

UNIT 13

LEVERAGES

Structure

- 13.0 Objectives
- 13.1 Introduction
- 13.2 Concept and Types of Leverage
- 13.3 Operating Leverage
 - 13.3.1 Meaning
 - 13.3.2 Computation of OL
 - 13.3.3 Behaviour of Operating Leverage
 - 13.3.4 Applications
- 13.4 Financial Leverage
 - 13.4.1 Meaning
 - 13.4.2 Computation of Financial Leverage
 - 13.4.3 Behaviour
 - 13.4.4 Applications
- 13.5 Composite Leverage
- 13.6 EBIT-EPS Analysis
- 13.7 Importance of Leverage
- 13.8 Practical Problems
- 13.9 Let us sum up
- 13.10 Key words
- 13.11 Answers to check your progress
- 13.12 Terminal Questions
- 13.13 Selected References

13.0 OBJECTIVES

After studying this unit, you should be able to

- understand the concepts of financial leverage, operating leverage and total leverage
- explain the computation process of leverages
- assess the behaviour and applications of leverages
- analysis the relationship between EBIT and EPS
- discuss the importance of leverages
- Illustrate various practical problems of leverage

13.1 INTRODUCTION

In the arena of financing decisions, the capital structure decision assumes greater significance. As it deals with debt equity composition of the organization, the resultant risk and return for shareholders is of utmost concern for finance managers. If the borrowed funds are more than owners' funds, it results in increase in shareholders' earnings. At the same time, it also increases the risk of the organization. In a situation where the proportion of the equity funds is more than the proportion of the borrowed funds, the return as well as risk of the shareholders will be very low. This underlines the importance of having an optimal capital structure where risk and return to shareholders be matched. The effect of capital structure where risk and return to shareholders may judiciously help the finance managers to decide their short term and long term strategies. The behaviour and application of leverage helps in examining the whole issue in right perspective.

13.2 CONCEPT AND TYPES OF LEVERAGES

The dictionary meaning of the term leverage refers to : an increased means for accomplishing some purpose”. It helps us in lifting heavy objects by the magnification of force when a lever is applied to a function.

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

Christy and Roder defines leverage as the tendency for profits to change at a faster rate than sales.

A few essential characteristics of leverage are as follows :

- (a) Leverage is applied to the employment of an asset or funds.
- (b) Profits tend to change at a faster rate than sales.
- (c) There is risk return relationship which is basically found in the same direction.
- (d) If higher is the leverage, higher will be the risk and higher will be the expected returns.

A brief review of various types of leverage is as follows :

Return on Investment Leverage is an index of operational efficiency. It is calculated as follows :

$$\frac{\text{EBIT}}{\text{Total Assets}}$$

Asset Leverage is the part of ROI leverage. It is like assets turnover. It is calculated as follows :

$$\frac{\text{Sales}}{\text{Total Assets}}$$

A firm with a relatively high turnover is said to have a high degree of asset leverage.

Operating Leverage is related to fixed cost. It indicates the impact of changes in sales on operating income. It is calculated as follows :

$$\frac{\text{Contribution}}{\text{EBIT}}$$

Financial Leverage depends upon the ratio of debt and preferred stock together to common shares. It is calculated with the help of EBIT and EBT as below :

$$\frac{\text{EBIT}}{\text{EBT}}$$

Combined Leverage is the multiplication of operating leverage and financial leverage.

Activity 1

1. Explain the following :

- (i) Combined Leverage
- (ii) Asset Leverage
- (iii) ROI Leverage

2. Explain the concept of leverage. State its essentials.

13.3 OPERATING LEVERAGE

It takes place when a change in revenue produces a greater change in EBIT. It is related to fixed costs. A firm with relatively high fixed costs uses much of its marginal contribution to cover fixed costs.

13.3.1 Meaning

It refers to heavy usage of fixed assets. A few definitions are as follows :

“The use of fixed operating costs to magnify a change in profits relative to a given change in Sales”

Walker & Petty

“If a high percentage of a firm’s total costs are fixed costs, then the firm is said to have a high degree of operating leverage.

