

FINANCING DECISION

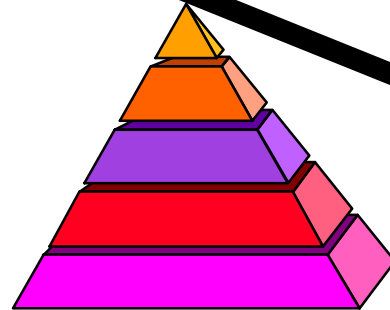
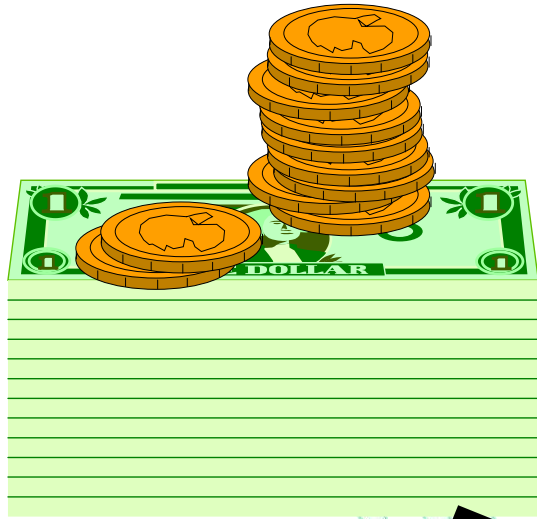
LEVERAGE

By

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What is Leverage?



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1. LEVERAGE

TOPICS COVERED IN THIS SESSION :

- LEVERAGE: DEFINITION
- OPERATING LEVERAGE
- DEGREE OF OPERATING LEVERAGE
- FINANCIAL LEVERAGE
- DEGREE OF FINANCIAL LEVERAGE
- COMBINED/ TOTAL LEVERAGE
- DEGREE OF TOTAL LEVERAGE

Introduction

- It has been explained from Cost of Capital chapter that a company can raise funds required for investment either by increasing the owners' claims or the creditors' claims or both.

The claims of owners increase when the company raises funds by issuing equity shares or ploughs back its earnings.

The claims of the creditors increase when the funds are raised by borrowings. The various means used to raise the funds represent the financial or capital structure of the company.

- It influences the debt-equity mix of the company, which ultimately affects the shareholders' return and risk.

- In case the borrowed funds are more as compare to the owners' funds, it results in increase in shareholders' earnings together with increase in their risk. This is because the cost of borrowed funds is less than that of shareholders' funds on account of cost of borrowed funds being allowable as a deduction for income-tax purposes. But at the same time borrowed funds carry a fixed interest, which has to be paid whether the company is earning profit or not. Thus, the risk of the shareholders increases in case there is a high proportion of the borrowed funds in the total capital structure of the company.
- The concept of leverage helps in examining the aspects of effect of financing or debt-equity mix on the shareholders' earnings and risk

- It is the responsiveness of one financial variable over the other. It is a mechanism in which the desired performance is enhanced.
- In financial Management , *leverage aims at increasing the earnings of equity shareholders by utilizing either fixed cost asset or fixed cost funds.*

According to James Horne :

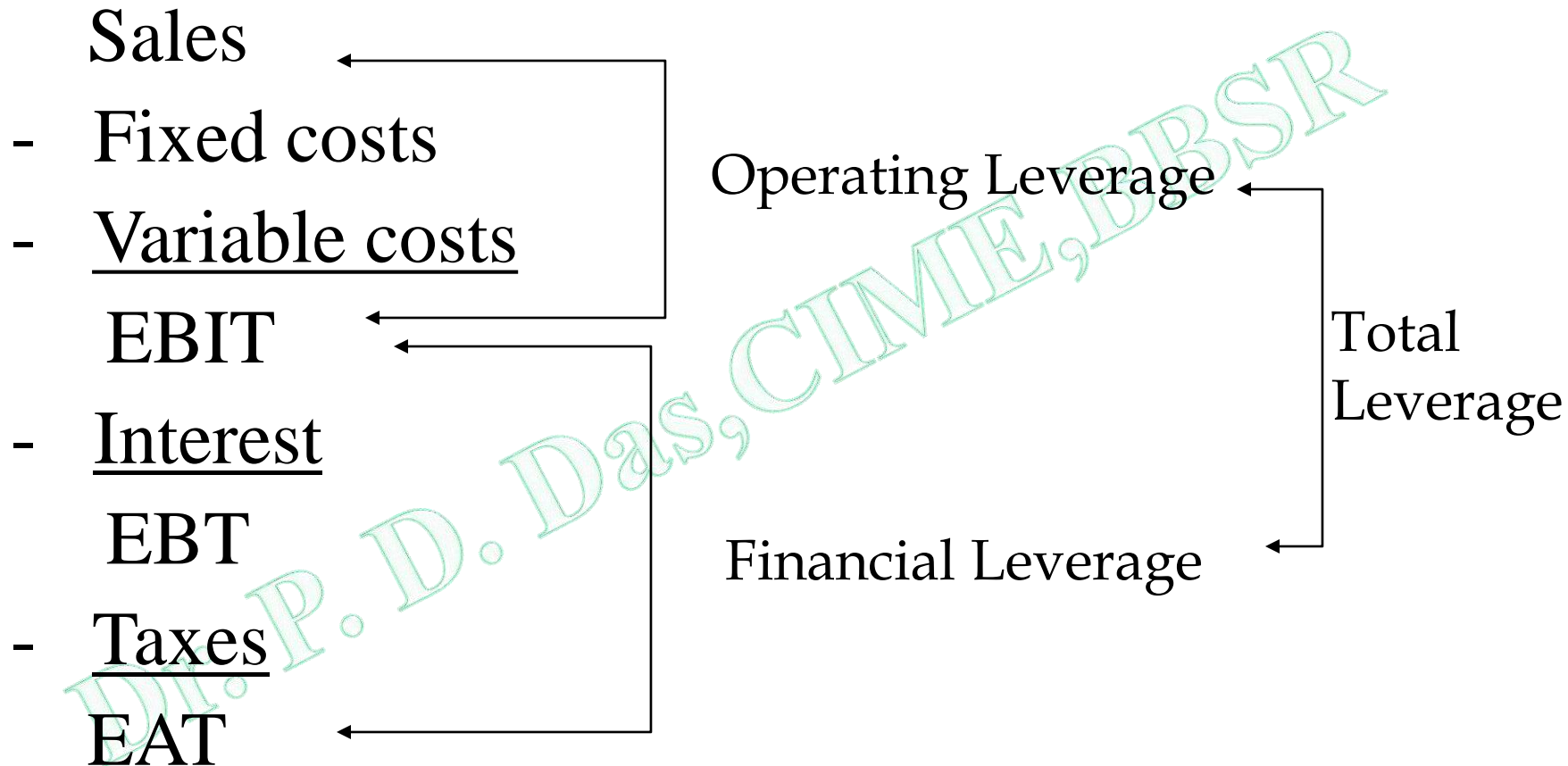
- Defines Leverage as : **“ the employment of an asset or funds for which the firm pays a fixed cost or fixed return”**

