OBJECTIVES

The main objective for preparing this presentation is to find out the "Leverage and its impacts on company's performance and growth." Other objectives toward preparing this term paper are as follows:

- To fulfill our course requirement.
- To understand the importance of leverage in determining the capital structure of a company.
- To understand the different types of leverages and there implications.
- To understand the leverages by analyzing examples.

I have followed text books and Internet to prepare this presentation.

DR.A.K.Manna

LEVERAGE

What is leverage? In physics, leverage implies the use of a lever to raise a heavy object with a small force. Let us revisit the concept of a “lever”. Suppose we want to lift a stone with a crowbar. We can lift it without any support. We can lift it with some support called “fulcrum”. The “fulcrum” is the support on which the crowbar rests while lifting the stone. Suppose the fulcrum is close to the object being lifted that is “stone”. The leverage is very good, i.e., the ease with which the stone can be lifted is high. If the “fulcrum” is in the middle of the length of the crowbar, it will be more difficult. The leverage available to the lifter is less than in the previous case. If on the contrary, the “fulcrum” is close to the hand that exerts pressure to lift the stone, it becomes increasingly difficult to lift it. The leverage is said to be the least. Thus the point of “fulcrum”, the support decides the extent of ease (leverage) in completing the work of lifting the stone.

Similar is the concept of leverage in the case of a business enterprise. Leverage can be defined as the ability of a firm to use its fixed cost assets or funds to magnify the returns to shareholders. According to **J. F. Weston, Scott, Besley and E. F. Brigham,** "Leverage is created when a firm has fixed cost associated either with its sales and production operation or with its financing characteristics."

Leverage refers to the employment of assets or sources of fund bearing fixed payment to magnify EBIT or EPS respectively. So it may be associated with investment activities or financing activities.

Fixed costs are of two types:

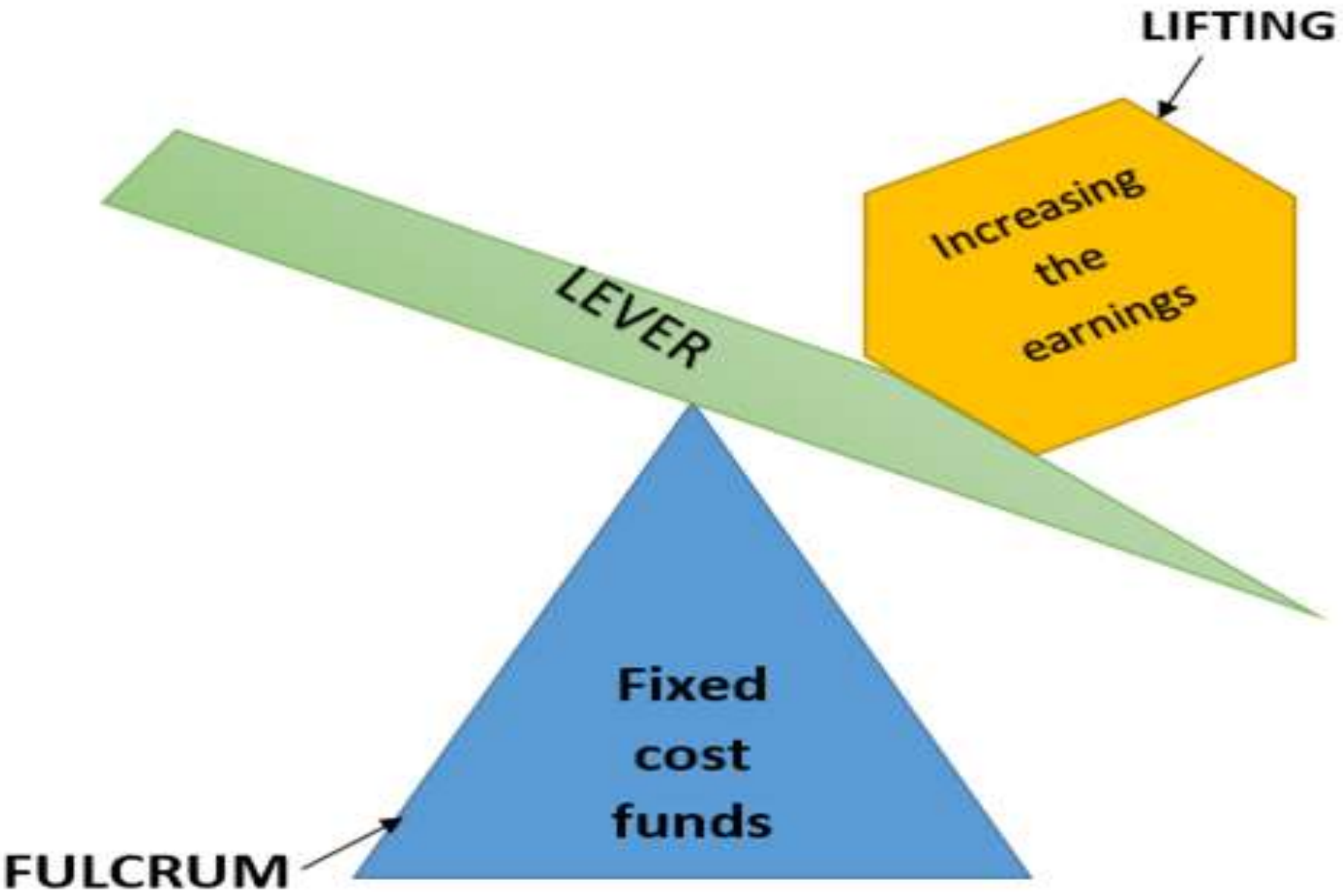
(i) Operating fixed cost and

(ii) Financial Fixed cost

Operating Fixed cost: Rent, Depreciation, Salary of employee, Advertisement Expenses, Administrative Expenses, Taxes etc.

Financial Fixed cost: Interest on debenture, Preference dividend etc.

Leverage in Finance



OBJECTIVES

The objective of Financial Management is to maximize the wealth of organization and to magnify the returns to shareholders. Financing and investment decisions are very important in maximizing shareholder's returns. The fixed cost assets or funds of a company play important role in maximizing EPS, ROE etc.