E F Brigham

It is a function of three factors :

- Fixed costs
- Contribution
- Volume of Sales

A few specific characteristics of operating leverage are as follows :

- It affects assets side of Balance sheet
- It is related to composition of fixed assets
- It is related in fluctuations in business risk
- It affects capital structure and return on total assets.

13.3.2 COMPUTATION OF OL

The operating leverage can be calculated by the following formula

$$OL = \frac{\text{Contribution}}{\text{EBIT}} \quad \text{or} \quad \frac{C}{\text{EBIT}}$$

where contribution means sales minus variables costs

EBIT means contribution minus fixed costs .

If contribution is more than fixed cost, it is favourable financial leverage. In case of vice-versa, it is unfavourable financial leverage.

Illustration No. 13.1

The following are the details

Selling price per unit	Rs. 20
Variable cost per unit	Rs. 12
Actual sales	200 units
Installed capacity	300 units

Calculated operating leverage in each of the following two situations.

- (i) when fixed costs are Rs. 1000
- (ii) when fixed costs are Rs. 800.

Solution :

Statement showing computation of operating leverage

Sales	Rs. 4,000	Rs. 4,000
Less Variables Costs	Rs. 2,400	Rs. 2,400
	-----	-----
Contribution	Rs. 1,600	Rs. 1,600
Less – Fixed Costs	Rs. 1,000	Rs. 800
	-----	-----
Earning Before Tax	Rs. 600	Rs. 800
Operating Leverage	Rs. 1,600	Rs. 1,600
	-----	-----
	Rs. 600	Rs. 800
	= 2.67	2.0

13.3.3.BEHAVIOUR OF OPERATING LEVERAGE

The behaviour of operating leverage may be measured by the degree of operating leverage.

The degree of operating leverage is the percentage change in the profits resulting from a percentage change in the sales. It may be put in the form of the following formula :

$$\text{Degree of Operating Leverage} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in Sales}}$$

Illustration No. 13.2

The following are the details

Selling Price Per Unit	Rs. 20
Variable Cost per unit	Rs. 12
Actual Sales	200 units
Fixed cost	1000

Calculate degree of operating leverage when sales will be

- (a) 150 units
- (b) 250 units
- (c) 300 units

Solution :

Computation of degree of operating leverage

Items	Present Position	(i)	(ii)	(iii)
Sales in units	200	150	250	300
Sales in Rs.	4000	3000	5000	6000
Less Variable	2400	1800	3000	3600
Costs in Rs.	-----	-----	-----	-----
Contribution	1600	1200	2000	2400
Less Fixed	1000	1000	1000	1000
Costs in Rs.	-----	-----	-----	-----
EBIT in Rs.	600	200	1000	1400
Degree of Operating Leverage		200	67	133
		-----	-----	-----
		25	25	50
		- 8	+ 2.67	+ 2.67

If a firm has a high degree of operating leverage, small change in sales will have large effect on operating income. Similarly, the operating profits of such a firm will suffer loss as compared to decrease in its sales.

There will not be any operating leverage, if there are no fixed costs.

13.3.4. APPLICATIONS

The operating leverage indicates the impact of change in sales on operating income. If a firm has a high degree of operating leverage, small change in sales will have large effect on operating income. A few areas of application are as follows :

(1) Operating leverage has an important role in capital budgeting decisions.

Infact, this concept was originally developed for use in capital budgeting.

(2) Long term profit planning is also possible by looking at quantam of fixed cost investment and its possible effects.

(3) Generally, a high degree of operating leverage increases the risk of a firm.

For deciding capital structure in favour of debt, the impact of further increase in risk will influence capital structure decision.

Activity II

1. Illustrate the concept of operating leverage.

2. State the applications of operating leverage in the changed socio-economic Indian scenario.

13.4 FINANCIAL LEVERAGE

It refers to usage of debt in capital structure. It is the use of fixed cost capital (debt) in the total capitalization of the firm. Fixed cost capital includes loans, debentures and preferences share capital.

