

# UNIT II

## Planning for Sources of Finance

### Capital Structure and it's Approach

#### CAPITAL STRUCTURE

Capital Structure mean mixture of ratio of funds invested into the business , it can be the debts or it can be the equity or it can be said that weighted of Ratio of the fund invested into the business. A firm needs funds for long term requirements and working capital. These funds are raised through different sources both short term and long term. The long term funds required by a firm are mobilized through owner's funds (equity share, preference shares and retained earnings) and long term debt (debentures and bonds). A mix of various long term sources of funds employed by a firm is called capital structure.

**According to Gerestenberg,** “Capital structure of a company refers to the composition or make-up of its capitalization and it includes all long term capital resources, viz, loans, bonds, shares and reserves”.

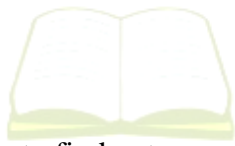
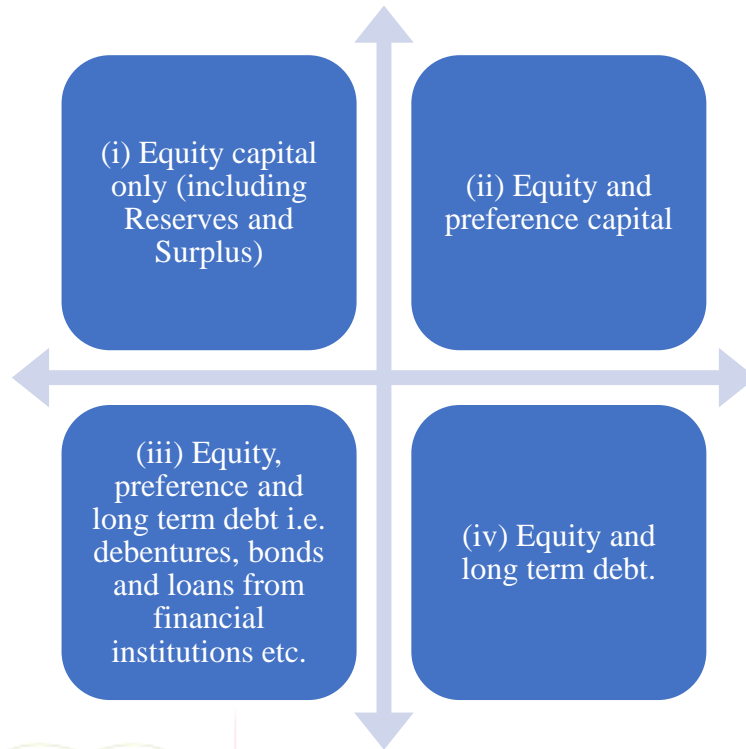
#### Features of an Appropriate Capital Structure

A capital structure will be considered to be appropriate if it possesses following features

- 1. Profitability**
- 2. Solvency**
- 3. Flexibility**
- 4. Conservatism**
- 5. Control**

#### MIXTURE OF CAPITAL STRUCTURE

Financial Manager has to plan the appropriate mix of different securities in total capitalization in such a way as to minimize the cost of capital and maximize the earnings per share to the equity shareholders. There may be four fundamental patterns of capital structure as follows:

