Determining Solvency Margin Requirements: Approaches and Considerations

Jamshaid Islam, FSA, FPSA

Threats to Solvency

- Poor mortality experience
- Poor expense experience
- Expense inflation
- Inadequate investment returns
- Poor lapse and surrender experience
- Asset default and depreciation
- Mismatched investments
- Guaranteed surrender values/investments returns
- Liquidity
- Options
- Change in business mix
- Inadequate reinsurance
- Operational risks

How to handle threats to solvency

- Management actions
- Role of the Appointed Actuary
- Regulations
- Timely intervention by regulator
- Conservative asset and liability valuations
- Risk based capital/solvency margin
- Holistic and integrated approach to risk management
- Incentives to encourage prudent risk management

Solvency Margin Issues

Rules Based	Principles based
Book values	Market consistent values
Use proxies to measure risk	Use statistical models
Strict regulation of investments	Encourage prudent investment policies
Standard models	Internal models
For regulators eyes only	Full disclosure to all interest parties

Solvency Capital Approaches

- Fixed ratio (EU Solvency I)
- Risk Based Capital (US)
- Scenario based approach (US/Canada)
- Probabilistic approach (Switzerland/Australia/EU Solvency II)

Fixed Ratios – EU Solvency I

- Liability valuation – generally NPV
- Asset valuation – generally lower of cost or market value
- Investments - regulated
- Solvency I requires insurers to hold capital funds equal to required solvency margin or the minimum guaranteed fund, whichever is higher
- The required solvency margin is calculated as:
  - 4% (1% in case of unit linked business) of mathematical reserves X retention rate mathematical provision plus
  - 0.3% of sum at risk X retention rate sum at risk

Fixed Ratios – EU Solvency I

- Advantages
  - Simple
  - Low compliance costs
  - Results easy to understand
  - Avoids subjectivity
- Disadvantages
  - Arbitrary capital requirements
  - The proxies only consider certain types of risks
  - Does not differentiate between good and bad companies
  - Does not provide incentive for good risk management

Risk Based Capital - US

- Similar to fixed ratio approach in using proxies for risk measures
- Looks at both assets and liabilities
- Asset and liability values based on US statutory accounting rules which do not reflect the market value of asset and liabilities
- Required solvency margin will reflect the nature of business written and the assets held to meet those obligations.
- Risks are categorized and separate proxies and factors are used to determine appropriate capital
- The US regulators adopted the RBC model to better predict troubled insurers and to require regulators and companies to take specific action once a company triggered a certain level.

Risk Based Capital - US

Risk Category	Proxy used	Factors used
Asset risk	Investment value	Varies according to asset type
Insurance risk (mortality/morbidity)	Sum at risk	Different weights applied to different levels of sum at risk
Interest rate risk	Mathematical reserves	Low Risk (.75%) Medium Risk (1.5%) High Risk (3%)
Business risk	Premium income	Different fixed factors are applied for life products and A&H products

Risk Based Capital - US

- Advantages
  - Enhancement to the fixed ratio approach
  - Explicit consideration of risk categories
  - Simple, low compliance costs, results easy to understand, avoids subjectivity
- Disadvantages
  - Arbitrary capital
  - Little predictive power for insolvency
  - Not dynamic or forward looking
  - May encourage under- rating or under provisioning as premiums and reserves used as proxies.

Scenario Based Approach – US, Canada

- Capital requirements are calculated based on worst case outcome from a set of scenarios applied to the insurance company's financial model
- Resilience testing, asset adequacy analysis
- Generally used to supplement minimum regulatory requirements

Scenario Based Approach – US, Canada

- Advantages
  - Straightforward and intuitive interpretation of results
  - Can consider a number of correlated risks
  - Provides useful information for management action
  - Forward looking

