Lesson 6

Capital Structure and Leverage Analysis

Objectives of the lesson

After studying this lesson, students will be able to:

- Understand concept and determinants of capital structure,
- Describe crux of various theories of capital structure,
- Understand meaning, types, and purpose of leaverage analysis, and
- Calculate operating, financial, and combined leverage, and interpret them.

1.0 Introduction

The capitalization of an undertaking refers to the way in which its long term obligations are distributed between different classes of owners and creditors. It depends on the expected average net income. From the point of income of investors, the yield on the securities which have been issued should be comparable to the yields of other securities of same nature available in the market. The rate at which prospective earnings are capitalized varies, as it is a subjective measure of risk and would be therefore be different for firms in different fields of business activity. If the income is expected to be regular, the rate would be lower and vice-versa. For a new venture, it would be higher; and it can be low, if the business conditions are at brisk.

Capitalization refers to the valuation of the total business or the total fund invested in the business. According to Guthmami and Dougall, 'capitalization is the sum of the par value of the outstanding stocks and the bonds'. ET Lincoln considers capitalization as sum of outstanding stocks and funded obligations which may represent fictitious values". In view of Gerstenbug "capitalisation is that which comprises of a company's ownership capital which includes capital stock and surplus in whatever form it may appear and borrowed capital which consists of bonds or similar evidences of long-term debt". Thus, it includes borrowed funds and owner's funds including surplus earning if any. Symbolically:

Capitalization = Long term Loans + Debentures + Share capital + Retained earnings, or,

Capitalization = Total Assets – Current Liabilities

There are two approaches or basis or theories for the determination of the amount of capitalization of the company. These are (i) Cost approach or Cost theory of capitalization, and (ii) Earnings approach or Earnings theory of capitalization.

(i) Cost Approach: According to this theory capitalization or the value of firm is arrived by adding (i) Cost of acquisition of fixed assets, (ii) Cost of establishment, comprising the preliminary expenses, underwriting commission, expenses on the issue of securities,

and (iii) permanent working capital. Though this approach is simple to arrive at, but it has the following drawbacks:

- Value of the company i.e. capitalization is based more on the earning capacity i.e. productivity than on the value of assets held by it.
- In the financial statement, assets are shown at the value of acquisition; if the earning capacity comes down, its impact on capitalization is not explained.
- Where the earnings are irregular this approach has no relevance.

(ii) Earning Approach: According to this approach, capitalization or the value of firm depends on the volume of the earnings and the fair rate of return or the rate of return of the industry.

The formula used for arriving at the amount of capitalization in case of new and upcoming firms is as follows.

$$\text{Capitalization} = \frac{\text{Estimated earnings of the firm}}{\text{Fair rate of return}} \text{X } 100, \text{or}$$

In case of existing companies, capitalization is estimates by following formula.

$$\text{Capitalization} = \frac{\text{Average amount of profit of the firm}}{\text{Fair rate of return}} \text{X } 100, \text{or}$$

Here, it is important that estimates of firm's earnings and rate of return of the industry (fair rate of return) must be accurate. Over and under estimates of the firm's earnings may lead to over and under-capitalization. Similarly, Over and under estimates of the rate of return of the industry may lead to under and over-capitalization.

Though, this method is more practical; it is difficult even risky for new and upcoming companies to estimate future earnings.

2.0 Meaning of Capital Structure

Organization, big or small requires funds to run the business. These funds are arranged from long-term sources and short-term sources. A prudent financial policy is to acquire fixed assets with long term funds (either own or borrowed), and current assets with short term funds. Since the working capital needs to be positive to safeguard the liquidity of the organization, to some extent current assets can be funded with long-term sources. Thus, long term funds are necessary both to fund fixed assets and current assets too.

Initially, capital structure is planned when company is incorporated; it keeps on changing periodically whenever firm needs additional finances. The management of the company should be careful in designing initial capital structure and subsequent financing decisions. Every time when funds have to be procured, the financial manager must weighs pros and cons of various sources of finance and select most advantageous sources keeping in view the target capital structure.

Capital structure refers to mix of long-term sources of funds which comprises of borrowed funds and stockholders' investment. Thus, it is the composition of various components of borrowed and owned sources of capital. It includes long term debt, debentures, share capital, and reserves & surplus. Symbolically:

Capital structure = Long term debt + Debentures + Preferred stock + Net worth

Here, Net worth means Equity holder funds (i.e., Equity capital + Reserves & surplus)

3.0 Determinants of Capital Structure

Capital structure may be determined either at the time of promotion of the company or during an intermediate stage of the organization. But determining the optimal capital structure at the time of floatation of the company is crucial, as it plays a vital role on the running of the organization. Following are the important determinants of capital structure.

- Nature, size and characteristics of the firm: Capital structure largely depends on nature of busines (manufacturing, trading or service oriented), size of firm (big, medium, small or micro) and characteristics of firm. All these factors influence size and composition of capital.
- Life cycle stage of the firm: Capital consumption beocmes higher in certain stages of business life cycle while in some it gets stabilised. Hence, there is a need to examine which stage a business a currently undergoing, what is the need of capital (short or long-term) and what will be the expected returns.
- Volume, growth and continuity of sales and earnings: Analysis and forecasting based on empirical data is conducted to reach on a point to estimate sales volume, revenue, growth of business, continuity of sales and earning. Risk elements are usually analysed to see if there are any impediments to revenue earning.
- Interest rates: Financial environment and general level of interest rates have specific effect on capital structure and related decisions. Higher or lower rates determine the directions of money market, and so, the direction of firms reaching out to money markes. Sources of funds may vary depending of rates prevailing in the market.
- Cost of capital: Overall impact of cost on the model of capital strucutre is a key component of capital structure. It is sometimes a "Yes" or "No" decision based on cost itself. Cost determines whether a source of fund will be manageable under the current and future circumstances of the firm.
- Tax rates: Tax rates generaly correlate with debt and the benefits reaping out of the debt shelter would attract the firms for optimal mix of debt in its capital structure.
- Desired degree of flexibility: This refers to the firms ability to adapt to the needs of changing conditions which may be either positive or negative; if the funds are in surplus, firm may take advantage of new investment opportunities, or it may meet repayment obligations. This flexibility depends on the flexibility in fixed charges, the covenants and debt capacity of the firm.

