Economic Capital Modeling Implementation

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III. AIG’s ECM Development and Key Applications
I. Overview
Why do we care about capital?

We need capital to cover potential, unexpected losses within a target confidence level and timeframe. Capital inadequacy can lead to ratings downgrades. In the severest case, extreme capital deterioration and successive downgrades would lead to economic insolvency (i.e., default).

Assets

Liabilities

Capital or Equity

Required Capital

Excess Capital

Cushion we need to maintain target ratings
Required Economic Capital

Different Capital Models

Cushion you have

- GAAP Capital (accounting view)
- Available Economic Capital (economic view)

or

Capital

- Required Capital
- Excess Capital

Cushion you need

Various measures of required capital:

- Regulatory Capital
- Rating Agency Capital
- Required Economic Capital
Economic Capital – Key Goals

The Economic Capital Project aims to answer several related questions:

1) How much capital is needed? → Required Economic Capital (REC)
2) How much capital do we have? → Available Economic Capital (AEC)
3) How much do we make on a risk adjusted basis? → Return (EVA)
4) How do we optimally deploy capital? → Capital Allocation

### Required Economic Capital
- Is defined as the amount of equity capital required to cover unexpected losses and to maintain a desired rating over a specified time horizon
- Is over and above the reserves held on AIG’s balance sheet which are intended to cover expected losses
- Captures the risk and return profiles and the inter-relationships of all AIG businesses
- Reflects AIG’s unique businesses and management strategies

### Available Economic Capital
- Is defined as the difference between the economic value of assets and the economic value of liabilities on the Economic Balance Sheet
- Provides a more accurate measure of AIG’s financial strength
- Allows the inclusion of future profitability of in-force and new business on the Economic Balance Sheet
Available Economic Capital, or Available Capital, is the difference between the economic value of assets and the economic value of liabilities. It is an economic view of the balance sheet akin to a “fair value” concept, and could there fluctuate significantly from period to period as market condition changes.
What is Required Economic Capital?

Required Economic Capital, or Economic Capital, is an assessment of capital required to cover potential, unexpected losses within a target confidence level and timeframe.

- AIG’s Required Economic Capital (REC) is calculated to maintain a strong AA rating
  - It consists of a “Pillar I” component that is based on probabilistic modeling at 99.95% and one-year time horizon, and,
  - a “Pillar II” component that capture the capital fungibility constraints on firm-wide diversification and stress testing “add-on” for unmodelable risks.
Required Economic Capital – Overall

Required Economic Capital (REC) at AIG, Inc

= Sum of Standalone REC at BU/LE

“Pillar I”

Diversification Benefits among BU/LE

“Pillar II”

Capital Fungibility Div. Benefit “Haircut”

+ Stress Testing Capital Requirement “Add-on”
Required Economic Capital differs from other required capital measures, such as regulatory and rating agency capital requirements, which may not provide the most accurate reflection of actual business risks and diversification benefits.

**General Relationship of Required Capital Measures**

- **Regulatory Capital**
- **Rating Agency Capital**
- **Cost of Regulation and Ratings**
- **Required Economic Capital**

- **Varies based on target rating**
- **The greater of Regulatory Capital and Rating Agency Capital**
- **current minimum capital we must have**
- **absent costs of regulation and ratings, Required Economic Capital represents the desired minimum capital we should hold**

quantification of potential for capital relief
AIG is actively preparing for the longer term expected convergence of capital requirements, but must continue to manage short-term needs according to existing operating constraints.

Economic view is expected to prevail

Ultimate convergence, but at different speeds

Illustrative only, i.e. the lines are not representative of any specific case
Four major rating agencies have indicated that they will, over time, incorporate ERM and ECM in the rating process.

“Standard & Poor’s is developing a process for evaluating the economic capital (EC) models of insurers with ERM programs that have been viewed as strong or excellent”

“Moody’s expects best practice insurers to develop economic capital models based on sound principles and conservative assumptions to reflect the risk profile of their businesses”

“Fitch believes reviewing insurers’ in-house models is a key part of capital analysis”

“A.M. Best will also expand the use of company-provided capital models in developing capital requirements within the rating evaluation process”

II. ECM Governance
AIG’s corporate philosophy has always encouraged full profit center accountability for risk management – ERM has built on this unique risk culture

- Each of the ERM functions focuses on systematic (non-diversifiable) risks
- Combination of centralized and decentralized processes that fit the business model (e.g. central oversight and built-up of local/business unit expertise)
- Regional ERM hubs in North America, Asia and Europe
- Mature risk governance structure since early 90’s
- ERM does not compensate for, but rather builds on, profit center RM
- Extensive use of “stress scenarios” that cut through all risk types (e.g. Pandemics)
Governance for ECM is built upon existing governance structures along organizational dimension and risk dimension.

