

FINANCING DECISIONS

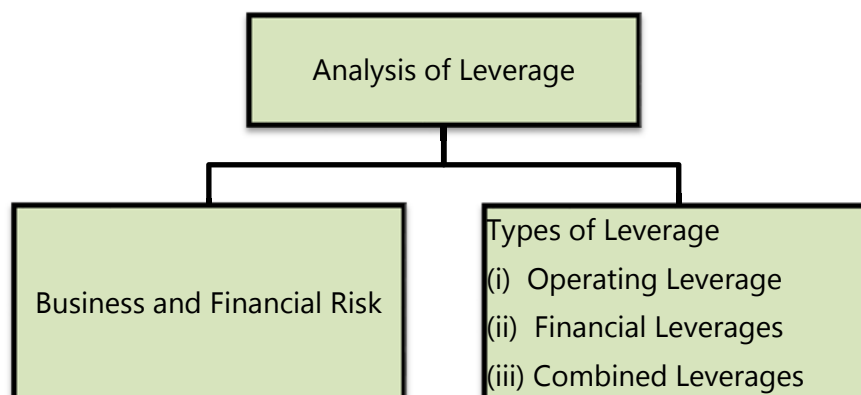
- LEVERAGES



LEARNING OUTCOMES

- ❑ Understand the concept of business risk and financial risk
- ❑ Discuss and Interpret the types of leverages.
- ❑ Discuss the relationship between operating leverage, Break - even analysis & Margin of Safety
- ❑ Discuss positive and negative Leverage
- ❑ Discuss Financial leverage as 'Trading on equity'
- ❑ Discuss Financial Leverage as 'Double Edged Sword'

CHAPTER OVERVIEW





6.1 INTRODUCTION

Objective of financial management is to **maximize wealth**. Here wealth means market value. Value is directly related to performance of company and inversely related to expectation of investors. In turn expectation of investor is dependent on risk of the company. Therefore, to maximize value company should try to manage its risk. This risk may be business risk, financial risk or both. In this chapter we will discuss factors that influence business and financial risks.



6.2 MEANING AND TYPES OF LEVERAGE

6.2.1 Meaning of Leverage

The term leverage represents influence or power. In financial analysis leverage represents the influence of one financial variable over some other related financial variable. These financial variables may be costs, output, sales revenue, Earnings Before Interest and Tax (EBIT), Earning per share (EPS) etc. Generally, if we want to calculate impact of change in variable X on variable Y, it is termed as Leverage of Y with X, and it is calculated as follows:

$$\text{Measurement of Leverage} = \frac{\text{Change in Y} \div Y}{\text{Change in X} \div X}$$

6.2.2 Types of Leverage

There are three commonly used measures of leverage in financial analysis. These are:

- (i) **Operating Leverage:** It is the relationship between Sales and EBIT and indicated **business risk**.
- (ii) **Financial Leverage:** it is the relationship between EBIT and EPS and indicates **financial risk**.
- (iii) **Combined Leverage:** It is the relationship between Sales and EPS and indicated **total risk**.

6.2.3 Chart Showing Operating Leverage, Financial Leverage and Combined leverage

Profitability Statement			
Sales	xxx	Operating Leverage	Degree of Combined Leverage
Less: Variable Cost	(xxx)		
Contribution	xxx		
Less: Fixed Cost	(xxx)	Financial Leverage	
Operating Profit/ EBIT	xxx		
Less: Interest	(xxx)		
Earnings Before Tax (EBT)	xxx		
Less: Tax	(xxx)		
Profit After Tax (PAT)	xxx		
Less: Pref. Dividend (if any)	(xxx)		
Net Earnings available to equity shareholders/ PAT	xxx		
No. Equity shares (N)			
Earnings per Share (EPS) = (PAT ÷ N)			

6.3 OPERATING LEVERAGE

Operating Leverage means tendency of operating income (EBIT) to change disproportionately with change in sale volume. This disproportionate change is caused by operating fixed cost, which does not change with change in sales volume.

In other words, operating leverage (OL) maybe defined **as the employment of an asset with a fixed cost** so that enough revenue can be generated to cover all the fixed and variable costs.

The use of assets for which a company pays a fixed cost is called operating leverage.

Operating leverage is a function of three factors:

- (i) Amount of fixed cost,

- (ii) Variable contribution margin, and
- (iii) Volume of sales.

6.3.1 Degree of Operating Leverage (DOL)

When we measure magnitude of disproportionate change it is termed as degree of leverage. Degree of Operating Leverage may be defined as percentage change in EBIT with respect to percentage change in sales quantity.

