Session 25 PD: Implications of Principle-Based Approaches to Reserve and Capital Determination

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Implications of principle-based approaches to reserve and capital determination

Tara Hansen, FSA, MAAA
2009 Valuation Actuary Symposium
September 24, 2009

Agenda

► Current regulatory landscape
► Possible future states:
  ► NAIC principle-based regulatory environment
    • NAIC Solvency Modernization Initiative
  ► Impact of Obama proposal
    • Federal versus state regulation
► Managing in the new world
The future of insurance solvency regulation

Where we are today:

- State regulated (NAIC)
- NAIC formulaic reserves + AG35/43
- NAIC factor-based RBC + C3P1/C3P2

Where will we land?

- State regulated (NAIC)
- Principle-based reserves
- Capital modernization:
  - Combination of factor- and principle-based
  - Solvency II – Pillar 2 influence
  - Solvency II for subs of Foreign entities
- Increased capital standards for all insurers
- Possible principle-based capital (e.g. Solvency II)
- Tier 1 FHCs:
  - Federal reserve requirements
  - Higher capital standards than other insurers
- Other?

Current path toward principle-based approaches

- Move toward principle-based approaches will continue:
  - CFT, AG 35, C3P1, C3P2, AG 43
  - C3P3 next?
- Solvency Modernization Initiative:
  - NAIC sponsored
  - Principle-based system
  - Five key areas of focus:
    1. Capital requirements
    2. Reinsurance
    3. Group issues
    4. International Accounting
    5. Insurance valuation
- Increased controls through Model Audit Rule
A review of the current US system

► The optimal system is one that is in part principle-based and in part rules-based.
   "The use of internal models to establish regulatory capital requirements cannot and
   should not disappear. However, internal models must be used appropriately, with
   recognition of their significant limitations."

► A major benefit of multiple agency (state) regulation over single agency
   (federal) regulation is the checks and balances in the state system.
   "Regulators may err in failing to understand the risk of a regulated entity, and they may
   err in failing to take appropriate action after they’ve identified excessive risk. A
   regulatory structure that includes a system of checks and balances can help control the
   negative effects of errors."

► Market discipline, i.e. the theory that well informed markets effectively restrict
   excessive risk taking by institutions, by itself is not enough to successfully
   regulate the markets.
   "Current developments have demonstrated that market discipline cannot be relied on
   as a substitute for regulation and supervision. The optimal regulatory structure is one
   that encourages supervisors to take action when it is appropriate, and a system that
   incorporates duplicative regulatory oversight may advance that objective."

Source: "The Implications of Solvency II for U.S. Insurance Regulation" by Therese Vaughn, C.E.O. of the NAIC

Alternative path toward solvency regulation

Obama proposal
► Issued June 18, 2009
► Office of National Insurance
► State versus federal legislation
► Interaction of banks and insurance
► Tier 1 Financial Holding Company (FHC)
► Consideration of Solvency II in the US?
Obama proposal

“Our legislation will propose the establishment of the Office of National Insurance within Treasury to gather information, develop expertise, negotiate international agreements, and coordinate policy in the insurance sector. Treasury will support proposals to modernize and improve our system of insurance regulation in accordance with the following six principals outlined in the body of the report:

1. Effective systemic risk regulation with respect to insurance;
2. Strong capital standards and an appropriate match between capital allocation and liabilities for all insurance companies;
3. Meaningful and consistent consumer protection for insurance products and practices;
4. Increased national uniformity through either a federal charter or effective action by the states;
5. Improve and broaden the regulation of insurance companies and affiliates on a consolidated basis, including those affiliates outside of the traditional insurance business; and
6. International coordination.”

