Prudential Ratio Analysis for Insurance

Financial Supervision Authority/World Bank
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Course Contents

I. Supervisory Model
II. Solvency and Enforcement
III. Accounting Concepts
IV. IRIS Ratios for Albania
I. The Supervisory Model
Evolution of Supervisory Approaches

Old Style Approach

Find contraventions of the law, regardless of materiality ...

Reconciliation of data, counting the securities, other detailed checking ...
Today we are concerned with assessing the degree of risk in the company’s business operations – and how to reduce risk as required.
Risk Based Supervision also forces management to improve


Supervisory attention and intervention based on RISK.

- Early Warning Test Ratios
- Other Financial Analysis
- On-Site Inspections
- Market Intelligence
- Self-Assessment with audits

Source: L Savage
Three fundamental stages of supervision

1. ‘Conducting off-site monitoring of financial condition using financial statement and market information analysis, and on-site examinations;
2. implementing corrective action plans for financially weakened companies; and
3. undertaking insolvency proceedings’
Two fundamental off-site tools

- Early warning indicators
  - Off-site monitoring
  - Guiding on-site inspection
  - Advising early intervention

- Solvency measures
  - Corrective action plans
  - Insolvency proceedings
Some countries combine these into a regulatory ladder

- Stage 0 - No problems/Normal activities
- Stage 1 - Early warning
- Stage 2 - Risk to financial viability or solvency
- Stage 3 - Future financial viability in serious doubt
- Stage 4 - Company not viable/Insolvency imminent
Early warning indicators – Off-site Analysis

- IRIS, or Insurance Regulatory Information System -ratios
- A scoring system
- An insurer profile system
## US IRIS Ratios

<table>
<thead>
<tr>
<th>IRIS Ratio</th>
<th>Maximum Normal Range</th>
<th>Minimum Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross written premium to statutory capital and surplus.[1]</td>
<td>900</td>
<td>N/A</td>
</tr>
<tr>
<td>Net written premium to statutory capital and surplus.</td>
<td>300</td>
<td>N/A</td>
</tr>
<tr>
<td>Change in net written premium year to year.</td>
<td>33</td>
<td>-33</td>
</tr>
<tr>
<td>Solvency support reinsurance to statutory capital and surplus.</td>
<td>15</td>
<td>N/A</td>
</tr>
</tbody>
</table>

[1] Statutory surplus only allows for admitted assets (i.e. assets that can be counted under the insurance regulations). It is usually less than the capital and surplus shown in the published accounts.
## US IRIS Ratios (cont.)

<table>
<thead>
<tr>
<th>IRIS Ratio</th>
<th>Maximum Normal Range</th>
<th>Minimum Normal range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two year operating ratio</td>
<td>100</td>
<td>N/A</td>
</tr>
<tr>
<td>Investment yield</td>
<td>10.0</td>
<td>4.5</td>
</tr>
<tr>
<td>Change in statutory capital and surplus</td>
<td>50</td>
<td>-10</td>
</tr>
<tr>
<td>Liabilities to liquid assets</td>
<td>105</td>
<td>N/A</td>
</tr>
</tbody>
</table>
## US IRIS Ratios (cont.)

<table>
<thead>
<tr>
<th>IRIS Ratio</th>
<th>Maximum Normal Range %</th>
<th>Minimum Normal range %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross amount due from agents divided by statutory capital and surplus.</td>
<td>40</td>
<td>N/A</td>
</tr>
<tr>
<td>One year development of claims provisions divided by statutory capital and surplus (i.e. development of provisions ignoring the current underwriting year).</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>Two year development of claims provisions divided by surplus</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>Deficiency in claims provisions as % capital and surplus</td>
<td>25</td>
<td>N/A</td>
</tr>
</tbody>
</table>
On site inspection

- Full scope – when an insurer is in serious trouble, but at least every 3 to 5 years:
  - Accounting methods and procedures, financial statement presentation.
  - Validating figures provided in the insurer’s statutory returns to the insurance supervisor.
  - Verifying the insurance company’s solvency.
  - Determining whether the insurer has complied with the relevant laws and regulations.
On site inspection

- Limited scope – a targeted inspection based on off site analysis and indication of potential distress
## Feedback Process

### Highest risk level determines supervisory response.

### Key Inspection Findings

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Financial Analysis</th>
<th>On-Site Examination</th>
<th>Actuarial Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Inspection Report Summary