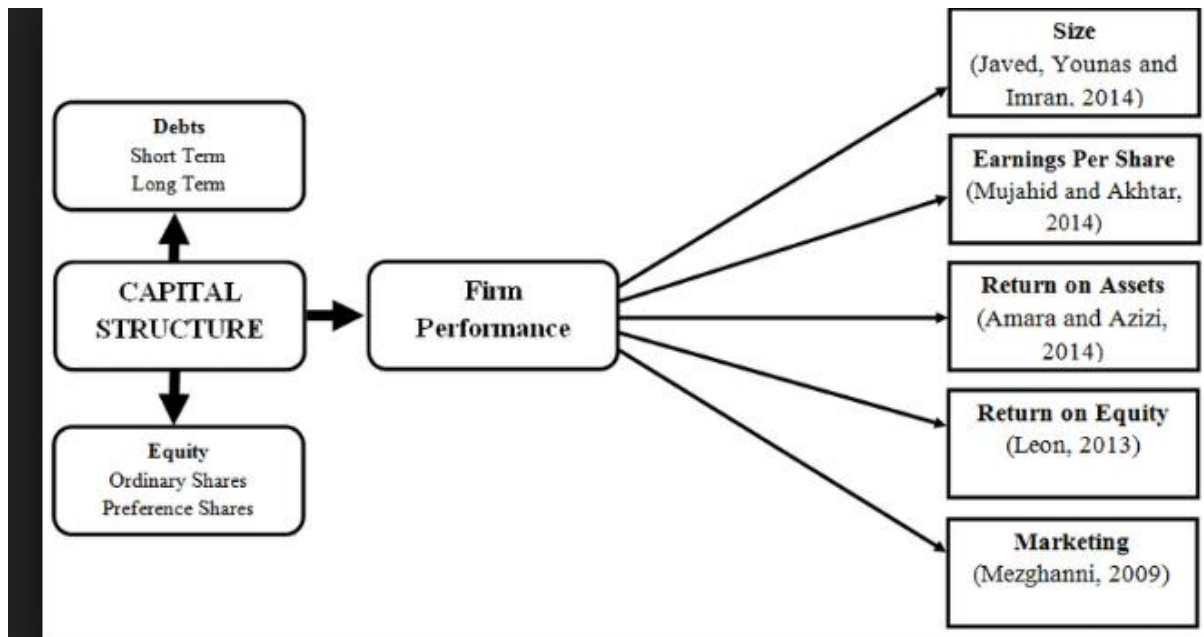


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1. In order to find out an optimum equity debt mix, the finance manager should know the theories underlying the capital structure of the firm.
2. It is seen that existence of optimal capital structure is not accepted by all.
3. One group of the people thinks that the debt equity mix has major impact on the shareholders wealth, whereas other group thinks, it does not have any impact.

### Optimal capital structure

Optimal capital structure is required to maintain financial stability. The optimal capital structure is that where the market value of shares is maximum.



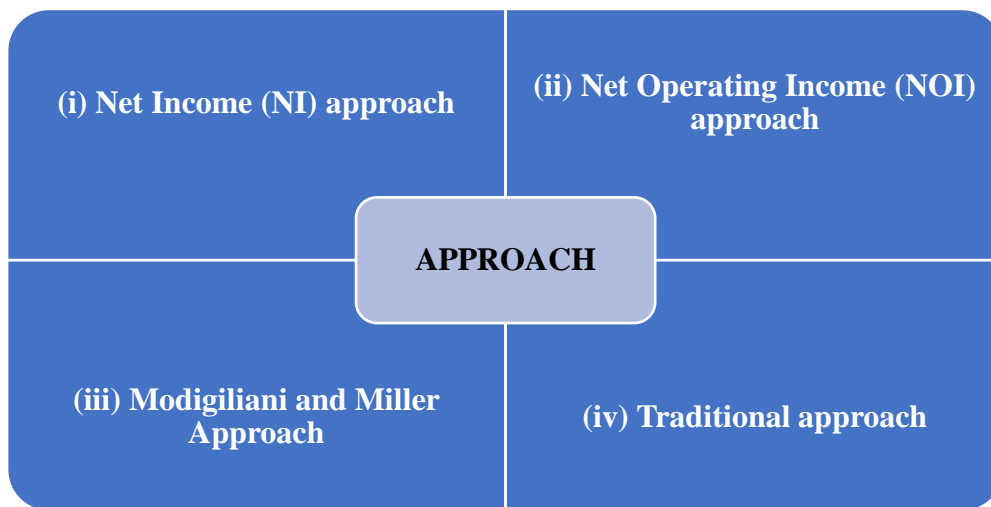
It can be a ratio between debt and equity where the share price of its shares at a stock exchange increases. And the cost of capital is minimum.

ROI, leverage on account of corporate taxes and perceived risk factor.

#### Assumption of Capital Structure-

- (i) Only two sources of funds i.e. debt and equity, no preference share capital.
- (ii) No taxes, this has been taken back later.
- (iii) Dividend payout is 100%, no retained earnings.
- (iv) Investment decisions are constant, no changes in assets.
- (v) Total financing remains same, firm changes the capital structure either by redeeming the debenture by issue of shares or raising more funds.
- (vi) EBIT are not expected to grow.
- (vii) Business risk remains constant and independent of capital structure.
- (viii) firm has perpetual life.

## APPROACH OF CAPITAL STRUCTURE



### 1. Net Income (NI) approach :

Provided by Durand, it says that **capital structure is relevant to** valuation of firm. According to this approach higher debt content in the capital structure will result in decrease of overall or WAC of the capital. This will increase in the value of the firm and consequently increase in the value of equity shares of the firm and vice versa.