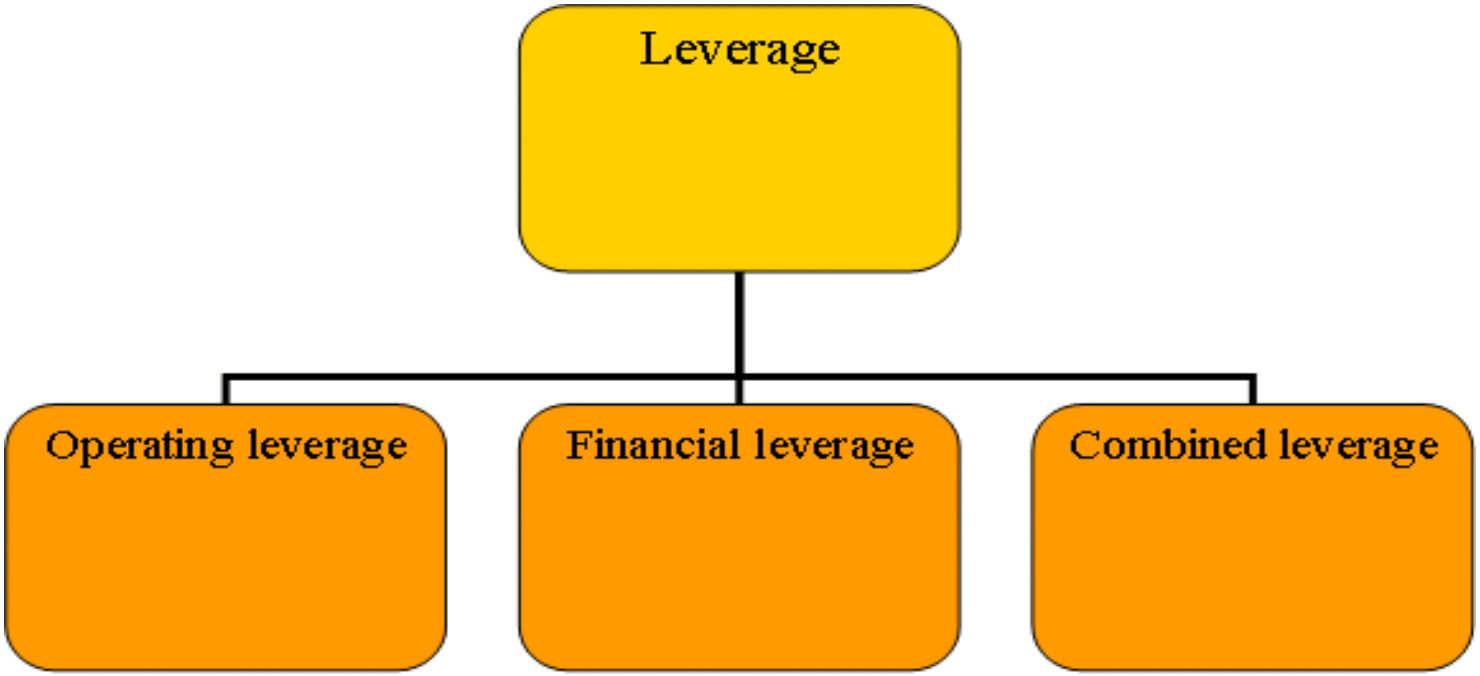
RISK

Total risk can be divided into two parts: **business risk** and **financial risk.**

Business risk: Business risk stems from the unpredictable nature of doing business, i.e., the unpredictability of consumer demand for products and services. As a result, it also involves the uncertainty of long-term profitability.

Financial risk: When a company uses debt or preferred stock financing, additional risk—**financial risk**—is placed on the company's common shareholders. They demand a higher expected return for assuming this additional risk, which in turn, raises a company's costs.

CLASSIFICATIONS OF LEVERAGE



OPERATING LEVERAGE

Operating leverage may be defined as the firm's ability to use fixed operating cost to magnify the effects of changes in sales on its operating profit or earnings before interest and taxes (EBIT).

- Fixed operating costs are used as a lever.
- This leverage relates to variation in sales and profit.
- Operating leverage is measured by computing the Degree of Operating Leverage (DOL).
- DOL expresses operating leverage in quantitative terms.
- The higher the proportion of fixed operating cost in the cost structure, higher is the degree of operating leverage.
- The percentage change in the EBIT relative to a given percentage change in sales and output is defined as the DOL.

FORMULA

$$\text{DOL} = \frac{\%\ \text{Change in EBIT}}{\%\ \text{Change in Sales}} \text{ or } \frac{\Delta\ \text{EBIT}}{\text{EBIT}} \times \frac{\text{Sales}}{\Delta\ \text{Sales}}$$

$$= \frac{\Delta\ \text{EBIT}}{\Delta\ \text{Sales}} \times \frac{\text{Sales}}{\text{EBIT}}$$

DOL can be calculated in an alternative way, which is as follows

$$\text{DOL} = \frac{Q(S - V)}{Q(S - V) - F}$$

where, Q = Units of Output,
S = Selling price per unit,
V = Variable cost per unit, and
F = Total Fixed Costs.

Since $\{Q(S - V)\}$ represents contribution and $\{Q(S - V) - F\}$ represents EBIT, we may write

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

Again, $\text{Contribution} = \text{EBIT} + \text{Fixed Cost}$

So,

$$\text{DOL} = \frac{\text{EBIT} + \text{Fixed Cost}}{\text{EBIT}}$$

This can also be expressed as

$$\text{DOL} = \frac{\text{Sales}}{\text{MOS}}$$

where MOS = Margin of Safety = Sales – BE sales.

The value of degree of operating leverage should be greater than 1.
If it is equal to 1, it can be said that operating leverage does not exist.

Example:

Calculate the degree of operating leverage from the following data:

Sales: 1,50,000 units at Rs 4 per unit.

Variable cost per unit Rs 2.

Fixed cost Rs 1, 50,000.

Interest charges Rs 25,000.

