

Capital Structure Decisions

Meaning of Capital Structure

Capital structure refers to the mix of a firm's capitalisation i.e. mix of long term sources of funds such as debentures, preference share capital, equity share capital and retained earnings for meeting total capital requirement.

Capital structure decision refers to deciding the forms of financing (which sources to be tapped), their actual requirements (amount to be funded) and their relative proportions (mix) in total capitalisation.

Normally, a finance manager tries to choose a pattern of capital structure which minimises cost of capital and maximises the owners' return.

Designing Capital Structure

A firm has the choice to raise funds for financing its investment proposals from different sources in different proportions. It can:

- Exclusively use debt, or
- Exclusively use equity capital, or
- Exclusively use preference capital, or
- Use a combination of debt and equity in different proportions,
- Use a combination of debt, equity and preference capital in different proportions, or
- Use a combination of debt and preference capital in different proportions.

The choice of the combination of these sources is called capital structure mix. But the question is which of the pattern should the firm choose?

Factors Governing Capital Structure

- Cost Principle - According to this principle, an ideal pattern or capital structure is one that minimises cost of capital structure and maximises earnings per share (EPS). For

e.g. Debt capital is cheaper than equity capital from the point of its cost and interest being deductible for income tax purpose, whereas no such deduction is allowed for dividends.

b) Risk Principle - According to this principle, reliance is placed more on common equity for financing capital requirements than excessive use of debt. Use of more and more debt means higher commitment in form of interest payout. This would lead to erosion of shareholders value in unfavourable business situation. There are two risks associated with this principle:

(i) Business risk

(ii) Financial risk.

Generally, a firm should neither be exposed to high degree of business risk and low degree of financial risk or vice-versa, so that shareholders do not bear a higher risk.

c) Control Principle - While designing a capital structure, the finance manager may also keep in mind that existing management control and ownership remains undisturbed. Issue of new equity will dilute existing control ~~of~~ pattern and also it involves higher cost. Issue of more debt causes no dilution in control, but causes a higher degree of financial risk.

d) Flexibility Principle - By flexibility it means that the management chooses such a combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too. While debt could be interchanged (If the company is loaded with a debt of 18% and funds are available at 15%, it can return old debt with new debt, at a lesser interest rate), but the same option may not be available in case of equity investment.

e) Other Considerations - Besides above principles, other factors such as nature of industry, timing of issue and competition in the industry should also be considered. Industries facing severe competition also resort to more equity than debt.

Capital Structure Theories

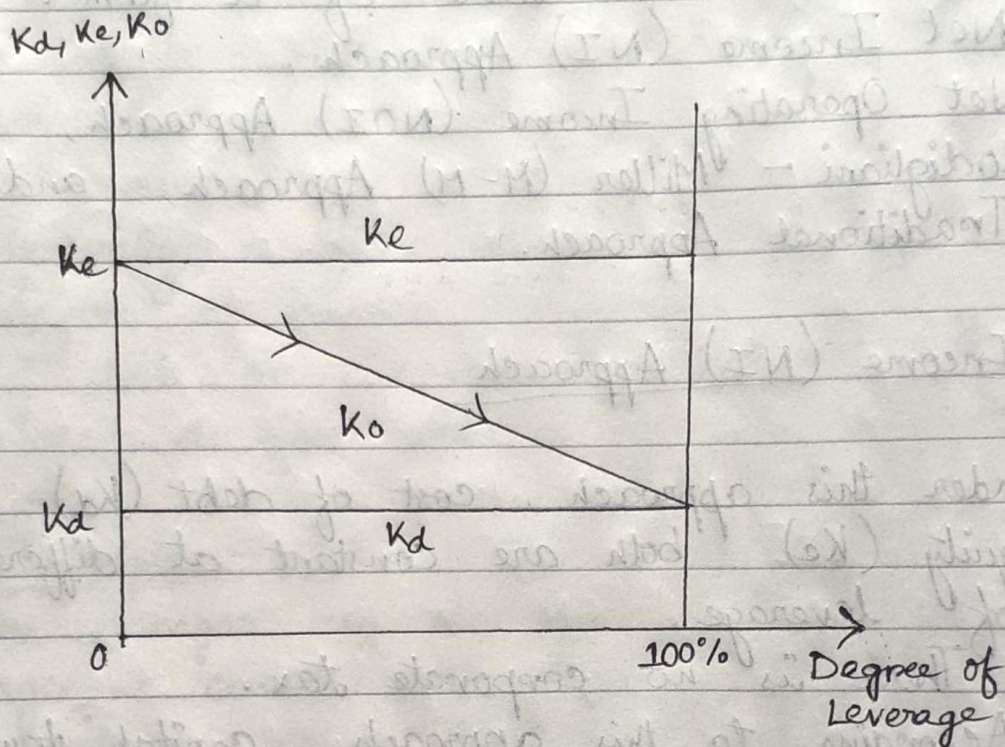
There are four major theories which explain the relationship between the capital structure, cost of capital and the value of a firm. These are:

