

KEY CONCEPTS

- Capital Structure ■ Horizontal Capital Structure ■ Vertical Capital Structure ■ Pyramid Shaped Capital Structure
- Inverted Pyramid Shaped Capital Structure ■ Optimal Capital Structure ■ Operating Risk ■ Financial Risk

Learning Objectives

To understand:

- Nature, scope and significance of capital structure
- Factors affecting Capital Structure
- Capital structure vis-à-vis Financial structure
- Optimal Capital Structure
- Capital Structure & Valuation
- Theories of Capital Structure
- Leverage- Operating leverage, Financial leverage and Combined Leverage
- EBIT – EPS Analysis
- Effect of leverages on return on equity

Lesson Outline

- Meaning and Significance of a Capital Structure
- Types of Capital Structure
- Planning and Designing of Capital Structure
- Capital Structure Theories
 - Net Income Approach
 - Net Operating Income Approach
 - Traditional Approach
 - Modigliani Miller (MM) Approach
- EBITDA Analysis
- Measures of Operating and Financial Leverage
- Hamada Equation
- Lesson Round-Up
- Glossary
- Test Yourself
- List of Further Readings

INTRODUCTION, DEFINITION AND SIGNIFICANCE OF CAPITAL STRUCTURE

Introduction

Given the Capital Budgeting decision of a firm, it has to decide the way in which the capital projects will be financed. Every time the firm makes an Investment decision, it has to undertake a financing decision also. For example, a decision to purchase a new machinery or plant implies specific ways of financing that project. Should the firm employ equity or debt or both? What may be its implications/ What is the appropriate mix of debt and equity? These are some questions that a firm needs to answer before taking up any Financing decision.

Capital structure means the structure or constitution or break-up of the capital employed by a firm. The capital employed consists of both the owners' capital and the debt capital provided by the lenders. Debt capital is understood here to mean the long term debt which has been deployed to build long term assets. Apart from the elements of equity and debt in the capital structure, a firm could have quasi equity in the form of convertible debt.

The Financing or Capital Structure decision is a significant managerial decision as it influences the shareholder's return and risk. Consequently, the market value of the share may be affected by the capital structure decision.

Definition of Capital Structure

The following definitions clearly initiate, the meaning and objective of the capital structure.

According to the definitions of **Gerstenberg**, "Capital Structure of a company refers to the composition or make up of its capitalization and it includes all long-term capital resources".

According to the definition of **James C. Van Horne**, Capital Structure is "The mix of a firm's permanent long-term financing represented by debt, preferred stock and common stock equity".

Type of Capital Structure

Capital Structure of a firm is a reflection of the overall investment and financing strategy of the firm. It shows how much reliance is being placed by the firm on external sources of finance and how much internal accruals are being used to finance expansions etc. Capital structure can be of various kinds as described below:

1. *Horizontal Capital Structure*

In a Horizontal capital structure, the firm has zero debt components in the structure mix. The structure is quite stable. Expansion of the firm takes in a lateral manner, i.e. through equity or retained earning only. The absence of debt results in the lack of financial leverage. Probability of disturbance of the structure is remote.

2. *Vertical Capital Structure*

In a vertical capital structure, the base of the structure is formed by a small amount of equity share capital. This base serves as the foundation on which the super structure of preference share capital and debt is built. The incremental addition in the capital structure is almost entirely in the form of debt. Quantum of retained earnings is low and the dividend pay-out ratio is quite high. In such a structure, the cost of equity capital is usually higher than the cost of debt. The high component of debt in the capital structure increases the financial risk of the firm and renders the structure unstable. The firm, because of the relatively lesser component of equity capital, is vulnerable to hostile takeovers.

3. *Pyramid shaped Capital structure*

A pyramid shaped capital structure has a large proportion consisting of equity capital and retained

earnings which have been ploughed back into the firm over a considerably large period of time. The cost of share capital and the retained earnings of the firm is usually lower than the cost of debt. This structure is indicative of risk averse conservative firms.

4. *Inverted Pyramid shaped Capital Structure*

Such a capital structure has a small component of equity capital, reasonable level of retained earnings but an ever increasing component of debt. All the increases in the capital structure in the recent past have been made through debt only. This may be due to shrinking of retained earnings on account of accumulating losses. Such a capital structure is highly vulnerable to collapse.

Significance of Capital Structure

Capital structure is significant for a firm because the long term profitability and solvency of the firm is sustained by an optimal capital structure consisting of an appropriate mix of debt and equity. The capital structure also is significant for the overall ranking of the firm in the industry group. The significance of the capital structure is discussed below:

1. *It reflects the firm's strategy*

The capital structure reflects the overall strategy of the firm. The strategy includes the pace of growth of the firm. In case the firm wants to grow at a faster pace, it would be required to incorporate debt in its capital structure to a greater extent. Further, in case of growth through acquisitions or the inorganic mode of growth as it is called, the firm would find that financial leverage is an important tool in funding the acquisitions.

2. *It is an indicator of the risk profile of the firm*

One can get a reasonably accurate broad idea about the risk profile of the firm from its capital structure. If the debt component in the capital structure is predominant, the fixed interest cost of the firm increases thereby increasing its risk. If the firm has no long term debt in its capital structure, it means that either it is risk averse or it has cost of equity capital or cost of retained earnings less than the cost of debt.

3. *It acts as a tax management tool*

The capital structure acts as a tax management tool also. Since the interest on borrowings is tax deductible, a firm having healthy growth in operating profits would find it worthwhile to incorporate debt in the capital structure in a greater measure.

4. *It helps to brighten the image of the firm*

A firm can build on the retained earnings component of the capital structure by issuing equity capital at a premium to a spread out base of small investors. Such an act has two benefits. On the one hand, it helps the firm to improve its image in the eyes of the investors. At the same time, it reduces chances of hostile take-over of the firm.

CAPITAL STRUCTURE VIS-A-VIS FINANCIAL STRUCTURE

In engineering, structure refers to different parts of a building and thus in financial terms, financial structure refers to all the components of finance in an organization. In simple terms, financial structure consists of all assets, all liabilities and the capital. The manner in which an organization's assets are financed is referred to as its financial structure. There are some similarities between capital structure and financial structure. However, there are many differences also.

If you take a look at the balance sheet of a company, the entire left hand side which includes liabilities plus

equity is called the financial structure of the company. It contains all the long term and short term sources of capital. On the other hand, capital structure is the sum total of all long term sources of capital and thus is a part of the financial structure. It includes debentures, long term debt, preference share capital, equity share capital and retained earnings. In the simplest of terms, capital structure of a company is that part of financial structure that reflects long term sources of capital.

Consider the balance sheet of a company :

(Amt. in ₹)

<i>Particulars</i>	<i>Note</i>	<i>Amount as at 31st March, 2019</i>
1	2	3
I EQUITY AND LIABILITIES		
(1) Shareholders' funds		
(a) Share Capital		2,00,000
(b) Reserve and Surplus	1	72,000
(2) Current liabilities		
(a) Trade payable		1,28,000
(b) Provision for income Tax		60,000
TOTAL		4,60,000
II. ASSETS		
(1) Non current-assets		
(a) Fixed Assets		2,64,000
(b) Preliminary expenses	2	8,000
(2) Current Assets		
(a) inventories		48,000
(b) Trade receivable		88,000
(c) Cash at bank		52,000
TOTAL		4,60,000

In the above illustration, the total liabilities size of ₹ 4,60,000 is the financial structure of the firm while the long term block of ₹ 2,72,000 is the capital structure. We can also say that that the total financial structure minus the current liabilities structure gives us the capital structure. (Financial Structure - Current Liabilities = Capital Structure)

We can enunciate the following differences between financial structure and capital structure:

- Capital structure relates to long term capital deployment for creation of long term assets. Financial structure involves creation of both long term and short term assets.

- Capital structure is the core element of the financial structure. Capital structure can exist without the current liabilities and in such cases. Capital structure shall be equal to the financial structure. But we cannot have a situation where the firm has only current liabilities and no long term capital.
- Components of the capital structure may be used to build up the level of current assets but the current liabilities should not be used to finance acquisition of fixed assets. This would result in an asset liability mismatch.

PLANNING AND DESIGNING OF CAPITAL STRUCTURE

Just as planning and design of a physical structure is important, the same holds true for capital structure as well. A well thought out plan for the capital structure supplemented by a careful design ensures that prime goal of the firm, i.e. maximisation of the shareholder wealth is easily achieved.

Planning of the capital structure is a preliminary activity and it might commence as early at the time of incorporation of the firm. Once the firm is established, the next logical step is to move in the direction of implementation of the project. For meeting the cost of the project, the means of finance are to be arranged. Hence the need for timely and early planning of the capital structure.

The management of a company should seek answers to the following questions while making the decision regarding capital structure of the company:

- How should the investment project be financed?
- Does the way in which the investment projects are financed matter?
- How does financing affect the shareholders' risk, return and value?
- Does there exist an optimum financing mix in terms of the maximum value to the firm's shareholders?
- Can the optimum financing mix be determined in practice for a company?
- What factors in practice should a company consider in designing its financing policy?

Attributes of a Well Planned Capital Structure

A sound or appropriate capital structure should have the following features:

Return: The capital structure of the company should be most advantageous. Subject to other considerations, it should generate maximum returns to the shareholders without adding additional cost to them.

Risk: The use of excessive debt threatens the solvency of the company. To the point debt does not add significant risk. It should be sued, otherwise its use should be avoided.

Flexibility: The capital structure should be flexible. It should be possible for a company to adapt its capital structure with a minimum cost and delay if warranted by a changed situation. It should also be possible for the company to provide funds whenever needed to finance its profitable activities.

Capacity: The capital structure should be determined within the debt capacity of the company and this capacity should not be exceeded. The debt capacity of a company depends on its ability to generate future cash flows. It should have enough cash to pay creditors' fixed charges and principal sum.

Control: The capital structure should involve minimum risk of loss of control of the company. The owners of closely-held companies are particularly concerned about dilution of control.

Designing a Capital Structure

After planning the capital structure, we are faced with the issue of its design. Design takes off from where the

plan ends. Planning establishes the broad parameters of the structure. It is left for the design to fill in the minor details. While designing a capital structure, following points need to be kept in view:

1. **Design should be functional:** The design should create synergy with the long term strategy of the firm and should not be dysfunctional. It should facilitate the day to day working of the firm rather than create systematic bottlenecks.
2. **Design should be flexible:** The capital structure should be designed to incorporate a reasonable amount of flexibility in order to allow for temporary expansion or contraction of the share of each component.
3. **Design should be conforming statutory guidelines:** The design should conform to the statutory guidelines, if any, regarding the proportion and amount of each component. The limits imposed by lenders regarding the minimum level of owners' equity required in the firm should be complied with.

OPTIMAL CAPITAL STRUCTURE

Is there an optimal capital structure for a firm? By the term optimal capital structure we mean a particular arrangement of various components of the structure which is just in tune with the both the long term and short term objectives of the firm. An optimal capital structure is the best debt to equity ratio for a firm that maximises its value. The optimal capital structure for a company is one that offers a balance between the ideal debt to equity range and minimises the firm's cost of capital. A combination less or more than the optimal combination would be less than satisfying. Hence, a sub-optimal combination would affect the achievement of the goal of maximisation of the shareholders' wealth.

