Chapter 7 Leverage

INTRODUCTION

Financial decision is one of the integral and important parts of financial management in any kind of business concern. A sound financial decision must consider the board coverage of the financial mix (Capital Structure), total amount of capital (capitalization) and cost of capital (K_o). Capital structure is one of the significant things for the management, since it influences the debt equity mix of the business concern, which affects the shareholder's return and risk. Hence, deciding the debt-equity mix plays a major role in the part of the value of the company and market value of the shares. The debt equity mix of the company can be examined with the help of leverage.

The concept of leverage is discussed in this part. Types and effects of leverage is discussed in the part of EBIT and EPS.

Meaning of Leverage

The term leverage refers to an increased means of accomplishing some purpose. Leverage is used to lifting heavy objects, which may not be otherwise possible. In the financial point of view, leverage refers to furnish the ability to use fixed cost assets or funds to increase the return to its shareholders.

Definition of Leverage

James Horne has defined leverage as, "the employment of an asset or fund for which the firm pays a fixed cost or fixed return.

Types of Leverage

Leverage can be classified into three major headings according to the nature of the finance mix of the company.

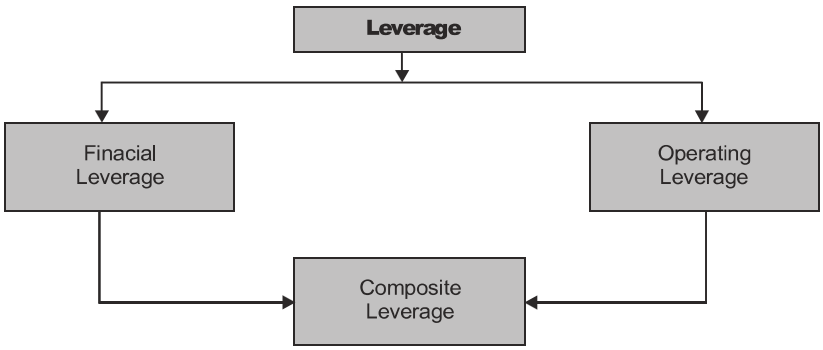


Fig. 7.1 Types of Leverage

The company may use finance or leverage or operating leverage, to increase the EBIT and EPS.

OPERATING LEVERAGE

The leverage associated with investment activities is called as operating leverage. It is caused due to fixed operating expenses in the company. Operating leverage may be defined as the company's ability to use fixed operating costs to magnify the effects of changes in sales on its earnings before interest and taxes. Operating leverage consists of two important costs viz., fixed cost and variable cost. When the company is said to have a high degree of operating leverage if it employs a great amount of fixed cost and smaller amount of variable cost. Thus, the degree of operating leverage depends upon the amount of various cost structure. Operating leverage can be determined with the help of a break even analysis.

Operating leverage can be calculated with the help of the following formula:

$$OL = \frac{C}{OP}$$

Where,

OL = Operating Leverage
C = Contribution
OP = Operating Profits

Degree of Operating Leverage

The degree of operating leverage may be defined as percentage change in the profits resulting from a percentage change in the sales. It can be calculated with the help of the following formula:

$$DOL = \frac{\text{Percentage change in profits}}{\text{Percentage change in sales}}$$

Exercise 1

From the following selected operating data, determine the degree of operating leverage. Which company has the greater amount of business risk? Why?

	Company A Rs.	Company B Rs.
Sales	25,00,000	30,00,000
Fixed costs	7,50,000	15,00,000

Variable expenses as a percentage of sales are 50% for company A and 25% for company B.

Solution

Statement of Profit

	Company A Rs.	Company B Rs.
Sales	25,00,000	30,00,000
Variable cost	12,50,000	7,50,000
Contribution	12,50,000	22,50,000
Fixed cost	7,50,000	15,00,000
Operating Profit	5,00,000	7,50,000

$$\text{Operating Leverage} = \frac{\text{Contribution}}{\text{Operating Profit}}$$

$$\text{“A” Company Leverage} = \frac{12,50,000}{5,00,000} = 2.5$$

$$\text{“B” Company Leverage} = \frac{2,25,000}{7,50,000} = 3$$

Comments

Operating leverage for B Company is higher than that of A Company; B Company has a higher degree of operating risk. The tendency of operating profit may vary portionately with sales, is higher for B Company as compared to A Company.

Uses of Operating Leverage

Operating leverage is one of the techniques to measure the impact of changes in sales which lead for change in the profits of the company.

If any change in the sales, it will lead to corresponding changes in profit.

Operating leverage helps to identify the position of fixed cost and variable cost.

