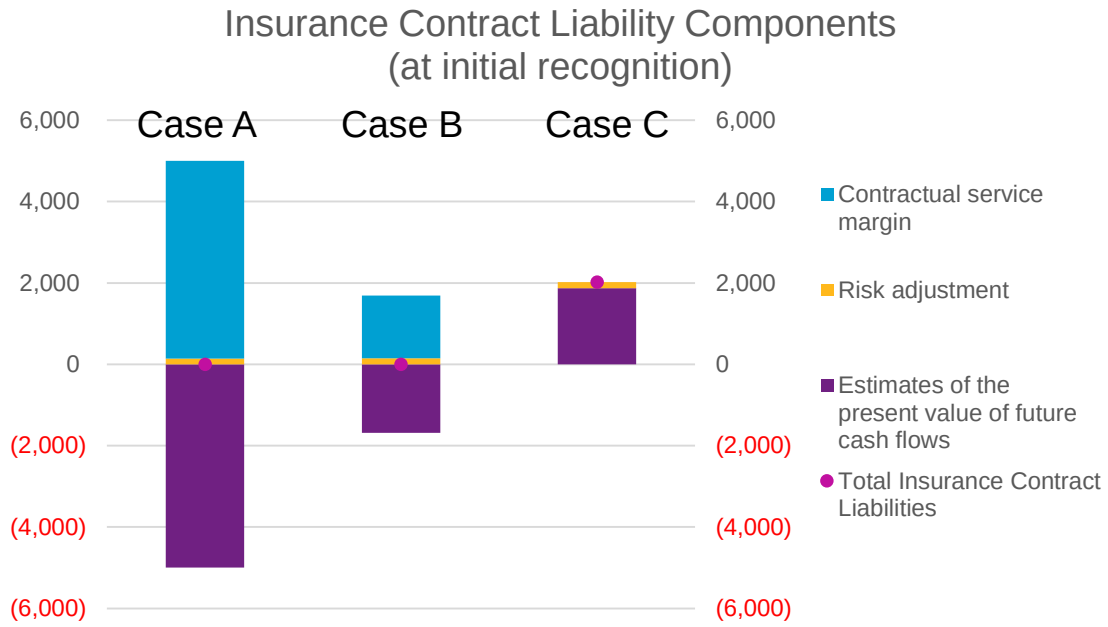
Insurance contract liabilities						
	Day 1	YE1	YE2	YE3	YE4	…
Contractual Service Margin (“CSM”)						
Risk adjustment for non-financial risk						
Present value of estimates of future cash flows (best estimate liabilities)						
Total insurance contract liabilities						

Statement of Comprehensive Income					
	Y1	Y2	Y3	Y4	…
Insurance contract revenue					
Insurance service expenses					
Insurance service result					
Investment income					
Insurance finance income or expenses					
Net finance result					
Profit/Loss					
Net OCI effect for assets and liabilities	OCI option not used in the case study				
Total comprehensive income					

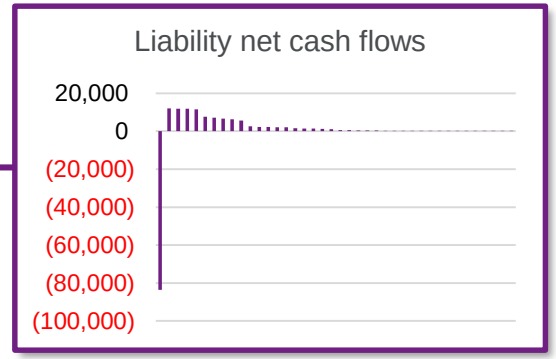
* General measurement model (or building block approach) for the case study

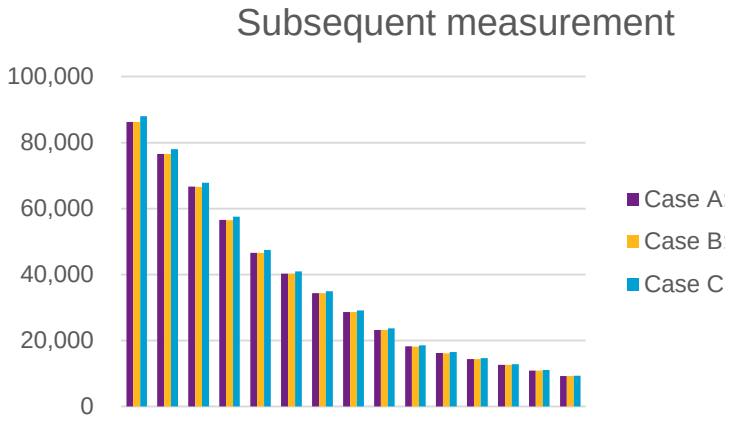
Insurance contract liabilities

The initial contractual service margin can be sensitive to the level of discount rate



Apply different discount rates for each case

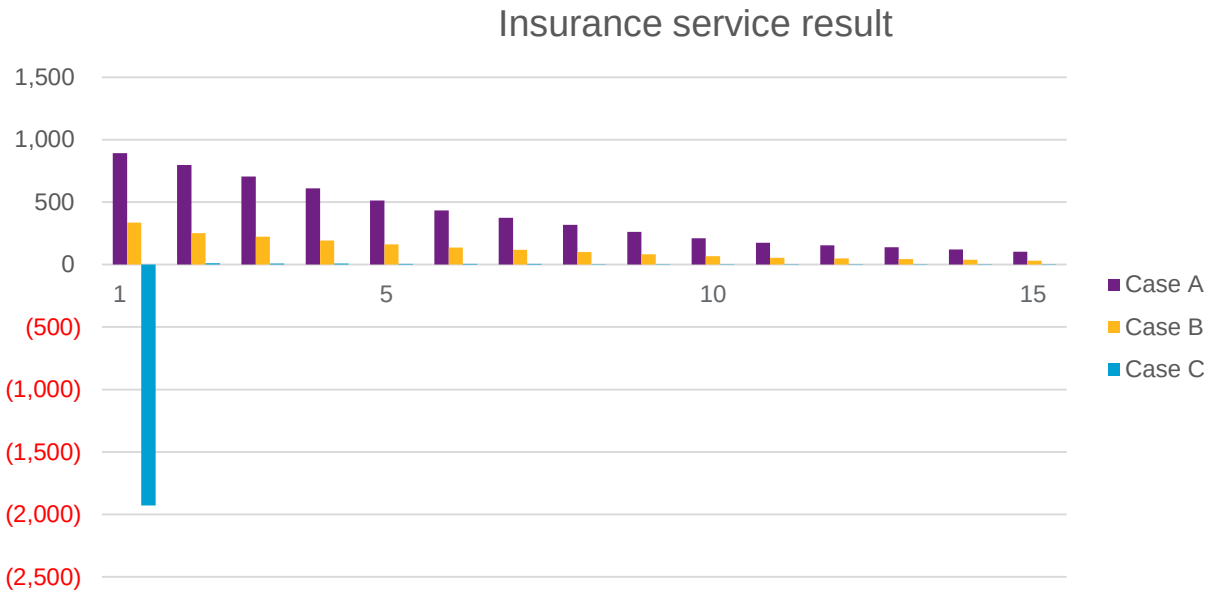




- Initial contractual service margin
  = Max[0, - (initial cash flows + PV of future cash flows + risk adjustment)]
  - PV of future cash flows sensitive to the level of discount rate
  - Risk adjustment may or may not be sensitive depending on approach