Solution: We know

$$\text{Degree of operating leverage (DOL)} = \frac{\text{Contribution}}{\text{EBIT}}$$

Here,	Sales = 1,50,000 × Rs 4	= Rs 6,00,000
	Less: Variable Cost: 1,50,000 × Rs 2	= Rs 3,00,000
	Contribution	Rs 3,00,000
	Less: Fixed Cost	Rs 1,50,000
	EBIT	Rs 1,50,000

$$\therefore \quad \text{DOL} = \frac{\text{Rs } 3,00,000}{\text{Rs } 1,50,000} = 2$$

DOL AND BUSINESS RISK

Business risk depends in part on the extent to which a firm builds fixed costs into its operations if fixed costs are high, even a small decline in sales can lead to a large decline in ROE. So, other things held constant, the higher a firm's fixed costs, the greater its business risk. Higher fixed costs are generally associated with more highly automated, capital intensive firms and industries. However, businesses that employ highly skilled workers who must be retained and paid even during recessions also have relatively high fixed costs.

FINANCIAL LEVERAGE

Financial leverage may be defined as the firm's ability to use fixed financial charges to magnify the effects of changes in EBIT on its EPS.

Financial leverage is mainly related to the mix of debt and equity in the capital structure of a firm. It exists due to the existence of fixed financial charges that do not depend on the operating profits of the firm.

Sources from which funds are used: Debentures, bonds, long-term loans and preference shares.

Fixed financial charges is used as a lever.

With the use of fixed financial charges, a firm can magnify the effect of change in EBIT on change in EPS.

The higher the proportion of fixed charge bearing fund in the capital structure of a firm, higher is the Degree of Financial Leverage (DFL) and vice-versa. Financial leverage is computed by the DFL. DFL expresses financial leverage in quantitative terms.

FORMULA

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

$$\%\ \text{Change in EPS} = \frac{\Delta EPS}{EPS}$$

$$EPS = \frac{(EBIT - I) \times (1 - T)}{N}$$

$$\Delta EPS = \frac{(\Delta EBIT - \Delta I) \times (1 - T)}{N} = \frac{\Delta EBIT \times (1 - T)}{N}$$

$$\%\ \text{Change in EPS} = \frac{\frac{\Delta EBIT \times (1 - T)}{N}}{\frac{(EBIT - I) \times (1 - T)}{N}} = \frac{\Delta EBIT \times (1 - T)}{N} \times \frac{N}{(EBIT - I) \times (1 - T)} = \frac{\Delta EBIT}{EBIT - I}$$

$$\%\ \text{Change in EBIT} = \frac{\Delta EBIT}{EBIT}$$

$$DFL = \frac{\frac{\Delta EBIT}{EBIT - I}}{\frac{\Delta EBIT}{EBIT}} = \frac{\Delta EBIT}{EBIT - I} \times \frac{EBIT}{\Delta EBIT} = \frac{EBIT}{EBIT - I}$$

DEGREE OF FINANCIAL LEVERAGE AND PREFERENCE SHARE CAPITAL

$$DFL = \frac{EBIT}{(EBIT - I) - \frac{D}{1 - T}}$$

A firm is said to be highly financially leveraged if the proportion of fixed interest bearing securities, i.e. long term debt and preference share capital in the capital structure is higher in comparison to equity share capital. Like operating leverage, the value of financial leverage must be greater than 1.

Example:

Calculate the degree of financial leverage from the following information:

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

5,000, 11 % Preference Shares of Rs 10 each Rs 50,000.

9% Debentures of Rs 100 each Rs 50,000.

The EBIT of the company is Rs 50,000 and corporate tax rate is 45%.

Solution: We know, $\text{Degree of Financial Leverage (DFL)} = \dfrac{\text{EBIT}}{\text{EBT} - \dfrac{P_d}{1-t}}$

Here,

EBIT	Rs 50,000
Less: Interest on Debentures $\left(50,000 \times \frac{9}{100}\right)$	4,500
EBT	45,500

$$\therefore \quad \text{DFL} = \frac{50,000}{45,000 - \dfrac{5,500}{1-0.45}}$$

$$= 1.41$$

DFL AND FINANCIAL RISK

Financial risk is referred to an increase in stockholders' risk, over and above the firm's basic business risk, resulting from the use of financial leverage.

Conceptually, stockholders face a certain amount of risk that is inherent in a firm's operations—this is its business risk, which is defined as the uncertainty inherent in projections of future operating income.

If a firm uses debt (financial leverage), this concentrates the business risk on common stockholders.