**Business Dimension**
- BU CFO/Chief Actuary responsible for data accuracy
- Consultation process is place to ensure various inputs/arguments are heard and considered
- Reach consensus or otherwise make decisions

**Risk Dimension**
- Risk manager responsible for each risk silo is also responsible for economic capital methodology for that risk – consistent with how risk is being managed
- E.g. Chief Credit Officer signs off credit risk methodology
ERM Asia has oversight responsibilities across all AIG businesses in Asia (ex Japan): Life and Retirement Services; General Insurance; Financial Services, Asset Management Division

Local Chief Risk Officers in each business units have a Matrix Report to Regional Director of ERM Asia
Economic Capital Center in China

The primary objective of the EC Center is to develop central EC expertise to support implementation across Asia (ex. Japan) business units.

- **Models**: Work with BUs on complex modeling issues
- **Methodology**: Technical guidance on methodology issues and financial statement reconciliation
- **Education**: Provide training and education to help BUs build local internal EC capabilities and expertise

- Started operations in May 2007 - Currently 10 FTE and expect to have a team of 11-12 FTE by 2008
- Report to ERM Asia (ex Japan)
III. AIG’s ECM Development and Key Applications
AIG is taking a “principles-based” approach to develop its Economic Capital Models (ECM).

- **Relevant**
  - In line with how AIG manages its business and used for decision-making

- **Collaborative**
  - Joint venture between Corporate and BUs in all phases

- **Comprehensive**
  - Covers all major risks, businesses, geographies

- **Flexible**
  - Integrates new products, M&A, divestitures, reorganizations, etc., in a timely fashion

- **Economic Value and Simulation-Based**
  - Addresses specific risks and returns of AIG’s businesses, including diversification
By focusing on business applications, AIG’s economic capital modeling has leapfrogged many of the traditional approaches to EC.

Important for:
- Capital fungibility
- Regulatory capital dialogue
- Understanding business
- Performance metrics – “fit for purpose”
Risks are grouped into “risk categories”. For AIG these include Insurance Risk (further separated into Life Insurance Risk and P&C Insurance Risk), Credit Risk, Market Risk, and Operational Risk.

- **Insurance Risk**
  - Mortality/Morbidity
  - Policyholder Behavior
  - Life Catastrophe
  - Premium risk
  - Reserve risk
  - P&C Catastrophe

- **Credit Risk**
  - Default
  - Rating Migration
  - Recovery

- **Market Risk**
  - Interest Rate
  - Exchange Rate
  - Equity
  - Alternative investment
  - Aircraft
  - Commercial Real Estate

- **Operational Risk**
  - Business Practices
  - Controls & Compliance
  - Systems & Disruption
  - Execution & Process
  - Fraud
  - Employment Practices
Stochastic Simulation Approach

Scenario-based simulation or other advanced methods are generally used to calculate Required Economic Capital.

1. Identify all the relevant risks
2. Develop loss distribution functions
3. Combine distributions
4. Measure and allocate required capital

Group, Business Unit or Product

- Insurance Risk
- Credit Risk
- Market Risk
- Operational Risk

Aggregation, Correlation

Expected Loss (Reserve)
Max Loss @ 99.95%

REC = Max Loss - Exp Loss
AIG’s ECM uses a three step approach for ensuring that “accumulations” of risk are robustly estimated

### Hybrid Approach in ECM
- Within risk types, aggregation is performed using consistent scenarios (e.g. the different components of market risk)
- Between risk types, risks are aggregated using a correlation matrix / copula approach to reflect the impact of “stress correlations” and increased interconnectedness of risks
- Some of the aggregations (e.g. between market and credit) are increasingly being performed using a consistent scenario approach