- (a) Net Income (NI) Approach,
- (b) Net Operating Income (NOI) Approach,
- (c) Modigliani - Miller (M-M) Approach, and
- (d) Traditional Approach.

(a) Net Income (NI) Approach

- i) Under this approach, cost of debt (K_d) and cost of equity (K_e) both are constant at different degree of leverage.
- ii) There is no corporate tax.
- iii) According to this approach, capital structure decision is relevant to the value of the firm. An increase in financial leverage will lead to decline in the weighted average cost of capital, while the value of the firm as well as market price of ordinary share will increase. Conversely, a decrease in the leverage will cause an increase in the overall cost of capital and a consequent decline in the value of the firm as well as market price of equity shares.
- iv) The cost of debt is less than the cost of equity capital i.e. $K_d < K_e$.

v) Under this approach at 100% degree of leverage, overall cost of capital (K_o) is minimum and Value of the firm (V) is maximum. Hence, under this approach 0% equity and 100% debt is the optimum capital structure.



Formulae —

i) Market value of debt (D) = $\frac{\text{Interest (I)}}{K_d}$

ii) Market value of equity (E) = $\frac{\text{EBIT} - I}{K_e}$

iii) Value of the firm (V) = $D + E$
 = Mkt. Value of Debt + Mkt. Value of Equity

iv) Overall Cost of Capital (K_o) = $\frac{\text{EBIT}}{V} \times 100$

E.g. Total investment of a firm is ₹ 1 lakh. Net income is 18% of total investment. Cost of debt is 10%, cost of equity is 15%. Degree of leverages — 0%, 20%, 50%, 75%, 100%. Determine —

- i) Market value of Debt.
- ii) Market value of Equity.
- iii) Value of the firm.
- iv) Overall cost of capital under NI approach and comment on the results.

Soln: Determination of Value of the firm and Overall Cost of capital under NI Approach

<u>Particulars</u>	<u>0%</u>	<u>20%</u>	<u>50%</u>	<u>75%</u>	<u>100%</u>
Equity Capital	1,00,000	80,000	50,000	25,000	0
10% Debentures	0	20,000	50,000	75,000	1,00,000
	<u>1,00,000</u>	<u>1,00,000</u>	<u>1,00,000</u>	<u>1,00,000</u>	<u>1,00,000</u>
Interest Amount	0	2000	5000	7,500	10,000
EBIT (18% of ₹ 1 lakh)	18,000	18,000	18,000	18,000	18,000
Less: Interest	0	2,000	5,000	7,500	10,000
EBT	<u>18,000</u>	<u>16,000</u>	<u>13,000</u>	<u>11,500</u>	<u>8,000</u>
Mkt. Value of Equity (E) $\left[\frac{EBIT - I}{K_e} \right]$	1,20,000	1,06,667	86,667	76,667	53,333
Mkt. Value of Debt (D) $\left[\frac{Interest}{K_d} \right]$	0	20,000	50,000	75,000	1,00,000
Value of the firm (V) [V = E + D]	<u>1,20,000</u>	<u>1,26,667</u>	<u>1,36,667</u>	<u>1,51,667</u>	<u>1,53,333</u>
Overall Cost of Capital (K _o) $\left[\frac{EBIT \times 100}{V} \right]$	15%	14.21%	13.17%	11.87%	11.74%

Comment

Maximum value of the firm is ₹ 1,53,333
and minimum Overall cost of capital is 11.74%.