But can we plan and design an optimal capital structure? For designing such a structure, one would need the following information:

- The requirement of capital of the firm
- Availability of different components
- Cost of these components
- Rate of return from investment

It has to be further kept in mind that the above information should be exact information. In reality it is not possible to have the exact information on all the above four parameters. Secondly whatever information is available is for a particular period. Thus, we have to design the structure in a static set-up which makes the design devoid of all flexibility.

The real world of business, however, is a dynamic world with ever changing demand and supply of various components of the capital structure. Hence, we can not formulate the optimal capital structure in a static framework. The process has to be carried out in a dynamic framework of interdependent investment and financing decisions that yield optimal values within the constraints at the time and place when the decisions were made. We can, therefore, say that the optimal capital structure is an ideal situation which can function as the benchmark of performance for a firm. But this benchmark is invincible and the firm can expect to achieve moderated or toned down versions of this benchmark depending upon dynamics of each project.

FACTORS INFLUENCING CAPITAL STRUCTURE

Under the capital structure, decision regarding the proportion of long-term sources of capital is determined. Most favourable proportion determines the optimum capital structure. That happens to be the need of the company because EPS happens to be the maximum on it. Some of the chief factors affecting the choice of the capital structure are the following:

(1) Cash Flow Position

While making a choice of the capital structure the future cash flow position should be kept in mind. Debt capital should be used only if the cash flow position is really good because a lot of cash is needed in order to make payment of interest and refund of capital.

(2) Interest Coverage Ratio-ICR

With the help of this ratio an effort is made to find out how many times the EBIT is available to the payment of interest. The capacity of the company to use debt capital will be in direct proportion to this ratio.

It is possible that inspite of better ICR the cash flow position of the company may be weak. Therefore, this ratio is not a proper or appropriate measure of the capacity of the company to pay interest. It is equally important to take into consideration the cash flow position.

(3) Debt Service Coverage Ratio-DSCR

This ratio removes the weakness of ICR. This shows the cash flow position of the company.

This ratio tells us about the cash payments to be made (e.g., preference dividend, interest and debt capital repayment) and the amount of cash available. Better ratio means the better capacity of the company for debt payment. Consequently, more debt can be utilised in the capital structure.

(4) Return on Investment-ROI

The greater return on investment of a company increases its capacity to utilise more debt capital.

(5) Cost of Debt

The capacity of a company to take debt depends on the cost of debt. In case the rate of interest on the debt capital is less, more debt capital can be utilised and vice versa.

(6) Tax Rate

The rate of tax affects the cost of debt. If the rate of tax is high, the cost of debt decreases. The reason is the deduction of interest on the debt capital from the profits considering it a part of expenses and a saving in taxes.

For example, suppose a company takes a loan of Rs. 100 and the rate of interest on this debt is 10% and the rate of tax is 30%. By deducting 10/- from the EBIT a saving of in tax will take place (If 10% on account of interest are not deducted, a tax of @ 30% shall have to be paid).

(7) Cost of Equity Capital

Cost of equity capital (it means the expectations of the equity shareholders from the company) is affected by the use of debt capital. If the debt capital is utilised more, it will increase the cost of the equity capital. The simple reason for this is that the greater use of debt capital increases the risk of the equity shareholders.

Therefore, the use of the debt capital can be made only to a limited level. If even after this level the debt capital is used further, the cost of equity capital starts increasing rapidly. It adversely affects the market value of the shares. This is not a good situation. Efforts should be made to avoid it.

(8) Floatation Costs

Floatation costs are those expenses which are incurred while issuing securities (e.g., equity shares, preference shares, debentures, etc.). These include commission of underwriters, brokerage, stationery expenses, etc. Generally, the cost of issuing debt capital is less than the share capital. This attracts the company towards debt capital.

(9) Risk Consideration: There are two types of risks in business –**(i) Operating Risk or Business Risk**

This refers to the risk of inability to discharge permanent operating costs (e.g., rent of the building, payment of salary, insurance installment, etc.).

(ii) Financial Risk

This refers to the risk of inability to pay fixed financial payments (e.g., payment of interest, preference dividend, return of the debt capital, etc.) as promised by the company.

The total risk of business depends on both these types of risks. If the operating risk in business is less, the financial risk can be faced which means that more debt capital can be utilised. On the contrary, if the operating risk is high, the financial risk likely occurring after the greater use of debt capital should be avoided.

(10) Flexibility

According to this principle, capital structure should be fairly flexible. Flexibility means that, if need be, amount of capital in the business could be increased or decreased easily. Reducing the amount of capital in business is possible only in case of debt capital or preference share capital.

If at any given time company has more capital than as necessary then both the above-mentioned capitals can be repaid. On the other hand, repayment of equity share capital is not possible by the company during its lifetime. Thus, from the viewpoint of flexibility to issue debt capital and preference share capital is the best.

(11) Control

According to this factor, at the time of preparing capital structure, it should be ensured that the control of the existing shareholders (owners) over the affairs of the company is not adversely affected.

If funds are raised by issuing equity shares, then the number of company's shareholders will increase and it directly affects the control of existing shareholders. In other words, now the number of owners (shareholders) controlling the company increases.

This situation will not be acceptable to the existing shareholders. On the contrary, when funds are raised through debt capital, there is no effect on the control of the company because the debenture holders have no control over the affairs of the company. Thus, for those who support this principle debt capital is the best.

(12) Regulatory Framework

Capital structure is also influenced by government regulations. For instance, banking companies can raise funds by issuing share capital alone, not any other kind of security. Similarly, it is compulsory for other companies to maintain a given debt-equity ratio while raising funds.

Different ideal debt-equity ratios such as 2:1; 4:1; 6:1 have been determined for different industries. Also, the public issue of shares and debentures has to be made under SEBI guidelines.

(13) Stock Market Conditions

Stock market conditions refer to upward or downward trends in capital market. Both these conditions have their influence on the selection of sources of finance. When the market is dull, investors are mostly afraid of investing in the share capital due to high risk.

On the contrary, when conditions in the capital market are cheerful, they treat investment in the share capital as the best choice to reap profits. Companies should, therefore, make selection of capital sources keeping in view the conditions prevailing in the capital market.

(14) Capital Structure of Other Companies

Capital structure is influenced by the industry to which a company is related. All companies related to a given industry produce almost similar products, their costs of production are similar, they depend on identical technology, they have similar profitability, and hence the pattern of their capital structure is almost similar.

Because of this fact, there are different debt- equity ratios prevalent in different industries. Hence, at the time of raising funds a company must take into consideration debt-equity ratio prevalent in the related industry.

CAPITAL STRUCTURE AND VALUATION

There is a theme that the capital structure should be conducive to increase in valuation of the firm. By valuation, we mean that the market value or the realisable value of the owners' equity should increase. This can happen in case value of both components of the shareholders' equity, i.e. share capital and retained earnings increases.

Value of the share capital is reflected in the market value of the firm in case the shares are traded on the stock exchange. This market value, under ideal conditions, is indicative of the inherent value and is different from both the face value and the book value. The capital structure should be such as maximises the inherent value of the firm.

Retained earnings also have a book value, i.e. the value at which these earnings are carried in the books of the firm. The inherent value of the retained earnings depends upon the future returns which these earnings can generate for the owners. As earnings of the firm increase, its valuation also increases. Earnings can increase either directly through increased level of operations of the firm or indirectly through decrease in cost of capital of the firm. The direct increase in earnings is dependent upon the investment decisions and the changes in capital structure have no explicit bearing upon these earnings. Capital structure plays an important part in increase in earnings brought about by change in cost of different components of the structure.

CAPITAL STRUCTURE THEORIES

There are basically four approaches to capital structure decision:

1. Net Income Approach
2. Net Operating Income Approach
3. Traditional Approach
4. Modigliani Miller (MM) Approach

1. Net Income Approach

According to this approach there is a relationship between capital structure and the value of the firm and therefore, the firm can affect its value by increasing or decreasing the debt proportion in the overall financial mix. The Net Income Approach makes the following assumptions:

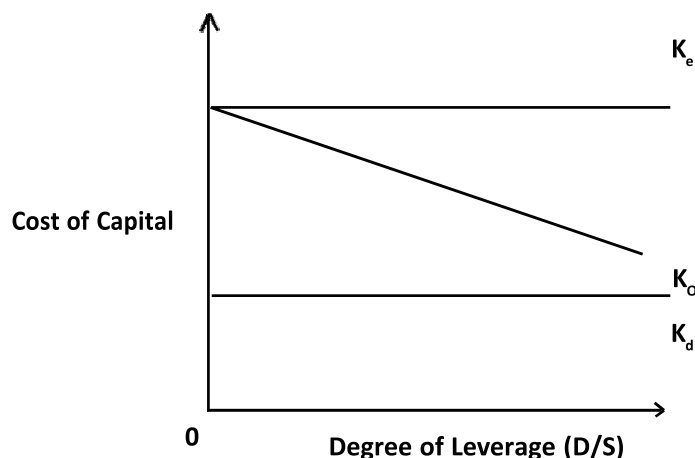
1. Cost of debt (K_D) is less than cost of equity (K_E) i.e. ($K_D < K_E$)
2. Both K_D and K_E remain constant and increase i.e., in financial leverage i.e., use of more and more debt financing in the capital structure does not affect the risk perception of the investors.

3. There are no taxes.

Under this approach, the cost of debt capital, K_d and the cost of equity capital K_e remains unchanged when D/S , the degree of leverage, varies. Here S stands for total capital employed ($S= D + E$). The constancy of K_d and K_e with respect to the degree of leverage means that K_o the average cost of capital, measured by the following formula declines as the degree of leverage increases.

$$K_o = K_d \times \frac{D}{(D+E)} + K_e \times \frac{E}{(D+E)}$$

This happens because when the degree of leverage increases, K_d which is lower than K_e receives a higher weight in the calculation of K_o . This can also be illustrated by a graph as shown below:



As our assumption is that the cost of debt and equity capital would not change with the change in the level of leverage, K is seen to go down with the increasing proportion of debt in the capital.

Let us take a company that has an investment of ₹ 2,00,000 and a net operating income of ₹ 50,000. It is considering two scenarios: (1) no debt and (2) equal levels of debt and equity of ₹ 1,00,000 each. Let us say that the company finds out that the cost of equity is 12% and the cost of debt is 8%.

Calculations show that equity earnings would be ₹ 50,000 and ₹ 42,000 respectively in the two scenarios and shown below. As the return expected on equity is 12%, we can say that this profit is 12% and therefore the market value of equity would be such that this return becomes 12% on the same. This means that the market value of equity would be ₹ 4,16,667 and ₹ 4,50,000 respectively in the two scenarios. Adding the market value of debt and the market value of equity gives us the total value of the firm in the market.

	Scenario A	Scenario B
Equity	2,00,000	1,00,000
Debt	0	1,00,000
Total Capital	2,00,000	2,00,000
Cost of Equity	12%	12%
Cost of Debt	8%	8%

Now the Calculation will be as under

	Scenario A	Scenario B
EBIT	50,000	50,000
Less Interest	0	(8,000)
Earnings available for Equity Shareholders	50,000	42,000
Value of Equity (Earnings Available/Ke)	4,16,667	3,50,000
Add - Market Value of Debt	0	1,00,000
Total Value of Firm	4,16,667	4,50,000

Average cost of capital Scenario A: $8\% \times (0/2,00,000) + 12\% \times (2,00,000/2,00,000) = 12\%$ Scenario B: $8\% \times (1,00,000/4,50,000) + 12\% \times (3,50,000/4,50,000) = 11.10\%$

There are two points to be noted here

1. As the cost of capital decreases the value of the firm would go up. Inverse relationship exists between the value of the firm and cost of capital for any given level of return.
2. As we increase the level of debt in the company, the value of the firm would go up even further. This would mean that the companies would like to employ as much debt as possible.