Operating leverage measures the relationship between the sales and revenue of the company during a particular period.

Operating leverage helps to understand the level of fixed cost which is invested in the operating expenses of business activities.

Operating leverage describes the over all position of the fixed operating cost.

FINANCIAL LEVERAGE

Leverage activities with financing activities is called financial leverage. Financial leverage represents the relationship between the company's earnings before interest and taxes (EBIT) or operating profit and the earning available to equity shareholders.

Financial leverage is defined as "the ability of a firm to use fixed financial charges to magnify the effects of changes in EBIT on the earnings per share". It involves the use of funds obtained at a fixed cost in the hope of increasing the return to the shareholders. "The use of long-term fixed interest bearing debt and preference share capital along with share capital is called financial leverage or trading on equity".

Financial leverage may be favourable or unfavourable depends upon the use of fixed cost funds.

Favourable financial leverage occurs when the company earns more on the assets purchased with the funds, then the fixed cost of their use. Hence, it is also called as positive financial leverage.

Unfavourable financial leverage occurs when the company does not earn as much as the funds cost. Hence, it is also called as negative financial leverage.

Financial leverage can be calculated with the help of the following formula:

$$FL = \frac{OP}{PBT}$$

Where,

FL = Financial leverage

OP = Operating profit (EBIT)

PBT = Profit before tax.

Degree of Financial Leverage

Degree of financial leverage may be defined as the percentage change in taxable profit as a result of percentage change in earning before interest and tax (EBIT). This can be calculated by the following formula

$$DFL = \frac{\text{Percentage change in taxable Income}}{\text{Precentage change in EBIT}}$$

Alternative Definition of Financial Leverage

According to **Gitmar**, "financial leverage is the ability of a firm to use fixed financial changes to magnify the effects of change in EBIT and EPS".

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

Where,

FL = Financial Leverage
EBIT = Earning Before Interest and Tax
EPS = Earning Per share.

Exercise 2

A Company has the following capital structure.

	Rs.
Equity share capital	1,00,000
10% Prof. share capital	1,00,000
8% Debentures	1,25,000

The present EBIT is Rs. 50,000. Calculate the financial leverage assuring that the company is in 50% tax bracket.

Solution

Statement of Profit	Rs.
Earning Before Interest and Tax (EBIT) (or) Operating Profit	50,000
Interest on Debenture 1,25,000 × 8 × 100	10,000
Earning before Tax (EBT)	40,000
Income Tax	20,000
Profit	20,000

$$\text{Financial leverage} = \frac{\text{Operating Profit (OP)}}{\text{Profit Before Tax (PBT)}}$$

$$= \frac{50,000}{40,000} = 1.25$$

Uses of Financial Leverage

Financial leverage helps to examine the relationship between EBIT and EPS.

Financial leverage measures the percentage of change in taxable income to the percentage change in EBIT.

Financial leverage locates the correct profitable financial decision regarding capital structure of the company.

Financial leverage is one of the important devices which is used to measure the fixed cost proportion with the total capital of the company.

If the firm acquires fixed cost funds at a higher cost, then the earnings from those assets, the earning per share and return on equity capital will decrease.

The impact of financial leverage can be understood with the help of the following exercise.

Exercise 3

XYZ Ltd. decides to use two financial plans and they need Rs. 50,000 for total investment.

Particulars	Plan A	Plan B
Debenture (interest at 10%)	40,000	10,000
Equity share (Rs. 10 each)	10,000	40,000
Total investment needed	50,000	50,000
Number of equity shares	4,000	1,000

The earnings before interest and tax are assumed at Rs. 5,000, and 12,500. The tax rate is 50%. Calculate the EPS.

Solution

When EBIT is Rs. 5,000

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT)	5,000	5,000
Less : Interest on debt (10%)	4,000	1,000
Earnings before tax (EBT)	1,000	4,000
Less : Tax at 50%	500	2,000
Earnings available to equity shareholders.	Rs.500	Rs.2,000
No. of equity shares	1,000	4,000
Earnings per share (EPS)	Rs. 0.50	Rs. 0.50
Earnings/No. of equity shares		

When EBIT is Rs. 12,500

Particulars	Plan A	Plan B
Earnings before interest and tax (EBIT).	12,500	12,500
Less: Interest on debt (10%)	4,000	1,000

(Contd....)