- Desired degree of control: Equity shareholders have the right to vote and if more shares are floated that will reduce the controlling power of the shareholders. If the capital has to be issued it should be with non-voting right instrument. Debt finance is preferred if the company debt serving capacity is satisfactory.
- Duration of funds requirement: If finance is required for a limited period a firm can issue redeemable preference shares or debentures. But, for long-term requirement, equity capital should be sought.
- Degree of financial leverage: This can be used as role model for constructing the capital structure as it depicts the trend of constituencies in capital structure. Financial leverage depends on seasonal variation. Low degree of financial leverage i.e., less of debt is preferable when a firms business is seasonal in nature. For example business engaged in air coolers, fans etc. depend less on debt as its income is concentrated and it may not be able to pay the interest during slack season.
- Investors' preferences and capital market conditions: Nature and preferences of investors (individual or institutional) is also one of the influencing factors of capital structure. They may be risk takers and risk averters, the former prefer equity where as the latter, debentures. Capital market conditions also influence investors confidence and readiness to take risk.
- Availability of funds in money market: It is twin factor combined with interest rates on some occasions. However, value of funds available in money markets is of high importance as firms reach in the market for debt support. The debt support also attracts firms to the tax benefits and government promotion, low availability of funds may divest financing needs to equity markets.
- Legal requirements: The guidelines issued by the government also can not be disregarded while deciding the capital structure. For example the SEBI grants consent to capital issue where debt ratio does not exceed 2:1, ratio of preference capital to equity capital does not exceed 1:3, and promoters hold at least 25 percent of equity capital.
- Conditions imposed by big financers: Big financers, such as venture capital financers and angle investors have major interest and risk in the firm; so, to safeguard their interest in investment, they put their conditions for new financing options.

4.0 Features of Good Capital Structure

In taking a financial decision the financial manager must arrive at optimal capital structure, which refers to that proportion of debt and equity where the market value per share is maximum and the cost of capital is minimum. Ezra says, 'optimum leverage is that mix of debt and equity which will maximize the market value of the company and minimize the company's overall cost of capital'. A good or optimal capital structure may consist of following features.

- Manageable cost of capital: There should be continuous emphasis on cost of each source of capital to govern the cost and to ensure that cost remains under check.
- Manageable degree of risk: It refers to adequate financial leverage or appropriate amount of debt the firm can manage.
- Simple and easy to understand: Capital structure should be simple and easier for management to understand and take decisions. Complex structures may lead to wastage of time and resource in analysis and decision-making process.
- Control of management: Use of more equity capital means dilution of control. The capital structure should not involve the sources which may have risk of loss of control over the firm.
- Adequate flexibility: This demands the possibility of changing the capital structure to 'need based' without adding to the cost of capital.
- Maximum return and maximum value of firm: Within the framework, a firm should set maximum profit, maximum return to owners, and maximum stock prices without raising costs.
- Minimum undue restrictions of lenders and financers: Care must be exercised while selecting financiers. There should not be unnecessary restrictions on financiers which may render narrow availability of funds and lower flexibility to operate capital structure.
- Safety of investment: The use of excessive debt is risky and threatens solvency. A proper proportion of it has to be arrived at which solvency of the firm is not hampered.
- Conservation / capacity: Proportion of debt and equity should arrive at depending on the repaying capacity and debt servicing capacity.
- Commensurate to legal requirements: It is to be ensured that the capital structure and methods of raising funds are legally valid and viable.

5.0 Theories of Capital Structure

In finance literature, there are four prominent theories of capital structure. These are (i) Net Income Theory (Based on relevance approach), (ii) Net Operating Income Theory (Based on irrelevance approach), (iii) Traditional Theory (Based on relevance approach), and (iv) Modigliani & Miller Theory (Based on irrelevance approach). These theories discuss the effects of change in debt-equity mix (leverage) on cost of capital and the value of firm. The brief description of these theories is as follows.

5.1 Net Income Theory

Net income (NI) theory was propounded by David Durand. It argues that capital structure decisions are relevant to the value of firm. This theory is based on certain assumptions; these are:

- There are two sources of capital - debt and equity.
- Firm can change debt-equity mix.

- Cost of debt (Kd) is less than cost of equity (Ke).
- Firm follows 100 percent dividend pay-out.
- Business risk is constant over time.
- There are no taxes.
- Use of debt does not change risk perception of common investors, so, Ke remains same at all degrees of financial leverage.

The theory states that an increase in proportion of debt, i.e. the degree of financial leverage will lead to decline in the form's cost of capital, while the value of firm and market price of equity shares will increase and vice versa.

In simple words, using more debt capital with a corresponding reduction in cost of capital, the value of the firm will increase. It can be explained with the help of following figure – 1.

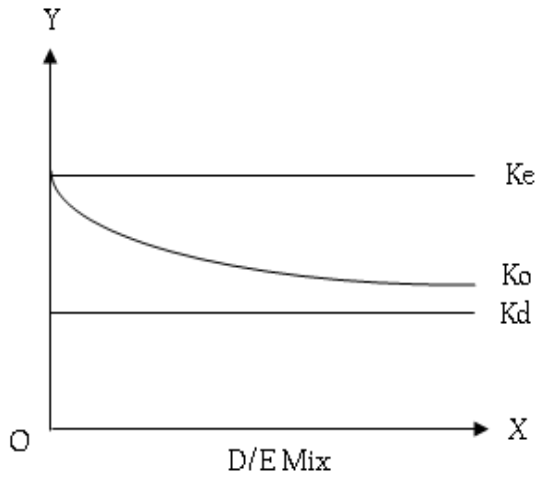

Figure – 1

The main proposition of the theory is that 'the value of firm (V) is determined by value of equity (E) and value of debt (D).' Symbolically,

$V = (E + D)$

$V = \frac{EBIT}{Ko}, D = \frac{I}{Kd}$ and $E = \frac{EE}{Ke}$

Here: V = Value of firm, EBIT = Earnings before interest & tax, Ko = Overall cost of capital, D = Value of debt, I = Interest on debt, Kd = Cost of debt, E = Value of equity, EE = Equity earnings, and Ke = Cost of equity

5.2 Net Operating Income Theory

Net income (NOI) theory also was given by David Durand; it is known is Durand's second theory. It states that capital structure decisions are irrelevant to the cost of capital and the value of firm; hence, there is nothing like optimal capital structure. It is based on following assumptions.

- There are two sources of capital - debt and equity.
- Firm can change debt-equity mix.
- Cost of debt (Kd) is less than cost of equity (Ke).
- Cost of equity (Ke) increases with every increase in debt.
- Firm follows 100% dividend pay-out.
- Business risk is constant over time.
- Market evaluates firm as a whole, hence, split between debt and equity is irrelevant.
- There are no taxes.

The theory states that an increase in debt increases risk perception of common stock-holders, hence, their expectations about return increase. This exactly offsets the advantage of low-cost debt to the firm, and results into no effect on cost of capital (Ko) and value of firm (V). The most significant assumption is that the Ko is constant irrespective of the degree of leverage. The segregation of debt and equity is not important here and the market capitalises the value of the firm as a whole. Thus, an increase in the use of apparently cheaper debt funds is offset exactly by the corresponding increase in the equity- capitalisation rate. So, the weighted average cost of capital K_o and K_d remain unchanged for all degrees of leverage. Needless to mention here that, as the firm increases its degree of leverage, it becomes more risky proposition and investors are to make some sacrifice by having a low price-earnings (PE) ratio. Main proposition of the theory is that the value of equity (E) is residual; it depends on value of firm (V) and the value of debt (D), $E = (V - D)$

$$Ke = Ko + (Ko - Kd)\frac{D}{E}$$

$$Ko = Ke\left(\frac{E}{E + D}\right) + Kd\left(\frac{D}{E + D}\right)$$

Here: $V =$ Value of firm, $Ko =$ Overall cost of capital, $D =$ Value of debt, $Kd =$ Cost of debt, $E =$ Value of equity, and $Ke =$ Cost of equity

The crux of the theory can be explained with the help of following figure – 2.

