



THE INSURATIVE Model

by Prakash Shimpi

Capital management and risk management are two sides of the same coin. Conventional finance theory treats them sep-

arately. Capital management focuses on delivering the optimal balance sheet, composed of equity and debt, that minimizes the cost of capital. It is

PATRICK DOHERTY, STONE





the domain of the CFO. Currently, the term “risk management” refers to the roles of the risk manager and treasurer, working separately in the insurance and capital markets to manage the firm’s operational and financial risks.

Simple intuition tells us that capital and risk are related. With a multitude of forms of capital and rapidly developing risk management techniques, it is natural to treat capital man-

agement and risk management as two distinct topics. This simplification comes at a price: By considering capital structure and insurance strategies in isolation, we fail to account for important connections between them. To capture this interrelationship requires a framework that incorporates both. Additionally, this framework needs to apply equally to techniques that straddle both the insurance and capital markets. ➤



Definitions & Equations:

This article is an excerpt from *Integrating Corporate Risk Management*, by Prakash Shimpi. Definitions and equations from that work are included below for your reference.

The Role of Corporate Capital

$$\begin{aligned} \text{capital required} &= \text{economic capital} + \text{signaling capital} \\ &= \text{operational capital} + \text{risk capital} + \text{signaling capital} \end{aligned}$$

where: **operational capital** is the capital required to finance corporate activities

risk capital is the capital to cover the financial consequences of the risks generated by corporate activities

signaling capital is the capital maintained to reassure stability of a firm

$$\text{capital required} = f \{ \text{firm risk} \}$$

where: **f {risk}** indicates the amount of capital necessary to cover some given "risk"

firm risk is the risk of entire firm's activities

Capital Resources

$$\text{firm capital} = \text{paid-up capital} + \text{off balance-sheet capital}$$

$$\text{firm risk} = \text{retained risk} + \text{transferred risk}$$

where: **firm capital** is the capital resources utilized by a firm

paid-up capital is the equity and various classes of corporate debt, which appear on the firm's balance sheet

off-balance sheet capital is the capital that does not appear on the firm's balance sheet

transferred risk is the subset of firm risk for which losses are borne by another party

retained risk is the subset of firm risk for which losses are borne by the firm

- If firm capital equals capital required, the firm is adequately capitalized.
- If firm capital exceeds capital required, the firm is overcapitalized and is likely not meeting investor expectations.
- If firm capital falls short of capital required, the firm is undercapitalized and taking risks beyond its stated tolerance, exposing itself to insolvency.

The Standard Model:

Focuses on paid-up capital resources of a firm, ignoring explicit description of risk; the presumption is that all paid-up capital stands behind all the retained risk of the firm.

$$\begin{aligned} \text{paid-up capital} &= f \{ \text{retained risk} \} \\ &= \text{capital needed to cover retained risk} \end{aligned}$$

The Insurance Model:

Focuses on risks being transferred, ignoring explicit impact on capital structure of firm; the presumption is that all transferred risk is managed with off-balance sheet capital.

$$\begin{aligned} \text{off-balance sheet capital} &= f \{ \text{transferred risk} \} \\ &= \text{capital needed to cover transferred risk} \end{aligned}$$

The Insurative Model

Conventionally, the standard model of corporate capital deals with debt and equity without an explicit description of a firm's risk. On the other hand, the insurance model focuses on risk without specifying a

firm's corporate finance setting. (See sidebar, above.) Combining the effects of the standard model and the insurance model gives us a simple generalized framework to consider the effects of on- and off-balance sheet capital, accessing both the insurance and capital markets. We call this the insurative model.

In effect, the insurative model

equates all firm capital to the amount necessary to cover all firm risks, both retained and transferred. Using the function $f\{\text{risk}\}$, we have:

$$\begin{aligned} \text{firm capital} &= f\{\text{firm risk}\} \\ &= \text{capital needed to cover firm risk} \end{aligned}$$

Or:

$$\begin{aligned} \text{paid-up capital} + \text{off-balance sheet capital} \\ &= f\{\text{retained risk}\} + f\{\text{transferred risk}\} \end{aligned}$$

This is structurally richer than

Prakash A. Shimpi is managing principal (U.S.) for Swiss Re New Markets.

merely combining the standard model and the insurance model. In the standard model, paid-up capital only refers to retained risk and in the insurance model, off-balance sheet capital only refers to transferred risk. In the insurative model, paid-up capital can be used to cover some of both retained and transferred risks. Likewise, off-balance sheet capital can be used to cover some of both those risks as well. (Figure 1) This framework captures the economics both of conventional insurance and corporate finance instruments, as well as the new integrated products.

