

Fundamentals of Financial Management

Fifth Edition

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Costs of Capital for Projects of Differing Riskiness. As noted in Chapter 11, care must be taken to assign different risk-adjusted discount rates to capital budgeting projects of differing degrees of riskiness.

Capital Structure Weights. In this chapter we have simply taken as given the target capital structure and used this target to obtain the weights used to calculate k . As we shall see in Chapter 17, establishing the target capital structure is a major task in itself.

Dynamic Considerations. Capital budgeting and cost of capital estimates are a part of the *planning process* — they deal with ex ante, or estimated, data rather than ex post, or historical data. Hence, we can be wrong about the location of the IOS and the MCC. For example, we can underestimate the MCC and hence accept projects that, with 20-20 hindsight, we should have rejected. In a dynamic, changing world this is a real problem. Interest rates and money costs could be low at the time plans are being laid and contracts to build plants are being let, but six or eight months later these capital costs could have risen substantially. Thus, a project that formerly looked good could turn out to be a bad one because we improperly forecasted the MCC schedule.

Although this listing of problem areas may appear formidable, the state of the art in cost of capital estimation is really not in bad shape. The procedures outlined in this chapter can be used to obtain cost of capital estimates that are sufficiently accurate for practical purposes, and the problems listed here merely indicate the desirability of certain refinements. The refinements are not unimportant, but the problems we have identified do not invalidate the usefulness of the procedures outlined in the chapter.

**Small
Business**

COST OF EQUITY CAPITAL FOR SMALL FIRMS

The three equity cost estimating techniques that were discussed in this chapter have serious limitations when applied to small firms, thus increasing the need for the small-business manager to use judgment. Consider first the constant growth model, $k_e = D_1/P_0 + g$. Imagine a small, rapidly growing firm, such as Bio-Technology General (BTG), which does not now and will not in the foreseeable future pay dividends. For firms like this, the constant growth model is simply not applicable. In fact, it is difficult to imagine any dividend model that would

be of practical benefit for such a firm because of the difficulty of estimating growth rates.

The method which calls for adding a risk premium of about 3 percent to the firm's cost of debt can be used for some small firms, but problems arise if the firm does not have a fixed rate issue outstanding. BTG, for example, has no such debt issue outstanding, so we could not use the bond-yield-plus-risk-premium approach for BTG.

The third approach, the CAPM, is also often unusable because if the firm's stock is not publicly

traded, then we cannot calculate the firm's beta. For the privately owned firm, we might use the so-called "pure play" CAPM technique. This involves finding a firm in the same line of business that does have public equity, estimating its beta, and then using this beta as a proxy for that of the small business in question.

To illustrate the pure play approach, again consider BTG. The firm is not publicly traded, so we cannot estimate its beta. However, data are available on more established firms, such as Genentech and Genetic Industries, so we could use their betas as representative of the biological and genetic engineering industry. Of course, these firms' betas would have to be subjectively modified to reflect their larger sizes and more established positions, as well as to take account of the differences in the nature of their products and their capital structures as compared to those of BTG. Still, as long as there are public companies in similar lines of business available for comparison, the estimates of their betas can be used to help estimate the cost of capital of a firm whose equity is not publicly traded. Note that a "liquidity premium" as discussed in Chapter 3 would also have to be added to reflect the illiquidity of the small, nonpublic firm's stock.

Flotation Costs for Small Issues

When external equity capital is raised, flotation costs increase the cost of equity capital beyond what it would be for internal funds. These external flotation costs are especially significant for smaller firms, and they can substantially affect capital budgeting decisions involving external equity funds. To illustrate this point, consider a firm that is expected to pay constant dividends forever, and hence whose growth rate is zero. In this case, if F is the percentage flotation cost, then the cost of equity capital is $k_e = D_1/[P_0(1 - F)]$. The higher the flotation cost, the higher the cost of external equity.