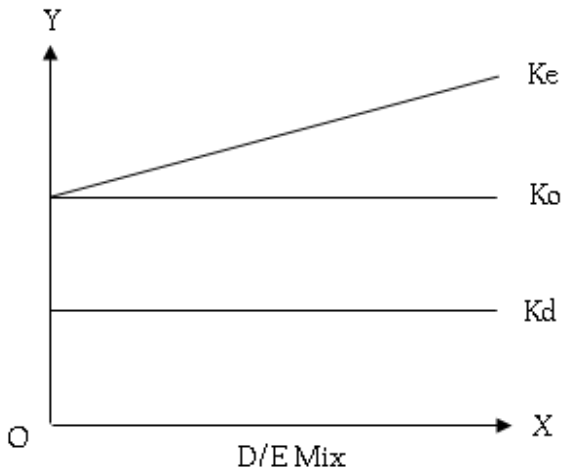

Figure – 2

5.3 Traditional Theory

According to this theory, capital structure decisions are relevant to the cost of capital and the value of firm. Firm should strive to reach at the 'optimal capital structure'.

It is accepted by all that the judicious use of debt will increase the value of the firm and reduce the cost of capital. So, the optimum capital structure is the point at which the value of the firm is highest and the cost of capital is at its lowest point. Practically, this approach encompasses all the ground between the Net Income Approach and the Net Operating Income Approach, i.e., it may be called Intermediate Approach.

The traditional approach explains that up to a certain point, debt-equity mix will cause the market value of the firm to rise and the cost of capital to decline. But after attaining the optimum level, any additional debt will cause to decrease the market value and to increase the cost of capital. In other words, after attaining the optimum level, any additional debt taken will offset the use of cheaper debt capital since the average cost of capital will increase along with a corresponding increase in the average cost of debt capital. Basic assumptions of theory are as follows:

- There are two sources of capital: debt and equity.
- Firm can change debt-equity mix.
- Cost of debt (Kd) is less than cost of equity (Ke).
- With increase in debt, initially, cost of equity (Ke) remains constant. But, after a point due to increase in risk perception of lenders and equity holders, both Kd and Ke increase.
- Firm follows 100% dividend payout ratio.
- Business risk is constant over time.
- There are no taxes.

The theory states that because of increase in debt up to certain point, cost of capital (Ko) comes down and value of firm (V) increases; beyond that point, reverse trend emerges.

The crux of the theory can be explained with the help of following figure – 3.

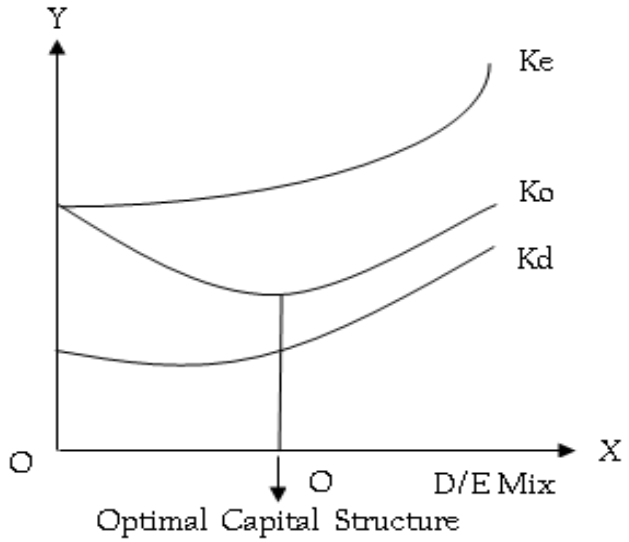

Figure – 3

The basic propositions of this approach are as follows.

- Stage I: With increase in debt, firm gets advantage of low-cost debt. Since Ke is constant, Ko decreases and V increases.
- Stage II: Further increase in debt leads to increased risk to equity holders. So, Ke increases, and as a result, Ko tends to increase, and V is deceasing.
- Stage III: Excessive increase in debt leads to increased Ke as well as Kd. This results into high Ko and low V.

In nutshell, traditional theory of Capital Structure says that a firm's value increases to a certain level of debt capital, after which it tends to remain constant and eventually begins to decrease if there is too much borrowing. This decrease in value after the debt tipping point happens because of overleveraging. On the other hand, a company with zero leverage will have a WACC equal to its cost of equity financing and can reduce its WACC by adding debt up to the point where the marginal cost of debt equals the marginal cost of equity financing. In essence, the firm faces a trade-off between the value of increased leverage against the increasing costs of debt as borrowing costs rise to offset the increase value. Beyond this point, any additional debt will cause the market value and to increase the cost of capital. A blend of equity and debt financing can lead to a firm's optimal capital structure.

5.4 Modigliani and Miller Theory

Modigliani – Miller (MM) theory is akin to NOI theory; it also talks about irrelevance of capital structure decisions. However, this theory provides operational and behavioral justification for irrelevance of capital structure.

Basic assumptions of MM theory are as follows:

- Perfect capital markets: Free market play, Free flow of information, Rational investors, Infinitely divisible securities, and No transaction costs.
- None of the investors can affect the stock price.
- Firms can be grouped into 'equivalent risk classes' based on their business risk. These are substitutable firms for investors.
- The cost of debt (kd) is fixed and always lower than the cost of equity (Ke).
- Investor can borrow freely on the terms as the firm can.
- 100% dividend payout and No taxes (removed later)

Main propositions of this theory are as follows.

- Overall cost of capital (Ko) and value of firm (V) are independent of capital structure.
- Increase in debt leads to increased risk to equity holders and increased cost of equity (Ke), which exactly offsets advantage of low cost debt.
- Market value of firm (V) is equal to discounted operating income (EBIT), at a rate (Ko) appropriate to its risk class.

  $$V = \frac{EBIT}{Ko}$$

- The cost of capital is:

  $$Ko = Ke\left(\frac{E}{E+D}\right) + Kd\left(\frac{D}{E+D}\right)$$

- A leveraged firm has higher cost of equity than an unlevered firm because it's cost of equity (Ke) include risk premia for financial risk.

  $$Ko = Ko + (Ko - Kd)\frac{D}{E}$$

The MM theory believes that valuation of a firm is irrelevant to its capital structure. The equation describing this relationship is: $(VL = VU)$. Here, V_U is the market value of an unlevered firm (capital is represented by equity only), and V_L is the market value of a levered firm (capital is represented by a mix of debt and equity).

Thus, the market value of a firm depends on the operating income and business risk rather than its capital structure. Therefore, the market value of an unlevered firm can be calculated using the following formula.

