

When Only the Best Will Do

Best Practices in Capital Allocation

HOW MUCH IS ENOUGH capital, given a firm's risk tolerance for losses? Should a business rely on its government regulator to set the minimum amount of capital it should hold, or would even more be better? Should a company differentiate among business lines—or even among its assets—to allocate its capital?

These are questions of increasingly more interest to the management, shareholders, creditors and regulators of financial services companies. For answers, they are looking to innovative leaders for the industry's best practices when it comes to managing risk and capital. What they are finding is a sophisticated mechanism for allocating capital that adjusts for the risk inherent in returns as well as in capital. This tool, referred to as a **risk-adjusted performance measure (RAPM)**, is based broadly on the **value-at-risk (VAR)** methodology (see "Enough Is Enough: A Timely Look at Financial-Soundness Measures," page 28), which estimates **loss-probability distributions** for various risk positions. The RAPM formulation goes further, however, assessing risk-adjusted returns relative to the value-at-risk estimates for a firm's



individual assets or business lines to determine the greatest expected return for a given level of risk.

Getting to Best

In recent years, a deeper understanding of risk by corporate managers—as well as the greater information demands of the financial industry's various stakeholders—has led more and more companies to develop highly sophisticated tools and measurements for risk, capital adequacy and capital allocation. As a result, a new generation of best practices is eclipsing the simple ratios of capital-to-assets upon which many regulatory requirements have been based.

Today, a best-practices approach to capital is one that *minimizes* the chance of a financial crisis by sufficiently reserving for expected levels of risk and allocating capital to

satisfy remoter possibilities of catastrophic losses. At the same time, it *maximizes* profitability by using scarce resources, such as capital, efficiently.

In short, today's cutting-edge firms are managing their capital in a way that generates the most economic value for the company owners. Economic value is created either by increasing returns while maintaining the same level of risk or by decreasing risk while sustaining the same level of returns (see "Aiming for a Financial Soundness Target," page 46). A firm's capital-management performance, then, depends on simultaneously measuring and managing these two areas through some type of RAPM.

The RAPM approach is particularly appropriate for financial services institutions because it:

- Provides a rigorous, fact-based analysis of performance;
- Incorporates quantifiable **market-risk** and **credit-risk** tolerances in the capital-allocation process;
- Establishes a consistent measurement tool for assessing

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and comparing risk-adjusted returns across asset classes or lines of business;

- Allows companies to identify and select asset categories or business lines on which the institution should concentrate;
- Gives managers specific performance targets for improving pricing or profit margins;
- Enables the evaluation of managers based on the returns they generate relative to the risks they take.

Using the RAPM Approach

In broad terms, RAPM is calculated by first subtracting expenses and *expected* default losses from revenues then dividing by the capital required to support *unexpected* default and market losses.

To use this type of risk-and-capital measure, a company first must determine how much capital is needed to absorb unexpected losses. Firms commonly turn to the value-at-risk statistical technique to estimate the loss likely to occur on a particular instrument or business line based on a probability parameter selected to define the worst case. Using a distribution of returns, it is possible to identify the magnitude of such a worst-case loss when specified as occurring less than, say, 1 percent or 2 percent of the time. This worst-case, *unexpected* loss becomes the

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basis for determining appropriate capital levels—meaning, the amount of **risk capital** needed to absorb the losses predicted under the worst conditions.

The RAPM methodology requires the calculation of a value-at-risk estimate for each of the firm's assets or business lines to determine the risk-adjusted capital requirements for each type of activity. The estimates are aggregated to arrive at the firm's risk-adjusted capital, which is another way of characterizing the firm's overall value-at-risk. This is not a matter of simple addition, however. In many cases, the risk exposures—including **interest-rate risk**, **liquidity risk** and **default risk**—for one or more individual assets or business lines may offset risks in the others, a relationship known as a **diversification effect** or **portfolio**

effect. RAPM takes the **covariance** of risk exposures into account. The firm's total risk-adjusted capital is thus the aggregation of the separate risk-capital amounts required for each asset class or business line, less the beneficial effects of diversification.

Although the value-at-risk concept is fairly well known in academic and business circles, the more comprehensive RAPM methodology has not received as much attention. In terms of commercial usage, few firms have developed a risk measure along the lines of RAPM; those that have generally regard the tool as proprietary. One fairly well-known example is the performance measure developed by Bankers Trust Corp. commonly referred to by the acronym **RAROC (Risk-Adjusted Return on Capital)**. This tool can measure anything from individual assets to entire business lines then aggregate those results to produce a gauge of the entire firm's performance on a risk-adjusted basis.

Besting the Rest

At one time or another, the **capital-to-assets ratio**, **duration analysis** and **nonprobabilistic stress test** have been hailed as the best way to get a handle on a company's financial risks, although each approach proved to have limitations. However, as shown in *Exhibit 1*, the RAPM methodology is able to overcome

many of these shortcomings, especially when used in conjunction with stress testing and sensitivity analysis.

Capital-to-Assets Ratio.