Thus, the use of debt, or financial leverage, concentrates the firm's business risk on its stockholders. This concentration of business risk occurs because debt holders, who receive fixed interest payments, bear none of the business risk.

Different combinations of DOL and DFL and their combined impact on the firm.

DEGREE OF FINANCIAL LEVERAGE(DFL)		DEGREE OF OPERATING LEVERAGE(DOL)	
		High	**Low**
	Low	This situation is a rigid one and not desirable.	This is a worst situation. The management in this situation might lose number of profitable opportunities and investments.
	High	High operating leverage and high financial leverage indicates the risky investment made by the company's shareholders. This situation is not desirable.	This is the optimum situation.

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.

COMBINED LEVERAGE

The firm's ability to cover the aggregate of fixed operating and financial charges is termed as combined leverage. The percentage change in EPS to a given percentage change in sales is defined as Degree of Combined Leverage (DCL).

DCL expresses combined leverage in quantitative terms.

The higher the proportion of fixed operating cost and financial charges, higher is the degree of combined leverage.

Like other two leverages the value of combined leverage must be greater than 1.

DCL can be calculated by multiplying a company's degree of operating leverage (DOL) by its degree of financial leverage (DFL).

FORMULA

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

or, $$DCL = \frac{\%\ \text{Change in EPS}}{\%\ \text{Change in Sales}}$$

Alternatively $$DCL = DOL \times DFL$$

$$= \frac{\text{Contribution}}{\text{EBIT}} \times \frac{\text{EBIT}}{\text{EBT}}$$

$\therefore$ $$DCL = \frac{\text{Contribution}}{\text{EBT}}$$

Note: If Preference Share exists in the capital structure the above formula will be revised as:

$$DCL = \frac{\text{Contribution}}{\text{EBT} - \frac{P_d}{1-t}}$$

where the notations have their usual meanings.

Example:

X Limited has given the following information:

	Rs
Sales	10,00,000
Variable costs	6,00,000
Fixed costs	1,50,000
Interest	75,000

Calculate the degree of combined leverage from the above data.

Solution: We know $\text{Degree of combined leverage (DCL)} = \frac{\text{Contribution}}{\text{EBT}}$

Here

$$\text{Contribution} = \text{Sales} - \text{Variable cost} = \text{Rs } 10,00,000 - 6,00,000 = \text{Rs } 4,00,000$$

$$\text{EBT} = \text{Contribution} - \text{Fixed cost} - \text{Interest} = \text{Rs } 4,00,000 - 1,50,000 - 75,000 = 1,75,000$$

$$\therefore \quad \text{DCL} = \frac{\text{Rs } 4,00,000}{\text{Rs } 1,75,000} = 2.29$$

CONCLUSION ON LEVERAGES

1.Leverage is a double-edged sword; if used properly it will enhance the operating efficiency of the firm by increasing the EBIT in response to sales (operating leverage) and maximize the return to shareholders by increasing the EPS in response to EBIT.

2. Simultaneously if not used properly, the results could be disastrous in the sense that the firm's operating risk and financial risk both increase.

3.Business enterprises use the leverage opportunities depending upon their risk taking ability or risk aversion that in turn depend upon the corporate philosophy of the management – whether they are conservative or aggressive. If they are conservative, they would like to operate at a very low leverage level – the DOL and DFL could be less than 1 and on the contrary if they are aggressive, the level of leverages would also increase – the DOL and DFL would be well above 1

Problem 35: The capital structure of Moon Ltd. is given below:

	₹(Lakh)
Equity share capital (₹10 each per share)	10.00
Retained earning	6.00
10% preference share capital	4.00
	20.00

The firm has planned to undertake an expansion scheme of ₹10,00,000 which can be financed (i) entirely by issue of equity shares of ₹10 each; or (ii) by issue of 12% debentures of ₹100 each at par.

