

# Risk Margins

Providing Perspective



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# Agenda

- Definition and possible risk margin objectives
- Risk and residual margins
- Risk margin approaches
- Subsequent measurement
- Practicality and consistency of results

# Definition and possible risk margin objectives

- Definition: *An amount or margin reflecting an assessment of uncertainty associated with insurance risk [IAA Risk Margins paper\*]*
- Possible risk margin objectives
  - Price of bearing risk
    - Market-based approach
  - Cost of bearing risk
    - Fulfilment-based approach
  - Confidence level
    - Regulatory / policyholder view
  - Shock absorber

\* *Measurement of Liabilities for Insurance Contracts: Current Estimates and Risk Margins* (IAA, 2009)

# Relation between building blocks

- Building block 1 – expected value
  - Reflects probabilities of scenarios
- Building block 3 – margin for risk (uncertainty)
  - Uncertainty of whether the expected value is properly estimated
- Example 1 -- With the same expected value, a wider range of uncertainty would lead to a higher margin for risk, independent of the objective
- Example 2 – With a higher risk aversion, the expected value would be the same, but the margin would be greater
- Example 3 – With the same expected value, a larger tail would result in a larger margin

# Risk and residual margins

- Residual margin is equal to difference between present value of premiums and benefits/losses and relevant expenses, less risk margin
- Composite or differentiated
  - Issue arises if a no-gain-at-issue rule is applied
  - In any case, better if explicitly measured and disclosed
- Advantages of a composite approach
  - Difficulty in splitting risk and other factors
  - Additional value may not be significant
- Advantages of a differentiated approach
  - Permits different method to earn/release
  - May provide more information about uncertainty
  - More consistent with claims liability application

# Historical approaches to reflect risk in liabilities

- Has depended on measurement objective and technology
- Prudent aggregate liability, for example, 10% margin
- Margin added to each assumption, for example, 10% to mortality, 150 basis point lower than current interest rate, and no consideration of lapses (life insurance when not lapse-supported contract)
- Standard mortality table that includes margin for most companies
- Conservative trend or lack of trend
- Use of worst case, e.g., greatest present values
- No offset of sufficiencies and deficiencies
- Implicit conservatism in assumptions
- Offset by not recognizing discount rate
  - Property & casualty claim liabilities

# Families of risk margin methods

As given in IAA Risk Margins paper:

- Quantile methods
- Cost of capital
- Explicit assumptions (related to specific risk factors)
- Discount rate related
- Implicit
- Others not discussed in IAA paper
  - Utility, hazard transforms

# Overall considerations

- All methods reflect uncertainty
- Might be based on cash flows, discount rates or a combination
  - For insurance, more likely consistent with cash flows
  - For financial instruments where risks are primarily credit risks, more likely as part of discount rates
  - For non-credit risk, the use of discount rates may not capture changes in risk profile over time
- Correlation between risk elements can be difficult to deal with
- Judgment usually involved
- May not be a best method for all circumstances



# Risk margin methods

## Quantile methods

- Directly related to uncertainty
  - Selection of level of confidence
  - Determination what variables vary by how much
    - Degree of skewness of risk has a large impact
- Variations
  - More simple methods use percentile or confidence levels
  - More complex methods give weight to uncertainty associated with or size of the tail of the probability distribution
    - Related methods such as Conditional Tail Expectation (CTE), tVaR (tail Variance at Risk)
  - Multiple of the second (variance) and higher moments (e.g., kurtosis) of the risk distribution confidence level
  - Will likely change each year and vary by product type
- Subjective element – selection of quantile level to use

# Risk margin methods

## Cost of capital methods

- Required to have a minimal level of capital to remain in insurance business
- Present value of cost of capital during period of coverage
- Capital
  - Economic capital, which is a function of uncertainty
- Cost of capital rate
  - Based on judgment, historical returns, market prices for risk (level the market demands)
  - Examples shown in IAA Risk Margins Report: a high (99.5) level of confidence & 6% cost; a 99% CTE & 4% cost; 99% CTE & constant capital ratio
- Being used in Swiss Solvency Test (regulatory purposes)
- Will be used in Solvency II (European solvency)

# Risk margin methods

## Explicit assumptions

- Margin associated with individual assumptions
  - For example, 10% of mortality, 5% of lapse, 25 basis points
  - May include a correlation factor to reflect relations between assumptions
  - Possibly easiest to reflect
- Used in Canada with strict ranges for each assumption, together with periodic peer review