Earning before tax (EBT)	8,500	11,500
Less : Tax at 50%	4,250	5,750
Earnings available to equity shareholders	4,250	5,750
No. of equity shares	1,000	4,000
Earning per share	4.25	1.44

DISTINGUISH BETWEEN OPERATING LEVERAGE AND FINANCIAL LEVERAGE

Operating Leverage/Financial Leverage

Operating Leverage	Financial Leverage
1. Operating leverage is associated with investment activities of the company.	1. Financial leverage is associated with financing activities of the company.
2. Operating leverage consists of fixed operating expenses of the company.	2. Financial leverage consists of operating profit of the company.
3. It represents the ability to use fixed operating cost.	3. It represents the relationship between EBIT and EPS.
4. Operating leverage can be calculated by $OL = \frac{C}{OP}$.	4. Financial leverage can be calculated by $FL = \frac{OP}{PBT}$.
5. A percentage change in the profits resulting from a percentage change in the sales is called as degree of operating leverage.	5. A percentage change in taxable profit is the result of percentage change in EBIT.
6. Trading on equity is not possible while the company is operating leverage.	6. Trading on equity is possible only when the company uses financial leverage.
7. Operating leverage depends upon fixed cost and variable cost.	7. Financial leverage depends upon the operating profits.
8. Tax rate and interest rate will not affect the operating leverage.	8. Financial leverage will change due to tax rate and interest rate.

EBIT - EPS Break even chart for three different financing alternatives

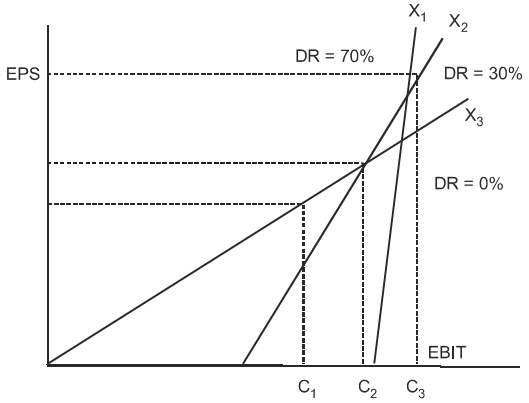


***Fig. 7.2** EBIT - EPS Break Even Chart*

Where,

DR = Debt Ratio

C_1, C_2, C_3 = Indifference Point

X_1, X_2, X_3 = Financial BEP

Financial BEP

It is the level of EBIT which covers all fixed financing costs of the company. It is the level of EBIT at which EPS is zero.

Indifference Point

It is the point at which different sets of debt ratios (percentage of debt to total capital employed in the company) gives the same EPS.

COMBINED LEVERAGE

When the company uses both financial and operating leverage to magnification of any change in sales into a larger relative changes in earning per share. Combined leverage is also called as composite leverage or total leverage.

Combined leverage express the relationship between the revenue in the account of sales and the taxable income.

Combined leverage can be calculated with the help of the following formulas:

$$CL = OL \times FL$$

$$CL = \frac{C}{OP} \times \frac{OP}{PBT} = \frac{C}{PBT}$$

Where,

CL = Combined Leverage

OL = Operating Leverage

FL = Financial Leverage

C = Contribution

OP = Operating Profit (EBIT)

PBT = Profit Before Tax

Degree of Combined Leverage

The percentage change in a firm's earning per share (EPS) results from one percent change in sales. This is also equal to the firm's degree of operating leverage (DOL) times its degree of financial leverage (DFL) at a particular level of sales.

$$\text{Degree of contributed coverage} = \frac{\text{Percentage change in EPS}}{\text{Percentage change in sales}}$$

Exercise 4

Kumar company has sales of Rs. 25,00,000. Variable cost of Rs. 12,50,000 and fixed cost of Rs. 50,000 and debt of Rs. 12,50,000 at 8% rate of interest. Calculate combined leverage.

Solution

Statement of Profit

Sales		25,00,000
Less:	Variable cost	15,00,000
	Contribution	10,00,000
Less:	Fixed cost	5,00,000
	Operating Profit	5,00,000

Combined leverage = Operating leverage × Financial leverage

Calculation of financial leverage

$$\frac{\text{Contribution}}{\text{Operating Profit}} = \frac{10,00,000}{5,00,000} = 2$$

Calculation of financial leverage

Earning before Interest and Tax (EBIT)	5,00,000
Less: Interest on Debenture (8% of 12,50,000)	1,00,000
Earnings before Tax	4,00,000

$$\text{Operating leverage} = \frac{\text{Operating Profit}}{\text{Earning Before Tax}} = \frac{5,00,000}{4,00,000} = 1.25$$

Combined leverage = 2 × 1.25 = 2.5

Exercise 5

Calculate the operating, financial and combined leverage under situations 1 and 2 and the financial plans for X and Y respectively from the following information relating to the operating and capital structure of a company, and also find out which gives the highest and the least value ? Installed capacity is 5000 units. Annual Production and sales at 60% of installed capacity.

