Capital Management

**Capital Structure**

The goal of financial managers is to maintain a capital structure that both meets the needs of the company and maximized shareholder value.

**Capital structure is a corporation’s mix of long-term debt and equity**. A company’s capital structure decisions are important financial policy decisions that are made at senior levels of management. Although these decisions focus on the composition of debt and equity on the balance sheet, in effect, they create the assets a company has available and affect how the company deploys those assets.

An insurer’s management makes analogous decisions when it determines the appropriate premium volume that can be supported by a give level of policyholders’ surplus. In either type of organization, the capital structure either enables or restricts company growth. The mix of long-term debt and equity can significantly affect a company’s value by influencing risk and return. **The financial manager’s goal is to maintain a capital structure that both meets the company’s needs and maximized the shareholders’ wealth**.

**Financial mangers decide how to raise and spend capital within a company. A company’s capital funds flow in this cycle:**

* **The company sells common stock (equity), bonds (debt), or some other type of security in the capital market and receives cash. (in the Flow of Funds in a Company).**
* **Proceeds from the security’s sale are used to purchase assets.**
* **Cash returns from the assets can be retained in the company to finance operations or to finance the purchase of more assets.**
* **Ultimately, cash returns can be distributed to the suppliers of capital.**
* **Debt holders receive income in the form of interest payments, and equity holders can receive income as cash dividends.**

**Equity**

Shareholders of the company have an equity interest, which is the right to whatever profits remain after all other expenses have been paid. **The rights that shareholders have depend in part on whether they are common shareholders or preferred shareholders**.

Common stock shares are the first security issued by a corporation and the last retired. Common shareholders are entitled to receive the residual earnings after bond and preferred shareholders, and consequently they bear the greatest risk. Although common stockholders are entitled to dividends, these dividends are paid only when declared.

Common shareholders are usually the voting owners of the company. With their right to vote for the members of the board, they can indirectly exercise control over company management. A company’s management is supposed to act in the best interests of its shareholders and to take those actions that it believes will maximize share price - including actions regarding the appropriate capital structure of the company.

Preferred stock has features of both debt and equity. It can resemble debt if its dividend is a fixed obligation (either a stated percentage of the par value of the preferred share or a stated dollar amount per share). Preferred stock, like common stock, creates and equity interest in whatever profits remain after all other expenses and creditors have been paid. It can resemble debt except that omission of a dividend does not result in the entire issue becoming payable immediately, as would a bond.

Preferred stock sits between pure debt and pure equity in terms of priority: Preferred shareholders have priority over common shareholders but stand behind debt holders.

**Some preferred stock, like some debt securities, is convertible into common stock under terms and conditions specified at the time of issue. This feature is used when the company desires to sell common stock to increase capital, but when selling is not economical because the company’s stock price is depressed**.

**Debt**

Under generally accepted accounting principles (GAAP), liabilities of companies are classified as either short-term liabilities or long-term liabilities.

Short-term liabilities are those due within one year and include bank loans, trade credit, commercial paper, and -other sources of funds. Short-term liabilities are used to manage net working capital or to smooth variations in cash flow within an accounting cycle. Long-term liabilities are liabilities that are due in more than one year and include bonds, mortgages, leases, and other variations of debt financing.

**Debt capital is usually raised through the sale of bonds in the capital market. If the bonds are backed simply by the general assets of the corporation (that is, they carry no specific pledge of assets), they are referred to as debentures**.

Bondholders and debenture holders have a priority claim on the company’s assets ahead of preferred shareholders and common shareholders. If the collateral with which the bonds are secured is insufficient to repay the bonds, the bondholders become unsecured creditors for the remaining balance.

**Financial Leverage**

Financial managers work to establish and maintain a capital structure that meets the needs of the company and maximized shareholder value.

Financial leverage is the use of fixed cost funds (debt) to increase returns to shareholders. This increase is accomplished through the use of capital raised by the issue of debt to earn a rate of return higher than the fixed cost of that debt. As long as the cost of debt is less than the return on the additional capital, the shareholders benefit. Typically, the fixed financial cost amount reported on a company’s income statement reflects interest payments on debt. This amount must be paid regardless of the amount of earnings available. The effect of financial leverage can be illustrated through financial leverage analysis.

**Financial Leverage Analysis**

**Financial leverage analysis is a technique used for comparing earnings per share (EPS) under alternate capitalization plans with varying levels of debt and equity.** The advantage of financial leverage analysis is that it provides a succinct portrayal of revenues and expenses under various circumstances.