# Risk margin methods

## Discount rate related

- Adjusts discount rate downward
- Assumes margin is related to time
  - Margin may change each year as the pattern of interest rates is usually not consistent with the pattern of risk developments
- Particularly applicable for investment-oriented contracts, as it is directly related to the risk
- Resulting discount rate might be negative

# Risk margin methods

## Implicit

- Where not explicitly calculated
- Primary example
  - Claims liability when undiscounted estimates used
  - Risk margin assumed to be equal to the discount

# Examples of approaches

- Cost of capital method
  - Switzerland regulatory: Swiss Solvency Test using 6% cost and regulatory capital
  - Solvency II in Europe
    - 6% cost on regulatory capital, which is defined at a 99.5% chance of a loss in one year
- Quantile method
  - Australian property & casualty claims liability
  - Minimum of 75% CTE
- Explicit method
  - Canada, with strict ranges for each risk determined by the actuarial profession, accompanied by peer review

# Possible criteria for suitable risk margins

IAA, IAIS and IASB have indicated the following are possible criteria that may be used to assess risk margins:

- The less that is known about the current estimate and its trend, the higher the risk margins
- Risks with low frequency and high severity will have higher risk margins than high frequency and low severity
- For similar risks, contracts that persist over a longer timeframe will have higher risk margins than those of shorter duration
- Risks with a wide probability distribution will have higher risk margins than those risks with a narrower distribution
- To the extent that emerging experience reduces uncertainty, risk margins will decrease, and vice versa

# Possible criteria for suitable risk margins (2)

A risk margin methodology should:

- Apply a consistent methodology for the entire lifetime of the contract
- Use assumptions consistent with those used in the determination of the corresponding current estimates
- Be determined in a manner consistent with sound insurance pricing practices
- Vary by product (class of business) based on risk differences between the products
- Be easy to calculate, especially given short time for financial reporting close
- Be consistently determined between reporting periods for each entity, that is, the risk margin varies from period to period only to the extent that there are real changes in risk
- Be consistently determined between entities at each reporting date, that is, two entities with similar business should produce similar risk margins using the methodology
- Facilitate disclosure of information useful to stakeholders
- Provide information that is useful to users of financial statements
- Be consistent with relevant accounting standard objectives



# Qualitative Comparison of methods\*

Desirable Characteristic	Cost of capital	Quantile methods		Discount	Explicit assumptions
		CTE & std dev***	Confidence level		
Complies with five IAIS desirable characteristics	1	2	2	3	4**
Consistency across classes of business	1	2***	3	3	4**
Ease of calculation	4	3	3+	2	1**
Disclosure	1	1	1	1	1
Market-consistent - in theory	1	2	3	4	4**
Market-consistent - in practice	unknown	unknown	unknown	unknown	unknown

\*From IAA Risk Margins paper, expressing view of author team. Ranks shown are on a stand-alone basis.

\*\*As an approximation, explicit assumption ranking would be close to the target method.

\*\*\*Standard deviation method is more often used in pricing than confidence levels.

+Among quantile methods, confidence level risk margins might be easier to determine than CTE or standard deviation risk margins.

# Subsequent margin measurement

- Consistent with release of risk
  - Requires allocation of risk to each period
  - Prospective measurement
- No single method for residual margin, possibilities
  - Consistent with release of insurance risk
  - Consistent with primary driver of risk
  - Consistent with arbitrarily selected metric (premium, expected profit)
- Due to long-term nature of many insurance contracts, a locked version unlikely to capture current value

# Technical issues for further development

- Methodologies for each of the methods
  - Evolution of practice
- Diversification effect
- Measurement of changes in risk preference
- Objective of service margin
  - Relationship with residual margin
  - Insurers not used to grossing-up internal costs
- Sources of gains

# Practicality and consistency of results

- Although all methods have been applied in practice in some context, given tight time for financial reporting close, implementation of an explicit current estimate method will be challenging
- Methods of driving consistent results
  - Explicit disclosure encourages / facilitates transparency and convergence of practice over time, e.g., occurred in Australia and Canada
  - Specific rules, e.g., specified mortality table or industry tail claim development factors
  - Audits, peer review, educational efforts
- Possible that first year of implementation may see significant difference in level of margins

# Related topics

- Depending on overall method, may have to decide whether risk margins are included in onerous contract test and whether included if contract is found to be onerous
- Disclosure
  - Amount
  - Effective communication of risks
  - Method and assumptions used