13.4.1 MEANING

Financial leverage is expressed as the firm's ability to use fixed financial cost in such a manner so as to have magnifying impact on the EPS due to any change in EBIT (Earning Before Interest and Taxes). In other words, financial leverage is a process of using debt capital to increase the return on equity.

According to Guthman "Financial leverage is the ability of the firm to use fixed financial changes to magnify the effect of changes in EBIT on the firms EPS.

The following are the essentials of financial leverage :

- (1) It relates to liabilities side of balance sheet
- (2) It is related to capital structure
- (3) It is related to financial risk
- (4) It affects earning after tax and earnings per share

- (5) It may be favourable or unfavourable. Unfavourable leverage occurs when the firm does not earn as much as the funds cost.

13.4.2 COMPUTATION OF FINANCIAL LEVERAGE

The financial leverage can be calculated by the following formula :

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

where EBIT refers to earnings before interest and tax and EBT refers to earnings before tax but after interest

Some authorities have used the term financial leverage in the context of establishing relationship between EBIT and EPS. The financial leverage shows the percentage change in EPS in relation to percentage change in EBIT.

13.4.3 BEHAVIOUR

The behaviour of financial leverage may be measured by the degree of financial leverage. The degree of financial leverage may be in the form of the following equation :

$$\text{Degree of Financial leverage} = \frac{\text{Percentage change in EBT}}{\text{Percentage change in EBIT}}$$

Alternatively, this may be calculated in terms of EPS.

$$\text{Degree of Financial leverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in EBT}}$$

Illustration No. 13.3.

A Ltd. has the following capital structure :

	Rs.
Equity share capital (of Rs. 100 each)	1,00,000
10% Preference share capital (of Rs. 100 each)	2,00,000
10% debentures (of Rs. 100 each)	2,00,000

If EBIT is (i) Rs. 1,00,000 (ii) Rs. 80,000 and (iii) Rs. 1,20,000,

Calculate financial leverage under three situations. Assume 50% tax rate.

Solution :**Computation of Financial Leverage**

Items	(i)	(ii)	(iii)
EBIT	Rs. 1,00,000	Rs. 80,000	Rs. 1,20,000
Less Interest on Debentures	Rs. 20,000	Rs. 20,000	Rs. 20,000
	-----	-----	-----
EBT	Rs. 80,000	Rs. 60,000	Rs. 1,00,000
Less Income Tax	Rs. 40,000	Rs. 30,000	Rs. 50,000
	-----	-----	-----
PAT	Rs. 40,000	Rs. 30,000	Rs. 50,000
Less Preference Dividend	Rs. 20,000	Rs. 20,000	Rs. 20,000
	-----	-----	-----
Earnings for Equity Shareholders	Rs. 20,000	Rs. 10,000	Rs. 30,000
No. of Shares	Rs. 10,000	Rs. 10,000	Rs. 10,000
EPS	2	1	3

	EBIT	Rs. 1,00,000	Rs. 80,000	Rs. 1,20,000
Financial Leverage	-----	-----	-----	-----
	EBT	Rs. 20,000	Rs. 10,000	Rs. 30,000
		5	8	4

13.4.4 APPLICATIONS

Financial leverage is useful in

- (i) Capital structure planning
- (ii) Profit Planning

Financial leverage helps the finance managers while devising the capital structure of the company. A high financial leverage means high fixed financial costs and high financial risk. Increase in fixed financial costs may force the company into liquidation.

13.5 COMPOSITE LEVERAGE

Both operating and financial leverage magnify the returns. There is combined effect of these leverages on income. Both the leverages are closely concerned with the firm's capacity to meet its fixed costs (both operating and financial). In case both the leverages are combined, the result obtained will disclose the effect of change in sales over change taxable profit.

