### What to Stress – Life Risks?

<table>
<thead>
<tr>
<th>S&amp;P</th>
<th>AMBest</th>
<th>RBC</th>
<th>Solvency 2 Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Asset Risk</td>
<td>C1 - Non EQ: fixed income securities</td>
<td>C0: Insurance Affiliates/Off-Balance sheet risk</td>
<td>Interest Rate Risk</td>
</tr>
<tr>
<td>w/o concentration risk</td>
<td>C1 - EQ: equity securities</td>
<td>C1cs: Asset Risk - Unaffiliated Common Stock</td>
<td>Equity Risk</td>
</tr>
<tr>
<td>C2: Insurance Risk</td>
<td>C2 - Mortality/Mobility</td>
<td>C1o: Asset Risk - All Others</td>
<td>Credit/CounterParty Risk</td>
</tr>
<tr>
<td>C3: Interest Rate Risk</td>
<td>C3 - int: interest rate</td>
<td>C2: Insurance Risk</td>
<td>Credit Spread Risk</td>
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<tr>
<td>IR Risk</td>
<td>C3 - Mkt: VA market</td>
<td>C3a: Interest Rate Risk</td>
<td>FX Risk</td>
</tr>
<tr>
<td>C4: Business</td>
<td>C4: Market Risk</td>
<td>C3c: Market Risk</td>
<td>Real Estate Risk</td>
</tr>
<tr>
<td>Phase II</td>
<td>C4a: General Business Risk</td>
<td>C4b: Administrative Expense Risk Risk</td>
<td>Mortality Risk</td>
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<tr>
<td><strong>Other Econ Risks</strong></td>
<td></td>
<td></td>
<td>Mortality Calamity Risk</td>
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<tr>
<td>Interest Rate Vol Risk</td>
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<td>Longevity Risk</td>
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<tr>
<td>Equity Vol Risk</td>
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<td>Morbidity Risk</td>
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<tr>
<td>Morbidity Calamity Risk</td>
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<td>Lapse Risk</td>
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<td>Model Risk</td>
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<td>Lapse Mass Risk</td>
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<td>Cost Risk</td>
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<td>Operational Risk</td>
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<td>Concentration Risk</td>
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<td>Health UWing Risk</td>
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</table>
What Happens?

Laser and the jelly bean

+ =
What Happens?

• Laser and the jelly bean
The Challenge

• How to Communicate Uncertainty?
  • Skeptical with ambiguity = GOOD, but if tipping point is crossed, it is too late.
    – Global Climate Change
    – Economic Issues 2007/2008

• How to link Uncertainty with Action
  – With Finite Corporate & Regulatory Resources & Diverse Political Climates
What is Actuarial Work?

“actuarial practice involves the identification, measurement, and management of contingent future events in environments that rarely, if ever, emerge exactly as projected. “

From *U.S. Introduction to Actuarial Standards of Practice (2008)*
I. What is Capital?

• Per Point of View
  – Assets in excess of liabilities to invest or to return to shareholders (Traditional shareholder view)
  – Buffer for uncertainty for additional policyholder protection (regulator & p/h view)
What is the Traditional Value Equation?

Value of Put Option –
(Babbel / Merrill Journal of Risk & Insurance 2005)
Interesting Insight

• In addition to the financial capital of a firm, there is the intellectual and cultural capital of its employees and management and the regulatory environment it operates in.
What are the Essential Elements of a Risk Culture?

• It Exists, but is it self aware?
• Identify & Prioritize
• Appetites/Tolerances/Limits/Budgets
• Risk Management & Controls
• Reporting & Communication – Feedback Loop that is Learning from the “Gaps”
Where Are We Going to Create Value?

Risk Management Governance

Risk Assessment

Risk Management Actions

Continuous Improvement

Risk Communications
What is the Value of a Risk Control Cycle Process?

• Process is an investigative one - a series of questions.
  – What are the risks implicit in the core business model/value creating purpose of the firm?
  – How to reliably quantify what needs to be managed?
  – If can’t quantify risks, how to manage them proactively?
    • What is missing? Or “Mind the Gap”
    • All models are imperfect, even accounting ones
ERM Tools = Antibiotics?