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

Mathematically:

$$DOL = \frac{\Delta EBIT}{EBIT} \div \frac{\Delta Q}{Q}$$

Here, $EBIT = Q(S-V) - F$

Q = sales quantity

S = selling price per unit

V = variable cost per unit

Δ Denotes change

$$DOL = \frac{\Delta [Q(S-V)-F] / [Q(S-V)-F]}{\Delta Q / Q}$$

Now ΔF is nil because change in fixed cost is nil. Therefore:

$$DOL = \frac{\Delta Q(S-V)}{Q(S-V)-F} \div \frac{\Delta Q}{Q} = \frac{\Delta Q(S-V)}{Q(S-V)-F} \times \frac{Q}{\Delta Q} = \frac{Q(S-V)}{Q(S-V)-F}$$

$$DOL = \frac{\text{Contribution}}{\text{Contribution-Fixed Cost}} = \frac{\text{Contribution}}{EBIT}$$

6.3.2 Break-Even Analysis and Operating Leverage

Break-even analysis is a generally used to study the Cost Volume Profit analysis. It is concerned with computing the break-even point. At this point of production level and sales there will be no profit and loss i.e. total cost is equal to total sales revenue.

$$\text{Break-even point in units} = \frac{\text{Fixed Cost}}{\text{Contribution per unit}}$$

Let us Understand through the following example:

Particulars	Product X	Product Y
	(₹)	(₹)
Selling Price	40	20
Variable Cost	20	12
Contribution	20	8
Total Contribution of 1,000 units	20,000	8,000
Fixed Cost	15,000	5,000
Profit (EBIT)	5,000	3,000
Break- even point (Fixed Cost / Contribution)	$\frac{15,000}{20} = 750 \text{ units}$	$\frac{5,000}{8} = 625 \text{ units}$
Operating Leverage $\left(\frac{\text{Contribution}}{\text{EBIT}} \right)$	$\frac{20,000}{5,000} = 4$	$\frac{8,000}{3,000} = 2.67$

There is a relationship between leverage and Break-even point. Both are used for profit planning. In brief the relationship between leverage, break-even point and fixed cost as under:

Leverage	Break-even point
1. Firm with high leverage	1. Higher Break-even point
2. Firm with low leverage	2. Lower Break-even point
Fixed cost	Operating leverage
1. High fixed cost	1. High degree of operating leverage
2. Lower fixed cost	2. Lower degree of operating leverage

6.3.3 Margin of Safety and Operating Leverage

In cost accounting, one studies that margin of safety (MOS) may be calculated as follows:

$$MOS = \frac{\text{Sales} - \text{BEP Sales}}{\text{Sales}} \times 100$$

Higher margin of safety indicates lower business risk and higher profit and vice versa. If we both multiply and divide above formula with profit volume (PV) ratio then:

$$MOS = \frac{\text{Sales} - \text{BEP Sales}}{\text{Sales}} \times \frac{\text{PV Ratio}}{\text{PV Ratio}} = \frac{\text{Sales} \times \text{PV} - \text{BEP} \times \text{PV}}{\text{Sales} \times \text{PV}}$$

we know that:

$$\text{PV ratio} = \frac{\text{Contribution}}{\text{Sales}} \quad \text{or} \quad \text{Sales} \times \text{PV ratio} = \text{Contribution}$$

$$\text{Further, } \text{BEP} = \frac{\text{Fixed Cost}}{\text{PV ratio}} \quad \text{or} \quad \text{BEP} \times \text{PV ratio} = \text{Fixed Cost}$$

So

$$MOS = \frac{\text{Contribution} - \text{Fixed Cost}}{\text{Contribution}} = \frac{\text{EBIT}}{\text{Contribution}}$$

we know that:

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

hence:

$$\text{Degree of Operating leverage} = \frac{1}{\text{Margin of Safety}}$$

Let us Understand through the following example:

Particulars	Product X
	(₹)
Sales (50 x 1000 units)	50,000

Variable Cost (30 x 1000 units)	30,000
Contribution	20,000
Fixed Cost	15,000
Profit (EBIT)	5,000
Break- even point (Fixed Cost / PV ratio)	15000/0.40 = 37,500
Margin of Safety = (50000-37500)/50000	0.25
Operating Leverage = Contribution/EBIT = 20000/5000	4
Operating Leverage = 1/MOS = 1/0.25	4

If Margin of safety	Business Risk	DOL (= 1/MOS)
Rises	Falls	Falls
Falls	Rises	Rises

When DOL is more than one (1), operating leverage exists. More is the DOL higher is operating leverage.

A positive DOL/ OL means that the firm is operating at higher level than the break-even level and both sales and EBIT moves in the same direction. In case of negative DOL/ OL firm operates at lower than the break-even sales and EBIT is negative.

Situation 1: No. Fixed Cost

Particulars	20,000 units	30,000 units
	(₹)	(₹)
Sales @ ₹10	2,00,000	3,00,000
Variable cost @ ₹ 5	1,00,000	1,50,000
EBIT	1,00,000	1,50,000

$$\text{Degree of Operative leverage (DOL)} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}} = \frac{50\%}{50\%} = 1$$

Situation 2: Positive Leverage

Particulars	(₹)	(₹)
Sales @ ₹10	2,00,000	3,00,000

Variable Cost @ ₹5	1,00,000	1,50,000
Contribution	1,00,000	1,50,000
Fixed Cost	50,000	50,000
EBIT	50,000	1,00,000

