Chapter 3

Cost of Capital
CHAPTER 3

COST OF CAPITAL

3.0 COST OF CAPITAL:

The cost of capital of a firm is the minimum rate of return expected by its investors. It is the weighed average cost of various sources of finance used by a firm. The capital used by a firm may be in the firm of debt, preference capital, retained earnings and equity shares.

The concept of cost of capital is very important in the financial management. Determination of cost of capital is essential for capital budgeting decisions. A decision to invest in a particular project depends upon the cost of capital of the firm or the cut off rate which is the minimum rate of return expected by the investors. In case a firm is not able to achieve even the cut off rate, the market value its shares will fall. In fact, cost of capital is the minimum rate of return expected by its investors which will maintain the market value of shares at its present level. Hence, to achieve the objective of wealth maximization, a firm must earn a rate of return more than its cost of capital. Further, optimal capital structure maximizes the value of a firm and hence the wealth of its owners and minimizes the firm’s cost of capital. The cost of capital of a firm or the minimum rate of return expected by its investors has a direct relation with the risk involved in the firm. Generally, higher the risk involved in a firm, higher is the cost of capital.
3.0-1 DEFINITION AND CONCEPT:

Cost of capital for a firm may be defined as the cost of obtaining funds, i.e., the average rate of return that the investors in a firm would expect for supplying funds to the firm. In the words of Hunt, William and Donaldson, "Cost of capital may be defined as the rate that must be earned on the net proceeds to provide the cost elements of the burden at the time they are due."

James C. Van Horne defines cost of capital as, "a cut-off rate for the allocation of capital to investments of projects. It is the rate of return on a project that will leave unchanged the market price of the stock."

According to Solomon Ezra, "Cost of capital is the minimum required rate of earnings or the cut-off rate of capital expenditures."

Hampton, John J. defines cost of capital as, "the rate of return the firm requires from investment in order to increase the value of the firm in the market place".

Thus, we can say that cost of capital is that minimum rate of return which a firm, must and, is expected to earn on its investments so as to maintain the market value of its shares.

From the definitions given above we can conclude three basic aspects of the concept of cost of capital:
Cost of capital is not a cost as such. In fact, it is the rate of return that a firm requires to earn from its projects.

It is the minimum rate of return. Cost of capital of a firm is that minimum rate of return which will at least maintain the market value of the shares.

It comprises of three components. As there is always some business and financial risk in investing funds in a firm, cost if capital comprises of three components:

- the expected normal rate of return at zero risk level, say the rate of interest allowed by banks;
- the premium for business risk; and
- the premium for financial risk of account of pattern of capital structure.

Symbolically cost of capital may be represented as:

\[ K = r_0 + b + f \]

Where,

- \( K = \) Cost of capital
- \( r_0 = \) Normal rate of return at zero risk level
- \( b = \) Premium for business risk
- \( f = \) Premium for financial risk.

3.0-2 CLASSIFICATION OF COST:

1) Historical Cost and Future Cost: Historical costs are book costs which are related to the past. Future costs are estimated costs of the
future. In financial decisions future costs are more relevant than the financial cost. However, historical costs act as guide for the estimation of future costs.

2) **Specific Cost and Composite Cost**: Specific cost refers to the cost of a specific source of capital while composite cost is combined cost of various sources of capital. It is the weighted average cost of capital. In case more than one form of capital is used in the business, it is the composite cost which should be considered for decision-making and not the specific cost. But where only one type of capital is employed the specific cost of that type of capital may be considered. In capital structure decisions, it is the weighted average cost of capital which should be given consideration.

3) **Explicit Cost and Implicit Cost**: An explicit cost is the discount rate which equates the present value of cash inflows with the present value of cash outflows. In other words, it is the internal rate of return. The explicit cost of a specific source of finance may be determined with the help of the following formula:

\[
I_0 = O_1 + O_2 \ldots + O_n = \sum_{t=1}^{n} (1 + K_t) \cdot t
\]

\[
(1+K) \quad (1+K^2) \quad \ldots \quad (1+K^n)
\]

Where, \( I_0 \) is the net cash inflow at zero point of time,
\( O_1 \) is the outflow of cash in periods 1, 2 and n.
K is the explicit cost of capital.

Implicit cost also known as the opportunity cost is the cost of the opportunity foregone in order to take up a particular project. For example, the implicit cost of retained earnings is the rate of return available to shareholders by investing the funds elsewhere.