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- There are two types of leverage-
“ Operating” and Financial”.
- The leverage associated with investment (asset acquisition) activities is referred to as **Operating leverage**, while leverage associated with financing activities is called **financial leverage**.
- **Operating leverage** is determined by the relationship between the firm’s sales revenue and its earning before interest and taxes (EBIT). The EBIT is also called Operating Profit.
- **Financial Leverage** represents the relationship between the firm’s earnings before interest & taxes (EBIT or Operating profit) and the earnings available for ordinary shareholders.

- It is said to exist when the firm has to pay fixed cost regardless of volume of output or sales. The firm is said to have a high degree of operating leverage if it employs a greater amount of fixed cost and a smaller amount of variable cost and vice-versa.
- Operating leverage in a firm is a function of three factors :
 1. The amount of Fixed costs
 2. The contribution margin
 3. The volume of sales

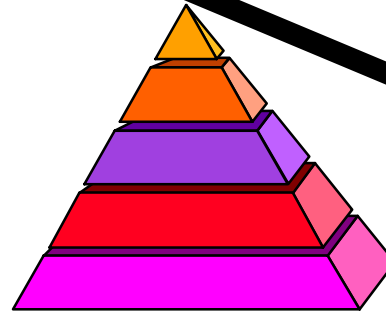
Leverage and the Income Statement



Note: $EPS = EAT / (\# \text{ shares})$



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Operating leverage can be calculated

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{EBIT or Op.Profit}}$$

$$C = \text{Sales} - \text{Variable Cost}$$

Contribution

Operating Leverage = -----

Operating Profit (EBIT)

Contribution = Sales – Variable Cost

Operating Profit = Sales – VC – FC = C – FC

% change in EBIT

Degree of OL = ----- > 1

% change in Sales

Fixed Cost

Break Even Point =-----

P/V Ratio

P/V Ratio = Contribution / Sales

Example :1

A firm sells its products for Rs. 50 per unit has variable operating costs of Rs.30 per unit and fixed operating cost of Rs. 5,000 per year. Its current level of sales is 300 units. We wish to ascertain the firm's degree of operating leverage. What will happen to EBIT if sales change ? Let us suppose that the sales level (a) rises to 350 units, and (b) decreases to 250 units.

Solution

	-16.7		+16.7
1. Sales level (units)	250	300	350
2. Sales Revenue (Rs)(250 X 50)	12,500	15,000	17,500
3. Less Variable Cost (250 X 30)	7,500	9,000	10,500
	-----	-----	-----
	5,000	6,000	7,000
4. Less fixed operating cost (Rs)	5,000	5,000	5,000
	-----	-----	-----
5. EBIT or Operating Profit	Zero	1,000	2,000
	-----	-----	-----
	- 100 %		+ 100 %

Interpretation

- When 16.7% decrease in sales volume (from 300 to 250 units) leads to 100% decline in EBIT (from 1000 to Zero). On the other hand, a 16.7% increase in sales level (from 300 to 350) results in 100% increase in EBIT (from 1000 to 2000).
- When the firm has fixed operating costs, an increase in sales volume results in a more than proportionate increase in EBIT. Similarly, a decrease in the level of sales has an exactly opposite effect. This is operating leverage.

