
CHAPTER 5: THE COST OF CAPITAL

The Meaning & Nature of the Cost of capital

In operational terms, cost of capital refers to the discount rate that is used in determining the present value of the estimated future cash flows (proceeds) and eventually deciding whether the project is worth undertaking or not. In this sense, it is defined as the minimum rate of return that a firm must earn on its investment for the market value of the firm to remain unchanged. The second definition considers the cost of capital as a break even rate.

The cost of capital is the minimum rate of return that a firm must earn in order to satisfy the overall rate of return required by its investors.

If a firm's actual rate of return exceeds its cost of capital, the value of the firm would increase. If on the other hand, the cost of capital is not earned, the firm's market value will decrease. So the cost of capital is the rate of return that is just sufficient to leave the price of the firm's common stock unchanged.

The cost of capital serves as a discount rate when a firm evaluates an investment proposal. Suppose a firm is considering investment on a plant. The finance required for this investment is to be raised by selling a common stock issue. Now, after raising capital, the firm is expected to provide required rate of return to those who invest on the common stock. This in effect is the firm's cost of capital. So to decide to invest on the plant, the minimum rate of return from the investment at least should be equal to the required rate of return by the common stockholders. If the required rate of return by the firm's common stockholders is 13%, then the firm should earn a minimum of 13% on its investment on the plant. The 13% minimum rate of return that should be earned by the firm is, therefore, its cost of capital.

Assumptions underlying the Cost of capital (K_c)

The theory of cost of capital is based on certain assumptions. A basic assumption of traditional cost of capital analysis is that the firm's business and financial risks are unaffected by the acceptance and financing of projects. Business risk measures the variability in operating profits [Earnings before interest and tax (EBIT)] due to change in sales. In other words, Business risk is the risk to the firm of being unable to cover fixed operating costs. If a firm accepts a project considerably more risky than the average, the suppliers of the funds are quite likely to increase the cost of funds as there is an increased probability of committing default on the part of the firm

in making payments of their money. However, in analyzing the cost of capital in this unit, we assume that there would be no change whatsoever in the business risk complexion of the firm as a result of acceptance of new investment proposals.

The capital budgeting decisions determine the business risk complexion of the firm where as the financing decision determines its Financial risk. **Financial risk is the risk of being unable to cover required financial obligations such as interest and preference dividends.** In general, the greater the proportion of long-term debt in the capital structure of the firm, the greater is the financial risk because there is a need for a larger amount of periodic interest payments and principal repayments at the time of maturity. In such situation, obviously, the firm requires higher operating profits to cover these charges. If it fails to earn adequate operating profits to cover such financial charges, it may be forced into cash insolvency and bankruptcy. Thus with the increase in the proportion of debt commitments and preference shares in its capital structure, fixed charges and the probability that the firm will be unable to meet these fixed charge will increase, which in turn, increases the financial risk and cost of capital. However, in the analysis of cost of capital in this unit, the firm's financial structure is assumed to remain fixed.

The first step in the measurement of the cost of capital of the firm is the computation of the cost of individual sources of raising funds. Apart from its relevance to the measurement of the combined cost, the specific cost will also indicate the relative cost of pursuing one line of financing rather than another. From the viewpoint of capital budgeting decisions, the long-term sources of funds are relevant as they constitute the major sources of financing of fixed assets. In calculating the cost of capital, therefore, the focus is on long-term funds.

The cost of capital for any particular capital source or security issue is called the specific cost of capital. It is also called individual cost of capital or component cost of capital. In other words, the specific costs of capital have to be calculated for the following individual long-term capital sources:

1. Debt
2. Preferred stock
3. Common stock
4. Retained earnings

There are **two important points** you should bear in mind about the specific cost of capital: the first one is that, it is **computed on an after-tax basis**. Meaning, if there would be any tax implication on the individual source of capital, it should be considered. In almost all circumstances, the tax implication is only on debt sources of finance. The second point is that the specific cost of capital is **expressed as an annual percentage** or rate like 6%, 9%, or 10%. The cost of capital is not stated in terms of birrs, dollar or other forms of currency.