Historically, government regulators have looked to the default risks of a firm’s assets as the basis for determining the minimum level of capital a regulated company must set aside to ensure its safety and soundness. A fixed capital-allocation ratio, such as the ones for banks and thrifts, encourages the investment in creditworthy assets because the lower the ratio value, the less capital a depository institution must hold.

However, assets with equivalent default risks can differ with respect to the interest-rate risks they pose. For example, a zero default risk is associated with both 3-month Treasury bills and 30-year Treasury bonds, yet the levels of interest-rate risk vary dramatically. Banking regulators, however, are moving towards replacing or supplementing these simple ratios with tests that address interest-rate risk or other market risks.

Duration Analysis. Corporate America makes fairly significant use of duration measures to allocate capital in ways that offset the respective interest-rate risks of different assets or business lines. The supervisory community has not widely embraced the technique, though, because most regulatory efforts

EXHIBIT 1: Characteristics of Various Risk-Assessment Tools

	Capital-to-Assets Ratio	Duration Analysis	Stress Test	RAPM (Value-at-Risk)
Captures Interest-Rate; Market Risk		✓	✓	✓
Captures Default Risk	✓		✓	✓
Captures Diversification Effect			Possible	✓
Utilizes Historical Data			Possible	✓
Analyzes Risk-Event Probability			Possible	✓
Easy to Implement	✓	✓	✓	

Note: Assumes stress testing applied interest-rate and creditworthiness shocks to a firm's entire portfolio. Stress tests selected through joint-probability ellipse integrates probability analysis. Risk-adjusted performance measure (RAPM) methodology relies extensively on value-at-risk calculations.
Source: Freddie Mac

tend to define capital adequacy in default-risk terms.

Duration is simply the percentage-point change expected in the market value of a portfolio for every 1-percent change in interest rates. A 10-year Treasury note has a duration of approximately seven, indicating that a 1-percentage-point change in interest rates is expected to cause the price of the note to move by roughly 7 percent. Duration analysis provides a major advantage over simple risk ratios because it provides some gauge of an instrument’s or a portfolio’s interest-rate sensitivity that ratios ignore. However, it still does not measure up to a RAPM because it does not relate reward with risk or quantify how bad the risk could get. Duration analysis also oversimplifies the world by treating the shape of the yield curve as a constant, meaning that only parallel shifts take place in short-term and long-term interest rates.

Furthermore, duration analysis is incomplete if no adjustment for convexity risk is made when analyzing large changes in interest rates. Convexity measures the extent to which prices change by more than the proportional change in interest rates. Convexity risk is particularly acute for assets with embedded options, such as mortgages that give homeowners the right to exercise a prepayment option.

Stress Test. The initial appeal of stress testing lies with the ability to probe a firm’s viability under stressful economic conditions. However, stress tests by themselves come up short because they do not provide a suitable basis for comparing stressful scenarios in terms of their relative risk. Further, stress tests do not capture every possible scenario, including ones that might prove more stressful than the scenario simulated in a stress test. The RAPM methodology can supply the

additional insights. A RAPM identifies the worst of a multitude of events in much the same way that a **joint-probability ellipse** sorts stress-test scenarios by severity (see “Drawing an Ellipse Around Risks,” page 39).

By embracing a RAPM approach to capital adequacy and allocation that is complemented by stress testing and sensitivity analysis, companies can make increasingly accurate assessments of the risks they face, determine the probability that those risks will occur and efficiently put capital to work where it is needed most. By first assessing and making comparable all of a firm’s risks, a RAPM analysis also promotes valid comparisons among those risks. Finally, a company that adjusts capital and returns for risk can meet the demands of its owners in the most reliable and efficient way—while following the industry’s best practices. **SMM**

Aiming for a Financial-Soundness Target

A banker might desire to achieve at least a single-A rating on his own corporate debt. . . . So the banker sets an internal corporate goal to allocate enough capital so that the probability of losses exceeding capital is less than one-tenth of 1 percent. In the language of statistics, this means that allocated capital must cover 99.9 percent of the estimated **loss-probability distribution**.

Once the banker estimates risk and allocates capital to that risk, the internal capital allocations can be used in a variety of ways—for example, in so-called **RAROC or Risk-Adjusted Return on Capital** models that measure the relative profitability of bank activities. If a particular bank product generates a return to allocated capital that is too low, the bank can seek to cut expenses, reprice the product or focus its efforts on other, more profitable ventures. These profitability analyses, moreover, are conducted on an “apples-to-apples” basis, since the profitability of each business line is adjusted to reflect the riskiness of the business line.

What these bankers have actually done themselves, in calculating these internal capital requirements, is something regulators have never done: defined a bank soundness target. What regulator, for example, has said that he wants capital to be high enough to reduce to 0.1 percent the probability of insolvency? Regulators have said only that capital ratios should be no lower than some number—8 percent in the case of the **Basle [Accord]** standards. But a high capital ratio, if it is accompanied by a highly risky portfolio composition, can result in a bank with a high probability of insolvency. The question should not be how high is the bank’s capital ratio, but how low is its failure probability.

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