What implications does this model have for our picture of corporate capital structure? Figure 2 shows just how rich the diversity of corporate capital resources can be, and how necessary it is to develop this generalized model of corporate capital and risk.

First, we can identify those resources that provide paid-up capital to the firm. If these cover risks that are retained by the firm, then they are the familiar varieties of equity and debt as well as some forms of finite risk reinsurance. If they cover risks that are being transferred away from the firm, then they are the new instruments, such as insurance-linked securities which embed insurance risks in corporate bonds.

Second, we can identify those resources that release the firm from raising paid-up capital immediately. If they cover risks that are being transferred away from the firm, then they are insurance or derivative contracts. If they cover risks that are retained by the firm, then they are the new instruments, such as contingent capital. In addition, we can consider the effect on corporate capital of transferring risks of discontinued businesses off-balance sheet using run-off facilities.

We coined the term “insurative” to refer to any corporate capital resource, be it debt, equity, insurance, derivative, contingent capital or any other. The insurative model embraces all of these instruments and allows us to evaluate their effectiveness in a consistent framework.

The standard model’s exclusive focus on debt and equity ignores the range of capital resources available to

FIGURE 1

Risk Related to Capital in the Insurative Model

If paid-up capital (PC) covers the proportions of p of retained risk (RR) and q of transferred risk (TR), and off-balance-sheet capital (OC) covers the rest, then:

$$PC = p \times f\{RR\} + q \times f\{TR\}$$

$$OC = (1-p) \times f\{RR\} + (1-q) \times f\{TR\}$$

Summing both sides of these equations gives:

$$PC + OC = f\{RR\} + f\{TR\}$$

Or:
$$\text{Firm Capital} = \text{Firm Risk}$$

FIGURE 2

The Insurative Model

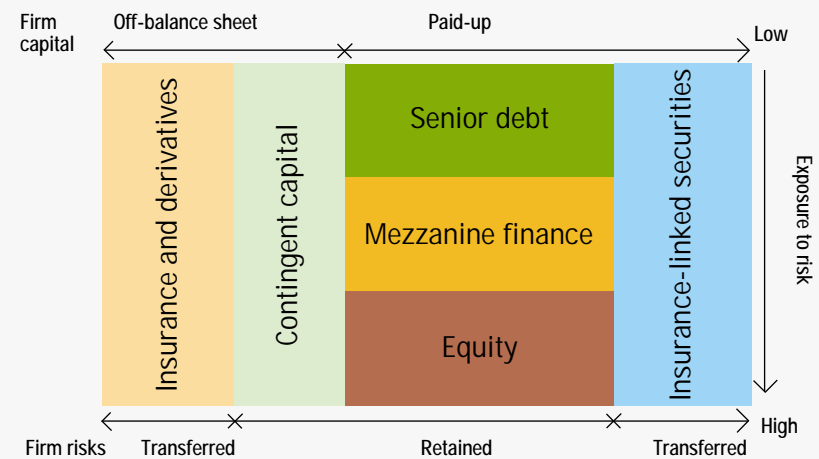


FIGURE 3

Relationships of TACC to WACC

$$TACC = \text{cost of debt} \times \frac{\text{debt value}}{\text{firm value}}$$

$$+ \text{cost of equity} \times \frac{\text{equity value}}{\text{firm value}}$$

$$+ \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}}$$

Adjust the first two terms:

$$TACC = \text{cost of debt} \times \frac{\text{debt value}}{\text{paid-up value}} \times \frac{\text{paid-up value}}{\text{firm value}}$$

$$+ \text{cost of equity} \times \frac{\text{equity value}}{\text{paid-up value}} \times \frac{\text{paid-up value}}{\text{firm value}}$$

$$+ \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}}$$

Combine the first two terms:

$$TACC = WACC \times \frac{\text{paid-up value}}{\text{firm value}}$$

$$+ \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}}$$

a corporation. This can distort the view of a firm's capital cost and its return on equity. In particular, minimizing the weighted-average cost of capital (WACC) under the standard model may not lead to minimizing the total average cost of capital (TACC) of the corporation.