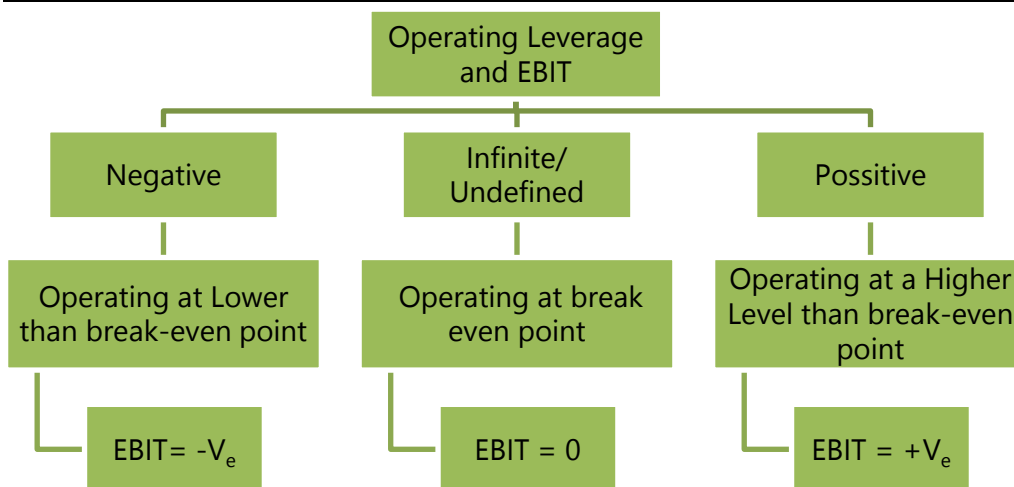
$$\text{Degree of Operative leverage (DOL)} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}} = \frac{100\%}{50\%} = 2$$

Situation 3: When EBIT is Nil (contribution = fixed cost)

$$\text{Degree of Operating Leverage (DOL)} = \frac{\text{Contribution}}{0} = \text{Undefined.}$$

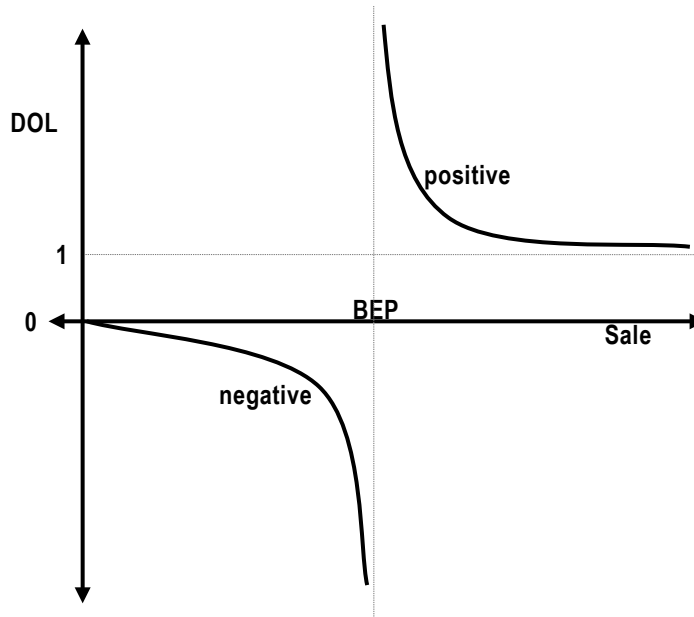
Analysis and Interpretation of operating leverage

S. No.	Situation	Result
1	No Fixed Cost	No operating leverage
2.	Higher Fixed cost	Higher Break-even point
3.	Higher than Break-even level	Positive operating leverage
4.	Lower than Break-even level	Negating operating leverage



Positive and Negative Operating Leverage

Note: DOL can never be between zero and one. It can be zero or less or it can be one or more.



When Sales is much higher than BEP sales, DOL will be slightly more than one. With decrease in sales DOL will increase. At BEP, DOL will be infinite. When sales is slightly less than BEP, DOL will be negative infinite. With further reduction in sale, DOL will move towards zero. At zero sales, DOL will also be zero.

ILLUSTRATION 1

A Company produces and sells 10,000 shirts. The selling price per shirt is ₹ 500. Variable cost is ₹ 200 per shirt and fixed operating cost is ₹ 25,00,000.

- CALCULATE operating leverage.
- If sales are up by 10%, then COMPUTE the impact on EBIT?

SOLUTION

- Statement of Profitability

	₹
Sales Revenue (10,000 × 500)	50,00,000
Less: Variable Cost (10,000 × 200)	20,00,000
Contribution	30,00,000
Less: Fixed Cost	25,00,000
EBIT	5,00,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{\text{₹ 30 lakhs}}{\text{₹ 5 lakhs}} = 6 \text{ times}$$

$$(b) \text{ Operating Leverage (OL)} = \frac{\% \text{ Change in EBIT}}{\% \text{ Change in Sales}}$$

$$6 = \frac{X / 5,00,000}{5,00,000 / 50,00,000}$$

$$X = ₹3,00,000$$

$$\therefore \Delta \text{EBIT} = ₹3,00,000 / 5,00,000 = 60\%$$

ILLUSTRATION 2

CALCULATE the operating leverage for each of the four firms A, B, C and D from the following price and cost data:

	Firms			
	A (₹)	B (₹)	C (₹)	D (₹)
Sale price per unit	20	32	50	70
Variable cost per unit	6	16	20	50
Fixed operating cost	60,000	40,000	1,00,000	Nil

What calculations can you draw with respect to levels of fixed cost and the degree of operating leverage result? Explain. Assume number of units sold is 5,000.