Excerpt from June 17, 2009 White Paper

Regulatory reforms will embed the need for change:

► Likely establishment of a US systemic risk regulator:
  ► Strengthen prudential supervision for ‘systemically significant’ institutions
  ► Extend this supervision beyond financial institutions to previously unregulated entities and products

► For all US financial institutions:
  ► Supervision expected to become much more intrusive and prescriptive
  ► Key areas of focus are likely to be:
    ► Risk governance
    ► Risk management
    ► Stress testing

► Specific regulatory and supervisory standards with respect to capital and liquidity risk management are probable. Internationally:
  ► BIS has proposed such a framework
  ► FSA has taken steps towards this

(continued)
Obama proposal

Regulatory reforms will embed the need for change:
► Solvency II will likely be in force in Europe by October 2012:
  ► Global insurance industry regulators began talks in June of 2009 to create the first common rules on solvency requirements for international insurers
► Rating agencies will likely:
  ► Increase their existing focus on enterprise risk management and capital management
  ► Ask the insurers to demonstrate practically how risk management is embedded in the decision-making process

Managing in the new world

Financial reporting model implications:
► US GAAP/IFRS convergence
► US regulatory reserves/PBR transformation
► US regulatory capital/Solvency II
► EV/EEV/MCEV/economic capital
► Management reporting basis?

At the current time, it appears that multiple bases will be required, adding further challenges to management of insurance companies

The road toward convergence will be long and bumpy, with no guarantees we will arrive.
Implications of Principle-Based Approaches to Reserve and Capital Determination

Bill Wilton, CFA, FSA, MAAA
Consulting Actuary, Actuarial Resources Corporation
Session 25 – 2009 Valuation Actuary Symposium
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PBA Roadmap

Reserves

- NY126
- CFT
- AG XLIII (VAs)
- VM-20 (Life)
- VM-22 (Annuities, Excl. VA)
- VM-31 (Report)
- VM-50/51 (Experience)

Capital

- C3 Phase I (FA & SPL)
- C3 Phase II (VAs)
- C3 Phase III (Life)
- C3 All Products
Managing the Process

- Anticipated Experience
  - Data Collection

- Determine Margins
  - Sensitivity Testing used to help identify key assumptions

- Establish Prudent Estimate Assumptions

- Perform Calculations

- Documentation and Reporting

Margins

- Greater analysis & justification for risk factors that reserves are more sensitive to

- Uncertainties covered by individual margins\(^1\)
  - Random fluctuation
  - Mis-estimate
  - Inappropriate trend assumptions

\(^1\)SOA - Determining Margins under PBA.pdf
### Contractholder Behavior

<table>
<thead>
<tr>
<th>Relevant &amp; fully credible data</th>
<th>Sensitivity Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>- If not, “assumptions on the conservative end of the plausible spectrum”</td>
<td>- Required – not optional</td>
</tr>
<tr>
<td>- What is “fully credible”?</td>
<td>- Higher margins if sensitive &amp; not fully credible experience</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dynamic Assumptions</th>
<th>Consistent with past experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dynamic preferred over static for scenario dependent assumptions</td>
<td>- No less conservative w/o evidence</td>
</tr>
<tr>
<td>- Dynamic behavior “encompass the plausible range”</td>
<td>- Assume “contract-holders’ efficiency will increase over time” w/o evidence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aggregate vs. Individual Margins</th>
<th>Contractholder Behavior Consistent with CTE scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Emulate CTE 70 with multivariate stochastic model BUT …</td>
<td>- Approximate top 1/3 of loss distribution</td>
</tr>
<tr>
<td>- Add to each assumption until feasible.</td>
<td>- Not set in isolation</td>
</tr>
</tbody>
</table>

### Managing the Assumptions

- **Prescribed Assumptions**
- **Anticipated Experience**
- **Cash flow Testing**
- **Prudent Estimate**
- **Standard Scenario (VA Reserves & RBC)**
- **Management Projections**
- **GAAP**
- **International Standards**
Managing the Calculations

- Seriatim vs. Grouped
- Monthly / Quarterly / Annual
- Gross & Net of Reinsurance
- Hedging
- Allocation of amounts to Contracts
- Sensitivity Testing

Reporting Deadlines

- **Monthly Reporting**
  - 2 day close?
  - Stochastic requirements?
  - Estimates based on net premium or deterministic reserve, standard scenario reserve?

- **Quarterly Reporting**
  - Similar to monthly?
  - Different numbers for quarterly blank?
  - Redesign of accounting systems?

