

## Risk-Based Capital

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.

### **Overview**

RBC is used in both the banking and insurance industries. Regulators, rating agencies<sup>1,2</sup> and company management may each use different methods, procedures and formulas for estimating RBC. As an indicator of the financial strength of a company, RBC information is also of interest to customers, creditors and investors.

RBC is typically calculated by applying factors to accounting aggregates that represent various risks to which a company is exposed. However, some or all of RBC could be determined by other methods. For example, the current National Association of Insurance Commissioners (NAIC) formula on risk based capital for life insurance companies is based in part on modeling the risk to the company from interest rate changes over many alternative interest rate scenarios<sup>3</sup>.

RBC is usually expressed as a **risk based capital ratio**. This is the total capital of the company (as determined by the RBC formula) divided by the company's risk-based capital (as determined by the formula). For example a company with a 200% RBC ratio has capital equal to twice its risk based capital.

To interpret the absolute meaning of a RBC ratio requires an analysis of the calculation. A few of the more basic questions would include:

- What is the underlying accounting basis (i.e., how are assets and liabilities valued)?
- How is capital defined in the RBC formula?
- What protection does a 100% RBC ratio imply (e.g., protects 95% of the time)?
- What is the time horizon implied? Is the protection for one year, five years, until all current business matures, or some combination?
- Does the calculation include provision for new business or does it just look at running out the current business?

Certain risks and risk mitigation factors are difficult to incorporate in a RBC formula and therefore are usually not accounted for in the formula. Such risks would include liquidity risk, operational risk, and the risk of fraud. Some risk mitigation factors could be the strength of management, the loyalty of customers and a competitive advantage of the company.

Clearly adequate capital alone cannot guarantee customer protection from adverse developments. Nevertheless, a RBC calculation with some history can be evaluated for effectiveness. An evaluation could examine the number of **false positives**; companies that have had low RBC ratios but have kept their commitments to customers, and **false**

**negatives**, companies that have had high RBC ratios but could not keep their commitments to customers. Other methods of evaluation are also possible, such as the correlation of RBC ratios to credit ratings.

Although RBC is designed to determine a minimum capital level, it is often used to measure the relative financial strength of two or more companies. Clearly a RBC calculation with many false positives and false negatives will be even less reliable at determining relative financial strength.

### **Regulatory Risk Based Capital - International**

International convergence of capital standards, including RBC, for the banking industry is being coordinated through “The Basel Committee on Banking Supervision”. The Committee formulates broad supervisory standards and guidelines and recommends statements of best practice. In 1988 the Committee introduced a capital measurement system commonly referred to as the Basel Capital Accord.<sup>5</sup> This system provided for the implementation of a credit risk measurement framework with a minimum capital standard of 8%. In June 1999, the Committee issued a proposal for a New Capital Adequacy Framework with minimum capital requirements that have not yet been finalized.

For insurance companies the International Association of Insurance Supervisors (IAIS) has produced an issue paper “On Solvency, Solvency Assessments and Actuarial Issues”. The issue paper indicates the role played by RBC in the context of solvency assessment of insurance companies and how RBC is used or not used in various parts of the world.<sup>6</sup>

In May of 2002 KPMG produced a study on insurance supervision under contract to the European Commission<sup>7</sup>. Section 10 of that report is a “Comparative analysis of solvency margin methodologies”. It places RBC in the context of other approaches to determining adequate capital levels and addresses advantages and disadvantages of each approach.

Coordination of banking and insurance risk based capital requirements is in its early stages. A primary goal of such coordination would be to avoid situations where reasonably similar risks have very different capital requirements. Without this effort, business would move toward the regulatory form with the lowest capital requirements. These dynamics are called “regulatory arbitrage” because doing business in one industry (insurance or banking) would have a capital advantage over the other industry.

### **Regulatory Risk Based Capital - Canada**

In Canada regulatory RBC for banks and insurers is determined by the Office of the Superintendent of Financial Institutions (OSFI)<sup>8</sup>.

OSFI publishes “Minimum Continuing Capital and Surplus Requirements” (MCCSR) for Life Insurance Companies. MCCSR includes a risk based capital formula and a significant amount of direction on the calculation of amounts to be entered in the formula. OSFI’s web site would be an excellent starting point for a detailed review of a

specific risk based capital formula<sup>9</sup>. The NAIC's life formula is very similar to Canada's MCCSR.

Banks in Canada must meet an asset to capital multiple and a RBC ratio. The RBC ratio focuses on asset credit and off balance sheet risks. The requirements are based on the Basel Capital Accord.<sup>10</sup>

### **Regulatory Risk Based Capital – United States**

In the United States there are three banking agencies, the Board of Governors of the Federal Reserve System (FRB), the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) and there is the Office of Thrift Supervision (OTS). The banking organizations and the OTS use a RBC framework based upon the Basle Capital Accord<sup>11</sup>. As noted above, the Basel Capital Accord is in the process of review and update.

In the United States the amount of capital required by state regulators for insurance companies is based on a RBC formulas provided by the NAIC.<sup>12</sup> The NAIC has separate formulas for life insurers, property and casualty insurers and health insurers. The formulas are constantly under review for refinement, improvement in factors and updating for new risks.

The NAIC systems is typical of RBC systems in that it has two main components:

- 1) RBC formulas, that establishes a risk based capital level that is compared to a company's actual capital level, and
- 2) A RBC model law that requires specific company and regulatory actions based on the ratio of risk based capital to actual capital.

The RBC system is based on statutory financial statements. The Life, P&C and Health formulas all take into account asset market and credit risks (often referred to as C-1 risk), underwriting and pricing risks (C-2 risk), the risk of that the return from assets are not aligned with the requirements of the company's liabilities (C-3 risk) and general business risk (C-4 risk).