Composite Leverage = Operating Leverage * Financial Leverage

It may be expressed as
$$= \frac{\text{Contribution}}{\text{EBT}}$$

The degree of combined leverage is computed in the following manner :

Degree of Combined leverage =
$$\frac{\text{Percentage change in EPS}}{\text{Percentage change in Sales Volume}}$$

Illustration No. 13.4

The following particulars are available :

Sales	Rs. 1,00,000
Variable Cost	Rs. 70,000
Fixed Cost	Rs. 20,000
Long term loans	Rs. 50,000
At 10 percent	

Compute the combined leverage.

Solution :

$$\text{Operating Leverage} = \frac{30,000}{10,000} = 3$$

$$\text{Financial Leverage} = \frac{10,000}{5,000} = 2$$

$$\text{Combined Leverage} = \frac{30,000}{5,000} = 6 \text{ (or } 3 \times 2 = 6)$$

Activity 3

1. What is degree of financial leverage ? How is it computed ?.

2. State the applications of financial leverage.

3. Illustrate with an example the process of computing financial leverage.

13.6 EBIT - EPS ANALYSIS

This is a method to study the effect of leverage. It involves the comparisons of alternative methods of financing under various alternative financing proposals. A firm may raise funds in either of the following alternatives :

- (i) Exclusive use of equity capital
- (ii) Exclusive use of debt
- (iii) Various combinations of debt and equity
- (iv) Various combinations of debt, equity and preferences capital

Illustration No. 13.5

A company is contemplating to raise additional fund of Rs. 20,00,000 for setting up a project. The company expects, EBIT of Rs. 8,00,000 from the project. Following alternative plans are available :

- (a) To raise Rs. 20,00,000 by way of equity share of Rs. 10 each
- (b) To raise Rs. 10,00,000 by way of equity shares and Rs. 10,00,000 by way of debt @ 10%.
- (c) To raise Rs. 6,00,000 by way of equity and rest Rs. 14,00,000 by way of preferences shares @ 14%.
- (d) To raise Rs. 6,00,000 by equity shares
Rs. 6,00,000 by 10% equity
Rs. 8,00,000 by 14% Preference shares

The company is in 60% tax bracket which option is best ?

Solution :

EBIT - EPS Analysis

Particulars	Options			
	A	B	C	D
EBIT	8,00,000	8,00,000	8,00,000	8,00,000
Less Interest	-	1,00,000	-	60,000
EBT	8,00,000	7,00,000	8,00,000	7,40,000
Less Tax	4,80,000	4,20,000	4,80,000	4,44,000
EAT	3,20,000	2,80,000	3,20,000	2,96,000
Less Dividend for Preference shares	-	-	1,96,000	1,12,000
Earnings for equity Shareholders	3,20,000	2,80,000	1,24,000	1,84,000
Number of Equity shares	2,00,000	1,00,000	60,000	60,000
EPS	1.6	2.8	2.07	3.07

Option D is the best as EPS is the maximum in this case.

13.7 IMPORTANCE OF LEVERAGES

Leverages have the magnifying effect. Operating leverage magnifies EBIT with respect to contribution while financial leverage magnifies EPS with respect to EBIT. Financial leverage enhances the EPS without an additional investment. By having judicious assets mix and financing mix, EPS may be increased. A few areas identified in this regard are as follows :

Investment in fixed assets	(Operating leverage)
Capital structure planning	(Financial leverage)
Profit planning	(Combined leverage)
Monitoring business and financial risk	
Maximising the value of share	
Improving EPS	
Judicious mixture of operating leverage and financial leverage.	

A firm with high operating leverage should not have a high financial leverage. Similarly, a firm having low operating leverage will stand to gain by having a high financial leverage. If both leverages are increased, the possibility of bearing more risk will increase.

Activity 4

1. How does EBIT-EPS analysis help in choosing the best financing mix ?

2. Collect information for a company regarding financing mix. Also compute leverages for the same.

3. Write a brief note on importance of leverages in profit planning.

13.8 PRACTICAL PROBLEMS

In this subsection, an attempt has been made to arrange a few practical problems of leverages alongwith solution :

Illustration No. 13.6

A company has three alternative plans :

	A	B	C
	Rs.	Rs.	Rs.
Equity Capital	30,000	15,000	45,000
Debt @ 10%	30,000	45,000	15,000

EBIT Rs. 6,000

Calculate financial leverage.

