Appendix 7A

Illustration of Risk-Based Capital

Given the complexity of insurer operations and the RBC formulas, our purpose here is not to provide a detailed description of the property-liability and life-health insurer RBC formulas. We will, however, illustrate the main ideas underlying RBC for a property-liability insurer using an expanded version of the TLC Insurance Company example introduced in Chapter 5.

Assume that:

1. TLC wrote personal auto liability policies during the year with expected claim costs equal to $20 million.

2. TLC received premiums of $30 million, of which $15 million was earned during the year for accounting purposes with the remaining $15 million reported as its year-end liability for unearned premiums (known as the unearned premium reserve).

3. TLC paid underwriting and distribution expenses of $10 million.

4. TLC estimated that claim costs (including loss adjustment expenses) for accidents that had occurred by year-end equaled $10 million, of which $5 million had been paid by year-end and $5 million was unpaid and reported as its year-end liability for unpaid claim costs (known as the loss reserve).

5. TLC had assets at year-end of $25 million, with $7.5 million invested in US government bonds, $15 million in municipal and corporate bonds in the highest NAIC quality category (i.e., with the lowest default risk), and $2.5 million in common stocks.

Under the RBC system, TLC’s accounting capital (known as surplus) is compared to its RBC. (To focus on the main ideas, this discussion ignores a number of adjustments to capital required by the RBC system before conducting this comparison.) TLC’s accounting capital equals its assets minus its accounting liabilities for unearned premiums and unpaid claims. That is, its accounting capital equals assets ($25 million) minus the unearned premium reserve ($15 million) minus the loss reserve ($5 million), so that its capital equals $5 million.

Ignoring (again for simplicity) credit risk and off-balance sheet risk, TLC’s required RBC will reflect its asset risk and underwriting risk. The asset and underwriting risk factors and charges for TLC as of 1996 are shown in Table 7.A1. The risk factors for asset risk are the same for each insurer, and they will not vary over time unless changed by the NAIC. The calculations of the underwriting risk factors depend on several variables, including (in part) an average of industry and individual company experience using the worst underwriting profit (loss) experience during the preceding decade. The underwriting risk factors vary across insurers and over time.

The total RBC for TLC is obtained using the charges by (1) summing the squares of each charge, (2) taking the square root of this sum, and (3) multiplying the result by 0.5. Taking the square root of the sum of squared charges adjusts for the less than perfect correlation across risk categories. The purpose of multiplying by 0.5 is to reduce the amount of RBC produced by the formula so as not to produce an excessive level of

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9Accounting rules require insurers to recognize premiums as earned evenly over the coverage period. For example, for a one-year policy sold on July 1, one-half of the annual premium would be earned by December 31. The remaining one-half would be unearned and thus included in the unearned premium reserve liability. The term reserve is potentially confusing. Keep in mind that the unearned premium reserve and loss reserve are liabilities, not earmarked asset accounts as might be implied by the term reserve.

10This procedure is theoretically appropriate if the risks associated with each item are uncorrelated.
Table 7A.1

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Description</th>
<th>Amount for TLC (a)</th>
<th>RBC Factor (b)</th>
<th>RBC Charge (a) × (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>US government bonds</td>
<td>$7,500</td>
<td>0.0</td>
<td>$0</td>
</tr>
<tr>
<td></td>
<td>Highest quality bonds</td>
<td>15,000</td>
<td>0.003</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Common stocks</td>
<td>2,500</td>
<td>0.15</td>
<td>375</td>
</tr>
<tr>
<td>Underwriting</td>
<td>Loss reserve</td>
<td>5,000</td>
<td>0.155</td>
<td>775</td>
</tr>
<tr>
<td></td>
<td>Premiums written during year</td>
<td>30,000</td>
<td>0.172</td>
<td>5,160</td>
</tr>
</tbody>
</table>

RBC in relation to industry capital when the formula was adopted.

This calculation produces total RBC for TLC equal to $2,615,764. The ratio of TLC's accounting capital ($5 million) to its total RBC is 191.1 percent. How would TLC look to regulators and other parties interested in whether its capital was adequate? The answer would be, not very good, even though TLC's $5 million in capital would exceed the fixed minimum capital requirement in almost all states. Specifically, TLC's ratio of capital to RBC would require the insurer to file a plan with regulators explaining why its ratio of capital to RBC was less than 200 percent and describing its plan to correct the deficiency (see Table 7.3).

TLC could increase its ratio of capital to RBC by raising more capital or by altering its investment policy. However, if TLC sold its common stock investments and invested the proceeds in US government bonds, its total RBC would only decline from $2,615,764 to $2,609,035. Its ratio of capital to RBC would only increase from 191.1 percent to 191.6 percent. The increase is negligible because (1) TLC has written a relatively large amount of premiums in relation to its capital, and (2) the property–liability insurer RBC formula gives more weight to underwriting risk than asset risk. The greater weight for underwriting risk in the property–liability insurer RBC formula is based on the historical evidence that underwriting risk generally plays a greater role than asset risk in property–liability insurer insolvencies. The life–health insurer RBC formula gives more weight to asset risk, given that changes in asset values have led to more insolvencies for life–health insurers.

TLC's basic problem is that it has too little capital compared to the amount of business it has written. (The typical insurer with this amount of business would have two to three times as much capital.) In order for TLC to reduce its ratio of capital to RBC significantly, it would have to raise more capital, write less coverage, and/or reinsure more of its business. If TLC did this, its ratio of RBC to capital would be dominated less by the RBC charge for underwriting risk; the ratio thus would become more sensitive to changes in TLC's investment mix.