Insurance service result

Most of the projected insurance service result represents realization of the contractual service margin



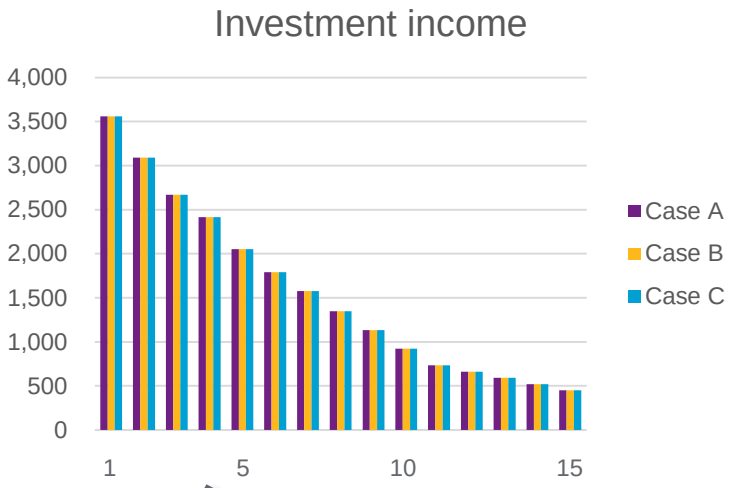
- Release of contractual service margin and risk adjustment (Case A and B)
- Loss recognition (Case C – onerous contract)

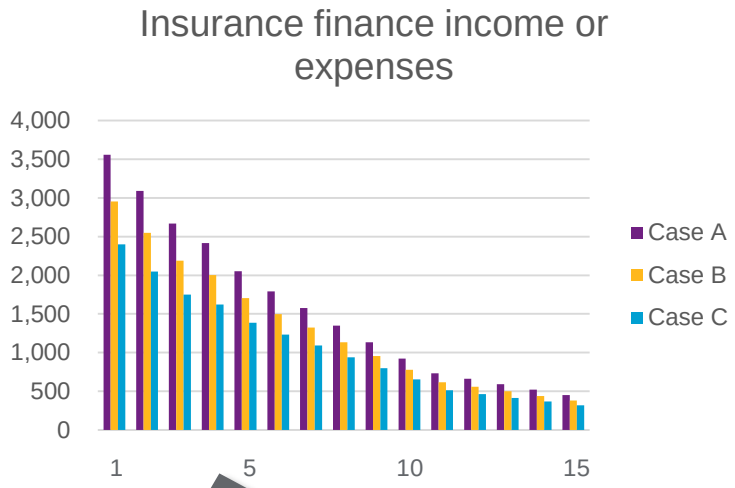
Statement of Comprehensive Income
Insurance contract revenue
Insurance service expenses
Insurance service result
Investment income
Insurance finance income or expenses
Net finance result
Profit/Loss

** Chart shows the first 15 years of the financial forecast where no change is expected from the initial condition*

** Experience adjustments and assumption changes, not assumed in the case study*

Net finance result

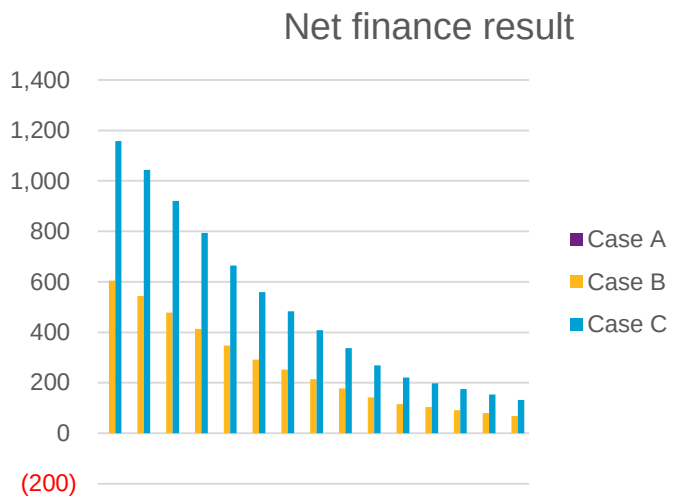




Statement of Comprehensive Income
Insurance contract revenue
Insurance service expenses
Insurance service result
Investment income
Insurance finance income or expenses
Net finance result
Profit/Loss

For all the cases, assumed the same level of investment income (corporate bond yield less expected default)

The effect of the time value of money and the effect of financial risk and changes in financial risk