Selling price per unit Rs. 25

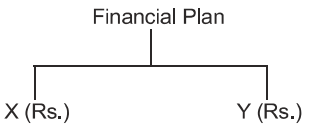
Variable cost per unit Rs. 15

Fixed cost:

Situation 1 : Rs. 10,000

Situation 2 : Rs. 12,000

Capital structure:



Equity	25,000	50,000
Debt (cost 10%)	50,000	25,000
	75,000	75,000

Solution

Annual production and sales 60% of 5,000 = 3000 Unit

Contribution per Unit	Rs.
Selling Price	25 Per Unit
Variable Price	15 Per Unit
	10 Per Unit

Total contribution is 3000 Units × Rs. 10 = Rs. 30,000

Computation of leverage.

Financial plan

	PLAN-X		PLAN-Y	
	Situation 1	**Situation 2**	**Situation 1**	**Situation 2**
Contribution	30000	30000	30000	30000
Fixed cost operating profit (or) EBIT	10000	12000	10000	12000
	20000	18000	20000	18000
Interest on Debts				
10% of 50,000	5000	5000	2500	2500
10% of 25,000				
Earnings before Tax	15000	13000	17500	15500
(i) Operating Leverage				
Contribution	30000	30000	30000	30000
	20000	18000	20000	18000
	= 1.5	1.67	1.5	1.67
(ii) Financial Leverage				
Operating Profit (op)	20000	18000	20000	18000
Profit Before Tax (PBI)	15000	13000	17500	15500
(iii) Combined leverage				
OL × FL =	1.5 × 1.33	1.67 × 1.38	1.5 × 1.14	1.67 × 1.16
	1.995	2.30	1.71	1.94

Highest and least value of combined leverage.

Highest Value = 2.30 under situation 2 plan X.

Least Value = 1.71 under situation 1 plan Y.

Exercise 6

Calculate operating, financial and combined leverages under situations when fixed costs are:

(i) Rs. 5,000 and

(ii) Rs. 10,000 and financial plans 1 and 2 respectively from the following information pertaining to the operating and capital structure of a textile company :

	Rs.
Total Assets	30,000
Total Assets turnover	2
Variable cost as percentage of sales	60

Capital structure	Financial Plan	
	1	2
	Rs.	Rs.
Equity	30,000	10,000
10% debentures	10,000	30,000

Solution

Computation of Leverage

Financial Plan

Plan	1		2	
Situation	**i**	**ii**	**i**	**ii**
Sales	60,000	60,000	60,000	60,000
Less : Variable cost	36,000	36,000	36,000	36,000
Contribution	24,000	24,000	24,000	24,000
Less : Fixed cost	5,000	10,000	5,000	10,000
Operating profit (EBIT)	19,000	14,000	19,000	14,000
Less : Interest	1,000	1,000	3,000	3,000
Profit before tax (PBT)	18,000	13,000	16,000	11,000
Operating leverage	24,000	24,000	24,000	24,000
Contribution	19,000	14,000	19,000	14,000
EBIT	1.26	1.71	1.26	1.71
Financial leverage	19,000	14,000	19,000	14,000
EBIT	18,000	13,000	16,000	11,000
PBT	1.05	1.07	1.18	1.27
Combined leverage	1.32	1.83	1.49	2.17

WORKING CAPITAL LEVERAGE

One of the new models of leverage is working capital leverage which is used to locate the investment in working capital or current assets in the company.

Working capital leverage measures the sensitivity of return in investment of charges in the level of current assets.

$$\text{WCL} = \frac{\text{Percentage Change in ROI}}{\text{Percentage Change is WC}}$$

If the earnings are not affected by the changes in current assets, the working capital leverage can be calculated with the help of the following formula.

$$\text{WCL} = \frac{\text{CA}}{\text{TA} \pm \text{DCA}}$$

Where,

CA = Current Assets
TA = Total Assets
DCA = Changes in the level of Current Assets

Exercise 7

The following information is available for two companies.

	X Ltd.	Y Ltd.
Fixed Assets	Rs. 4,00,000	1,00,000
Current Assets	Rs. 10,00,000	4,00,000
Total Assets	Rs. 14,00,000	14,00,000
Earning before interest and taxes	Rs. 1,50,000	1,50,000

You are required to compare the sensitivity earnings of the two companies for 30% charge in the level of their current assets.