$V_U = V_L = EBIT / K_{eU}$

Here, EBIT is earnings before interest and taxes, and K_{eU} is the required rate of return on equity of an unlevered firm.

The Modigliani-Miller theory of capital structure also believes that the weighted average cost of capital (WACC) is fixed at any level of financial leverage and equals the required rate of return on equity of an unlevered firm (K_{eU}). Thus, WACC = K_{eU}

Modigliani and Miller suggest that the weighted average cost of capital remains fixed because the risk is growing by an increase in financial leverage, and investors will claim a higher return to compensate for it. In other words, the required rate of return on equity will increase as financial leverage increases. Therefore, increasing cheaper debt will be offset by a higher required rate of return on equity. This relationship isdescribed by the equation, $Ke_L = K_{eU} + D/E (Ke_U - K_{dU})$

Here, k_{eL} is the required rate of return on equity of a levered firm, k_{eU} is the required rate of return on equity of an unlevered firm, d is the market value of debt, e is the market value of equity, and k_d is the required rate of return on debt.

The operational justification of this theory is explained through functioning of the process of arbitrage. The 'Process of Arbitrage' states that investors sell 'Over-valued' shares of levered firm and buy 'Under-valued' shares of unlevered firm. Therefore, the price of overvalued stock will decline, and the price of undervalued stock will increase until they are equal, i.e., until the moment when market equilibrium will occur. When the market reaches equilibrium, arbitrage becomes impossible. Therefore, the market value of firms within the same class of business risk will be the same regardless of their capital structure.

The process of arbitrage sets right the discrepancy in the valuation of levered and unlevered firm. It's functioning can be explained as:

Firm A (Levered): Ko↓ — V↑ — MPS ↑ — Sell — MPS ↓ — V ↓

Firm B (Unlevered): Ko↑ — V↓ — MPS ↓ — Buy — MPS ↑ — V ↑

The theory also states that while switching his investment from levered to unlevered firm, an investor replaces 'corporate leverage' by 'personal/ home-made leverage'. The rationale behind this is that an investor, for equalizing risk in new investment (unlevered firm), will replicate the debt-equity mix of the firm in his personal capacity, and invest total fund (sale proceed plus loan) for maximizing return on investment.

6.0 Leverage Analysis

The core objectives of a business firm are wealth maximization, and stock price maximization. The culmination of these objectives can be done through efficient operational activities, optimal capital structure, and effective risk-return analysis. A business firms normally contemplates on certain issues. These may be (i) should the firm increase level of production? (ii) should the firm

increase scale of production? (iii) should the firm increase investment in business? (iv) if yes, should it rely heavily on borrowed money? The answer to these questions depends on how above changes would affect risk and return to shareholders.

In financial analysis, leverage represents the influence of one financial variable over some other related financial variable, such as cost, output, sales, earning before interest and tax (EBIT), earning per share (EPS) etc. In general, leverage analysis is concerned with analysis of the impact of fixed cost on return to shareholders. It involves three types of leverages, namely (i) operating leverage, (ii) financial leverage, and (iii) combined leverage.

Operating leverage is associated with investing activities; it establishes relationship between sales or contribution and EBIT. Likewise, financial leverage: is associated with financing activities; it establishes relationship between EBIT and EBT or EPS. The combined leverage is concerned with both, the investing as well as financing activities. It establishes relationship between sales or contribution and EBT or EPS.

Operating Leverage: It is defined as the firm's ability to use fixed operating cost to magnify effects of changes in sales on its earnings before interest and taxes. Operating leverage occurs when a firm has fixed operating costs which must be met regardless of volume of sales. It is ratio between percentage change in EBIT divided by Percentage change in sales.

Operating leverage measures the sensitivity of EBIT with respect to change in sales or contribution.

Since $\Delta S = \Delta C$, the fundamental equation of operating leverage is as follows.

$$\text{DOL} = \frac{\text{Proportionate Change in EBIT}}{\text{Proportionate Change in Sales}}$$

$$\text{DOL} = \frac{\frac{\Delta \text{EBIT}}{\text{EBIT}}}{\frac{\Delta Q}{Q}} = \frac{\frac{\Delta Q(P-V)}{Q(P-V)-F}}{\frac{\Delta Q}{Q}}$$

Since: $\text{EBIT} = Q(P-V)-F$, and $\Delta\text{EBIT} = \Delta Q(P-V)$

$$\text{DOL} = \frac{\Delta Q(P-V)}{Q(P-V)-F} X \frac{Q}{\Delta Q}$$

$$\text{DOL} = \frac{Q(P-V)}{Q(P-V-F)}$$

$$\text{DOL} = \frac{C}{\text{EBIT}}$$

DOL must be > 1

Financial Leverage: It is defined as the ability of a firm to use fixed interest charges to magnify the effects of changes in EBIT /Operating Profits, on the firm's earning per share. Financial leverage occurs when a firm's capital structure contains obligation of fixed financial charges i.e. interest cost. It is ratio between percentage change in EPS divided by Percentage change in EBT.

Financial leverage measures the sensitivity of EPS with respect to change in EBIT. The mathematical relation among related variables can be explained with the help of following formula.

$$\text{DFL} = \frac{\text{Proportionate Change in EPS}}{\text{Proportionate Change in EBIT}}$$

$$\text{DFL} = \frac{\Delta\text{EPS}}{\text{EPS}} \text{X} \frac{\text{EBIT}}{\Delta\text{EBIT}}$$

$$\text{Here: EPS} = \frac{[\text{Q}(\text{P} - \text{V}) - \text{F} - \text{I}]\ (1 - \text{t}) - \text{PD}}{\text{N}}, \text{ and}$$

$$\Delta\text{EPS} = \frac{[\Delta\text{Q}(\text{P} - \text{V})]\ (1 - \text{t})}{\text{N}}$$

$$\text{So, Prop.}\Delta \text{ in EPS} = \frac{[\Delta\text{Q}(\text{P} - \text{V})]\ (1 - \text{t})}{[\text{Q}(\text{P} - \text{V}) - \text{F} - \text{I}]\ (1 - \text{t}) - \text{PD}}$$

On dividing equation by $(1 - \text{t})$, we get:

$$\text{Prop. Change in EPS} = \frac{[\Delta\text{Q}(\text{P} - \text{V})]}{[\text{Q}(\text{P} - \text{V}) - \text{F} - \text{I}] - \frac{\text{PD}}{(1 - \text{t})}}$$

$$\text{Now, DFL} = \frac{\Delta\text{Q}(\text{P} - \text{V})}{[\text{Q}(\text{P} - \text{V}) - \text{F} - \text{I}] - \frac{\text{PD}}{(1 - \text{t})}} \text{X} \frac{\text{Q}(\text{P} - \text{V}) - \text{F}}{\Delta\text{Q}(\text{P} - \text{V})}$$

$$\text{So, DFL} = \frac{\text{Q}(\text{P} - \text{V}) - \text{F}}{[\text{Q}(\text{P} - \text{V}) - \text{F} - \text{I}] - \frac{\text{PD}}{(1 - \text{t})}}$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBIT} - \text{I} - \frac{\text{PD}}{(1 - \text{t})}}$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EPS}}$$

DFL must be > 1

Combined Leverage: Operating leverage explains the operating risk and financial leverage explains the financial risk of firm. However, a firm has to look into overall risk or total risk of the firm i.e., combined risk which is measured by combined leverage. It is ratio between percentage change in EPS divided by Percentage change in sales.