As a result of expansion, sales and operating fixed cost will increase by 60% and 75% respectively. The other relevant information are given below :

Sales	₹50,00,000
Variable Cost	60%
Operating Fixed Cost	₹5,00,000
Corporate tax	40%

Calculate leverages and EPS before and after expansion and give your opinion for taking appropriate decision with respect to financing. ***[C.U.B.Com(H) 2010]***

Solution:

Calculation of leverages and EPS

Particulars	Before expansion (₹)	After expansion	
		(i) by Equity Shares (₹)	(ii) by 12% Debentures (₹)
(a) Sales	50,00,000	80,00,000	80,00,000
(b) Variable Cost	30,00,000	48,00,000	48,00,000
(c) Contribution (a – b)	20,00,000	32,00,000	32,00,000
(d) Operating Fixed Cost	5,00,000	8,75,000	8,75,000
(e) EBIT	15,00,000	23,25,000	23,25,000
(f) Interest on Debentures	—	—	1,20,000
(g) EBT (e – f)	15,00,000	23,25,000	22,05,000
(h) Corporate Tax	6,00,000	9,30,000	8,82,000
(i) EAT (g – h)	9,00,000	13,95,000	13,23,000
(j) Preference dividend	40,000	40,000	40,000
(k) EAES	8,60,000	13,55,000	12,83,000
(l) No. of Equity Shares	1,00,000	2,00,000	1,00,000
(m) EPS (k ÷ l)	8.60	6.775	12.83
(n) DOL (c ÷ e)	1.33	1.38	1.38
(o) DFL (e ÷ g – j / 1 – t)	1.05	1.03	1.09
(p) DCL (n × o)	1.40	1.42	1.50

Comment : Before expansion EPS was ₹8.60. If the expansion is financed by equity share, EPS will come down to ₹6.775 and the firm cdannot take the benefit of financial leverage as there is no debt capital.

If the firm makes its plan to undertake the expansion scheme by issuing 12% debentures, EPS will go up from ₹8.60 to ₹12.83 and DFL is also reasonable.

Therefore, the expansion scheme by issuing 12% debenture should be accepted.

Problem 39: Calculate operating leverage and financial levarage under situations I and II and financial plans A and B, respectively, from the following information relating to the operation and capital structure of a company. What are the combinations of operating and financial leverage which give highest and least value?

Installed Capacity	2,000 units
Actual production and sales	50% of installed capacity
Selling Price per unit	₹20
Variable Cost per unit	₹10

Fixed Cost:
Situation I: ₹ 4,000
Situation II: ₹ 5,000

Capital Structure	Financial Plans	
	A ₹	B ₹
Equity	5,000	15,000
Debt (Cost of Debt = 10%)	15,000	5,000
	20,000	20,000

[I.C.W.A. Final & C.A. Final—Adapted]

Solution:

Actual Production & Sales = 50% of Installed capacity i.e. (2,000 x 50%) = 1,000 units

Statement showing the computation of Operating, Fianancial and Combined Leverages

Particulars	Financial Plans			
	A		B	
	Situation I	Situation II	Situation I	Situation II
	₹	₹	₹	₹
Sales (1,000 x ₹ 20)	20,000	20,000	20,000	20,000
Less: Variable Cost (1,000 x ₹10)	10,000	10,000	10,000	10,000
Contribution	10,000	10,000	10,000	10,000
Less: Fixed Cost	4,000	5,000	4,000	5,000
EBIT	6,000	5,000	6,000	5,000
Less: Interest	1,500	1,500	500	500
EBT	4,500	3,500	5,500	4,500
(i) Operating Leverage $\left(= \frac{\text{Contribution}}{\text{EBIT}}\right)$	$\frac{10,000}{6,000}$ = 1.67	$\frac{10,000}{5,000}$ = 2.00	$\frac{10,000}{6,000}$ = 1.67	$\frac{10,000}{5,000}$ = 2.00
(ii) Financial Leverage $\left(= \frac{\text{EBIT}}{\text{EBT}}\right)$	$\frac{6,500}{4,500}$ = 1.33	$\frac{5,000}{3,500}$ = 1.43	$\frac{6,000}{5,500}$ = 1.09	$\frac{5,000}{4,500}$ = 1.11
(iii) Combined Leverage $\left(= \frac{\text{Contribution}}{\text{EBIT}}\right)$	$\frac{10,000}{4,500}$ = 2.22	$\frac{10,000}{3,500}$ = 2.86	$\frac{10,000}{5,500}$ = 1.82	$\frac{10,000}{4,500}$ = 2.22
Alternatively, Combined Leverage = Operating Leverage x Financial Leverage	= 1.67 x 1.33 = 2.22	= 2.00 x 1.43 = 2.86	= 1.67 x 1.09 = 1.82	= 2.00 x 1.11 = 2.22