Hence, under this approach the optimum
debt-equity mixture is 0% equity and 100% debt
i.e. equity capital is 0 and debt capital is
₹ 1 lakh.

Illustration 1.

P Ltd. has operating income of ₹ 1,00,000 and its cost of equity is 10% and cost of debt is 6%. The amount of debt capital is ₹ 5,00,000.

- (a) What is the value of the firm? Find out the overall cost of capital (K_0).
- (b) What is the value of the firm and corresponding overall cost of capital if the amount of debt capital increases to ₹ 7,00,000.

[Almost similar to C.U. M.Com., 2004]

Solution :

(a) Computation of the value of the firm (V) and overall cost of capital (K_o) under Net Income (NI) Approach.

Operating Income (EBIT)	₹ 1,00,000
Less : Interest on debt capital (I)	30,000
[6% of ₹ 5,00,000]	
Earnings available to equity shareholders/ Equity Earnings (E_e)	70,000
Cost of equity/Equity capitalisation rate (K_e)	10%
∴ Market value of Equity Capital (S) = $\frac{E_e}{K_e} = \frac{₹ 70,000}{10\%}$	₹ 7,00,000
Market value of Debt Capital (D) = $\frac{I}{K_d} = \frac{₹ 30,000}{6\%}$	₹ 5,00,000
∴ Value of the firm [$V = (S + D)$]	₹ 12,00,000

Overall Cost of Capital/Overall Capitalisation Rate (K_o)

$$\frac{EBIT}{V} = \frac{₹ 1,00,000}{₹ 12,00,000} = 0.08333 \text{ or } 8.33\%$$

Alternatively, overall cost of capital may be computed as follows :

$$K_o = W_1 K_d + W_2 K_e, \text{ where } W_1 = \frac{D}{V} \text{ and } W_2 = \frac{S}{V}$$

$$\begin{aligned} \therefore K_o &= \left(\frac{D}{V}\right)K_d + \left(\frac{S}{V}\right)K_e \\ &= \left(\frac{₹ 5,00,000}{₹ 12,00,000}\right) \times 0.06 + \left(\frac{₹ 7,00,000}{₹ 12,00,000}\right) \times 0.10 \\ &= 0.0250 + 0.0583 \\ &= 0.0833 \text{ or } 8.33\% \end{aligned}$$

(b) Computation of the value of the firm (V) and overall cost of capital (K_o) when debt capital increases to ₹ 7,00,000.

Operating Income (EBIT)		₹
		1,00,000
Less : Interest on debt capital (I)		42,000
[6% of ₹ 7,00,000]		
Equity Earnings (E_e)		58,000
Equity capitalisation rate (K_e)		10%
Market value of Equity Capital (S) = $\frac{E_e}{K_e}$	= $\frac{₹ 58,000}{10\%}$	₹ 5,80,000
Market value of Debt Capital (D) = $\frac{I}{K_d}$	= $\frac{₹ 42,000}{6\%}$	₹ 7,00,000
Value of the firm [$V = (S + D)$]		₹ 12,80,000

$$\begin{aligned} \text{Overall Cost of Capital } (K_o) &= \frac{EBIT}{V} \\ &= \frac{₹ 1,00,000}{₹ 12,80,000} \\ &= 0.0781 \text{ or } 7.81\% \end{aligned}$$

Therefore, the essence of Net Income approach is that a firm can minimise its overall cost of capital (from 8.33% to 7.81% in the above illustration) and increase its value (from ₹ 12,00,000 to ₹ 12,80,000) by increasing the proportionate use of debt capital (from ₹ 5,00,000 to ₹ 7,00,000) in the overall capital structure. Thus higher the leverage, higher the total value of the firm. So optimum capital structure will be the one having 100% debt financing which would result in achieving the lowest overall cost of capital. But in reality this is not possible. So, appropriateness in capital structure is essential rather than of its optimality. Thus the desirable structure, according to this approach, should be, the highest possible leverage leading to maximisation of the value of the firm and minimisation of overall cost of capital. The reduction of overall cost of capital with more and more use of debt capital and increase in the value of the firm is only possible when assumptions in respect of NI approach (as mentioned earlier) are held valid.