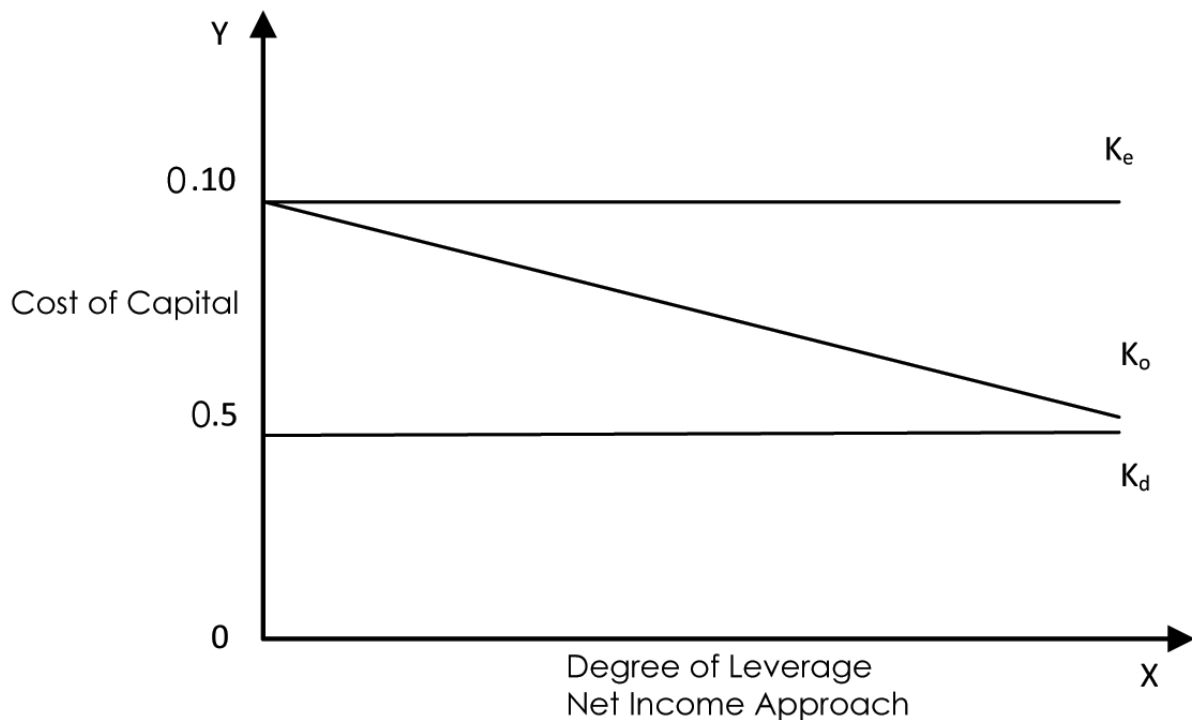
#### Assumptions of NI approach

- (i) There are no corporate taxes.
- (ii) The cost of debt is less than the cost of equity.
- (iii) The debt content does not change the risk perception of the investors.

$$\begin{aligned} \text{Value of firm} &= \text{value of debt} + \text{value of Equity.} \\ \text{Value of equity} &= \text{EAE} / K_e \end{aligned}$$

The value of the firm is ascertained as under:

$V = S + B$ , V means value of firm, S market value of equity and B market value of debt respectively. Here,  $S = NI / K_e$ , NI means PAT and  $k_e$  is the cost of equity capital or capitalisation rate.



It is evident from the above diagram that when degree of leverage is zero (i.e. no debt capital employed), overall cost of capital is equal to cost of equity ( $K_o = K_e$ ). If debt capital is employed further and further which is relatively cheap when compared to cost of equity, the overall cost of capital declines, and it becomes equal to cost of debt ( $K_d$ ) when leverage is one (i.e. the firm is fully debt financed). Thus, according to this theory, the firm's capital structure will be optimum, when degree of leverage is one.

#### Illustration : 1

A company's expected annual net operating income (EBIT) is ₹50,000. The company has ₹2,00,000, 10% debentures. The equity capitalisation rate ( $K_e$ ) of the company is 12.5%. Find the value of the firm and overall cost of capital under Net Income approach.

#### Solution:

Calculation of value of firm and overall cost of capital under Net Income approach

Value of firm = MV of Equity + MV of Debt

EBIT	50,000
Less: Interest (2,00,000 x 10%)	20,000
Equity earnings	30,000
Equity Capitalisation Rate ( $K_e$ )	12.5%

Therefore

$$\text{Value of Equity} = \frac{30,000}{12.5\%} = 240,000$$

$$\text{Value of Debt (given)} = 2,00,000$$

$$\text{Value of Firm} = 240,000 + 2,00,000 = 4,40,000$$

**Illustration : 2**

Assuming no taxes and given the earnings before interest and taxes (EBIT), interest (I) at 10% and equity capitalisation rate (Ke) below, calculate the total market value of each firm under Net Income Approach:

Firms	EBIT ₹	I ₹	K
X	200000	20000	12.0%
Y	300000	60000	16.0%
Z	500000	200000	15.0%
W	600000	240000	180%

Also determine the weight average cost of capital for each firm.

**Solution:**

Calculation of valuation of each firm under Net Income Approach

Value of firm = Value of equity + Value of debt

FIRM	X (₹)	Y (₹)	Z (₹)	W (₹)
EBIT	200000	300000	500000	600000
Less: Interest	(20000)	(60000)	(200000)	(240000)
Equity Earnings	180000	240000	300000	360000
Cost of Equity (Ke)	12%	16%	15%	18%
Capitalised value of equity	1500000	1500000	2000000	2000000
Add: MV of Debt	200000	600000	2000000	2000000
Value of firm	1700000	2100000	4000000	4400000
WACC (KO)	11.76%	14.19%	12.50%	13.64%

