Leverage

In general sense the term 'Leverage' means influence of power i.e. utilising the existing strength to attain something else. In financial management, the term leverage means influence of an independent financial variable over a dependent financial variable.

Leverage in financial terms is defined as the employment of an asset or source of funds for which the firm has to pay a fixed cost or fixed return. Consequently, the earnings available to the shareholders, as also the risks involved, are taken into account in calculating degree of leverage.

If earnings less variable costs exceed the fixed cost or, earnings before interest and taxes exceed the fixed return requirement, the leverage is called favourable. When they do not, it results in unfavourable leverage. There are 2 types of leverages —

(i) Operating leverage and (ii) Financial leverage.

Risk Profile of a Firm

A high degree of leverage implies that there will be a significant change in earnings as a result of relatively small change in sales and vice-versa. A high degree of risk leverage also implies higher degree of risk. This risk refers to the degree of uncertainty related with the firm's ability to pay fixed operating cost and fixed interest obligation. The former may be termed as operating risk or business risk and the later may be known as financial risk. Hence, the combined effect of operating and financial risk provides a total risk profile of the firm.

1. <u>Business Risk / Operating Risk</u> — The business risk refers to all those hazards inherent in the operation of the business itself. Hence, it is also referred to as operating risk. Operating risk refers to the variability of EBIT (Earning before Interest and Taxes) as a result of environment in which a company operates.

2. <u>Financial Risk</u> — Financial risk is associated with the financing of the projects. Hence, it is mainly concerned with the financing decision of the firm. Financial risk means the risk of possible insolvency arising out of inadequacy of available cash as well as the variability in the EPS (Earning Per Share).

Different financial variables are shown in the following example —

<u>Income Statement of XYZ Ltd.</u>

Units manufactured and sold (Q)   5,000
Selling price per unit (S)   ₹20
Variable cost per unit (V)   ₹12

(Figures in ₹)

1.	Sales / Total Revenue (Q×S)	1,00,000
2.	Less: Total Variable cost (Q×V)	(60,000)
3.	Contribution (C).	40,000
4.	Less: Fixed Operating Costs (F)	(10,000)
5.	Earnings before Interest & Tax / Operating Profit (EBIT/OP)	30,000
6.	Less: Interest on Debt (I)	(4,000)
7.	Earnings before Tax (EBT)	26,000
8.	Tax [@ 50%] (T)	(13,000)
9.	Earnings after Tax (EAT)	13,000
10.	Less: Preference Dividend (P)	(3,000)
11.	Earnings Available to Equity Shareholders / Equity Earnings (EAES/Ee)	10,000
12.	Number of Equity Shares (N)	2,000
13.	Earnings per share [₹10,000 ÷ 2000 shares] (EPS)	₹5

From the above, we can develop certain relationships among different financial variables —

(i) $EBIT = [(Q \times S) - (Q \times V)] - F = Q \cdot (S-V) - F$

(ii) $EBT = EBIT - I$

(iii) $EAT = (EBIT - I)(1 - T) = EBT(1-T)$

(iv) $EPS = \dfrac{EAT - P}{N} = \dfrac{EBT(1-T) - P}{N}$

$$= \dfrac{[(EBIT - I)(1 - T)] - P}{N}$$

$$= \dfrac{[\{Q(S-V) - F - I\}(1-T)] - P}{N}$$

Operating Leverage

The operating leverage is determined by the relationship between the firm's sales revenues and its earnings before interest and taxes. These earnings before interest and taxes (EBIT) are also known as operating leverage. In other words, operating leverage results from the existence of fixed operating expenses in the firm's income stream. It may be defined as the firm's ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. Operating event occurs at any time when the firm has fixed costs. We will illustrate it with the following example —

E.g: A firm sells products for ₹100/unit, has variable operating cost of ₹50/unit and fixed operating cost of ₹50,000/year. Show the impact on EBIT at various levels —

i) 1000 units   ii) 2000 units   iii) 3000 units

Soln:

EBIT at various Sales levels

Particulars	Present Activity	Case I (-) 50%	Case II (+) 50%
Units manufactured & sold	2,000	1,000	3,000
Sales @ ₹100 p.u.	2,00,000	1,00,000	3,00,000
Less: Variable Cost @ ₹50 p.u.	1,00,000	50,000	1,50,000
Contribution	1,00,000	50,000	1,50,000
Less: Fixed Operating Cost	50,000	50,000	50,000
EBIT	50,000	—	1,00,000
Increase/Decrease in EBIT		(-) 50,000	(+) 50,000
% change in EBIT		-100%	+ 100%

Interpretation of the Table

In Case II, a 50% increase in sales (from 2000 to 3000 units) results in 100% increase in EBIT. Similarly in Case I, a 50% decrease in sales results in a 100% decrease in EBIT. This example clearly shows when a firm has fixed operating cost, an increase in sales volume results in more than a proportionate increase in EBIT. Similarly, a decrease in the level of sales has an exactly opposite effect. This is Operating leverage, the former being the favourable leverage while the latter is unfavourable leverage. Thus leverage can work in both directions.