Financial leverage analysis is used in the estimation of the optimum mix of equity and debt capital.

Financial leverage analysis is used for comparing earnings per share (EPS) under alternate capitalization plans with varying levels of debt and equity. A company is planning an expansion and needs to determine how to raise capital necessary to fund the expansion**. A needs $2,500,000 in new capital** and has two choices on how to raise funds. 1st they can **sell common shares at $50.00** per share, 2nd, they could issue debt (bonds) that require 10% per year in interest payments**. The expansion will double A’s EBIT to $2,000,000**

Income Statement

* **EBIT - $1M**
* Net Income (NI) $1M

Balance Sheet

* Assets $5M
* Liabilities $0
* Equity $5M
* Total (liabilities and shareholder’s equity) $5,000,000
* Common Shares Outstanding $100,000

Outstanding shares $100,000 x $50.00 per share they will sell to raise capital = $5,000,000

Funds need to be raised $2,500,000

EBIT will now be valued at $2,000,000

**$2,000,000 / ($5M = $2.5M) = .2667 or 26.67%**

**Tax Shield**

**Under federal tax law, interest on debt is deductible in calculating taxable income, but dividends paid to stockholders is not. As a result, more after-tax money is available to the company if it raises capital using debt rather than equity**. The amount of income taxes saved because of the deductibility of interest expense is known as the tax shield. The tax shield effectively reduces the cost of the debt.

**Limitations of Financial Leverage**

**The analysis of Zeselle suggests that it should raise capital by issuing debt because that alternative allows for an expected return on its investment that is greater than the cost of the debt. However, this strategy should not be taken to extremes.**

* **Additional cost of High Debt – Lenders require higher interest rates as debt increases, and additional investments by Zeselle may offer lower returns than previously earned. The higher cost of greater amounts of debt and potentially lower returns from additional investments reduce the benefits of leverage.**
* **Reduced Cash Flow Flexibility – Additional debt also reduces the flexibility that management has in managing cash and increases the company’s liquidity risk by increasing the amount of cash flow required to pay the debt holders. These situations could also reduce the market value of the company.**
* **Cost of Financial Distress – A company may encounter its ratio of debt to equity rises, it will experience an increased risk of defaulting on its debt and an increased potential for bankruptcy.** At low levels of debt, the cost of financial distress is low. As the level of debt increases, the cost of financial distress increases until as some point it exceeds the EPS benefit from financial leverage. Once the cost of financial distress is greater than the EPS benefit, the value of the company will start to decline.

**Insurance Leverage**

Insurers use policyholder-supplied funds as leverage to increase their returns.

Compared with other businesses, insurance companies do not have large amounts of traditional debt or fixed assets. Insurers generate substantial funds from operations. These funds provide a unique means of increasing the insurer’s return through insurance leverage.

**Insurer Cash Flow**

Insurers have two main sources of funds with which they can generate investment income to help pay for losses or provide additional profit:

* Policyholders’ surplus – contributed capital plus earning retained in the business plus other items, such as unrealized capital gains and losses.
* Policyholder-supplied funds (funds from operations)-Reserves for losses, loss adjustment expenses, and unearned premiums. These funds arise as part of an insurer’s ongoing operations.

Funds from two sources are commingled and become indistinguishable when invested.

**Insurance Leverage**

**Positive cash flow from underwriting operations allows insurers to increase funds for investment without tapping other sources of financing. Insurers obtain funds from their policyholders by selling insurance, which increases the size of unearned premium reserves and loss reserves. In effect, insurers operate with a leveraged financial structure by borrowing money from their insureds in the form of premiums collected and repaying that money in the form of claim and expense payments. This insurance leverage is analogous to financial leverage used by firms that borrow funds by issuing traditional debt**.

**Insurance leverage is measured by taking the ratio of reserves to policyholders’ surplus. Reserves include those arising from loss and loss adjustment expense liabilities as well as from unearned premium liabilities. Insurance exposure is measured as the ratio of written premium to policyholders’ surplus. The relationship between them is shown in the equation:**

**Insurance leverage = Insurance exposure X Reserves** **÷ Premiums written**

Or:

Reserves ÷ Policyholders’ Surplus = Premiums written ÷ Policyholders’ surplus X Reserves ÷ Premiums written

There are some limitations on the value of an insurance leverage ratio. **The primary limitation is the reliance on the insurer’s book value of surplus reserves. Some insurer assets, such as bonds the insurer plans to hold to maturity, might not be shown on the insurer’s financial statement as current market value. Insurer loss reserves are usually carried on an undiscounted basis, and their market value may be substantially different.**

While reliance on book values as well as other accounting issues may limit the precision of the insurance leverage calculation, the ratio will still provide valuable information about the capital structure of an insurer.

