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LEVERAGE

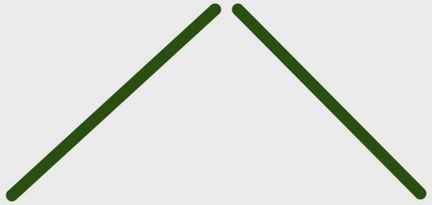
Concepts + Question 1-7

What is LEVERAGE?

- Leverage helps in calculating the **RISK** of a business.
  Higher the leverage, Greater the risk.

- Risk can be either **OPERATING** risk (related to the fixed cost) or the **FINANCIAL RISK** (related to the interest cost on loan)

LEVERAGE CHECKS RISK



OPERATING RISK + FINANCIAL RISK = TOTAL RISK

LEVERAGE

Leverages are of 3 types and are ascertained through the formula which are as follows.

OPERATING LEVERAGE

$$\frac{\text{CONTRIBUTION}}{\text{EBIT}}$$

FINANCIAL LEVERAGE

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

COMBINED LEVERAGE

$$\frac{\text{CONTRIBUTION}}{\text{EBT}}$$

To get the figures of Contribution, EBIT and EBT, We need to prepare Income Statement which is as follows:-

INCOME STATEMENT	
SALES	
LESS: VARIABLE COST	
CONTRIBUTION	
LESS: FIXED COST	
EARNING BEFORE INTEREST AND TAX (EBIT)	
LESS: INTEREST	
EARNING BEFORE TAX	
LESS: TAX	
EARNING AFTER TAX (EAT)	

Let’s see how Leverage actually checks the risk.

	CASE 1		CASE 2		CASE 3		CASE 4
Sales	100,000		100,000		100,000		100,000
Less: VC	40,000		40,000		40,000		40,000
Contribution	60,000		60,000		60,000		60,000
Less: Fixed Cost	0		20,000		30,000		40,000
EBIT	60,000		40,000		30,000		20,000
Less: Interest	0		10,000		15,000		18,000
EBT	60,000		30,000		15,000		2,000

OL	60,000 / 60,000	1 times	60,000 / 40,000	1.50 time	60,000 / 30,000	2 times	60,000 / 20,000	3 times
FL	60,000 / 60,000	1 times	40,000 / 30,000	1.33 time	30,000 / 15,000	2 times	20,000 / 2,000	10 times
CL	60,000 / 60,000	1 times	60,000 / 30,000	2 time	60,000 / 15,000	4 times	60,000 / 2,000	30 times

- Case 1 is the best scenario-
  NO Fixed cost and Interest cost. Hence OL, FL, CL all are 1

- As the figures of Fixed cost and Interest cost are rising from Case 2-4, OL, FL, CL all are increasing.

- Case 4 has the highest risk and so as the Leverage.

- We can understand this more through the following:-

What does OL =1, indicates

OL of 1 indicates that the contribution and the EBIT are equal
i.e. there is no fixed cost.

CONTRIBUTION	100,000
Less: Fixed cost	-
EBIT	100,000
$OL = \frac{CONTRIBUTION}{EBIT}$	$= \frac{100,000}{100,000}$ = 1 times
Best scenario as No operating risk.	

CONTRIBUTION	100,000
Less: Fixed cost	80,000
EBIT	20,000
$OL = \frac{CONTRIBUTION}{EBIT}$	$= \frac{100,000}{20,000}$ = 5 times
Very Bad scenario.	

If we divide 100%/ 5 times
we get 20%, which states that 80% of the contribution is spent towards the fixed cost.

OL of 1 times is the best scenario while the more is the number, the greater is the risk.

For E.g. OL of 10 times states that 100%/10 = 10% which means 90% of the contribution has gone towards the fixed cost and the EBIT left is just the 10%

- QUESTIONS

Q1:- From the following data is available find out:

1. Using the concept of Operating leverage, by what % will EBIT increase if there is 10% increase in sales?
2. Using the concept of Financial leverage, by what % will the taxable income will increase if there is 6% increase in EBIT?
3. Using the concept of Combined Leverage, by what % will the taxable income increase if the sales increase by 8%? Also verify the results.

Sales	200,000
Variable cost	(50,000)
Contribution	150,000
Fixed cost	(100,000)
EBIT	50,000
Interest	(10,000)
EBT	40,000

Solution

Calculating the Leverage:-

Sales	200,000
Less: VC	50,000
Contribution	150,000
Less: Fixed Cost	100,000
EBIT	50,000
Less: Interest	10,000
EBT	40,000
OL = Contribution/EBIT	3.00
FL = EBIT/ EBT	1.25
CL = Contribution/EBT or OL × FL	3.75

OL = %Change in EBIT/ % Change in Sales	
3 = %Change in EBIT/ 10%	
%Change in EBIT = 30%	Part-1
FL= % Change in EBT / % Change in EBIT	
1.25 = % Change in EBT/ 6%	
%Change in EBT = 7.5%	Part-2
CL= % Change in EBT / % Change in Sales	
3.75 =% Change in EBT/ 8%	
%Change in EBT = 30%	Part-3

Q-2:- Annual sales of the company are 60 lacs

- The Sales to variable cost ratio is 150%.
- Fixed cost other than interest is 500,000 p.a.
- Company has 11% debentures for 30 lacs.