1. The cost of debt

This is the minimum rate of return required by suppliers of debt. The relevant specific cost of debt is the after-tax cost of new debt. Generally, debt is the cheapest source of finance to a firm and, hence, the cost of debt is the lowest specific cost of capital. There are two basic explanations for this. First, debt suppliers, generally, assume the lowest risk among all suppliers of capital. They receive interest payments before preferred and common dividends are paid. Since they assume the smallest risk, their return is the lowest. Their lowest return would be the lowest cost of capital to the firm. Second, raising capital through debt sources entails interest expense. The interest expense in turn reduces the firm's income which ultimately would cause tax payment to be reduced. So raising money in the form of debt results in the smallest tax burden, and finally, the firm's cost of debt would be the lowest.

Debt sources of finance may take several forms like bonds, debentures, promissory notes, bank loans. Here, for our convenience we consider bond issue to illustrate the cost of debt.

Computing the cost of new bond issue involves two steps:

- i) Determine the net proceeds from the sale of each bond

$$NPd = Pd - f$$

Where:

NPd = the net proceeds from the sale of each bond

Pd = the market price of the bond

f = Flotation costs

- ii. Compute the effective before tax cost of the bond using the following approximation formula:

$$Kd = \frac{I + \frac{(Pn - NPd)}{n}}{\frac{(Pn + NPd)}{2}}$$

2. The cost of preferred stock (Kps)

The computation of the cost of preferred stock is conceptually difficult as compared to the cost of debt. In the case of debt, as shown above, the interest rate is the basis of calculating cost, as payment of a specific amount of interest is legal commitment on the part of the firm. There is no such obligation in regard to preference dividend. It is true that a fixed dividend rate is stipulated on preference shares. It is also true that holders of such shares have a preferential right as regards payment of dividend as well as return of principal, as compared to the ordinary shareholders. But, unlike debt, there is no risk of legal bankruptcy if the firm does not pay the dividends due to the holders of such shares. Nevertheless, firms can be expected to pay the stipulated dividend, if

there are sufficient profits, for a number of reasons. First, the preference shareholders, as already observed, carry a prior right to receive dividends over the equity shareholders. Unless, therefore, the firm pays out the dividend to its preference shareholders, it will not be able to pay anything to its ordinary shareholders. Moreover, the preference shares are usually cumulative which means that preference dividend will get accumulated till it is paid. As long as it remains in arrears, nothing can be paid to the equity holders. Therefore, the stipulated dividend on preference shares, like the interest rate on debt, constitutes the basis for the calculation of the cost of preference shares.

The cost of preferred stock is the minimum rate of return a firm must earn in order to satisfy the required rate of return of the firm's preferred stock investors. It is also the minimum rate of return a firm's preferred stock investors require if they are to purchase the firm's preferred stock. When a firm raises capital by issuing new preferred stock, it is expected to pay fixed amount of dividends to the preferred stockholders. So it is the dividend payment that is the cost of the preferred stock to the firm stated as an annual rate.

The market price of a share of preferred stock (P_p) equals the present value of an infinite stream of annual dividend payments (D_p) discounted at rate of K_p (where, K_p is the cost of preferred stock). The component cost of preferred stock used to calculate the weighted average cost of capital, k_p , is the preferred dividend, D_p , dividend by the current price of the preferred stock, P_p :

$$P_p = \frac{D_p}{(1 + K_p)^1} + \frac{D_p}{(1 + K_p)^2} + \dots + \frac{D_p}{(1 + K_p)^\infty}$$

Since the above equation represents perpetual annuity, it can be simplified as follows

Which you can solve for K_p (compute cost of preferred stock using the formula: $K_p = \frac{D_p}{P_p}$)

As we can see from the above equation, calculating the cost of preferred stock is generally quite simple. This is particularly true when we consider the traditional form of preferred stock that pays a fixed dividend in perpetuity. Some preferred stock has a fixed maturity date. These expected returns would also represent the cost of preferred stock for these fixed-maturity issues. In some other instances, preferred stock may include an option to convert to common stock. In these cases, calculating the cost of preferred stock becomes considerably more complicated. We will leave these more complicated cases for advanced classes and restrict ourselves to preferred issues.