• Powerful new Tool

• Caution =
Hard Tools (Pillar 1 & 3)

Regulator

1. Valuation and capital requirements
2. Disclosure requirements both public (such as financial reporting standards) and private (such as the ORSA)
3. Intervention powers including wind up/resolution authority (typically based on triggers defined in items 1 & 2)
4. Examination authority and authority to fine
5. Authority to prohibit or restrict certain operations or transactions.
Soft Tools (Pillar 2)  
Regulator  

1. Reliance on experts, such as actuaries (with professional standards & discipline process)  
2. Collaborate with and learn from other regulatory jurisdictions as part of supervisory cooperation and coordination (e.g., supervisory colleges)  
3. In depth discussions with management and access to private corporate information.  
4. If allowed by law, coordinate with guarantee funds to back failed companies.
Company Tools

1. Reliance on experts (especially actuaries), with those from a profession being, perhaps, the most valuable.
2. Organizational structures such as groups.
3. Reinsurance, both proportional and non-proportional - to mitigate risk and to act as a form of capital.
4. Hedging and asset liability management techniques.
5. Enterprise Risk Management (ERM) concepts such as emerging risk identification, risk appetites, limits and controls.
6. Capital focused on addressing needs in excess of regulatory requirements.
Company Tools

7. Models, including both external vendor models and internal models (e.g., catastrophe models and economic capital models)
8. Internal model control and validation procedures
9. Stress testing
10. Responsible pricing, product design and inforce management.
11. Voluntary disclosures to both shareholders and policyholders
12. Traditional corporate management processes such as disaster recovery, strategic planning, compensation philosophy and market positioning.
Professional Tools

• Role & Function of the Actuary
• Sophisticated Internal Model Development
• ERM Standards
• This “Riskapedia” Project via the IAA
Business Model Examples

• Create Credit/Money Supply through leverage
• Pool Collective Risk via Insurance + Provide Source of Business Capital
• Create price discovery and planning via Exchanges
• Invest $ for Clients
• WHAT IS ROLE OF CAPITAL & OTHER TOOLS IN EACH MODEL?
II. What Level of Capital?

• **Expected obligations + the uncertainty of that estimate (liabilities).**
  – May be a single conservatively set liability or a calculation of a best estimate plus an explicit capture of a risk based or conservatively prescribed margin.

• **Obligations and business needs can be paid (even in unusual circumstances).**
  – Need may be to pay off over a long period of time
  – Be needed for immediate liquidation
  – Be for recapitalization needs
What Level of Capital?

• **Ensure regulator and public trust.**
  – This includes management’s ability to continue to add value (sometimes called going concern objective)

• **Free/excess capital**
  – Available for either new business and acquisitions or to distribute to shareholders

These levels are not necessarily additive
Capital Level – Pts of View

- Capital (and liquidity) to continue operations and maintain (or enhance) the rating from a rating bureau. (Shareholder perspective and objectives)
- Capital (and liquidity) to avoid increased regulatory scrutiny. (Management perspective to avoid - Regulator perspective to set an early warning trigger)
- Capital sufficient to provide for all policyholder obligations. (Mandated regulatory intervention - Regulator perspective)
Current Issues

Where the common language within insurance begins to divide rests on several risk related topics such as,

- Available capital (i.e. different components not viewed as having the same strength in times of crisis)
- Risk diversification (i.e. regulators view diversification as being appropriate within a risk but only partial across risk categories)
- Capital fungibility (e.g. across companies, geographies, currencies etc.)
- Value of Soft Tools used by both Companies and Regulators
- In addition now need to talk across financial service models
What is Sufficient?

– Less than 5% chance of a loss greater than 10% of surplus in any one year.
– 99% TVAR or 99.5% VAR
– Probability of ruin less than or equal to 5%
– Capital needed to get an acceptable rating from one or more rating agencies
– Capital to satisfy the Bermuda Monetary Authority or other Solvency II regime.
– Capital needed to avoid increased regulatory scrutiny
– Meet a management goal over a short-term period so fluctuations in material external and internal variables are within a desired range.
– Survive extreme stresses as defined by management or regulators.
– Assets are greater than or equal to liabilities after extreme, improbable events.
– Based on liabilities determined on a guaranteed basis using risk-free discounts or on a real world basis based on portfolio yields. (Relates to value of non-guaranteed values & P/H dividends)
### III. How to Calculate Capital?

