

Capital Structure



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Capital Structure

Coverage –

- Capital Structure concept
- Capital Structure planning
- Concept of Value of a Firm
- Significance of Cost of Capital (WACC)
- Capital Structure theories –
 - Net Income
 - Net Operating Income
 - Modigliani-Miller
 - Traditional Approach



Capital Structure

- ⊕ Capital structure can be defined as the mix of owned capital (equity, reserves & surplus) and borrowed capital (debentures, loans from banks, financial institutions)
- ⊕ Maximization of shareholders' wealth is prime objective of a financial manager. The same may be achieved if an optimal capital structure is designed for the company.
- ⊕ Planning a capital structure is a highly psychological, complex and qualitative process.
- ⊕ It involves balancing the shareholders' expectations (risk & returns) and capital requirements of the firm.

Planning the Capital Structure

Important Considerations –

- **Return:** ability to generate maximum returns to the shareholders, i.e. maximize EPS and market price per share.
- **Cost:** minimizes the cost of capital (WACC). Debt is cheaper than equity due to tax shield on interest & no benefit on dividends.
- **Risk:** insolvency risk associated with high debt component.
- **Control:** avoid dilution of management control, hence debt preferred to new equity shares.
- **Flexible:** altering capital structure without much costs & delays, to raise funds whenever required.
- **Capacity:** ability to generate profits to pay interest and principal.

Value of a Firm – directly co-related with the maximization of shareholders' wealth.

- Value of a firm depends upon earnings of a firm and its cost of capital (i.e. WACC).
- Earnings are a function of investment decisions, operating efficiencies, & WACC is a function of its capital structure.
- Value of firm is derived by capitalizing the earnings by its cost of capital (WACC). **Value of Firm = Earnings / WACC**
- Thus, value of a firm varies due to changes in the earnings of a company or its cost of capital, or both.
- Capital structure cannot affect the total earnings of a firm (EBIT), but it can affect the residual shareholders' earnings.

An illustration of Income Statement

Particulars	Rs.
Sales (A)	10,000
(-) Cost of goods sold (B)	4,000
Gross Profit (C = A - B)	6,000
(-) Operating expenses (D)	2,500
Operating Profit (EBIT) (E = C - D)	3,500
(-) Interest (F)	1,000
EBT (G = E - F)	2,500
(-) Tax @ 30% (H)	750
PAT (I = G - H)	1,750
(-) Preference Dividends (J)	750
Profit for Equity Shareholders (K = I - J)	1,000
No. of Equity Shares (L)	200
Earning per Share (EPS) (K/L)	5

Capital Structure Theories



ASSUMPTIONS –

- ❖ Firms use only two sources of funds – equity & debt.
- ❖ No change in investment decisions of the firm, i.e. no change in total assets.
- ❖ 100 % dividend payout ratio, i.e. no retained earnings.
- ❖ Business risk of firm is not affected by the financing mix.
- ❖ No corporate or personal taxation.
- ❖ Investors expect future profitability of the firm.

Capital Structure Theories –

A) Net Income Approach (NI)

- Net Income approach proposes that there is a definite relationship between capital structure and value of the firm.
- The capital structure of a firm influences its cost of capital (WACC), and thus directly affects the value of the firm.
- NI approach assumptions –
 - *NI approach assumes that a continuous increase in debt does not affect the risk perception of investors.*
 - *Cost of debt (K_d) is less than cost of equity (K_e) [i.e. $K_d < K_e$]*
 - *Corporate income taxes do not exist.*