SOLUTION

	Firms			
	A	B	C	D
Sales (units)	5,000	5,000	5,000	5,000
Sales revenue (Units × price) (₹)	1,00,000	1,60,000	2,50,000	3,50,000
Less: Variable cost (Units × variable cost per unit) (₹)	(30,000)	(80,000)	(1,00,000)	(2,50,000)
Less: Fixed operating costs (₹)	(60,000)	(40,000)	(1,00,000)	Nil
EBIT	10,000	40,000	50,000	1,00,000

$$\text{DOL} = \frac{\text{Current sales (S) - Variable costs (VC)}}{\text{Current EBIT}}$$

$$\text{DOL}_{(A)} = \frac{₹ 1,00,000 - ₹ 30,000}{₹ 10,000} = 7$$

$$\text{DOL}_{(B)} = \frac{₹ 1,60,000 - ₹ 80,000}{₹ 40,000} = 2$$

$$\text{DOL}_{(C)} = \frac{₹ 2,50,000 - ₹ 1,00,000}{₹ 50,000} = 3$$

$$\text{DOL}_{(D)} = \frac{₹ 3,50,000 - ₹ 2,50,000}{₹ 1,00,000} = 1$$

The operating leverage exists only when there are fixed costs. In the case of firm D, there is no magnified effect on the EBIT due to change in sales. A 20 per cent increase in sales has resulted in a 20 per cent increase in EBIT. In the case of other firms, operating leverage exists. It is maximum in firm A, followed by firm C and minimum in firm B. The interception of DOL of 7 is that 1 per cent change in sales results in 7 per cent change in EBIT level in the direction of the change of sales level of firm A.



6.4 FINANCIAL LEVERAGE

Financial leverage (FL) maybe defined as **'the use of funds with a fixed cost in order to increase earnings per share.'** In other words, it is the use of company funds on which it pays a limited return. Financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to common stockholders.

$$\text{Financial Leverage (FL)} = \frac{\text{Earnings before interest and tax (EBIT)}}{\text{Earnings before tax (EBT)}}$$

Where, EBIT = Sales - (Variable cost + Fixed cost)

EBT = EBIT - Interest

6.4.1 Degree of Financial Leverage (DFL)

Degree of financial leverage is the ratio of the percentage increase in earnings per share (EPS) to the percentage increase in earnings before interest and taxes (EBIT). Financial Leverage (FL) is also defined as **"the ability of a firm to use fixed financial charges to magnify the effect of changes in EBIT on EPS"**

Degree of Financial Leverage (DFL)

$$= \frac{\text{Percentage change in earnings per share (EPS)}}{\text{Percentage change in earnings before interest and tax (EBIT)}}$$

$$DFL = \frac{\Delta EPS}{EPS} \div \frac{\Delta EBIT}{EBIT}$$

Δ EPS means change in EPS and Δ EBIT means change in EBIT

now $EPS = [(EBIT - I)(1 - t)] - D / \text{No. of Shares}$

Here

T = Tax Rate

D = Dividend on Preference Shares (inclusive of dividend tax if any)

on simplifying the above we get,

$$DFL = \frac{EBIT(1 - t)}{(EBIT - Int.)(1 - t) - D_p}$$

$$DFL = \frac{EBIT}{EBIT - Int. - \frac{D_p}{1-t}}$$

If the company has not issued preference shares, then:

$$DFL = \frac{EBIT}{EBIT - Int.} = \frac{EBIT}{PBT}$$

When DFL is more than one (1), financial leverage exists. More is DFL higher is financial leverage.

A positive DFL/ FL means firm is operating at a level higher than break-even point and EBIT and EPS moves in the same direction. Negative DFL/ FL indicates the firm is operating at lower than break-even point and EPS is negative.

Let us understand through the following analysis:

Situation 1:No Fixed Interest Charges

Particulars	X	Y
	₹	₹
EBIT	1,00,000	1,50,000
Tax @ 50%	50,000	75,000

PAT	50,000	75,000
No. of share	10,000	10,000
EPS	5	7.5

$$\text{Degree of Finance Leverage - (DFL)} = \frac{\text{Change in EP}}{\text{Change in EBIT}} = \frac{50\%}{50\%} = 1$$

