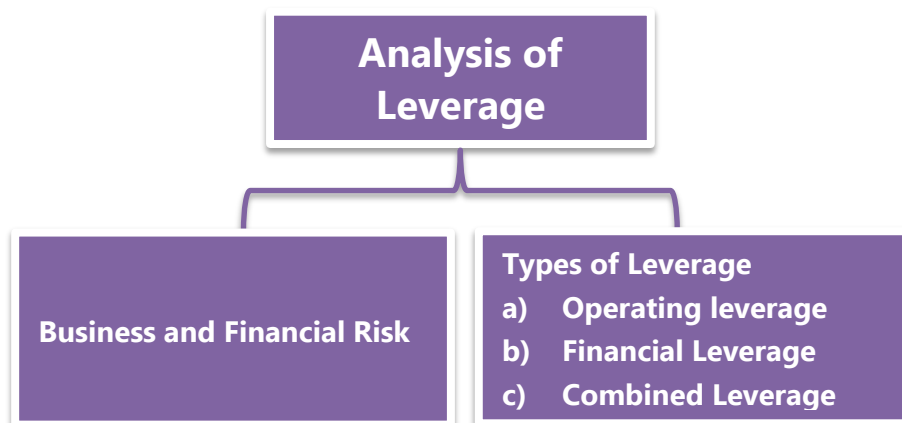


Financing Decisions - Leverages

CHAPTER OVERVIEW



3.1 Introduction

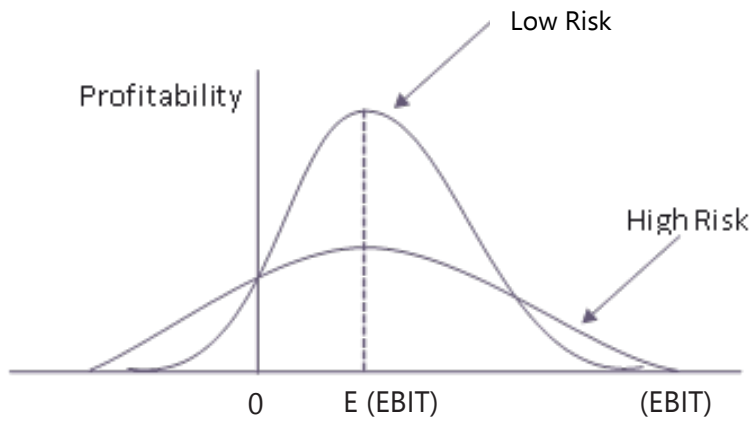
- A firm can finance its operations through common and preference shares, with **retained earnings, or with debt**. Usually a firm uses a combination of these financing instruments.
- Capital structure refers to a firm's debt-to-equity ratio, which provides insight into how risky a company is. Capital structure decisions by firms will have an effect on the **expected profitability of the firm**, the risks faced by debt holders and shareholders, the **probability of failure**, the **cost of capital** and the **market value of the firm**.

3.1.1 Business Risk and Financial Risk

- Risk facing the common shareholders is of two types, namely business risk and financial risk. Therefore, the **risk faced by common shareholders is a function of these two risks, i.e. Business Risk, Financial Risk**

a) Business Risk:- It refers to the **risk associated with the firm's operations**. It is the **uncertainty about the future operating income (EBIT)**, i.e. how well can the operating incomes be predicted?

Business risk can be measured by the standard deviation of the Basic Earning Power ratio.



b) Financial Risk:- It refers to the additional risk placed on the firm's shareholders as a result of debt use i.e. the additional risk a shareholder bears when a company uses debt in addition to equity financing. Companies that issue more debt instruments would have higher financial risk than companies financed mostly or entirely by equity.