Combined Leverage is associated with investing as well as financing activities. It establishes relationship between Sales or Contribution and EBT or EPS. It is the product of operating and financial leverage, so it is written as DCL = DOL x DFL

$$DCL = \frac{Q(P-V)}{Q(P-V-F)} X \frac{Q(P-V-F)}{Q(P-V-F) - I - \frac{PD}{(1-t)}}$$

$$DCL = \frac{C}{EBIT} X \frac{EBIT}{EBIT - I - \frac{PD}{(1-t)}}$$

$$DCL = \frac{C}{EBIT} X \frac{EBIT}{EPS}$$

$$DCL = \frac{C}{EPS}$$

DFL must also be > 1

Significance of Leverage Analysis:

- Operating leverage helps to analyze the impact of fixed operating cost on return to equity shareholders. It helps management in deciding whether to invest further or not.
- Financial leverage helps to analyze the ability of firm to raise the borrowed money in order to maximize the return on equity. It analyzes impact of fixed Interest cost. It helps management in deciding sources of funds and restructuring the present capital structure.
- Combined leverage helps to analyze the overall risk firm is exposed to i.e. operating risk and financial risk.

Summary

Capital structure refers to mix of long-term sources of funds which comprises of borrowed funds and stockholders' investment. Thus, it is the composition of various components of borrowed and owned sources of capital. It includes long term debt, debentures, share capital, and reserves & surplus. A large number of factors influence capital structure of a firm; these factors can be internal or external. The internal factors may include nature, size and characteristics of the firm, volume, growth and continuity of sales and earnings, cost of capital, desired degree of flexibility, desired degree of control, duration of funds requirement, and degree of financial leverage; and external factors are life cycle stage of the firm, interest rates, tax rates, investors' preferences and capital market conditions,

availability of funds in money market, legal requirements, and conditions imposed by big financers.

A company has to decide the proportion in which it should have its own finance and outsider's finance particularly debt finance. Based on the proportion of finance, cost of capital and value of a firm are affected. There are four capital structure theories discussing relationship between debt-equity mix and cost of capital and value of firm. These are net income theory, net operating income theory, traditional theory, and Modigliani and Miller theory. Net income theory and traditional theory support the relevance of capital structure, while net operating income theory and Modigliani and Miller theory oppose the proposition of relevance of capital structure in determining value of firm. They argue that an increase in debt increases risk perception of common stock-holders, hence, their expectations about return increase. This exactly offsets the advantage of low-cost debt to the firm, and results into no effect on cost of capital and value of firm.

Operating leverage reflects the impact on operating income due to change in level of output or the investing activities. The financial leverage shows the impact of change in debt-equity mix on equity returns. In other words, financial leverage implies the employment of the source of funds, involving fixed return so as to cause more than a proportionate change in earnings per share (EPS) to change in operating profits. Like the operating leverage, financial leverage is positive when operating profits are increasing and can be negative in the situation of decrease in such profits. In view of these, financial leverage will affect financial risk of the firm. An important analytical tool for financial leverage is indifference point at which the EPS/market price is the same for different financial plans under consideration. The combined leverage represents the effect of a given change in the sales revenue on the earnings per share. It affects the total risk of the firm. To keep the within manageable limits, a firm which has high degree of operating leverage will be well advised to have low financial leverage and vice versa.

Self check Questions

1. Explain the meaning of capitalization. How would you estimate the capital requirement of a newly established business firm?
2. What do you mean by capital structure? Explain determinants of capital structure of a business firm.
3. Write a detailed note on importance of capital structure decisions in a business firm. What should be the qualities in a good capital structure?
4. Explain briefly crux of net income (NI) and net operating income (NOI) theory of capital structure and give a note on key differences between them.
5. Explain Modigliani & Miller (MM) approach of capital structure. How it is an improvement over net operating income approach of capital structure decision?

6. Write a lucid note on traditional theory of capital structure. How it justifies optimal capital structure?
7. Write short notes: (a) Trading on equity (b) Optimal capital structure (c) Process of arbitrage (d) Home-made leverage.
8. What do you mean by Leverage? Explain implications of operating and financial leverage in business decisions.
9. Write short notes: (a) Calculation of operating leverage, and (b) Determinants of financial leverage.
10. Attempt related practical problems by refering suggested readings.

Practical Problems on Capital Structure Decisions

Illustration # 1: Expected earnings of a company are Rs. 2,00,000. It has 10 percent debt of Rs. 8,00,000. The equity capitalization rate (cost of equity) to the company is 12.5 percent. Using NI approach find out (i) Value of firm, and (ii) Overall cost of capital to the firm. If firm decides to redeem part of equity capital by raising further debt of Rs. 2,00,000, examine impact on overall cost of capital and the value of firm

Solution:

	Amount
EBIT	2,00,000
Less: Interest @ 10%	80,000
Equity Earnings (EE)	1,20,000
Equity Capitalization Rate (Ke)	12.5%
Value of Equity (E)	9,60,000
Value of Debt (D)	8,00,000
Value of Firm: V = (E + D)	17,60,000
Overall Cost of Capital (Ko)	11,36%

$$E = \frac{EE}{Ke} = \frac{1,20,000}{0.125} = \text{Rs. } 9,60,000$$

$$D = \frac{I}{Kd} = \frac{80,000}{0.10} = \text{Rs. } 8,00,000$$

$$\text{Since, } V = \frac{EBIT}{Ko}$$

$$Ko = \frac{EBIT}{V} = \frac{2,00,000}{17,60,000} = 11.36\%$$

If firm decides to redeem equity by raising further debt of Rs. 2,00,000 (i)The value of equity (S) will be 8,00,000; Value of debt (D) will be Rs. 10,00,000; and value of firm will increase to Rs. 18,00,000. (ii) The overall cost of capital will reduce to 11.11%. It proves application of NI approach.

Illustration # 2: Expected earnings of a company are Rs. 4,00,000. It belongs to 10 percent risk class (it means overall cost of capital to the form is 10 percent). Using NOI approach find out (i) Value of firm, and (ii) Cost of equity capital, if it employs 8 percent debt to the extent of 20 percent, 35 percent or 50 percent of total financial requirement of Rs. 20,00,000. Also prove how advantage of low-cost debt to firm gets neutralized as argued by NOI theory.