Illustration 1: Super manufacturing company expects to earn net operating income of INR 1,50,000 annually. The company has INR 6,00,000, 8% debentures. The cost of equity capital of the company is 10%. What would be the value of the company? Also calculate overall cost of capital.

Solution:

Calculation of Value of Super Manufacturing Company

Particulars	Amount (INR)
Net Operating Income	1,50,000
Less: Interest on 8% debentures (I)	48,000
Earnings available to equity shareholders (NI)	1,02,000
Equity capitalisation rate (Ke)	0.10
Market value of equity (S) = NI / Ke	10,20,000
Market value of debt (B)	6,00,000
Total value of firms (S+B)= V	16,20,000

Overall cost of capital = $K_0 = \text{EBIT} / V = \text{INR } 1,50,000 / 16,20,000$

= 0.093

= 9.3% approximately

Illustration 2: Find out the value of the Magic Limited with the help of given information:

<i>Particulars</i>	<i>Amount (Rs.)</i>
Earnings Before Interest and Tax	350000
Cost of Equity	10%
Cost of Debt	7.2%
Debenture	100000

Find out the overall cost of capital with the help of net income approach. (Assume tax rate-10%).

Solution:

<i>Particulars</i>	<i>Amount (Rs.)</i>
Earnings Before Interest and Tax	350000
Less: Interest @ 7.2%	7200
Earnings Before Interest and Tax	342800
Less: Tax@10%	34280
Net Income	308520
Cost of equity	10%
Market value of equity (S = net income / cost of equity)	3085200
Market value of Debt (B)	100000
Value of the firm (S+B)	3185200

Illustration 3: Compute the value of Elite limited from the following figures. Further, assume that the proportion of debt increases from US\$300,000 to US\$400,000, and everything else remains the same what will be the value of the company?

<i>Particulars</i>	<i>Amount (US\$)</i>
Earnings before Interest and Tax (EBIT)	100000
Bonds (Debt part)	300000
Cost of bonds issued (Debt)	10%
Cost of Equity	14%

Solution:

<i>Particulars</i>	<i>Amount (US\$)</i>
EBIT	100000
Less: Interest cost (10% of 300,000)	30,000
Earnings (since tax is assumed to be absent)	70,000
Shareholders' Earnings	70,000
Market value of Equity (70,000/14%)	500,000
Market value of Debt	300,000
Total Market value	800,000
Overall cost of capital	100,000/800,000 =12.5%

When the proportion of debt increases from US\$300,000 to US\$400,000

<i>Particulars</i>	<i>Amount (US\$)</i>
EBIT	100,000
Less: Interest cost (10% of 400,000)	40,000
Earnings (since tax is assumed to be absent)	60,000
Shareholders' Earnings	60,000
Market value of Equity (60,000/14%)	428,570 (approx)
Market value of Debt	400,000
Total Market value	828,570
Overall cost of capital	100,000/828,570 = 12% (approx.)

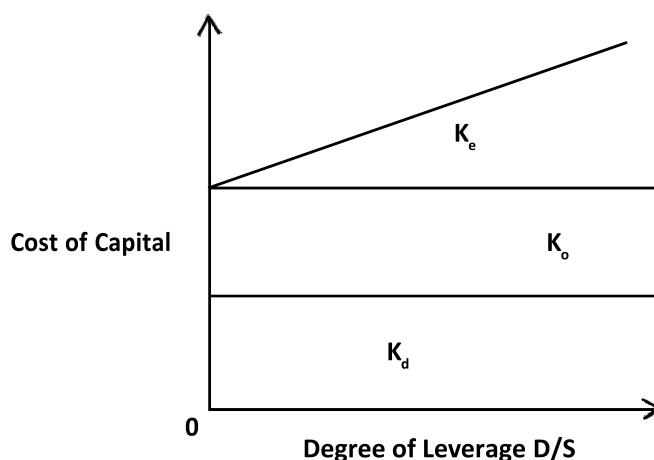
2. Net Operating Income Approach

Net operating income approach is opposite to the Net income approach. According to NOI Approach, the market value of the firm depends upon the net operating profit or EBIT and the overall cost of capital. The financing mix or the capital structure is irrelevant and does not affect the value of the firm. The NOI Approach makes the following assumptions:

1. The investors see the firm as a whole and thus capitalize the total earnings of the firm to find the value of the firm as a whole.
2. The overall cost of capital K_O , of the firm is constant and depends upon the business risk which also is assumed to be unchanged.
3. The cost of debt, K_D , is also taken as constant.

4. The use of more and more debt in the capital structure increases the risk of the shareholders and thus results in the increase in the cost of equity capital i.e, K_e . The increase in K_e is such as to completely offset the benefits of employing cheaper debt, and
5. There is no taxes.

Under NOI Approach the relationship between the leverage and cost of capital has been represented in the Figure below:



Let us repeat the example we discussed earlier in net income approach. Let us take a company that has an investment of ₹ 2,00,000 and net operating income of ₹ 50,000. It is considering two scenarios: 1) no debt and 2) equal levels of debt and equity of ₹ 100,000 each. Let us assume that the company finds out that the overall cost of capital is 10% and the cost of debt is 8%.

As the return expected on total capital is 10 per cent, therefore the market value of total capital would be such that this return becomes 10 per cent on the same. This means that the market value of capital would be ₹ 5,00,000 in both the scenarios as our assumption in this case is that the total market value remains constant. Also the value of debt would also remain constant as the cost of debt remains constant. This means that the equity capitalization can be calculated by subtracting the market value of debt from the total market value of the firm. Then the return on equity divided by the market capitalization of equity would give us the cost of equity.

Equity	Scenario 'A'	Scenario 'B'
Equity	₹ 2,00,000	₹ 1,00,000
Debt	0	₹ 1,00,000
Cost of Debt	8%	8%
Net operating income	₹ 50,000	₹ 50,000
Overall Capitalization rate	10%	10%
Total market value	₹ 5,00,000	₹ 5,00,000
Interest on debt	0	₹ 8,000
Debt capitalization rate	0.08	0.08
Market value of debt	0	₹ 1,00,000
Market value of equity	₹ 5,00,000	₹ 4,00,000

There are two points to be noted here:

- As the cost of total capital and debt is constant, the cost of equity would go up or down with increasing or decreasing leverage, i.e., the amount of debt in the capital structure.
- This means that as we increase the level of debt in the company, the value of the firm doesn't change and the company does not benefit by taking on debt. This would mean that the companies would like to employ as much equity as possible so as to reduce the risk of the company.

$$\text{Value of firm} = \frac{\text{Net Operating Income}}{\text{WACC}}$$

Or

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

Alternatively, Value of the Firm = Value of Equity + Value of Debt

$$K_e = \frac{\text{Net Income after interest}}{\text{Value of equity}}$$

Cost of equity can also be calculated as follows:

$$K_e = K_0 + (K_0 - K_d) D/E$$

Illustration 1: Bliss limited has an EBIT of Rs. 4,00,000 and belongs to a risk class of 10% i.e. its overall cost of capital is 10%. What is the value of equity capital if it employees 5% debt to the extent of 30%, 40% or 50% of the total capital of Rs. 20,00,000? Assume that Net Operating Income approach applies.

Solution:

Particulars	30% Debt	40% Debt	50% Debt
EBIT (A)	4,00,000	4,00,000	4,00,000
Overall cost of capital (K_0)	10%	10%	10%
Value of the firm ($V = \text{EBIT} / K_0$)	40,00,000	40,00,000	40,00,000
Value of debt (D) 30%, 40%, 50% of Rs. 20 lacs	6,00,000	8,00,000	10,00,000
Value of Equity ($E = V - D$)	34,00,000	32,00,000	30,00,000
Interest on debt @5% (B)	30,000	40,000	50,000
Net profit available for equity shareholders (A-B)	3,70,000	3,60,000	3,50,000
K_e (Net profit for equity shareholders / Value of Equity)	10.88%	11.25%	11.67%

The cost of equity capital increases with the increase in the proportion of debt capital.

Cost of Equity can also be calculated using the following formula

$$K_e = K_0 + (K_0 - K_d) D/E$$

$$K_e = 10 + (10 - 5) 6,00,000/34,00,000 = 10.88\%$$

$$K_e = 10 + (10 - 5) 8,00,000/32,00,000 = 11.25\%$$

$$K_e = 10 + (10 - 5) 10,00,000/30,00,000 = 11.67\%$$

Illustration 2: Ample limited operating income (EBIT) is Rs.5,00,000. The firm's cost of debt is 10% and currently the firm employ Rs.15,00,000 of debt. The overall cost of capital of the firm is 15%.

You are required to calculate:

- (i) Total value of firm
- (ii) Cost of equity

Solution:

(i) Statement showing value of the firm

<i>Particulars</i>	<i>Amount (Rs.)</i>
Net Operating Income (EBIT)	5,00,000
Less: Interest on debentures (10% of Rs.15,00,000)	1,50,000
Earnings available for equity holders	3,50,000
Total cost of capital (K_0) (given)	15%
Value of the firm $V = \text{EBIT} / K_0 = \text{Rs.}5,00,000 / 0.15$	33,33,333

(ii) Calculation of cost of equity

<i>Particulars</i>	<i>Amount (Rs.)</i>
Market value of debt (D)	15,00,000
Market value of equity (S) = $V - D = \text{Rs.}33,33,333 - \text{Rs.}15,00,000$	18,33,333

$$K_e = \frac{\text{Earnings available for equity holders}}{\text{Value of equity (S)}}$$

$$\text{OR} = \frac{\text{EBIT} - \text{Interest paid on debt}}{\text{Market value of equity}}$$

$$= \frac{\text{Rs.}3,50,000}{\text{Rs.}18,33,333} \times 100 = 19.09\%$$

OR

$$K_e = K_e \times \left(\frac{S}{V}\right) + K_d \left(\frac{D}{V}\right)$$

$$\begin{aligned}
 K_e &= K_e \times \left(\frac{V}{S}\right) + K_d \left(\frac{D}{S}\right) \\
 &= 0.15 \left[\frac{33,33,333}{18,33,333}\right] - 0.10 \left[\frac{15,00,000}{18,33,333}\right] \\
 &= \frac{1}{18,33,333} [(0.15 \times 33,33,333)] - (0.15 \times 15,00,000) \\
 &= 19.09\%
 \end{aligned}$$

Illustration 3: A ltd. and B ltd. are identical except for capital structures. A ltd. has 50 percent debt and 50 percent equity, whereas B ltd. has 20 percent debt and 80 percent equity. It is to be noted that all percentages are in market-value terms. The borrowing rate for both companies is 8 percent in a no-tax world, and capital markets are assumed to be perfect.

- (a) (i) If you own 2 percent of the shares of A ltd., determine your return if the company has net operating income of Rs.3,60,000 and the overall capitalisation rate of the company, K_o is 18 percent?
(ii) Calculate the implied rate of return on equity?
- (b) B ltd. has the same net operating income as A ltd.
i) Determine the implied required equity return of B ltd.
ii) Analyse why does it differ from A ltd.