Example : 2

- The installed capacity of a factory is 600 units. Actual capacity used is 400 units. Selling price per unit is Rs. 10, variable cost is Rs. 6 per unit. Calculate the operating leverage in each of the following three situations :
 1. When fixed costs are Rs.400
 2. When fixed costs are Rs. 1,000
 3. When fixed costs are Rs. 1,200

Solution :

Particulars	Situation 1	Situation 2	Situation 3
Sales (400 X 10)	4000	4000	4000
Variable Cost (400 X 6)	2400	2400	2400
Contribution (S-VC)	1600	1600	1600
Fixed Cost	400	1000	1200
Operating Profit/ EBIT (C-F)	1200	600	400
Operating Leverage= C / OP	1600 / 1200 = 1.33	1600 / 600 = 2.67	1600 / 400 = 4

Interpretation

- If sales increase by one rupee, the profit would increase by Rs.4. This can be verified if sales increase to Rs. 8000, the profit will be :

Sales : 8000

VC : 4800

C : 3200

FC : 1200

Profit : 2000

Thus, the sales have increased from Rs. 4000 to Rs. 8000 i.e., hundred per cent increase. The operating profits have increased from Rs. 400 to 2000 i.e., 1600 (400 % increase). The operating leverage is 4 which indicates that *with every increase of one rupee in sales, the profit will increase four times*. From the ex. 100% increase in sales results to 400 % increase in profits.

$$\begin{aligned}\text{The degree of OL} &= \% \text{ change in O Income} / \% \text{ change in Sales} \\ &= 400 / 100 = 4\end{aligned}$$

Example:3

Lever Ltd. manufactures calculators and it has arrived at three different levels of output that the company can produce: 1,500; 2500 and 4000. The fixed costs of the firm are Rs.5,00,000. The selling price per unit is Rs 300 and the variable costs per unit are Rs. 175. Compute the DOL for various levels of output.

Solution:

Quantity Produced	Contribution (in Rs)	EBIT (in Rs)	DOL
1500	1,87,500	-3,12,500	3.67
2500	3,12,500	-1,87,500	-1.67
4000	5,00,000	0	∞
5500	6,87,500	1,87,500	3.67

From the above table we observe that when 4000 units are produced then the EBIT of the firm is zero and the DOL is undefined.

Other inferences that can be drawn from the table are:

- Each level of output has a distinct DOL.
- The DOL at operating break-even point is undefined.
- If Q is less than the operating break-even point, then the DOL will be negative.
- If Q is greater than the operating break-even point, DOL will be positive. However, DOL will start declining as the level of output increases further and will reach a limit of 1.

Applications of Operating Leverage

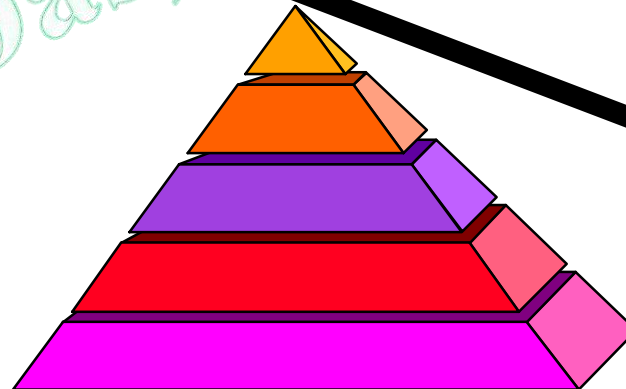
- Operating Leverage: Firm's ability to use fixed operating costs to magnify the effects of changes in sales on its EBIT.
- **Applications of Operating Leverage**
 - Helps in determining the behaviour of EBIT
 - Measuring business risk
 - Production planning

FINANCIAL LEVERAGE

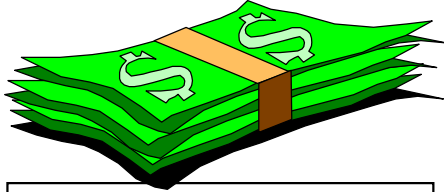
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Financial Leverage...



Rs . 4 , 000000
EQUITY
INVESTMENT



Rs . 10 , 000000
PROPERTY

"Leverage Ratio" = Rs.10,000,000 / Rs.4,000,000 = 2.5

Equity = Rs. 4,000,000

Debt = Rs. 6,000,000

- The sources of funds consists of various types of long-term debt, including bonds, debentures, and preference shares. The long-term debts carry a fixed rate of interest which is a contractual obligation for the firm. *Although the dividend on preference shares is not a contractual obligation, it is a fixed charge and must be paid before anything is paid to the ordinary shareholders.* The equity holders are entitled to the remainder of the operating profits of the firm after the prior obligations are met.
- Financial leverage results from the presence of fixed financial charges in the firm's income stream. These fixed charges do not vary with the EBIT or OP. They have to be paid regardless of the amount of EBIT available to pay them. After paying them the OP belong to the ordinary shareholders. *Financial leverage is concerned with the effects of changes in EBIT on the earnings available to equity shareholders.*

- It is defined as the ability of a firm to use fixed financial charges to magnify the effect of changes in EBIT on the firm's earning per share.
- In other words, financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders.

- It may be defined as the tendency of the residual net income to vary disproportionately with OP. It indicates the change that take place in the taxable income as a result of change in the operating income. It signifies the existence of fixed of fixed interest / fixed dividend bearing securities in the total capital structure of the company.
- Thus, the use of fixed interest / dividend bearing securities such as debt and preference capital along with the owners' equity in the total capital structure of the company, is described as financial leverage.