Solution:

	20% Debt	35% Debt	50% Debt
EBIT	4,00,000	4,00,000	4,00,000
Overall Cost of Capital	10%	10%	10%
Value of Firm (V)	40,00,000	40,00,000	40,00,000
Amount of Debt (% of 20,00,000)	4,00,000	7,00,000	10,00,000
Interest @ 8%	32,000	56,000	80,000
Value of Debt (D)	4,00,000	7,00,000	10,00,000
Value of Equity: E = (V – D)	36,00,000	33,00,000	30,00,000
Equity Earning (EE) = (EBIT – Int.)	3,68,000	3,44,000	3,20,000
Cost of Equity (Ke)	10.22%	10.42%	10.66%

$$V = \frac{EBIT}{Ko} = \frac{4,00,000}{0,10} = 40,00,000$$

$$D = \frac{I}{Kd}$$

$$\text{Case of 20\% Debt: } D = \frac{32,000}{0.08} = 4,00,000$$

$$\text{Case of 35\% Debt: } D = \frac{56,000}{0.08} = 7,00,000$$

$$\text{Case of 50\% Debt: } D = \frac{80,000}{0.08} = 10,00,000$$

$$Ke = \frac{EE}{E}$$

$$\text{Case of 20\% Debt: } Ke = \frac{3,68,000}{36,00,000} = 10.22\%$$

$$\text{Case of 35\% Debt: } Ke = \frac{3,44,000}{33,00,000} = 10.42\%$$

$$\text{Case of 50\% Debt: } Ke = \frac{3,20,000}{30,00,000} = 10.66\%$$

$$\text{Proof of application of NOI Approach: } Ko = Ke\left(\frac{E}{E+D}\right) + Kd\left(\frac{D}{E+D}\right)$$

$$\text{Case of 20\% Debt: } Ko = 10.22\left(\frac{36,00,000}{40,00,000}\right) + 8\left(\frac{4,00,000}{40,00,000}\right) = 10$$

$$\text{Case of 35\% Debt: } Ko = 10.42\left(\frac{33,00,000}{40,00,000}\right) + 8\left(\frac{7,00,000}{40,00,000}\right) = 10$$

$$\text{Case of 50\% Debt: } Ko = 10.66\left(\frac{30,00,000}{40,00,000}\right) + 8\left(\frac{10,00,000}{40,00,000}\right) = 10$$

It proves that advantage of low-cost debt to firm gets neutralized due to increased cost of equity, and Ko remains same at all debt-equity mix.

Illustration # 3: Expected earnings of a company are Rs. 3,00,000. It presently raised its total financial needs of Rs. 20,00,000 by issue of equity with equity capitalization rate of 16 percent. It is now contemplating to redeem a part of equity by raising debt to the extent of 30 percent or 50 percent of total capital. It is expected that the debt financing up to 30 percent, the rate of interest on debt will be 10 percent and equity capitalization rate will increase to 17 percent. However, if firm opts for 50 percent debt, the rate of interest on debt will be 12 percent and equity capitalization rate will further increase to 20 percent. Calculate (i) firm's overall cost of capital, and (ii) value of firm under different scenarios. Also find optimal capital structure.

Solution:

	0% Debt	30% Debt	50% Debt
Total Debt		6,00,000	10,00,000
Interest Rate		10%	12%
EBIT	3,00,000	3,00,000	3,00,000
Less: Interest		60,000	1,20,000
Equity Earnings (EE)	3,00,000	2,40,000	1,80,000

Equity Capitalization Rate (Ke)	16%	17%	20%
Value of Equity (E)	18,75,000	14,11,176	9,00,000
Value of Debt (D)		6,00,000	10,00,000
Value of Firm: V = (E + D)	18,75,000	20,11,176	19,00,000
Overall Cost of Capital (Ko)	16%	14.91%	15.78%
		Optimal Point	

$$E = \frac{EE}{Ke}$$

Case of 0% Debt: $E = \frac{3,00,000}{0.16} = 18,75,000$

Case of 30% Debt: $E = \frac{2,40,000}{0.17} = 14,11,176$

Case of 50% Debt: $E = \frac{1,80,000}{0.20} = 9,00,000$

$$D = \frac{I}{Kd}$$

Case of 30% Debt: $D = \frac{60,000}{0.10} = 6,00,000$

Case of 50% Debt: $E = \frac{1,20,000}{0.12} = 10,00,000$

$Ko = \frac{EBIT}{V}$

Case of 0% Debt: $Ko = \frac{3,00,000}{18,75,000} = 16\%$

Case of 30% Debt: $Ko = \frac{3,00,000}{20,11,176} = 14.91\%$

Case of 50% Debt: $Ko = \frac{3,00,000}{19,00,000} = 15.78\%$

It proves that at optimal debt-equity mix, Ko is minimum, and V is maximum.

Illustration # 4: Two companies A and B belong to same risk class with expected earnings of Rs. 1,80,000. Total capital of both the companies is Rs. 15,00,000. Company A has arranged its capital from 6 percent debt of Rs. 6,00,000 and equity capital of Rs. 9,00,000 (divided in shares of Rs. 10 each). Company B has arranged its entire capital by issuing equity shares of Rs. 10 each. The market price of shares of company A is Rs. 12 and company B is Rs. 10.

Explain how an investor holding 10 percent of shares in company A will be better off in switching his holding to company B. Use MM approach.

Solution:

- Firm A is levered, and B is unlevered.
- Investor will sell shares of A and purchase shares of B after creating his personal leverage.

	Amount
Realization from sale of shares of A (9000 shares @ Rs. 12)	1,08,000
Borrowing (10% of Debt of Company A @ 6%)	60,000
Investment in B (16,800 shares @ Rs. 10 each)	1,68,000
Benefit to Investor	Amount
Expected Earning in B	20,160
Less: Interest on Debt (6% of Rs. 60,000)	3,600
Net Earnings	16,560
Current Earnings in A Ltd.	14,400
Net Benefit	2,160

Expected Earning in B Ltd.

$$\text{EE}\ \frac{\text{Holding}}{\text{Total Shares}} = 1{,}80{,}000\frac{16{,}800}{1{,}50{,}000} = 20{,}160$$

Current Earnings in A Ltd.

$$\text{EE}\frac{\text{Holding}}{\text{Total Shares}} = 1{,}44{,}000\frac{9{,}000}{90{,}000} = 14{,}400$$

Here: EE = (EBIT – Interest), i.e., (1,80,000 – 36,000) = 1,44,000

Practical Problems on Leverage Analysis

Illustration # 1: Answer the followings.

Part A: A firm has sales of Rs. 10 lakh. It's total variable cost and fixed cost is Rs. 7 lakh and Rs. 2 lakh respectively. The firm has borrowings of Rs. 5 lakh at 10 percent interest rate. Find degree of operating, financial and combined leverage of the firm. Also calculate percent increase in sales required to double EBIT of the firm.