Note 1: Value of debt =  $\frac{\text{Interest}}{K_d}$

Note 2:  $K_o = \frac{\text{EBIT}}{\text{Value of firm}}$

## 2. Net Operating Income (NOI) approach

- This net operating income (NOI) approach is also suggested by David Durand. According to NOI approach the value of firm is irrelevant, on other hand Any change in leverage will not lead to any change in the total value of the firm. This capital structure of the firm does not influence cost of capital and value of the firm. The value of the firm (V) is determined as follows:

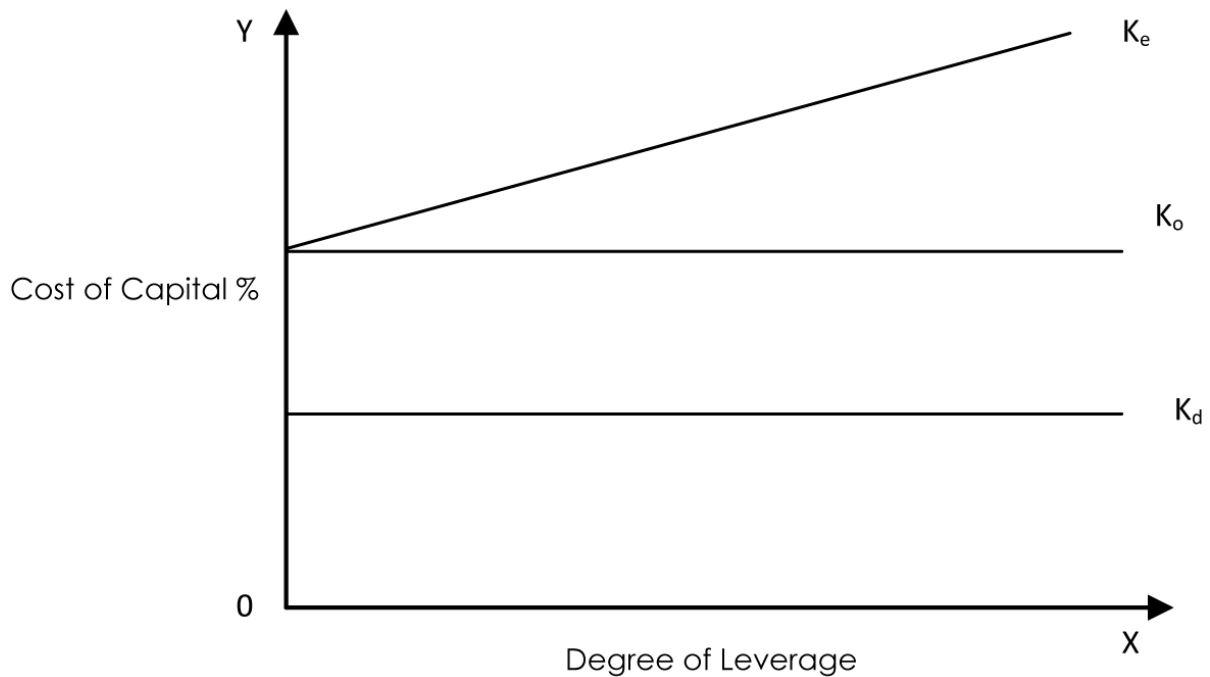
$$V = S + D = \frac{\text{NOI}}{K_0}$$

$K_0$  The overall cost of capital and depends on the business risk of the firm. It is not affected by financing mix.

### Assumptions of NOI approach

1. The market capitalises the value of the firm as a whole.
2. The business risk remains constant at every level of debt - equity mix.
3. There are no corporate taxes.
4. The debt capitalisation rate ( $K_d$ ). is constant

VALUE OF FIRM = Value of  
Equity + Value of Debt



The above diagram shows that  $K_o$  and  $K_d$  are constant and  $K_e$  increases with leverage continuously. The increase in cost of equity ( $K_e$ ) exactly offsets the advantage of low cost debt, so that overall cost of capital ( $K_o$ ) remains constant, at every degree of leverage. It implies that every capital structure is optimum and there is no unique optimum capital structure.

### 3. Modigliani and Miller Approach

Similar to NOI approach, according to this the value of the firm is independent of its capital structure. The basic difference between NOI and MM approach is that NOI is purely definitional whereas MM approach provide behavioural justification for the independence of valuation and cost of capital of the firm from its capital structure.

#### Assumptions of MM approach-

1. Capital markets are perfect: investors are free to buy and sell, well informed, no restriction on borrow, behave rationally and no transaction cost.
2. Homogenous firms shall have same degree of business risk.
3. Dividend payout ratio is 100%. No taxes.
4. All investors have the same expectation of EBIT



$$\text{Value of firm} = \frac{\text{EBIT}}{K_0}$$

According to M – M, the average cost of capital is constant as shown in the following Figure.



The above diagram shows that  $K_0$  is constant so that overall cost of capital ( $K_0$ ) remains constant, at every degree of leverage. It implies that every capital structure is optimum and there is no unique optimum capital structure.

Illustration : 03

From the following data find out the value of each firm and value of each equity share as per the Modigliani-Miller approach:

	P	Q	R
EBIT	1300000	1300000	1300000
No. of shares	300000	250000	200000
12% debentures		900000	1000000

Every firm expect 12% return on investment.

