

# LEVERAGES

## Question No. (1)

The data relating to two Companies are as given below:

PARTICULAR	COMPANY A	COMPANY B
Equity Capital	₹ 6,00,000	₹ 3,50,000
12% Debentures	₹ 4,00,000	₹ 6,50,000
Output (unit) per annum	60,000	15,000
Selling price / unit	₹ 30	₹ 250
Fixed Costs per annum	₹ 7,00,000	₹ 14,00,000
Variable Cost per unit	₹ 10	₹ 75

You are required to calculate the Operating, Financial and Combined Leverage of two Companies.

### Answer

#### Income statement

	COMPANY A	COMPANY B
Selling	18,00,000	37,50,000
Variable cost	6,00,000	11,25,000
<b>Contribution</b>	<b>12,00,000</b>	<b>26,25,000</b>
Fixed Costs per annum	7,00,000	14,00,000
EBIT	<b>5,00,000</b>	<b>12,25,000</b>
Interest	48,000	78,000
<b>EBT</b>	<b>4,52,000</b>	<b>11,47,000</b>
OL	2.40	2.14
FL	1.11	1.07
CL	2.65	2.29

## Question No. (2)

A company operates at a production level of 1,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, combined leverage is 24. If tax rate is 30%, what would be its earnings, after tax?

### Answer

Contribution            1,000 x 60            60,000

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$$OL = \text{Contribution} / \text{EBIT}$$

$$\text{EBIT} = C / OL = 60,000 / 6 = 10,000$$

$$CL = \text{Contribution} / \text{EBT}$$

$$\text{EBT} = \text{Contribution} / CL = 60,000 / 24 = 2500$$

$$\text{EAT} = 2500 - 30\% = 1,750$$

## Question No. (3)

The following data relate to RT Ltd. Calculate Combined Leverage.

PARTICULAR	₹
Earnings before interest and tax (EBIT)	10,00,000
Fixed Cost	20,00,000
Earning before tax (EBT)	8,00,000

## Answer

Contribution (b/f)	30,00,000
Fixed Costs per annum	20,00,000
EBIT	10,00,000
Interest (b/f)	2,00,000
EBT	8,00,000

$$CL = 3.75$$

## Question No. (4)

A firm has sales of ₹ 40 lakhs, Variable cost of ₹ 25 Lakhs, Fixed Cost of ₹ 6 lakh; 10% debt of ₹ 30 Lakhs; and equity Capital of ₹ 45 Lakhs. Calculate operating and financial leverage.

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## Answer

### Income statement

Selling	40,00,000
Variable cost	25,00,000
<b>Contribution</b>	<b>15,00,000</b>
Fixed Costs per annum	6,00,000
EBIT	<b>9,00,000</b>
Interest	3,00,000
<b>EBT</b>	<b>6,00,000</b>

OL	1.67
FL	1.50

### Problem No. (5)

The capital structure of the Progressive Corporation Ltd. consists of an ordinary share capital of ₹ 10,00,000 (shares of ₹ 100 per value) and ₹ 10,00,000 of 10% Debentures. The unit sales increased by 20% from 1,00,000 units to 1,20,000 units, the selling price is ₹ 10 per unit, variable costs amount to ₹ 6 per unit and fixed expenses amount to ₹ 2,00,000. The income tax rate is assumed to be 35 %.

- a. You are required to calculate the following:
- The percentage increase in earnings per share
  - The degree of financial leverage at 1,00,000 units and 1,20,000 units.
  - The degree of operating leverage at 1,00,000 units and 1,20,000 units.
- b. Comment on the behavior of operating and financial leverage in relation to increase of production from 1,00,000 to 1,20,000 units.