Solution:

$$(a) \text{ Value of A ltd.} = \frac{\text{NOI}}{K_o} = \frac{\text{Rs.3,60,000}}{18\%} = \text{Rs.20,00,000}$$

- (i) Return on shares of A ltd.

Particulars	Amount (Rs.)
Value of the company	20,00,000
Market value of debt (50%)	10,00,000
Market value of equity (50%)	10,00,000
Net Operating Income	3,60,000
Interest on debt (8% x Rs. 10,00,000)	80,000
Earnings available to shareholders	2,80,000
Return on equity (2% x 2,80,000)	5,600

- (ii) Implied rate of return on equity

$$= \frac{\text{Rs.2,80,000}}{\text{Rs.10,00,000}} \times 100 = 28\%$$

(b) (i) Calculation of implied rate of return

<i>Particulars</i>	<i>Rs.</i>
Total value of company	20,00,000
Market value of debt (20% x Rs.20,00,000)	4,00,000
Market value of equity (80% x Rs.20,00,000)	16,00,000
	<i>Rs.</i>
Net Operating Income	3,60,000
Interest on debt (8% x Rs.4,00,000)	32,000
Earnings available to shareholders	3,28,000

$$\text{Implied required rate of return on equity} = \frac{\text{Rs.3,28,000}}{\text{Rs.16,00,000}} \times 100 = 20.5\%$$

(ii) It is lower than the A Ltd. because B Ltd. uses less debt in its capital structure. As the equity capitalisation is a linear function of the debt-to-equity ratio when we use the net operating income approach, the decline in required equity return offsets exactly the disadvantage of not employing so much in a way of "cheaper" debt funds.

3. Traditional Approach

The NI Approach and NOI Approach hold extreme views on the relationship between the leverage, cost of capital and the value of the firm. In practical situations, both these approaches seem to be unrealistic. The traditional view takes a compromising view between the two and incorporates the basic philosophy of both. The traditional approach to capital structure suggests that there exist an optimal debt to equity ratio where the overall cost of capital is the minimum and market value of the firm is the maximum. On either side of this point, changes in the financing mix can bring positive change to the value of the firm. Before this point, the marginal cost of debt is less than a cost of equity and after this point vice-versa.

The traditional approach to capital structure advocates that there is a right combination of equity and debt in the capital structure, at which the market value of a firm is maximum. As per this approach, debt should exist in the capital structure only up to a specific point, beyond which, any increase in leverage would result in the reduction in value of the firm.

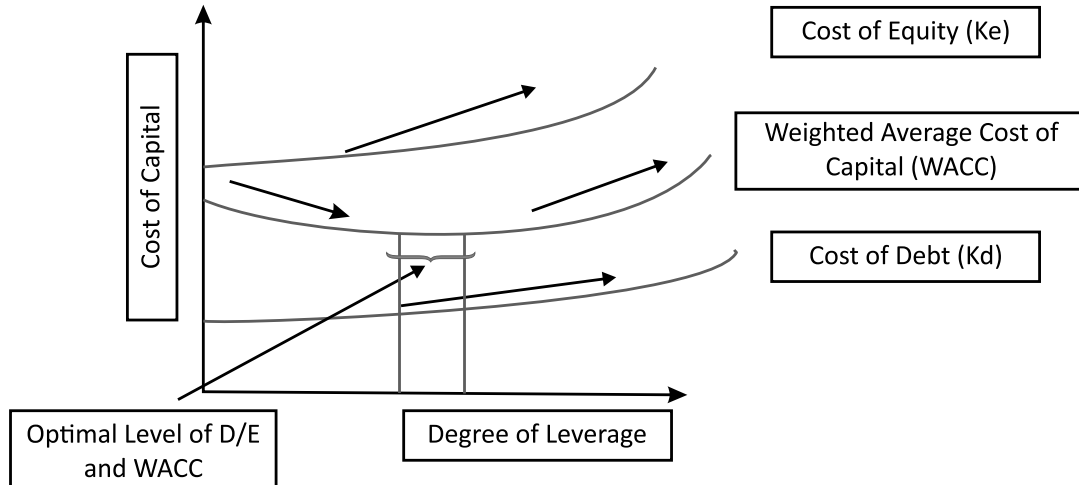
It means that there exists an optimum value of debt to equity ratio at which the Weighted Average Cost of Capital (WACC) is the lowest and the market value of the firm is the highest. Once the firm crosses that optimum value of debt to equity ratio, the cost of equity rises to give a detrimental effect to the WACC. Above the threshold, the WACC increases and market value of the firm starts a downward movement.

Assumptions under traditional approach:

1. The rate of interest on debt remains constant for a certain period and thereafter with an increase in leverage, it increases.
2. The expected rate by equity shareholders remains constant or increase gradually. After that, the equity shareholders starts perceiving a financial risk and then from the optimal point and the expected rate increases speedily.

3. As a result of the activity of rate of interest and expected rate of return, the WACC first decreases and then increases. The lowest point on the curve is optimal capital structure.

Traditional viewpoint on the relationship between leverage, cost of capital and the value of the firm is displayed in the figure below:



The following estimates of the cost of debt and cost of equity capital have been made at various level of the debt- equity mix of PQR Ltd:

% of Debt (1)	Cost of Debt (2)	(3) = (1) * (2)	% of Equity (4)	Cost of Equity (5)	(6) = (4) * (5)	Cost of Capital {(3) + (6)} in %
0	5	0	1	12	12	12
0.10	5	0.5	0.90	12	10.8	11.3
0.20	5	1	0.80	12.5	10	11
0.30	5.5	1.65	0.70	13	9.1	10.75
0.40	6	2.4	0.60	14	8.4	10.8
0.50	6.5	3.25	0.50	16	8	11.25
0.60	7	4.2	0.40	20	8	12.20

4. Modigliani - Miller Theory

In 1958, Franco Modigliani and Merton Miller (MM) published a theory of modern financial management – they concluded that the value of a firm depends solely on its future earnings stream, and hence its value is unaffected by its debt/equity mix. In short, they concluded that a firm's value stems from its assets, regardless of how those assets are financed.

In their paper, MM began with a very restrictive set of assumptions, including perfect capital markets (which implies zero taxes). And then they used an arbitrage proof to demonstrate that capital structure is irrelevant. Under their assumptions, if debt financing resulted in a higher value for the firm than equity financing, then

investors who owned shares in a leveraged (debt-financed) firm could increase their income by selling those shares and using the proceeds, plus borrowed funds, to buy shares in an unleveraged (all equity- financed) firm. The simultaneous selling of shares in the leveraged firm and buying of shares in the unleveraged firm would drive the prices of the stocks to the point where the values of the two firms would be identical. Thus, according to MM Hypothesis, a firm's stock price is not related to its mix of debt and equity financing.

Modigliani and Miller have restated and amplified the net operating income position in terms of three basic propositions. These are as follows:

Proposition – I

The total value of a firm is equal to its expected operating income (PBIT when tax = 0) divided by the discount rate appropriate to its risk class. It is independent of the degree of leverage.

$$V_l = V_u = \frac{\text{EBIT}}{K_{Ol}} = \frac{\text{EBIT}}{K_{Ou}}$$

Here the subscript l is used to denote leveraged firm and subscript u is used to denote unleveraged firm.

Since the V (Value of the firm) as established by the above equation is a constant, then under the MM model, when there are no taxes, the value of the firm is independent of its leverage. This implies that the weighted average cost of capital to any firm is completely independent of its capital structure and the WACC for any firm, regardless of the amount of debt it uses, is equal to the cost of equity of unleveraged firm employing no debt.

Proposition – II

The expected yield on equity, K_e is equal to K_o plus a premium. This premium is equal to the debt – equity ratio times the difference between K_o and the yield on debt, K_d . This means that as the firm's use of debt increases its cost of equity also rises, and in a mathematically precise manner.

Proposition – III

The cut-off rate for investment decision making for a firm in a given risk class is not affected by the manner in which the investment is financed. It emphasizes the point that investment and financing decisions are independent because the average cost of capital is not affected by the financing decision.

Illustration 4:

Let us take the case of two firms X and Y, similar in all respects except in their capital structure. Firm X is financed by equity only; firm Y is financed by a mixture of equity and debt. The financial parameters of the two firms are as follows:

Financial Particulars of Firms X and Y

(Amount in ₹)

<i>Particulars</i>	<i>Firm X</i>	<i>Firm Y</i>
Total Capital Employed	10,00,000	10,00,000
Equity Capital	10,00,000	6,00,000
Debt	Nil	4,00,000
Net operating Income	1,00,000	1,00,000
Debt Interest	0	20,000

Market value of debt	0	4,00,000
Equity earnings	1,00,000	80,000
Equity capitalization rate	10%	12%
Market value of equity	10,00,000	6,66,667
Total market value of the firm	10,00,000	10,66,667
Average cost of capital	10%	9.37%
Debt-Equity ratio	0	0.6

Solution:

From the above particulars, it can be seen that the value of leveraged firm Y is higher than that of the unleveraged firm. According to Modigliani Miller approach, such a situation cannot persist because equity investors would do well to sell their equity investment in firm Y and invest in the equity of firm X with personal leverage. For example, an equity investor who owns 1% equity in firm Y would do well to:

- Sell his equity in Firm Y for ₹ 6,667
- Borrow ₹ 4,000 at 5% interest on personal account and
- Buy 1.0667% of the equity of firm X with the amount of ₹ 10,667 that he has.

Such an action will result in the following income:

Particular	(₹)
Income on investment in firm X	1066.70
Less: Interest (4000 x 5%)	200.00
Net Income	866.70

This net income of ₹ 866.7 is higher than a net income of ₹ 800 foregone by selling 1 percent equity of firm Y and the leverage ratio is the same in both the cases.

When investors sell their equity in firm Y and buy the equity in firm X with personal leverage, the market value of equity of firm Y tends to decline and the market value of equity of firm X tends to rise. This process continues until the net market values of both the firms become equal because only then the possibility of earning a higher income for a given level of investment and leverage by arbitraging is eliminated. As a result of this the cost of capital for both the firms is the same.

The above example explains that due to the arbitrage mechanism the value of a leveraged firm cannot be higher than that of an unleveraged firm, other things being equal. It can also be proved that the value of an unleveraged firm cannot be higher than that of leveraged firm, other things being equal.

Let us assume the valuation of the two firms X and Y is the other way around and is as follows:

(Amount in INR)

Particulars	Firm X	Firm Y
Debt Interest	0	20,000

Market Value of debt (Debt capitalisation rate is 5%)	0	4,00,000
Equity earnings	1,00,000	80,000
Equity Capitalisation rate	8%	12%
Market value of equity	12,50,000	6,66,667
Total Market value	12,50,000	10,66,667

If a situation like this arises, equity investors in firm X would do well to sell the equity in firm X and use the proceeds partly for investment in the equity of firm Y and partly for investment in the debt of firm Y. For example, an equity investor who owns 1 percent equity in firm X would do well to:

- Sell his 1% equity in firm X for ₹ 12,500
- Buy 1.01% of the equity and debt in firm Y involving an outlay of INR 10,773

Such an action will result in an increase of income by INR 1727 without changing the risk shouldered by the investor. When investors resort to such a change, the market value of the equity of firm X tends to decline and the market value of the equity of firm Y tends to rise. This process continues until the total market value of both the firms becomes equal.