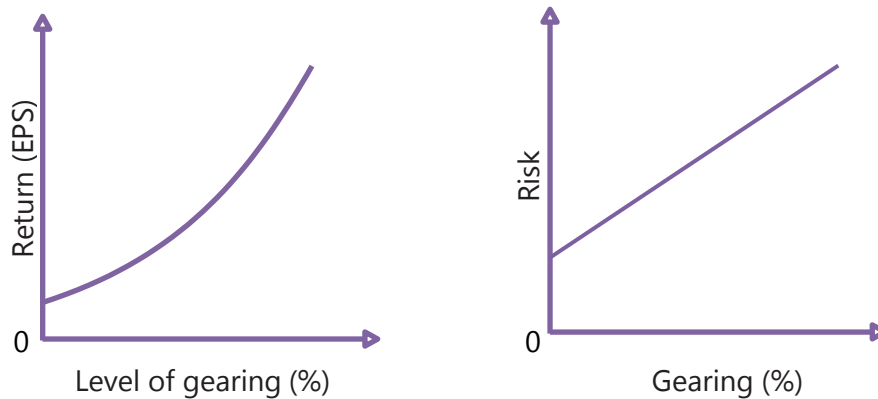
Risk	Business Risk	Financial Risk
a) Meaning	It is associated with firm's operation's, and refers to the uncertainty about future Net Operating Income (EBIT)	It is the additional risk placed on Equity Shareholders due to the use of Debt Funds.
b) Measurement	It can be measured by the standard deviation of the Basic Earning power, i.e. ROCE.	It can be measured using ratios like leverage multiplier, Debt to assets, etc.
c) Linked to	Economic Climate.	Use of Debt Funds.
d) Reduction	Every firm would be susceptible to business risk due to changes in the overall economic climate & business operating conditions.	A firm which is entirely financed by equity (i.e. an unlevered Firm) will have almost no financial risk.

3.2 Debt versus Equity Financing

- Financing a business through borrowing is cheaper than using equity. This is because:
 - a) Lenders require a lower rate of return than ordinary shareholders. Debt financial securities present a lower risk than shares for the finance providers because they have prior claims on annual income and liquidation.
 - b) A profitable business effectively pays less for debt capital than equity for another reason: the debt interest can be offset against pre-tax profits before the calculation of the corporate tax, thus reducing the tax paid.
 - c) Issuing and transaction costs associated with raising and servicing debt are generally less than for ordinary shares.
- These are some benefits from financing a firm with debt. Still firms tend to avoid very high gearing levels.
- One reason is financial distress risk. This could be induced by the requirement to pay interest

regardless of the cash flow of the business. If the firm goes through a rough period in its business activities it may have trouble paying its bondholders, bankers and other creditors their entitlement.

- The relationship between Expected return (Earnings per share) and the level of gearing can be represented as:



Relationship between leverage and risk

- Leverage can occur in either the operating or financing portions of the income statement.
- The effect of leverage is to magnify the effects of changes in sales volume on earnings. Let's now discuss in detail Operating, Financing and Combined Leverages.

3.3 Meaning and Types of Leverage

3.3.1 Meaning of Leverage

- Leverage refers to the ability of a firm in employing long term funds having a fixed cost, to enhance returns to the owners. In other words, leverage is the amount of debt that a firm uses to finance its assets. A firm with a lot of debt in its capital structure is said to be highly levered. A firm with no debt is said to be unlevered.
- The term Leverage in general refers to a relationship between two interrelated variables. In financial analysis it represents the influence of one financial variable over some other related financial variable. These financial variables may be costs, output, sales revenue, Earnings Before Interest and Tax (EBIT), Earning per share (EPS) etc.