Situation 2. Positive Financial Leverage

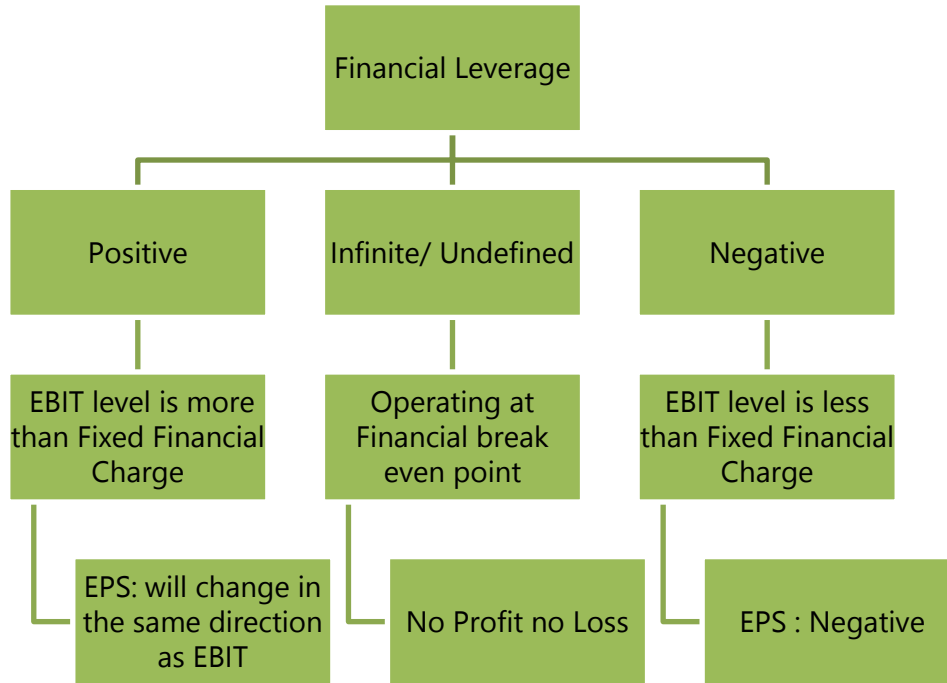
Particular	M	N
EBIT	1,00,000	1,50,000
Interest	20,000	20,000
EBT	80,000	1,30,000
Tax @ 50%	40,000	65,000
PAT	40,000	65,000
No of Share	10,000	10,000
	4	6.5

$$\text{Degree of Finance Leverage - (DFL)} = \frac{\text{Change in EPS}}{\text{Change in EBIT}} = \frac{62.5\%}{50\%} = 1.25$$

$$\frac{\left(\frac{2.5}{4} \times 100\right)}{50\%} = 62.5\%$$

Situation 3. When EBT is nil (EBIT = Fixed Interest)

$$\text{Degree of Finance Leverage} = \frac{\text{EBIT}}{\text{Nil}} = \text{undefined.}$$



Positive and Negative Financial Leverage

Analysis and Interpretation of Financial leverage

Sl. No.	Situation	Result
1	No Fixed Financial Cost	No Financial leverage
2.	Higher Fixed Financial cost	Higher Financial Leverage
3.	When EBIT is higher than Financial Break-even point	Positive Financial leverage
4.	When EBIT is less than Finance Break-even point	Negating Financial leverage

6.4.2 Financial Leverage as 'Trading on Equity'

Financial leverage indicates the use of funds with fixed cost like long term debts and preference share capital alongwith equity share capital which is known as trading on equity. The basic aim of financial leverage is to increase the earnings available to equity shareholders using fixed cost fund. A firm is known to have a positive leverage when its earnings are more than the cost of debt. If earnings is equal to or less than cost of debt, it will be an unfavourable leverage. When the

quantity of fixed cost fund is relatively high in comparison to equity capital it is said that the firm is **“trading on equity”**.

6.4.3 Financial Leverage as a ‘Double edged Sword’

On one hand when cost of ‘fixed cost fund’ is less than the return on investment financial leverage will help to increase return on equity and EPS. The firm will also benefit from the saving of tax on interest on debts etc. However, when cost of debt will be more than the return it will affect return of equity and EPS unfavourably and as a result firm can be under financial distress. This is why financial leverage is known as **“double edged sword”**.

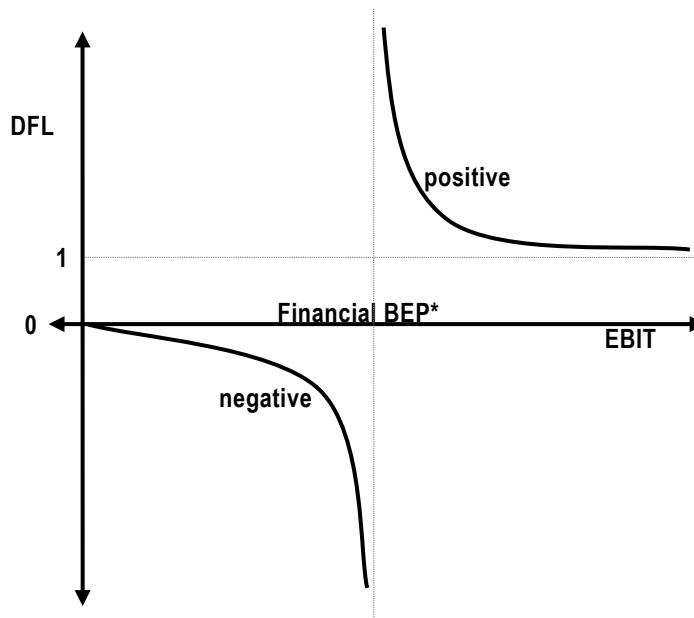
Effect on EPS and ROE:

When, $ROI > \text{Interest}$ – Favourable – Advantage

When, $ROI < \text{Interest}$ – Unfavourable – Disadvantage

When, $ROI = \text{Interest}$ – Neutral – Neither advantage nor disadvantage.

Note: DFL can never be between zero and one. It can be zero or less or it can be one or more.



*Financial BEP is the level of EBIT at which earning per share is zero. If a company has not issued preference shares then Financial BEP is simply equal to amount of Interest.

When EBIT is much higher than Financial BEP, DFL will be slightly more than one. With decrease in EBIT, DFL will increase. At Financial BEP, DFL will be infinite. When EBIT is slightly less than Financial BEP, DFL will be negative infinite. With further reduction in EBIT, DFL will move towards zero. At zero EBIT, DFL will also be zero.