Solution

$$\text{Working capital leverage} = \frac{\text{Current Assets}}{\text{Total Assets} \pm \text{DCA}}$$

$$\text{X Ltd.} = \frac{1,00,000}{14,00,000 - 3,00,000}$$

$$= \frac{10,00,000}{11,00,000}$$

$$= 0.90$$

$$\text{Y Ltd.} = \frac{4,00,000}{14,00,000 - 1,20,000}$$

$$= \frac{4,00,000}{12,80,000}$$

$$= 0.3125$$

Looking at the working capital leverage of the two companies, we can say that the sensitivity of earnings for charge on the level of current assets of X Ltd. is a greater than of Y Ltd.

Exercise 8

Calculate operating leverage and financial leverage under situations A, B and C and financial plans 1, 2 and 3 respectively from the following information relating to the operating and financial leverage which give the highest value and the least value.

Installed capacity (units)	1,200
Actual production and sales (units)	800
Selling price per unit (Rs.)	15
Variable cost per unit (Rs.)	10
Fixed costs (Rs.) Situation A	1,000
Situation B	2,000
Situation C	3,000

Capital Structure	**Financial Plan**		
	1	2	3
Equity	Rs. 5,000	Rs. 7,500	Rs. 2,500
Debt	Rs. 5,000	Rs. 2,500	Rs. 7,500
Cost of debt (for all plans)		12 per cent	

(MBA – P.U. Nov. 2005)

Solution

	A	B	C
S – VC	4,000	4,000	4,000
EBIT	3,000	2,000	1,000
$DOL = \frac{S - VC}{EBIT}$	1.33	2	4
	1	2	3
Situation A			
EBIT	3,000	3,000	3,000
Less : Interest	600	300	900
EBT	2,400	2,700	2,100
Financial Leverage	1.25	1.11	1.43
Situation B			
EBIT	2,000	2,000	2,000
Less : Interest	600	300	900

EBT	1,400	1,700	1,100
Financial Leverage	1.43	1.18	1.82

Situation C

EBIT	1,000	1,000	1,000
Less : Interest	600	300	900
EBT–I	400	700	100
Financial Leverage	2.5	1.43	10

Exercise 9

' XYZ' company has a choice of the following three financial plans. You are required to calculate the financial leverage in each case.

	Plan I	**Plan II**	**Plan III**
Equity capital	Rs. 2,000	Rs. 1,000	Rs. 3,000
Debt	Rs. 2,000	Rs. 3,000	Rs. 1,000
EBIT	Rs. 400	Rs. 400	Rs. 400

Interest @10% per annum on debts in all cases.

Solution

	Plan I	**Plan II**	**Plan III**
	Rs.	Rs.	Rs.
EBIT	400	400	400
Less Interest-(I)	200	300	100
EBIT–I	200	100	300
FL	2	4	1.33

MODEL QUESTIONS

1. Write a note on trading on equity.
2. What is meant by working capital leverage?
3. What is leverage? Mention different types of leverage?
4. Explain the operating leverage.
5. Discuss the concept of financial leverage.
6. How compared leverage is calculated?
7. Explain the working capital leverage.

8. What is point of indifference?
9. Distinguish the operating leverage from financial leverage.
10. Explain the uses of operating leverage.
11. From the following information find out operating, financial and combined leverages.

Sales	1,00,000
Variable Cost	60,000
Fixed Cost	20,000
Interest	10,000

(**Ans.** OL 2, FL 1.33, LL 2.67)

12. Arvind Ltd. is having the following informations. Calculate financial leverage opening leverage and combined leverage.

Sales	50,000 units Rs. 10 each
UC	Rs. 6 Per Unit
FC	Rs. 1,00,000
Interest	8 of 5,00,000

(**Ans.** FL 1.66, OL 2, CL 3.33)

13. X Ltd. is having the following capital structure. Calculate financial leverage, operating leverage and combined leverage having two situations A and B and financial plans I and II respectively.

Capacity	1,500 units
Production	1,200 units
Selling Price	Rs. 25
Variable Cost	Rs. 18
Fixed Cost Situation I	Rs. 1,400
Situation II	Rs. 2,400

Capital structure

	Financial Plan	
	A	B
Equity	80,000	60,000
Debt	20,000	40,000

(**Ans.** OL 1.2, 1.4, 1.2, 1.4
FL 1.16, 1.2, 1.4, 1.5
CL 1.39, 1.68, 1.68, 2.1)

14. The following details are available for the two companies.

	X Ltd.	**Y Ltd.**
Fixed Assets	4,00,000	6,00,000
Current Assets	6,00,000	4,00,000
Total Asset	10,00,000	10,00,000
Earnings Before Interest and Taxes	1,50,000	1,50,000

You are required to compare the sensibility of the two companies for a 30% changes in the level of current assets with the help of using capital leverages.

(**Ans.** X .73, Y 4.5)