3.3.2 Types of Leverage

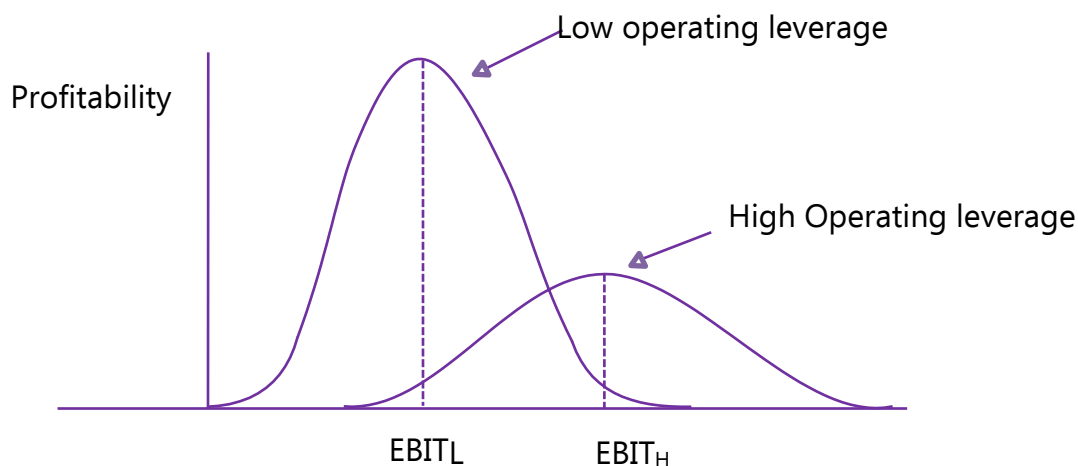
- There are three commonly used measures of leverage in financial analysis. These are:
 - a) Operating Leverage
 - b) Financial Leverage
 - c) Combined Leverage

3.3.3 Chart Showing Operating Leverage, Financial Leverage and Combined leverage

Profitability Statement			
Sales	xxx		
Less: Variable Cost	(xxx)		
Contribution	xxx	Operating Leverage	Combined Leverage
Less: Fixed Cost	(xxx)		
Operating Profit/ EBIT	xxx		
Less: Interest	(xxx)	Financial Leverage	
Earnings Before Tax (EBT)	xxx		
Less: Tax	(xxx)		
Profit After Tax (PAT)	xxx		
Less: Pref. Dividend (if any)	(xxx)		
Net Earnings available to equity shareholders/ PAT	xxx		
No. Equity shares (N)	xxx		
Earnings per Share (EPS) = (PAT ÷ N)	xxx		

3.3.4 Operating Leverage

- Operating leverage (OL) may be defined as the employment of an asset with a fixed cost in the hope that sufficient revenue will be generated to cover all the fixed and variable costs.
- The use of assets for which a company pays a fixed cost is called operating leverage. With fixed costs the percentage change in profits accompanying a change in volume is greater than the percentage change in volume. The higher the turnover of operating assets, the greater will be the revenue in relation to the fixed charge on those assets.



- Operating leverage is a function of three factors:
 - Amount of fixed cost**
 - Variable contribution margin and**
 - Volume of sales.**

$$\text{Operating Leverage (OL)} = \frac{\text{Contribution (C)}}{\text{Earnings before interest and tax (EBIT)}}$$

Where, $\text{Contribution (C)} = \text{Sales} - \text{Variable cost}$
 $\text{EBIT} = \text{Sales} - \text{Variable cost} - \text{Fixed cost}$

3.3.5 Break-Even Analysis and Leverage

- Break-even analysis is a generally used method to study the **Cost Volume Profit analysis**. This technique can be explained in two ways:
 - It is concerned with computing the break-even point. At this point of **production level and sales there will be no profit and loss i.e. total cost is equal to total sales revenue**.
 - This technique is **used to determine the possible profit/loss at any given level of production or sales**.

$$\text{Break-even point in units} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

- There is a **relationship between leverage and Break-even point**. Both are used for profit planning. In brief the relationship between leverage, break-even point and fixed cost as under.

Leverage	Break-even point
1. Firm with leverage	1. Higher Break-even point
2. Firm with no leverage	2. Lower Break-even point

Fixed cost	Operating leverage
1. High fixed cost	1. High degree of operating leverage
2. Lower fixed cost	2. Lower degree of operating leverage

3.3.6 Degree of Operating Leverage (DOL)

- The operating leverage may also be defined as **"the firm's ability to use fixed operating cost to magnify the effects of changes in sales on its earnings before interest and taxes."**