No tax adjustments are made when calculating k_p , because preferred dividends, unlike interest on debt, are not deductible. Therefore, there is no tax savings associated with the use of preferred stock. More procedurally, the cost of a new preferred stock issue can be computed using the following two steps:

- i) Determine the net proceeds from the sale of each preferred stock.

$$NPps = MPPs - f \quad \text{Where:}$$

$NPps$ = Net proceeds from the sale of each preferred stock

$MPPs$ = Market price of the preferred stock

f = Flotation costs

- ii) Compute the cost of preferred stock issue using the following formula

$$Kps = Dps / NPps \quad \text{Where:}$$

Kps = the cost of preferred stock

Dps = the pre share annual dividend on the preferred stock

3. The cost of common stock (Cost of Equity capital)

The cost of common stock is by far, conceptually speaking, the most difficult and controversial cost to measure. It has been shown in the preceding discussions that the coupon rate of interest which forms the basis of calculations of cost of debt can be estimated with a high degree of accuracy since interest payments as well as the return of the principal are contractual obligations. The return on preference shares, although not a contractual obligations, can also be estimated fairly accurately as they are fixed in terms of the stipulations governing the issue of such shares. In contrast, the return to the common stockholders solely depends upon the discretion of the company's management. Apart from the absence of any definite commitment to receive dividends, the equity shareholders rank at the bottom as claimants on the assets of the company at the time of its liquidation. Generally, the equity shares involve the highest degree of financial risk since they are entitled to receive dividend and return of principal after all other obligations of the firm are met. As compensation to the higher risk exposure, holders of such securities expect a higher return and, therefore, higher cost is associated with them.

The cost of common stock is the minimum rate of return that a firm must earn for its common stockholders in order to maintain the value of the firm remain unchanged. As explained earlier, a firm does not make explicit commitment to pay dividends to common stockholders. However,

when common stockholders invest their money in a corporation, they expect returns in the form of dividends. Therefore, common stocks implicitly involve a return in terms of the dividends expected by investors and hence, they carry cost.

To sum up, common stock dividends are paid after interest and preferred dividends are paid. As a result, common stock investors assume the maximum risk in corporate investment. They compensate the maximum risk by requiring the highest return. This highest return expected by common stockholders make common stock the most expensive source of capital.

There are two possible approaches that can be employed to calculate the cost of equity capital or cost of common stock:

- Dividend valuation model
- Capital assets pricing model (CAPM)

Dividend valuation model

According to this approach, the cost of equity capital is calculated on the basis of a required rate of return in terms of the future dividends to be paid on the shares. The cost of equity capital (K_s) is, accordingly, defined as the discount rate that equates the present value of all expected future dividends per share with the net proceeds of the sale (or the current market price) of a share. This method assumes that the value of a share equals the present value of all future dividends that it is expected to provide over an indefinite period.

The cost of common stock can be computed using the constant growth valuation model.

$$K_s = (D_1 + g) / NP_o$$

Where:

K_s = The cost of new common stock issue

D_1 = Expected dividend payment at the end of next year

NP_o = Net proceeds from the sale of each common stock

g = The expected annual dividends growth rate

The net proceeds from the sale of each common stock (NP_o) is computed as follows:

$$NP_o = P_o - f$$

Where:

P_o = The current market price of the common stock

f = flotation costs

It is used when a firm's earning is relatively stable. The formula to be used will be

$$K_s = \text{Earnings ratio} / N_{po}$$

The Capital Asset Pricing Method (CAPM Approach)

The CAPM explains the behavior of security investment on their overall portfolio risk and return. In other words, it formally describes the risk-return trade-off for securities. It is based on certain assumptions. The basic assumptions of CAPM are related to (a) the efficiency of the security markets and (b) investors preference.

The efficient market assumption implies that (i) all investors have common (homogeneous) expectations regarding the expected returns, variances and correlations of returns among all securities; (ii) all investors have the same information about securities; (iii) there are no restrictions on investments; (iv) there are no taxes; (v) there are no transaction costs; and (vi) no single investor can affect market price significantly.

The implications of investors' preference assumption is that all investors prefer the security that provides the highest return for a given level of risk or the lowest amount of risk for a given level of return, that is, the investors are risk averse.

With reference to the cost of capital perspective, the CAPM describes the relationships between the required rate of return, or the cost of equity capital, and the non-diversifiable risk of the firm as measured by beta coefficient, b_i .

$$k_s = k_{RF} + (k_M - k_{RF})b_i$$

4. The cost of Retained Earnings

Retained earnings represent profits available for common stockholders that the corporation chooses to reinvest in itself rather than payout as dividends. Retained earnings are not securities like stocks and bonds and hence do not have market price that can be used to compute costs of capital.