6.5 COMBINED LEVERAGE

Combined leverage maybe defined as the potential use of fixed costs, both operating and financial, **which magnifies the effect of sales volume change on the earning per share of the firm.**

$$\begin{aligned}\text{Combined Leverage (CL)} &= \text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)} \\ &= \frac{C}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}} \\ &= \frac{C}{\text{EBT}}\end{aligned}$$

6.5.1 Degree of Combined Leverage (DCL)

Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. **It indicates the effect the sales changes will have on EPS.**

$$\begin{aligned}\text{DCL} &= \text{DOL} \times \text{DFL} \\ &= \frac{\% \text{Change in EBIT}}{\% \text{Change in Sales}} \times \frac{\% \text{Change in EPS}}{\% \text{Change in EBIT}} \\ &= \frac{\% \text{Change in EPS}}{\% \text{Change in Sales}}\end{aligned}$$

Like operating leverage and financial leverage, combined leverage can also be positive and negative combined leverage.

6.5.2 Analysis of combined leverage

Combine leverage measures total risk. It depends on combination of operating and financial risk.

DOL	DFL	Comments
Low	Low	Lower total risk. Can not take advantage of trading on equity.
High	High	Higher total risk. Very risky combination.

High	Low	Moderate total risk. Not a good combination. Lower EBIT due to higher DOL and lower advantage of trading on equity due to low DFL.
Low	High	Moderate total risk. Best combination. Higher financial risk is balanced by lower total business risk.

ILLUSTRATION 3

A firm's details are as under:

Sales (@100 per unit)	₹ 24,00,000
Variable Cost	50%
Fixed Cost	₹ 10,00,000

It has borrowed ₹ 10,00,000 @ 10% p.a. and its equity share capital is ₹ 10,00,000 (₹ 100 each)

CALCULATE:

- Operating Leverage
- Financial Leverage
- Combined Leverage
- Return on Investment
- If the sales increases by ₹ 6,00,000; what will the new EBIT?

SOLUTION

	₹
Sales	24,00,000
Less: Variable cost	12,00,000
Contribution	12,00,000
Less: Fixed cost	10,00,000
EBIT	2,00,000
Less: Interest	1,00,000
EBT	1,00,000
Less: Tax (50%)	50,000

EAT	50,000
No. of equity shares	10,000
EPS	5

(a) Operating Leverage = $\frac{12,00,000}{2,00,000} = 6$ times

(b) Financial Leverage = $\frac{2,00,000}{1,00,000} = 2$ times

(c) Combined Leverage = OL × FL = 6 × 2 = 12 times.

(d) R.O. I = $\frac{50,000}{10,00,000} \times 100 = 5\%$

Here ROI is calculated as ROE i.e. $\frac{\text{EAT - Pref.Dividend}}{\text{Equity shareholders' fund}}$

(e) Operating Leverage = 6

$$6 = \frac{\Delta \text{EBIT}}{0.25}$$

$$\Delta \text{EBIT} = \frac{6 \times 1}{4} = 1.5$$

Increase in EBIT = ₹ 2,00,000 × 1.5 = ₹ 3,00,000

New EBIT = 5,00,000

SUMMARY

DOL	DFL	DCL
Shows level of business risk.	Shows level of financial risk.	Shows level of total or combined risk.
It is dependent upon fixed cost.	It is dependent upon interest and preference dividend	It is dependent upon fixed cost, interest & preference dividend.
Measures % change in EBIT which results from a 1% change in Sales.	Measures % change in EPS which results from a 1% change in EBIT.	Measures % change in EPS which results from a 1% change in Sales.

For example, if DOL is 3 & there is 8% increase in output then EBIT will increase by 24% & if there is a 8% decrease in output EBIT will decrease by 24%.	For example, if DFL is 2 and there is 5% increase in EBIT then EPS will increase by 10% and if there is a 5% decrease in EBIT, EPS will decrease by 10%.	For example, if DCL is 6 and there is a 8% increase in sales then EPS will increase by 48%. And if there is a 8% decrease in sales then EPS will decrease by 48%.
There is unique DOL for each level of output.	There is a unique DFL for each level of EBIT.	There is a unique DCL for each level of sales.
It is undefined at Operating B.E.P.	It is undefined at Financial B.E.P.	It is undefined at Financial B.E.P.

TEST YOUR KNOWLEDGE

MCQs based Questions

1. Given

Operating fixed costs ₹ 20,000

Sales ₹ 1,00,000

P/ V ratio 40%

The operating leverage is:

- (a) 2.00
- (b) 2.50
- (c) 2.67
- (d) 2.47

2. If EBIT is ₹ 15,00,000, interest is ₹ 2,50,000, corporate tax is 40%, degree of financial leverage is

- (a) 1:11
- (b) 1.20
- (c) 1.31
- (d) 1.41

3. If DOL is 1.24 and DFL is 1.99, DCL would be:

- (a) 2.14

- (b) ...2.18
 (c) 2.31
 (d) 2.47
4. Operating Leverage is calculated as:
- (a) Contribution \div EBIT
 (b) EBIT \div PBT
 (c) EBIT \div Interest
 (d) EBIT \div Tax
5. Financial Leverage is calculated as:
- (a) EBIT \div Contribution
 (b) EBIT \div PBT
 (c) EBIT \div Sales
 (d) EBIT \div Variables Cost
6. Which of the following is correct?
- (a) $CL = OL + FL$
 (b) $CL = OL - FL$
 (c) $OL = OL \times FL$
 (d) $OL = OL \div FL$

Theoretical based Questions

1. DIFFERENTIATE between Business risk and Financial risk.
2. "Operating risk is associated with cost structure, whereas financial risk is associated with capital structure of a business concern." Critically EXAMINE this statement.