**Effect of Insurance Leverage**

**The effect of insurance leverage on insurers is similar to the effect of financial leverage for all companies: increased returns to shareholders. In both cases, additional funds are provided by nonoshareholders, either from sales of insurance policies of from debt issued. Greater leverage, whether insurance or financial, can provide more funds for investment and thereby increase an insurer’s earnings and return on equity if the investment returns exceed the cost of the funds.**

**Underwriting operations do not have to generate an underwriting profit to produce funds for investment. Because of timing differences cash receipts and revenue recognition and between cash disbursements and expense recognition, an insurer can generate investable funds supplied by policyholders without earning an underwriting profit.**

**Cost of Funds from Insurance Operations**

When financial leverage is used by taking on debt (selling bonds), the cost of that leverage is the interest paid on the bonds (assuming the bonds are issued at face value), which is generally fixed. However, the cost of obtaining funds from insurance operations is more difficult to estimate and is inherently uncertain.

Insurance operation funds arise from the sale of insurance policies. The “Hypothetical Insurer Cash Flow” example shows that an insurer receives funds up front (premium less underwriting expenses) and pays losses over time. **One method for estimating the cost of insurance operations funds is the ratio of underwriting results to reserves. An underwriting loss is a reduction to income for tax purposes, so the after-tax cost should be used. The model can be express by an equation:**

**Cost of capital from insurer operations =**

**(1 – Tax rate) X Underwriting loss(gain) ÷ Loss and loss expense reserves ÷ Unearned premium reserves**

According to the formula, an underwriting loss produces an estimate of the cost of funds by showing the relationship between the loss and the amount of funds for investment generated by writing policies. If there is an underwriting gain, the formula produces, in effect, a negative cost. That is, the policy produces not only funds for investment based on the reserves, but also funds equal to the underwriting profit, which can also be invested to produce a return.

**Limitations of Insurance Leverage**

**One limiting factor is statutory accounting. As new business is written, the immediate recognition of policy acquisition costs, combined with the deferral of revenues, temporarily reduces policyholders’ surplus. Another factor limiting use of insurance leverage is the cost of obtaining funds from insurance operations. The cost of funds must be less than the expected investment return to produce a beneficial effect from insurance leverage. A third factor limiting premium growth and insurance leverage is the increased likelihood and size of underwriting losses as new business is written and the additional expense in underwriting and servicing the increased business.**

**Insurer Cost of Capital**

Cost of Capital – The opportunity cost of funds provided by investors

The capital need for business operations of any firm, including an insurer, has a cost that must be balanced against the return on that capital.

Because an insurer’s management is responsible for maximizing company value, it needs to be aware of what the cost of capital is to the company. These costs can vary by the source of the capital, whether it is equity, debt, or preferred stock. When multiple sources of capital are used a weighted average cost of capital should be determined.

**Cost of Equity**

The cost of capital either to or from the insurance industry depends on whether comparisons to returns offered by other industries are favorable or unfavorable**. The cost of equity is the rate of return required to compensate a company’s common stockholders for use of their capital. Essentially, it is an opportunity cost concept that compares the return on insurer shares with the return on other shares in an equivalent risk class. For example, if investors can make an expected return of 10% on an alternative investment with the same risk as investing in an insurer, then the insurer’s cost of equity is 10%. If investment in the insurer’s shares offered less than 10% return, investors would move their capital elsewhere.**

**The flow of capital to and from the insurance industry depends on whether comparisons to returns offered by other industries are favorable or unfavorable.**

Two approaches for estimating the cost of equity capital are discounted cash flow (DCF) and the capital asset pricing model (CAPM). Given the assumptions of these models, they should yield similar cost of equity estimates. These calculations require a number of estimates, such as future rates of return and growth. Therefore, the estimation of the cost of equity is inexact.