Capital Structure Theories –

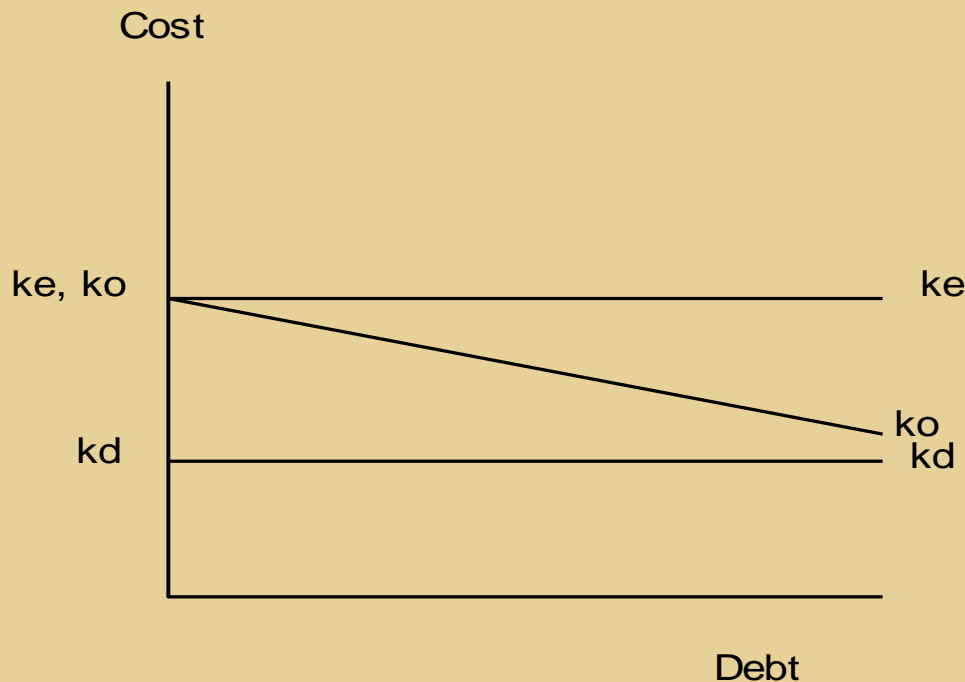
A) Net Income Approach (NI)

- As per NI approach, higher use of debt capital will result in reduction of WACC. As a consequence, value of firm will be increased.

$$\text{Value of firm} = \frac{\text{Earnings}}{\text{WACC}}$$

- Earnings (EBIT) being constant and WACC is reduced, the value of a firm will always increase.
- Thus, as per NI approach, a firm will have maximum value at a point where WACC is minimum, i.e. when the firm is almost debt-financed.

Capital Structure Theories – A) Net Income Approach (NI)



As the proportion of debt (K_d) in capital structure increases, the WACC (K_o) reduces.

Capital Structure Theories –

A) Net Income Approach (NI)

Calculate the value of Firm and WACC for the following capital structures

EBIT of a firm Rs. 200,000.	$K_e = 10\%$	$K_d = 6\%$	
Debt capital Rs. 500,000	Debt = Rs. 700,000	Debt = Rs. 200,000	

Particulars	case 1		case 2		case 3
EBIT	200,000		200,000		200,000
(-) Interest	30,000		42,000		12,000
EBT	170,000		158,000		188,000
Ke	10%		10%		10%
Value of Equity (EBT / Ke)	1,700,000		1,580,000		1,880,000
Value of Debt	500,000		700,000		200,000
Total Value of Firm	2,200,000		2,280,000		2,080,000
WACC	9.09%		8.77%		9.62%
(EBIT / Value) * 100					

Capital Structure Theories –

B) Net Operating Income (NOI)

- Net Operating Income (NOI) approach is the exact opposite of the Net Income (NI) approach.
- As per NOI approach, value of a firm is not dependent upon its capital structure.
- Assumptions –
 - *WACC is always constant, and it depends on the business risk.*
 - *Value of the firm is calculated using the overall cost of capital i.e. the WACC only.*
 - *The cost of debt (K_d) is constant.*
 - *Corporate income taxes do not exist.*