- Financial leverage is also termed as “ **trading on equity**”. The company resorts to trading on equity with the objective of *giving the equity shareholders a high rate of return* than the general rate of earning on capital employed in the company, to compensate them for the risk that they have to bear.
- **For ex:** if a company borrows Rs.100 at 8% interest p.a., and earns a return of 12%, the balance of Rs.4 p.a. after payment of interest will belong to the shareholders and thus they can be paid a higher rate return than the general rate of earnings of the company. But in case the company could earn a return of only 6% on Rs.100 employed by it, the equity shareholders' loss would be Rs.2 p.a.
- It has the potentiality of increasing the return to equity shareholders, but at the same time creates additional risk for them.

Financial leverage can be calculated

- $FL = OP \text{ or } EBIT / PBT$

$$\text{Degree of FL} = \frac{\% \text{ Change in EPS}}{\% \text{ change in EBIT}}$$

Example - 4

- A company has a choice of the following three financial plans. You are required to calculate the financial leverage in each case and interpret it :

Particulars	X	Y	Z
Equity Capital	2000	1000	3000
Debt	2000	3000	1000
Operating Profit (EBIT)	400	400	400
Interest @ 10% on debt in all cases			

Solution

- The financial leverage will be computed as follows in case of each of these financial plans :

Particulars	X	Y	Z
Operating Profit (OP)	400	400	400
Interest (10% on Debt)	200	300	100
Profit before Tax (PBT)	200	100	300
Financial Leverage (OP / PBT)	$400 / 200$ $= 2$	$400 / 100$ $= 4$	$400 / 300$ $= 1.33$

Interpretation

- FL indicates the change that will take place in the taxable income as a result of change in the operating income. For Ex, taking financial plan X as the basis, if the operating profit decreases to Rs.200, its impact on taxable income will be as follows

Operating Profit	:	Rs.200
Less : Interest	:	<u>200</u>
Profit before tax (PBT)	:	Nil

FL in case of plan X is 2. It means every 1% change in operating profit will result in 2% change in the taxable profit. In the above case operating profit has decreased from Rs.400 to 200 (50% decrease) , as a result the taxable profit has decreased from Rs. 200 to Zero (100% decrease)

Example - 5

- The financial manager of the X Ltd expects that its EBIT in the current year would amount to Rs. 10,000. The firm has 5% bonds aggregating Rs. 40,000, while the 10% preference shares amount to Rs. 20,000. What would be the EPS ? Assuming the EBIT being (i) Rs.6,000, and (ii) Rs. 14,000, how would the EPS be affected ? The firm can be assumed to be in 50% tax bracket. The number of outstanding ordinary shares is 1,000.

Solution

Particulars	Case 2 -40%	Base	Case 1 +40%
EBIT	6,000	10,000	14,000
Less Interest on bond	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>
EBT	4,000	8,000	12,000
Less taxes (50%)	<u>2,000</u>	<u>4,000</u>	<u>6,000</u>
EAT	2,000	4,000	6,000
Less Pref dividend (10%)	<u>2,000</u>	<u>2,000</u>	<u>2,000</u>
Earnings available for ordinary shareholders	0	2,000	4,000
EPS	0	2	4
	-100%		+100

Interpretation

- Case 1 : A 40% increase in EBIT (from Rs.10,000 to Rs.14,000) results in 100% increase in EPS (from Rs. 2 to Rs. 4).
- Case 2 : A 40% decrease in EBIT (from Rs. 10,000 to Rs. 6,000) leads to 100% decrease in EPS (from Rs.2 to Zero)

Example - 6

- A company has the following capital structure :

10,000 Equity Shares of Rs. 10 each : Rs.1,00,00

2,000 10% Pref. Shares of Rs.100 each : 2,00,000

2,000 10% Debentures of Rs. 100 each : 2,00,000

Calculate the EPS for each of the following levels of EBIT :

(i) Rs.1,00,00 (ii) Rs. 60,000 and (iii) Rs.1,40,000. The company is in 50% tax bracket

Calculate the financial leverage taking EBIT level under (i) base.

Solution

- Computation of EPS

Particulars	(i)	(ii)	(iii)
EBIT	1,00,000	60,000	1,40,000
Less : Int on Debenture	20,000	20,000	20,000
PBT	80,000	40,000	1,20,000
Less : Income Tax (50%)	40,000	20,000	60,000
PAT	40,000	20,000	60,000
Less : Preference Dividend	20,000	20,000	20,000
Earnings available for Eq.sh	20,000	---	40,000
	20,000	---	40,000
EPS	2	Nil	4

- The table shows that :
 - (a) In case (ii) the EBIT has increased by 40% (1,00,000 to 1,40,000) while the EPS has decreased by 100% (2 to Nil).
 - (b) In case (iii) the EBIT has increased by 40% (1,00,00 to 1,40,000) as compared to case (i) while the EPS has increased by 100% (2 to 4)

The degree of FL can be computed as follows :

% change in EPS / % change in EBIT

Financial Leverage in between (i) and (ii) = $100/40 = 2.5$

Financial Leverage in between (i) and (iii) = $100/40 = 2.5$

Computation of FL

	I	Ii	Iii
OP	1,00,000	60,000	1,40,000
Less : I	20,000		
Pref Div	40,000	60,000	60,000
PBT	40,000	---	80,000
FL = OP / PBT = $1,00,000 / 40,000 = 2.5$			

FINANCIAL LEVERAGE

- Financial Leverage: Measures the effect of change in EBIT on the EPS of the company.
- **Applications of Financial Leverage**
 - Helps in studying the impact of using debt on investor's rate of return.
 - Helps in analyzing the increased financial risk due to debt financing.