**Discounted Cash Flow (DCF) Model**

**The discounted cash flow model (DCF) values an asset as the present value of all future cash flows from that asset in perpetuity. These cash flows are discounted for the time value of money by a discount rate. When the discounted cash flow model is applied to equities, it is sometimes call the Dividend Growth Model**. Because equity has no maturity date its value is the present value of all future dividends in perpetuity. **A limitation of the discounted cash flow model is that it can be used only for companies that are paying dividends.**

Assuming a constant growth rate of dividends in perpetuity, the cost of equity (Ke) under the DCF method is calculated using this formula:

**Ke = [d ÷ P) X (1 + g)] + g**

**Where d = last annual dividend, P = Current Share Price, g = expected annual growth rate of the dividend in perpetuity**

**The last annual dividend (d) must be multiplied by the dividend growth rate to reflect the dividend for the current year.**

**Summer Insurance Co has been paying dividends that have been growing at 2% per year. Last year Summer paid dividends of $1.60 per share. Summers current share price is $40. Using the DCF, calculate Summer’s cost of equity.**

**Summers cost of equity = [(1.6 / 40.00) x (1 + .02) + .02 = [.04 x 1.02] + .02 = .0408 + .02 = .0608 or 6.08%**

**The cost of equity = [Last annual dividend/Current share price) x (1 + Expected annual growth rate of the dividend in perpetuity)] + Expected annual growth rate of the dividend in perpetuity**

**Capital Asset Pricing Model (CAPM)**

**The capital asset pricing model (CAPM) is a method of pricing securities based on the relationship between risk and return. It estimates the cost of equity capital by separating and valuing the two component risks of an equity security: Unsystematic risk (company specific risk) and systemic risk (market risk).** The cost of equity (Ke) is calculated using this formula:

**Ke = rf + B (rm – rf)**

**Where: B = Beta of security, rm = expected return on the market, rf = Risk-free rate**

**The CAPM technique yields a cost of equity financing slightly lower than the estimate produced by the DCF model. Both methods are subject to error, so knowing each model’s assumptions if helpful in determining which one is likely to produce the more accurate result for the company concerned. One approach to reconciling the different results is to take the average of the two**.

Summer Insurance Co has a beta of 2.0, risk-free rate of interest of 1%, and an expected market return of 3%. What is the cost of equity using the CAPM

**The cost of equity = Risk-free interest rate + beta x (market return – risk-free interest rate) = .01 + 2.0 X (.02) = .05 or 5.0%**

Reconcile the different results from summers’ cost of equity from the DCF and the CAPM calculations**.**

**One approach to reconcile the different results for the cost of equity from the DCF and the CAPM is to average the two results. 6.08 + 5.0 = 11.08 / 2 = 5.54%**

**Cost of Debt**

The cost of debt is the rate of return required to compensate a company’s debt holders for the use of their capital. Like the cost of equity, the cost of debt is essentially an opportunity cost concept that compares the return on insurer debt with the return on other debts of equivalent credit risk.

**The cost of new debt is an interest expense, which can be separated into two components: the risk-free rate of return (rf), and the risk premium. Similar to capital raised from bonds, the cash assets an insurer receives from premiums can be invested until needed to pay losses. One way to approximate the insurer’s cost for this capital is to use the insurer’s cost of debt for bonds with maturities similar to the average duration of the insurer’s reserves**.

The risk-free rate of return is the market rate of return on a risk-free investment, such as United States Treasury Bills. The risk premium is the amount of additional return demanded by investors for the risk associated with purchasing the organization’s debt. To estimate the cost of the debt, the risk premium is added to the risk-free rate of return. This sum is then multiplied by one minus the tax rate. Since interest payments are generally tax deductible, this latter factor adjusts for the after-tax cost of the interest.

Cost of debt Ko = (risk-free rate of return rf + risk premium) x (1- tax rate)

**Cost of Insurance Reserves**

When an insurer issues policies, it receives a specified amount of cash (the policy premium) and issues contracts to pay an amount (losses) at some future date based on the terms of the contracts. The cash asset from the premium can be thought of as “capital” because the insurer can invest these funds until they are needed to pay losses. In this sense insurance policies are similar to debt. In both cases, the “borrower” receives a specified amount of cash and issues a contract to pay amounts due at some future date. As with bonds, insurance policies create a current cash inflow and corresponding liabilities to pay cash in the future. At any point in time, the amount of capital raised by writing insurance policies is the total of the insurer’s unearned premium, loss and loss adjustment expense reserves (that is, premium minus expenses and losses paid to date).

One way to approximate the insurer’s cost for this capital is to use the insurer’s cost of debt for bond with maturities similar to the average duration of the insurer’s reserves.

