Reinsurance Optimisation for Non-Life Insurance

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Agenda

- Why to Reinsure?
- Contradictions within the system
- Reinsurance Decision Criterion
- RI Selection
- Importance of Optimisation
- A Simple Example of RI Assessment
- Other Considerations
- Questions?
Why to Reinsure?

- Stabilizing the UW Results while increasing business capacity
- Improving the capacity to absorb large losses
- Accessing benefits from larger diversification pools
- Reducing Capital Requirement (in many jurisdictions)
- New products & Technical Support

And others..
Contradictions within the system

RI OPTIMISATION

Board: Maximise return on capital
Finance/RM: Stabilise results
UW: Maximise profit by line
Regulator: RI follows risk appetite
The insurer compares treaties to:

- Maximise expected profit after reinsurance
- Minimise probability of ruin after reinsurance
- Modify risk profile to reduce capital required

Difficult but important to formalise the reinsurance selection process
Factors that play a big role in our market:

- Market practice
- (Re)Insurance cycle (hard/soft or in between)
- Personal choice/Historical arrangements
- Rating of the Reinsurer

RI brokers are relied on for quantification
• Too much or inappropriate reinsurance reduces profitability by passing on profit to the RI
• Too little or ineffective reinsurance can expose the insurer to excessive risk

So, the aim is to find the optimal level of RI
Some concepts

- **Underwriting Result:** The Insurance operation profit before investment gains
- **Cost of Capital:** Rate of return required by the Shareholders for the risk written
- **Economic Result:** Underwriting results after deduction of cost of capital

The UW and Economic Results are assessed to determine the optimal level of RI
A Simple Example

- Motor LOB: AED 100M top line (GWP)
- Expenses: 20% of GWP
- RI Commission: 20% of the Ceded Premium
- Cost of Capital: 8% of the VaR (99.5 percentile)
- RI:
  - XL Premiums: 80% LR assumed for RI (actual market driven)
  - QS Premiums: 70% Ceded
Data:
- Vehicle-Year level data in R
  - Policy & Claims per risk per year
  - Packages used: actuar and fitdistrplus
- Distribution Fitting:
  - Frequency: Poisson/Negative binomial
  - Severity: Lognormal/Gamma

Monte Carlo Simulations (10k)
- Gross of RI
- Excess of Loss (Excess 100K)
- Quota share (70%)

Each simulation generates gross & retained losses for the projected year
### A Simple Example (cont.)

<table>
<thead>
<tr>
<th>(All Amounts in AED '000)</th>
<th>Gross</th>
<th>XL Excess 100K</th>
<th>70% QS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Premium</td>
<td>100,000</td>
<td>100,000</td>
<td>100,000</td>
</tr>
<tr>
<td>RI Premium</td>
<td>-</td>
<td>5,815</td>
<td>70,000</td>
</tr>
<tr>
<td><strong>Net Premium</strong></td>
<td><strong>100,000</strong></td>
<td><strong>94,185</strong></td>
<td><strong>30,000</strong></td>
</tr>
<tr>
<td>Net Retained Losses</td>
<td>69,575</td>
<td>64,924</td>
<td>20,873</td>
</tr>
<tr>
<td>Expenses</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>RI Commission</td>
<td>-</td>
<td>-</td>
<td>14,000</td>
</tr>
<tr>
<td><strong>Underwriting Result (A)</strong></td>
<td><strong>10,425</strong></td>
<td><strong>9,262</strong></td>
<td><strong>3,127</strong></td>
</tr>
<tr>
<td><strong>Capital at Risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VaR (99.5%)</td>
<td>91,875</td>
<td>84,765</td>
<td>27,563</td>
</tr>
<tr>
<td>Cost of Capital (at 8%) (B)</td>
<td>7,350</td>
<td>6,781</td>
<td>2,205</td>
</tr>
<tr>
<td><strong>Economic Result (A-B)</strong></td>
<td><strong>3,075</strong></td>
<td><strong>2,481</strong></td>
<td><strong>921</strong></td>
</tr>
</tbody>
</table>
A Simple Example (cont.)

Economic Results
Gross of RI (Pink)
A Simple Example (cont.)

Economic Results
Gross of RI (Pink), Net of XL RI (Light Blue)
A Simple Example (cont.)

Economic Results
Gross of RI (Pink), Net of XL RI (Light Blue), Net of QS RI (Grey)
Other Considerations

- Quota Share: It increases the supply of insurance in the industry resulting in price war
- No “Cheap RI” in long run
- Minimum RI to fulfill the need of the insurer
- Consider brokerage role in purchasing proportional RI
- Actuaries involvement should increase
Questions?
Sources

1. Value of Risk reduction [Gary Venter & Alice Underwood]
2. Optimising non-life reinsurance strategy under risk-based capital measures [Jeff Courchene and Vincent Robert]
3. Reinsurance [Gary Patrik]
4. Reinsurance: Actuarial and Statistical Aspects [Hansjörg Albrecher, Jan Beirlant, Jozef L. Teugels]
5. Reinsurance Optimisation: [Subhash Chandra]