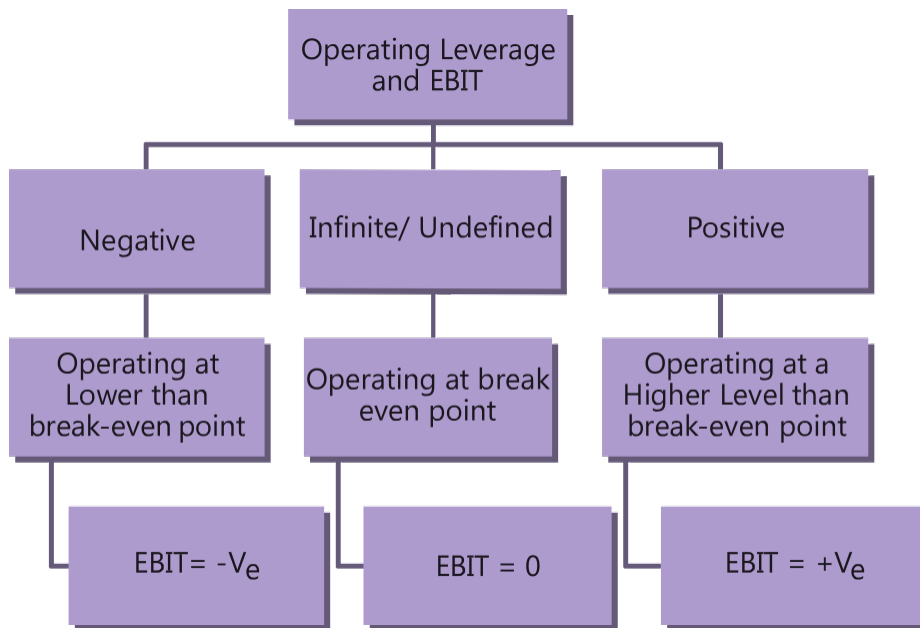
$$\text{Degree of Operating Leverage (DOL)} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in Sales}}$$

Or

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

- Δ EBIT means changes in EBIT
- Δ Sales means changes in Sales
- When DOL is more than one (1), operating leverage exists. **More is the DOL higher is operating leverage.**

- A positive DOL/OL means that the firm is operating at higher level than the break-even level and both sales and EBIT moves in the same direction. In case of negative DOL/OL firm operates at lower than the break-even and EBIT is negative.



Positive and Negative Operating Leverage

Analysis and Interpretation of operating leverage

Sr. No.	Situation	Result
1	No Fixed Cost	No operating leverage
2.	Higher Fixed cost	Higher Break-even point
3.	Higher than Break-even level	Positive operating leverage
4.	Lower than Break-even level	Negative operating leverage

1

X Limited has estimated that for a new product its break-even point is 20,000 units if the item is sold for ₹ 14 per unit and variable cost ₹ 9 per unit. Calculate the degree of operating leverage for sales volume 25,000 units and 30,000 units.

3.3.7 Financial Leverage

- Financial leverage (FL) maybe defined as 'the use of funds with a fixed cost in order to increase earnings per share. In other words, it is the use of company funds on which it pays a limited return.
- Financial leverage involves the use of funds obtained at a fixed cost in the hope of increasing the return to common stockholders.

$$\text{Financial Leverage (FL)} = \frac{\text{Earnings before interest and tax (EBIT)}}{\text{Earnings before tax (EBT)}}$$

Where, $EBIT = Sales - Variable\ cost - Fixed\ cost$
 $EBT = EBIT - Interest$

3.3.8 Degree of Financial Leverage (DFL)

- Degree of financial leverage is the ratio of the percentage increase in earnings per share (EPS) to the percentage increase in earnings before interest and taxes (EBIT).
- Financial Leverage (FL) is also defined as 'the ability of a firm to use fixed financial charges to magnify the effect of changes in EBIT on EPS'.

$$\text{Degree of Financial Leverage (DFL)} = \frac{\text{Percentage change in Earning per share (EPS)}}{\text{Percentage change in Earnings before Interest \& Tax (EBIT)}}$$