If the mix of insurance, debt and equity remains unchanged, there should be no change in the ROE under the expanded model. The generalized framework then states the return on equity (ROE) equation as:

$$\text{ROE} = \frac{\text{net operating earnings}}{\text{equity capital}}$$

where net operating earnings is the amount available to shareholders after paying all the costs of other paid-up and off-balance sheet capital, and equity capital is a book-value measure.

In this model, TACC considers all sources of capital. The numerator includes the costs of both on- and off-balance sheet capital. The denominator is not just the value of paid-up capital but the total value of the capital resources of the firm, i.e., firm value.

$$\begin{aligned} \text{TACC} = & \text{cost of debt} \quad \times \frac{\text{debt value}}{\text{firm value}} \\ & + \text{cost of equity} \quad \times \frac{\text{equity value}}{\text{firm value}} \\ & + \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}} \end{aligned}$$

The sum of the first two terms is the proportion of TACC due to paid-up capital, and the last term is the proportion of TACC due to off-balance sheet capital. WACC, the cost of paid-up capital, is only one component in the true capital cost of the firm.

If we define **paid-up value** to be the value of paid-up capital, then:

$$\text{paid-up value} = \text{debt value} + \text{equity value}$$

This allows us to restate TACC in the following way:

$$\begin{aligned} \text{TACC} = & \text{WACC} \quad \times \frac{\text{paid-up value}}{\text{firm value}} \\ & + \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}} \end{aligned}$$

The insurative framework is gener-

More Definitions & Equations:

WACC (weighted-average cost of capital)

$$\begin{aligned} \text{WACC} = & \text{cost of debt} \times \frac{\text{debt value}}{\text{debt value} + \text{equity value}} \\ & + \text{cost of equity} \times \frac{\text{equity value}}{\text{debt value} + \text{equity value}} \end{aligned}$$

where:

$$\text{cost of debt} = \frac{\text{expected annual interest payment}}{\text{debt value}}$$

$$\text{cost of equity} = \frac{\text{expected annual net operating earnings}}{\text{equity value}}$$

debt value—market value of debt

equity value—market value of equity

TACC (total average cost of capital)

$$\begin{aligned} \text{TACC} = & \text{cost of debt} \times \frac{\text{debt value}}{\text{firm value}} \\ & + \text{cost of equity} \times \frac{\text{equity value}}{\text{firm value}} \\ & + \text{cost of insurance} \times \frac{\text{insurance value}}{\text{firm value}} \end{aligned}$$

where:

$$\begin{aligned} \text{firm value} = & \text{debt value} + \text{equity value} + \text{insurance value} \\ & = \text{paid-up value} + \text{off-balance sheet value} \end{aligned}$$

$$\begin{aligned} \text{firm capital} = & \text{paid-up capital} + \text{off-balance sheet capital} \\ & = \text{debt capital} + \text{equity capital} + \text{insurance capital} \end{aligned}$$

$$\text{cost of insurance} = \frac{\text{expected annual insurance premium}}{\text{insurance value}}$$

insurance value—current amount of capital relief insurance provides

al enough to consider risk management techniques that combine facets of all these elements (debt, equity and insurance).

This framework shows us that a firm's decisions on insurance and risk retention can be just as important as its decisions on its debt-equity mix. The determination of a firm's optimal debt-equity mix is only the last in a series of capital structure decisions that its management must make. As we show in Figure 4, the preceding steps include decisions on risk retention, risk transfer, and the amounts and structure of paid-up and off-balance sheet capital.