Part B: The operating and combined leverage of a firm is 1.25 and 2.5 respectively. It's sales is Rs. 10 lakh, fixed cost is Rs. 50 thousand, and interest and dividend payable at year end is Rs. 1 lakh and Rs. 2 lakh respectively. Find (i) degree of financial leverage, and (ii) P/V ratio of the firm.

Part C: The net worth of a firm is Rs. 25 lakh and operating profit is Rs. 20 lakh. It has debt-equity mix is 3 : 1. The debt carries 12 percent interest burden. Does firm have high financial leverage?

Solution:

Part A:

(i) Calculation of DOL, DFL and DCL

$$\text{DOL} = \frac{\text{C}}{\text{EBIT}} = \frac{3{,}00{,}000}{1{,}00{,}000} = 3$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBT}} = \frac{1{,}00{,}000}{50{,}000} = 2$$

$$\text{DCL} = \frac{\text{C}}{\text{EBT}} = \frac{3{,}00{,}000}{50{,}000} = 6$$

(ii) Calculation of percent increase in sales required to double EBIT

$$\text{DOL} = \frac{\Delta\text{EBIT}}{\Delta\text{S}} \Rightarrow 3 = \frac{100}{\Delta\text{S}} \Rightarrow \Delta\text{S} = \frac{100}{3} = 33.33\%$$

Verification:

	Present	New (After 33.33% Increase)

Sales	10,00,000	13,33,333
Less: Variable Cost	7,00,000	9,33,333
Contribution	3,00,000	4,00,000
Less: Fixed Operating Cost	2,00,000	2,00,000
EBIT	1,00,000	2,00,000
Less: Interest (10% on Rs. 5 lakh	50,000	50,000
EBT	50,000	1,50,000

Part B:

(i) Calculation of DFL

$$\text{DCL} = \text{DOL} * \text{DFL}$$

$$\text{DFL} = \frac{\text{DCL}}{\text{DOL}} = \frac{2.5}{1.25} = 2$$

(ii) Calculation of PV Ratio

We know that

$$\text{DOL} = \frac{\text{C}}{\text{EBIT}} = \frac{\text{S} - \text{V}}{\text{S} - \text{V} - \text{F}} \Rightarrow 1.25 = \frac{10,00,000 - \text{V}}{10,00,000 - \text{V} - 50,000}$$

$$12,50,000 - 1.25\text{V} - 62,500 = 10,00,000 - \text{V}$$

$$1,87,500 = 0.25\text{V}$$

$$\text{V} = 7,50,000$$

$$\text{PVR} = \frac{\text{Contribution}}{\text{Sales}} = \frac{10,00,000 - 7,50,000}{10,00,000} = 0.25 \text{ or } 25\%$$

Part C:

$$\text{Debt Equity Ratio} = \frac{\text{Debt}}{\text{Equityholders Funds (or Net Worth)}}$$

$$3 = \frac{\text{Debt}}{25,00,000};\ \text{So, Debt} = \text{Rs. } 75,00,000, \text{and Interest payable} = \text{Rs. } 9,00,000$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBT}} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}} = \frac{20,00,000}{20,00,000 - 9,00,000} = 1.82$$

Firm does not have high financial leverage.

Illustration # 2: A firm has sales - Rs. 75 lakh, variable cost - Rs. 42 lakh and fixed cost - Rs. 6 lakh. It has debt of Rs. 45 lakh at 9 percent interest and equity of Rs. 55 lakh. Explain (a) What is the degree of operating, financial and combined leverage of the firm? (b) What is firm's rate of return on investment? (c) Does firm have favorable financial leverage? (d) Does firm have high asset leverage? Given that Industry's Asset-turnover ratio is 3, (e) If sales is

expected to fall to Rs. 50 lakh, what will be new EBIT of the firm. (f) At what sales level, the EBT of the firm will be zero?

Solution:

(a) Calculation of DOL, DFL and DCL

$$\text{DOL} = \frac{\text{C}}{\text{EBIT}} = \frac{33{,}00{,}000}{27{,}00{,}000} = 1.222$$

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBT}} = \frac{27{,}00{,}000}{22{,}95{,}000} = 1.176$$

$$\text{DCL} = \frac{\text{C}}{\text{EBT}} = \frac{33{,}00{,}000}{22{,}95{,}000} = 1.438$$

	Amount (Rs.)
Sales	75,00,000
Less: VC	42,00,000
Contribution	33,00,000
Less: Fixed Operating Cost	6,00,000
EBIT	27,00,000
Less: Interest (9% on Rs. 45 Lakh)	4,05,000
EBT	22,95,000

(b) Calculation of RoI

$$\text{DOL} = \frac{\text{EBIT}}{\text{Investment}} = \frac{27{,}00{,}000}{1{,}00{,}00{,}000} = 0.27 \text{ or } 27\%$$

Here: Investment = Debt + Equity = 45,00,000 + 55,00,000 = 1,00,00,000

(c) Since rate of return on investment (RoI) of the firm is 27% and fixed cost source of finance (debt) carries interest liability of 9% only, firm has favorable financial leverage. DFL also is > 1.

(d) Asset leverage refers to Asset – Turnover Ratio (ATR). The ATR of the firm is:

$$\text{ATR} = \frac{\text{Turnover or Sales}}{\text{Total Assets}} = \frac{75{,}00{,}000}{1{,}00{,}00{,}000} = 0.75$$

Since ATR of the industry is 3, firm's ATR is very low.

(e) Calculation of new EBIT at sales of Rs. 50,00,000

Here, fall in sales is 25,00,000 (or 33.333%)

$$\text{DOL} = \frac{\Delta\text{EBIT}}{\Delta\text{S}} \Rightarrow 1.222 = \frac{\Delta\text{EBIT}}{33.333} \Rightarrow \Delta\text{EBIT} = 1.222 * 33.333 = 40.73\%$$

New EBIT = EBIT (1 – 0.4073) ⇒ 27,00,000 (1 – 0.4073) = 16,00,000 approx.

Verification:

	Present	New	Decrease (%)
Sales	75,00,000	50,00,000	33.333%
Less: Variable Cost	42,00,000	28,00,000	33.333%
Contribution	33,00,000	22,00,000	33.333%
Less: Fixed Operating Cost	6,00,000	6,00,000	
EBIT	27,00,000	16,00,000	40.73%

(f) Calculation of sales level where firm's EBT will be zero

$$\text{DCL} = \frac{\Delta\text{EBT}}{\Delta S} \Rightarrow 1.438 = \frac{100}{\Delta S} \Rightarrow \Delta S = \frac{100}{1.438} = 69.54\%$$

Verification:

	Present	New (Approx.)	Decrease (%)
Sales	75,00,000	22,84,500	69.54%
Less: Variable Cost	42,00,000	12,79,500	69.54%
Contribution	33,00,000	10,05,000	69.54%
Less: Fixed Operating Cost	6,00,000	6,00,000	
EBIT	27,00,000	4,05,000	85.00%
Less: Interest (9% on Rs. 45 Lakh)	4,05,000	4,05,000	
EBT	22,95,000	0	100.00%

Illustration # 3: Following data relate to two companies A Ltd. and B Ltd.