**Cost of Preferred Stock**

Although capital raised by issuing preferred stock is equity capital, the cost of preferred stock capital is calculated like the cost of a bond and is based on the preferred dividends that must be paid. Because preferred stock does not have a maturity date, it is valued as a perpetuity

Kps + D ÷ Pp Dollar amount of dividend paid in each share / market price of one share

Where Pp = market price of one share of preferred stock, D = dollar amount of dividend paid on each share and Kps = cost of preferred stock capital

**Weighted Average Cost of Capital**

The weighted average cost of capital (WACC) is the average of the cost of equity and the cost of debt calculated according to the proportion of the whole invested capital that each represents. To reflect the current operating environment, the percentage figure developed in this calculation is the cost of the last dollar of capital raised from each source, rather than the historical cost.

The formula for WACC is:

WACC = (cost of equity X percentage of equity) + (cost of debt x percentage of debt)

In this case because there are two types of equity, the WACC equation can be divided into the capital components:

WACC = (cost of common stock X % of common stock) + (cost of preferred stock X % preferred stock) + (cost of debt X % of debt)

In this example, the “capital” can be viewed broadly to include its loss and loss adjustment expense reserves as well as its unearned premium reserves.

WACC = (cost of common stock X % of common stock) + cost of preferred stock X % of preferred stock) = (cost of debt X % debt) + (cost of reserves X % of reserves)

**A company’s WACC is important for capital budgeting purposes. IN an analysis of potential investments by the company, investment projects that have an expected rate of return greater than a company’s WACC, including investments in new lines of insurance, will create positive net value for the company. Investment projects that are expected to earn less than the company’s WACC will result in a decrease in shareholder value.**

Summer Insurance Co’s Capital is distributed as 10% debt, 30% common stock, and 60% reserves. The cost of debt is 3%, the cost of common stock is 4%, and the cost of reserves is 5%. Calculate the Summer’s WACC

**WACC = (Cost of debt x percentage debt) + (cost of common stock X percentage of common stock) + (cost of reserves x Percentage of reserves) Or (.03 x .1) + .(04 x .30) + (.05 x .6) = .003 + .012 + .03 = .045 or 4.5%**

**Risk-Based Capital Requirements**

An insurer may face regulatory oversight or even direct supervision if it does not meet risk-based capital requirements.

An insurer’s surplus, or capital, provides a cushion that protects policyholders against potentially poor financial results. Regulators review the risk-based capital measure of insurers annual to assess each insurer’s ability to weather adverse circumstances. If an insurer’s risk-based capital measure falls below certain standards, company and/or regulatory action is required.

**Capital Adequacy**

One purpose of an insurer’s capital is to enable it to meet its obligations to policyholders and other claimants in the event of unexpectedly poor results. **From the perspective of a policyholder or claimant, the more capital an insurer has, the more likely it will be able to pay claims. However, because holding capital has associated costs, an insurer wishes to generate the most revenue from the least amount of capital**.

To protect the interests of policyholders and claimants, regulators specify capital requirement for insurers. Minimum capital requirements exist for starting an insurer. These requirements vary by type of insurance and by state, but generally range from about $50K to $5M. However, these requirements are too low for insurers writing any significant volume of business.

Net written premiums to surplus requirements are another type of capital requirement. Prohibiting and insurer from writing more than $3 of premium for every $1 of policyholders’ surplus is simultaneously a requirement to have at least $1 of surplus for every $3 of written premiums. Nevertheless, a net written premiums to surplus requirement has limited value as a standard for capital adequacy for two reasons. First, exceeding the specified standard is not strictly prohibited. Second, the only type of risk to an insurer’s financial strength that the requirement addresses is underwriting risk.

**Risk-Based Capital System**

**The national Association of Insurance Commissioners (NAIC) has developed a risk-based-capital (RBC) system to determine the minimum amount of capital an insurer needs to support its operations, given the insurer’s risk characteristics.**  The RBC requirements consider not only underwriting risk but also asset risk and reserve risk – that is, all potential effects on an insurer’s policyholders’ surplus. Matches Regulatory action to the level of solvency.

**Risk-Based Capital for Insurers Model Act**

**The Risk-Based Capital for Insurers Model Act has been enacted in some form in all states. It broadly requires that capital requirements be based on all risks that insurers face**. For property-casualty insurers, the RBC takes into account asset risk, credit risk, and underwriting risk. CUBA = Credit, Underwriting, Business, Asset

**Nondiscretionary Operation of RBC Requirements**

The RBC Model Law enables insurance regulators to take regulatory action when warranted, before an insurer becomes too financially weak to be rehabilitated. Before the NAIC developed the RBC formula, state regulators where required to petition the courts and prove that an insurer was in financial difficulty before intervention was allowed, thereby subjecting the insurer to regulatory control.