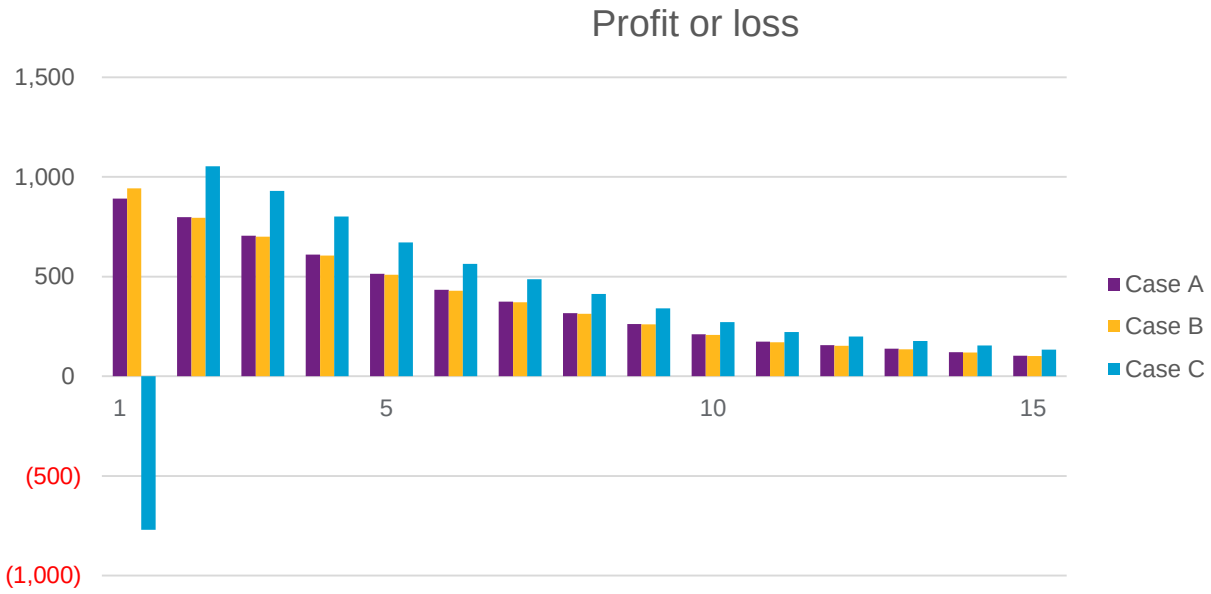


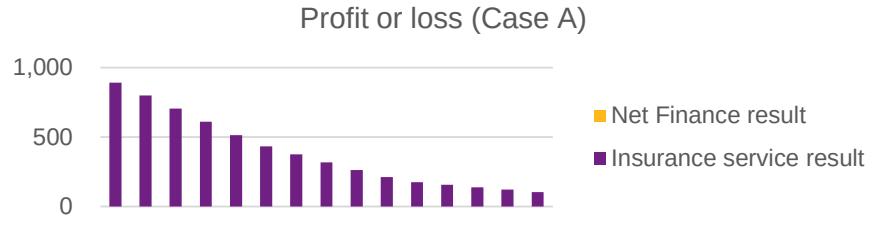
- Case A has zero net finance result as the expected asset return and liability discount rate are the same
- Case C has the largest net finance result as the expected asset return exceeds the liability discount rate (risk-free rate)

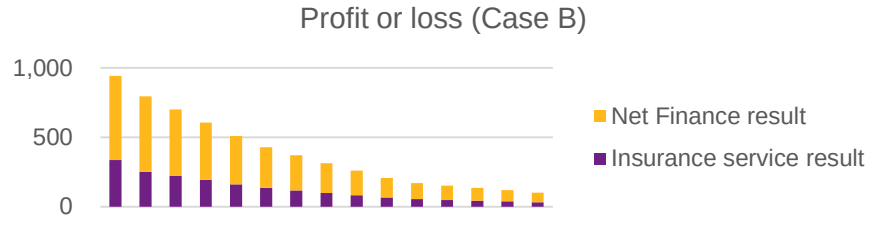
Insurance service result
Net finance result
Profit/Loss

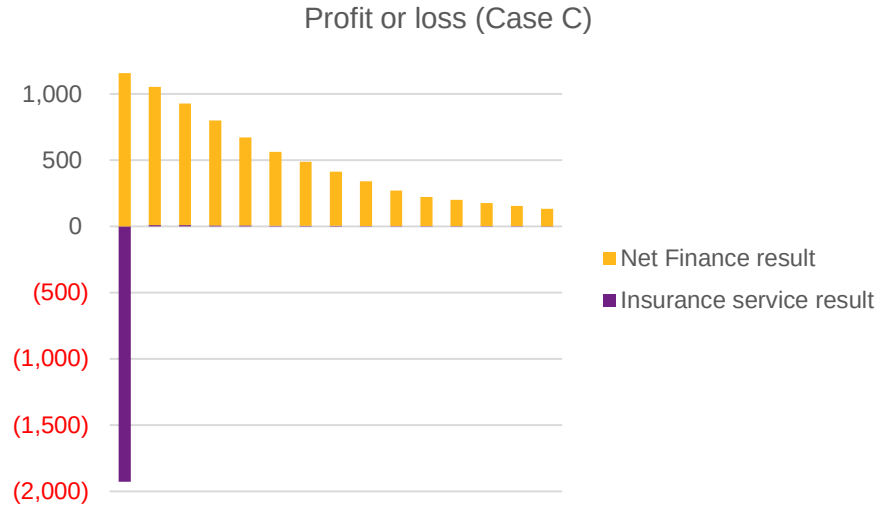
Profit or loss

The profit recognition pattern will vary depending on the level of discount rate at initial recognition





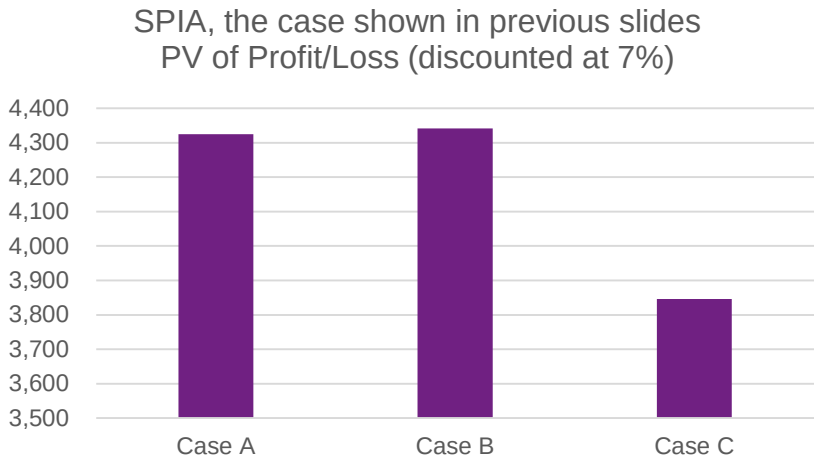


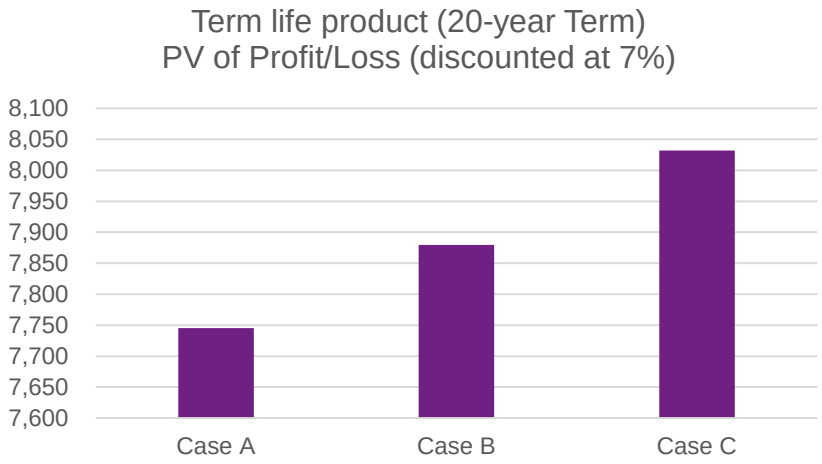


- All cases have the same amount of lifetime profit, while recognition timing differs
- Cases A and B have similar profit patterns although the geography differs (insurance service result vs. net finance result)
- Case C recognizes the loss on day 1 (onerous contract)

Discount rate matters

- The discount rate will determine the level of the initial contractual service margin and subsequent profit or loss pattern
  - Regardless of the level of discount rate, the expected lifetime profit or loss would be the same given the same actual investment income, all else being equal
- Further thoughts
  - The direction and magnitude may differ depending on cash flow pattern





  - The variability of profit or loss may depend on the level of contractual service margin
  - The difference between the discount rate and the actual underlying assets may lead to variance of the net finance result as there will be mismatch between investment income and insurance finance income or expenses

Moody's Analytics

Better Faster Decisions

Introduction to Stochastic Modelling

Ruth Moore, Associate Director Insurance Advisory Services

October 2019

Agenda

- Scenarios for IFRS17
- Why do we need Stochastic Modelling?
- What is an Economic Scenario Generator (ESG)?
- Practical Considerations and Modelling Challenges

Scenarios for IFRS17

What does IFRS17 say about scenarios?