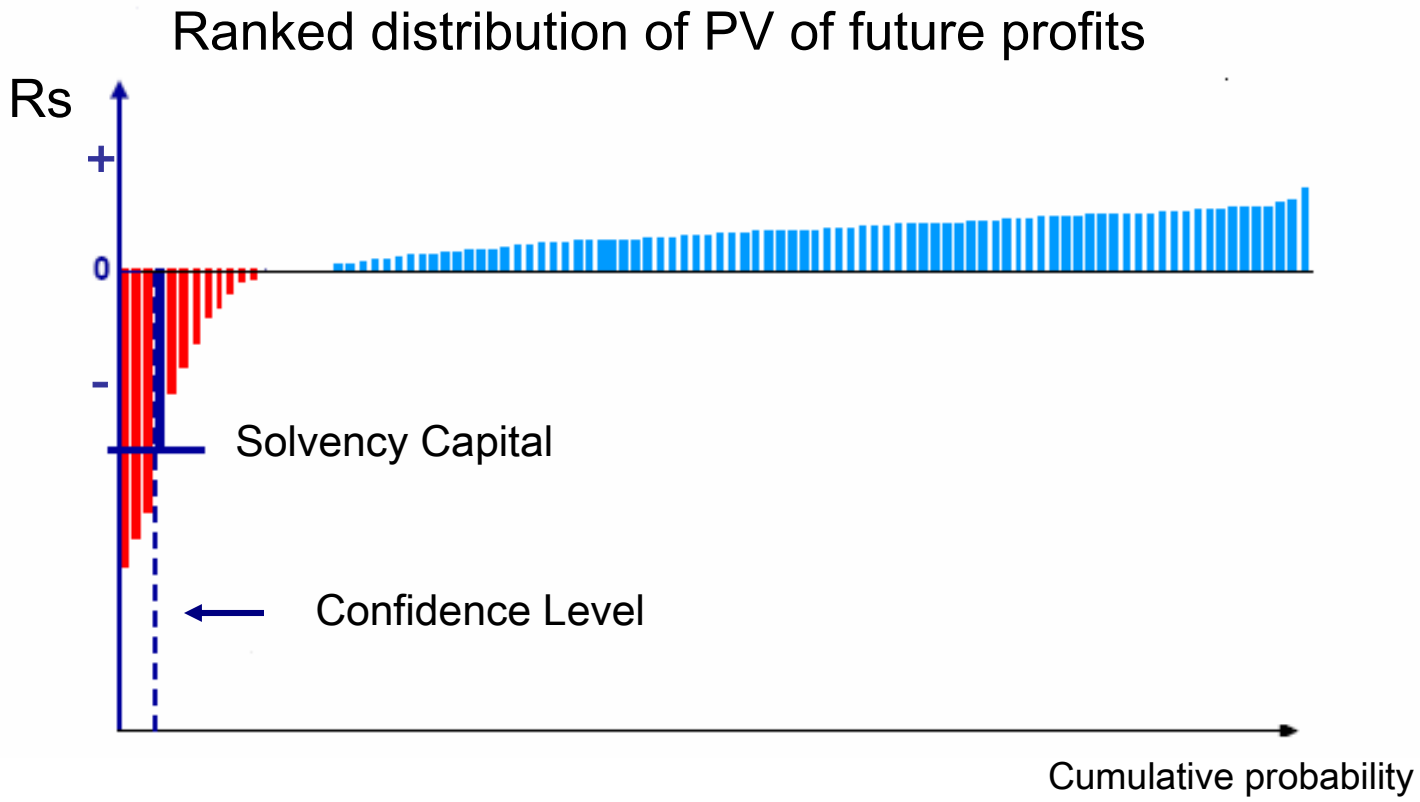
- Disadvantages
  - Capital determined on the basis of fixed scenarios and depends on the completeness of these scenarios
  - The likelihood of the worst scenario occurring is not considered
  - Models may be complex
  - Considerable data requirements

Probabilistic Approach

- Attempts to cover the full range of risk variables from statistical distributions in a simulation procedure
- Wider range of outcomes
- Considers statistical measures such as likelihood of adverse development and confidence intervals

Probabilistic Approach

Determining Solvency Capital



Probabilistic Approach

- Advantages
  - Sophisticated
  - Offer the best framework for a clear capital definition
  - Takes a holistic and integrated risk approach
  - Provides useful information for management action

- Disadvantages
  - Complex
  - Expensive
  - Extensive data requirements

Solvency Margin - India

- Assets – bonds values at amortized cost, equities at market values
- Policyholders liabilities – gross premium valuation
- Investments – regulated except for unit linked
- Solvency Margin – Combination of Fixed Ratios and RBC
- Presently, no ratios prescribed for assets and so the solvency margin is similar to EU Solvency I

Solvency Margin - India

Item	First Factor	Second Factor
Non-Linked Business:		
Individual Business:		
01: Life Business	4%	0.3%
Linked Business:		
Individual Business:		
Life Business-		
11: With guarantees	2%	0.2%
12: Without Guarantees	1%	0.3%

Pakistan

- Assets – lower of cost or market values
- Policyholders liabilities– NPV (if gross premium liability is higher, this needs to be disclosed in the FCR)
- Only admissible assets can be counted towards the solvency margin
- Appointed Actuary has to express opinion that the life insurer has adequate capital to continue its business at planned levels for a period of not less than five years.
- According to the draft valuation regulations, the Appointed Actuary can make aggregate provisions for expense overruns, guarantees, options, etc
- Products environment is fairly controlled and stable – product guarantees and options are minimal
- Fit and proper person criteria
- Role of the Appointed Actuary
- SECP audits
- Admissibility limits for assets
- Higher paid-up capital requirement – Rs 500 million
- Solvency margin in shareholders fund – Rs 75 million
- Compulsory rating
- Inherent conservatism in the NPV and book value of assets combination, plus Appointed Actuary can set aside additional reserves
- Do we need additional solvency margin requirements?
- Which approach to follow?