2.2 Cost Of Capital

This Section includes:

- Cost of Capital-Key Concepts
- Importance
- Classification
- Determination of Cost of Capital
- Computation
- Weighted Average Cost of Capital

INTRODUCTION:

It has been discussed in lesson 4 that for evaluating capital investment proposals according to the sophisticated techniques like Net Present Value and Internal Rate of Return, the criterion used to accept or reject a proposal is the cost of capital. The cost of capital plays a significant role in capital budgeting decisions. In the present lesson the concept of cost of capital and the methods for its computation are explained.

COST OF CAPITAL-KEY CONCEPTS:

The term cost of capital refers to the minimum rate of return a firm must earn on its investments. This is in consonance with the firm’s overall object of wealth maximization. Cost of capital is a complex, controversial but significant concept in financial management.

The following definitions give clarity management.

Hampton J.: The cost of capital may be defined as “the rate of return the firm requires from investment in order to increase the value of the firm in the market place”.

James C. Van Horne: The cost of capital is “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”.

Soloman Ezra: “Cost of Capital is the minimum required rate of earnings or the cut-off rate of capital expenditure”.

It is clear from the above definitions that the cost of capital is that minimum rate of return which a firm is expected to earn on its investments so that the market value of its share is maintained. We can also conclude from the above definitions that there are three basic aspects of the concept of cost of capital:

i) **Not a cost as such:** In fact the cost of capital is not a cost as such, it is the rate of return that a firm requires to earn from its projects.

ii) **It is the minimum rate of return:** A firm’s cost of capital is that minimum rate of return which will at least maintain the market value of the share.

iii) It comprises three components:
\[ K = r_o + b + f \]

Where, \( k \) = cost of capital;

\( r_o \) = return at zero risk level:

\( b \) = premium for business risk, which refers to the variability in operating profit (EBIT) due to change in sales.

\( f \) = premium for financial risk which is related to the pattern of capital structure.

**IMPORTANCE OF COST OF CAPITAL:**

The cost of capital is very important in financial management and plays a crucial role in the following areas:

i) **Capital budgeting decisions:** The cost of capital is used for discounting cash flows under Net Present Value method for investment proposals. So, it is very useful in capital budgeting decisions.

ii) **Capital structure decisions:** An optimal capital is that structure at which the value of the firm is maximum and cost of capital is the lowest. So, cost of capital is crucial in designing optimal capital structure.

iii) **Evaluation of final Performance:** Cost of capital is used to evaluate the financial performance of top management. The actual profitability is compared to the expected and actual cost of capital of funds and if profit is greater than the cost of capital the performance may be said to be satisfactory.

iv) **Other financial decisions:** Cost of capital is also useful in making such other financial decisions as dividend policy, capitalization of profits, making the rights issue, etc.

**CLASSIFICATION OF COST OF CAPITAL:**

Cost of capital can be classified as follows:

i) **Historical Cost and future Cost:** Historical costs are book costs relating to the past, while future costs are estimated costs act as guide for estimation of future costs.

ii) **Specific Costs and Composite Costs:** Specific cost is the cost if a specific source of capital, while composite cost is combined cost of various sources of capital. Composite cost, also known as the weighted average cost of capital, should be considered in capital and capital budgeting decisions.

iii) **Explicit and Implicit Cost:** Explicit cost of any source of finance is the discount rate which equates the present value of cash inflows with the present value of cash outflows. It is the internal rate of return and is calculated with the following formula;
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\[ I_o = \frac{C_1}{(1 + K)^1} + \frac{C_2}{(1 + K)^2} + \ldots + \frac{C_n}{(1 + K)^n} \]

\( I_o \) = Net cash inflow received at zero of time
\( C \) = Cash outflows in the period concerned
\( K \) = Explicit cost of capital
\( N \) = Duration of time period

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.

iv) **Average Cost and Marginal Cost:** An average cost is the combined cost or weighted average cost of various sources of capital. Marginal cost of refers to the average cost of capital of new or additional funds required by a firm. It is the marginal cost which should be taken into consideration in investment decisions.

**DETERMINATION OF CAST OF CAPITAL:**

As stated already, cost of capital plays a very important role in making decisions relating to financial management. It involves the following problems.

**Problems in determination of cost of capital:**

i) Conceptual controversy regarding the relationship between cost of capital and capital structure is a big problem.

ii) Controversy regarding the relevance or otherwise of historic costs or future costs in decision making process.

iii) Recomputation of cost of equity capital depends upon the expected rate of return by its investors. But the quantification of expectations of equity shareholders is a very difficult task.

iv) Retained earnings has the opportunity cost of dividends forgone by the shareholders. Since different shareholders may have different opportunities for reinvesting dividends, it is very difficult to compute cost of retained earnings.

v) Whether to use book value or market value weights in determining weighted average cost of capital poses another problem.