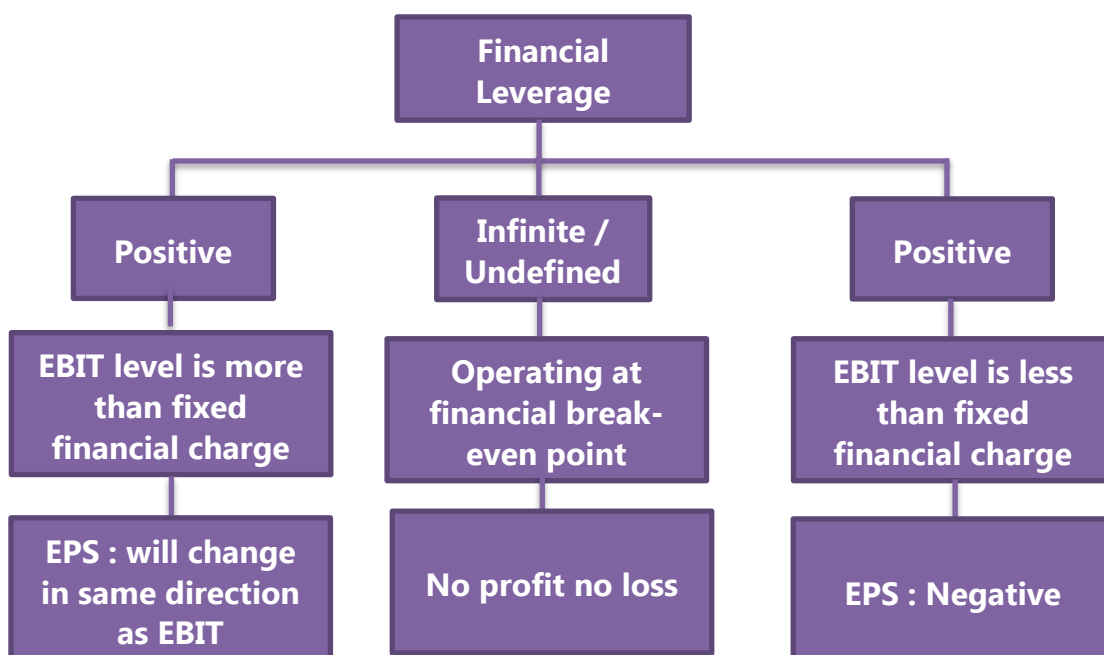
Or

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

- ΔEPS means change in EPS and $\Delta EBIT$ means change in EBIT.
- When DFL is more than one (1), financial leverage exists. More is DFL higher is financial leverage.
- A positive DFL/ FL means firm is operating at a level higher than break-even point and EBIT and EPS moves in the same direction. Negative DFL/ FL indicates the firm is operating at lower than break-even point and EPS is negative.

2 A firm has Sales of ₹ 40 lakhs; Variable cost of ₹ 25 lakhs; Fixed cost of ₹ 6 lakhs; 10% debt of ₹ 30 lakhs; and Equity Capital of ₹ 45 lakhs.

Required: Calculate operating and financial leverage.



- Analysis and Interpretation of Financial leverage

Sr. No.	Situation	Result
1	No Fixed Financial Cost	No Financial leverage
2.	Higher Fixed Financial cost	Higher Financial Leverage
3.	When EBIT is higher than Financial Break-even point	Positive Financial leverage
4.	When EBIT is less than Finance Break-even point	Negative Financial leverage

3.3.9 Financial Leverage as 'Trading on Equity'

- Financial leverage indicates the use of funds with fixed cost like long term debts and preference share capital along with equity share capital which is known as trading on equity.
- The basic aim of financial leverage is to increase the earnings available to equity shareholders using fixed cost fund.
- A firm is known to have a positive leverage when its earnings are more than the cost of debt.
- If earnings is equal to or less than cost of debt, it will be an unfavourable leverage.
- When the quantity of fixed cost fund is relatively high in comparison to equity capital it is said that the firm is "trading on equity".

3.3.10 Financial Leverage as a 'Double edged Sword'

- On one hand when cost of 'fixed cost fund' is less than the return on investment financial leverage will help to increase return on equity and EPS.
- The firm will also benefit from the saving of tax on interest on debts etc. However, when cost of debt will be more than the return it will affect return of equity and EPS unfavourably and as a result firm can be under financial distress. This is why financial leverage is known as "double edged sword".
- Effect on EPS and ROE:
 When, ROI > Interest – Favourable Advantage
 When, ROI < Interest – Unfavourable – Disadvantage
 When, ROI = Interest – Neutral – Neither advantage nor disadvantage.