4) **Average Cost and Marginal Cost:** An average cost refers to the combined cost of various sources of capital such as debentures, preference shares and equity shares. It is the weighted average cost of the incurred to obtain additional funds required by a firm. In investment decisions, it is the marginal cost which should be taken into consideration.

**3.1 SIGNIFICANCE OF COST OF CAPITAL:**

The concept of cost of capital is very important in the financial management. It plays crucial role in both capital budgeting as well as decisions relating to planning of capital structure. Cost of capital concept can also be used as a basis for evaluating the performance of a firm and it further helps management in taking so many other financial decisions like.

a) As an acceptance Criterion in Capital budgeting :- Capital budgeting decisions can be made by considering the cost of capital. According to the present value method of capital budgeting, if the present value of expected returns from investment is greater than or equal to the cost of investment, the project may be accepted or vice-versa.
b) As a Determinant of Capital Mix in Capital Structure Decisions:
Financing the firm's assets is a very crucial problem in every business there should be a proper mix of debt and equity capital in while designing an optimal capital structure the management has to keep in mind the objective of maximizing the value essential in planning the capital structure of any firm.

c) As a basis for evaluating the financial performance: - The actual profitability of the project is compared to the projected overall cost of capital and the actual cost of capital. If the actual profitability of the project is more then the projected and actual cost of capital, the performance may be said to be satisfactory.

d) As a basis for taking other financial decisions: - The cost of capital is also used in making other financial decisions such as dividend policy capitalization of profits making the rights issue and working capital.

3.2 COMPUTATION OF COST OF CAPITAL:

Computation of overall cost of capital of a firm involves:
A. Computation of cost of specific source of finance, and
B. Computation of weighted average cost of capital.
3.2-1 COMPUTATION OF SPECIFIC SOURCE OF FINANCE:

Computation of each specific source of finance, viz, debt, preference share capital, equity share capital and retained earnings is discussed as below:

3.2-1-I COST OF DEBT:

The cost of debt is the rate of interest payable on debt. For example, a company issues Rs. 1,00,000 10'10 debentures at par; the before-tax cost of this debt issue will also be 10%. By way of a formula, before-tax-cost of debt may be calculated as:

(i) \[ K_{db} = \frac{I}{P} \]

where, \( K_{db} \) = Before tax cost of debt

\( I \) = Interest

and \( P \) = Principal

In case the debt is raised at premium or discount, we should consider \( P \) as the amount of net proceeds received from the issue and not the face value of securities. The formula may be changed to

\[ K_{db} = \frac{I}{NP} \] (where, \( NP \) = Net proceeds)

Further, when debt is used as a source of finance, the firm saves a
considerable amount in payment. As interest is allowed as a deductible expense in computation of tax. Hence, the effective cost of debt is reduced. The After-tax cost of debt may be calculated with the help of following formula:

\[ K_{da} = K_{db} (1 - t) = \frac{I}{NP} (1 - t) \]

where, \( K_{da} = \text{After-tax cost of debt} \)
\( t = \text{Rate of tax.} \)

Cost of Redeemable Debt Usually, the debt is issued to be redeemed after a certain period during life time of a firm. Such a debt issue is known as Redeemable debt. The cost of redeemable debt capital may be computed as

(iii) **Before-tax cost of redeemable debt,**

\[ K_{db} = \frac{I + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)} \]

where,
\( I = \text{Annual Interest} \)
\( n = \text{Number of years in which debt is to be redeemed} \)
\( RV = \text{Redeemable value of debt} \)
\( NP = \text{Net Proceeds of debentures} \)

(iv) **After-tax cost of redeemable debt**

\[ K_{da} = \frac{I(1-t) + \frac{1}{n}(RV - NP)}{\frac{1}{2}(RV + NP)} \]

Where,
\( I = \text{Annual interest} \)
\( t = \text{Tax rate} \)
\( n = \text{Number of years in which debt is to be redeemed} \)
\( RV = \text{Redeemable value of debt} \)
\( NP = \text{Net proceeds of debentures} \)
3.2-1-II COST OF PREFERENCE CAPITAL:

A fixed rate of divided is payable on preference shares. Though dividend is payable at the discretion of the Board of directors and there is no legal binding to pay dividend, yet it does not mean that preference capital is cost free. The cost of preference capital is a function of dividend expected by its investors i.e., its stated dividend. In case dividends are not paid to preference shareholders, it will affect the fund raising capacity of the firm. Hence, dividends are usually paid regularly on preference shares except when there are no profits to pay dividends. The cost of preference capital which is perpetual can be calculated as:

\[ K_p = \frac{D}{P} \]

where

- \( K_p \) = Cost of Preference Capital
- \( D \) = Annual Preference Dividend
- \( P \) = Preference Share Capital (Proceeds.)

