Using Scenario Analysis in a Risk Management Framework

Neil Drzewiecki
Tim Patria
MassMutual Financial Group
November 11, 2014

ERM # TBD

We'll help you get there.

Disclaimer

- This presentation represents the opinions and views of Neil Drzewiecki & Tim Patria and do not represent our employer MassMutual.

Agenda

- Considerations in Scenario Analysis
- Examples

Introduction

- Scenario Analysis is a means of understanding the impact to your organization in a stress environment using a single or limited set of events
- Scenario Analysis can be useful tool as part of a robust risk management framework
  - Growing trend in using scenario analysis (rating agencies, regulators, management)
- We’re here to explore some considerations in using scenarios
- 2 Specific Examples of Scenario Analysis in a Risk Management Framework

Risk Management Framework

- Focus on strategic risk management and integrating risk analyses into decision making
- Scenario analysis is not new and has been used in many contexts
- What this presentation is not:
  - A recipe on how to do any specific existing analyses such as VAR, CFT, Solvency II
- Scenarios are not limited to specific financial events
  - For example, scenario analysis can be utilized to understand operational or reputational risks
- ASOP 46 & 47
  - Risk Evaluation in Enterprise Risk Management
  - Risk Treatment in Enterprise Risk Management

Define the objective and desired measurements

- Need to be clear on your objective and what you will be measuring
- What decision are you influencing or considering?
- Examples:
  - Solvency analysis or capital adequacy
  - Set or define a risk appetite
  - Set a risk limit on a specific risk
  - Compliance function
- Measurements:
  - Capital
  - Volatility of Earnings – which accounting basis?
  - Sensitivity of specific metrics
- What scenario are you picking – why does that scenario have value to your analysis
- ASOP 41 disclosures – intended audience, uses of your analysis

Selecting the Scenario

- Be descriptive on the scenario – tell a story
- How far in the tail are you? How adverse should the scenario be?
- Depends on the objective
  - Continuation of strategy
  - Solvency
- Critical that it's believable and you obtain buy in
- Think through holistically how it would impact the company
- Demonstrate why the scenario was chosen and how it impacts the analysis

Setting the assumptions

- Link to your holistic analysis of impact to the company
- How to calibrate & set assumptions in the tail
  - Might have limited or no experience
  - Consider a range of assumptions
- Gather diverse experts; discuss with peers; use stochastic modeling?
- Reflecting management actions
  - Are there documented policies or actions in specific events
- Existing risk mitigations
  - Hedging? Reinsurance?
  - How are you handling counterparty risk?
- Actuarial judgment will be needed
- Be clear what you did, document and disclose properly

Communicating the results

- Run your model – now what?
- Tailor the communication to your audience
  - Risk maturity of your organization
- Communicating Results
  - Scenarios lend themselves to be communicated
  - Stochastic analyses can be harder to grasp
- Be very clear on the purpose of the analysis and limitations
  - What are your key assumptions?
- Linking to your strategy
- Influencing Decisions

Pros & Cons

- Single scenarios can be easier to understand & communicate
- Easier to model and validate
- Are they too simple?
- Do they fully capture the risks you are analyzing?

Quantitative Example

Acquisition opportunity that changes the company risk and return profile

- The opportunity: purchase a sizeable block of deferred annuity business into a life insurance company that sells predominately life insurance business

- Company criteria for a capital investment
  - Satisfies strategic plan goals
  - Stock price growth
    - Return on capital investments exceeds 12%
    - GAAP income growth and earnings per share growth
    - Maintain or increase the dividend level
  - Financial strength rating to support the business strategy
    - RBC ratio greater than 400%

Do You Purchase the Block?

Pricing and capital criteria

- The pricing of the deal is in itself an exercise in scenario analysis
- Sample output may look like
  - Capital can be raised to support the purchase and maintain 400% RBC
  - GAAP income increases in operating plan (and increases EP)
  - Returns
    - 14% - Base case scenario
    - 13% - Rates down but above rate guarantee
    - 6% – Rates down and 50bp below rate guarantee
    - 0% –Rate shock increase of 300bp over two years with higher withdrawals
    - 11% - Expenses are 10% higher than projected
    - This may be weighted in some fashion such that expected return is 12.5%
- Do you move forward with the transaction?
  - All appearances are YES

Do You Have Sufficient Information?