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.........................
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### Letter to Management

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.................................
........
```
The off site analysts have a critical role

Examples of Financial Analysis comments that might typically be found in a company at this risk level:

<table>
<thead>
<tr>
<th>Level 3 High</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Company outside normal ranges on 6 or more Early Warning Ratios.</td>
</tr>
<tr>
<td></td>
<td>Risk ratio is in excess of 3.5 to 1.</td>
</tr>
<tr>
<td></td>
<td>Highly unprofitable underwriting.</td>
</tr>
<tr>
<td></td>
<td>Significant understatement of claims liabilities</td>
</tr>
<tr>
<td></td>
<td>Speculative investments have harmed overall performance.</td>
</tr>
<tr>
<td></td>
<td>Negative return on equity.</td>
</tr>
<tr>
<td></td>
<td>Considerable reliance on reinsurance and reinsurers may be experiencing financial problems</td>
</tr>
<tr>
<td></td>
<td>Management has not demonstrated ability to bring problems under control.</td>
</tr>
<tr>
<td></td>
<td>Capital is close to being impaired.</td>
</tr>
</tbody>
</table>
II. Solvency and Enforcement
Requirements of minimum statutory solvency

- It is related to risk
- It raises the safety net for insurers
- It is consistent in application
- It provides a legal basis for the supervisor to take enforcement action
**Definition:** Risk-based capital (RBC) represents an amount of capital based on an assessment of risks that a company should hold to protect customers against adverse developments.
Items taken into account in determining risk based capital for non life insurers in the US

- R0 style risk – asset risk – associated entities
- R1 style risk – asset risk – fixed income
- R2 style risk – asset risk - equity
- R3 style risk – asset risk - credit
- R4 style risk – underwriting risk – provisions
- R5 style risk – underwriting risk - premiums

Correlations between some of these risks that reduce the required level of capital
The non life RBC formula

\[ RBC = R_0 + \sqrt{R_1^2 + R_2^2 + R_3^2 + R_4^2 + R_5^2} \]
Figure 3
Risk-based capital of US property & casualty and life insurers in 2003

<table>
<thead>
<tr>
<th>P&amp;C insurance</th>
<th>% of net premiums earned</th>
<th>Life insurance</th>
<th>% of technical provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>R0 Asset Risk Affiliates</td>
<td></td>
<td>C0 Asset Risk Affiliates</td>
<td></td>
</tr>
<tr>
<td>R1 Asset Risk Fixed Income</td>
<td></td>
<td>C1 Other Asset Risk</td>
<td></td>
</tr>
<tr>
<td>R2 Asset Risk Equity</td>
<td></td>
<td>C2 Insurance Risk</td>
<td></td>
</tr>
<tr>
<td>R3 Asset Risk Credit</td>
<td></td>
<td>C3 Interest Rate Risk [1]</td>
<td></td>
</tr>
<tr>
<td>R4 Underwriting Risk Reserves</td>
<td></td>
<td>C4 Business Risk</td>
<td></td>
</tr>
<tr>
<td>R5 Underwriting Risk Written Premiums</td>
<td></td>
<td>Tax Sensitivity Test [2]</td>
<td></td>
</tr>
<tr>
<td>Covariance adjustment</td>
<td></td>
<td>Covariance adjustment</td>
<td></td>
</tr>
<tr>
<td>RBC After Covariance</td>
<td></td>
<td>RBC After Covariance</td>
<td></td>
</tr>
</tbody>
</table>

[1] Including health credit risk, 0.002% of technical provisions
[2] The tax sensitivity test cancels the tax discounts included in all risk categories by assuming that the company is not a taxpayer, that its losses are of no value to another taxpayer, and that its deferred total assets and deferred total liabilities are zero.

Source: NAIC
Enforcement actions in the US

- Solvency >100% required amount – no action
- Solvency <100% required amount – recapitalization plan
- Solvency >35%<50% required amount – supervisor may place under administration
- Solvency <35% required amount – supervisor obliged to place under administration
III. Accounting Concepts
Double entry accounting applies

- Debits – assets and expenses – the business itself
- Credits – revenues and liabilities – the resources provided to generate the assets – the claims of others on the business
- Every credit has a corresponding debit or a negative credit
- Every debit has a corresponding credit or negative debit
As applied to insurance

- Premium and technical provisions are credits

- Claims and assets are debits
