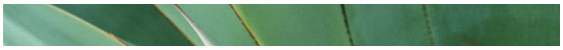
Risk Margins

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
  - 10% margin
- Margin added to each assumption
  - 10% to mortality, 150 basis point lower than current interest rate, 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

- Adjust discount rate downward
- Related to time
- Particularly applicable for investment – oriented contracts
- Resulting discount rate could 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 – Europe
    - Equivalent to 99.5% chance of a loss in one year
- Quantile method
  - Australia 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 financial reporting closes
- 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 regulatory solvency and other objectives
- 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 implementation method, 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 (Australia margin for services)
  - 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 method
  - 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 financial close timeframes, implementation of any 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