CRITICISM OF MM HYPOTHESIS

If the MM theory was correct, managers would not need to concern themselves with capital structure decisions, because such decisions would have no impact on stock prices. However, like most theories, MM's results would hold true only under a particular set of assumptions. Still, by showing the conditions under which capital structure is irrelevant, MM provided important insights into when and how debt financing can affect the value of a firm.

MM Hypothesis with Corporate Taxes

In 1963, MM added corporate taxes to their model. With corporate taxes considered, a firm's stock price was shown to be directly related to its use to debt financing – higher the percentage of debt financing, the higher the stock price. Under the MM with tax theory, firms should use virtually 100% debt financing. The reason for this result is the corporate tax structure – returns to stockholders come from after-tax earnings, but returns to creditors are paid before tax. The effect of this tax treatment is that more of a company's operating income is left for investors when more debt financing is used.

Empirical evidence against MM Hypothesis

In spite of the MM arguments, firms do not usually use anywhere close to 100% debt financing. In an attempt to modify MM's model to make it more consistent with actual behaviour, many of their assumptions were relaxed in papers by other authors. In particular, the possibility of financial distress drastically changed the MM results. In the modified model, tax savings cause the value of a firm to rise as more and more debt is used, but at some point (the optimal structure), the value of the firm begins to fall with additional debt because the tax benefits are more than offset by the increasing costs of potential financial distress.

The MM model as modified to include financial distress suggests to managers .

- that a certain amount of debt is good
- that too much debt is bad, and
- that there is an optimal amount of debt for every firm.

Thus, the modified MM theory, which is called the trade-off theory of capital structure, provides useful insights into the factors that affect a firm's optimal capital structure. Here the marginal costs and benefits of debt financing are balanced against one another, and the result is an optimal capital structure that falls somewhere between zero and 100% debt.

Pecking Order Theory

One of the most influential theory of corporate leverage is Pecking Order Theory. It assumes that there is no target capital structure and due to adverse selection, firms prefer internal finance to external finance. Even when outside funds are necessary, debt is preferred to equity since issue of debt involves lower information costs. The debt is preferred because issuing equity would bring external ownership into the company.

EBIT - EPS Analysis

One widely used means of examining the effect of leverage is to analyse the relationship between earnings before interest and taxes (EBIT) and earnings per share (EPS). The use of EBIT – EPS analysis indicates to management the projected EPS for different financial plans. Generally, management wants to maximise EPS if doing so also satisfies the primary goal of financial management - maximisation of the owner's wealth as represented by the value of business, i.e. the value of firm's equity. If the firm attempts to use excessive amounts of debt, shareholders (who are risk - averters) may sell their shares, and thus its price will fall. While the use of large amount of debt may result in higher EPS, it may also result in a reduction in the price of the firm's equity. The optimum financial structure for a firm (that is, the use of debt in relationship of equity and retained earnings as sources of financing) should be the one which maximises the price of the equity.

Given the importance of earnings per share (EPS) as a measure of a firm's performance, analysis of the impact of financing alternatives on EPS is an important first step. Essentially, the method involves the comparison of alternative methods of financing under various assumptions as to EBIT.

Let us assume that a firm has a capital structure of INR 1,00,000. The equity capital is of ₹ 100 each and debt carries rate of interest of 10% p.a. We further assume that the firm has the following combination of components of this structure:

Case No.	Equity (%)	Debt (%)
1.	100	0
2.	75	25
3.	50	50
4.	25	75

For calculating the impact on EPS of various levels of EBIT, we take five values of ₹ 5,000, ₹ 7,500, ₹ 12,500 and ₹ 15,000. The tax rate is assumed to be 40 %.

(a) If EBIT is INR 5,000

(Amount in INR)

Debt Level (%)	0%	25%	50%	75%
EBIT	5,000	5,000	5,000	5,000
Less: Interest	0	(2,500)	(5,000)	(7,500)
PBT	5,000	2,500	0	2,500

Less: Tax @ 40%	2,000	1,000	0	0
PAT	(3,000)	(1,500)	0	(2,500)
No. of Equity Shares	1,000	750	500	250
EPS (PAT/No. of Equity Shares)	3.0	2.0	0	(1.0)

We find that with increasing level of debt in the capital structure, the EPS decreases.

(b) If EBIT is INR 7,500

(Amount in INR)

Debt Level (%)	0%	25%	50%	75%
EBIT	7,500	7,500	7,500	7,500
Less: Interest	0	(2,500)	(5,000)	(7,500)
PBT	7,500	5,000	2,500	0
Less: Tax @ 40%	(3,000)	(2,000)	(1,000)	0
PAT	4,500	3,000	1,500	0
No. of Equity Shares	1,000	750	500	250
EPS (PAT/No. of Equity Shares)	4.5	4.0	3.0	0

In this case also, the EPS decreases with increasing level of debt.

(c) If EBIT is INR 10,000

(Amount in INR)

Debt Level (%)	0%	25%	50%	75%
EBIT	10,000	10,000	10,000	10,000
Less: Interest	0	(2,500)	(5,000)	(7,500)
PBT	10,000	7,500	5,000	2,500
Less: Tax @ 40%	(4,000)	(3,000)	(2,000)	(1,000)
PAT	6,000	4,500	3,000	1,500
No. of Equity Shares	1,000	750	500	250
EPS (PAT/No. of Equity Shares)	6.0	6.0	6.0	6.0

At this level of EBIT, the EPS remains unchanged irrespective of any change in the capital structure.

(d) If EBIT is INR 12,500

(Amount in INR)

Debt Level (%)	0%	25%	50%	75%
EBIT	12,500	12,500	12,500	12,500
Less: Interest	0	(2,500)	(5,000)	(7,500)

PBT	12,500	10,000	7,500	5,000
Less: Tax @ 40%	(5,000)	(4,000)	(3,000)	(2,000)
PAT	7,500	6,000	4,500	3,000
No. of Equity Shares	1,000	750	500	250
EPS (PAT/No. of Equity Shares)	7.5	8.0	9.0	12.0

Now we see that EPS increases with increasing level of debt.

(e) If EBIT is INR 15,000

(Amount in INR)

Debt Level (%)	0%	25%	50%	75%
EBIT	15,000	15,000	15,000	15,000
Less: Interest	0	(2,500)	(5,000)	(7,500)
PBT	15,000	12,500	10,000	7,500
Less: Tax @ 40%	(6,000)	(5,000)	(4,000)	(3,000)
PAT	9,000	7,500	6,000	4,500
No. of Equity Shares	1,000	750	500	250
EPS (PAT/No. of Equity Shares)	9.0	10.0	12.0	18.0

If we increase the EBIT further, the impact on EPS is better still.

We can conclude from the above illustration that the firm should resort to financing its operations through debt only beyond a threshold or indifference level in order to benefit from tax breaks provided by interest on borrowings. In other words, debt is suitable if the EBIT is expanding rapidly. If the operations are shrinking, it should change its capital structure immediately in favour of equity capital.

The EBIT-EPS analysis of the above illustration can be summarised in the form of following table :

	Debt Levels (%)			
	0%	25%	50%	75%
EBIT	EPS at above levels			
₹ 5,000	3.0	2.0	0	(1.0)
₹ 7,500	4.5	4.0	3.0	0
₹ 10,000	6.0	6.0	6.0	6.0
₹ 12,500	7.5	8.0	9.0	12.0
₹ 15,000	9.0	10.0	12.0	18.0

The indifference point of a firm (EBIT of ₹ 10000 in this case) varies from firm to firm but normally it approximates the breakeven point.

EBITDA ANALYSIS (EARNINGS BEFORE INTEREST, TAX, DEPRECIATION AND AMORTIZATION),

EBITDA, an acronym for “earnings before interest, taxes, depreciation and amortization,” is an often-used measure of the value of a business. EBITDA is calculated by taking net income and adding interest, taxes, depreciation and amortization expenses back to it. EBITDA is used to analyze a company’s operating profitability before non-operating expenses (such as interest and “other” non-core expenses) and non-cash charges (depreciation and amortization).

Analysis with EBITDA

EBITDA enables analysts to exclude the impacts of non-operating activities and focus on the outcome of operating decisions. Non-operating activities include interest expenses, tax rates, and large non-cash items such as depreciation and amortization.

By removing the non-operating effects, EBITDA gives investors the ability to focus on the profitability of their operations. This type of analysis is particularly important when comparing similar companies across a single industry.

Limitations of EBITDA

Factoring out interest, taxes, depreciation and amortization can make even completely unprofitable firms appear to be fiscally healthy. The use of EBITDA as measure of financial health made these firms look attractive. EBITDA numbers are easy to manipulate. If fraudulent accounting techniques are used to inflate revenues and interest, taxes, depreciation and amortization are factored out of the equation, almost any company may appear to be profitable and great.

Operating cash flow is a better measure of how much cash a company is generating because it adds non-cash charges (depreciation and amortization) back to net income and includes the changes in working capital that also use or provide cash (such as changes in receivables, payables and inventories). These working capital factors are the key to determining how much cash a company is generating. If investors do not include changes in working capital in their analysis and rely solely on EBITDA, they will miss clues that indicate whether a company is losing money because it isn’t making any sales.

Despite various shortcomings, there are some good reasons for using EBITDA.

1. The first factor to consider is that EBITDA can be used as a shortcut to estimate the cash flow available to pay debt on long-term assets, such as equipment and other items with a lifespan measured in decades rather than years. Dividing EBITDA by the amount of required debt payments yields a debt coverage ratio. Factoring out the “ITDA” of EBITDA was designed to account for the cost of the long-term assets and provide a look at the profits that would be left after the cost of these tools was taken into consideration
2. Another factor is that EBITDA estimate to be reasonably accurate, the company under evaluation must have legitimate profitability. Using EBITDA to evaluate old-line industrial firms is likely to produce useful results. This idea was lost during the 1980s, when leveraged buyouts were fashionable, and EBITDA began to be used as a proxy for cash flow. This evolved into the more recent practice of using EBITDA to evaluate unprofitable dotcoms as well as firms such as telecoms, where technology upgrades are a constant expense.
3. EBITDA can also be used to compare companies against each other and against industry averages. In addition, EBITDA is a good measure of core profit trends because it eliminates some of the extraneous factors and allows a more “apples-to-apples” comparison.

Ultimately, EBITDA should not replace the measure of cash flow, which includes the significant factor of changes

in working capital. Remember “cash is king” because it shows “true” profitability and a company’s ability to continue operations.

MEASURES OF OPERATING AND FINANCIAL LEVERAGE

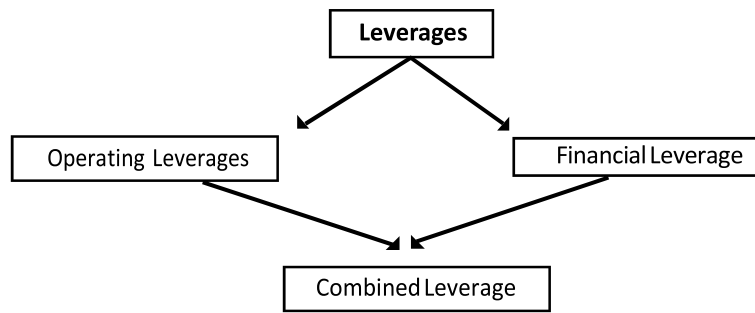
The term leverage refers to an increased means of accomplishing some purpose. Leverage is used to lifting heavy objects, which may not be otherwise possible. In the financial point of view, leverage refers to furnish the ability to use fixed cost assets or funds to increase the return to its shareholders.