Sometimes Redeemable Preference Shares are issued which can be redeemed or cancelled on maturity. The cost of redeemable preference share capital can be calculated as:

\[ K_{pr} = \frac{D + \frac{MV - NP}{n}}{\frac{1}{2} (MV + NP)} \]

where,

- \( K_{pr} \) = Cost of Redeemable Preference Shares
- \( D \) = Annual Preference Dividend
- \( MV \) = Maturity Value of Preference Shares
- \( NP \) = Net Proceeds of Preference Shares.
3.2-1-III COST OF EQUITY SHARE CAPITAL:

The cost of equity is the ‘maximum rate of return that the company must earn on equity financed portion of its investments in order to leave unchanged the market price of its stock.’ The cost of equity capital is a function of the expected return by its investors. The cost of equity is not the out-of-pocket cost of using equity capital as the equity shareholders are not paid dividend at a fixed rate every year. Moreover, payment of dividend is not a legal binding. It may or may not be paid. But it does not mean that equity share capital is a cost free capital. Shareholders invest money in equity shares on the expectation of getting dividend and the company must earn this minimum rate so that the market price of the shares remains unchanged. Whenever a company wants to raise additional funds by the issue of new equity shares, the expectations of the shareholders have to be evaluated. The cost of equity share capital can be computed in the following ways:

(a) Dividend Yield Method or Dividend/Price Ratio Method:

According to this method, the cost of equity capital is the ‘discount rate that equates the present value of expected future dividends per share with the net proceeds (or current market price) of a share’. Symbolically
\[ K_e = \frac{D}{NP} \quad \text{or} \quad \frac{D}{MP} \]

where,

- \( K_e \) = Cost of Equity Capital
- \( D \) = Expected dividend per share
- \( NP \) = Net proceeds per share
- \( MP \) = Market Price per share.

and

The basic assumptions underlying this method are that the investors give prime importance to dividends. And risk in the firm remains unchanged. The dividend price ratio method does not seem to consider the growth in dividend, (i) it does not consider future earnings or retained earnings, and (ii) it does not take into account the capital gains. This method of computing cost of equity capital is suitable only when the company has stable earnings and stable dividend policy over a period of time.

(b) Dividend yield plus growth in dividend method:

When the dividends of the firm are expected to grow at a constant rate and the dividend-pay-out ratio is constant this method may be used to compute the cost of equity capital. According to this method the cost of equity capital is based on the dividends and the growth rate.
\[ K_e = \frac{D_1}{NP} + G = \frac{D_0(1+g)}{NP} + G \]

where

- \( K_e \) = Cost of equity capital
- \( D_1 \) = Expected Dividend per share at the end of the year
- \( NP \) = Net proceeds per share
- \( G \) = Rate of growth in dividend
- \( D_0 \) = Previous year's dividend.

Further, in case cost of existing equity share capital is to be calculated, the NP should be changed with MP (market price per share) in the above equation

\[ K_e = \frac{D_1}{MP} + G \]

(c) Earning Yield Method:

According to this method, the cost of equity capital is the discount rate that equates the present values of expected future earnings per share with the net proceeds (or, current market price) of a share. Symbolically:

\[ K_e = \frac{\text{Earnings per share}}{\text{Net Proceeds}} = \frac{\text{EPS}}{\text{NP}} \]
where, the cost of existing capital is to be calculated:

\[
K_e = \frac{\text{Earnings per share}}{\text{Market Price per share}}
\]

\[
= \frac{\text{EPS}}{\text{MP}}
\]

This method of computing cost of equity capital may be employed in the following cases:

i. When the earnings per share are expected to remain constant.

ii. When the dividend pay-out ratio is 100 per cent or when the retention ratio is zero, i.e., all the available profits are distributed as dividends.

iii. When a firm is expected to earn an amount on new equity shares capital, which is equal to the current rate of earnings.

iv. The market price of the share is influenced only by earnings per share.

(d) Realised Yield Method:

One of the serious limitations of using dividend yield method or earnings yield method is the problem of estimating the expectations of the investors regarding future dividends and earnings. It is not possible to estimate future dividends and earnings and earnings correctly; both of these depend upon so many uncertain factors. To remove this drawback, realised yield method, which takes into account the actual average rate of return realised in the past, may be applied to compute the cost of equity share capital. To calculate the average rate of return realised, dividend received in the past
along with the gain realised at the time of sale of shares should be considered. The cost of equity capital is said to be the realised rate of return by the shareholders. This method of computing cost of equity share capital is based upon the following assumptions:

(a) The firm will remain in the same risk class over the period;
(b) The shareholders' expectations are based upon the past realised yield;
(c) The investors get the same rate of return as the realised yield even if they invest elsewhere;
(d) The market price of shares does not change significantly.