Solution :

Computation of Financial Leverage in Rs.

Particulars	A	B	C
EBIT	6,000	6,000	6,000
Less - Interest	3,000	4,500	1,500
	-----	-----	-----
Profit Before Tax	3,000	1,500	4,500
Financial Leverage	2	4	1.33

Illustration No. 13.7

Given below the following data of two companies :

Particulars	A Ltd.	B. Ltd.
Sales	4,00,000	3,50,000
Variable Cost	40% of Sales	40% of Sales
Fixed Cost	25,000	30,000
Interest	1,40,000	80,000

Calculate degree of operating leverage and degree of financial leverage.

Solution :

Statement showing computation of OL and FL

in Rs.

Particulars	A Ltd.	B Ltd.
Sales	4,00,000	3,50,000
Less - Variable Cost	1,60,000	1,40,000
Contribution	2,40,000	2,10,000
Less - Fixed Cost	25,000	30,000
EBIT	2,15,000	1,80,000
Degree of Operating Leverage	1.12	1.17
Interest	1,40,000	80,000
EBT	2,75,000	1,00,000
Degree of Financial Leverage	2.87	1.80

Illustration No. 13.8

The following data is available for ABC Ltd.

	Rs.
Sales	7,50,000
Variable Cost	4,20,000
Fixed Cost	60,000
Debt	4,50,000
Interest on Debt @	9%
Equity Capital	5,50,000

Calculate ROI, Operating, financial and combined leverage. Also ascertain the level at which EBIT will be zero.

Solution :

Return on Investment

Sales - Variable Cost - Fixed Cost

EBIT = Rs. 7,50,000 - Rs. 4,20,000 - Rs. 60,000 = Rs. 2,70,000

ROI = $\frac{\text{Rs. 2,70,000}}{\text{Rs. 10,00,000}} \times 100 = 27\%$

Operating Leverage

$\frac{C}{\text{EBIT}} = \frac{\text{Rs. 3,30,000}}{\text{Rs. 2,70,000}} = 1.22$

Financial Leverage

$$\frac{\text{EBIT}}{\text{EBT}} = \frac{\text{Rs. 2,70,000}}{\text{Rs. 2,29,500}} = 1.17$$

$$\text{Combined Leverage} = 1.17 * 1.22 = 1.43$$

Sales when EBIT will be zero

$$\text{P/V Ratio} = \frac{\text{Rs. 3,30,000}}{\text{Rs. 7,50,000}} * 100 = 44\%$$

$$\text{Fixed Cost} = 60,000 + 40,500 = 1,00,500$$

$$\text{Rs. 1,00,500}$$

$$\text{BEP} = \frac{\text{Rs. 1,00,500}}{44\%} = \text{Rs. 228409}$$

Illustration No. 13.9

The following details are available :

Existing equity capital 10,000 shares of Rs. 10 each

Proposals to Raise Rs. 1,00,000 with following alternatives

(a) Debt at 10%

(b) Equity capital @ Rs. 10 per share

(c) Preference shares of Rs. 10 each @ 12% dividend

EBIT Rs. 80,000

Tax Rate 50%

Advise which of the method of financing would be most suitable.

Which is the most optimum proposal of financing ?

Solution :

Optimum proposal of financing

in Rs.

Particulars	I	II	III
EBIT	80,000	80,000	80,000
Less - Interest	10,000	-	-
EBT	70,000	80,000	80,000
Tax	35,000	40,000	40,000
EAT	35,000	40,000	40,000
Less – Dividend for Preferences shares	-	-	12,000
Earnings per shareholders	35,000	40,000	28,000
No. of shares	11,000	10,000	10,000
EPS	3.18	4.00	2.80

Activity 5

1. Calculate degree of (i) operating leverage (ii) financial leverage and (iii) combined leverage from the following data :

Sales 50,000 units @ Rs. 4 per unit

Variable cost per unit 40%

Fixed costs – Rs. 1,00,000

Interest charges Rs. 3668

2. The installed capacity of a factory is 700 units. The actual exploited capacity is 500 units. Selling price per unit Rs. 100 and variable cost is Rs. 60 per unit.