The NAIC RBC formula provides an objective test of an insurer’s solvency and matches regulatory action to the level of solvency concern.

**The Nondiscretionary operation of the RBC system has benefits for insurers, state regulators, and policyholders.**

* **Insurers can perform the complex but mechanical RBC calculation themselves to know whether they will come under regulatory scrutiny. An insurer that has difficulty meeting RBC requirements can choose either, or both of two options: reduce the risk to which it is exposed or increase its capital.**
* State Regulators do not have a choice about whether to implement the regulatory action specified; therefore, regulatory intervention is not arbitrary or motivated by political factors. State insurance regulators are given a clear mandate with RBC Rehabilitation is no longer subject to delays caused by regulators’ expectations that insurers will be able to solve their financial problems.
* Policyholders have greater security that potential financial concerns of their insurers will be addressed either by the company or by regulators.

**The RBC Standard**

The specifics of the RBC formula are intricate, subject to change, and beyond the scope of this discussion. Generally, the RBC standard determines an acceptable level of capital for each insurer based on the risks that insurer faces. The insurer’s actual capital is then compared to this acceptable level and if found insufficient, various consequences result depending on the level of insufficiency.

**The NAIC RBC formula considers various from of asset risk, underwriting risk and credit risk. Included within these broad categories of risk are virtually all specific risks to which an insurer can be subject.** Each component of the RBC formula weights the risks assumed by an insurer, because those risks vary by insurer. The components of the NAIC RBC formula attempt to evaluate these risks and consolidate them into a single index.

Because it is unlikely that all of the risks measured by the formula would befall an insurer simultaneously, the RBC formula adjusts the sum of the values assigned to each risk using a statistical technique call covariance.

**Risk Types**

The RBC formula considers several types of risk.

**Asset Risk**

Virtually all assets involve some amount of asset risk. Under the RBC formula, riskier assets (those more likely to have a loss, or greater degree of loss) require more underlying capital than less risky assets. The amount of capital required is determined by multiplying the NAIC Annual Statement value of the asset by a factor provided by the NAIC in the RBC booklet.

The determine the amount of risk-based capital required to support its asset risk, an insurer multiplies the NAIC Annual Statement value of each asset by the appropriate risk factor and sums the resulting products. Additional RBC charges are imposed if the insurer’s investments are concentrated in securities issued by a small number of issuers – that is, if investments are not sufficiently diversified.

**Credit Risk**

Credit risk reflects the possibility that the insurer will not be able to collect money owed to it. Although it is specifically mentioned in the RBHC Model Law, credit risk is another type of asset risk. Receivables, the source of much credit risk, are money owed to and assets of an organization.

**By far, the most significant credit risk is the chance that one or more of the insurer’s reinsurers will not be able to pay amounts due under reinsurance agreements**. While most reinsurance recoveries are included in the RBC calculation, cessions to some reinsurers are not subject to the RBC charge. Such reinsurers include state-mandated involuntary pools and federal insurance programs, voluntary market mechanism pools that meet certain conditions specified in the RBC booklet, and the insurer’s US based affiliates, subsidiaries, and parents.

**Underwriting Risk**

**An insurer is at risk of an underwriting loss if premiums charged and/or loss reserves are too low.** Premiums can be inadequate for the losses they must cover. Loss reserving errors directly affect the amount of an insurer’s capital. Inadequate reserves, as evidenced by excessive loss reserve development, indicate that the insurer might have to draw on its capital to make up the shortfall.

Another underwriting risk recognized in the RBC formula is excessive premium growth. Growth is considered excessive if the three-year average growth rate is greater than 10%. A persistent concern exists that premium growth may have been achieved by price cutting. This creates the risk that rates that result from price cutting will be inadequate.

**Action Levels**

The RBC Formula determines a minimum RBC amount, which is the Authorized Control Level of capital for each insurer. When capital decreases to this level, the regulator may seize control of the insurer. **If an insurer’s RBC does not exceed 200% of the authorized control level, various regulatory actions are triggered**.