Company	Equity Capital (Share of Rs. 10)	7% Debenture	EBIT	Return on Capital Employed (%)
A Ltd.	5,00,000		1,00,000	20
B Ltd.	2,50,000	2,50,000	1,00,000	20

The equity shareholders of the A Ltd. are in dilemma the despite same return earned by both the companies A Ltd. and B Ltd. on their capital employed, earnings per share of A Ltd. seems to be less than B Ltd. You are required to: (i) verify the fact for the satisfaction of the shareholders of the A Ltd., and (ii) give reasons in support of your findings. Corporate tax rate is 50%.

Solution:

Calculation of EPS of A Ltd. and B Ltd.

	A Ltd.	A Ltd.
EBIT	1,00,000	1,00,000
Less: Interest (@ 9%)		22,500
EBT	1,00,000	77,500
Less: Tax (@ 50%)	50,000	38,750

EAT	50,000	38,750
Number of Shares	50,000	25,000
EPS	1.00	1.55
$DFL = \frac{EBIT}{EBT}$	$\frac{1,00,000}{1,00,000} = 1$	$\frac{1,00,000}{77,500} = 1.29$

EPS of A Ltd. is lower than B Ltd. because:

1. DFL of B Ltd. is more than A Ltd., so B Ltd. has advantage of cheaper debt (@ 9%) compared to RoI @ 20% on half of the capital. It also has tax advantage of Rs. 11,250.
2. In case of B Ltd., saving of 11% (20 – 9 percent) on borrowed funds has resulted after tax benefit of Rs. 13,750 to shareholders, and thus, it has higher EPS.

Justification:

Saving on Borrowed Funds (11% on Rs. 2,50,000)	27,500
Less: Tax (@50%)	13,750
Net Benefit to shareholders	13,750
Benefit Per Share (13,750/ 25,000)	0.55

Illustration # 4: A firm produces single articles and sales it at unit price of Rs. 20. The variables cost is 50 percent of sales price. At the present output level of 1 lakh units, the operating leverage of the firm is 2.5. The firm, in its capital structure has 1 lakh equity shares and 10 percent debt taken from IFCI. Assuming 50 percent corporate tax rate, find (i) Earnings per share (at current level), and (ii) Amount of debt, if 25 percent decline in sales is expected to wipe-out earnings per share.

Solution:

	Present Level Amount (Rs.)	After 25% Decline Amount (Rs.)
Sales (1,00,000 Units @ Rs. 20)	20,00,000	15,00,000
Less: VC (50% of Sales)	10,00,000	7,50,000
Contribution	10,00,000	7,50,000
Less: Fixed Operating Cost (Bal. Fig.)	6,00,000	6,00,000
EBIT (WN – 1)	4,00,000	1,50,000
Less: Interest (WN – 2)	1,50,000	1,50,000
EBT	2,50,000	0
Tax (@50%)	1,25,000	0
EAT	1,25,000	0
EPS (EAT/ No. of Equity Shares)	1.25	0

Working Note No. 1:

$$\text{DOL} = \frac{\text{C}}{\text{EBIT}} \Rightarrow 2.5 = \frac{10{,}00{,}000}{\text{EBIT}} \Rightarrow \text{EBIT} = 4{,}00{,}000$$

Working Note No. 2:

We know that $\Delta C = \Delta EBIT$. So, if $\Delta EBIT$ will be equal to amount of interest payable, equity earnings (or EPS) will be zero.

$$\text{Since DOL} = \frac{\%\Delta\text{EBIT}}{\%\Delta\text{Sales}} \Rightarrow 2.5 = \frac{\%\Delta\text{EBIT}}{25} \Rightarrow \%\Delta\text{EBIT} = 62.5\%$$

$$\text{New EBIT} = (\text{EBIT} - 0.625\text{EBIT}) = (4{,}00{,}000 - 2{,}50{,}000) = 1{,}50{,}000$$

Now, For Zero EPS (or Zero EBT), the amount of interest must be equal to EBIT (i.e., Rs. 1,50,000). Hence, the amount of debt is –

$$\text{Debt} = \frac{\text{Interest Amount}}{\text{Interest Rate}} = \frac{1{,}50{,}000}{0.10} = 15{,}00{,}000$$

Illustration # 5: From the following financial information of three companies operating in pharmaceutical sector, prepare income statements.

	A Ltd.	B Ltd.	C Ltd.
Variable Cost (% to sales)	66.67	75	50
Interest Payable (Rs.)	2 lakh	3 lakh	10 lakh
Degree of Operating Leverage	5	6	2
Degree of Financial Leverage	3	4	2
Corporate Tax Rate	40 Percent	40 Percent	40 Percent

Solution:

Calculation of Sales and EBIT

	A Ltd.	B Ltd.	C Ltd.
$\text{DFL} = \frac{\text{EBIT}}{(\text{EBIT} - \text{Int.})}$	$3 = \frac{\text{EBIT}}{\text{EBIT} - 2{,}00{,}000}$ $\text{EBIT} = 3{,}00{,}000$	$4 = \frac{\text{EBIT}}{\text{EBIT} - 3{,}00{,}000}$ $\text{EBIT} = 4{,}00{,}000$	$2 = \frac{\text{EBIT}}{\text{EBIT} - 10{,}00{,}000}$ $\text{EBIT} = 20{,}00{,}000$
$\text{DOL} = \frac{\text{C}}{\text{EBIT}}$	$5 = \frac{\text{C}}{3{,}00{,}000}$ $\text{C} = 15{,}00{,}000$	$6 = \frac{\text{C}}{4{,}00{,}000}$ $\text{C} = 24{,}00{,}000$	$2 = \frac{\text{C}}{20{,}00{,}000}$ $\text{EBIT} = 40{,}00{,}000$
$\text{C} = (\text{S} - \text{V})$	$15{,}00{,}00s0 = (\text{S} - \frac{2}{3}\text{S})$ $\text{S} = 45{,}00{,}000$	$24{,}00{,}000 = \left(\text{S} - \frac{3}{4}\text{S}\right)$ $\text{S} = 96{,}00{,}000$	$40{,}00{,}000 = \left(\text{S} - \frac{1}{2}\text{S}\right)$ $\text{S} = 80{,}00{,}000$

Income Statement

	A Ltd.	B Ltd.	C Ltd.
Sales	45,00,000	96,00,000	80,00,000
Less: Variable Cost (as % of Sales)	30,00,000	72,00,000	40,00,000
Contribution	15,00,000	24,00,000	40,00,000
Less: Fixed Operating Cost (Bal. Fig.)	12,00,000	20,00,000	20,00,000
EBIT	3,00,000	4,00,000	20,00,000
Less: Interest (Given)	2,00,000	3,00,000	10,00,000
EBT	1,00,000	1,00,000	10,00,000
Tax (@ 40%)	40,000	40,000	4,00,000
EAT	60,000	60,000	6,00,000