3.3.11 Combined Leverage

- Combined leverage maybe defined as the potential use of fixed costs, both operating and financial, which magnifies the effect of sales volume change on the earning per share of the firm.

$$\text{Combined Leverage (CL)} = \text{Operating Leverage (OL)} \times \text{Financial Leverage (FL)}$$

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

$$= \frac{C}{\text{EBT}}$$

3.3.12 Degree of Combined Leverage (DCL)

- Degree of combined leverage (DCL) is the ratio of percentage change in earning per share to the percentage change in sales. It indicates the effect the sales changes will have on EPS.

$$DCL = DOL \times DFL$$

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

- Like operating leverage and financial leverage, combined leverage can also be positive and negative combined leverage.
- Analysis and Interpretation of Combined leverage.

SR. No.	Situation	Result
1.	No Fixed Cost and Fixed Financial Fixed Cost	No Combined leverage
2.	Higher Fixed cost	Higher Combined Leverage
3.	Sales level higher than break-even level	Positive combined leverage
4.	Sales leverage lower than break-even level	Negative Combined leverage

3

Calculate the operating leverage, financial leverage and combined leverage for the following firms and interpret the results:

	P	Q	R
Output (units)	2,50,000	1,25,000	7,50,000
Fixed Cost (₹)	5,00,000	2,50,000	10,00,000
Unit Variable Cost (₹)	5	2	7.50
Unit Selling Price (₹)	7.50	7	10.0
Interest Expense (₹)	75,000	25,000	-

3.4 Ideal Combination of Leverage

- Combined leverage is analysed by reference to the combination of DOL and DFL, as under-

DOL	DFL	Effect	Reasons and Significance
High	High	Risky	High DOL - High operating risk - High fixed costs & BEP. High DFL - Small fall in EBIT will lead to greater fall in EBT.
High	Low	Careful	High DOL's impact is sought to be set off with low financial risk. Hence equity shareholders interest is safeguarded.

Low	Low	Cautious & Conservative	Low DOL - Low operating risk - Low fixed costs & BEP. But Equity shareholder's gains are not maximized, since DFL is low.
Low	High	Preferable	Low DOL - Low operating risk - Low fixed costs & BEP. Due to high DFL (favorable gearing), small rise in EBIT leads to greater rise in EBT and EPS. Hence Equity shareholders gains are maximized.

3.5 Relationship between Sales & Capital Employed

- Increase in sales leads to **increase in EBIT, EBT and ROI**. Hence, a firm may be tempted to try to **raise its capital Turnover Ratio** (i.e. $\text{Sales} \div \text{Capital employed}$) without restraint, merely by increasing the numerator (i.e. Sales).
- However, as a sales increases, **there is a need for increase in the amount of capital base** (i.e. funds employed), both fixed assets and net working capital. **Extra production can be achieved only by installing more machinery** (i.e. Fixed Assets). Increase in activity levels **also entail more purchase of Raw materials** (hence more stockholding and creditors), more money blocked in debtors, etc.
- Hence, **as sales increases, both current assets and current liabilities also increase**, but **not necessarily in proportion to the current ratio**. Hence current ratio may register a **fall and affect the liquidity position of the firm adversely**.
- To avoid this adverse effect, an increase in sales and activity levels, **must be supported by an adequate capital base and increase in the amount of funds employed**, more particularly in **working capital**.

4

Following information are related to four firms of the same industry :

Firm	Change in Revenue	Change in Operating Income	Change in EPS
M	28%	26%	32%
N	27%	34%	26%
P	25%	38%	23%
Q	23%	43%	27%
R	25%	40%	28%

You are required to calculate – 1) Degree of Operating Leverage and
2) Degree of Combined Leverage, of all firms

5

The following summarises the percentage changes in operating income, percentage changes in revenues, and betas for four pharmaceutical firms.