- IFRS17 guidance on projecting cashflows introduces the idea that scenarios are needed.

> *…an entity shall estimate the expected value (i.e. probability-weighted mean) of the full range of possible outcomes…*

- The standard further explains when stochastic scenarios may be needed.

> *…in some cases, the cash flows may be driven by complex underlying factors and may respond in a non-linear fashion to changes in economic conditions…In such cases, more sophisticated stochastic modelling is likely to be necessary to satisfy the measurement objective…*

- Observable inputs should replicate observable prices

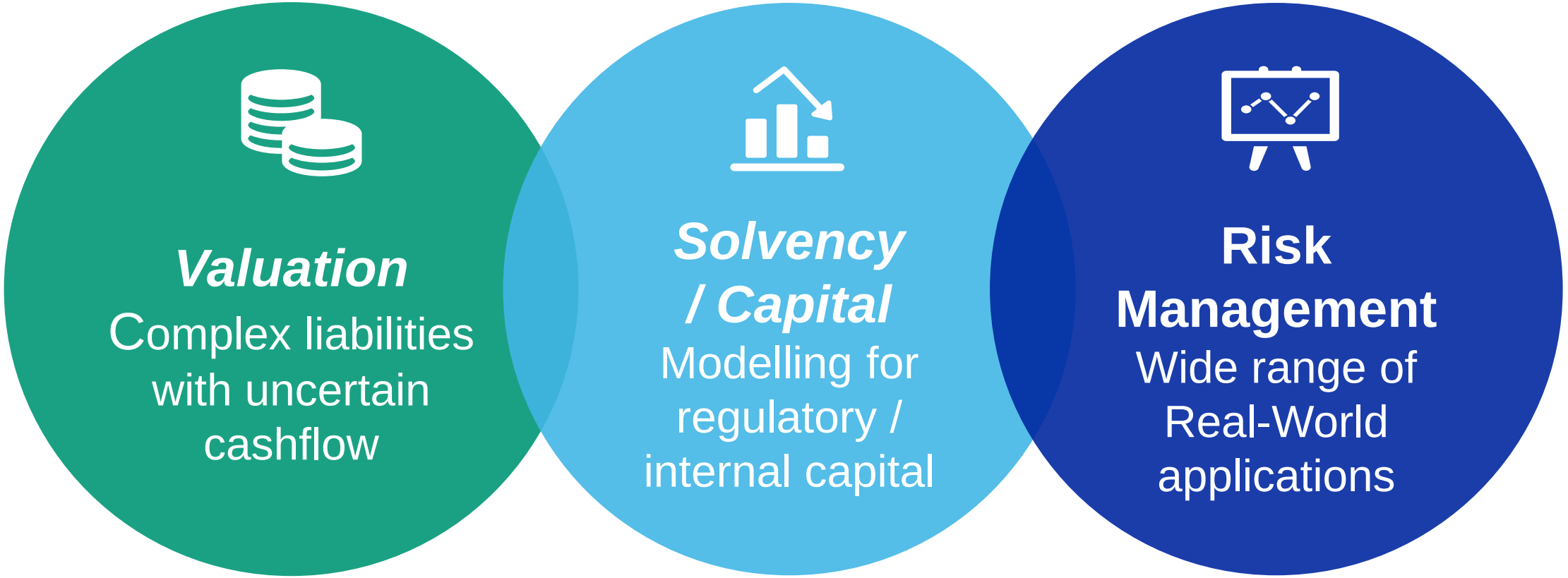
> *…Judgement is required to determine the technique that best meets the objective of consistency with observable market variables in specific circumstances.. In particular, the technique used must result in the measurement of any options and guarantees included in the insurance contracts being consistent with observable market prices (if any) for such options and guarantees…*

- Stochastic economic scenarios are market variables and must focus on market and not entity specific assumptions.

> *…An entity shall maximise the use of observable inputs and shall not substitute its own estimates for observable market data except as described in paragraph 79 of IFRS 13 Fair Value Measurement…*

Why do we need stochastic modelling?

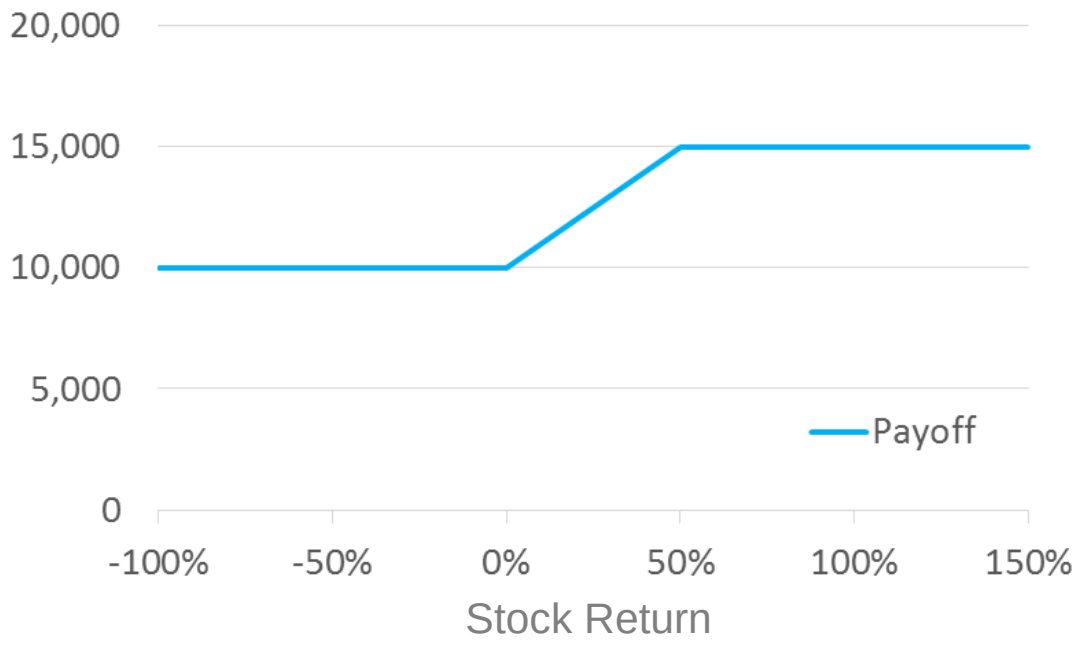
Requirements of the Insurers



Simple Example: Guaranteed Equity Bond

Invest for potential stock market linked growth, whilst minimising the risks to your capital