Example – 7

A Ltd Company has equity share capital of Rs.5,00,000 dividend into shares of Rs.100 each. It wishes to raise further Rs.3,00,000 for expansion cum modernization plans. The company plans the following financial schemes :

- a. All common stock
- b. Rs. One lakh in common stock & Rs. Two lakh in 10% debentures.
- c. All debt at 10% p.a
- d. Rs. One lakh in common stock & Rs. Two lakhs in Preference Capital with the rate of dividend at 8%. The company's existing earnings before interest & tax (EBIT) are Rs. 1,50,000. The corporate rate of tax is 50%.
- e. You are required to determine the EPS in each plan and comment on the implications of finance leverage.

Solution

	Plan I	Plan II	Plan III	Plan IV
EBIT	1,50,000	1,50,000	1,50,000	1,50,000
Less: Int	----	20,000	30,000	-----
	-----	-----	-----	-----
	1,50,000	1,30,000	1,20,000	1,50,000
Less : Tax (50%)	75,000	65,000	60,000	75,000
	-----	-----	-----	-----
	75,000	65,000	60,000	75,000
Less : Pre Div @ 8%	-----	-----	-----	16,000
	-----	-----	-----	-----
	75,000	65,000	60,000	59,000
No of common shares	8,000	6,000	5,000	6,000
EPS	9.37	10.83	12	9.83

Example- 8 : The capital structure of ABC Ltd. is as follows:

Capital Structure	Amount
Authorized Issued and Paid-up Capital 6,50,000 Equity Shares @ Rs. 10 each	65,00,000
12% debentures	7,00,000
12% ; 6000 Preference Shares @ Rs. 100	6,00,000
Total	78,00,000

Corporate tax rate applicable: 50%

Compute the DFL for the varying levels of EBIT given below:

- a. Rs 1,00,000
- b. Rs 1,85,000
- c. Rs. 2,28,000
- d. Rs. 5,00,000
- e. Rs 6,50,000

- The analysis of this information shows that financial leverage has helped in improving EPS for equity shareholders. It helps to conclude that higher the ratio of debt to equity the greater the return for equity stockholders.

The DFL for various levels has been summarized in the table 8.2:

EBIT	DFL
Rs 1,00,000	-0.78
Rs 1,85,000	-4.30
Rs. 2,28,000	∞
Rs. 5,00,000	1.84
Rs. 6,50,000	1.54

From the above table we observe that EPS is undefined when EBIT is Rs 2,28,000 and the DFL is undefined at this point. This level at which the EPS is zero and DFL is undefined is known as financial break-even point.

- From the table 8.2 we can make the following inferences:
- Each level of EBIT has a distinct DFL.
- DFL is undefined at the financial break-even point.
- DFL will be negative when the EBIT level goes below the financial break-even point.
- DFL will be positive for all value of EBIT above the break-even point. However, it will start declining as EBIT increases and will reach a limit of 1.

Example-9

- XYZ Company has currently an equity share capital of Rs.40 Lakhs consisting of 40,000 equity shares of Rs. 100 each. The management is planning to raise another Rs.30 lakhs to finance a major programme of expansion through one of the four possible financing plans. The options are :
 - i. Entirely through equity shares.
 - ii. Rs.15 lakhs in equity shares of Rs.100 each and the balance in 8% Debentures.
 - iii. Rs.10 lakhs in equity shares of Rs.100 each and the balance through long-term borrowing at 9% interest p.a..
 - iv. Rs.15 lakhs in equity shares of Rs.100 each and the balance through preference shares with 5% dividend.
- The company's expected EBIT will be Rs.15 lakhs. Assuming corporate tax rate of 50%, you are required to determine the EPS and comment on the financial leverage that will be authorized under each of the above scheme of financing.

Solution :

	F Plan - I	F Plan - II	F Plan - III	F Plan - IV
Equity shares (in lakhs)	40+30=70	40+15=55	40+10=50	40+15=55
Equity share (no)	70,000	55,000	50,000	55,000
8% Debentures	----	15	----	----
9% Long-term borrowings	----	----	20	----
5% Preference Shares (in lakhs)	----	----	----	15
EBIT	15,00,000	15,00,000	15,00,000	15,00,000
Less : Int on debentures	----	1,20,000	----	----
Int on long-term borrowing	----	----	1,80,000	----
EBT	15,00,000	13,80,000	13,20,000	15,00,000
Less : Tax @ 50%	7,50,000	6,90,000	6,60,000	7,50,000
EAT	7,50,000	6,90,000	6,60,000	7,50,000
Less : Pref Dividend	----	----	----	75,000
Earning for equity shareholders	7,50,000	6,90,000	6,60,000	6,75,000
No of Equity shares	70,000	55,000	50,000	55,000
EPS	10.71	12.55	13.20	12.27
DFL = EBIT / (EBIT-I)	1.00	1.087	1.136	1.00

Comments

- Since the EPS as well as degree of financial leverage (DFL) is highest in financial plan III, it should be accepted. The company should raise Rs.10 lakhs in equity shares and the balance of Rs. 20 lakhs through long-term borrowing at 9% interest p.a.