- Then the CEO asks how this transaction affects the company risk level and whether the transaction hindered its ability to continue with the existing business strategy
  - Common answers identify the risks that were taken and “priced for”
    - Credit risk
    - Disintermediation risk
    - Rate guarantee risk
  - Only armed with the return numbers of the transaction (in various scenarios), no one can specifically answer the question

Enterprise Risk Appetite

Provides risk framework to assess a strategic initiative

- Identify risks to the company business strategy
  - RBC level – financial strength ratings (FSR)
  - Liquidity – FSR, regulatory response
  - Decline in GAAP income – shareholder response

- Impacted by pandemics, change in credit markets and interest rates and associated policyholder behavior

- Develop scenarios that stress the inherent risks
  - Stochastic or Deterministic
  - Theoretical scenarios – can tailor a stress
    - Interest rates rise and credit markets are stressed
  - Historical scenarios – captures attention, feels real
    - Depression, 08/09 financial crisis, S&L crisis high interest environment

Enterprise Risk Appetite

Established framework speeds strategic risk assessment and decisions

Scenario 1 – Pandemic and interest rate decline of 150 bps over 1 year period

Criteria:	Pre-Acquisition	Post-Acquisition
RBC		
Liquidity		
GAAP Income		

Scenario 2 – Rates up 300 bps over 2 years, credit spreads rise 200 bps over 2 years

Criteria:	Pre-Acquisition	Post-Acquisition
RBC		
Liquidity		
GAAP Income		

Strategic Actions to Support Risk Appetite

Modify portfolio assumption to support scenario two

Pre-Acquisition → **Post-Acquisition** → **With Modified Portfolio**

Assessment

- In this case, product portfolio shifts to a much higher % of on-demand $'s
- Pricing based on current portfolio allocation. High policy holder withdrawal behavior cannot be supported in rising rate environment

Action

- Increase liquidity of asset portfolio
- Reduces investment income

Re-price the opportunity and reassess risk appetite and pricing criteria

Qualitative Example - Adverse Scenario Exercises

Overview of what, why, when, who, how and what is next

- What is an adverse scenario?
  - Role playing of an unfavorable set of circumstances
- Why perform scenario testing?
  - To practice responses and identify potential enhancements
- When should one be done?
  - When a process is mature and the business is confident they will pass the scenario
- How perform one?
  - Identify the participants, create a realistic script – ideally with “actors” to role play key constituents, and schedule several hours of uninterrupted time to work together
- What comes next?
  - Perform the test, have someone monitor what worked – and more importantly what didn’t – identify steps/owners/dates to enhance future performance
  - Repeat in the future once owners are confident in the revised process

Adverse Scenario Example

Tabletop exercise may reveal gaps in the response

- Scenario: Cyber attack creates a significant data theft
- Tabletop exercise includes participants from areas such as Corporate Communications, IT, Business units, Risk Management
- Facilitator reveals events in a compressed real-time basis to the simulation participants with the "actors" jumping in with role playing demanding answers to hard questions
- Potential unexpected findings
  - No defined process to communicate amongst groups
  - Multiple areas believe they are responsible to deliver communications to employees or the field - potential inconsistent messages
  - No relationship exists with credit monitoring services - time to negotiate deal delays calming of constituents and limits power to negotiate price
  - No backup facility to process business while systems are "cleaned" – potential regulatory issues, significant expense to perform tasks, angry clients or brokers

Adverse Scenario Example

The quantitative angle

- With knowledge about the implications of an attack
  - What is the cost of potential attack scenarios? and,
  - Is there an action to take now?

- Costs of a breach
  - Credit monitoring services
  - Down-time of employees and executive management diversion from other activities
  - Reputation – lost business/brokers

- Weigh the cost of mitigation against the risk
  - Proactive contracting with credit monitoring services
  - Purchase insurance to reimburse costs
  - Invest in software/hardware to harden defenses (everywhere? or targeted areas?) or create backup capability

MassMutual

FINANCIAL GROUP®

We'll help you get there.®

CRN000000-000000

X000 000