Illustration 3.

Following particulars are given in respect of two companies producing similar product. Show the impact on Operating Profit/EBIT due to change in activity of sales ($\pm$) 20%.

	ABC LTD.	XYZ LTD.
Units manufactured and Sold	10,000	10,000
Selling Price per unit	₹ 100	₹ 100
Variable Cost per Unit	₹ 50	₹ 50
Fixed Operating Cost p.a.	₹ 2,50,000	₹ 4,00,000

Solution :

Operating profit / EBIT for different sales Levels

Particulars	ABC LTD.			XYZ LTD.		
	Present	Changed Activity		Present	Changed Activity	
	Activity	(–) 20%	(+) 20%	Activity	(–) 20%	(+) 20%
(1) Units manufactured and Sold	10,000	8,000	12,000	10,000	8,000	12,000
	₹	₹	₹	₹	₹	₹
(2) Sales @ ₹ 100 per unit	10,00,000	8,00,000	12,00,000	10,00,000	8,00,000	12,00,000
(3) Less : Variable Cost @ ₹ 50 per unit	5,00,000	4,00,000	6,00,000	5,00,000	4,00,000	6,00,000
(4) Contribution [(2) – (3)]	5,00,000	4,00,000	6,00,000	5,00,000	4,00,000	6,00,000
(5) Less : Fixed Operating Cost	2,50,000	2,50,000	2,50,000	4,00,000	4,00,000	4,00,000
(6) Operating Profit/EBIT	2,50,000	1,50,000	3,50,000	1,00,000	0	2,00,000
(7) Increase (+)/Decrease (–) in EBIT		(–) 1,00,000	(+) 1,00,000		(–) 1,00,000	(+) 1,00,000
(8) % change in EBIT		(–) 40%	(+) 40%		(–) 100%	(+) 100%

Formulae —

Degree of Operating Leverage = % change in EBIT/Operating Profit
(DOL) ÷ % change in Sales

$$[OR],$$

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

where, Contribution = Sales − Variable Cost
and EBIT = Contribution − Operating fixed costs.

Significance

i) DOL represents the percentage change in EBIT due to percentage change in Sales.

ii) With the increase of DOL, operating risk of the firm will be increased i.e. uncontrollable fixed costs will increase. Hence, low DOL is desirable or acceptable.

iii) There is an inverse relationship between DOL and Margin of Safety i.e. $DOL = \dfrac{1}{Margin\ of\ Safety\ Ratio}$

With the increase of Margin of Safety, DOL can be reduced because Break-even Sales / Break-even Point will be reduced.

Break-Even Point (BEP)

It may be defined as that point of sales volume at which Total Revenue = Total Cost. It is a point of no profit, no loss. At this point contribution equals to the fixed costs and

hence it is the point of volume of sales at which operating profit /EBIT is zero. At this point all fixed costs are recovered.

Formulae —

1. Break-even Point (BEP) [in Sales] $= \dfrac{\text{Fixed Cost}}{\text{P/V ratio}}$

where, P/V ratio $=$ Profit-Volume Ratio

$= \dfrac{\text{Contribution}}{\text{Sales}} \times 100$

2. Break-even Point (BEP) [in units] $= \dfrac{\text{Fixed Cost}}{\text{Contribution per unit}}$

Margin of Safety

Any increase in sales over Break-even Sales is known as Margin of Safety.

Formula —

$$\text{Margin of Safety} = \text{Total Sales} - \text{Sales at BEP}$$

$$= \text{Total Sales} - \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{(\text{Total Sales} \times \text{P/V Ratio}) - \text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{\text{Contribution} - \text{Fixed Cost}}{\text{P/V Ratio}}$$

$$= \frac{\text{Operating Profit / EBIT}}{\text{P/V Ratio}}$$

$$\therefore \text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Sales}}$$

$$\boxed{OR},$$

$$= \frac{\text{Operating Profit / EBIT}}{\text{Contribution}}$$

$$\boxed{OR},$$

$$= \frac{1}{\text{DOL}}$$

Illustration 4.

Alpha Ltd.