Practical Problems

1. The Sale revenue of TM excellence Ltd. @ Rs.20 Per unit of output is Rs.20 lakhs and Contribution is Rs.10 lakhs. At the present level of output the DOL of the company is 2.5. The company does not have any Preference Shares. The number of Equity Shares are 1 lakh. Applicable corporate Income Tax rate is 50% and the rate of interest on Debt Capital is 16% p.a. What is the EPS (At sales revenue

of ₹ 20 lakhs) and amount of Debt Capital of the company if a 25% decline in Sales will wipe out EPS.

2. Betatronics Ltd. has the following balance sheet and income statement information:

Balance Sheet as on March 31st 2019

Liabilities	₹	Assets	₹
Equity capital (₹ 10 per share)	8,00,000	Net fixed assets	10,00,000
10% Debt	6,00,000	Current assets	9,00,000
Retained earnings	3,50,000		
Current liabilities	1,50,000		
	19,00,000		19,00,000

Income Statement for the year ending March 31st 2019

	₹
Sales	3,40,000
Operating expenses (including ₹ 60,000 depreciation)	1,20,000
EBIT	2,20,000
Less: Interest	60,000
Earnings before tax	1,60,000
Less: Taxes	56,000
Net Earnings (EAT)	1,04,000

- (a) DETERMINE the degree of operating, financial and combined leverages at the current sales level, if all operating expenses, other than depreciation, are variable costs.
- (b) If total assets remain at the same level, but sales (i) increase by 20 percent and (ii) decrease by 20 percent, COMPUTE the earnings per share at the new sales level?

3. A company had the following Balance Sheet as on 31st March, 2019:

Liabilities	(₹ in crores)	Assets	(₹ in crores)
Equity Share Capital (50 lakhs shares of ₹ 10 each)	5		
Reserves and Surplus	1	Fixed Assets (Net)	12.5
15% Debentures	10	Current Assets	7.5
Current Liabilities	4		
	20		20

The additional information given is as under:

Fixed cost per annum (excluding interest)	₹ 4 crores
Variable operating cost ratio	65%
Total assets turnover ratio	2.5
Income Tax rate	30%

Required:

CALCULATE the following and comment:

- (i) Earnings Per Share
 - (ii) Operating Leverage
 - (iii) Financial Leverage
 - (iv) Combined Leverage
4. CALCULATE the operating leverage, financial leverage and combined leverage from the following data under Situation I and II and Financial Plan A and B:

Installed Capacity	4,000 units
Actual Production and Sales	75% of the Capacity
Selling Price	₹ 30 Per Unit
Variable Cost	₹ 15 Per Unit

Fixed Cost:

Under Situation I	₹ 15,000
Under Situation-II	₹20,000

Capital Structure:

	Financial Plan	
	A (₹)	B (₹)
Equity	10,000	15,000
Debt (Rate of Interest at 20%)	10,000	5,000
	20,000	20,000

ANSWERS/SOLUTIONS

Answers to the MCQs based Questions

1. (a) 2. (b) 3. (d) 4. (a) 5. (b) 6. (c)

Answers to Theoretical based Questions

- Please refer paragraph 6.1.1
- Please refer paragraph 6.1.1

Answers to Practical problems

1. (i) Calculation of Fixed Cost

$$DOL = \frac{\text{Contribution}}{\text{Contribution} - \text{Fixed Cost}} \text{ or } 2.5 = \frac{10}{EBIT} \text{ or } EBIT = ₹ 4,00,000 \text{ lakhs}$$

$$EBIT = \text{Contribution} - \text{Fixed Cost}$$

$$4 = 10 - \text{Fixed Cost}$$

$$\text{Fixed Cost} = 10 - 4 = ₹ 6 \text{ lakhs}$$

(ii) Calculation of Degree of total Leverage (DTL)

Question says that 25% change in sales will wipe out EPS. Here wipe out means it will reduce EPS by 100%.

$$DTL = \frac{\text{Percentage Change in EPS}}{\text{Percentage Change in Sales}} = \frac{100\%}{25\%} = 4$$

(iii). Calculation of Degree of Financial Leverage (DFL)

$$DTL = DOL \times DFL \text{ or } 4 = 2.5 \times DFL$$

$$\text{So DFL} = 1.6$$

(iv) Calculation of Interest and amount of Debt

$$DFL = \frac{EBIT}{EBIT - Int} \text{ or } 1.6 = \frac{4}{4 - Int} \text{ or } Int = ₹ 1,50,000 \text{ lakhs}$$