**Solution:**

Calculation of value of each firm under Modigliani – Miller approach:

$$\text{Value of firm} = \frac{\text{EBIT}}{K_o}$$

Firm	P	Q	R
EBIT	1300000	1300000	1300000
ROI = $K_o$	12%	12%	12%
Value of firm 1/2	1,08,33,333	1,08,33,333	1,08,33,333

Calculation of value of each equity share for each firm

Firm	P	Q	R
1. Value of Firm	1,08,33,333	1,08,33,333	1,08,33,333
2. Debt	-	900000	1000000
3. Value of equity	10833333	9933333	9833333
4. No. of equity shares	300000	250000	200000
5. Market Price 3/4	36.11	39.73	49.17

## 4. Traditional approach

Traditional approach, is also known as intermediate approach, this approach was popularised by Ezra Solomon. **It is a compromise between the two extremes of Net Income Approach and Net Operating Income Approach.** Therefore, traditional/intermediate approach is mid way of two approaches. It partly contains features of both the approaches. According to this approach, cost of capital can be reduced or the value of the firm can be increased with a judicious mix of debt and equity. This theory says that cost of capital declines with increase in debt capital upto a reasonable level, and later it increases with a further rise in debt capital. The way in which the overall cost of capital reacts to changes in capital structure can be divided into three stages under traditional position.

### Stage I

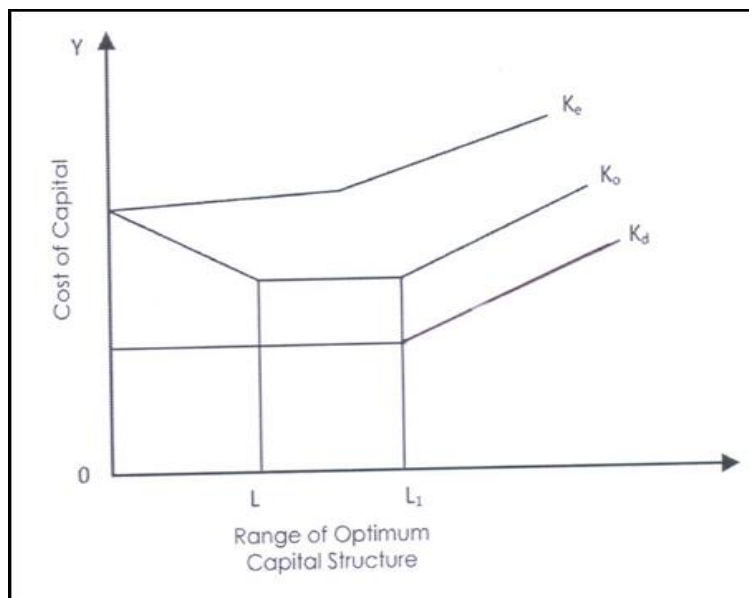
In this stage, the cost of equity ( $K_e$ ) and the cost of debt ( $K_d$ ) are constant and cost of debt is less than cost of equity. The employment of debt capital upto a reasonable level will cause the overall cost of capital to decline due to the low cost advantage of debt.

### Stage II

Once the firm has reached a reasonable level of leverage, a further increase in debt will have no effect on the value of the firm and the cost of capital.

### Stage III

If the firm increases debt capital further and further beyond reasonable level, it will cause an increase in risk to both equity shareholders and debt – holders, because of which both cost of equity and cost of debt start rising in this stage.



**Traditional View**

It is evident from above graph that the overall cost of capital declines with an increase in leverage upto point L and it increases with rise in the leverage after point L1. Hence, the optimum capital structure lies in between L and L1.

### Assumptions of NI approach

- (i) There are no corporate taxes.
- (ii) The cost of debt is less than the cost of equity.
- (iii) The debt content does not change the risk perception of the investors.

$$\begin{aligned}\text{Value of firm} &= \text{value of debt} + \text{value of Equity.} \\ \text{Value of equity} &= \text{EAE} / K_e\end{aligned}$$

Illustration : 04

A Company's current operating income is `4 lakhs. The firm has `10lakhs of 10% debt outstanding. Its cost of equity capital is estimated to be 15%. Determine the current value of the firm using traditional valuation approach.

#### Solution:

Calculation of value of firm under Traditional approach:

Value of firm = Value of Debt + Value of equity

1. EBIT	400000
2. Interest(1000000 × 10%)	10000
3. Equity Earning (1-2)	300000
4. Equity Capitalisation rate	15%
5. Value of Equity (3/4)	2000000
6. Value of debt	1000000
7. Value of Firm ( 5+6)	3000000

## FOR PRACTICES

**Q.** Company X and Company Y are in the same risk class, and are identical in every fashion except that Company X uses debt while Company Y does not. The levered firm has ₹9,00,000 debentures, carrying 10% rate of interest. Both the firms earn 20% before interest and taxes on their total assets of ₹15 lakhs. Assume perfect capital markets, rational investors and so on; a tax rate of 50% and capitalisation rate of 15% for an all equity company.