**COMPUTATION OF COST OF CAPITAL:**

Computation of cost capital of a firm involves the following steps:

i) Computation of cost of specific sources of a capital, viz., debt, preference capital, equity and retained earnings, and
Computation of weighted average cost of capital.

Cost of Debt ($k_d$)
Debt may be perpetual or redeemable debt. Moreover, it may be issued at par, at premium or discount. The computation of cost debt in each is explained below.

Perpetual / irredeemable debt:
i) At par:
$$\text{K}_d = \text{Cost of debt before tax} = \frac{I}{P_o}$$
$$\text{K}_d = \text{Cost of debt}; I = \text{interest}; P_o = \text{net proceeds}$$
$$\text{k}_d(\text{after-tax}) = \frac{i}{P(I-t)}$$
Where $T = \text{tax rate}$

Example
Y Ltd issued Rs. 2,00,000, 9% debentures at a premium of 10%. The costs of floatation are 2%. The tax rate is 50%. Compute the after tax cost of debt.

Answer: $k_d(\text{after-tax})= \frac{I}{NP} (i-t) \frac{18,000}{215,600} (1-5) = 4.17\%$

[net proceeds = Rs. 2,00,000 + 20,000 – (2/100x2,20,000)]

Redeemable debt
The debt repayable after a certain period is known as redeemable debt. Its cost computed by using the following formula:

$$\text{i) Before – tax cost of debt} = \frac{I+1/n (P-NP)}{\frac{1}{2} (P+NP)}$$
$I = \text{interest}; P = \text{proceeds at par};$
$NP = \text{net proceeds}; n = \text{No. of years in which debt is to be redeemed}$

$$\text{ii) After tax of debt} = \text{Before – tax cost of debt} \times (1-t)$$

Example
A company issued Rs. 1,00,000 10% redeemable debentures at a discount of 50%. The cost of floatation amount to Rs. 3,000. The debentures are redeemable after 5 years. Compute before – tax and after – tax Cost of debt. The rate is 50%. 
Solution:

i) Before – tax cost of debt = \[ \frac{\frac{I}{n} + (P-NP)}{\frac{1}{2} (P+NP)} \]

\[ = \frac{10,000+1/5(1,00,000-92,000)}{\frac{1}{2} (1,00,000+92,000)} \]

\[ = \frac{10,000-16000}{96,000} = \frac{11,000}{96,000} = 12.08\% \]

[NP=1,00,000 – 5,000 – 3,000=92,000]

After tax cost of debt = Before – tax cost x (1-t)=12.08X(1-.5)=6.04%

Cost of preference Capital \( (k_p) \)

In case of preference share dividend are payable at a fixed rate. However, the dividends are not allowed to be deducted for computation of tax. So no adjustment for tax is required just like debentures, preference share may be perpetual or redeemable. Future, they may be issued at par, premium or discount.

Perpetual preference Capital

i) If issued at par ; \( K_p = \frac{D}{P} \)

\( K_p \) = Cost of preference capital

\( D \) = Annual preference dividend

\( P \) = Proceeds at par value

ii) If issued at premium or discount

\( K_p = \frac{D}{NP} \)

Where NP = net proceeds.

Example:

A company issued 10,000, 10% preference share of Rs. 10 each, Cost of issue is Rs. 2 per share. Calculate cost of capital, of these shares are not issued (a) at par , (b) at 10% premium, and (c) at 5% discount.

Solutions : Cost of preference capital, \( (k_p) = \frac{D}{NP} \)

a) When issued at par:

\[ \frac{10,000}{1,00,000-20,000} \times 100 = \frac{10,000}{80,000} \times 100 = 12.5\% \]

[ Cost of issued = 10,000xRs. 2= Rs. 20,000]
b) When issued at 10% premium:

\[ K_p = \frac{10,000}{1,00,000 + 10,000 - 20,000} \times 100 = \frac{10,000}{90,000} \times 100 = 11.11\% \]

c) When issued at 5% discount:

\[ K_p = \frac{10,000}{1,00,000 - 5,000 - 20,000} \times 100 = \frac{10,000}{75,000} \times 100 = 13.33\% \]

**Redeemable preference shares** - It is calculated with the following formula:

\[ K_p = \frac{D + \frac{MV - NP}{n}}{\frac{1}{2} (MV + NP)} \times 100 \]

Where,

- \( K_p \) = Cost of preference capital
- \( D \) = Annual preference dividend
- \( MV \) = Maturity value of preference shares
- \( NP \) = Net proceeds of preference shares

**Example:**

A company issues 1,00,000 10% preference share of Rs. 10 each. Calculate the cost of preference capital if it is redeemable after 10 years.