Financial statements of corporations do not adequately disclose all off-balance sheet facilities. In particu-

lar, insurance protection is not clearly described. Financial managers do try to give an accurate account of their capital costs and return potential. However, being familiar with the standard model, they focus on ROE and WACC. The insurative model shows that this does not give the true picture: no distinction is made between companies that are well-insured (or hedged) and those that are not.

The insurative model allows us to compare the impact of derivatives strategies, multi-line insurance covers, contingent capital facilities, finite risk reinsurance, insurance-linked securitization, asset-backed securitization, and various forms of debt and equity in one consistent framework. The prerequisites for making such

comparisons appropriately are by no means trivial; they require a thorough understanding of the firm's risks, their interactions and their impact on financial performance. On top of this, the structural features of the insuratives must be modeled and their impact on the firm assessed. Then, the firm must determine the decision criteria for selecting a particular capital structure, and put the appropriate capital resources in place. For now, we turn our attention to how the interaction between risk and capital management is changing the function of corporate risk management.

The Changing Function of Risk Management

This analytical framework was developed to help describe some of the changes that are already taking place in corporate risk management.

The risk manager and treasurer are entrusted with managing operational and financial risks within the framework of a given capital structure, the composition of which is the responsibility of the chief financial officer (CFO). Besides avoiding or reducing risk, the risk manager has traditionally had recourse to the insurance markets to transfer risk to third parties, and the treasurer has had recourse to the capital markets to transfer risk and (separately) to obtain financing. The CFO has viewed the capital markets as the primary vehicle for maintaining or transforming capital structure.

As capital and insurance markets converge, progressive organizations have started developing risk management tools that incorporate features of both. For example, one of the new integrated risk management products provides a single block of insurance capacity that protects against a broad set of risks, both those that are traditionally insured and those that are hedged in the capital markets. It may be inefficient to purchase insurance and financial loss protection separately, because the corporation may be overprotected on the financial side and underprotected on the insurance side, or vice versa. By purchasing an integrated cover that protects both insurance and financial exposures, the

FIGURE 4

Steps in Determining a Firm's Debt-Equity Mix

1. Identify the firm's risks.
2. Calculate the capital required to cover those risks.
3. Determine the risks to transfer and to retain.
4. Determine the amount of paid-up capital and off-balance sheet capital needed.
5. Structure the off-balance sheet capital.
6. Structure the paid-up capital, which includes the decision on debt-equity mix.


corporation is assured that capacity will be available no matter what the source of the loss is. And, of course, no matter what the source of the loss is, the ultimate effect on the bottom line is the same.

Another consequence of the convergence of insurance and capital markets is the development of tools that combine risk transfer and financing. For example, finite risk reinsurance products combine financing and risk transfer in a way that allows corporations to achieve in a single transaction the benefits of both insurance and debt financing.

The revolution in risk management techniques has implications for the CFO as well. Any policy regarding capital structure configuration is predicated on an assessment of the risks confronting the corporation. As we saw in the insurative model, a company's risk profile may change as a result of the implementation of new risk management instruments, with a consequent change in the corporate capital needs. Instead of simply optimizing the balance of debt and equity, the CFO now has at least three instruments to use: debt, equity and insurance.

In addition, there are techniques that directly address the capital structure issue. Given that equity capital is an expensive source of long-term financing, and that the risk profile of a firm determines its required amount of equity capital, substitutes for paid-up equity capital have the potential to offer significant economies. Contingent capital products, for example, promise to infuse the company with

capital precisely when it is needed—in the event of a catastrophic loss. These products eliminate the need to hold expensive on-balance sheet equity capital for those rare events that may inflict severe financial harm on a corporation. An off-balance sheet contingent capital facility (almost insurance, but not quite) can be cost effective.

These examples show that the CFO, treasurer and risk manager need to recognize that integrating corporate risk management can take place at several levels. At its most basic, the integration can occur within the separate worlds of the treasurer and the risk manager. At the next level, integration can occur across the two markets. A further level of integration takes place with the inclusion of the CFO's domain of corporate capital structure. Finally, all these forces can lead to fundamental structural changes in the markets for risk capital. 

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Is the insurative model a feasible application for your company?

Read the full Shimpi chapter in *Risk Write-Up* and find out what others are saying in the *Reader Forum* at rmmag.com.