## Answer

	Standard	Increase by 20%
Sales	10,00,000	12,00,000
(-)variable cost	6,00,000	7,20,000
Contribution	<b>4,00,000</b>	<b>4,80,000</b>
(-)fixed cost	2,00,000	2,00,000
EBIT	<b>2,00,000</b>	<b>2,80,000</b>

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(-)Interest	1,00,000	1,00,000
EBT	<b>1,00,000</b>	<b>1,80,000</b>
-Tax @ 35%	35,000	63,000
EAT	<b>65,000</b>	<b>1,17,000</b>
÷ No. of shares	10,000	10,000
EPS	<b>6.5</b>	<b>11.7</b>

i) % increase in EPS =  $\frac{11.7 - 6.5}{6.5} \times 100$   
= 80%

ii)

$$F.L = \frac{EBIT}{EBT}$$

=	$\frac{2,00,000}{1,00,000}$	$\frac{2,80,000}{1,80,000}$
=	<b>2</b>	<b>1.56</b>

iii)

$$O.L = \frac{\text{Contribution}}{EBIT}$$

	for 1,00,000 units	for 1,20,000 units
=	$\frac{4,00,000}{2,00,000}$	$\frac{4,80,000}{2,80,000}$
=	<b>2</b>	<b>1.71</b>

**Comment :** Operating and financial leverage reduced from 2 to 1.56 and 2 to 1.71 because of the increase of production from 1,00,000 to 1,20,000 units, hence the risk of the co. is reduced.

### Problem No.(6)

Prepare Income Statements for A, B and C Companies.

PARTICULAR	A	B	C
Variable expenses as a percentage of sales	66.67	75	50
Interest expenses (₹)	200	300	1,000

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Degree of Operating Leverage	5	6	2
Degree of Financial leverage	3	4	2
Income tax Rate	0.35	0.35	0.35

**Answer**

### Income statement

Particulars	A	B	C
sales	4,500	9,600	8,000
(-)variable cost	3,000	7,200	4,000
contribution	1,500	2,400	4,000
(-)fixed cost	1,200	2,000	2,000
EBIT	300	400	2,000
(-)Interest	200	300	1,000
EBT	100	100	1,000
-Tax	35	35	350
EAT	65	65	650

**Working note:**

$$F.L = \frac{EBIT}{EBIT - Int}$$

**A**

$$3 = \frac{EBIT}{EBIT - 200}$$

$$3EBIT - 600 = EBIT$$

$$2EBIT = 600$$

$$EBIT = 300$$

**B**

$$4 = \frac{EBIT}{EBIT - 300}$$

$$4EBIT - 1200 = EBIT$$

$$3EBIT = 1200$$

$$EBIT = 1200/3 = 400$$

**C**

$$2 = \frac{EBIT}{EBIT - 1000}$$

$$2EBT - 2000 = EBIT$$

$$EBIT = 2000$$

$$O.L = \frac{Contribution}{EBIT}$$

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## Company A

$$5 = \frac{\text{Contribution}}{300}$$

$$\text{con} = 300 * 5 = 1500$$

## Company B

$$6 = \frac{\text{Contribution}}{400}$$

$$\text{con} = 400 * 6 = 2400$$

## Company C

$$2 = \frac{\text{Contribution}}{2000}$$

$$\text{con} = 2000 * 2 = 4000$$

$$\text{sales} = \frac{\text{Con} * 100}{\% \text{ of con}}$$

$$\text{comp A} = \frac{1500 * 100}{33.33} = 4,500$$

$$\text{comp B} = \frac{2400 * 100}{25} = 9,600$$

$$\text{comp C} = \frac{4000 * 100}{50} = 8,000$$

### Problem No. 7

From the following Financial data of Company A and Company B, Prepare the Income Statement:

PARTICULAR	Company A	Company B
Variable Cost (₹ )	56,000	60% of Sales
Fixed Cost (₹ )	20,000	--
Interest expenses (₹ )	12,000	9,000
Financial Leverage	5 : 1	--
Operating Leverage	--	4 : 1

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Income tax rate	30%	30%
Sales	--	1,05,000

