DEVELOPING A GROUP CAPITAL CALCULATION

Presentation to NAIC’s Group Solvency Issues Working Group
March 25, 2011
Economic capital models: critical decisions

1. Definition of solvency
2. Time horizon of risk exposure
3. Risks to model
4. How risks are quantified
5. Measurement metric
6. Target level of capital
7. Reflecting diversification
Decision #1
Definition of solvency

- Cash flow basis: an insurer is solvent if it can continue to pay claims as they come due
- Balance sheet basis: an insurer is solvent if its assets exceed its liabilities
  - Most common
  - Requires selection of accounting basis for assets and liabilities (most common are US GAAP or market-consistent)
Decision #2  
Time horizon of risk exposure

- Any time horizon can be modeled, but two are most common

**One year**
- “Open system”: assumes that gains are paid out as dividends and capital losses (up to a point) can be replaced by shareholders
- Future events considered through revaluation of assets and liabilities after one year
- Greater emphasis on near-term risks
- Simpler to implement

**Lifetime**
- “Closed system”: assumes gains are not paid out as dividends, and capital losses are not replaced
- Greater emphasis on long-term risks
- More complex to implement
Decision #3
Risks to model

- Objective: measure material risks
## Decision #4
### How risks are quantified

<table>
<thead>
<tr>
<th>Stress Tests</th>
<th>Stochastic Modeling</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk is measured by the impact of a shock to the system</td>
<td>Risk is measured by multiple scenarios that produce a range of possible outcomes</td>
<td>Risk is measured by static factors that generally do not change from period to period</td>
</tr>
<tr>
<td>Used in Solvency II</td>
<td>Used in Life RBC C-3 measurements</td>
<td>Used in many aspects of U.S. RBC</td>
</tr>
</tbody>
</table>
## Decision #5
### Measurement metric

<table>
<thead>
<tr>
<th>Value at Risk (percentile)</th>
<th>Tail Value at Risk (CTE)</th>
<th>Probability of Ruin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantifies the capital needed to withstand a loss at a certain probability.</td>
<td>Quantifies the capital needed to withstand average losses above a certain probability.</td>
<td>Quantifies the probability of ruin given the capital held.</td>
</tr>
<tr>
<td>Used in Solvency II</td>
<td>Used in emerging system in Bermuda.</td>
<td>Complement of VAR</td>
</tr>
</tbody>
</table>
Decision #6
Target level of capital

- Target capital is a function of the insurer’s business objectives

AAA
Target capital business objective

AA
Target capital business objective

A
Target capital business objective

BBB
Target capital business objective
Decision #7
Reflecting diversification

- Diversification benefits provide an incentive to spread around the risks to which the insurer is exposed
# Two most common economic capital approaches

<table>
<thead>
<tr>
<th></th>
<th>One-Year Mark-to-Market</th>
<th>Lifetime Runoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Definition of solvency</td>
<td>Market-consistent balance sheet basis</td>
<td>Balance sheet basis, frequently US GAAP</td>
</tr>
<tr>
<td>2. Time horizon of risk exposure</td>
<td>One year</td>
<td>Lifetime</td>
</tr>
<tr>
<td>3. Risks to model</td>
<td>All material risks</td>
<td>All material risks</td>
</tr>
<tr>
<td>4. How risks are quantified</td>
<td>Primarily stress tests</td>
<td>Stochastic modeling</td>
</tr>
<tr>
<td>5. Measurement metric</td>
<td>Typically VaR (percentile)</td>
<td>Frequently TVaR (CTE)</td>
</tr>
<tr>
<td>6. Target level of capital</td>
<td>Usually at least 99% confidence over one year</td>
<td>Usually at least 90%+ CTE over the lifetime</td>
</tr>
<tr>
<td>7. Diversification effects</td>
<td>Determined after stress tests are performed</td>
<td>Embedded in stochastic scenarios</td>
</tr>
</tbody>
</table>
Economic capital and the ORSA

Key Messages

- Insurers should have sound processes for assessing capital adequacy in relation to risk profile; this process should be integrated into its management and decision-making culture.
- Regulators should be able to understand insurers’ risk profiles.
- Economic capital models can be an excellent risk assessment resource, in context.
- The ORSA process should not mandate specific approaches but should focus on verifying that insurers are thinking about and managing their risk exposures.
- Care must be taken to ensure that the ORSA process does not have unintended consequences on insurer risk management practices.
ADDITIONAL INFORMATION

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