- **Annual Reporting**
Model Audit Rule (2010)

- Management responsible for establishing & maintaining internal controls
- Internal control is effective to provide reasonable assurance regarding the reliability of financial statements
- Describe approach for evaluating effectiveness
- Scope of work
- Disclose any unremediated material weaknesses
- Inherent limitations of internal control systems
- Signature of CEO & CFO (or equivalent)

Documentation and Reporting

- VM-30 – Opinion & Memorandum Requirements
- VM-31 – Reporting & Documentation Requirements (PBR Report)
- AG 43 – Supporting Memorandum Requirements
  - GLBs – require communication of actual to expected lapses on two bases (Prudent Estimate & Standard Scenario)
  - Experience separated by blocks, duration, moneyness, age
  - Experience separated by past year, past three, all years AG 43
- VM-50 – Experience Reporting Requirements
- VM-51 – Experience Reporting Formats
## Conclusion

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>data collection</td>
<td>new or refined procedures and processes</td>
</tr>
<tr>
<td>experience analysis</td>
<td>system solutions to efficiently and effectively</td>
</tr>
<tr>
<td>assumption management</td>
<td>meet the emerging requirements</td>
</tr>
</tbody>
</table>

**Slide 11**
Additional Knowledge Requirements

- Actuaries may have to expand their knowledge base to be able to:
  - Perform ALM testing
  - Set dynamic assumptions
  - Assign credibility to experience
  - Determine appropriate margins
  - Understand and model reinsurance treaty terms
  - Simulate hedges
SOA Research Report

“Analysis of Proposed Principle-Based Approach”

12 companies contributing results under the guidance of a Milliman research team on various blocks to determine:

- The impact of the proposed methodology through preliminary modeling results
- Challenges of implementing the methodology
- Elements of the methodology that will require refinement before adoption by regulators

Term Reserve Implications

<table>
<thead>
<tr>
<th>TERM BLOCK</th>
<th>Deterministic Reserve</th>
<th>Excess of Stochastic Reserve over Deterministic Reserve</th>
<th>VM-20 Minimum Reserve</th>
<th>VM-20 as a percentage of Net Statutory Reserve less Deferred Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>$ 692</td>
<td>$ 0</td>
<td>$ 692</td>
<td>26%</td>
</tr>
<tr>
<td>A-2</td>
<td>7,867</td>
<td>44</td>
<td>7,911</td>
<td>83%</td>
</tr>
<tr>
<td>D-1</td>
<td>844</td>
<td>0</td>
<td>844</td>
<td>61%</td>
</tr>
<tr>
<td>E-1</td>
<td>1,947</td>
<td>0</td>
<td>1,947</td>
<td>32%</td>
</tr>
</tbody>
</table>
### Whole Life Reserve Implications

**MINIMUM RESERVE – WHOLE LIFE**

<table>
<thead>
<tr>
<th>WL BLOCK</th>
<th>Deterministic Reserve</th>
<th>Excess of Stochastic Reserve over Deterministic Reserve</th>
<th>VM-20 Minimum Reserve</th>
<th>VM-20 as a percentage of Net Statutory Reserve less Deferred Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>$101,855</td>
<td>$12,282</td>
<td>$114,137</td>
<td>96%</td>
</tr>
<tr>
<td>B-2</td>
<td>160,903</td>
<td>0</td>
<td>160,903</td>
<td>100%</td>
</tr>
<tr>
<td>C-1</td>
<td>7,224</td>
<td>0</td>
<td>7,224</td>
<td>70%</td>
</tr>
<tr>
<td>B-3</td>
<td>765,626</td>
<td>0</td>
<td>765,626</td>
<td>99%</td>
</tr>
</tbody>
</table>

### Universal Life Reserve Implications

**MINIMUM RESERVE – UNIVERSAL LIFE**

<table>
<thead>
<tr>
<th>UL BLOCK</th>
<th>Deterministic Reserve</th>
<th>Excess of Stochastic Reserve over Deterministic Reserve</th>
<th>VM-20 Minimum Reserve</th>
<th>VM-20 as a percentage of Net Statutory Reserve less Deferred Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3</td>
<td>$116,088</td>
<td>0</td>
<td>$116,088</td>
<td>95%</td>
</tr>
<tr>
<td>C-2</td>
<td>36,971</td>
<td>0</td>
<td>36,971</td>
<td>67%</td>
</tr>
<tr>
<td>C-3</td>
<td>39,711</td>
<td>0</td>
<td>39,711</td>
<td>73%</td>
</tr>
<tr>
<td>C-4</td>
<td>28,281</td>
<td>0</td>
<td>28,281</td>
<td>95%</td>
</tr>
<tr>
<td>E-3</td>
<td>144,280</td>
<td>6,264</td>
<td>150,544</td>
<td>103%</td>
</tr>
<tr>
<td>E-3b</td>
<td>127,075</td>
<td>0</td>
<td>127,075</td>
<td>116%</td>
</tr>
</tbody>
</table>
Whole Life & Term Implications

