GIRO Conference and Exhibition 2012
Juggling uncertainty the actuary’s part to play

Economic Capital Modelling In Emerging Market
Cynthia Yuan, Michael Fung, Lawrence Cheng
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• Solvency regime in Asia
• Upcoming changes
• Opportunities and challenges to capital actuaries in Asia

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Solvency Regime in Asia

Solvency Requirement around the World

UK
ICA from 2004

Canada
DCAT

Canada
RBC model (NAIC) from 1994

EU
Solvency II from 2014

Switzerland
Swiss Solvency Test

South Korea
RBC from 2006

Phillipines
RBC from 2006

Thailand
1st parallel run 2010, implementation 2012

Singapore
RBC from 2004

Malaysia
RBC from 2009

Australia
GPS 110 from 2002
**APAC Regulatory Timeline**

- **1995**: Brunei, 1995
- **1997**: Hong Kong/Macau
- **2000**: India, 2000
- **2004**: Singapore, 2004
- **2005**: Philippines, 2005
- **2006**: Vietnam, 2006
- **2007**: Vietnam, 2007
- **2008**: Indonesia/Malaysia/Papua New Guinea, 2008
- **2009**: Singapore, 2009
- **2010**: Viet Nam, 2010
- **2011**: Korea/Thailand
- **2015**: Japan/Australia/Labuan

**RBC Regimes**

- Most common modern day regulatory regime
- Calculation differs slightly by country by concept the same

- **Capital Adequacy Ratio (CAR)** = \( \frac{\text{Available Capital}}{\text{Required Capital}} \)

- If CAR or RBC ratio < pre-defined %, regulatory action taken
**RBC Regimes**

Regulatory Intervention Action - Example

- **CAR, RBC Ratio > 100%**: No Action

- **RBC ratio 75-100%**: Company action level
  - Insurer files financial and business plan

- **RBC ratio 50-75%**: Regulatory action level
  - Business & financial plans plus, regulator examines and requires corrective action

- **RBC ratio 35-50%**: Authorized control level
  - Those listed above plus, regulator may take control of insurer

- **RBC ratio < 35%**: Mandatory control level
  - Regulator required to take control unless corrected within 90 days

**Practical Illustration**

- How does the capital requirement differ between various regimes?
  - Hong Kong
  - China
  - Thailand
  - Singapore
  - Indonesia
  - Malaysia
  - Korea
  - India
Introducing Insurance Company A, B & C

Balance Sheet as at 31/12/2011

<table>
<thead>
<tr>
<th>Asset Profile</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>AAA Bond 5-Year</td>
<td>10,000,000</td>
<td>2,500,000</td>
<td>-</td>
</tr>
<tr>
<td>AA Bond 3-Year</td>
<td>5,000,000</td>
<td>2,500,000</td>
<td>-</td>
</tr>
<tr>
<td>BB Bond 2-Year</td>
<td>5,000,000</td>
<td>20,000,000</td>
<td>-</td>
</tr>
<tr>
<td>Equity</td>
<td>5,000,000</td>
<td>-</td>
<td>25,000,000</td>
</tr>
<tr>
<td>Reinsurance Recoverables</td>
<td>5,000,000</td>
<td>9,000,000</td>
<td>-</td>
</tr>
<tr>
<td>Total Asset</td>
<td>35,000,000</td>
<td>39,000,000</td>
<td>30,000,000</td>
</tr>
<tr>
<td>Effective duration of asset (Years)</td>
<td>3.5</td>
<td>2.0</td>
<td>-</td>
</tr>
</tbody>
</table>

Liability Profile

<table>
<thead>
<tr>
<th>Liability Profile</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss Reserve</td>
<td>20,000,000</td>
<td>22,000,000</td>
<td>-</td>
</tr>
<tr>
<td>Unearned Premium Reserve</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>-</td>
</tr>
<tr>
<td>Total Liability</td>
<td>25,000,000</td>
<td>27,000,000</td>
<td>-</td>
</tr>
<tr>
<td>Effective duration of Liability (Years)</td>
<td>2.5</td>
<td>3.5</td>
<td>-</td>
</tr>
<tr>
<td>Net Asset Value</td>
<td>10,000,000</td>
<td>12,000,000</td>
<td>30,000,000</td>
</tr>
</tbody>
</table>

Introducing Insurance Company A, B & C

Breakdown of Liability Profile

<table>
<thead>
<tr>
<th>Breakdown of Liability Profile</th>
<th>Company 1</th>
<th>Company 2</th>
<th>Company 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Household</td>
<td>50%</td>
<td>0%</td>
<td>50%</td>
</tr>
<tr>
<td>Third Party Liability</td>
<td>0%</td>
<td>50%</td>
<td>0%</td>
</tr>
<tr>
<td>Commercial Property</td>
<td>0%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Reinsurer Distribution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AAA</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>A</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>BBB</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Business Plan 2012