- (i) Compute the value of firms X and Y using the net income (NI) approach.
- (ii) Compute the value of each firm using the net operating income (NOI) approach.
- (iii) Using the NOI approach, calculate the overall cost of capital ( $k_o$ ) for firms X and Y.
- (iv) Which of these two firms has an optimal capital structure according to the NOI approach? Why?



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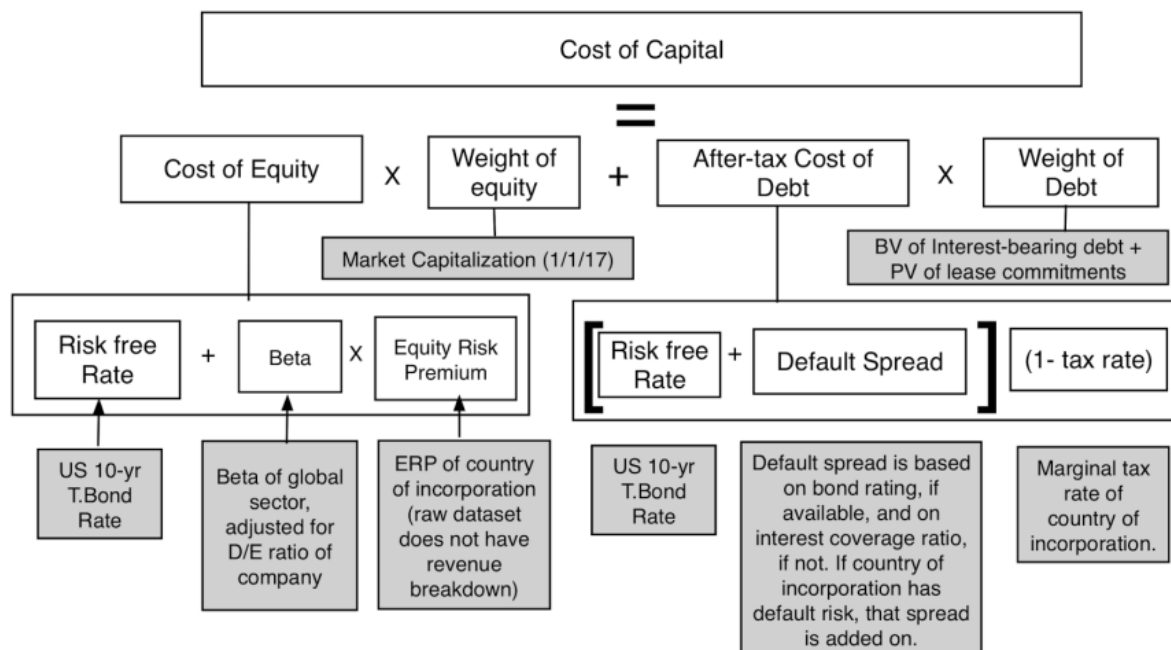
# Cost of Capital

## COST OF CAPITAL

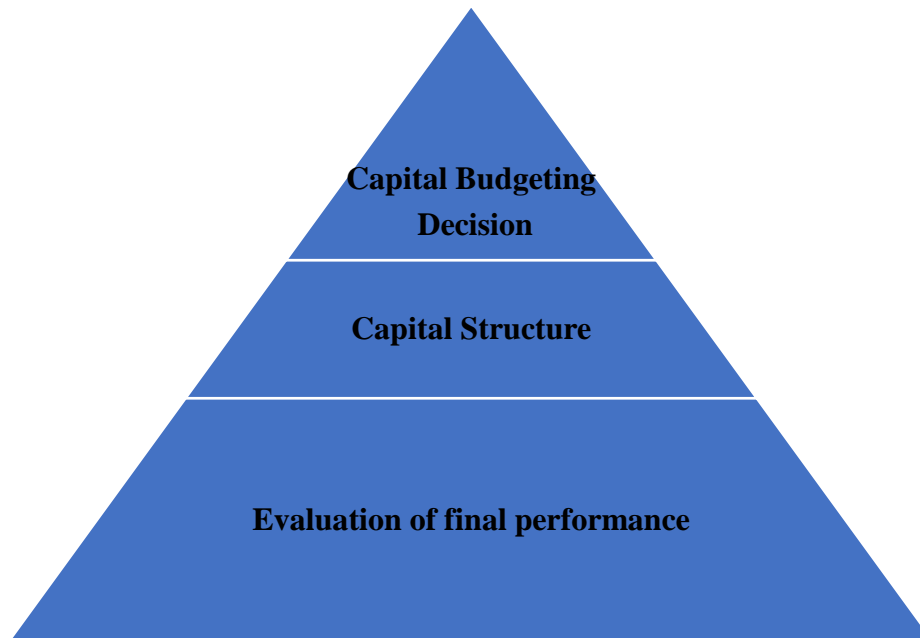
It refers to that minimum required rate of return that the project must earn in order to recover the cost of fund use in financing the project.