Interest Tax Shield

- The interest charges are tax deductible and, therefore, provide tax shield, which increases the earnings of the shareholders.

$$\text{Interest tax shield} = \text{Tax rate} \times \text{Interest}$$

Effect of Leverage on ROE and EPS

Favourable

$$ROI > i$$

Unfavourable

$$ROI < i$$

Neutral

$$ROI = i$$

Effect of Financial Plan on EPS and ROE: Varing EBIT

	<i>Economic Conditions</i>					
	<i>Very poor</i>	<i>Poor</i>	<i>Normal</i>	<i>Good</i>		
Probability	0.05	0.10	0.15	0.35	0.30	0.05
Sales (Rs)	510	660	710	800	880	1,160
Costs:						
Variable (Rs)	255	330	355	400	440	580
Fixed (Rs)	280	280	280	280	280	280
Total Costs (Rs)	535	610	635	680	720	860
EBIT (Rs)	- 25	50	75	120	160	300
ROI (r)	- 5%	10%	15%	24%	32%	60%

Effect of Financial Plan on EPS and ROE: Varing EBIT

(Rs ' 000)

	<i>Economic Conditions</i>					
	<i>Very poor</i>	<i>Poor</i>	<i>Normal</i>	<i>Good</i>		
PBT	- 25.00	50.00	75.00	120.00	160.00	300.00
Less:						
Tax, 50%	-12.50*	25.00	37.50	60.00	80.00	150.00
PAT	- 12.50	25.00	37.50	60.00	80.00	150.00
No. of shares ('000)	50.00	50.00	50.00	50.00	50.00	50.00
EPS (Rs)	- 0.25	0.50	0.75	1.20	1.60	3.00
ROE (%)	- 2.50	5.00	7.50	12.00	16.00	30.00
Plan II: 25% debt						
EBIT	- 25.00	50.00	75.00	120.00	160.00	300.00
Less:						
Interest	18.75	18.75	18.75	18.75	18.75	18.75
PBT	- 43.75	31.25	56.25	101.25	141.25	281.25
Less:						
Tax, 50%	- 21.88*	15.63	28.13	50.63	70.63	140.63
PAT	- 21.87	15.62	28.12	50.62	70.62	140.62
No. of shares ('000)	37.50	37.50	37.50	37.50	37.50	37.50
EPS (Rs)	- 0.58	0.42	0.75	1.35	1.88	3.75
ROE (%)	- 5.80	4.20	7.50	13.50	18.80	37.50