Problem 14: Following financial results are available from companies A, B and C for the last financial year:

Particulars	Co. A	Co. B	Co. C
Variable cost (on sales)	$66\frac{2}{3}$ %	75%	50%
Interest on borrowed capital	₹40,000	₹60,000	₹2,00,000
DOL	5 : 1	6 : 1	2 : 1
DFL	3 : 1	4 : 1	2 : 1
Income tax rate	50%	50%	50%

(a) Prepare income statements for Co. A, Co. B and Co. C

(b) Comment on the financial position and structure of these companies. ***[C.A. Final]***

[C.U.BCom(H), 2019, Similar Problem]

Solution:

- **In case of Company A:**

DFL = 3 : 1 i.e. $\frac{\text{EBIT}}{\text{EBIT} - 1} = 3$

or, 3 EBIT – 3I = EBIT

or, 2 EBIT = 3I or, EBIT = $\frac{3 \times ₹40,000}{2}$ = ₹60,000

Again, DOL = $\frac{\text{Contribution}}{\text{EBIT}}$ = 5 (given)

∴ Contribution = 5 EBIT = 5 x ₹60,000 = ₹3,00,000

∴ Sales Value = $\frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{₹3,00,000}{33\frac{1}{3}\%}$ = ₹9,00,000

Operating fixed cost = Contribution – EBIT = ₹2,40,000

As variable cost = $66\frac{2}{3}\%$ on sales

Therefore, C = $100 - 66\frac{2}{3}\% = 33\frac{1}{3}\%$ on sales

∴ P/V ratio = $33\frac{1}{3}\%$

- **In case of Company B:**

DFL = 4 : 1 i.e. $\frac{\text{EBIT}}{\text{EBIT} - 1} = 4$

or, 4EBIT – 4.1 = EBIT

or, 3EBIT = 4.1 or, EBIT = $\frac{4 \times ₹60,000}{3}$ = ₹80,000

Again, DOL $= \frac{\text{Contribution}}{\text{EBIT}} = 6$

$\therefore$ Contribution $= 6 \times ₹80,000 = ₹4,80,000$

Operating fixed cost = contribution – EBIT = ₹40,00,000

$\therefore$ Sales Value $= \frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{₹4,80,000}{25\%} = ₹19,20,000$

As variable cost = 75% on sales,
$\therefore$ C = 25% on sales,
$\therefore$ P/V ratio = 25%

- **In case of Company C:**

DFL = 2 : 1 or, $\frac{\text{EBIT}}{\text{EBIT} - I} = 2$

or, 2EBIT – 2I = EBIT
or, EBIT = 2I
or, EBIT = 2 x ₹2,00,000 = ₹4,00,000

Again, DOL $= \frac{\text{Contribution}}{\text{EBIT}} = 2$

$\therefore$ Contribution = 2 x EBIT = ₹8,00,000

Operating fixed cost = Contribution – EBIT = ₹4,00,000

$\therefore$ Sales Value $= \frac{\text{Contribution}}{\text{P/V Ratio}} = \frac{₹8,00,000}{50\%} = ₹16,00,000$

As variable cost = 50% on sales
$\therefore$ C = 50% on sales,
$\therefore$ P/V ratio = 50%

(a) *Income Statement*

Particulars	Co.A ₹	Co.B ₹	Co.C ₹
Sales Value	9,00,000	19,20,000	16,00,000
Less: Variable costs	6,00,000	14,40,000	8,00,000
Contribution	3,00,000	4,80,000	8,00,000
Less: Operating fixed cost	2,40,000	4,00,000	4,00,000
EBIT	60,000	80,000	4,00,000
Less: Interest on borrowed capital	40,000	60,000	2,00,000
EBT	20,000	20,000	2,00,000
Less: Tax @ 50%	10,000	10,000	1,00,000
EAT	10,000	10,000	1,00,000
Interest coverage ratio $\left(\frac{\text{EBIT}}{\text{I}}\right)$	1.50	1.33	2.00


Thank
you