**Answer**

## **Income Statement**

Particulars	Com A	Com B
sales	91,000	1,05,000
(-)variable cost	56,000	63,000
contribution	35,000	42,000
(-)fixed cost	20,000	31,500
EBIT	15,000	10,500
(-)Interest	12,000	9,000
EBT	3,000	1,500
-Tax	900	450
EAT	2,100	1,050

**Working:**

**Company A**

$$F.L = \frac{EBIT}{EBIT - Int}$$

$$5 = \frac{EBIT}{EBIT - 12000}$$

$$5EBIT - 60,000 = EBIT$$

$$4EBIT = 60,000$$

$$EBIT = 15,000$$

$$Con = EBIT + Fixed cost$$

$$= 15,000 + 20,000$$

$$= 35,000$$

$$Sales = 35,000 + 56,000$$

$$= 91,000$$

**Company B**

Contributio

$$O.L = \frac{n}{EBIT}$$

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$$4 = \frac{42,000}{\text{EBIT}}$$

$$4\text{EBIT} = 42,000$$

$$\text{EBIT} = 42,000/4$$

$$\text{EBIT} = 10,500$$

## Problem No.8

Calculate operating leverage and financial leverage under situations A, B and C and financial plans 1, 2 and 3 respectively of XYZ Ltd.

PARTICULAR		Amount		
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		
<b>Capital Structure:</b>		<b>Financial Plan</b>		
		<b>1</b>	<b>2</b>	<b>3</b>
Equity		₹ 5,000	₹ 7,500	₹ 2,500
Debt (interest 12%)		5,000	2,500	7,500

**Answer**

### Income statement

	Situation A	Situation B	Situation C
Sales	12,000	12,000	12,000
(-)variable cost	8,000	8,000	8,000



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contribution	4,000	4,000	4,000
(-)fixed cost	1,000	2,000	3,000
EBIT	3,000	2,000	1,000
(-)Interest	600	300	900
<b>EBT</b>	<b>2,400</b>	<b>1,700</b>	<b>100</b>

### Under situation A

$$O.L = \frac{\text{Contribution}}{\text{EBIT}}$$

$$\text{Plan 1: } \frac{4,000}{3,000} = 1.33$$

$$\text{Plan 2: } \frac{4,000}{2,000} = 2$$

$$\text{Plan 3: } \frac{4,000}{1,000} = 4$$

$$F.L = \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Plan 1: } \frac{3,000}{2,400} = 1.25$$

$$\text{Plan 2: } \frac{3,000}{2,700} = 1.11 \quad (3,000 - 300 = 2,700)$$

$$\text{Plan 3: } \frac{3,000}{2,100} = 1.43 \quad (3,000 - 900 = 2,100)$$

### Financial leverage under situation B

$$\text{Plan 1: } \frac{2,000}{1,400} = 1.43 \quad (2,000 - 600 = 1,400)$$

$$\text{Plan 2: } \frac{2,000}{1,700} = 1.18$$

$$\text{Plan 3: } \frac{2,000}{1,100} = 1.82$$

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$$1,100 \quad (2,000 - 900 = 1,100)$$

## Financial leverage under situation C

$$\text{Plan 1: } \frac{1,000}{400} = 2.5 \quad (1,000 - 600)$$

$$\text{Plan 2: } \frac{1,000}{700} = 1.43 \quad (1,000 - 300)$$

$$\text{Plan 3: } \frac{1,000}{100} = 10 \quad (1,000 - 900)$$

### Problem No.9

(a) Find out Operating Leverage from the following data:

PARTICULAR	Amount
Sales	₹ 50,000
Variable Costs	60%
Fixed Costs	₹ 12,000

(b) Find out the Financial leverage from the following data:

PARTICULAR	Amount
Net worth	₹ 25,00,000
Debt / Equity	3 : 1
Interest Rate	12%
Operating Profit	₹ 20,00,000

### Answer

Sales	50,000
(-)VC @ 60%	<u>30,000</u>
Contribution	20,000
(-)Fixed cost	<u>12,000</u>
EBIT	<u>8,000</u>