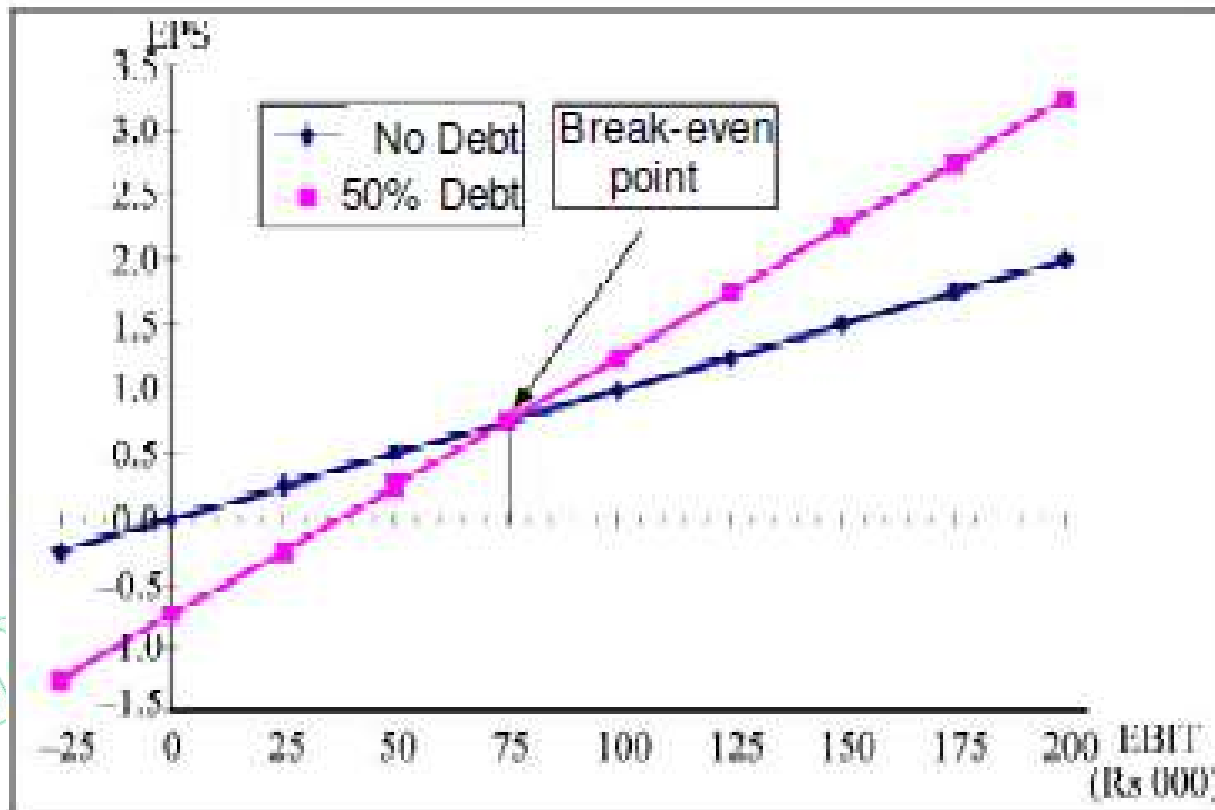
Plan III: 50% debt

EBIT	- 25.00	50.00	75.00	120.00	160.00	300.00
Less:						
Interest	37.50	37.50	37.50	37.50	37.50	37.50
PBT	- 62.50	12.50	37.50	82.50	122.50	262.50
Less:						
Tax, 50%	- 31.25*	6.25	18.75	41.25	61.25	131.25
PAT	- 31.25	6.25	18.75	41.25	61.25	131.25
No. of shares ('000)	25.00	25.00	25.00	25.00	25.00	25.00
EPS (Rs)	- 1.25	0.25	0.75	1.65	2.45	5.25
ROE (%)	- 12.50	2.50	7.50	16.50	24.50	52.50

Plan IV: 75% debt

EBIT	- 25.00	50.00	75.00	120.00	160.00	300.00
Less:						
Interest	56.25	56.25	56.25	56.25	56.25	56.25
PBT	- 81.25	- 6.25	18.75	63.75	103.75	243.75
Less:	- 40.63*	- 3.13	9.38	31.88	51.88	121.88
Tax, 60%						
PAT	- 40.62	- 3.12	9.37	31.87	51.87	121.87
No. of shares ('000)	12.50	12.50	12.50	12.50	12.50	12.50
EPS (Rs)	- 3.25	- 0.25	0.75	2.55	4.15	9.75
ROE (%)	- 32.50	- 2.50	7.50	25.50	41.50	97.50

EBIT–EPS chart-Example



Calculation of indifference point

- The EPS formula under all-equity plan is

$$EPS = \frac{(1-T) EBIT}{N_1}$$

- The EPS formula under debt–equity plan is:

$$EPS = \frac{(1-T) (EBIT - INT)}{N_2}$$

- Setting the two formulae equal, we have:

$$\frac{(1-T) EBIT}{N_1} = \frac{(1-T) (EBIT - INT)}{N_2}$$

Composite Leverage

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- As we discussed, OL measures percentage change in OP due to % change in sales. It explains the degree of operating risk. FL measures % change in taxable profit (EPS) on account of % change in OP (EBIT). Thus, it explains the degree of financial risk. Both these leverages are closely concerned with the firm's capacity to meet its fixed costs (both). In case both the leverages are combined, the result obtained will disclose the effect of change in sales over change in taxable profit (EPS).
- Composite leverage, thus, expresses the relationship between revenue on account of sales (Contribution or sales less variable cost) and the taxable income. It helps in finding out the resulting % change in taxable income on account of % change in sales.

- Composite Leverage =
Operating leverage X Financial leverage
= C / OP X OP / PBT
= C / PBT

Combining Financial and Operating Leverages

- The **degree of combined leverage (DCL)** is given by the following equation:

$$= \frac{\% \text{ Change in EBIT}}{\% \text{ Change in Sales}} \times \frac{\% \text{ Change in EPS}}{\% \text{ Change in EBIT}} = \frac{\% \text{ Change in EPS}}{\% \text{ Change in Sales}}$$

- another way of expressing the degree of combined leverage is as follows:

$$\text{DCL} = \frac{Q(s - v)}{Q(s - v) - F} \times \frac{Q(s - v) - F}{Q(s - v) - F - \text{INT}} = \frac{Q(s - v)}{Q(s - v) - F - \text{INT}}$$

Example-10

- The following figures relate to two companies :

	X Ltd	Y Ltd
Sales	500	1,000
Variable Costs	200	300
Contribution	300	700
Fixed Costs	150	400
	150	300
Interest	50	100
PBT	100	200

- You are required to :
 - Calculate the operating, financial, and combined leverage for the two companies; and
 - Comment on the relative risk position of them.

Solution :

i) Calculation of leverages :	X Ltd	Y Ltd
(a) Operating leverage = C / EBIT	$= 300 / 150$ $= 2$	$700 / 300$ $= 2.333$
(b) Financial leverage = EBIT / EBT	$= 150 / 100$ $= 1.5$	$= 300 / 200$ $= 1.5$
(c) Combined leverage = $\text{OL} \times \text{FL}$ or C / PBT	$300 / 100$ $= 3$	$700 / 200$ $= 3.5$

ii) Comments on the relative Risk Position :

- a) **Operating leverage** : As the OL for Y Ltd is higher than that of X ltd has a higher degree of operating risk. The tendency of operating profit to vary disproportionately with sales is higher for Y ltd as compare to X ltd.
- b) **Financial leverage** : Since FL for the two companies is the same, both the companies have the same degree of financial risk, I.e., the tendency of net disproportionately is the same for X ltd and Y ltd.
- c) **Combined leverage** : As the combined leverage for Y ltd is higher than X ltd ; Y ltd has overall higher risk as compared to X ltd.

