

SOA Research Report: Economic Capital for Life Insurance Companies

WILLIS TOWERS WATSON

September 2016



Contents

- Background
- EC Methodology
- Influence of Supervisory Developments
- Applications and Implementation

Background



The Society of Actuaries (SOA) Committee on Finance Research commissioned a report on Economic Capital (EC) practices for U.S. life insurers

- While designed to be read as a standalone document, the report is an update to prior research published by the SOA in 2008
- Since that time, EC has continued to grow in importance amidst an evolving insurance landscape
 - More complex products and risk exposures
 - Increased computing capabilities
 - 2008 financial crisis
 - Supervisory developments (ORSA, Solvency II, etc.)
- Objectives included:
 - Discussing methodology considerations for internal EC frameworks
 - Identifying uses of EC for company management
 - Reviewing implementation and reporting considerations

The report was developed by the Risk Consulting and Software practice of Willis Towers Watson

- The primary authors consisted of Willis Towers Watson consultants with U.S. and global expertise in economic capital
 - Ian Farr – London
 - Adam Koursaris – New York
 - Mark Mennemeyer – New York
- Significant industry input was provided by the Project Oversight Group
 - Bob Reitano
 - Dennis Radliff
 - James Berger
 - Nate Deboer
 - Steve Marco
 - Steven Siegel

EC Methodology



Economic capital is a realistic assessment of risks, independent from any regulatory or accounting conventions

- What is capital?
 - Available capital = the excess of assets over liabilities held by the insurer
 - Required capital = the amount of assets in excess of liabilities needed to withstand future adverse outcomes
 - Capital ratio = Available capital / Required capital
- What makes capital “economic?”
 - This term is not standardized in the insurance industry and can cause confusion
 - A realistic projection of risk, coupled with a realistic assessment of the implications for the company
 - Regardless of the methodology or valuation approach, economic capital calculations involve a joint, real-world projection of future risk along with some measurement of the effects on the company’s financial condition
- Why is capital held?
 - To allow the company to meet its objectives with a high degree of certainty
 - A common, fundamental objective is policyholder protection
 - Satisfying other stakeholders (such as regulators or shareholders) is also relevant, as failure to do so may impact financial strength, debt financing, frictional costs, or the ability to write new business
- For whom is the EC calculation performed?
 - Economic capital should be aligned with company goals and management’s view of risk; therefore, it is meant to be a useful internal measure
 - External stakeholders may also be a secondary audience to the extent that management wishes to demonstrate how EC fits within a comprehensive risk management framework

There are a number of different ways in which to define EC

- In deciding on a definition of EC to use, insurers need to make a number of key decisions
 - What time horizon to use
 - Which measure(s) of risk to use
 - Which risks to include
 - What level of confidence to target
- There are also a number of implementation decisions to be made (e.g., stochastic vs. stress testing quantification method) — consequently, there are a large number of possible ways in which EC can be defined
- In practice, two methods have emerged as the most common:
 - **Liability runoff approach:** The current market value of assets, less some measure of reserves for liabilities, required to pay all future policyholder benefits and associated expenses at the chosen confidence level
 - **Risk horizon approach:** The current market value of assets required to cover the liabilities at some finite point in the future (typically one year) at the chosen confidence level, less the current value of the liabilities

Both approaches answer the same fundamental question—identifying the level of assets required to cover policyholder benefits with some degree of security

Liability runoff approach

- EC is based on the amount of initial assets needed to cover liabilities at a required confidence level projected over the lifetime of the business
 - For each scenario examined, the minimum amount of assets required to satisfy all liabilities by the end of the projection is determined
 - Scenarios are rank ordered to form distribution of the required initial asset amounts
 - EC is a function (e.g., VaR or CTE) of the distribution for a given confidence level less some measure of the liabilities
- In practice, different variations of the runoff approach exist, due to differences in
 - Liability valuation basis
 - Different liability basis results in a different split between liabilities and EC, but total required assets is effectively unchanged
 - Popular choices are a statutory, economic or best estimate basis
 - Measures of interim solvency
 - No solvency check at interim points implicitly allows profits and losses in different time periods to offset each other, ignoring impacts of potential regulatory intervention
 - Measures of interim solvency create a more stringent EC requirement, but also one that is more aligned with reality
 - Degree to which new business is projected
- This approach is frequently implemented using an integrated stochastic model, although other implementation approaches are possible