* No Action required – if the insurer’s capitalization level is above the Company Action Level (200% or more of the computed minimum RBC amount)
* Company Action Level – if the insurer’s capitalization level falls between the Regulatory Action Level and the Company Action Level (between 150 and 200% of the computed minimum RBC amount). The company is required to submit a comprehensive financial plan to correct financial problems.
* Regulatory Action Level – If the insurer’s capitalization level falls between the Authorized Control Level and the Regulatory Action Level (between 100 and 150% of the RBC amount). The regulator is required to conduct an examination or analysis as deemed necessary. The insurer is required to file a comprehensive financial plan with the insurance regulator
* Authorized Control Level – If an insurer’s capitalization level falls between the Mandatory Control Level and the Authorized Control Level (between 70 and 100 % of the computed minimum RBC amount). The regulator may place the insurer under regulatory control but is not required to do so.
* Mandatory Control Level – If an insurer’s capitalization level falls below 70% of the Authorized Control Level (the computed minimum RBC amount) the insurance regulator is required to place the insurer under regulatory control

**Economic Capital**

**Economical capital, a form of regulatory capital, is an estimate of the amount of capital a firm needs to remain solvent at a given risk tolerance level. It differs from other types of regulatory capital because rather than being based on a formula, it is based on the fair (market) values of the firm’s assets and liabilities as well as their variability.**

**Economic capital is developed by modeling the potential variability in market value of a firm’s assets and liabilities, taking into consideration all of the firm’s risk (market, credit, liquidity, underwriting, operational). These risks are considered together to estimate at the firm level the probabilities of various amounts by which the market value of the firm’s liabilities may exceed the market value of its assets over a one-year period.**

**This probability measure is based on the value at risk (VaR) concept, which uses variability in market value of an asset to estimate the probability of a loss in market value exceeding a threshold level over a given time period.**

The concept of economic capital underlies new European regulatory standards for insurers (Solvency II), which will affect not only European-based insurers but also Unites States insurers with European subsidiaries or parents.

**Fair Value Accounting**

The determination of an organization’s economic capital stats with the fair value accounting of its assets and liabilities. Fair value is a market-based measurement based on the price the asset owner o would receive by selling the asset, or that a liability holder would pay to transfer to liability. The latter is sometimes called an exit price.

As defined in the Financial Accounting Standard Board’s (FASB) Topic 820 “Fair Value Measurements and Disclosures,” the fair value of an asset or liability is the price a knowledgeable and independent entity would pay in an active market, excluding any transaction costs.

The fair value market price of an asset or liability incorporates several factors. The most important are the future cash flows and the risk attached to those cash flows. For example, the present value of a bond issued by an organization in financially difficulty would reflect the possibility of default on interest or principal payments. The valuation of assets or liabilities that are not traded on active markets is based on a hypothetical transaction on the valuation date.

Fair value accounting differs from generally accepted accounting principle (GAAP) or statutory accounting principles (SAP used by insurers in the US, both of which at times use nonmarket values.

Under GAAP, an organization’s net worth (assets less liabilities) is often called equity. Under SAP, and insurer’s net worth is called policyholders surplus. Fair value accounting, which uses actual or estimated market value calls net worth market value surplus (MVS).

**Fair Value of Surplus – The fair value of assets minus the fair value of liabilities.**

**Fair value measurement, which can be used with GAAP or SAP is a method to determine the market value of an asset or liability. Fair value accounting uses only fair value (actual, or estimated market value) for all of an organization’s assets or liability, unlike GAAP or SAP, which use methods other than fair value to determine the value of certain assets or liabilities, such as acquisition, amortized cost, and depreciated cost**.

**Fair Value of Insurers**

**The calculation of an insurer’s fair value is complicated because no readily available market exists for trading insurer’s largest liabilities: loss reserves (including loss adjustment expenses) and unearned premium reserves. These liabilities are generally carried on an insurer’s balance sheet at the undiscounted estimate of future payments or earned amounts. However, these reserve estimates are uncertain, particularly for future loss payments. Therefore, it is unlikely that an insurer would be able to transfer these reserves to a reinsurer or another party at their present value. The assuming entity would require additional payment for the potential that the reserves prove to be inadequate. The additional payment is called a risk premium, risk margin, or market value margin. Therefore, to calculate the fair value of an insurer’s reserves, estimated future amounts are discounted to present value and a market value is added.**

Calculation: Market value surplus (MSV) of an insurer =

Fair value of assets – fair value of liabilities

Fair value of assets – (present value of liabilities + Market value margin)

Market Value Surplus of an insurer (MVS) can be considered a risk adjuster form of policyholder’s surplus. MVS is already adjusted for risk because fair value takes into account the risk inherent in the cash flows arising from assets and liabilities and because a market value margin is added to the present value of the liabilities.

**Economic Capital for Insurers**

An insurer’s economic capital is the amount of capital required to maintain solvency (that is, an MVS greater than zero) at a given risk tolerance level.