a) At par  
b) at 5% premium

**Solution**

\[ K_p = \frac{D + \frac{1}{n} MV - NP}{\frac{1}{2} (MV + NP)} \times 100 \]

a) Cost of preference capital, if redeemable at par:

\[ K_p = \frac{1,00,000 + \frac{1}{10} (10,00,000 - 10,00,000)}{\frac{1}{2} (10,00,000 + 10,00,000)} \times 100 = \frac{1,00,000}{5,00,000} \times 100 = 10\% \]

b) If redeemable at a premium of 5%, \( K_p = \)

\[ K_p = \frac{1,00,000 + \frac{1}{10} (10,50,000 - 10,00,000)}{\frac{1}{2} (10,50,000 + 10,00,000)} \times 100 = \frac{1,00,000 + 5,000}{5,00,000} \times 100 = \frac{1,05,000}{10,25,000} \times 100 = 10.24\% \]
Cost of Equity capital
Cost of Equity is the expected rate of return by the equity shareholders. Some argue that, as there is no legal for payment, equity capital does not involve any cost. But it is not correct. Equity shareholders normally expect some dividend from the company while making investment in shares. Thus, the rate of return expected by them becomes the cost of equity. Conceptually, cost of equity share capital may be defined as the minimum rate of return that a firm must earn on the equity part of total investment in a project in order to leave unchanged the market price of such shares. For the determination of cost equity capital it may be divided into two categories:

i) External equity or new issue of equity shares.

ii) Retained earnings.

The cost of external equity can be computed as per the following approaches:

Dividend Yield / Dividend Price Approach- According to this approach, the cost of equity will be that rate of expected dividends which will maintain the present market price of equity shares. It is calculated with the following formula:

\[ Ke = \frac{D}{NP} \]  
for new equity shares

Or

\[ Ke = \frac{D}{MP} \]  
for existing shares

Where,

- \( Ke \) = Cost of equity
- \( D \) = Expected dividend per share
- \( NP \) = Net proceeds per share
- \( MP \) = Market price per share

This approach rightly recognizes the importance of dividends. However, it ignores the importance of retained earnings on the market price of equity shares. This method is suitable only when the company has stable earnings and stable dividend policy over a period of time.

Example
A company issues, 10,000 equity shares of Rs. 100 each at a premium of 10%. The company has been paying 20% dividend to equity shareholders for the past five years and expected to maintain the same in the future also. Compute cost of equity capital. Will it make any difference if the market price of equity share is Rs. 150?
Solution:

\[ Ke = \frac{D}{NP} = \frac{Rs.20}{Rs.110} \times 100 = 18.18\% \]

If the market price per share = Rs.150

\[ Ke = \frac{D}{MP} = \frac{Rs.20}{Rs.150} \times 100 = 13.33\% \]

**Dividend yield plus Growth in dividend methods**

According to this method, the cost of equity is determined on the basis if the expected dividend rate plus the rate of growth in dividend. This method is used when dividends are expected to grow at a constant rate.

Cost of equity is calculated as:

\[ Ke = \frac{D_1}{NP} + g \] (for new equity issue)

Where,

- \( D_1 \) = expected dividend per share at the end of the year. \( [D_1 = D_0(1+g)] \)
- \( Np \) = net proceeds per share
- \( g \) = growth in dividend for existing share is calculated as:

\[ D_1 / MP + g \]

Where,

- \( MP \) = market price per share.

**Example:**

ABC Ltd plans to issued 1,00,000 new equity share of Rs. 10 each at par. The floatation costs are expected to be 5% of the share price. The company pays a dividend of Rs. 1 per share and the growth rate in dividend is expected to be 5%. Compute the cost of new issue share. If the current the cost of new issue of shares.

**Solution:**

Cost of new equity shares = \( (K_e) = \frac{D}{NP} + g \)

\[ K_e = 1 / (10-5-5) + 0.05 = 1 / 9.5 + 0.05 = 0.1053 + 0.05 = 0.1553 \text{ or } 15.53\% \]

Cost of existing equity share: \( k_e = \frac{D}{MP} + g \)

\[ K_e = 1 / Rs. 15 = 0.05 = 0.0667 \text{ or } 11.67\% \]
Earnings Yield Method - According to this approach, the cost of equity is the discount rate that capitalizes a stream of future earnings to evaluate the shareholdings. It is called by taking earnings per share (EPS) into consideration. It is calculated as:

i) \( K_e = \frac{\text{Earnings per share}}{\text{Net proceeds}} = \frac{\text{EPS}}{\text{NP}} \) [For new share]

ii) \( K_e = \frac{\text{EPS}}{\text{MP}} \) [For existing equity]

Example

XYZ Ltd is planning for an expenditure of Rs. 120 lakhs for its expansion programme. Number of existing equity shares are 20 lakhs and the market value of equity shares is Rs. 60. It has net earnings of Rs. 180 lakhs.