Definition of Leverage

James Horne has defined leverage as, “the employment of an asset or fund for which the firm pays a fixed cost or fixed return.

Types of Leverage

Leverage can be classified into three major headings according to the nature of the finance mix of the company.



The company may use financial or leverage or operating leverage, to increase the EBIT and EPS.

The leverage associated with investment activities is called as operating leverage. It is caused due to fixed operating expenses in the company. Operating leverage may be defined as the company’s ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. Operating leverage consists of two important costs viz., fixed cost and variable cost. When the company is said to have a high degree of operating leverage if it employs a great amount of fixed cost and smaller amount of variable cost. Thus, the degree of operating leverage depends upon the amount of various cost structure. Operating leverage can be determined with the help of a break even analysis.

Operating leverage can be calculated with the help of the following formula:

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit (EBIT)}}$$

Degree of Operating Leverage

The degree of operating leverage may be defined as percentage change in the operating income (EBIT) resulting from a percentage change in the sales. It can be calculated with the help of the following formula:

$$\text{DOL} = \frac{\text{Percentage change in EBIT}}{\text{Operating Profit (EBIT)}}$$

Illustration 5:

From the following selected operating data, determine the degree of operating leverage. Which company has the greater amount of business risk? Why?

Amount in ₹

	Company A (₹)	Company B (₹)
Sales	25,00,000	30,00,000
Fixed costs	7,50,000	15,00,000

Variable expenses as a percentage of sales are 50% for company A and 25% for company B.

Solution:**Statement of Profit**

Amount in ₹

	Company A	Company B
Sales	25,00,000	30,00,000
Less : Variable cost	12,50,000	7,50,000
Contribution	12,50,000	22,50,000
Less : Fixed cost	7,50,000	15,00,000
Operating Profit (EBIT)	5,00,000	7,50,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit}}$$

$$\text{Company 'A' Operating Leverage} = \frac{12,50,000}{5,00,000}$$

= 2.5

$$\text{Similarly for Company B Operating Leverage would be} = \frac{22,50,000}{7,50,000} = 3$$

Comments

Operating leverage for Company B is higher than that of Company A ; Company B has a higher degree of operating risk. The tendency of operating profit may vary proportionately with sales, is higher for Company B as compared to Company A.

Uses of Operating Leverage

Operating leverage is one of the techniques to measure the impact of changes in sales which lead for change in the profits of the company. If any change in the sales, it will lead to corresponding changes in profit. Operating leverage helps to identify the position of fixed cost and variable cost.

Operating leverage measures the relationship between the sales and revenue of the company during a particular period. Operating leverage helps to understand the level of fixed cost which is invested in the operating expenses of business activities. It describes the overall position of the fixed operating cost.

FINANCIAL LEVERAGE

A leverage activity with financing activities is called financial leverage. Financial leverage represents the relationship between the company's earnings before interest and taxes (EBIT) or operating profit and the earning available to equity shareholders.

Financial leverage is defined as "the ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the earnings per share". It involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders. "The use of long-term fixed interest bearing debt and preference share capital along with share capital is called financial leverage or trading on equity".

Financial leverage may be favourable or unfavourable depends upon the use of fixed cost funds.

Favourable financial leverage occurs when the company earns more on the assets purchased with the funds, then the fixed cost of their use. Hence, it is also called as positive financial leverage.

Unfavourable financial leverage occurs when the company does not earn as much as the funds cost. Hence, it is also called as negative financial leverage.

Financial leverage can be calculated with the help of the following formula:

$$\text{Financial Leverage} = \frac{\text{Operating Profit (EBIT)}}{\text{Profit Before Tax}}$$

Degree of Financial Leverage

Degree of financial leverage may be defined as the percentage change in taxable profit as a result of percentage change in earnings before interest and tax (EBIT). This can be calculated by the following formula :-

$$\text{DFL} = \frac{\text{Percentage change in taxable Income}}{\text{Percentage change in operating income}}$$

Alternative Definition of Financial Leverage

According to **Gitmar**, "financial leverage is the ability of a firm to use fixed financial changes to magnify the effects of change in EBIT on its EPS".

$$\text{DFL} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBIT}}$$

Illustration 6:

A Company has the following capital structure :

<i>Particulars</i>	₹
Equity share capital	1,00,000
10% Preference share capital	1,00,000

8% Debentures

1,25,000

The present EBIT is ₹ 50,000. Calculate the financial leverage assuming that the company is in 50% tax bracket.

Solution:

Statement of Profit	₹
Earnings before Interest and Tax (EBIT) or operating profit	50,000
Less: Interest on Debenture $(1,25,000 \times \frac{8}{100})$	(10,000)
Earnings before Tax (EBT)	40,000
Income Tax	(20,000)
Profit	20,000

$$\text{Financial leverage} = \frac{\text{Operating Profit (OP)}}{\text{Profit before Tax (PBT)}}$$

$$= \frac{50,000}{40,000}$$

$$= 1.25$$

Uses of Financial Leverage

Financial leverage helps to examine the relationship between EBIT and EPS.

Financial leverage measures the percentage of change in taxable income to the percentage change in EBIT. It locates the correct profitable financial decision regarding capital structure of the company. It is one of the important devices which is used to measure the fixed cost proportion with the total capital of the company. If the firm acquires fixed cost funds at a higher cost, then the earnings from those assets, the earning per share and return on equity capital will decrease. The impact of financial leverage can be understood with the help of the following exercise.

Illustration 7:

XYZ Ltd. decides to use two financial plans and they need ₹ 50,000 for total investment.

Particulars	Plan A	Plan B
Debenture (interest at 10%)	₹ 40,000	₹10,000
Equity share (₹ 10 each)	₹ 10,000	₹40,000
Total investment needed	₹ 50,000	₹ 50,000
Number of equity shares	1,000	4,000

The earnings before interest and tax are assumed at ₹ 5,000, and 12,500. The tax rate is 50%. Calculate the EPS.

Solution

When EBIT is ₹ 5,000

<i>Particulars</i>	<i>Plan A</i>	<i>Plan B</i>
Earnings before interest and tax (EBIT)	₹ 5,000	₹ 5,000
Less : Interest on debt (10%)	₹ 4,000	₹ 1,000
Earnings before tax (EBT)	₹ 1,000	₹ 4,000
Less : Tax at 50%	₹ 500	₹ 2,000
Earnings available to equity shareholders.	₹ 500	₹ 2,000
No. of equity shares	1,000	4,000
Earnings per share (EPS) Earnings/No. of equity shares	₹ 0.5	₹ 0.5

When EBIT is ₹ 12,500

<i>Particulars</i>	<i>Plan A</i>	<i>Plan B</i>
Earnings before interest and tax (EBIT)	₹ 12,500	₹ 12,500
Less : Interest on debt (10%)	₹ 4,000	₹ 1,000
Earnings before tax (EBT)	₹ 8,500	₹ 11,500
Less : Tax at 50%	₹ 4,250	₹ 5,750
Earnings available to equity shareholders.	₹ 4,250	₹ 5,750
No. of equity shares	1,000	4,000
Earnings per share (EPS) Earnings/No. of equity shares	₹ 4.25	₹ 1.44

DIFFERENCE BETWEEN OPERATING LEVERAGE AND FINANCIAL LEVERAGE

<i>Sl. No</i>	<i>Operating Leverage</i>	<i>Financial Leverage</i>
1	Operating leverage is associated with investment activities of the company.	Financial leverage is associated with financing activities of the company.
2	Operating leverage consists of fixed operating expenses of the company.	Financial leverage consists of Fixed Financial Expenses of the company.
3	It represents the ability to use fixed operating cost.	It represents the ability to use fixed financial cost.
4	Operating leverage can be calculated by= Contribution/EBIT	Financial leverage can be calculated by= EBIT/EBT
5	A percentage change in the profits resulting from a percentage change in the sales is called as degree of operating leverage.	A percentage change in taxable profit is the result of percentage change in EBIT.

6	Trading on equity is not possible by using operating leverage	Trading on equity is possible only when the company uses financial leverage.
7	Operating leverage depends upon fixed cost and variable cost.	Financial leverage depends upon the operating profits & fixed financial costs.
8	Tax rate and interest rate will not affect the operating leverage.	Financial leverage will change due to tax rate and interest rate.

Financial Break Even Point

It is the level of EBIT which covers all fixed financing costs of the company. It is the level of EBIT at which EPS is zero.

$$\text{FBP} = \text{Interest} + \frac{\text{Preference Dividend}}{1 - t}$$

Illustration 8:

ABC Limited has the following capital structure and want to know its Financial Break Even Point

Equity shares (FV = ₹ 100)	₹ 5,00,000
12% Preference Shares (FV = ₹ 100)	₹ 5,00,000
10% Debentures (FV = ₹ 100)	₹ 10,00,000
Tax Rate	40%

Solution:

$$\begin{aligned} \text{FBP} &= \text{Interest} + \frac{\text{Preference Dividend}}{(1 - t)} \\ &= 1,00,000 + \frac{6,00,000}{(1 - 0.40)} \\ &= ₹ 11,00,000 \end{aligned}$$

In other words, the EPS of the firm will be zero at Rs 11,00,000 level of EBIT.

	<i>Amount in ₹</i>
EBIT	11,00,000
Less : Interest	(1,00,000)
EBT	10,00,000
Less : Taxes @ 40%	(4,00,000)
EAT	6,00,000
Less : Preference Dividend	(6,00,000)
Earnings Available for Equity Shareholders	Nil
No. of Equity Shares	5,000
EPS	Nil

Indifference Point

It is the point at which different sets of debt ratios (percentage of debt to total capital employed in the company) gives the same EPS. Indifference level is the level of EBIT beyond which the benefits of financial leverage began to operate with respect to EPS.

In other words, if the expected levels of EBIT exceed the indifference level of EBIT, the use of fixed charge sources (debt) would be favorable from the point of view of EPS. In nutshell, financial leverage is favorable & leads to an increase in the EPS.

On the other hand, if the expected level of EBIT is less than the indifference point, the advantage of EPS would be available from the use of equity capital.

The indifference point between two financial plans can be calculated by using the following formula:

$$\frac{(\text{EBIT} - \text{Interest}) (1-t) - \text{PD} (1+t)}{\text{No of equity shares in Plan A}} = \frac{(\text{EBIT} - \text{Interest}) (1-t) - \text{PD}(1+t)}{\text{No of equity shares in Plan B}}$$

Illustration 9:

A new project requires a capital outlay of ₹ 400 lakhs. The required amount to be raised either fully by equity shares of ₹ 100 each or by equity shares of the value of ₹ 200 lakhs and by loan of ₹ 200 lakhs at 15% interest. Assuming a tax rate of 40%, calculate the figure of EBIT that would keep the equity investors indifferent to the two options.