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$$\begin{aligned} \text{O.L} &= \frac{\text{Contribution}}{\text{EBIT}} \\ &= \frac{20,000}{80,000} \\ &= 2.5 \end{aligned}$$

## b) Calculation of Financial leverage

$$\begin{aligned} \text{F.L} &= \frac{\text{EBIT}}{\text{EBT}} \\ &= \frac{20,00,000}{11,00,000} \\ &= 1.82 \end{aligned}$$

**Net worth = Equity = 25,00,000**  
 So, Debt = 25 L \* 3 = 75 L  
 Int = 75 L \* 12%  
 = 9,00,000  
 EBT = 20,00,000 - 9,00,000  
 = 11,00,000

### Problem No.10

The following details of RST Limited for the year ended 31<sup>st</sup> March, 2013 are given below:

PARTICULAR	Amount
Operating Leverage	1.4
Combined Leverage	2.8
Fixed cost (excluding Interest)	₹ 2.04 Lakhs
Sales	₹ 30.00 Lakhs
12% Debenture of ₹ 100 each	₹ 21.25 Lakhs
Equity share capital of ₹ 10 each	₹ 17.00 Lakhs
Income tax rate	30 percent

Required:

- (i) Calculate financial leverage
- (ii) Calculate P / v ratio and earning per share

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- (iii) If the company belongs to an industry, whose assets turnover ratio is 1.5, does it have a high or low assets leverage?

At what level of sales the earning before tax (EBT) of the company will be equal to zero?

**Answer**

$$\text{O.L} = 1.4 \qquad \text{C.L} = 2.8$$

**i)**

$$\text{C.L} = \text{O.L} * \text{F.L}$$

$$\text{F.L} = \frac{\text{C.L}}{\text{O.L}}$$

$$= \frac{2.8}{1.4}$$

$$\text{F.L} = 2$$

**ii)**

Calculation of PV ratio

$$\text{PV} = \frac{\text{Contribution}}{\text{sales}} * 100$$

$$\text{O.L} = \frac{\text{Contribution}}{\text{EBIT}}$$

$$1.4 = \frac{\text{Contribution}}{\text{con} - \text{F.C}*(2,04,000)}$$

$$\text{con} = 1.4 \text{ con} - 2,85,600$$

$$\text{con} - 1.4\text{con} = 2,85,600$$

$$0.4\text{con} = 2,85,600$$

$$\text{c} = \frac{2,85,600}{0.4}$$

$$= 7,14,000$$

$$\text{PV ratio} = \frac{7,14,000}{30,00,000} * 100$$

$$= 23.80\%$$

$$\text{EPS} = \frac{\text{Earnings available to ESH}}{\text{Number of Shares}}$$

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	No. of equity shares
Sales	30,00,000
(-)variable cost	22,86,000
contribution	7,14,000
(-)fixed cost	2,04,000
EBIT	5,10,000
(-)Interest	2,55,000
EBT	2,55,000
-Tax @ 30%	76,500
EAT	1,78,500
÷ No. of shares	1,70,000
EPS	1.05

iii)

$$\text{A.L ratio} = \frac{\text{Sales}}{\text{Total assets}} * 100$$

$$\frac{30,00,000}{38,25,000}$$

$$= 0.78$$

Industry asset turnover ratio = 1.5

So company has **LOW** ATR = 0.78

iv)

When contribution = Fixed cost + Interest  
then EBT will be zero

sales	19,28,751	% VC =	22,86,000	*100
(-)variable cost	14,69,571		30,00,000	
contribution	4,59,180			
(-)fixed cost	2,04,000	=	76.20%	=23.8%
EBIT	2,55,180		100 - 76.2%	
(-)Interest	2,55,180			
EBT	-	sales =	4,59,000 * 100	
			23.80%	

Sales = Rs. 19,28,571

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## Problem No.11

The following is the income statement of XYZ Ltd for the year 2013:

