THE COST OF CAPITAL

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- Capital is a necessary factor of production, and like any other factor, it has a cost. This cost is equal to the marginal investor's required return on the security in question. With this in mind, we now consider the process of estimating the cost of capital.
- The firm's primary objective is to maximize shareholder value, and companies can increase shareholder value by investing in projects that earn more than the cost of capital. For this reason, the cost of capital is sometimes referred to as a hurdle rate: For a project to be accepted, it must earn more than its hurdle rate.

BASIC DEFINITIONS

- The items on the right side of a firm's balance sheet—various types of debt, preferred stock, and common equity—are called capital components.
- Any increase in total assets must be financed by an increase in one or more of these capital components.
- The cost of each component is called the component cost of that particular type of capital.
- Throughout this lecture, we concentrate on these three major capital components: debt, preferred stock, and common equity.

COST OF DEBT, K $_{D}$ (1-T)

The after-tax cost of debt, kd (1-T), is used to calculate the weighted average cost of capital, and it is the interest rate on debt, kd, less the tax savings that result because interest is deductible. This is the same as kd multiplied by (1-T), where T is the firm's marginal tax rate:

After-tax component cost of debt = Interest rate - Tax savings

$$= k_{d} - k_{d}T$$

= $k_{d}(1 - T)$. (10-1)

COST OF PREFERRED STOCK, Kp

 The rate of return investors require on the firm's preferred stock. kp is calculated as the preferred dividend, D_p, divided by the current price, P_p.

Component cost of preferred stock = $k_p = \frac{D_p}{P_p}$. (10-2)

 For example, Allied has preferred stock that pays a \$10 dividend per share and sells for \$97.50 per share in the open market. Therefore, Allied's cost of preferred stock is 10.3 percent: k_p = \$10/\$97.50 = 10.3%.

COST OF RETAINED EARNINGS, K_s

- the rate of return required by stockholders on a firm's common stock.
- The cost of common equity is based on the rate of return investors require on a company's common stock.
- Note, though, that new common equity is raised in two ways: (1) by retaining some of the current year's earnings and (2) by issuing new common stock.

As we shall see, equity raised by issuing stock has a somewhat higher cost than equity raised as retained earnings due to the flotation costs involved with new stock issues.

We use the symbol k_s to designate the **cost of retained** earnings and ke to designate the cost of common equity raised by issuing new stock, or external equity. If a stock is in equilibrium, then its required rate of return, k_s , must be equal to its expected rate of return, k_s . Further, its *required* return is equal to a risk-free rate, k_{RF} , plus a risk premium, RP, whereas the *expected* return on a constant growth stock is the stock's dividend yield, D_1/P_0 , plus its expected growth rate, g:

Required rate of return = Expected rate of return

 $\mathbf{k}_{\mathrm{s}} = \mathbf{k}_{\mathrm{RF}} + \mathrm{RP} \qquad = \qquad \mathbf{D}_{\mathrm{1}}/\mathbf{P}_{\mathrm{0}} + \mathbf{g} = \hat{\mathbf{k}}_{\mathrm{s}}.$

 P_0 = actual market price of the stock today D_t = dividend the stockholder *expects to receive at the end* of Year t. D_0 is the most recent dividend, which has already been paid; D_1 is the first dividend expected, and it will be paid at the end of this year; D_2 is the dividend expected at the end of two years; and so forth. D_1 represents the first cash flow a new purchaser of the stock will receive.

 D_1/P_0 = expected **dividend yield on the stock during the** coming year. If the stock is expected to pay a dividend of D_1 = \$1 during the next 12 months, and if its current price is P_0 = \$10, then the expected dividend yield is \$1/\$10 = 0.10 = 10%. g = expected **growth rate in dividends as predicted by a** marginal investor. If dividends are expected to grow at a constant rate, g is also equal to the expected rate of growth in earnings and in the stock's price. Different investors may use different g's to evaluate a firm's stock, but the market price, P0, is set on the basis of the g estimated by marginal investors.

 k_s = minimum acceptable, or **required, rate of return on** the stock, considering both its riskiness and the returns available on other investments. Again, this term generally relates to marginal investors.

 k_s^* = expected rate of return that an investor who buys the stock expects to receive in the future. k_s^* (pronounced "k hat s") could be above or below ks, but one would buy the stock only if k^{*} s were equal to or greater than k_s

ESTIMATED K_s by three methods

- The cost of common equity can be estimated by three methods:
- (1) the CAPM approach,
- (2) the bond-yield-plus-risk-premium approach, and
- (3) the dividend-yield-plus-growth-rate, or DCF, approach.