(e) Capital Asset Pricing Model (CAPM):

The value of an equity share is a function of cash inflows expected by the investors and the risk associated with the cash inflows. It is calculated by discounting the future stream of dividends at the required rate of return, called the capitalisation rate. The required rate of return depends upon the element of risk associated with investment in shares. It will be equal to the risk – free rate of interest plus the premium for risk. Thus, the required rate of return, Ke, for a share is

$$Ke = \text{Risk} - \text{free Rate of Interest} + \text{Premium for Risk}$$

According to CAPM, the premium for risk is the difference between market return from a diversified portfolio and the risk – free rate of return. It is indicated in terms of beta co-efficient ($\beta$); i.e.

$$\text{Risk-Premium} = (\text{Market Return of a diversified portfolio-Risk free return}) \times \beta = \beta_i(Rm - Rf)$$
Thus, cost of equity, according to CAPM, can be calculated as below:
\[ K_e = R_f + \beta_i (R_m - R_f) \]
Where,  
\( K_e \) = Cost of equity capital  
\( R_f \) = Risk-free rate of return  
\( R_m \) = Market return of a diversified portfolio  
\( \beta_i \) = beta co-efficient of the firm’s portfolio

3.2-1-IV COST OF RETAINED EARNINGS:

It is sometimes argued that retained earnings do not involve any cost because a firm is not required to pay dividends on retained earnings. However, the shareholders expect a return on retained profits. Retained earnings accrue to a firm only because of some sacrifice made by the shareholders in not receiving the dividends out of the available profits. The cost of retained earnings may be considered as the rate of return which the existing shareholders can obtain by investing the after-tax dividends in alternative opportunity of equal qualities. It is, thus, the opportunity cost of dividends foregone by the shareholders. Cost of retained earnings can be computed with the help of following formula:

\[ K_r = \frac{D_1}{NP} + G \quad \text{or} \quad \frac{D_1}{MP} + G \]

where,  
\( K_r \) = Cost of retained earnings  
\( D \) = Expected dividend at the end of the year  
\( NP \) = Net proceeds of share issue  
\( G \) = Rate of growth  
\( MP \) = Market price per share
3.2-2 COMPUTATION OF WEIGHTED AVERAGE COST OF CAPITAL:

Weighted average cost of capital is the average cost of the costs of various sources of financing. Weighted average cost of capital is also known as composite cost of capital, overall cost of capital or average cost of capital. Once the specific cost of individual sources of finance is determined, we can compute the weighted average cost of capital by putting weights to the specific costs of capital in proportion of the various sources of funds to the total. The weights may be given either by using the book value of the source or market value of the source. If there is a difference between market value and book value weights, the weighted average cost of capital would also differ. The market value weighted average cost would be overstated if the market value of the share is higher than the book value, and vice-versa. The market value weights are sometimes preferred to the book value weights because the market value represents the true value of the investors. However, the market value weights suffer from the following limitations:

It is very difficult to determine the market values because of frequent fluctuations.

With the use of market value weights, equity capital gets greater importance. For the above limitations, it is better to use book value which is readily available. Weighted average cost of capital can be computed as follows:

\[ Kw = \frac{\Sigma XW}{\Sigma W} \]

where, \( Kw = \) Weighted average cost of capital
X = Cost of specific source of finance
W = Weight, proportion of specific source of finance

3.2-3 DETERMINATION OF COST OF CAPITAL:
It has already been stated that the cost of capital plays a crucial role in the decisions relating to financing management. However, the determination of the cost of capital of a firm is not an easy task because of both conceptual problems as well as uncertainties of proposed investments and the pattern of financing. The major problems concerning the determination of cost of capital are discussed below:

3.2-3-I Problems in Determination of Cost of Capital:

- **Conceptual controversies regarding the relationship between the cost of capital and the capital structure**: Different theories have been propounded by different authors explaining the relationship between capital structure, cost of capital and the value of the firm. This has resulted into various conceptual difficulties. According to the Net Income Approach and the traditional theories both the cost of capital as well the value of the firm have a direct relationship with the method and level of financing. In their opinion, a firm can minimise the weighted average cost of capital and increase the value of the firm by using debt financing. On the other hand, Net Operating Income and Modigliani and Miller Approach prove that the cost of capital is not affected by changes in the capital structure or say that debt equity mix is irrelevant in determination of cost of capital and the value of a firm. However, the M and M approach is based upon certain unrealistic assumptions such as, there is perfect market or the
expected earnings of all the firms have identical risk characteristic, etc.