Calculate operating leverage when

- (a) fixed costs are Rs. 5000
 - (b) fixed costs are Rs. 11,000
 - (c) fixed costs are Rs. 15,000
-
-
-

13.9 LET US SUM UP

Leverage refers to the use of an asset or source of funds which involves fixed costs or fixed returns. Leverages can be operating, financial and combined. Operating leverage uses fixed operating costs to magnify the effects of changes in sales on the operating profits. Operating leverage may be favourable or unfavourable. High operating leverage is good when sales increase. Financial leverage affects financial risk of the firm. In financial leverage, the source of fund which wants fixed refund so that more than proportionate change in EPS may be reflected. Combined leverage is the multiplication of financial and operating leverage. In order to keep the risk under control, low financial leverage be kept alongwith high degree of operating leverage. EBIT – EPS analysis may help the financial managers to choose the optimum capital structure.

13.10 KEY WORDS

Leverage is the employment of an asset or funds for which the firm pays a fixed cost or fixed return.

Operating Leverage is the use of fixed operating costs to magnify a change in profits relative to a given change in sales.

Financial Leverage is the tendency of residual income to vary disproportionately with operating profit.

Combined Leverage expresses the relationship between revenue on account of sales and the taxable income.

ROI Leverage is the ratio of EBIT and total assets.

Trading on Equity – Financial leverage is also sometimes called on trading on equity.

EPS – Earnings per share is calculated by dividing earnings available to equity share holders with number of equity shares.

13.11 ANSWERS

Activity 5

1. Operating leverage 4.33, Financial leverage 1.14
Combined leverage 4.9
2. Operating leverage 1.33, Financial leverage 2.22
Combined leverage 4.0 times

13.12 TERMINAL QUESTIONS

1. What is leverage ? What are the different types of leverages ?
2. What is operating leverage ? How is it different from financial leverage ? Illustrate.
3. What is combined leverage ? Explain its significance.
4. Illustrate EBIT – EPS Analysis.
5. State the applications of operating and financial leverage.
6. Explain the significance of operating leverage ? Discuss its effect on risk.
7. When does financial leverage become favourable ? Discuss its impact on risk.
8. The following are the details :

	A Company	B Company
Sales	10,00,000	6,00,000
Variable cost	4,00,000	2,40,000
Fixed cost	2,40,000	1,80,000
Interest	1,00,000	1,00,000

Calculate the following :

- a) Degree of operating leverage and financial leverage of both the firms.
- b) Comment on the risk position.

[Ans : A Comp. 1.66 and 1.38
 B Comp. 2 and 2.25]

9. A textile company has EBIT of Rs. 3,20,000. Its capital structure consists of the following securities :

	Rs.
10% Debentures	10,00,000
12% Preference shares	2,00,000
Equity shares of Rs. 100 each	8,00,000

The company is in the 35 percent tax bracket.

- a) Determine the EPS
- b) Determine the degree of financial leverage

[Ans. a) Rs. 14.875 b) 1.75]

10. Calculate operating, financial and combined leverage under situations when fixed costs are

- a) Rs. 50,000
- b) Rs. 1,00,000

For financial plans 1 and 2 respectively from the following information pertaining to the operation and capital structure of XYZ co.

Total Assets	Rs. 3,00,000
Asset Turnover	2
Variable cost as Percentage of sales	60%
Financial plan	
A. Debt 10%	Rs. 10,00,000
Equity	Rs. 3,00,000
B. Debt 10%	Rs. 3,00,000
Equity	Rs. 1,00,000

[Ans. a) 1.26 FPA 1.05 / 1.08 FPB 1.19 / 1.27

b) 1.71 FPA 1.33 / 1.84 FPB 1.5 / 2.18]

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