Firm	Change in revenue	Change in operating income	Beta
PQR Ltd.	27%	25%	1.00
RST Ltd.	25%	32%	1.15
TUV Ltd.	23%	36%	1.30
WXY Ltd.	21%	40%	1.40

Required:

- 1) Calculate the degree of operating leverage for each of these firms. Comment also.
- 2) Use the operating leverage to explain why these firms have different beta.

6 Consider the following information for Omega Ltd.:

	₹ in lakhs
EBIT (Earnings before Interest and Tax)	15,750
Earnings before Tax (EBT):	7,000
Fixed Operating costs:	1,575

Calculate percentage change in earnings per share, if sales increase by 5%.

7 You are given two financial plans of a company which has two financial situations. The detailed information are as under:

Installed capacity - 10,000 units

Actual production and sales – 60% of installed capacity

Selling price per unit - ₹ 30

Variable cost per unit - ₹ 20

Fixed cost – Situation 'A' = ₹ 20,000, Situation 'B' = ₹ 25,000

Capital structure of the company is as follows-

	Financial Plans	
	XY (₹)	XM (₹)
Equity	12,000	35,000
Debt (Cost of debt 12%)	40,000	10,000
	<u>52,000</u>	<u>45,000</u>

You are required to calculate Operating Leverage and Financial Leverage of both the plans.

8 Z Limited is considering the installation of a new project costing ₹ 80,00,000. Expected annual sales revenue from the project is ₹ 90,00,000 and its variable costs are 60 percent of sales. Expected annual fixed cost other than interest is ₹ 10,00,000. Corporate tax rate is 30 percent. The company wants to arrange the funds through issuing 4,00,000 equity shares of ₹ 10 each and 12 percent debentures of ₹ 40,00,000.

You are required to:

- i) Calculate the operating, financial and combined leverages and Earnings per Share (EPS).
- ii) Determine the likely level of EBIT, if EPS is ₹ 4, or ₹ 2, or Zero.

9 A Company had the following Balance Sheet as on March 31, 2017.

Liabilities and Equity	Amount (₹)	Assets	Amount (₹)
Equity Share Capital of ₹10 each	40,00,000	Fixed Assets (Net)	1,28,00,000
Reserves and Surplus	8,00,000	Current Assets	32,00,000
15% Debentures	80,00,000		
Current Liabilities	32,00,000		
	<u>1,60,00,000</u>		<u>1,60,00,000</u>

The additional information given is as under:

Fixed cost per annum (excluding Interest) - ₹ 32,00,000

Variable Operating Cost Ratio – 70%

Total Assets Turnover Ratio – 2.5

Income Tax Rate – 30%

Calculate the following and comment:

- i) Earnings per share
- ii) Operating Leverage
- iii) Financial Leverage
- iv) Combined Leverage.

10

A Company had the following Balance Sheet as on March 31, 2017.

Liabilities and Equity	Amount (₹)	Assets	Amount (₹)
Equity Share Capital of ₹10 each	10,00,000	Fixed Assets	30,00,000
Reserves and Surplus	2,00,000	Current Assets	18,00,000
15% Debentures	28,00,000		
Current Liabilities	8,00,000		
	48,00,000		48,00,000

The additional information given is as under:

Fixed cost per annum (excluding Interest) - ₹ 28,00,000

Variable Operating Cost Ratio – 60%

Total Assets Turnover Ratio – 2.5

Income Tax Rate – 30%

Calculate the following and comment:

- i) Earnings per share
- ii) Combined Leverage.

11

The following information related to YZ Company Ltd for the year ended 31st March –

Equity share capital of ₹ 10 each	₹ 50 Lakhs	Financial Leverage	1.49
12% bonds of ₹ 1,000 each	₹ 37 Lakhs	Profit – Volume Ratio	27.55%
Sales	₹ 84 Lakhs	Income tax rate applicable	40%
Fixed Cost (excluding Interest)	₹ 6.96 Lakhs		

Calculate – a) Operating leverage b) Combined Leverage c) Earning per Share (Upto two decimal points)

12

The Capital structure of RST Ltd. is as follows:

	(₹)
Equity Share of ₹ 10 each	8,00,000
10% Preference Share of ₹ 100 each	5,00,000
12% Debentures of ₹ 100 each	7,00,000
	20,00,000