It is the rate that supplies of a fund expect to get. It is determined by the cost of various sources of finance. It also refers to the weighted average cost of capital or composite cost of capital. On the other hand, it is the minimum rate of return that will maintain the market value of shares at present level.

The COC/minimum rate of return has a direct relation with the risk i.e. higher the risk followed by higher the COC.



## Importance of cost of capital



A firm's cost of capital is important from both the angles of planning for capital budgeting and capital structure decisions.

**Capital budgeting decisions:** Under this cost of capital is used as discount rate on the basis of that firm's future cash flows are discounted to find out their present values. That is why cost of capital is very essential for financial appraisal of new capital expenditure proposals.

**Capital structure decisions:** The finance manager must raise the funds from the different sources in a way that it minimises the cost and risk factor. The cost of debt may be cheaper because of tax benefits, but a slight fall in earning capacity of the firm may bring the firm near to cash insolvency.

## Components of cost of capital

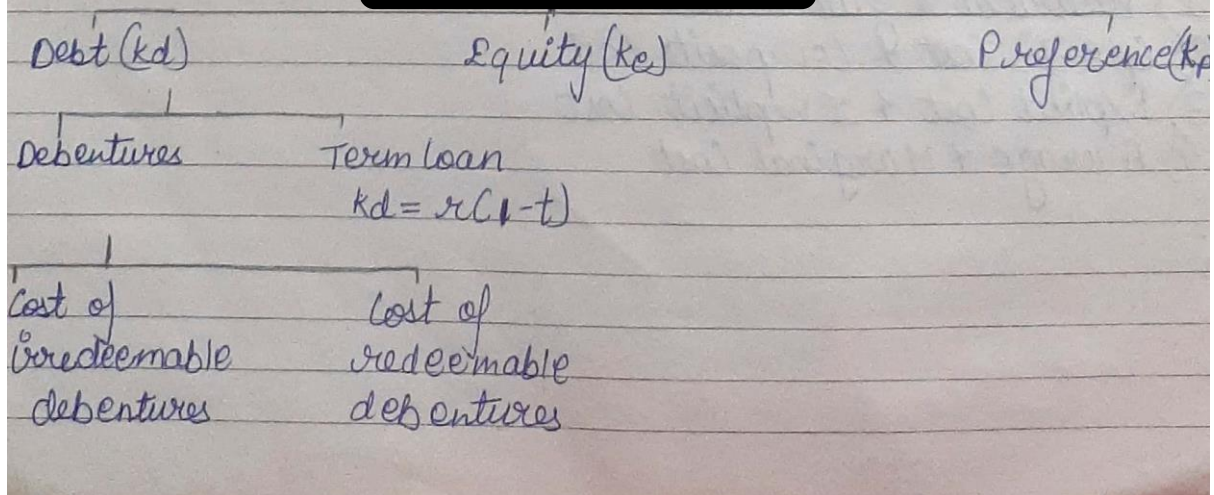
- ❖ **Return at zero risk level:** this component of cost of capital is minimum, which is certain under all circumstances.
- ❖ **Premium for business risk:** It refers the changes in operating profit (EBIT) due to change in sales. The selection of a project of higher risk will increase the cost of capital by way of increase in the expected rate of return of the investors.
- ❖ **Premium for financial risk:** Financial risk is due to debt equity mix, in case of high debt in the total capital structure the financial risk exists. In order to make the payment of interest and principal, such firms need to generate higher operating profits to avoid insolvency.
- ❖ **The above components of cost of capital can be put under equation:**  $K = r_o + b + f$ , where K, is cost of capital,  $r_o$ , is return at zero risk level, b, premium for business risk and f, premium for financial risk.

## Classification of cost of capital

- ❖ **Explicit cost:** It is the discount rate that equates the PV of funds received by the firm net of underwriting cost with the PV of expected cash outflows.
- ❖ **Implicit cost:** it is the opportunity cost for the firm and its shareholders to be foregone in case of project under consideration is accepted.
- ❖ **Future cost:** It refers to projected cost of funds to finance the project.
- ❖ **Historical cost:** It is the cost which has been already incurred for financing a project. It can be useful in projecting the future costs when compared with standard cost.
- ❖ **Specific cost:** The cost of each component of capital i.e. equity, preference share and debenture is known is specific cost.
- ❖ **Combined cost:** overall cost of capital of all sources of finance is combined cost.
- ❖ **Average cost:** It is the weighted average cost of capital of each component of capital in the total capital.
- ❖ **Marginal cost:** It is the WACC of new funds raised by the firm. For capital structure and financing decisions the marginal cost of capital is the most important factor to be considered. So, it the cost which is based on the funds raised afresh.