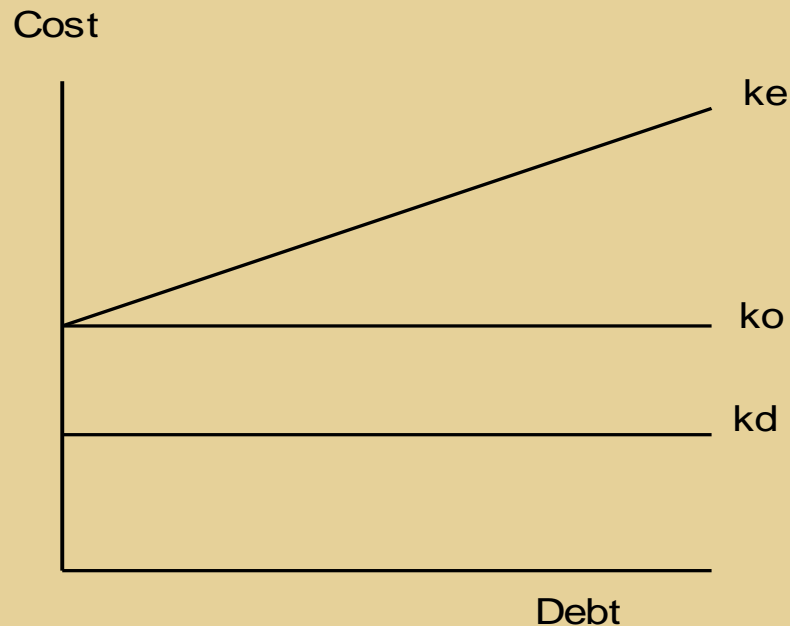
Capital Structure Theories –

B) Net Operating Income (NOI)

- NOI propositions (i.e. school of thought) –
 - ✚ The use of higher debt component (borrowing) in the capital structure increases the risk of shareholders.
 - ✚ Increase in shareholders' risk causes the equity capitalization rate to increase, i.e. higher cost of equity (K_e)
 - ✚ A higher cost of equity (K_e) nullifies the advantages gained due to cheaper cost of debt (K_d)
 - ✚ In other words, the finance mix is irrelevant and does not affect the value of the firm.

Capital Structure Theories –

B) Net Operating Income (NOI)



- Cost of capital (K_o) is constant.
- As the proportion of debt increases, (K_e) increases.
- No effect on total cost of capital (WACC)

Capital Structure Theories –

B) Net Operating Income (NOI)

Calculate the value of firm and cost of equity for the following capital structure -

EBIT = Rs. 200,000.

WACC (K_o) = 10%

K_d = 6%

Debt = Rs. 300,000, Rs. 400,000, Rs. 500,000 (under 3 options)

Particulars	Option I	Option II	Option III
EBIT	200,000	200,000	200,000
WACC (K_o)	10%	10%	10%
Value of the firm	2,000,000	2,000,000	2,000,000
Value of Debt @ 6 %	300,000	400,000	500,000
Value of Equity (bal. fig)	1,700,000	1,600,000	1,500,000
Interest @ 6 %	18,000	24,000	30,000
EBT (EBIT - interest)	182,000	176,000	170,000
Hence, Cost of Equity (K_e)	10.71%	11.00%	11.33%

Capital Structure Theories –

C) Modigliani – Miller Model (MM)

- MM approach supports the NOI approach, i.e. the capital structure (debt-equity mix) has no effect on value of a firm.
- Further, the MM model adds a behavioural justification in favour of the NOI approach (personal leverage)
- Assumptions –
 - *Capital markets are perfect and investors are free to buy, sell, & switch between securities. Securities are infinitely divisible.*
 - *Investors can borrow without restrictions at par with the firms.*
 - *Investors are rational & informed of risk-return of all securities*
 - *No corporate income tax, and no transaction costs.*
 - *100 % dividend payout ratio, i.e. no profits retention*

Capital Structure Theories –

C) Modigliani – Miller Model (MM)