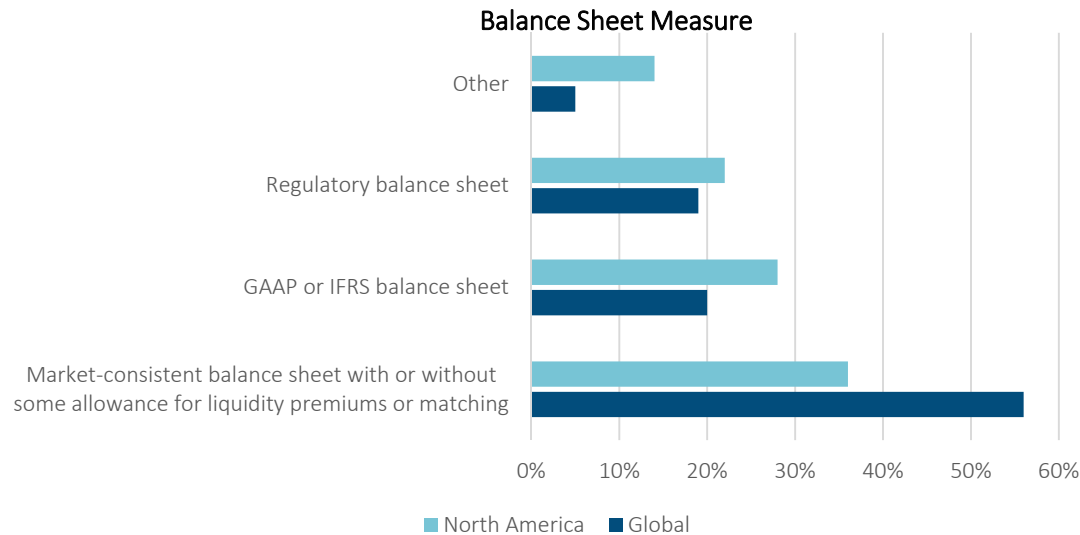
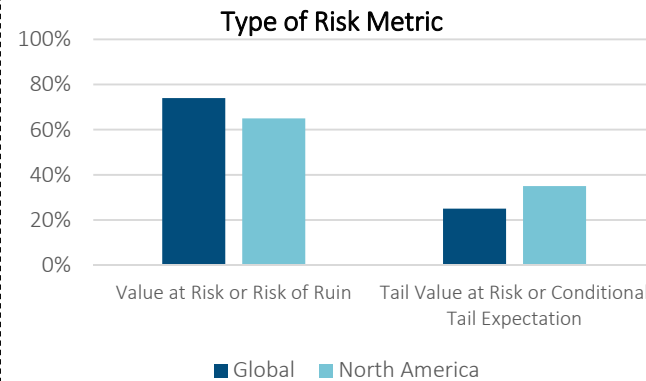
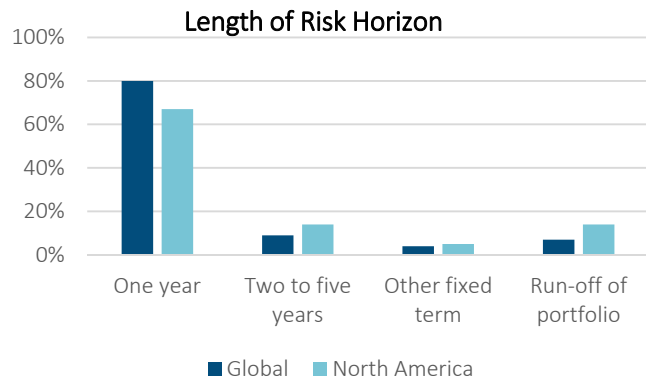
One-year risk horizon approach

- EC is based on the amount of assets needed to remain solvent over a one-year time horizon at a required confidence level
 - Opening asset and liability values are projected forward one year
 - Value of net assets is calculated and discounted to valuation date
 - Tail distribution of the present value of net assets is developed by repeating under different conditions
 - EC measures (e.g., VaR, CTE) are calculated from tail distribution
- In practice, stochastic and stress testing implementation approaches are used
 - With stress testing, a limited number of stress scenarios are run, which have been calibrated to give results in the relevant tail of the capital distribution
 - Instantaneous stresses may further simplify the process, where EC effectively becomes the difference between current and stressed net assets at time 0
 - Stochastic approaches are becoming more common, but are usually more complex, particularly when future valuations along each scenario path require additional stochastic projections (“stochastic on stochastic”)
 - Proxy models address computing challenges by developing polynomial functions of balance sheet movements which can then be decoupled from computationally intensive cash flow projection models
 - Practical adjustments to minimize balance sheet volatility have created a divergence from pure market consistent measures