Find out all the leverage.

Notes for Q 2:-

$$\frac{\text{SALES}}{\text{VARIABLE COST}} = 150\% \text{ (Given)}$$

$$\text{SALES} = 150\ \%\ \text{OF VC}$$

$$\text{VC} = \frac{\text{SALES}}{150\%} = \frac{60{,}00{,}000}{150\%} = 40{,}00{,}000$$

Solution

Sales	6,000,000
Less: VC	4,000,000
Contribution	**2,000,000**
Less: Fixed Cost	500,000
EBIT	**1,500,000**
Less: Interest	330,000
EBT	**1,170,000**
OL =	1.33
FL =	1.28
CL =	1.71

20,00,000 / 15,00,000
1500,000 / 11,70,000
2000,000 / 11,70,000

Q3:-

A firm has a Sales of Rs. 75, 00,000, Variable cost-42, 00,000 & Fixed cost -600,000. It has a debt of 45, 00,000 at 9% & Equity of Rs. 55, 00,000.

- What is the OL, FL &CL
- If the Sales drop to 50,00,000, what will be the new EBIT.
- At what level of sales, the EBT of the Firm will be equal to zero.

Solution

Sales	75,00,000
Less: VC	42,00,000
Contribution	**33,00,000**
Less: Fixed Cost	600,000
EBIT	**27,00,000**
Less: Interest	405,000
EBT	**22,95,000**
OL	**1.22**
FL	**1.18**
CL	**1.44**

Sales	50,00,000
Less: VC	28,00,000
Contribution	**22,00,000**
Less: Fixed Cost	6,00,000
EBIT	**1600,000**

*Variable cost on Sales of 50 lacs:-

$\frac{42}{75} \times 50 = 28$ lacs

Sales	22,92,000
Less: VC	12,83,520
Contribution	10,08,480
Less: Fixed Cost	6,00,000
EBIT	4,08,480
Less: Interest	4,05,000
EBT	3,480
When sales dropped by 69.44% EBT will be NIL	

$$\textbf{CL} = \frac{\textbf{\% Change in EBT}}{\textbf{\% Change in Sales}}$$

$$1.44 = \frac{100\%}{\text{\% Change in Sales}}$$

$$\text{\% Change in Sales} = \frac{100\%}{1.44} = \textbf{69.44\%}$$

New Sales =75 (100-69.44)% = 22.92 lacs

Sales	22,92,000
Less: VC	12,83,520
Contribution	10,08,480
Less: Fixed Cost	6,00,000
EBIT	4,08,480
Less: Interest	4,05,000
EBT	3,480
When sales dropped by 69.44% EBT will be NIL	

*Variable cost on Sales of 22.92 lacs:-

$\frac{42}{75} \times 22.92 = 12.8352$ lacs

Ques.-4

Prepare Income statement of the following three Co's: A, B and C

	A	B	C
VC as % of Sales	66.667	75	50
Interest	200	300	1000
OL	5	6	2
FL	3	4	2
Tax rate	0.4	0.4	0.4

Calculating fig for CASE 1:-

$$FL = \frac{EBIT}{EBT} = \frac{EBIT}{EBIT - INTEREST}$$

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

$$3\,EBIT - 600 = EBIT$$

$$EBIT = 300$$

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

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

$$=5\times300 = \text{Contribution} = 1{,}500$$

VC = 66.67 % of Sales

That means Contribution = 33.33% of Sales as Sales –VC = Contribution

$$\text{Sales} = \frac{\text{Contribution}}{33.33\%} = \frac{1{,}500}{33.33\%} = \mathbf{4{,}500}$$

	CASE 1		CASE 2		CASE 3
Sales	4,500		9,600		8,000
Less: VC	3,000		7,200		4,000
Contribution	1,500		2,400		4,000
Less: Fixed Cost	1,200		2,000		2,000
EBIT	300		400		2,000
Less: Interest	200		300		1,000
EBT	100		100		1,000
Less: Tax	40		40		400
EAT	60		60		600

Calculating fig for CASE 1:-

$$FL = \frac{EBIT}{EBT} = \frac{EBIT}{EBIT - INTEREST} = 3 = \frac{EBIT}{EBIT - 200}$$

$$3\,EBIT - 600 = EBIT$$

$$EBIT = 300$$

Q5:- Following is the balance sheet:

Equity	1,000,000	Fixed assets	3,000,000
General reserve	200,000	Current assets	1,800,000
15% Debentures	2,800,000		
Current liabilities	800,000		
	4,800,000		**4,800,000**

- Annual fixed cost other than interest-28, 00,000
- VC ratio-60%
- Total assets turnover ratio-2.5
- Tax-30%.