MM Model proposition –

- Value of a firm is independent of the capital structure.
- Value of firm is equal to the capitalized value of operating income (i.e. **EBIT**) by the appropriate rate (i.e. **WACC**).
- Value of Firm = **Mkt. Value of Equity + Mkt. Value of Debt**
= $\frac{\text{Expected EBIT}}{\text{Expected WACC}}$

Capital Structure Theories –

C) Modigliani – Miller Model (MM)

MM Model proposition –

- As per MM, identical firms (except capital structure) will have the same level of earnings.
- As per MM approach, if market values of identical firms are different, 'arbitrage process' will take place.
- In this process, investors will switch their securities between identical firms (from levered firms to un-levered firms) and receive the same returns from both firms.

Capital Structure Theories –

C) Modigliani – Miller Model (MM)

Levered Firm

- Value of levered firm = Rs. 110,000
- Equity Rs. 60,000 + Debt Rs. 50,000
- $K_d = 6\%$, EBIT = Rs. 10,000,
- Investor holds 10 % share capital

Un-Levered Firm

- Value of un-levered firm = Rs. 100,000 (all equity)
- EBIT = Rs. 10,000 and investor holds 10 % share capital

Capital Structure Theories –

C) Modigliani – Miller Model (MM)

Return from Levered Firm:

$$\text{Investment} = 10\% \times 110,000 - 50,000 = 10\% \times 60,000 = 6,000$$

$$\text{Return} = 10\% \left[10,000 - 6\% \times 50,000 \right] = 1,000 - 300 = 700$$

Alternate Strategy:

1. Sell shares in L : $10\% \times 60,000 = 6,000$

2. Borrow (personal leverage): $10\% \times 50,000 = 5,000$

3. Buy shares in U : $10\% \times 100,000 = 10,000$

Return from Alternate Strategy:

$$\text{Investment} = 10,000$$

$$\text{Return} = 10\% \times 10,000 = 1,000$$

$$\text{Less: Interest on personal borrowing} = 6\% \times 5,000 = 300$$

$$\text{Net return} = 1,000 - 300 = 700$$

$$\text{Cash available} = 11,000 - 10,000 = 1,000$$

Capital Structure Theories –

D) Traditional Approach

- The NI approach and NOI approach hold extreme views on the relationship between capital structure, cost of capital and the value of a firm.
- Traditional approach (*'intermediate approach'*) is a compromise between these two extreme approaches.
- Traditional approach confirms the existence of an optimal capital structure; where WACC is minimum and value of the firm is maximum.
- As per this approach, a best possible mix of debt and equity will maximize the value of the firm.