For example

<table>
<thead>
<tr>
<th>Premium Written - P&amp;L</th>
<th>Cash at bank or receivable - B/S</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
For example

- Commission paid to agent - Journal: 20
- Bank – B/S: -20
- Commission expense – P&L: 12
- DAC – B/S: 8
Because of long operating cycles balance sheet items need to be created

<table>
<thead>
<tr>
<th>Claims provisions EOY - B/S</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims provisions BOY - B/S</td>
<td>100</td>
</tr>
<tr>
<td>Claims Expense</td>
<td>20</td>
</tr>
</tbody>
</table>
Thus accrual accounts need to be used

- $\text{Earned premium} = \text{written premium} + \text{unearned premium provision in} - \text{unearned premium provision out}$

- $\text{Claims incurred} = \text{claims paid} + \text{claims provisions out} - \text{claims provisions in}$
Technical provisions need to cover all future claims

- Claims reported
- Claims reported but not enough provision
- Claims incurred but not reported
- Unearned premium provision
- Unexpired risk provision if unearned premium is inadequate
Reinsurance can affect the numbers in the short term

- Surplus relief – Quota Share – generates exchange commission
- Excess – helps to balance the portfolio and protect against catastrophe
- Small insurers can find it difficult to arrange reinsurance
- Not all reinsurers are equal
- Reinsurance can be abused
IV. IRIS Ratios for Albania
IRIS set for non life insurance in Albania

- Premium growth rate
- Net retention
- Net claims (or loss) ratio
- Expense ratio
- Combined ratio
- Investment income ratio
- Other income ratio
- Operating ratio
- Profit ratio
- Capital and surplus to gross premium
- Capital to technical provisions
- Solvency coverage
Premium Growth Ratio

\[
\text{Premium growth rate} = \frac{\text{Change in net written premium}}{\text{Net premium written prior year}} = \frac{\text{Gross premium written current year} - \text{Gross premium written prior year}}{\text{Net premium written prior year}}
\]
Net Retention Ratio

\[
\text{Net Retention Ratio} = \frac{\text{Net written premium}}{\text{Retention ratio}} \times \frac{\text{Gross written premium}}{}
\]
Net Claims Ratio

\[
\text{Net Claims ratio} = \frac{\text{Net incurred claims}}{\text{Net earned premium}}
\]
Expense Ratio

\[
\text{Expense ratio} \div \frac{\text{Net expenses}}{\text{Net written premium}}
\]
Investment Income Ratio

Investment Income Ratio = \frac{\text{Investment Income}}{\text{Net earned premium}}
Other Income Ratio

\[
\text{Other income ratio} = \frac{\text{Other income}}{\text{Net earned premium}}
\]
Operating Ratio

Combined ratio

- Expense ratio
  + Claims (or loss) ratio
  + Investment income ratio
  + Other income ratio
Profit Ratio

Profit ratio

1

Operating ratio
Capital and Surplus to Gross Premium

Capital and surplus (shareholders funds) ÷ Gross written premium
Capital and Surplus to Technical Provisions

\[
\text{Capital and surplus to technical provisions} \div \text{Capital and surplus (shareholders funds)} = \text{Technical provisions}
\]
Solvency

Solvency ratio ÷

Capital and surplus (shareholders funds)

Required minimum solvency under then law
### Normal Ranges – Developing Country

<table>
<thead>
<tr>
<th>Ratio</th>
<th>High End %</th>
<th>Low end %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premium growth rate</td>
<td>+40</td>
<td>-40</td>
</tr>
<tr>
<td>Net Retention</td>
<td>80</td>
<td>40</td>
</tr>
<tr>
<td>Expense</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Net claims</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>Combined</td>
<td>105</td>
<td>85</td>
</tr>
<tr>
<td>Investment income</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Other income</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>Operating</td>
<td>101</td>
<td>80</td>
</tr>
<tr>
<td>Profit</td>
<td>20</td>
<td>-1</td>
</tr>
<tr>
<td>Capital and surplus to GWP</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>Capital and surplus to technical provisions</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>Solvency</td>
<td>300</td>
<td>150</td>
</tr>
</tbody>
</table>
Information for the Test

- Start time is 9:30 a.m.
- Estimated duration of 1 hour, with more time available if needed
- Format is multiple choice
- Open book
- Please bring calculator