## COST OF CAPITAL



⇒ Cost of Equity ( $k_e$ ):  $k_e = \frac{D_1}{P_0} + G$

$P_0$  = Market price per share

$G$  = Growth Rate

$D$  = Dividend to be paid

$$D_1 = D_0 + (1+g)$$

where

$D_0$  = last paid/ year dividend

$$\text{If } k_e = \frac{D_1}{P_0} + G$$

$$= k_e - G = \frac{D_1}{P_0}$$

$$\therefore P_0 (k_e - G) = D_1$$

$$\therefore P_0 = \frac{D_1}{k_e - G}$$

$(G = b \times r)$

⇒ Cost of Preference ( $k_p$ ):

Redeemable

$$k_p = \frac{D + R_p - N_p}{\frac{N}{R_p + N_p} \times 100}$$

Irredeemable

$$k_p = \frac{D}{NP} \times 100$$

### Cost of Equity Capital

The cost of Equity Capital is most difficult to compute. Some people argue that the equity capital is cost free as the Company is not legally bound to pay the dividends to Equity shareholders. But this is not true. Shareholders will invest their funds with the expectation of dividends. The market value of Equity Share depends in the dividends expected by shareholders. The cost of Equity Capital may be expressed as the minimum rate of return that must be earned on New Equity Share Capital financed investment in order to keep the earnings available to the existing Equity shareholders of the firm unchanged.

It may be computed in the following 4 methods.

a) Dividend method (no growth model):

b) Constant growth model (Gordon Model):

c) Earning Model

d) Capital Asset Pricing Model:

### Illustration : 01

Assuming the corporate tax rate of 35%, compute the after tax cost of capital in the following situations:

- (i) Perpetual 15% Debentures of ₹1,000, sold at a premium of 10% with no flotation costs.
- (ii) 10-year 14% Debentures of ₹2,000, redeemable at par, with 5% flotation costs.

**Solution:**

- i. Computation of cost of Capital

$$K_d = \frac{I}{P} (1 - t)$$

Where,

I = Interest Payment

P = Sale price of debenture

t = Tax rate

$$K_d = \frac{150(1 - 0.35)}{1100} \times 100 = 8.86\%$$

- ii. Computation of Cost of Capital

$$K_d = \frac{I(1-t) + \frac{RV - NS}{n}}{\frac{RV + NS}{2}} \times 100$$

$$K_d = \frac{280(1 - 0.35) + \frac{2000 - 1900}{10}}{\frac{2000 + 1900}{2}} \times 100$$

$$= 9.85\%$$

**Illustration 2:**

Calculate the Cost of Capital from the following cases:

- (i) 10-year 14% Preference shares of ₹100, redeemable at premium of 5% and flotation costs 5%. Dividend tax is 10%.
- (ii) An equity share selling at ₹50 and paying a dividend of ₹6 per share, which is expected to continue indefinitely.
- (iii) The above equity share if dividends are expected to grow at the rate of 5%.

**Solution:**

$$i. \quad K_p = \frac{\text{Preference dividend}(1 + \text{dividend}) + \frac{RV - NS}{N}}{\frac{RV + NS}{2}} \times 100 = 8.86\%$$

$$K_p = \frac{14(1 + 0.1) + \frac{105 - 95}{10}}{\frac{105 + 95}{2}} \times 100 = 16.4\%$$

$$ii. \quad K_e(\text{no growth model}) = \frac{\text{Dividend}}{\text{Net Sale Proceeds}} \times 100$$

$$K_e = \frac{6}{50} \times 100 = 12\%$$

$$iii. \quad K_e(\text{no growth model}) = \frac{D_1}{\text{Net Sale Proceeds}} + \text{Growth}(g)$$

$$K_e = \frac{6.3}{50} + 0.05 = 0.176(\text{or}) 17.6\%$$

**Illustration 3:**

From the following information, determine the appropriate weighted average cost of capital, relevant for evaluating long-term investment projects of the company.

Cost of equity	0.18
After tax cost of long-term debt	0.08
After tax cost of short-term debt	0.09
Cost of Reserve	0.15

Sources of capital	Book Value (BV) ₹	Market Value (MV) ₹
Capital	300000	750000
Reserve	200000	-
Long-term debt	400000	375000
Short-term debt	100000	100000
	1000000	1225000

**Solution:****Calculation of Weighted Average Cost of Capital (WACC) or overall Cost of Capital:****Alternative 1: - Book value as weights:**

Element	Amount (₹)	Weight	Specific cost of capital	Overall cost of capital
Capital	3,00,000	0.3333	0.18	0.06
Reserve	2,00,000	0.2222	0.15	0.03
L/T debt	4,00,000	0.4445	0.08	0.04
	9,00,000	1.0000		0.13

Therefore, WACC = 13%

**Alternative 2: - Market value as weights:**

Element	Amount (₹)	Weight	Specific cost of capital	Overall cost of capital
Capital	4,50,000	0.40	0.18	0.0720
*Reserve	3,00,000	0.27	0.15	0.0405
L/T debt	3,75,000	0.33	0.08	0.0264
	11,25,000	1.00		0.1389

Therefore, WACC = 13.89%

**\*Note:** Market Value of equity share capital apportioned between capital and reserve in book value weightage.



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