Solution:

	Option A (Full Equity)	Option B (Debt + Equity)
Equity (FV 100)	₹ 400 Lakhs	₹ 200 Lakhs
15% Debt	Nil	₹ 200 Lakhs
Total Capital	₹ 400 Lakhs	₹ 400 Lakhs
No of Equity Shares	4,00,000	2,00,000

Let us assume Indifference Level of EBIT is ₹ X. Thus

$$\frac{\{(X - 0) (1 - 0.4) - 0\}}{4,00,000} = \frac{(X - 30,00,000) (1 - 0.4) - 0}{2,00,000}$$

$$\frac{0.6X}{4,00,000} = \frac{0.6X - 18,00,000}{2,00,000}$$

$$0.6X = \frac{(4,00,000)}{1} \cdot \frac{\{0.6X - 18,00,000\}}{2,00,000}$$

$$0.6X = 1.2X - 36,00,000$$

$$36,00,000 = 1.2X - 0.6X$$

$$0.6X = 36,00,000 \quad X = ₹ 60,00,000$$

Thus the EPS under two different financial options will be equal at ₹ 60 lakhs EBIT Level. This can be verified as follows:

	Option A (in ₹)	Option B (in ₹)
EBIT	60,00,000	60,00,000
Less : Interest	Nil	(30,00,000)
EBT	60,00,000	30,00,000
Less : Taxes @ 40%	(24,00,000)	(12,00,000)
Earnings available for equity shares	36,00,000	18,00,000
No. of Equity Shares	4,00,000	2,00,000
EPS (Earnings available for Equity Shares / No. of Shares)	9	9

COMBINED LEVERAGE

When the company uses both financial and operating leverage to magnification of any change in sales into a larger relative changes in earning per share. Combined leverage is also called as composite leverage or total leverage.

$$DCL = DOL \times DFL \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{PBT}} = \frac{\text{Contribution}}{\text{PBT}}$$

Combined leverage expresses the relationship between the revenue in the account of sales and the taxable income. Combined leverage can be calculated with the help of the following formulas:

Degree of Combined Leverage

The percentage change in a firm's earning per share (EPS) results from one percent change in sales. This is also equal to the firm's degree of operating leverage (DOL) times its degree of financial leverage (DFL) at a particular level of sales.

$$\text{Degree of combined leverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in sales}}$$

Illustration 10:

Kumar Company has sales of ₹ 25,00,000. Variable cost of ₹ 15,00,000 and fixed cost of ₹ 5,00,000 and debt of ₹ 12,50,000 at 8% rate of interest. Calculate combined leverage.

Solution

Statement of Profit

	Amount in ₹
Sales	25,00,000
Less: Variable cost	(15,00,000)
Contribution	10,00,000
Less: Fixed cost	(5,00,000)

Operating Profit

5,00,000

Combined leverage = Operating leverage x Financial leverage

Calculation of operating leverage

$$\frac{\text{Contribution}}{\text{Operating Profit}} = \frac{10,00,000}{5,00,000} = 2$$

Calculation of financial leverage

Earning before Interest and Tax (EBIT)	₹ 5,00,000
Less: Interest on Debenture (8% of 12,50,000)	(₹ 1,00,000)
Earnings before Tax	₹ 4,00,000

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Financial Leverage} = \frac{5,00,000}{4,00,000} = 1.25$$

$$\text{Combined leverage} = 2 \times 1.25 = 2.5 \text{ OR } = \frac{10,00,000}{4,00,000} = 2.5$$

WORKING CAPITAL LEVERAGE

One of the new models of leverage is working capital leverage which is used to locate the investment in working capital or current assets in the company.

Working capital leverage measures the sensitivity of return in investment of charges in the level of current assets.

$$\text{Working Capital Leverage} = \frac{\text{Percentage Change in ROI}}{\text{Percentage Change in Working Capital}}$$

If the earnings are not affected by the changes in current assets, the working capital leverage can be calculated with the help of the following formula.

$$\text{Working Capital Leverage} = \frac{\text{CA}}{(\text{TA} + \Delta \text{CA})}$$

where,

CA = Current Assets TA = Total Assets

Δ CA = Changes in the level of Current Assets

Illustration 11:

The following information is available for two companies.

You are required to compare the sensitivity earnings of the two companies for 30% change in the level of their current assets.

Solution:

$$\text{Working Capital Leverage} = \frac{\text{CA}}{\text{TA} + \Delta\text{CA}}$$

	<i>X Ltd.</i>	<i>Y Ltd.</i>
Fixed Assets	₹ 4,00,000	₹ 1,00,000
Current Assets	₹ 10,00,000	₹ 4,00,000
Total Assets	₹ 14,00,000	₹ 14,00,000
Earnings before interest and taxes	₹ 1,50,000	₹ 1,50,000

$$\begin{aligned} \text{Working Capital Leverage for Company X} &= \frac{10,00,000}{14,00,000 - 1,20,000} \\ &= \frac{10,00,000}{11,00,000} \\ &= 0.90 \end{aligned}$$

$$\begin{aligned} \text{Working Capital Leverage for Company Y} &= \frac{4,00,000}{14,00,000 - 1,20,000} \\ &= \frac{4,00,000}{12,80,000} \\ &= 0.3125 \end{aligned}$$

EFFECTS OF LEVERAGE ON SHAREHOLDERS' RETURNS

Financial plan is one of the vital decisions of a firm because a financial plan affects the market value, cost of capital and shareholders return of a firm. The Proportion of Debt to Equity in the financial plan of a firm is called leverage. Since optimal debt ratio influences a firm's market value and shareholder's return, different firms use different debt ratio at different levels to maximize market value and shareholders return. Leverage has statistically significant effect on the shareholders' return and proper management of leverage can maximize the value of EPS.

1. Operating Leverage Effect : % Change in EBIT is more than % Change in Sale

If % change of earning before interest and tax is more than % change in sale, this operating leverage will effect ROE positively because at this level, per unit fixed cost will decrease and small increase in sale will boost EBIT.

If EBIT will increase, ROE will also increase. Operating Leverage indicates, how will EBIT change if sales changes. 2:1 ratio of operating leverage means 100% increase in sales will increase EBIT by 200%. As interest is fixed cost, so ROE will increase.

A. *Situation: High Operating Leverage:*

Too high operating leverage is not good, it may be highly risky.

B. *Situation: Low Operating Leverage:*

Low operating leverage may be useful when sale market is fluctuating.

2. Effect of Financial Leverage on ROE

If we have to check real effect of leverage on ROE, we have to study financial leverage. Financial leverage refers to the use of debt to acquire additional assets. Financial leverage may decrease or increase return on equity in different conditions.

A. *Situation: High Financial Leverage:*

Financial over-leveraging means incurring a huge debt by borrowing funds at a lower rate of interest and utilizing the excess funds in high risk investments in order to maximize returns.

B. *Situation: Low Financial Leverage:*

Financial low-leveraging means incurring a low debt by borrowing funds. It may affect positively, if decrease the value of bought asset with this low debt.

3. Effect of High Operating leverage and High Financial Leverage

It will increase ROE but it is highly risky also.

4. Effect of Low Operating leverage and High Financial Leverage

It is optimum combination for bringing optimum return on equity.

RISK AND LEVERAGE

Risk is the probability that the future revenue streams of a firm shall show a variation from the expected figures. The variation is normally on the negative or the lower side because a positive variation reduces the investment risk and a reduction of risk is always welcome.

For linkage with leverage, we can divide risk into two broad categories, i.e. business risk and financial risk. Business risk pertains to risks associated with day to day operations of the firm. For example, decisions made regarding purchase of raw materials, manufacturing expenses and administrative expenses, etc. change the business risk profile of the firm. These decisions have an impact upon the operational profitability of the firm, i.e. the profits before interest and taxes. Financial risk, on the other hand, is associated with introduction of fixed interest bearing debt obligations in the capital structure of the firm. These obligations create a prior charge on EBIT before distribution of post tax profits among the owners.

The distinction between business risk and financial risk can be clarified through the following illustration:

ABC Company Limited

Profit and Loss Statement for the year ended 31.03.2012

(Amount in ₹ Lacs)

(a) Net Sales	8,500	
(b) Cost of goods Sold	5,000	(1)
(c) Gross Profit	3,500	
(d) Selling Expenses	1,500	(2)
(e) EBIT	2,000	(3)

Business risk is associated with the impact of item no. (3) above of changes in item nos. (1) and (2). The “Cost of goods sold” item consists of cost of raw materials, labour cost, factory rent and other manufacturing expenses. Out of these elements, labour cost and factory rent are fixed costs while the rest are variable depending upon the level of sales. Now if the fixed costs are increased the expectation would be that the sales would rise in anticipated proportion. However, if the sales do not rise as anticipated, business risk of the firm increases.

Till now we have assumed that the firm has no debt and as such, no interest cost. Let us assume that the firm raises debt with yearly interest payment of ₹ 500 lacs. The Profit & loss account would now be extended as shown below:

Sr. No.	Particulars	Amount(₹ in lakh)	
(a)	EBIT	2,000	
(b)	Less : Interest	500	(4)
(c)	Profit before tax	1,500	
(d)	Less : Tax @ 40%	600	
(e)	Profit after Tax	900	(5)

Now item no. (5) i.e. profit after tax is dependent on interest payments which are fixed. If EBIT decreases as a result of changes in items (1) and (2) and item no. (4) remains the same, the venture would become riskier as an additional element of financial risk has been built in. The change in risk profile of the firm has been caused by change in its leverage. The changes in fixed labour costs and factory rent are referred to as changes in operating leverage while the changes in fixed interest costs are described as changes in financial leverage.

A firm has operating leverage when it can expand output and sales without a proportionate increase in fixed costs. Let us assume that in our earlier illustration, cost of sales has the following break-up:

Cost of raw materials	₹ 2,500
Labour Cost	₹ 500
Factory rent	₹ 500
Other manufacturing costs	₹ 1,500

Labour cost and factory rent are fixed costs for running the factory for manufacturing, say, 1,00,000 units of

the product. The firm now plans to expand the capacity to 2,00,000 units in the same factory by increasing the number of factory labour and installation of new machinery. The profit and loss account under the two levels of capacity would now read as under:

Amount in ₹

Sr. No.	Particulars	Capacity (100000 units)	Capacity (200000 units)
1.	Net Sales	8,500	17,000
2.	Cost of raw material	2,500	5,000
3.	Labour cost	500	1,000
4.	Factory rent	500	500
5.	Other mfg. Costs	1,500	2,500
6.	Gross profit	3,500	8,000
7.	Selling Expenses	1,500	2,500
8.	EBIT	2,000	5,500
9.	Tax @ 40%	800	2,200
10.	Profit after tax	1,200	3,300

We see that while net sales have increased by 100%, the EBIT has increased by 175%, thanks to the operating leverage provided by the fixed factory rent and the fixed component of manufacturing expenses and selling expenses, which we assume to be ₹ 500 lacs each.

Now, if due to recessionary conditions, capacity utilisation of the factory is reduced to 50% and 40% in two subsequent years respectively, profitability of the firm would change as under:

Amount in ₹

Sr. No	Particulars	Capacity 50%	Capacity 40%
1.	Net Sales	8,500	6,800
2.	Cost of raw material	2,500	2,000
3.	Labour cost	1,000	1,000
4.	Factory rent	500	500
5.	Other mfg. Costs	1,500	1,300
6.	Gross profit	3,000	2,000
7.	Selling Expenses	1,500	1,300
8.	EBIT	1,500	700

9.	Tax @ 40%	600	280
10.	Profit after tax	900	420

We see that the fall in EBIT is much sharper than the decline in sales. This has happened due to operating leverage.