Ranges of results influenced by:

- Sufficiency of the premium to support benefits, expenses and profit
- Maturity of the block
- Level of margins used in the valuation
- Characteristics of the asset portfolio supporting the policies

Universal Life Implications

Ranges of results additionally influenced by:

- Level of funding in the block and the significance of the cash value floor
- Strength of the secondary guarantee
Required Capital Implications

C-3 P3 analysis for all companies performed assuming starting assets=formulaic reserves

- Term: No Additional C-3 RBC capital required
- WL: 1 of 4 required additional capital
- UL: 1 of 6 required additional capital

Compare to current basis where C-3 capital is generally 0.77% of after-tax net reserve

Deferred Annuity Implications

- Analysis included Fixed-only deferred annuities from one company and Fixed, Indexed, and MVA annuities from another company.

- Outcomes were not materially different than the current formulaic approach for reserves and capital.

- Is this by design of the existing formulaic approach for annuities or just luck?
Required Capital Implications

This does not necessarily mean a company can look forward to capital reductions.

- C-3 additional required assets become:
  - CTE(90) After-tax GPVAD
  - Minus
  - Actual Allocated Assets ~ VM-20 reserve

- Excluding co-variances with other risk, the difference is leveraged by the company’s own target RBC ratio in excess of 200%

- Even if both reserves and C-3 AAR decrease under PBR, it’s possible more assets overall may be needed to support a company’s target capital requirements.

Company Target Capital Implications

Capital Calculation Demonstration

<table>
<thead>
<tr>
<th></th>
<th>Formulaic Basis</th>
<th>PBA Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reserves</td>
<td>$1,000,000</td>
<td>$900,000</td>
</tr>
<tr>
<td>LR025 Contribution to C-3</td>
<td>$7,700</td>
<td>$100,000</td>
</tr>
<tr>
<td>Pre-Tax Assets Prior to RBC Calc</td>
<td>$1,007,700</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Company Action Level (200% ACL)</td>
<td>$5,005</td>
<td>$65,000</td>
</tr>
<tr>
<td>Company Target RBC (350% ACL)</td>
<td>$8,759</td>
<td>$113,750</td>
</tr>
<tr>
<td>Sum (Reserves + Company RBC)</td>
<td>$1,008,759</td>
<td>$1,013,750</td>
</tr>
</tbody>
</table>
Reported Implementation Difficulties

- Setup and runtime requirements
- Iteration requirements for VM-20
- Review and audit of results (esp. Outliers)
- Credibility blending of mortality
- Setting prudent margin estimates
- Seriatim calculation requirements
- Methodology Issues (i.e. NIER)
- Inclusion of Pre-Tax IMR (Felt redundant)

Implications on Pricing

- Evaluation of future reserve and capital strain may be even more extensive than valuation.
- A nested stochastic analysis might even be required for:
  - Setting of anticipated reserves
  - Setting of anticipated capital requirements
  - Simulating hedges
  - All of the above simultaneously
- Subjective nature of assumption setting for margins means both the pricing and valuation actuaries need to be on the same page in advance of a new product issue.
- Might expect significant shock lapses on existing business and more than anticipated new sales as more competitive products emerge under PBA (esp. products previously subject to XXX requirements).
Other Implications

Using 105% of 1yr treasury as discount rate

- Recently revised from using a discount rate equal to the net asset investment earned rate
- Accumulated Deficiencies still grow @ NIER
- Discounted back at a generally lower rate
- “Projects cash flows for a period that extends far enough into the future so that no material amount of business remains at the end of the period.”

Other Implications

If all scenarios in CTE(70) were like this example, the current methodology appears to adjust initial assets up to compensate.

- But how does it look if only the extreme tail exhibits these losses?
- One company has suggested solving for initial assets for each and every scenario to set GPVAD = 0.
- Segment business by remaining projection duration?