TOTAL LEVERAGE

- Total leverage: Measures the percentage change in EPS due to percentage change in output.
- **Applications of Combined Leverage:**
 - Helps in measuring changes in EPS due to change in quantity produced
 - Helps in measurement of total risk (i.e. both operating and financial risk)

Example-11 : The following details are given about Green star Ltd.

Variable cost per unit = Rs. 150

Selling price per unit = Rs. 400

Number of outstanding equity shares = 3,00,000

Equity earnings = Rs. 1,50,000

Fixed expenses = Rs 7,00,000

Interest charges = Rs. 55,000

Preference dividend= 35,000

Corporate tax rate = 50%

Compute the Degree of Total Leverage at the following levels of output:

1. 1000
2. 2500
3. 3300
4. 4500
5. 6000

Solution:

DTL at various levels of output have been summarized in the table 8.3:

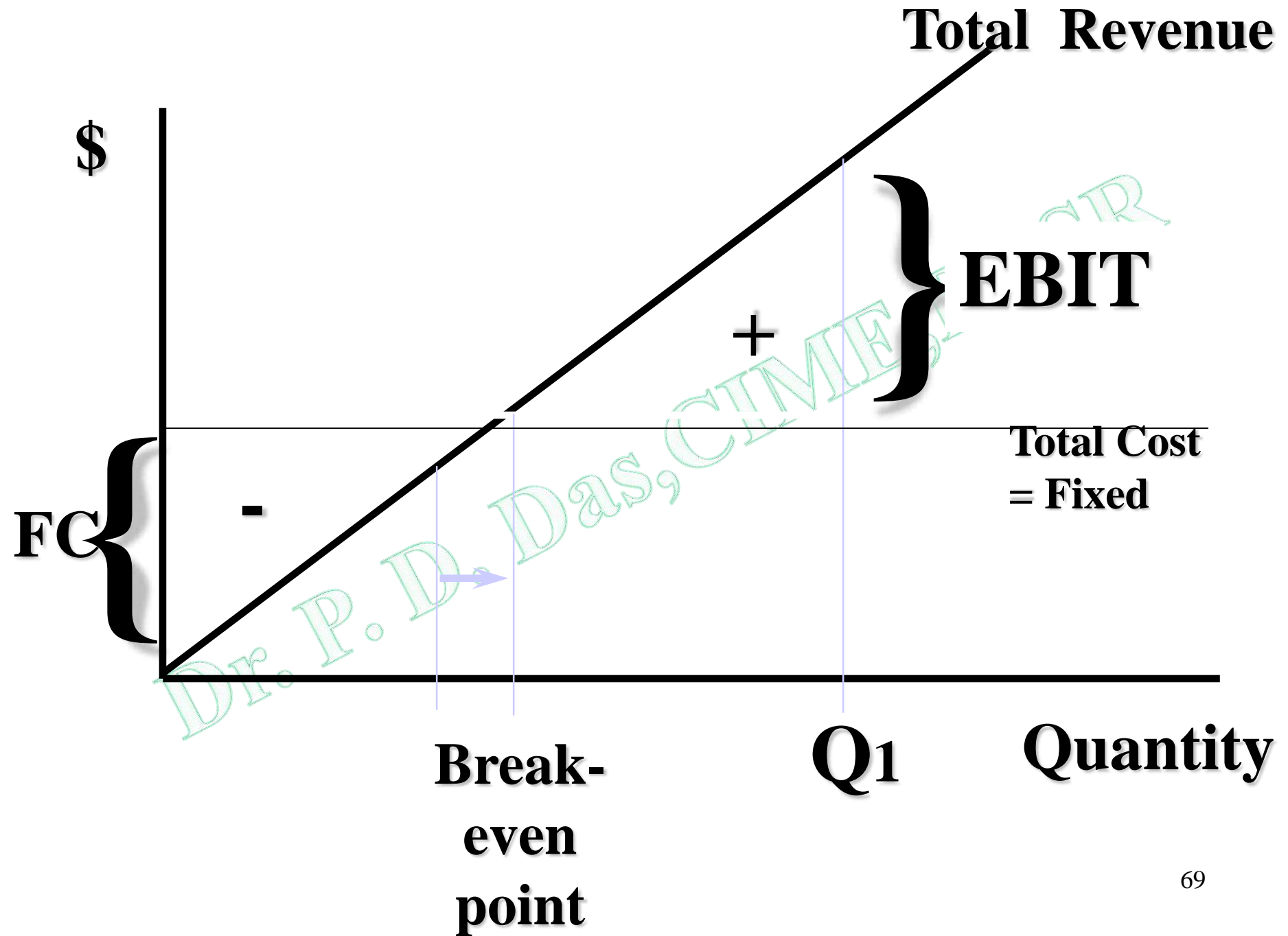
Quantity	DTL
1000	-0.44
2500	-3.13
3300	∞
4500	3.75
6000	2.22

From the above table, we observe that the EPS is zero when the level of output is 3,300 units and at this level the DTL is undefined. The output level at which $\text{EPS} = 0$ and DTL is undefined is known as overall break-even point.

The following inferences can be drawn from the table 8.3:

- Each level of output has a unique DTL.
- DTL is undefined at the overall break-even point.
- DTL will be negative if the level of output is less than the overall break-even point.
- DTL will be positive if the level of output is greater than the overall break-even point. However, beyond a certain DTL will decrease with increase in the level of output and will reach a limit of 1.

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END OF SESSION

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