Let us assume that the firm decides to move from rented factory premises to own premises. This is achieved by borrowing a sum of ₹ 15 crores from the bank carrying fixed interest of 12% p.a. The capacity is also simultaneously doubled. The comparative profit & loss figures shall now read as under:

Amount in ₹

Sr. No.	Particulars	Original Capacity	Double Capacity
1.	Net Sales	8,500	17,000
2.	Cost of raw material	2,500	5,000
3.	Labour cost	500	1,000
4.	Other mfg. Costs	1,500	2,500
5.	Gross profit	4,000	8,500
6.	Selling Expenses	1,500	2,500
7.	EBIT	2,500	6,000
8.	Interest	180	180
9.	Profit before tax	2,320	5,820
10.	Tax @ 40%	928	2,328
11.	Profit after tax	1,392	3,492

By creating financial leverage, the firm has not only ensured rise in EBIT but in PAT as well. But at the same time, it has increased its financial risk, i.e. the risk of default on repayment of loan amount and the interest on loan.

Now let us see how financial leverage impacts the performance of the firm in recessionary conditions:

Amount in ₹

Sr. No.	Particulars	Original Capacity	Double Capacity
1.	Net Sales	8,500	6,800
2.	Cost of raw material	2,500	2,000
3.	Labour cost	1,000	1,000
4.	Other mfg. Costs	1,500	1,300
5.	Gross profit	3,500	2,500

6.	Selling Expenses	1,500	1,300
7.	EBIT	2,000	1,200
8.	Interest	180	180
9.	Profit before tax	1,820	1,020
10.	Tax @ 40%	728	408
11.	Profit after tax	1,092	612

We can see that in case of financial leverage, the impact on PAT upon reduction in capacity utilisation is much severe. The degree of financial leverage can be calculated by the rate of change of PAT for a one percent change in sales.

Relationship between Financial Risk and Financial Leverage

As the financial leverage increases, the break-even point of the company increases and the company now has to sell more of its product (or service) in order to break even. High financial leverage increases the risk to banks and other lenders because of the higher probability of bankruptcy and the risk to stockholders because greater losses may be incurred if the company goes bankrupt. Increase in financial leverage, increases the risk to stockholders because the higher leverage will cause greater volatility in earnings and greater volatility in the stock price.

SOME CASE STUDIES

Illustration 12: Calculate the operating, financial and combined leverage under situations 1 and 2 and the financial plans for X and Y respectively from the following information relating to the operating and capital structure of a company, and also find out which gives the highest and the least value? Installed capacity is 5000 units. Annual Production and sales at 60% of installed capacity.

Selling price per unit ₹ 25 Variable cost per unit ₹ 15 **Fixed cost:**

Situation 1 : ₹ 10,000

Situation 2 : ₹ 12,000

	Financial Plan	
	X (₹)	Y (₹)
Equity	25,000	50,000
Debt (10%)	50,000	25,000
	75,000	75,000

Solution:

Annual production and sales 60% of 5,000 = 3000 Unit

	₹
Selling	25 Per Unit
Variable Cost	15 Per Unit

Contribution Per Unit

10 Per Unit

Total contribution is 3000 Units \times ₹ 10 = ₹ 30,000**Computation of leverage.**

Amount in ₹

Contribution	PLAN- X		PLAN- Y	
	Situation 1	Situation 2	Situation 1	Situation 2
	30,000	30,000	30,000	30,000
Fixed cost	10,000	12,000	10,000	12,000
operating Profit or EBIT	20,000	18,000	20,000	18,000
Interest on Debts				
10% of 50,000	5,000	5,000		
10% of 25,000			2,500	2,500
Earnings before Tax	15,000	13,000	17,500	15,500
Operating Leverage (Contribution/ EBIT)	1.50	1.67	1.5	1.67
Financial Leverage (EBIT/EBT)	1.33	1.38	1.14	1.16
(iii) Combined leverage (OL X FL)	2.00	2.31	1.71	1.94

Highest and least value of combined leverage. Highest Value = 2.31 under situation 2 plan X. Least Value = 1.71 under situation 1 plan Y.

Illustration 13: XYZ' company has a choice of the following three financial plans. You are required to calculate the financial leverage in each case

	Plan I	Plan II	Plan III
Equity capital	₹ 2,000	₹ 1,000	₹ 3,000
Debt	₹ 2,000	₹ 3,000	₹ 1,000
EBIT	₹ 400	₹ 400	₹ 400

Interest @10% per annum on debts in all cases.

Solution:

Amount in ₹

	Plan I	Plan II	Plan III
EBIT	400	400	400
Less Interest-(I)	200	300	100
EBT	200	100	300
FL (EBIT/EBT)	2	4	1.33

Illustration 14: Calculate operating leverage and financial leverage under situations A, B and C and financial plans 1, 2 and 3 respectively from the following information relating to the operating and financial leverage which give the highest value and the least value.

Installed capacity (units)		1,200
Actual production and sales (units)		800
Selling price per unit (₹)		15
Variable cost per unit (₹)		10
Fixed costs (₹)	Situation A	1,000
	Situation B	2,000
	Situation C	3,000

Sources of Fund	Financial Plan		
	1	2	3
Equity	₹ 5,000	₹ 7,500	₹ 2,500
Debt	₹ 5,000	₹ 2,500	₹ 7,500
Cost of debt	12 per cent per annum		

Solution:

Amount in ₹

	A	B	C
S – VC	4,000	4,000	4,000
EBIT	3,000	2,000	1,000
Degree of Operative Leverage = (S – VC)/EBIT	1.33	2	4

FINANCIAL LEVERAGE

Situation A	1	2	3
EBIT	3,000	3,000	3,000
Less : Interest	600	300	900
EBT	2,400	2,700	2,100
Financial Leverage	1.25	1.11	1.43

Situation B

EBIT	2,000	2,000	2,000
Less : Interest	600	300	900
EBT	1,400	1,700	1,100
Financial Leverage	1.43	1.18	1.82

Situation C

EBIT	1,000	1,000	1,000
Less : Interest	600	300	900
EBT	400	700	100
Financial Leverage	2.5	1.43	10

Hamada Equation

The equation draws upon the Modigliani-Miller theorem on capital structure and extends an analysis to quantify the effect of financial leverage on a firm. Beta is a measure of volatility or systemic risk relative to the overall market. The Hamada equation, then, shows how the beta of a firm changes with leverage. The higher the beta coefficient, the higher the risk associated with the firm. The significant facets of Hamada equation are as under:

- The Hamada equation is a method of analysing a firm's cost of capital as it uses additional financial leverage.
- It draws upon the Modigliani-Miller theorem on capital structure.
- The higher the Hamada equation beta coefficient, the higher the risk associated with the firm.

Robert Hamada is a former professor of finance at the University of Chicago Booth School of Business. Hamada started teaching at the university in 1966 and served as the dean of the business school from 1993 to 2001. His equation appeared in his paper, "The Effect of the Firm's Capital Structure on the Systemic Risk of Common Stocks" in the Journal of Finance in May 1972.

The formula for the Hamada equation is:

$$\beta_L = \beta_u \left[1 + (1 - T) \left(\frac{D}{E} \right) \right]$$

Where:

β_L = Levered beta

β_u = Unlevered beta*

T = Tax Rate

D/E = Debt to Equity Ratio*

* Unlevered beta is the market risk of a company without the impact of debt.

* Debt-to-equity ratio is a measure of a company's financial leverage.

Illustration 15:

A company has a debt to equity ratio of 0.70:1.00, a tax rate of 34%, and an unlevered beta of 0.75. Calculate Hamada coefficient or leveraged beta.

Solution:

The Hamada coefficient or leveraged beta would be:

$$\beta_L = \beta_U [1 + (1-T) (D/E)]$$

$$0.75 [1 + (1-.34) (.70)] = 1.09$$

Here, the leveraged beta is 1.09,

It means that the financial leverage of the company increases the overall risk by the beta amount of 0.34 (1.09 less .75) or 34%.

Therefore, as the beta of the coefficient rises, the associated risk of having higher debt also rises.

LESSON ROUND-UP

- Capital Structure of a firm is a reflection of the overall investment and financing strategy of the firm. It shows how much reliance is being placed by the firm on external sources of finance and how much internal accruals are being used to finance expansions.
- Optimal capital structure means arrangement of various components of the structure in tune with both the long-term and short term objectives of the firm.
- The four Capital Structure Theories are—Net Income Approach, Net Operating Income Approach, Traditional Approach and Modigliani Miller Approach.
- Net income approach provides that the cost of debt capital, K_d and the cost of equity capital K_e remains unchanged when the degree of leverage, varies.
- Net Operating Income approach states that cost of the capital for the whole firm remains constant, irrespective of the leverage employed in the firm.
- Traditional Approach to capital structure advocates that there is a right combination of equity and debt in capital structure, at which market value of the firms is maximum.
- Modigliani and Miller have restated the net operating income position in terms of three basic propositions:
 - Proposition I – The total value of a firm is equal to its expected operating income divided by the discount rate appropriate to its risk class.
 - Proposition II – The expected yield on equity, K_e is equal to K_o plus a premium.
 - Proposition III – The cut off rate for investment decision making for a firm in a given risk class is not affected by the manner in which the investment is financed.
- Leverage refers to relationship between two variables as reflected in a unit change in one variable consequent upon a unit change in another variable.
- Two major types of Leverages are: Financial leverage and operating leverage.
- Financial leverage measures the extent to which the cost of project has been funded by borrowed money as compared to owner's equity.
- EBIT –EPS Analysis indicates the projected EPS for different financial plans.

GLOSSARY

Optimal Capital Structure: An optimal capital structure is the best mix of debt and equity financing that maximizes a company's market value while minimizing its cost of capital.

Target Capital Structure: The target capital structure of a company refers to the capital which the company is striving to obtain. In other words, target capital structure describes the mix of debt, preferred stock and common equity which is expected to optimize the stock price of company.

Capital Structure Analysis: Capital structure analysis is a periodic evaluation of all components of the debt and equity financing used by a business. The intent of the analysis is to evaluate what combination of debt and equity the business should have.

Leverage Ratio: A leverage ratio is any one of several financial measurements that look at how much capital comes in the form of debt (loans) or assesses the ability of a company to meet its financial obligations.

Capital Structure Theory: In financial management, capital structure theory refers to a systematic approach to financing business activities through a combination of equities and liabilities. There are several competing capital structure theories, each of which explores the relationship between debt financing, equity financing, and the market value of the firm slightly differently.

TEST YOURSELF

(These are meant for re-capitulation only. Answers to these questions are not to be submitted for evaluation)

1. What is the significance of capital structure? Describe its various kinds.
2. What points need to be kept in mind while deciding the capital structure of a firm?
3. Describe the process of planning and designing of capital structure.
4. Briefly discuss the theories of capital structure.
5. Illustrate the difference between operating leverage and financial leverage.
6. What factors determine the cost of capital?
7. Explain the various types and leverages and their significance in financial decision making.

LIST OF FURTHER READINGS

1. Capital Structure in Indian Corporate Sector by Niranjana Dhal,
2. Capital Structure and Corporate Financing Decisions: Theory, Evidence, and Practice, H.Kent Baker, Gerald S. Martin, Editors KOLB Series in Finance.
3. Corporate Finance and Capital Structure by Kentaro Asai.
4. Capital Structure Designing of Indian Companies by Raju Mondal, Palmview.
5. Capital Structure and Corporate Financing Decisions: Theory, Evidence, and Practice by H. Kent Baker, Gerald S. Martin
6. Capital Structure in the Modern World by Anton Miglo