<table>
<thead>
<tr>
<th>Business Plan 2012</th>
<th>USD</th>
<th>USD</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Written Premium</td>
<td>10,000,000</td>
<td>10,000,000</td>
<td>15,000,000</td>
</tr>
<tr>
<td>Gross Earned Premium</td>
<td>10,000,000</td>
<td>10,000,000</td>
<td>7,500,000</td>
</tr>
<tr>
<td>Gross Ceded Premium</td>
<td>2,500,000</td>
<td>2,500,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Ceded Earned Premium</td>
<td>2,500,000</td>
<td>2,500,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td>Gross LR</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Ceded LR</td>
<td>45%</td>
<td>45%</td>
<td>45%</td>
</tr>
</tbody>
</table>
Minimum Capital Required

Drivers of Capital Requirement – Observations

- Outcomes differ significantly between regimes
  - Different countries having different focus

- The key in this comparison though should be if the calculated requirement reflects the company’s true risk exposure
  - Wrong incentives
  - Both company and regulator not aware of true degree of risk and failure in regulatory action
AM Best Impairment Study (1968-2008) Cause

<table>
<thead>
<tr>
<th>Cause (1969-2008)</th>
<th>Pct Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficient Loss Reserves</td>
<td>38.1%</td>
</tr>
<tr>
<td>Rapid Growth</td>
<td>14.3%</td>
</tr>
<tr>
<td>Alleged Fraud</td>
<td>8.1%</td>
</tr>
<tr>
<td>Catastrophe Losses</td>
<td>7.6%</td>
</tr>
<tr>
<td>Impairment of Affiliate</td>
<td>7.9%</td>
</tr>
<tr>
<td>Overstated Assets</td>
<td>7.0%</td>
</tr>
<tr>
<td>Significant Change</td>
<td>4.2%</td>
</tr>
<tr>
<td>Reinsurance Failure</td>
<td>3.7%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

Source: A. M. Best Impairment Study, 2009
* A. M. Best defines impairment as any type of restrictive regulatory action

Insurance risk is the main killer of P&C companies based on 40 year track record

Upcoming Changes
Regulatory Plan – China (1)

- China Insurance Regulatory Commission (CIRC) officially published a roadmap for the Chinese 2nd generation solvency standard

- The plan is for full implementation in the next 3 – 5 years time, with an overall objective of developing a more robust solvency regime

Regulatory Plan – China (2)

- The roadmap is designed to compose with the following five stages:
  - Stage 1: Review current Chinese solvency regime
  - Stage 2: Perform fundamental research on various insurance risk and solvency topics
  - Stage 3: Issue draft regulation
  - Stage 4: Perform QIS studies
  - Stage 5: Launch the final implementation
Regulatory Plan – India

• India Regulatory Development Authority (IRDA) has setup a committee to draft a roadmap for risk based solvency approach in insurance sector

• The committee is carefully studying risk based solvency approach around the world – the US, the UK, Europe, Singapore/ Malaysia

• The aim is to recommend a suitable approach in Indian context and design a system to fit within the Indian regulatory environment

Opportunities And Challenges To Actuaries in Asia
Emerging markets actuaries are faced with multitude of issues

**Cultural**
- Brave New world

**Data & Processes**
- Inadequate information

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**Emerging markets actuaries are faced with multitude of issues**

**Cultural & environmental issues**
- Traditional reserving or quantitative role
- Need more hands-on business experience
- Professional training not coping with ever-changing business environment

**Data / Process issues**
- Missing / inadequate data
- Data is seldom homogenous
- Uncertainty are dealt with in unsatisfactory ways, or simply ignored

**Knowledge issues**
- Experience / Skills Gap
- Compliance roles, not value added
- Expose to areas outside their expertise
- Overconfidence
Emerging markets actuaries are faced with multitude of issues

- Be Realistic
- Clarity of Communication
- Professional Standards
- Credibility
- Strengthen Business Knowledge

SWOT of Asia capital modelling actuaries

**Strengths**
- Qualitative skills
- Traditionally involved in quantitative roles
- Activities bounded by professional standards

**Weaknesses**
- Lack of overall understanding of business arena
- Few are confined in mathematical theories
- Professional training may not offer the right skills to deal with real business environment

**Opportunities**
- Play important advisory role in wide aspect than mature market
- Simple market with less technical demanding
- Innovation and creativity can be valuable
- Provide more value added assistance

**Threats**
- Insufficient / seldom homogeneous data, uncertainty and limitations dealt unsatisfactorily
- Expose to inappropriate areas, lack of experience and skills or being overconfident
- Lack of professional standard
Actuaries are more involved in company operations

- Economic Capital Model attempts to capture all key risks of a company and the characteristic of risk inherent within the business processes
- Actuaries involved in capital works are required to understand all the business processes and the nature of different operations
- Few actuaries have in-depth knowledge of all the activities mentioned above
- Usually actuaries will need to tap into the knowledge of other professionals, in order to create a realistic Economic Capital Model

Prospect for Asia actuaries

Fast growing market
- Premium volume has increased significantly
- A lot start ups
- Fewer experienced actuaries

More requirement of risk management
- Thailand flood
- Japanese earthquake
- Insurance company has become more mature

More requirement on using capital efficiently
- Fast growing economy—Opportunity costs
- More sophisticated investor
Thank you!

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged. The views expressed in this presentation are those of the presenter.