- **Historic cost and future cost:** Another problem in the determination of cost of capital arises on account of the difference of opinion as regards the concept of cost itself. It is argued that historic costs are book costs which are related to the past and are irrelevant in the decision-making process. In their opinion, future estimated costs are more relevant for decision-making. In the same manner, arguments are given in favour of specific cost and composite cost as well as explicit cost and implicit cost and the marginal cost.

- **Problems in computation of cost of equity:** The computation of cost of equity capital depends upon the expected rate of return by its investors. But the quantification of the expectations of equity shareholders is a very difficult task because there are many factors which influence their valuation about a firm.

- **Problems in computation of cost of retained earnings:** It is sometimes argued that retained earnings do not involve any cost. But is the opportunity cost of dividends foregone by its shareholders. Since different shareholders may have different opportunities for investing their dividends, it becomes very difficult to compute the cost of retained earnings.
**Problem in assigning weights:** For determining the weighted average cost of capital, weights have to be assigned to the specific cost of individual sources of finance. The choice of using the book value of the source or the market value of the source poses another problem in the determination of cost of capital.

### 3.2-4 MARGINAL COST OF CAPITAL:

Sometimes, we may be required to calculate the cost of additional funds to be raised, called the marginal cost of capital. The marginal cost of capital is the weighted average cost of new capital calculated by using the marginal weights. The marginal weights represent the proportion of various sources of funds to be employed in raising additional funds. In case, a firm employs the existing proportion of capital structure and the component costs remain the same the marginal cost of capital shall be equal to the weighted average cost of capital. But in practice, the proportion and/or the component costs may change for additional funds to be raised. Under this situation, the marginal cost of capital shall not be equal to the weighted average cost of capital. However, the marginal cost of capital shall not be equal to the weighted average cost of capital. However, the marginal cost of capital concept ignores the long-term implications of the new financing plans, and thus, weighted average cost of capital should be preferred for maximization of shareholder’s wealth in the long-run.
3.3 ANALYSIS OF COST OF CAPITAL

Q. - What is the cost of individual sources in your company’s capital?

<table>
<thead>
<tr>
<th>Capital</th>
<th>Average Cost (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>13.28</td>
</tr>
<tr>
<td>Debt</td>
<td>11.33</td>
</tr>
<tr>
<td>Preference</td>
<td>0</td>
</tr>
<tr>
<td>Any other</td>
<td>0</td>
</tr>
</tbody>
</table>

On the basis of averaging the respondents’ answer, average Cost of Equity is 13.28% and Cost of Debt is 11.33%. Debt being cheaper source, should be utilized more.
Q. What is the weighted average cost of capital (over – all cost of capital) of your company’s fund?

<table>
<thead>
<tr>
<th>Proportion of Companies</th>
<th>Cost slab (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0 – 4</td>
</tr>
<tr>
<td>10%</td>
<td>4 – 8</td>
</tr>
<tr>
<td>12%</td>
<td>8 – 12</td>
</tr>
<tr>
<td>78%</td>
<td>12 - 16</td>
</tr>
</tbody>
</table>

In continuation of previous question, most of the respondent’s (78%) weighted average cost of capital (WACC) is ranging between 12-16% (12.72% as calculated averaging all the responses).
Q. Does the cost of capital affect the value of your company?

<table>
<thead>
<tr>
<th>Percentage of Companies</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Yes</td>
</tr>
<tr>
<td>76</td>
<td>No</td>
</tr>
</tbody>
</table>

Contrary to the effect of Capital Structure, most of the respondents (76%) don’t think that Cost of Capital affects the value of an enterprise. Probably that is the reason these companies don’t bother much about the restructuring of capital.
Q. The return on investment is higher than the fixed cost of fund?

<table>
<thead>
<tr>
<th>Percentage of Companies</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Yes</td>
</tr>
<tr>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>

All the respondents unanimously agree that ROI is greater than the fixed cost of funds.
Q. Do you calculate optimum cost of capital for your business?

<table>
<thead>
<tr>
<th>Percentage of Companies</th>
<th>Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>No</td>
</tr>
</tbody>
</table>

View of companies on calculation of the optimum cost of capital

78% of the respondents answered positively when asked about the calculation of the Optimum Cost of Capital.