Debt x interest rate = Amount of Interest

$$\text{Debt} \times 16\% = ₹ 1,50,000$$

$$\text{Debt} = ₹ 9,37,500$$

(v) Calculation of Earning per share (EPS)

$$EPS = \frac{(EBIT - Int)(1 - t)}{N} = \frac{(4 - 1.5)0.5}{1} = ₹ 1.25$$

2. (a) Calculation of Degree of Operating (DOL), Financial (DFL) and Combined leverages (DCL).

$$DOL = \frac{₹ 3,40,000 - ₹ 60,000}{₹ 2,20,000} = 1.27$$

$$DFL = \frac{₹ 2,20,000}{₹ 1,60,000} = 1.38$$

$$DCL = DOL \times DFL = 1.27 \times 1.38 = 1.75$$

(b) Earnings per share at the new sales level

	Increase by 20%	Decrease by 20%
	(₹)	(₹)
Sales level	4,08,000	2,72,000
Less: Variable expenses	72,000	48,000
Less: Fixed cost	<u>60,000</u>	<u>60,000</u>
Earnings before interest and taxes	2,76,000	1,64,000
Less: Interest	<u>60,000</u>	<u>60,000</u>
Earnings before taxes	2,16,000	1,04,000
Less: Taxes	<u>75,600</u>	<u>36,400</u>
Earnings after taxes (EAT)	1,40,400	67,600

Number of equity shares	80,000	80,000
EPS	1.76	0.85

Working Notes:

(i) Variable Costs = ₹ 60,000 (total cost – depreciation)

(ii) Variable Costs at:

(a) Sales level, ₹ 4,08,000 = ₹ 72,000 (increase by 20%)

(b) Sales level, ₹ 2,72,000 = ₹ 48,000 (decrease by 20%)

3. Total Assets = ₹ 20 crores

Total Asset Turnover Ratio = 2.5

Hence, Total Sales = $20 \times 2.5 = ₹ 50$ crores

Computation of Profit after Tax (PAT)

	(₹ in crores)
Sales	50.00
Less: Variable Operating Cost @ 65%	<u>32.50</u>
Contribution	17.50
Less: Fixed Cost (other than Interest)	<u>4.00</u>
EBIT	13.50
Less: Interest on Debentures (15% × 10)	<u>1.50</u>
PBT	12.00
Less: Tax @ 30%	<u>3.60</u>
PAT	<u>8.40</u>

(i) Earnings per Share

$$\text{EPS} = \frac{8.40 \text{ crores}}{\text{Number of Equity Shares}} = \frac{8.40 \text{ crores}}{50,00,000} = ₹ 16.80$$

It indicates the amount the company earns per share. Investors use this as a guide while valuing the share and making investment decisions. It is also a indicator used in comparing firms within an industry or industry segment.

(ii) Operating Leverage

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT}} = \frac{17.50}{13.50} = 1.296$$

It indicates the choice of technology and fixed cost in cost structure. It is level specific. When firm operates beyond operating break-even level, then operating leverage is low. It indicates sensitivity of earnings before interest and tax (EBIT) to change in sales at a particular level.

(iii) Financial Leverage

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{PBT}} = \frac{13.50}{12.00} = 1.125$$

The financial leverage is very comfortable since the debt service obligation is small vis-à-vis EBIT.

(iv) Combined Leverage

$$\text{Combined Leverage} = \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{PBT}}$$

Or,

$$= \text{Operating Leverage} \times \text{Financial Leverage}$$

$$= 1.296 \times 1.125 = 1.458$$

The combined leverage studies the choice of fixed cost in cost structure and choice of debt in capital structure. It studies how sensitive the change in EPS is vis-à-vis change in sales. The leverages operating, financial and combined are used as measurement of risk.

4.

Operating Leverage:	Situation-I	Situation-II
	₹	₹
Sales (S)	90,000	90,000
3000 units @ ₹ 30/- per unit		
Less: Variable Cost (VC) @ ₹ 15 per unit	45,000	45,000
Contribution (C)	45,000	45,000
Less: Fixed Cost (FC)	15,000	20,000
Operating Profit (OP)	30,000	25,000
(EBIT)		

(i) Operating Leverage

$$\frac{C}{OP} = \frac{\text{₹ } 45,000}{30,000} = 1.5$$

$$\frac{\text{₹ } 45,000}{25,000} = 1.8$$

(ii) Financial Leverages

	A ₹	B ₹
Situation I		
Operating Profit (EBIT)	30,000	30,000
Less: Interest on debt	2,000	1,000
PBT	28,000	29,000

$$\text{Financial Leverage} = \frac{OP}{PBT} = \frac{\text{₹ } 30,000}{28,000} = 1.07 \quad \text{₹ } \frac{30,000}{29,000} = 1.034$$

	A (₹)	B (₹)
Situation-II		
Operating Profit (OP) (EBIT)	25,000	25,000
Less: Interest on debt	2,000	1,000
PBT	23,000	24,000

$$\text{Financial Leverage} = \frac{OP}{PBT} = \frac{\text{₹ } 25,000}{23,000} = 1.09 \quad \text{₹ } \frac{25,000}{24,000} = 1.04$$

(iii) Combined Leverages

	A	B
Situation-I		
FL x OL	(1.5 × 1.07) = 1.61	1.5 × 1.034 = 1.55
Situation-II		
FL x OL	1.8 × 1.09 = 1.96	1.8 × 1.04 = 1.872