Installed Capacity (units)	5,000
Units manufactured and sold (Q)	3,000
Selling price per unit (S)	₹ 20
Variable Cost per unit (V)	₹ 15

Calculate the Operating Leverage, Break-Even Point and Margin of Safety Ratio in each of the following three situations :

   I.   When fixed costs are ₹ 5,000

  II.   When fixed costs are ₹ 7,000

 III. When fixed costs are ₹ 12,000

Solution :

Computation of Operating Leverage, Break-Even Point and Margin of Safety Ratio

Particulars	Situations		
	I	II	III
	₹	₹	₹
(1) Total Sales [(Q × S)]	60,000	60,000	60,000
(2) Less : Total Variable Cost [(Q × V)]	45,000	45,000	45,000
(3) Contribution (C)	15,000	15,000	15,000
(4) Less : Operating Fixed Costs	5,000	7,000	12,000
(5) Operating Profit / EBIT	10,000	8,000	3,000
(6) Profit Volume Ratio (P/V Ratio) $\left[\dfrac{Contribution}{Sales} \times 100\right]$	25%	25%	25%
(7) Break-Even Point $\left[\dfrac{Fixed\ Cost}{P/V\ Ratio}\right]$	20,000	28,000	48,000
(8) Degree of Operating Leverage (DOL) $\left[\dfrac{Contribution}{EBIT}\right]$	1·50	1·88	5·00
(9) Margin of Safety Ratio $\left[\dfrac{1}{DOL}\right]$	$66\frac{2}{3}\%$	53%	20%
(10) % of Break-Even sales on total sales $\left[\dfrac{(7)}{(1)} \times 100\right]$	$33\frac{1}{3}\%$	47%	80%

Comments :

From the above illustration it is evident that the degree of operating leverage increases with every increase in fixed cost in the total cost structure of the company. In situation 'III' if sales increase by one rupee, the operating profit would increase by ₹ 5 i.e. by 5 times. In other words, if sales volume

increases by 100%, the operating profit would increase by 500%. This can be verified considering situation 'III' when sales volume increase to 6000 units (i.e., 100%), the Operating Profit/EBIT in such a case will be as follows :

	₹
Total Sales [6000 × ₹ 20]	1,20,000
Less : Total Variable Cost [6000 × ₹ 15]	90,000
Contribution	30,000
Less : Fixed Cost	12,000
Operating Profit/EBIT	18,000

It is clear from the above that if sales volume increases from 3000 units to 6000 units i.e., by 100%,

the Operating Profit would increase from ₹ 3000 to ₹ 18,000 i.e., by 500% $\left[\frac{(18,000-3000)}{3,000} \times 100 \right]$

This involves a greater amount of risk because if sales happen to decrease by 100%, the Operating Profit will come down by 500%.

We know that operating leverage is a reciprocal of margin of safety ratio. In situation I, margin of

safety ratio is $66\frac{2}{3}$%. It indicates, the firm can afford to lose it sales upto $66\frac{2}{3}$% before it reaches

the break-even point. But in situation III, margin of safety ratio is only 20% which means this situation does not provide enough support in respect of variation of sales. In other words, if sales reduced by more than 20% in situation III, the firm will be in the red. This happens due to existence of high operating fixed cost resulting in lower margin of safety. A low operating leverage in situation I provides more safety in respect of variation of sales as margin of safety is pretty high but it makes unable the firm for using fixed operating costs to magnify the effects of changes in sales on its EBIT.

5.5.2. Advantages of Operating Leverage

(i) DOL is a measure of the firm's business risk. Business risks refers to the uncertainty or variability of the firm's EBIT. Hence, other things remaining unchanged, a higher DOL means higher business risk and *vice-versa*.

(ii) It helps us to understand the impact of change in sales on operating income of the firm. If a firm has a high degree of operating leverage, a small change in sales will have a large effect on operating income.

(iii) It enables us to make production planning proper. Any new method of production which requires a large amount of fixed operating costs, increases DOL and is justified only if there is a possibility of a very high sales so that the firm enjoys the increased EBIT of increased DOL.

5.5.3. Disadvantages of Operating Leverage

(i) DOL is undefined at the operating break-even point. It means, if the firm is operating at break-even-level, the contribution is equal to the fixed cost and the EBIT is zero. At that stage the DOL for the firm cannot be defined, i.e., at break-even level,

$$DOL = \frac{Contribution = fixed\ cost}{EBIT} = \frac{Contribution}{0} = undefined.$$

(ii) In most cases companies do not like operating leverage. This is a very risky situation because a small decrease in sales can significantly damage the endeavour of a business firm to increase