Illustration 7.

Alpha Ltd. has earned a profit of ₹ 40,00,000 before providing for interest and tax. The company's capital structure is as follows :

- (a) 8,00,000 Equity shares of ₹ 10 each and its market capitalisation rate is 15.5%.
- (b) 50,000, 12% secured redeemable debentures of ₹ 150 each.

You are required to calculate the value of the firm under Net Income (NI) approach, assuming that there is no tax. Also calculate the overall cost of capital.

Solution :

Computation of the Value of the firm (V) and overall cost of capital (K_o) under Net Income (NI) approach.

Earnings/Profits before Interest and Tax (EBIT)	₹ 40,00,000
Less : Interest on debentures [12% of (50,000 × ₹ 150)]	9,00,000
Earnings available to equity shareholders/Equity Earnings (E_e)	31,00,000
Equity Capitalisation Rate (K_e)	15.5%
Market Value of Equity (S) = $\frac{E_e}{K_e} = \frac{₹ 31,00,000}{15.5\%}$	₹ 2,00,00,000
Market Value of Debt (D) = $\frac{I}{K_d} = \frac{₹ 9,00,000}{12\%}$	₹ 75,00,000
∴ Market value of the firm (V) = $S + D$	₹ 2,75,00,000
Overall Cost of Capital (K_o) = $\frac{EBIT}{V} = \frac{₹ 40,00,000}{₹ 2,75,00,000}$	0.14545
	or 14.5%

Illustration 12.

From the following particulars determine the market value of the equity (S), market value of the debt (D), market value of the firm (V) and overall cost of capital (K_o) under NI Approach of ABC Ltd.

- (1) Net Operating Income of the company is ₹ 1,00,000
- (2) Total amount of investment is ₹ 5,00,000
- (3) Assume that there is no corporate tax.

Following estimates of the cost of debt and cost of equity capital have been made at various level of the debt-equity mix for ABC Ltd.

% of Debt	Cost of Debt (K_d)	Cost of Equity (K_e)
0%	—	15%
10%	10%	15%
20%	10%	15%
50%	10%	15%
75%	10%	15%

Which of the capital structure will you recommend, and why ?

Solution :

Computation of Market Value of Equity (S), Debt (D) and the Total Value of the Firm (V) and the Overall Cost of Capital (K_o) under Net Income (NI) Approach

Particulars	% of Debt to Total Capital Employed				
	0	10	20	50	75
Amount of Debt Capital (₹)	—	50,000	1,00,000	2,50,000	3,75,000
Amount of Equity Capital (₹)	5,00,000	4,50,000	4,00,000	2,50,000	1,25,000
Total Capital Employed (₹)	5,00,000	5,00,000	5,00,000	5,00,000	5,00,000
EBIT/Net Operating Income (₹)	1,00,000	1,00,000	1,00,000	1,00,000	1,00,000
Less : Interest on Debt (I) (₹)	—	5,000	10,000	25,000	37,500
Earnings available to Equity Shareholders/Equity Earnings (E_e) (₹)	1,00,000	95,000	90,000	75,000	62,500
Equity Capitalisation Rate/ Cost of Equity (K_e)	15%	15%	15%	15%	15%
Market Value of Equity (S) $\left[\frac{E_e}{K_e} \right]$	6,66,667	6,33,333	6,00,000	5,00,000	4,16,667
Market Value of Debt (D) $\left[\frac{I}{K_d} \right]$	—	50,000	1,00,000	2,50,000	3,75,000
Market Value of the Firm (V) [S + D]	6,66,667	6,83,333	7,00,000	7,50,000	7,91,667
Overall Cost of Capital (K_o) $\left[\frac{EBIT}{V} \right]$	15%	14.63%	14.29%	13.33%	12.63%

Comment :

We know that the optimum capital structure is that point where 'V' is maximum and ' K_o ' is minimum. In this case maximum $V = ₹ 7,91,667$ and minimum $K_o = 12.63\%$ and therefore, at 75% debt capital, optimum capital structure exists under NI approach. It happens, because of a higher debt content in the capital structure leads to a high financial leverage and this results in decline in the overall or weighted average cost of capital. This obviously, results in increase in the value of the firm and also increase in the value of the equity shares.