Compute the cost of existing equity share and the cost of equity capital assuming that new share will be issued at a price of Rs. 52 per share and the costs of new issue will be Rs. 2 per share.

Solutions

\[ \text{EPS} = \frac{1,80,00,000}{20,00,000} = \text{Rs} 9 \]

\( K_e = \frac{9}{60} = 0.15 \text{ or } 15\% \)

\( \text{Cost of new equity capital (} K_e \text{)} = \frac{\text{ESP}}{\text{NP}} = \frac{9}{52-2} = \frac{9}{50} = 0.18 \text{ or } 18\% \)

Cost of Retained Earnings (\( K_r \))

Retained earnings refer to undistributed profits of a firm. Out of the total earnings, firms generally distribute only part of them in the form of dividends and the rest will be retained within the firms. Since no dividend is required to be paid on retained earnings, it is stated that 'retained earnings carry no cost'. But this approach is not appropriate. Retained earnings has the opportunity cost of dividends in alternative investment becomes cost if retained earnings. Hence, shareholders expect a return on retained earnings at least equity.

\( K_r = K_e = \frac{D}{\text{NP}+g} \)

However, while calculating cost of retained earnings, two adjustments should be made:

a) Income-tax adjustment as the shareholders are to pay some income tax out of dividends, and b) adjustment for brokerage cost as the shareholders should incur some brokerage cost while investment dividend income. Therefore, after these adjustments, cost of retained earnings is calculated as:

\( K_r = K_e \cdot (1-t)(1-b) \)
Where, \( K_r \) = cost of retained earnings
\( K_e \) = Cost of equity
\( t \) = rate of tax
\( b \) = cost of purchasing new securities or brokerage cost.

**Example**
A firm’s cost of equity (\( K_e \)) is 18%, the average income tax rate of shareholders is 30% and brokerage cost of 2% is excepted to be incurred while investing their dividends in alternative securities. Compute the cost of retained earnings.

Solution : Cost of retained earnings = \( (K_r) = K_e (1-t)(1-b) \)
= 18 \times 0.7 \times 0.98 = 12.35% 

**Cost of Rights Issue**
Rights issue is an invitation to the existing shareholders to subscribe for further shares to be issued by a company. A right simply means an option to buy certain shares at a privileged price which is considerably below the market price. It is generally felt that the cost of issue would be different from the cost of direct issue. But for two reasons, the real cost of rights issue would be the same as the cost of direct issue of share to the public.

i) The shareholder who is not interested in the rights issue, sells his rights and obtain cash. Then he has the old share plus the money obtained from selling the rights.

ii) Otherwise, the shareholder exercise his rights and acquires the share the new share, in addition to the old shares.

Thus, the present wealth of the shareholders in both the cases remains the same.

**Cost of Convertible Securities**
Convertible securities or debentures are another type of instruments for mobilization of debt capital. In this case the debenture holder is entitled to gull pr a part of the value of the debenture being converted into equity shares. The price at which the debenture is convertible into share is known as “conversion price”. This conversion price is declares at the time of the issue of debentures itself.

When the bondholder exercises his option of conversion, he enjoys two benefits-interest on bonds till the date of conversion and increased market value share a at the time of conversion. Hence, the cost of convertible securities is taken to be that rate of discount switch which equates the after-tax interest and the expected market value of the share at the end option period, with the current market value of bond.

This is calculated with the help of following formula:

\[
P_o = \sum
\]

Where,
\( P_o \) = Current market value of debenture
\( I \) = Interest
\( t \) = tax rate
\( K_o \) = Rate of discount or cost of convertible security.
\( n \) = no. of years at the end of which conversion takes place.
\( CR \) = conversion or the no. of share the bond – holder gets on conversion
WEIGHTED AVERAGE COST OF CAPITAL:
It is the average of the costs of various sources of financing. It is also known as composite or overall or average cost of capital.

After computing the cost of individual sources of finance, the weighted average cost of capital is calculated by putting weights in the proportion of the various sources of funds to the total funds.

Weighted average cost of capital is computed by using either of the following two types of weights:

1) Market value  
2) Book Value

Market value weights are sometimes preferred to the book value weights as the market value represents the true value of the investors. However, market value weights suffer from the following limitations:

i) Market value are subject to frequent fluctuations.

ii) Equity capital gets more importance, with the use of market value weights.

Moreover, book values are readily available.

Average cost of capital is computed as follows:

\[
K_w = \frac{\sum K_w}{\sum W}
\]

Where, \( K_w \) = weighted average cost of capital  
\( X \) = cost of specific sources of finance  
\( W \) = weights (proportions of specific sources of finance in the total)

The following steps are involved in the computation of weighted average cost of capital:

i) Multiply the cost of each sources with the corresponding weight.

ii) Add all these weighted costs so that weighted average cost of capital is obtained.