<table>
<thead>
<tr>
<th></th>
<th>Total Statutory</th>
<th>IFRS</th>
<th>US GAAP</th>
<th>MV</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td>8,460,000</td>
<td>9,660,000</td>
<td>9,650,000</td>
<td>9,280,000</td>
<td></td>
</tr>
<tr>
<td><strong>DAC</strong></td>
<td>380,000</td>
<td>370,000</td>
<td></td>
<td></td>
<td>No DAC for US Stat or MV</td>
</tr>
<tr>
<td><strong>Reinsurance Recoverable</strong></td>
<td>300,000</td>
<td>300,000</td>
<td>300,000</td>
<td></td>
<td>US Stat is reported on a net basis</td>
</tr>
<tr>
<td><strong>Goodwill &amp; Intangibles</strong></td>
<td>30,000</td>
<td>30,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>“Net” Assets</strong></td>
<td>8,460,000</td>
<td>8,950,000</td>
<td>8,950,000</td>
<td>8,980,000</td>
<td>Fair Value vs. Book Value of assets</td>
</tr>
<tr>
<td><strong>Liabilities</strong></td>
<td>(8,130,000)</td>
<td>(9,030,000)</td>
<td>(9,090,000)</td>
<td>(8,750,000)</td>
<td></td>
</tr>
<tr>
<td><strong>DAC</strong></td>
<td>380,000</td>
<td>370,000</td>
<td></td>
<td></td>
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<tr>
<td><strong>Reinsurance Recoverable</strong></td>
<td>300,000</td>
<td>300,000</td>
<td>300,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>“Normalized”</strong></td>
<td>(8,130,000)</td>
<td>(8,350,000)</td>
<td>(8,420,000)</td>
<td>(8,450,000)</td>
<td>deferred taxes, IMR/AVR, payables, pension benefits, etc.</td>
</tr>
<tr>
<td><strong>Non-policyholder liabilities</strong></td>
<td>(120,000)</td>
<td>(140,000)</td>
<td>(100,000)</td>
<td>(100,000)</td>
<td></td>
</tr>
<tr>
<td><strong>“Normalized” PH Liabilities</strong></td>
<td>(8,010,000)</td>
<td>(8,210,000)</td>
<td>(8,320,000)</td>
<td>(8,350,000)</td>
<td></td>
</tr>
<tr>
<td><strong>Surplus</strong></td>
<td>330,000</td>
<td>630,000</td>
<td>560,000</td>
<td>530,000</td>
<td></td>
</tr>
<tr>
<td><strong>Required @100%</strong></td>
<td>120,000</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td><strong>Required @300%</strong></td>
<td>350,000</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>
IV. Linking Actions to RBC Targets

- Is Capital the Answer or is Process?

<table>
<thead>
<tr>
<th></th>
<th>Insurance</th>
<th>Banking</th>
<th>Mining</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>HF/LS</td>
<td>Claims processing, data errors</td>
<td>ATM Failures</td>
<td>Transportation service interruption</td>
<td>Meter Reading Error</td>
</tr>
<tr>
<td>MF/MS</td>
<td>Fraud, Reg. Compliance Failure, Strategic Failure</td>
<td>Online Security Breach</td>
<td>Environmental Contamination</td>
<td>Environmental Contamination</td>
</tr>
<tr>
<td>LF/HS</td>
<td>Mis-Selling or Pricing</td>
<td>Rogue Trader</td>
<td>Mine Collapse</td>
<td>Oil Spill, gas plant fire</td>
</tr>
</tbody>
</table>
Beyond List of Risks - Need

• **Time Horizon of Risk**
  – Banks/Liquidity
  – P&C (Short Tail)
  – Life (Long Tail)

• **Ability to Replenish Capital & Share Some Financial Risks with Policyholder**

• **Other Options within business & regulatory model**
  – Bank regulators can move funds anywhere
  – Ins. supervisors can freeze assets/delay payments

• **Systemic Linkages**
Next Steps

- Volatility of Estimates – How to picture?
- Compare a Bank Balance Sheet Elements to Insurer based on Risks
- Liquidity vs. Capital
- Effect of Risk Charges on Management
- Use of Blunt vs. Refined Instruments
Professional Need

• Organizing the “Story” beyond the technical data dump.
  – T.S. Eliot paraphrase. We have had the numbers, but have missed the meaning.

• What is at risk?
  – Profits vs. Promises
  – Micro vs. Macro
Thank you

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