How big is F ? According to the latest Securities and Exchange Commission data, the average flotation cost of large common stock offerings (more than \$50 million) is only about 4 percent. For a firm that is expected to provide a 15 percent dividend yield (that is, $D_1/P_0 = 15\%$), the cost of equity is $15\%/(1 - 0.04)$, or 15.6 percent. However, the

SEC's data on small stock offerings (less than \$1 million) show that flotation costs for such issues average about 21 percent. Thus, the cost of equity capital in the preceding example would be $15\%/(1 - 0.21)$, or about 19 percent. When we compare this to the 15.6 percent for large offerings, it is clear that a small firm would have to earn considerably more on the same project than a large firm. Small firms are therefore at a substantial disadvantage because of the effects of flotation costs.

The Small-Firm Effect

A number of researchers have observed that portfolios of small-firm stocks have earned consistently higher average returns than those of large-firm stocks; this is called the "small-firm effect." On the surface, it would seem to be advantageous to the small firm to provide average returns in the stock market that are higher than those of large firms. In reality, it is bad news for the small firm; what the small-firm effect means is that the capital market demands higher returns on stocks of small firms than on otherwise similar stocks of large firms. Therefore, the cost of equity capital is higher for small firms. This compounds the high flotation cost problem noted above.

It may be argued that stocks of small firms are riskier than those of large ones and that this accounts for the differences in returns. It is true that academic research usually finds that betas are higher on average for small firms than for large ones. However, the larger returns for small firms remain larger even after adjusting for the effects of their higher risks as reflected in their beta coefficients.

The small-firm effect is an anomaly in the sense that it is not consistent with the CAPM theory. Still, higher returns reflect a higher cost of capital, so we must conclude that smaller firms do have higher capital costs than otherwise similar larger firms. The manager of a small firm should take this factor into account when estimating his or her firm's cost of equity capital. In general, the cost of equity capital appears to be about four percentage points higher for small firms (those with market values of less than \$20 million) than for large, New York Stock Exchange firms with similar risk characteristics.

business risk, taxes, and financial flexibility, along with other factors, combine to determine the firm's optimal capital structure.

BUSINESS AND FINANCIAL RISK

In Chapter 4, when we examined risk from the viewpoint of the individual investor, we distinguished between *market risk*, which is measured by the firm's beta coefficient, and *total risk*, which includes both beta risk and an element of risk which can be eliminated by diversification. Then, in Chapter 11, we examined risk from the viewpoint of the corporation, and we considered how capital budgeting decisions affect the riskiness of the firm. There again we distinguished between beta risk (the effect of a project on the firm's beta) and corporate risk (the effect of the project on the firm's total risk).

Now we introduce two new dimensions of risk: (1) *business risk*, which is the riskiness of the firm's operations if it uses no debt, and (2) *financial risk*, which is the additional risk placed on the common stockholders as a result of the firm's decision to use debt. Conceptually, the firm has a certain amount of risk inherent in its operations; this is its business risk. When it uses debt, it partitions this risk and concentrates most of it on one class of investors — the common stockholders. However, the common stockholders must be compensated for this extra risk by a higher expected return.¹

Business Risk

business risk
The risk associated with projections of a firm's future operating income.

Business risk, which is defined as the uncertainty inherent in projections of future *operating income*, or *earnings before interest and taxes (EBIT)*, is the single most important determinant of a firm's capital structure. Figure 17-1 gives some clues about Porter Electronics Company's business risk. The top graph shows the trend in EBIT over the past 11 years; this gives both security analysts and Porter's management an idea of the degree to which EBIT has varied in the past and might vary in the future. The bottom graph shows a subjectively estimated probability distribution of Porter's EBIT for 1988. The estimate was made at the beginning of 1988, and the expected value of \$275 million was read from the trend line in the top section of the figure. As the graphs indicate, actual EBIT in 1988 fell below the expected value.

Porter's past fluctuations in EBIT were caused by many factors — booms and recessions in the national economy, successful new products introduced both by Porter and by its competitors, labor strikes, a fire in Porter's major plant, and so on. Similar events will doubtless occur in the future, and when they do, EBIT will rise or fall. Further, there is always the possibility that a

¹Using preferred stock also adds to financial risk. To simplify matters somewhat, in this chapter we shall consider only debt and common equity. Also, if a firm uses an especially large amount of debt in an LBO, as RJR Nabisco will apparently do, then its debt will be classified as "junk bonds," and the bondholders will also be exposed to financial risk. Some junk bonds practically amount to equity.