The cost of retained earnings is the rate of return a corporation's common stockholders expect the corporation to earn on their reinvested earnings, at least equal to the rate earned on the outstanding common stock. Therefore, the specific cost of capital of retained earnings is equated with the specific cost of common stock. However, flotation costs are not involved in the case of retained earnings.

Computing the cost of retained earnings involves just a single procedure of applying the following formula:

$$K_r = (D_1 + g)/P_0 \quad \text{Where:}$$

K_r = The cost of retained earnings

D_1 = The expected dividends payment at the end of next year

P_0 = The current market price of the firm's common stock

g = The expected annual dividend growth rate.

Weighted Average Cost of Capital

Generally, the firm's capital structure may be composed of debt, preferred stock, common stock, and retained earnings. Each capital source accounts to some portion of the total finance. But the percentage contribution of one source is usually different from another. So we must compute the weighted average cost of capital rather than the simple average.

The weighted average cost of capital (WACC) is the weighted average of the individual costs of debt, preferred stock and common equity (common stock and retained earnings). It is also called the composite cost of capital.

If the weights of the component capital sources are all given, the weighted average cost of capital can be computed as:

$$\text{WACC} = W_d K_{dt} + W_{ps} K_{ps} + W_{ce} K_s$$

Where:

WACC = the weighted average cost of capital

W_d = The weight of debt

W_{ps} = the weight of preferred stock

W_{ce} = the weight of common equity

K_{dt} = the after – tax cost of debt

K_{ps} = the cost of preferred stock

K_s = the cost of common equity

The WACC is found by weighting the cost of each specific type of capital by its proportion in the firm's capital structure. Weights of the individual capital sources can be calculated based on their book value or market value.

Factors That Affect the WACC

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.

a. Those factors that the Firm Cannot Control

The two most important factors that are beyond a firm's direct control are the level of interest rates and tax rates.

i. The Level of Interest Rates

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. The decrease in inflation, and consequently, interest reduces the cost of capital for all firms, encouraging additional investment.

ii. Tax Rates

Tax rates, which are largely beyond the control of an individual firm (although firms can and do lobby for more favorable tax treatment), have an important effect on the cost of 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.

b. Those factors that the Firm Can Control

A firm can directly affect its cost of capital through its capital structure policy, its dividend policy, and its investment (capital budgeting) policy.

i. Capital Structure Policy

Until now we have assumed that a firm has a given target capital structure, and we used weights based on that target structure to calculate the WACC. However, a firm can change its capital structure, and such a change can affect its cost of capital.

The after-tax cost of debt is lower than the cost of equity. Specifically, if the firm decides to use more debt and less common equity, this change in the weights in the WACC equation will tend to lower the WACC. However, an increase in the use of debt will increase the riskiness of both

the debt and the equity, and these increases in component costs will tend to offset the effects of the change in the weights. The firm's optimal capital structure minimizes its cost of capital.

ii. Dividend Policy

As we indicated earlier, firms can obtain new equity either through retained earnings or by issuing new common stock, but because of flotation costs, new common stock is more expensive than retained earnings. For this reason, firms issue new common stock only after they have invested all of their retained earnings. Since retained earnings is income that has not been paid out as dividends, it follows that dividend policy can affect the cost of capital because it affects the level of retained earnings. Firms take cost of capital effects into account when they establish their dividend policies.

iii. Investment Policy

When we estimate the cost of capital, we use as the starting point the required rates of return on the firm's outstanding stock and bonds. Those cost rates reflect the riskiness of the firm's existing assets. Therefore, we have implicitly been assuming that new capital will be invested in assets of the same type and with the same degree of risk as is embedded in the existing assets. This assumption is generally correct, as most firms do invest in assets similar to those they currently operate. However, it would be incorrect if the firm dramatically changed its investment policy. For example, if a firm invests in an entirely new line of business, its marginal cost of capital should reflect the riskiness of that new business.

Marginal cost of capital (MCC)

As a firm tries to have more new capital, the cost of each birr will rise at some point. Thus, the marginal cost of capital (MCC) is the cost of obtaining additional new capital. Technically speaking, the MCC is the weighted average cost of the last birr of new capital obtained. So the concept of marginal cost of capital is discussed in the context of the weighted average cost of capital.

As a firm raises larger and larger amounts of capital, the weighted average cost of capital also rises. But the question would be at what point the firm's costs of debt, preferred stock, and common equity as well as WACC increase?

The first point, therefore, in computing the MCC is to determine the breaking points where the cost of capital will increase.