- The Guaranteed Equity Bond is a **6 year fixed term** investment linked to the performance of the S&P Index.
- Performance:
  - 100% of any growth in the S&P Index,
  - up to a maximum return of 50% of your original investment
  - Guaranteed to receive your initial investment of USD 10,000 at maturity

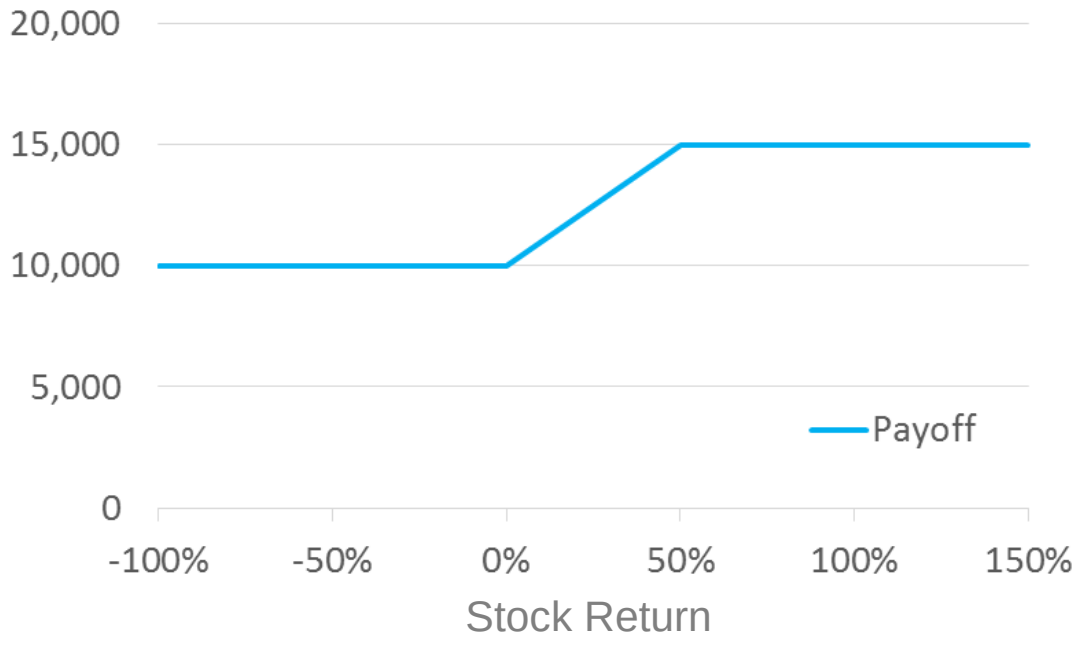


What is the value of this product/liability to the issuer?

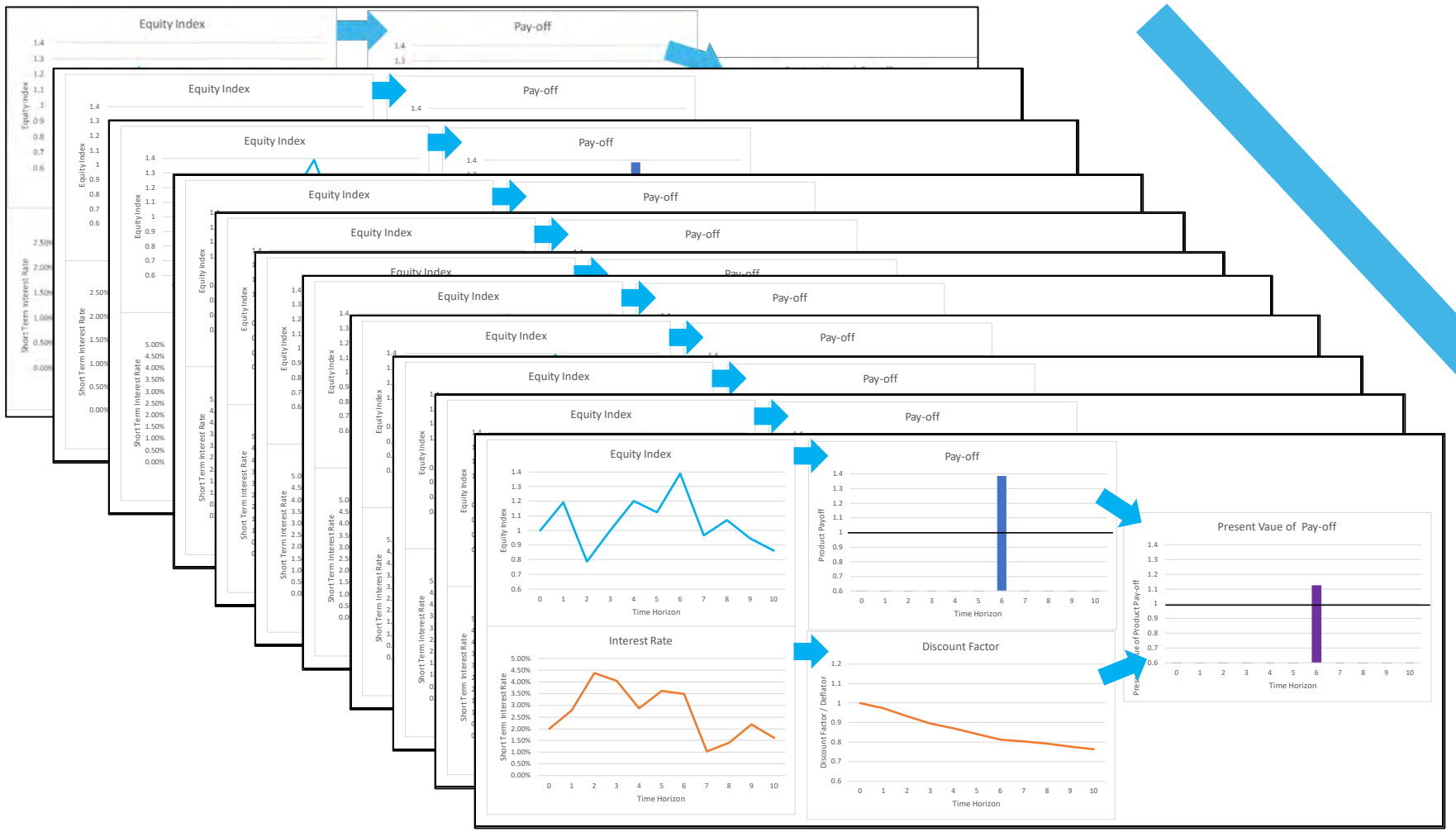
Simple Example: Guaranteed Equity Bond

Invest for potential stock market linked growth, whilst minimising the risks to your capital