The underlying paradigm of economic capital is similar to an insurer’s risk based capital (RBC) calculation. Both attempt to quantify the various risks faced by an insurer such as:

* Market risk (changes in bond or stock prices)
* Credit risk (defaults by those owing money)
* Liquidity risk (losses due to improper matching of asset and liability cash flows)
* Insurance risk (potential for adverse loss experience or catastrophe losses)
* Operational risk (failed internal processes due to data system problems)

The major difference between the calculation of RBC and economic capital is that RBC uses factors to calculate a risk margin for the underlying risks. In contrast, economic capital is calculated using probability models of the various factors affecting results.

Probability models estimate the likelihood of potential outcomes by allowing for variation over time of inputs such as loss ratios, interest rates, and the effect of regulation changes. The variations are usually based on historical experience. Probability models are used to estimate the effect of various stresses and particularly concerned about the variability of insured losses, both from current policies and in the loss reserves for prior claims. Numerous models are needed to simulate the potential risks to an organization across all aspects of its operation.

The results of the various models are combined, taking into account any overlapping effects or correlation between risks. The output is a distribution of possible fair value profits and losses (gains and losses in market value surplus), which is unique for each organization. Economic capital is equal to the value of a loss in MVS that is expected to be exceeded at the selected level of probability (threshold).

Economical capital is defined using the concept of value at risk, the maximum loss at a selected probability or threshold level. The threshold level used is based on the organization’s risk tolerance, market expectations and regulatory requirements. For example, ING Group uses a 99.95% (1 in 2000) threshold level for its economic capital in order to achieve an AA financial rating from outside rating agencies.

If an organization’s MVS is larger than its economical capital, then is has excess capital. If its MVS is less than its economical capital, a deficiency exists. This deficiency could require management or regulators to take action, such as some combination of increasing its available capital and reducing its risk level and economic capital requirement.

**Advantages and Disadvantages of Economic Capital Analysis**

Enterprise Risk management – An approach to managing all of an organization’s key business risks and opportunities with the intent of maximizing shareholder value. Also known as enterprise-wide risk management.

Numerous advantages are associated with economic capital analysis. First, it focuses attention on the risks attached to each of an organization’s various activities and can be used to define an organization’s risk tolerance. It is used to put a value on an organization’s overall level of risk. An organization can use economic capital analysis to establish the amount of capital it needs, or the risks that can be taken with a given amount of capital. It can reveal capital requirements for different operations and improve capital allocation. In addition, it can help an organization understand its economic capital position in order to deal with investors, rating agencies, and regulators, all of whom are increasingly using economic capital as a standard of financial adequacy. Overall, economic capital analysis provides a quantitative measure for a company’s enterprise risk management program.

However, economic capital analysis is complex and sophisticated. Its reliance on the underlying assumptions and probability estimates of various outcomes is another disadvantage. Also, the use of fair value to assess all assets and liabilities at market value may produce changes in MVS unrelated to the company’s ability to operate on an ongoing basis (for example, a change in the value of an organization’s owned headquarters building is unrelated to the results of its day-to-day operations).

Solvency II

**Solvency II is a fundamental review of the capitalization of insurers in the European Union (EU). It aims to “establish a revised set of EU-wide capital requirements and risk management standards….)**

**Solvency II has three “pillars. The First deals with quantitative requirements of capital based on each insurer’s specific circumstances. This includes a solvency capital requirement akin to economic capital that would ensure a 99.5% probability that the insurer would meet its obligations over the next year. The second pillar sets requirements for insurers’ internal risk management process and for the supervision of insurers. The third focuses on reporting, disclosure, and transparency of the risk assessment to the public and regulators**.

Solvency II applies to insurers in the EU, including the European operations and subsidiaries of insurers based outside the EU. As a consequence, many parent companies are adopting Solvency II standards corporate-wide.

**Question: Autumn Assurance group has assets at fair value of $100M. The present value of Autumn’s liabilities is $85M. The market value margin is $5M What is autumn’s MVS**?

Autumn’s MVS = $100M – ($85M - $5M) = $10M

Using probability models, Autumn determines that its VaR is $8M. Autumns may be expected to incur $8M or greater loss of capital at a .5% probability over a one-year periods. What is Autumn’s economic capital?

Autumn’s economic Capital is $8M. The VaR is $8M at the threshold determined by Autumn

Does Autumn have excess capital or a deficiency in capital?

Autumn’s MVS of $10M is larger than its economic capital of $8M. Therefore Autumn has excess capital