Calculate EPS & CL

Solution

Sales	12,000,000
Less: VC	7,200,000
Contribution	4,800,000
Less: Fixed Cost	2,800,000
EBIT	2,000,000
Less: Interest	420,000
EBT	1,580,000
Less: Tax	474,000
EAT	1,106,000

$$\text{Asset Turnover Ratio} = \frac{\text{Sales}}{\text{Total Assets}} = 2.5$$

Sales = 48 LACS × 2.5 = 120 Lacs

$$EPS = \frac{EAT}{\text{No. of Equiy Shares}} = \frac{1106,000}{100,000} \quad \textbf{=11.06}$$

COMBINED LEVERAGE

$$= \frac{\text{Contribution}}{EBT} = \frac{48,00,000}{1580,000} \quad =3.04$$

Q6:- Calculate OL, FL & CL under situation I & II & Financial Plan A & B

Installed capacity	4,000 units
Actual production & sales	75% of the capacity
SP	30 per unit
Variable cost	15 per unit
Fixed cost:	
Under Situation I	15,000
Under Situation II	20,000

	Capital structure:	
	Plan A	Plan B
Equity	100,000	150,000
10% Debt	100,000	50,000

Situation 1: When Fixed cost is 15,000		
	Plan A	Plan B
Sales	90,000	90,000
Less: VC	45,000	45,000
Contribution	45,000	45,000
Less: Fixed Cost	15,000	15,000
EBIT	30,000	30,000
Less: Interest	10,000	5,000
EBT	20,000	25,000

$$OL = \frac{\text{Contribution}}{\text{EBIT}} = \frac{45,000}{30,000} = 1.5 \text{ times}$$

$$FL = \frac{EBIT}{EBT} = \frac{30,000}{20,000} = 1.50,\ FL = \frac{30,000}{25,000} = 1.20$$

Situation 2: When Fixed cost is 20,000		
	Plan A	Plan B
Sales	90,000	90,000
Less: VC	45,000	45,000
Contribution	45,000	45,000
Less: Fixed Cost	20,000	20,000
EBIT	25,000	25,000
Less: Interest	10,000	5,000
EBT	15,000	20,000

$$OL = \frac{\text{Contribution}}{\text{EBIT}} = \frac{45,000}{25,000} = 1.8 \text{ times}$$

$$FL = \frac{EBIT}{EBT} = \frac{25,000}{15,000} = 1.67,\ FL = \frac{25,000}{20,000} = 1.25$$

Q7:- The Sale revenue of TM excellence Ltd. @ Rs.20 Per unit of output is Rs.20 lacs and Contribution is Rs.10 lacs.

At the present level of output, the OL 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 and amount of Debt Capital of the company if a 25% decline in Sales will wipe out EPS.

Solution

$$OL = \frac{\text{Contribution}}{\text{EBIT}} = 2.5 \text{ (Given)}$$

$$2.5 = \frac{10 \text{ lacs}}{\text{EBIT}}$$

$$EBIT = \frac{10 \text{ lacs}}{2.5} = 4 \text{ lacs}$$

ATQ:

25% decline in Sales will wipe out EPS

i.e. 25% decline in sales will result in

100% change in EPS

$$DCL = \frac{\% \text{ Change in Eps}}{\%\text{Change in Sales}}$$

$$= \frac{100}{25} = 4\text{times}$$

Now DOL × DFL = DCL

$$DFL = \frac{DCL}{DOL} = \frac{4}{2.5} = 1.6 \text{ times}$$

$$FL = \frac{EBIT}{EBT}$$

$$1.6 = \frac{4 \text{ lacs}}{EBT}$$

$$EBT = \frac{4 \text{ lacs}}{1.60} = 2.5$$

Interest = EBIT – EBT

= 4 lacs -2.50 lacs =1.50 lacs

$$\text{Debt} = \frac{\text{Interest}}{\text{rate}} = \frac{150{,}000}{16\%} = 937{,}500$$

$$\text{EPS} = \frac{\text{EAT}}{\text{No. of equity shares}}$$

$$= \frac{250{,}000\ (1 - \text{tax rate})}{100{,}000}$$

$$= \frac{250{,}000\ (1 - 0.50)}{100{,}000} = 1.25$$