PARTICULAR	Amount
Sales	₹ 50 Lacs
- Variable Cost	10 lacs
- Fixed Cost	20 lacs
EBIT	20 lacs
- Interest	5 lacs
Profit before tax	15 lacs
- Tax at 40%	6 lacs
Profit after tax	9 lacs
- Preference dividend	1 lacs
Profit for equity shareholder	8 lacs

The company has 3 lacs equity shares issued to the shareholders. Find out the degree of (i) Operating leverage, (ii) Financial Leverage, and (iii) Combined leverage. What would be the EPS if the sales level increases by 10%.

### Answer

Particulars	Present sales	10% in sales
sales	50,00,000	55,00,000
(-)variable cost	10,00,000	11,00,000
contribution	40,00,000	44,00,000
(-)fixed cost	20,00,000	20,00,000
EBIT	20,00,000	24,00,000
(-)Interest	5,00,000	5,00,000
EBT	15,00,000	19,00,000
-Tax @ 40%	6,00,000	7,60,000
EAT	9,00,000	11,40,000
- Pref Div	1,00,000	1,00,000
Earning to ESH	8,00,000	10,40,000

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$$O.L = \frac{\text{Contribution}}{\text{EBIT}} = \frac{40,00,000}{20,00,000} = 2$$

$$F.L = \frac{\text{EBIT}}{\text{EBIT} - \text{Int} - (\text{Pref. div} / 1-t)} = \frac{20,00,000}{20 \text{ L} - 5 \text{ L} - (1 \text{ L} / 0.6)} = 1.5$$

$$C.L = \frac{\text{Contribution}}{\text{EBIT} - \text{Int} - (\text{Pref. div} / 1-t)} = \frac{40,00,000}{20 \text{ L} - 5 \text{ L} - (1 \text{ L} / 0.6)} = 3$$

$$\text{Old EPS} = \frac{\text{Earning to ESH}}{\text{E.S.C}} = \frac{8,00,000}{4,00,000} = 2$$

$$\text{New EPS} = \frac{10,40,000}{4,00,000} = 2.60$$

Therefore, change in % in EPS  
=  $\frac{(2.6-2)}{2} * 100$   
= 30%

30% increase in new EPS

## Problem No.12

The Sale revenue of TM excellence Ltd. @ ₹ 20 Per unit of output is ₹ 20 lakhs and Contribution is ₹ 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** (it means EPS become zero when sales are reduced by 25%)?

### Answer

**i) Calculation of Fixed Cost**

$$OL = \text{Contribution} / \text{EBIT};$$

$$2.5 = 10 \text{ L} / \text{EBIT};$$

$$\text{EBIT} = 10 \text{ L} / 2.5 = ₹ 4,00,000;$$

$$\text{So fixed cost} = \text{Contribution} - \text{EBIT} = 10 \text{ L} - 4 \text{ L} = ₹ 6,00,000;$$

**ii) Calculation of FL:**

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

$$CL = \% \text{ change in EPS} / \% \text{ change in Sales} = 100 / 25 = 4$$

$$FL = CL / OL = 4 / 2.5 = 1.6$$

### iii) **Calculation of Interest**

$$FL = EBIT / EBT = 1.6$$

$$4,00,000 / EBT = 1.6$$

$$EBT = 4,00,000 / 1.6 = ₹ 2,50,000$$

$$\text{So, Interest} = EBIT - EBT = ₹ 4,00,000 - ₹ 2,50,000 = ₹ 1,50,000;$$

$$\text{Interest rate is 16\%, Hence, Debt amount} = ₹ 1,50,000 / 16\% = ₹ 9,37,500;$$

### iv) **Calculation of EPS**

$$EAT = EBT (1-t) = 2,50,000 (1-0.5) = ₹ 1,25,000$$

No. of shares = 1 lakh

$$EPS = ₹ 1,25,000 / 1,00,000 = ₹ 1.25$$