

# Capital Structure

The objective of the firm should be directed towards the maximization of the value of the firm the capital structure, or average, decision should be examined from the point of view of its impact on the value of the firm. If the value of the firm can be affected by capital structure or financing decision a firm would like to have a capital structure which maximizes the market value of the firm. The capital structure decision can affect the value of the firm either by changing the expected earnings or the cost of capital or both. **The capital structure decision can affect the value of the firm either by changing the expected earnings or the cost of capital or both.**

**To examine the relationship between capital structure and cost of capital (firm value), the following assumptions have been made:**

- Firms employ only two types of capital: debt and equity.
- The total assets of the firm are given. The degree of average can be changed by selling debt to purchase shares or selling shares to retire debt.
- The firm has a policy of paying 100 per cent dividends.
- The operating earnings of the firm are not expected to grow.
- The business risk is assumed to be constant and independent of capital structure and financial risk. The corporate income taxes do not exist. This assumption is relaxed later on.

## Net Income Approach (NI- Approach)

This approach has been suggested by David Durand. As per the NI approach, the firm can increase its value or lower its cost of capital by increasing the proportion of debt in the capital structure. In other words, if the degree of financial leverage increases, the WACC will decline with every increase in debt component in the total capital employed, while the firm's value will increase. Net income approach is based on following three assumptions--

1. No corporate taxes
2. Cost of debt is less than cost of equity (equity capitalization rate)
3. Use of debt component does not change the risk perception of investors as a result the  $k_d$  (debt capitalization rate) and  $k_e$  (equity capitalization rate) remains constant

Value of the firm as per the NI approach can be stated as  **$V = S + D$**

where,  $V$  = Value of the firm,  $S$  = Market value of equity and  $D$  = Value of Debt

**Market Value of Equity (S) =  $NI / K_e$ ,**

Where,  $NI$  = Earnings available to equity shareholders  
 $K_e$  = Equity Capitalization Rate

Under the NI approach, the value of the firm will be maximum at a point where the WACC is minimum. Thus the theory suggests total or maximum possible debt financing for minimizing the cost of capital. Overall cost of capital under the NI approach is –

**Overall cost of capital =  $EBIT / \text{Value of the firm}$**

## Net Operating Income Approach (NOI- Approach)

The NOI approach has been suggested by Durand. According to the NOI method, the market value of the firm is not affected by changes in capital structure. The market value can be arrived at by capitalizing the net operating income at the overall cost of capital which is constant. Market value of the firm is arrived as using below formula-

Market value of Firm (V) = EBIT / Overall cost of capital

Value of equity can be determined by the following equation--

Value of Equity (S) = V (Market Value of firm) – D (Market value of debt)

Cost of Equity = EBIT / (V-D)

### **The NOI approach is based on certain assumptions mentioned as under –**

- Overall cost of capital remains constant for all degrees of debt-equity combination
- The market capitalizes the value of the firm as a whole; therefore the split between debt and equity is not significant
- No corporate taxes
- Cost of debt is constant
- Use of less costly debt funds increases the risk of shareholders, which causes the equity capitalization rate to increase. Thus the advantage of debt is set off exactly by increase in equity capitalization rate.

## Modigliani-Miller Approach (MM-Approach)

The Modigliani-Miller (MM) approach is similar to the Net Operating Income (NOI) approach. In other words, according to this approach, the value of a firm is independent of its capital structure. However, there is a basic difference between the two. The NOI approach is purely definitional or conceptual. It does not provide operational justification for irrelevance of the capital structure in the valuation of the firm. While the MM approach supports the NOI approach providing behavioural justification for the independence of the total valuation and the cost of capital of the firm from its capital structure. The MM approach maintains that the average cost of capital does not change with change in the debt weighed equity mix or capital structure of the firm.

### **The following are the three basic propositions of the MM approach:**

1. The overall cost of capital (k) and the value of the firm (V) are independent of the capital structure. In other words k and V are constant for all levels of the debt-equity mix. The total market value of the firm is given by capitalizing the expected net operating income (NOI) by the rate appropriate for that risk class.
2. The cost of equity (ke) is equal to the capitalization rate of a pure equity stream plus a premium for the financial risk. The financial risk increases with more debt content in the capital structure. As a result, ke increases in a manner to offset exactly the use of a less expensive source of funds represented by debt.
3. The cut-off rate for investment purposes is completely independent of the way in which an investment is financed.

### **Assumptions:**

- Capital markets are perfect thereby implying investors are free to buy and sell securities, investors can borrow without restrictions on the same terms as that of corporates, there are no transaction costs, each investor has the same information which is readily available to him, investors behave rationally.
- All investors have same expectations of the firm's net operating income (EBIT) to evaluate the value of the firm
- Business risk is equal among all firms within an industry
- Dividend Payout is 100%
- There are no taxes (this assumption has been removed later)

The operational justification is the **arbitrage process**. Arbitrage refers to the act of buying an asset / security in one market (at lower prices) and selling it in another (at higher prices), resulting into an equilibrium in the market price in different markets.