Capital Structure Theories –

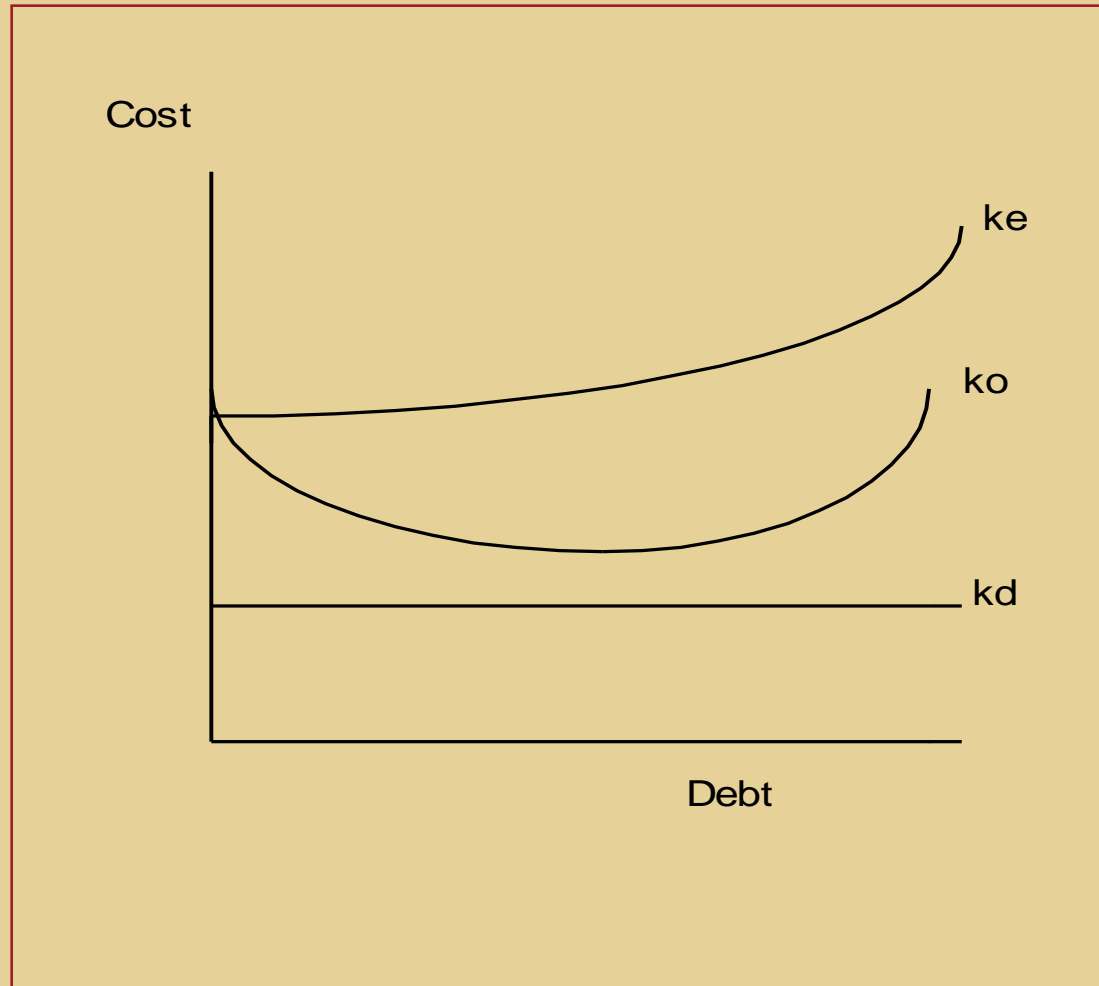
D) Traditional Approach

The approach works in 3 stages –

- 1) Value of the firm increases with an increase in borrowings (since $K_d < K_e$). As a result, the WACC reduces gradually. This phenomenon is up to a certain point.
- 2) At the end of this phenomenon, reduction in WACC ceases and it tends to stabilize. Further increase in borrowings will not affect WACC and the value of firm will also stagnate.
- 3) Increase in debt beyond this point increases shareholders' risk (*financial risk*) and hence K_e increases. K_d also rises due to higher debt, WACC increases & value of firm decreases.

Capital Structure Theories – D) Traditional Approach

- Cost of capital (K_o) is reduced initially.
- At a point, it settles
- But after this point, (K_o) increases, due to increase in the cost of equity. (K_e)



Capital Structure Theories –

D) Traditional Approach

EBIT = Rs. 150,000, presently 100% equity finance with $K_e = 16\%$. Introduction of debt to the extent of Rs. 300,000 @ 10% interest rate or Rs. 500,000 @ 12%.

For case I, $K_e = 17\%$ and for case II, $K_e = 20\%$. **Find the value of firm and the WACC**

Particulars	Presently		case I		case II
Debt component	-		300,000		500,000
Rate of interest	0%		10%		12%
EBIT	150,000		150,000		150,000
(-) Interest	-		30,000		60,000
EBT	150,000		120,000		90,000
Cost of equity (K_e)	16%		17%		20%
Value of Equity (EBT / K_e)	937,500		705,882		450,000
Total Value of Firm (Db + Eq)	937,500		1,005,882		950,000
WACC (EBIT / Value) * 100	16.00%		14.91%		15.79%