Comparing the two main approaches

	Liability Runoff	One-Year Risk Horizon
Horizon	Measures risk over the period risk is held, with a more direct link to risk emergence over time	More natural alignment with the reality of risk management, in which capital levels will be reevaluated on an annual basis
Decision making	Longer-term decision making not distorted by volatility of economic assumptions over short term	Short-term volatility to economic assumptions may be very relevant when assessing risk management options currently available
Regulation	Generally consistent with approaches used by the NAIC	Generally consistent with approaches used globally
Management actions	Management actions may be important to consider when evaluating long-term solvency needs	Less dependent on implementing subjective assumptions (e.g., with respect to management actions) over time
Performance Management	Runoff horizon may promote longer term performance management	Risk quantification and risk management linked to performance management over the typical annual performance reporting cycle
Risk calibration	Target confidence levels may be defined from long term default studies or other data	Generally easier to calibrate risks to target confidence levels over one year
Aggregation	Integrated scenarios support risk aggregation for individual products	Measuring all risks over the same time horizon facilitates aggregation

The one-year calculation remains the most popular, with variations on the balance sheet measurement



Source: Willis Towers Watson Insurance Enterprise Risk Management Survey, April 2015.

Responses came from senior executives at 398 insurance companies. "Global" includes all responses; "North America" includes the U.S., Canada, and Bermuda

Influence of Supervisory Developments



Ongoing supervisory developments may influence EC models

- Global Financial Crisis
 - Highlighted the need for more robust models able to perform frequent sensitivity testing and solvency monitoring
 - Motivated new supervisory frameworks
- Solvency II
 - A major update to solvency regulation for European insurers after several years of development
 - Promotes a one-year risk horizon at a 99.5th percent confidence level
 - Based around market values, though numerous material adjustments reflect compromises to move away from pure market consistent approaches, especially as related to yield curves and liquidity
 - Introduced “internal models,” allowing for principles-based development of capital subject to a rigorous approval process
- Own Risk and Solvency Assessment
 - Requires insurers to self assess their risk and solvency position, with flexibility to use internal measurements
 - Highlighted the need to assess future capital adequacy and to project capital relative to business plans
- Global Capital Standards
 - Largely driven by the IAIS, this includes the BCR for G-SIIs and the ICS for IAIGs
 - Still under development, but stakeholders around the globe are paying attention and engaging in discussions
- U.S. Federal Regulatory Activities
 - Dodd-Frank introduced the concept of SIFIs and included insurers within the scope
 - Emphasizes stress testing to determine capital adequacy
 - Current debates focus on whether similar standards should apply to both banks and insurers

Economic capital models promote realistic economic principles and need not strictly follow regulatory frameworks; nonetheless, these supervisory developments have an important influence on EC

Applications and Implementation



Economic capital can add value if used effectively within business operations

- Business use of EC is a requirement in some regulatory regimes, and additionally, many insurers choose to emphasize such use in rating agency and ORSA discussions
- As EC frameworks continue to evolve and achieve greater buy-in, applications are expected to increase
- The report discusses the use of EC in several areas:
 - Capital adequacy
 - Capital allocation
 - Risk appetite
 - Performance measurement
 - Strategic planning
 - Pricing
 - Mergers & acquisitions

Implementation and communication are critical for successful EC programs

- Objectives
 - The implementation approach should be influenced by the insurer's objectives
 - There are trade-offs between the accuracy of the EC results and the timeliness of their availability for business use
- Constraints
 - Resource constraints may further influence the design of EC frameworks
 - Many insurers start with simple but manageable models and expand these over time to reflect increasing sophistication
 - Lack of availability of experienced staff is often cited as a limiting factor
- Governance
 - On an operational level, a senior level business owner helps to guide the use of EC
 - Effective communication is critical to obtain broad buy-in from internal stakeholders
 - Internal processes involve a combination of corporate level decisions (e.g. high level methodology and aggregation) and business unit decisions (e.g. how risks interact with product features)
- Validation
 - EC models often rely on separate cash flow projection systems. Existing validation processes should be extended to account for unique considerations such as tail scenarios
 - Back testing against historical data, accompanied by forward looking views for reasonableness checks, is an important technique to identify risk calibrations
- Reporting
 - The usefulness of EC requires the ability to extract timely results
 - Flexible reporting across business units, geographies, risk categories, etc. is common
 - Reports should be aligned with objectives—produce necessary information but not extraneous information