- To use the CAPM approach, one (1) estimates the firm's beta, (2) multiplies this beta by the market risk premium to determine the firm's risk premium, and (3) adds the firm's risk premium to the risk-free rate to obtain the firm's cost of common equity: k_s= k_{RF}+ (k_M - k_{RF})*b_i.
- The bond-yield-plus-risk-premium approach calls for adding a risk premium of from 3 to 5 percentage points to the firm's interest rate on long-term debt: k_s= Bond yield + RP.
- To use the dividend-yield-plus-growth-rate approach, which is also called the discounted cash flow (DCF) approach, one adds the firm's expected growth rate to its expected dividend yield: k_s= D₁/P₀ + g.

WEIGHTED AVERAGE, COST OF CAPITAL, WACC

- A weighted average of the component costs of debt, preferred stock, and common equity.
- A value-maximizing firm will determine its optimal capital structure, use it as a target, and then raise new capital in a manner designed to keep the actual capital structure on target over time.

WACC =
$$w_d k_d (1 - T) + w_p k_p + w_c k_s$$

 Here w_d, w_p, and w_c are the weights used for debt, preferred, and common equity, respectively.

FACTORS THAT A F F E C T THE COMPOSITE COST OF CAPITAL

- The cost of capital is affected by a number of factors. Some are beyond a firm's control, but others are influenced by its financing and investment decisions.
- The two most important factors that are beyond a firm's direct control are the level of interest rates and tax rates.
- *T h e L evel of I n t e re s t R a t e s -* If interest rates in the economy rise, the cost of debt increases because firms will have to pay bondholders more to obtain debt capital.

 Also, recall from our discussion of the CAPM that higher interest rates increase the costs of common and preferred equity capital.

Tax rates are used in the calculation of the component cost of debt. In addition, there are other less apparent ways in which tax policy affects the cost of capital.

For example, lowering the capital gains tax rate relative to the rate on ordinary income makes stocks more attractive, and that reduces the cost of equity.

FACTORS THE FIRM CAN CONTROL

CapitalStructurePolicy DividendPolicy InvestmentPolicy

SOME PROBLEM AREAS IN COST OF CAPITAL

- Depreciation-generated funds. The largest single source of capital for many firms is depreciation, yet we have not discussed the cost of funds from this source.
- Privately owned firms. Our discussion of the cost of equity was related to publicly owned corporations, and we have concentrated on the rate of return required by public stockholders. However, there is a serious question about how one should measure the cost of equity for a firm whose stock is not traded.

- Small businesses. Small businesses are generally privately owned, making it difficult to estimate their cost of equity. The Small Business box, entitled "The Cost of Equity Capital for Small Firms," discusses this issue.
- Measurement problems. One cannot overemphasize the practical difficulties encountered when estimating the cost of equity. It is very difficult to obtain good input data for the CAPM, for g in the formula $k_s = D_1/P_0 + g$, and for the risk premium in the formula $k_s = Bond$ yield + Risk premium. As a result, we can never be sure just how accurate our estimated cost of capital is.

- Costs of capital for projects of differing riskiness. It is difficult to measure projects' risks, hence to assign 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 have used it to calculate the cost of capital.

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- The following symbols identify the cost of each:
- k_d = interest rate on the firm's new debt = before-tax component cost of debt. For Allied, k_d = 10%.
- k_d(1-T) = after-tax component cost of debt, where T is the firm's marginal tax rate. k_d(1-T) is the debt cost used to calculate the weighted average cost of capital. For Allied, T = 40%, so k_d(1-T) = 10%(1-0.4) = 10%(0.6) = 6.0%.
- k_p = component cost of preferred stock. For Allied, k_p =10.3%.

 k_s = component cost of common equity. It is defined as the rate of return investors require on a firm's common stock. Equity capital is raised in two ways: (1) by retaining earnings (internal equity) or (2) by issuing new common stock (external equity).

It is generally difficult to estimate ks, but, as we shall see shortly, a reasonably good estimate for Allied is $k_s = 13.4\%$.

WACC = the weighted average cost of capital. If Allied raises new capital to finance asset expansion, and if it is to keep its capital structure in balance (that is, if it is to keep the same percentage of debt, preferred stock, and common equity funds), then it must raise part of its new funds as debt, part as preferred stock, and part as common equity (with equity coming either from retained earnings or by issuing new common stock).

LITERATURE:

 SCHWAB, CH., LYNCH, M.: Fundamentals of financial management, Brigham&Houston, tenth editional, 2003, p.787

THANKS FOR ATTENTION