- **Analytical Approaches**
  - The pay-off could look like the pay-off on a mixture of Call and Put options
  - We already know the price of call/puts in the market
  - There are analytical formula and models that can be used to value this vanilla options
  - Black-Scholes model
- **Monte-Carlo based approaches**
  - Scenario based analysis → stochastic modelling



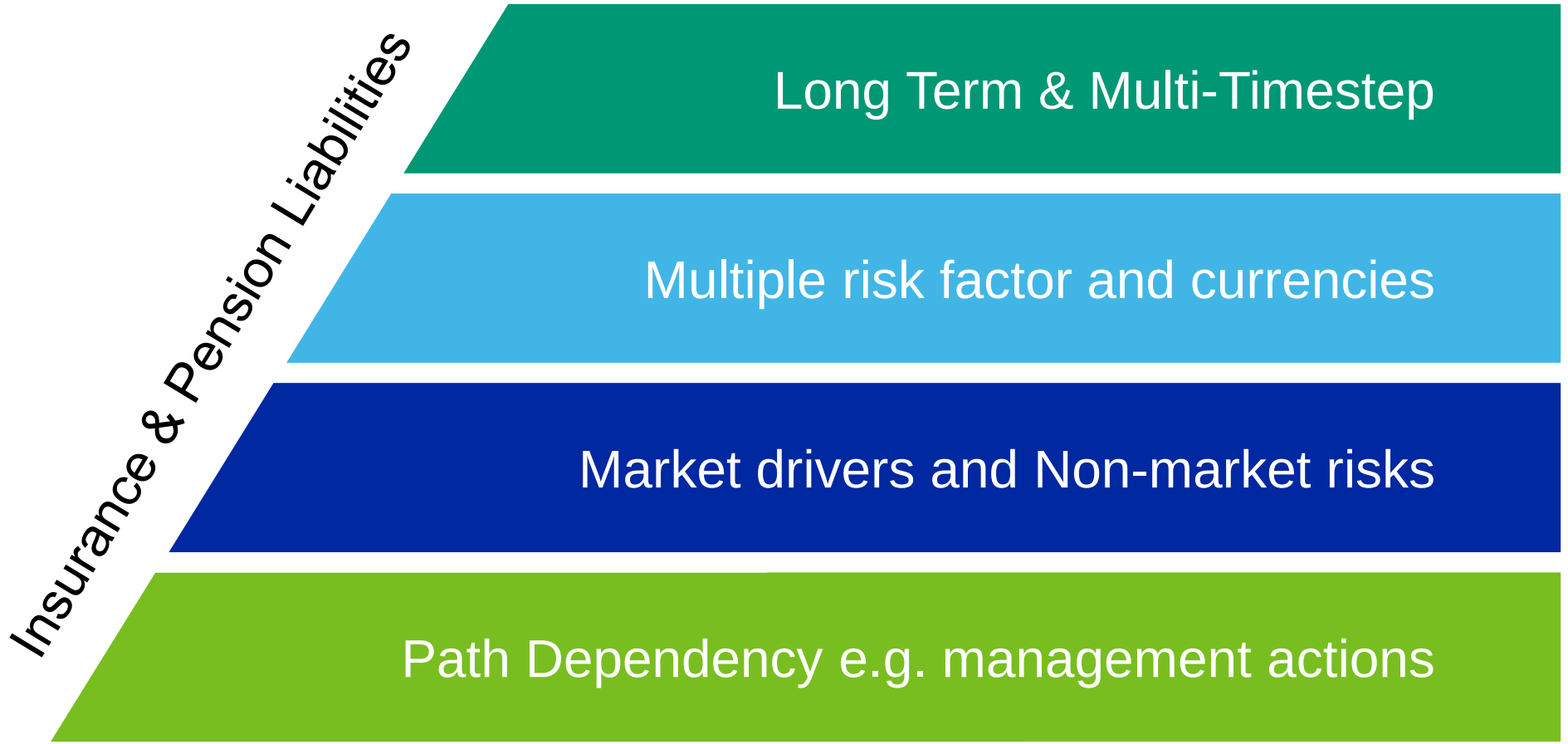
Monte-Carlo Pricing Approach



Generate 1,000's of stochastic trials

- Produces a distribution of Discounted Pay-offs
- The **average** of the Discounted Pay-Off provides the best estimate of the product or liability value

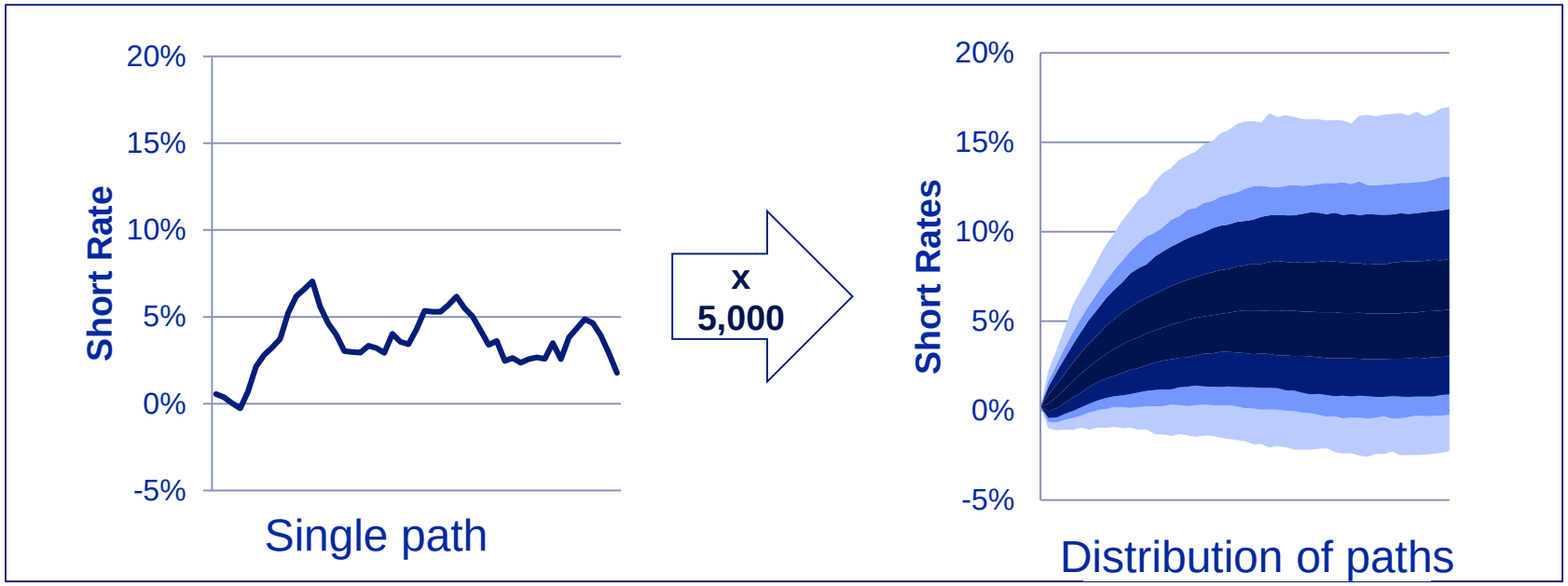
Why do we need Monte-Carlo modelling approach?