### Capital Mobility
- Insurance operations are regulated along legal entities by different jurisdictions with varying minimum risk based capital (RBC) requirements
- Restrictions on dividend payments to the parent and other capital flow constraints and tax considerations give rise to a further “fungibility haircut” to determine realizable diversification benefits

### Stress Testing
- Bottom up “stress tests” (e.g. effect of a severe pandemic) are performed by simple addition of risk type effect, following detailed assessment of each category of loss (e.g. mortality, credit, interest rate and business interruption losses for pandemics)
- Provides a “reality check” on assumed modeled dependencies
In view of the large uncertainty surrounding the estimation of the yield curve extension in developing markets, AIG at the corporate level sets aside additional “stress test” capital for a parallel shift down in the yield curve.
Key Applications

Economic Capital will help drive better decision-making by providing a tool for various applications

<table>
<thead>
<tr>
<th>Opportunity</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater individual business unit risk retention / buy less reinsurance</td>
<td>Higher growth and profitability</td>
</tr>
<tr>
<td>Increased operating efficiency / more financial flexibility</td>
<td>Optimize net Investment Income and total return</td>
</tr>
<tr>
<td>More aggressive products evaluated on overall AIG portfolio risk effect vs. profit center</td>
<td>Higher ROE</td>
</tr>
<tr>
<td>Converge rating agency and economic views of excess capital positions</td>
<td>Higher margins</td>
</tr>
<tr>
<td>Link management compensation to economic value creation</td>
<td>Allows for more efficient redeployment of capital</td>
</tr>
<tr>
<td></td>
<td>Allows measurement of risk adjusted business performance</td>
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AIG’s Applications of EC

- **Business Performance**: Analysis of operating performance on a risk-adjusted basis using consistent measures across segments

- **Capital and Asset Allocation**: Quantitative tool to optimize asset allocation within AIG’s global investment portfolio and allocate capital to businesses providing the most attractive risk-adjusted returns

- **Capital Management**: Methodology for optimizing AIG’s capital structure and lowering the cost of capital, in part through utilization of capital markets to leverage AIG’s capital base more efficiently

- **Risk Management**: Approach to analyze economic risks and benefits of investment strategies and risk mitigation through reinsurance and hedging programs

- **Cost of Regulation and Ratings**: Framework for analyzing the cost of maintaining capital to meet rating agency and regulatory standards for capital required to be held in excess of the economic capital required to support AIG’s risk profile

- **Product Development**: Detailed approach to develop and price products to meet market demand and to maximize economic value added

- **Management Compensation**: Framework to incorporate the importance of maximizing economic value added into management compensation programs

*Source: AIG Investor Relations Website; February 2008*
We evaluated alternative Strategic Asset Allocations (SAA) using our SRM framework, incorporating RBC requirements and GAAP earnings projections.

1. Efficient Frontier
   Developed Risk and Return efficient frontier for each asset class as well as the portfolio SAAs

2. Peer Group Analysis
   Compared the risky asset allocations of Life Co. with that of its competitors

3. RBC Impact
   Projected multi-year distribution of RBC ratios for portfolio SAAs

3. GAAP Earnings Volatility
   Projected multi-year distribution of GAAP & Economic earnings for portfolio SAAs

3. Projection of AEC & REC
   Projected multi-year distribution of Available Economic Capital & Required Economic Capital for SAAs
SAA: Efficient Frontier and Peer Group Analysis

We evaluated the risk and return trade off for the portfolio SAAs and compared the asset allocation with that of its competitors.

Peer Group Analysis

<table>
<thead>
<tr>
<th></th>
<th>BU</th>
<th>Company A</th>
<th>Company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Income</td>
<td>70.0%</td>
<td>65.0%</td>
<td>80.0%</td>
</tr>
<tr>
<td>Onshore Listed Equity</td>
<td>14.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Onshore Private Equity</td>
<td>1.0%</td>
<td>2.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>15.0%</td>
<td>23.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
An integrated model enables a holistic approach to evaluate alternative SAAs, incorporating EC, RBC requirements and GAAP earnings volatility.
“In 2008, AIG plans to extend the model’s applications by building on the work performed in 2007 for a wider range of businesses, segments, geographies and product lines. Commencing in 2008, the economic value added for each of AIG’s business segments will be considered as an element, alongside other existing measures, in the evaluation of senior management performance.”

- AIG Investor Relations Website, February 2008