The MM approach applies this concept with reference to valuation of two firms that identical in all respects except that one firm has more debt in its capital structure than the other. In such case, investors of the firm whose value is higher will sell their shares and instead buy the shares of the firm whose value is lower, as they are able to earn same returns at lower outlay with same perceived risk. As a result of this behaviour of the investors, the share price of the firm whose shares are being purchased, will increase and the share price of the firm whose shares are being sold, will witness a decline. This process will continue till market prices of two firms become identical.

In order to buy the shares without any additional risk, the investor can borrow in proportion to the degree of leverage present in the firm. This is called personal leverage. Thus the WACC of the two firms, after exercising their personal leverage, would be constant because investors exactly offset the firm's leverage with their personal leverage.

### **Limitations:**

1. Personal leverage and corporate leverage are not perfect substitutes as liability in case of corporates is limited while in case of personal borrowing the liability is unlimited.
2. Cost of borrowing is different from personal borrowing
3. If the investor has borrowed funds to buy shares of an unlevered firm and has to borrow again to purchase shares of the levered firm then it will lead to double leverage.
4. Buying and selling of shares does involve transaction costs in terms of brokerage, commission, etc, which further pushes up the investment amount for an investor, to earn the same amount of return
5. Existence of corporate tax

### **Traditional Approach**

This approach is the midway between the NI and NOI approach. It resembles the NI approach that the cost of capital and value of firm are not independent of the capital structure. However it does not agree that value of the firm will necessarily increase for all degrees of leverage. It coincides with the NOI approach that beyond a certain degree of leverage, the overall cost increase leading to decrease in the value of the firm. But it differs from NOI approach that the WACC is constant for all degrees of leverage.

Debt is relatively a cheaper source of finance. Increased use of debt will lead to decrease in overall cost of capital, however, if debt is beyond a certain limit, the firm would become financially more risky and the shareholders would demand a higher rate of return. Upto a certain limit, the increase in cost of equity may not be so high as to offset the benefit of using cheaper debt. But if debt is increased further, the two things are likely to happen-

- Due to increased financial risk, the cost of equity ( $K_e$ ) will rise substantially

- Firm would become risky to the creditors who would also like to be compensated by higher rate of return, such that cost of debt ( $k_d$ ) will also rise.

Therefore, use of debt beyond a certain point would increase the WACC and thereby lower the firm's value. Optimum capital structure is that point up to which the use of debt affects the value of the firm favourably.

**Problem 1-** ABC Ltd is expecting an annual EBIT of Rs 2 lakhs. The company in its capital structure has Rs.8 Lakhs in 10% Debentures. The cost of equity is 12.5%.

- Compute the value of the firm as per NI approach and overall cost of capital.
- The company has decided to raise additional funds of Rs. 2 lakhs by issuing debentures and the proceeds so generated will be used to buyback equity shares. Compute the value of the firm as per NI approach and overall cost of capital.

**Problem 2 –** Excel Engineering Ltd is expecting an EBIT of Rs.4 lakhs and belongs to the risk class of 10%. You are required to find out the value of firm and cost of equity capital if it employs 8% debt to the extent of 20%, 35%, or 50% of the total financial requirement of Rs.20 lakhs.

**Problem 3-** Below mentioned data for two companies A and B is provided. Profits of the firms are Rs.1,00,000. Firm A has Rs.5,00,000, 10% debt/ The cost of equity of company A is 16% and that of company B is 12.5%. a) Compute the value of both companies using NI approach. b) Suppose a person holds 10% of the shares of company A and then subsequently purchases shares of company B using borrowed, what will be earnings generated in case of his investments in company A and company B.

**Problem 4-** Below mentioned data for two companies A and B is provided. Profits of the firms are Rs.1,00,000. Firm A has Rs.5,00,000, 10% debt/ The cost of equity of company A is 20% and that of company B is 12.5%. a) Compute the value of both companies using NI approach b) Suppose a person holds 10% shares of company B, what will be his level of earnings. c) Assuming that he sells his investments in company B and acquires 10% of shares of Company A and 10% of its debentures, what will be level of earnings.

**Problem 5-** Prime Engineering has total capital of Rs.2,50,000 and normally earns Rs.50,000 (EBIT). The finance manager wants to make a decision regarding capital structure. You are given below information:

Amount of Debts (Rs)	Interest Rate % (After Tax)	Equity Capitalization Rate (at given level of debt)
0	-	10.00%
50,000	8%	10.50%
1,00,000	8%	11.00%
1,50,000	9%	11.50%
2,00,000	9.5%	12.30%

Determine: a) WACC and optimum capital structure using traditional approach b) Equity Capitalization Rate if MM approach is used.