What is an ESG?

What is an Economic Scenario Generator?

- Generates scenarios for various economic variables and asset returns using Monte Carlo simulation
  - Generate 1000s of different paths of an economy by stochastically modelling many different risk drivers
  - Interest rates, equity returns, corporate bond returns
  - "Sample" normal normally distributed increments of a Brownian motion → Also referred to as **Shocks**
  - Convert these to key variables using different **stochastic models** depending on the variable
- A **simulation** is a collection of many paths (trials)



Market Consistent vs Real World Modelling

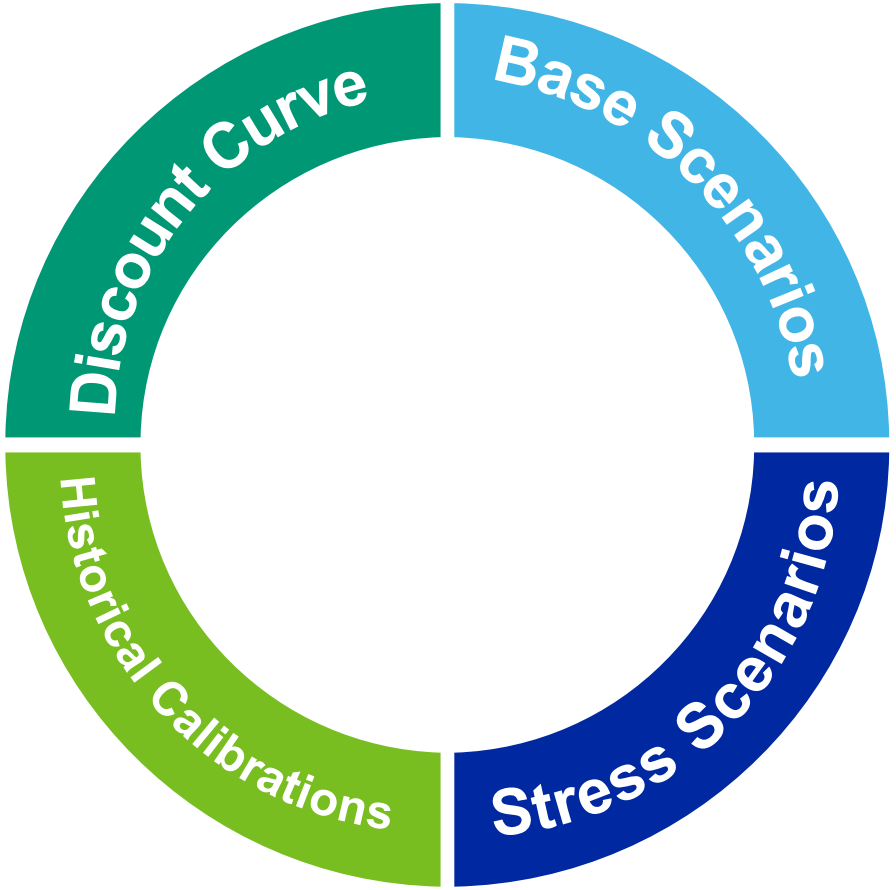
Market Consistent	Real World
Used for risk neutral liability valuation. Risk neutral valuation is a mathematical trick that simplifies the valuation of cashflows	The main uses of real world modelling in insurance is within capital calculations and asset liability management
Modelled under 'Risk Neutral' probability measure, producing risk neutral scenarios for valuation	Modelled under 'Real World' probability measure
Investors are assumed to be risk neutral so all assets earn the risk free rate – i.e. no risk premia in the model	Under this measure, probability of an outcome corresponds to the real world probability of occurrence – i.e. scenarios are intended to be *realistic*
While valuation is simplified, the probability of outcomes and modelled distributions may not be realistic	This makes the scenarios useful where we are interested in the probability of outcomes
Market consistency comes through calibration of models where parameters are set to align with market prices of instruments	Calibration approach typically uses a combination of historical data, current prices and forward looking expectations

Implementing Scenarios for IFRS17: Practical Considerations

Preparing for IFRS 17

All insurers will need to produce discount curves consistent with IFRS 17 principles to determine the present value of future cash flows reported in their balance sheet and how profit and loss will be recognized.

Insurers will need to create historical discount curves and scenarios (where applicable) to support the transition and the calculation of the contractual service margin based on locked-in rates.