Each year the company calculates its capital based on the RBC formula. It also calculates the capital required for risk, the "Company Action Level RBC". The ratio of a company's capital to its "Company Action Level RBC" is generally referred to as its RBC ratio. However, the regulator rules use a ratio based on the "Authorized Control Level RBC", which is 50% of the "Company Action Level RBC". The NAIC system details specific actions to be taken by the company or the state insurance regulator if this ratio declines. For example, if the ratio exceeds 200% (a 100% ratio using the Company Action Level RBC) no action is suggested. If the ratio is less than 200% a capital plan is required. If the ratio is between 70% to 100%, the regulator has the option of taking control of the insurer, and if the ratio is below 70%, the regulator is required to place the insurer under control.

### **Risk Based Capital – An example**

Attachment A is a simplified example of the NAIC's RBC calculation for a life insurance company in the United States. The actual formula is more complex. It has pre-tax factors and tax adjustments while the example uses net factors. A partial list of other complexities includes factors for disability business, complex features for various types of subsidiaries and special modeling for interest rate risk. The bond size factor in the example is part of the NAIC formula. Its purpose is to reflect that when there are fewer bonds the risk of above average default is higher. The concentration factor is additional required capital for the largest investments.

#### Internet References as of 7/23/02

- 1) A.M. Best's Capital Adequacy Ratio for Property and Casualty Insurers  
<http://www.ambest.com/ratings/2001underbar.pdf>
- 2) Standard & Poor's Feb. 13, 2002 U.S. Life Insurance Capital Adequacy Model revision:  
<http://www.standardandpoors.com/ResourceCenter/RatingsCriteria/Insurance/index.html>
- 3) NAIC General Overview of Risk Based Capital and an interest rate scenario generator  
[http://www.naic.org/1financial\\_reporting/rbc/rbc\\_information.htm](http://www.naic.org/1financial_reporting/rbc/rbc_information.htm)
- 4) Background information on the Basel Committee  
<http://www.bis.org/bcbs/aboutbcbs.htm>
- 5) Information on the 1988 Basel Capital Accords and the update in progress:  
<http://www.bis.org/publ/bcbsca.htm>
- 6) The International Association of Insurance Supervisors papers on solvency:  
<http://www.iaisweb.org/framesets/pub.html>
- 7) Commission Services study prepared by KPMG on the methodologies to assess the financial position of an insurance undertaking from the perspective of prudential supervision.  
[http://europa.eu.int/comm/internal\\_market/en/finances/insur/solvency-study\\_en.htm](http://europa.eu.int/comm/internal_market/en/finances/insur/solvency-study_en.htm)
- 8) Links to Canada's Capital Requirements for a variety of institutions  
[http://www.osfi-bsif.gc.ca/eng/publications/guidance/index\\_capital.asp](http://www.osfi-bsif.gc.ca/eng/publications/guidance/index_capital.asp)
- 9) Canada's MCCSR for Life Insurers  
[http://www.osfi-bsif.gc.ca/eng/publications/guidance/index\\_capital.asp#INSURlife](http://www.osfi-bsif.gc.ca/eng/publications/guidance/index_capital.asp#INSURlife)
- 10) Canada's requirements for banks  
[http://www.osfi-bsif.gc.ca/eng/publications/guidance/index\\_capital.asp#DTIbanks](http://www.osfi-bsif.gc.ca/eng/publications/guidance/index_capital.asp#DTIbanks)
- 11) Federal Reserve report to Congress on "Differences in Capital and Accounting Standards among the Federal Banking and Thrift Agencies"  
<http://www.federalreserve.gov/boarddocs/rptcongress/differences/>

12) NAIC Risk Based Capital Newsletters:

[http://www.naic.org/financial\\_reporting/rbc/rbc\\_newsletters.htm](http://www.naic.org/financial_reporting/rbc/rbc_newsletters.htm)

<b>Attachment A</b>	<b>Statement Value</b>	<b>RBC net Factor</b>	<b>Risk-Based Capital</b>
<b>Asset Risk</b>			
Class 1 Bonds	100,000,000	0.004	400,000
Class 2 Bonds	20,000,000	0.013	<u>260,000</u>
Bonds subject to size factor			660,000
Size Factor			1.7
Total RBC for Bonds			1,122,000
Common Stock	1,000,000	0.2925	292,500
Asset Concentration Factor			45,000
Total Asset Risk - C1			1,459,500
<b>Insurance Risk</b>			
Ordinary life insurance in force	720,000,000		
Life insurance reserves	90,000,000		
Net Amount at risk	630,000,000		
First \$500 million	500,000,000	.001495	747,500
Balance	130,000,000	.000975	126,750
Total Insurance Risk - C2			874,250
<b>Interest Rate Risk</b>			
Life Insurance Reserves	90,000,000	.007475	672,750
Total Interest Risk - C3			672,750
<b>Business Risk</b>			
Life premiums	8,000,000	0.02002	160,160
Total Business Risk - C-4			160,160
<b>Total Risk Based Capital</b>			
C-1			1,459,500
C-2			874,250
C-3			672,750
C-4			<u>160,160</u>
			3,166,660
Effect of Covariance			701,982
Company Action Level RBC			2,464,678
Authorized Control Level RBC (50% of Company Action Level)			1,232,339
<b>Total Adjusted Capital</b>			
Surplus	5,000,000	1	5,000,000
AVR	75,000	1	75,000
Dividend Liability	50,000	0.5	<u>25,000</u>
			5,100,000
RBC Ratio			2.07