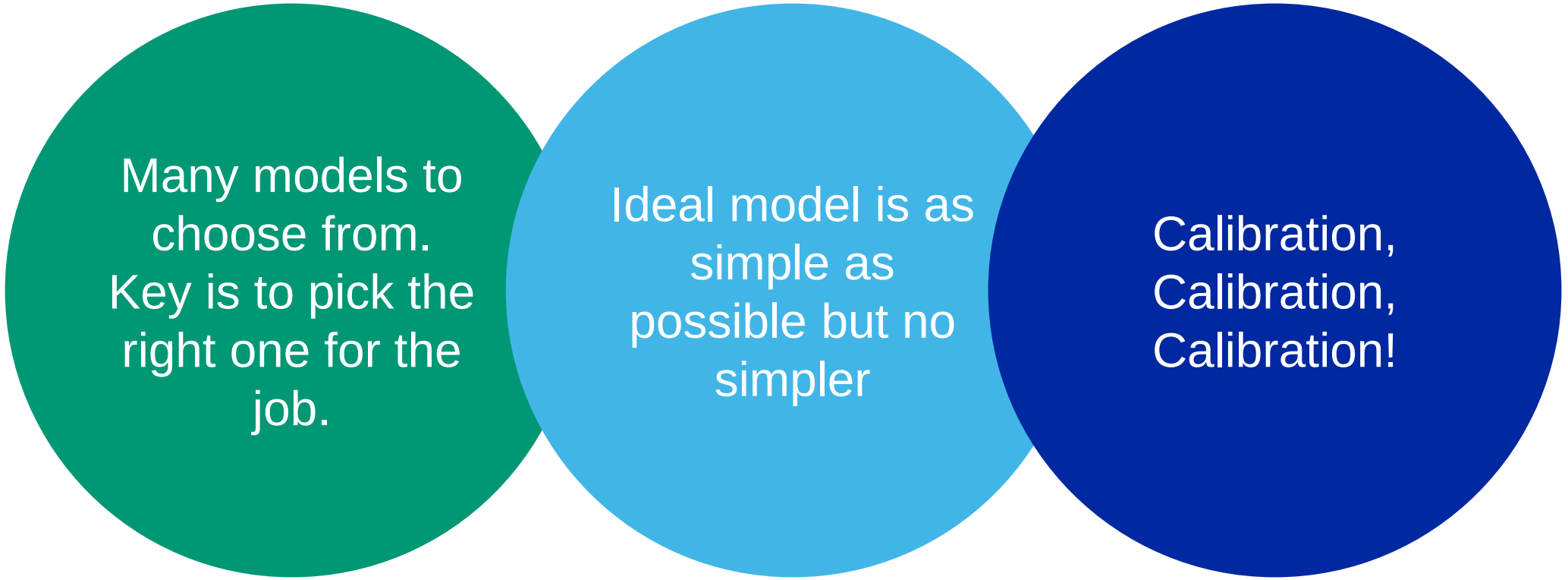
Insurers with participating business will need to produce market consistent scenarios to evaluate the time value of guarantees embedded in their liabilities. IFRS 17 permits alternative approaches, such as replicating portfolios, but Monte Carlo simulation is likely to be prevalent approach.

Insurers will need to stress discount curve and market consistent scenarios / replicating portfolios (where applicable) to value their liabilities under market sensitivities to support disclosure reporting.

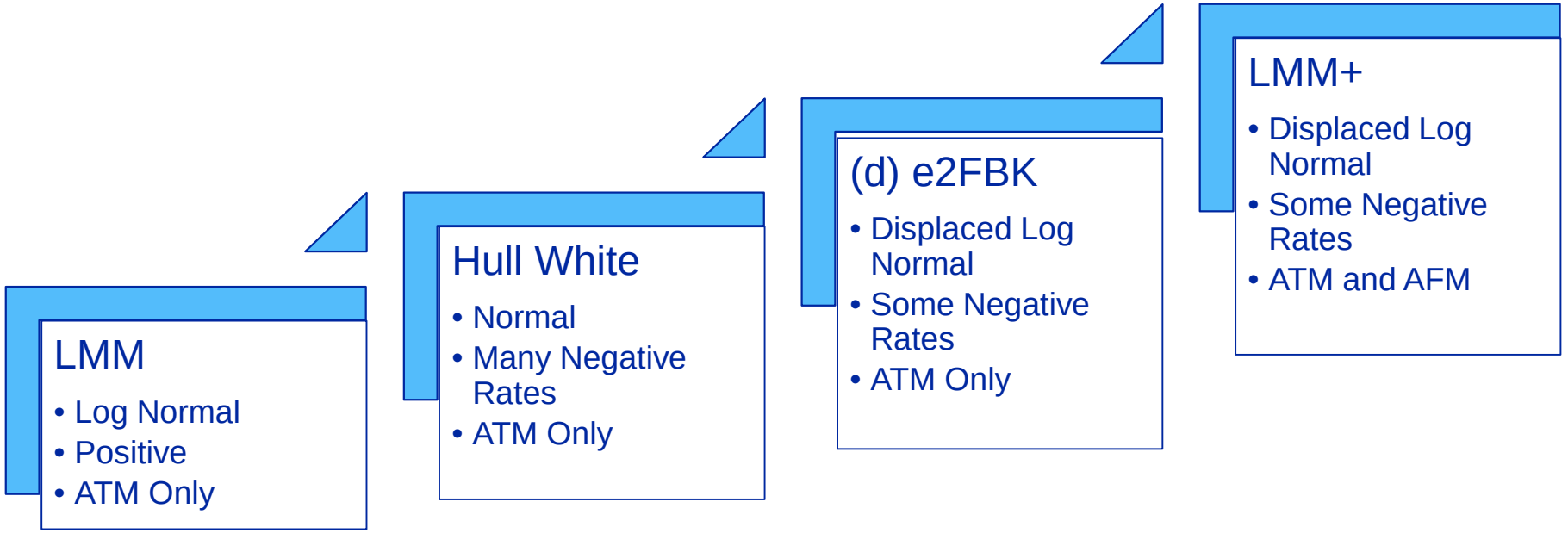
Model Choice

“All models are wrong but some are useful”

George Box



MC Interest Rate Model Choice



	LMM	Hull-White	(d)E2FBK	LMM+
Factors	2	2(1)	2	2(3)
Negative Rates	No	Yes	Yes	Yes
Control Correlations between forward rates of different maturity	Yes	Some	Some	Yes
Fit to ATM?	Yes	Yes	Yes	Yes
Fit to AFTM?	No	No	No	Yes

Calibration Challenges

Nominal Interest Rates	Inflation	Credit Spreads	Equity	Correlations
• Discount curves need to align with IFRS17 principles • May need multiple calibrations/ scenarios to reflect discount rates for different product lines • Volatility can be calibrated to ensure market IVs are replicated	• When nominal rates are shifted upwards, breakeven inflation will increase • Could recalibrate real interest rates to ensure break-even inflation is maintained • Alternatively, could calibrate real interest rates directly to index linked bonds	• Increasing the discount curve to reflect LP will erode credit spreads, potentially to 0 for high ratings • Key challenge will be how to fit to lower spreads and ensure volatility is sensible • Model should be able to replicate market prices for bonds	• No impact on equity modelling from increase to discount curve • To ensure market consistency, calibrate equity volatility to market IVs • Equity model should be able to price market instruments	• Aim of calibrating correlations is to reflect the joint behaviour of risk factors • Key to ensure sensible dynamics when modelling liabilities with multi-risk exposures • No market data available so may need to fit to historical observations

Further Practical Considerations

IFRS 17 is principles based so insurers have to choose a modelling approach which they deem satisfies the standard. There are a number of modelling factors to consider:

- The granularity of the modelling required
- The ability to perform sensitivity testing for disclosures
- Are multiple curves required

Other considerations that are likely to drive the methodology choice include:

- The impact on the balance sheet and P/L
- Type of business they sell
- Sign off requirement from their auditor
- Market consensus: all firms need to disclose their methodology to the market so will be mindful of being an outlier
- Practicalities of running stochastic models/valuations
  - Production times (and reporting timelines).
  - Automation/process.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