Additional information -

- a) Profit after tax (Tax Rate 30%) are of ₹ 2,80,000
- b) Operating Expenses (including Depreciation of ₹ 96,800) are 1.5 times of EBIT
- c) Equity Dividend paid is 15%
- d) Market price of Equity Share is of ₹ 23

Calculate:

- a) Operating and Financial Leverage
- b) Cover for preference and equity dividend
- c) The Earning Yield Ratio and Price Earning Ratio
- d) The Net Fund Flow

13

A company operates at a production level of 5,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

14

A company operates at a production level of 1,000 units. The contribution is ₹ 60 per unit, operating leverage is 6, and combined leverage is 24. If tax rate is 30%, what would be its earnings after tax?

15

From the following financial data of Company A and Company B: Prepare their Income Statements.

	Company A (₹)	Company B (₹)
Variable Cost	56,000	60% of sales
Fixed Cost	20,000	-
Interest Expenses	12,000	9,000
Financial Leverage	5 : 1	-
Operating Leverage	-	4 : 1
Income Tax Rate	30%	30%
Sales	-	1,05,000

16

From the following details of X Ltd., prepare the Income Statement for the year ended 31st December, 2017:

Financial Leverage	2
Interest	₹ 2,000
Operating Leverage	3
Variable cost as a percentage of sales	75%
Income tax rate	30%

17

The following details of RST Limited for the year ended 31st March, 2015 are given below:

Operating Leverage	1.4 times
Combined Leverage	2.8 times
Income Tax Rate	30%
Fixed cost (Excluding Interest)	₹ 2.04 Lakhs
Sales	₹ 30.00 Lakhs
12% Debentures of ₹ 100 each	₹ 21.25 Lakhs
Equity share capital of ₹ 10 each	₹ 17.00 Lakhs

- Calculate Financial leverage
- Calculate P/V ratio and Earning per Share (EPS)
- If the company belongs to an industry, whose assets turnover is 1.5, does it have a high or low assets Leverage?
- At what level of sales the Earning before Tax (EBT) of the company will be equal to zero?

18

Delta Ltd. currently has an equity share capital of ₹ 10,00,000 consisting of 1,00,000 Equity share of ₹ 10 each. The company is going through a major expansion plan requiring to raise funds to the tune of ₹ 6,00,000. To finance the expansion the management has following plans:

Plan-I : Issue 60,000 Equity shares of ₹ 10 each

Plan-II : Issue 40,000 Equity shares of ₹ 10 each and the balance through long-term borrowing at 12% interest p.a.

Plan-III : Issue 30,000 Equity shares of ₹ 10 each and 3,000, 9% Debentures of ₹ 100 each

Plan-IV : Issue 30,000 Equity shares of ₹ 10 each and the balance through 6% preference shares.

The EBIT of the company is expected to be ₹ 4,00,000 p.a. assume corporate tax rate of 40%.
Required:

- Calculate EPS in each of the above plans.
- Ascertain financial leverage in each plan.

19

The net sales of A Ltd. is ₹ 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises ₹ 10 crores of equity, ₹ 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of ₹ 6 crores. Income-tax rate is 40%.

- Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).
- Calculate WACC for the above company.
- Calculate the Operating Leverage of the Company given that combined leverage is 3.

20

The capital structure of ABC Ltd. as at 31.3.15 consisted of ordinary share capital of ₹ 5,00,000 (face value ₹ 100 each) and 10% debentures of ₹ 5,00,000 (₹ 100 each). In the year ended with March 15, sales decreased from 60,000 units to 50,000 units. During this year and in the previous year, the selling price was ₹ 12 per unit; variable cost stood at ₹ 8 per unit and fixed expenses were at ₹ 1,00,000 p.a. The income tax rate was 30%.

You are required to calculate the following:

- i) The percentage of decrease in earnings per share.
- ii) The degree of operating leverage at 60,000 units and 50,000 units.
- iii) The degree of financial leverage at 60,000 units and 50,000 units.

21

A firm has sales of ₹ 75,00,000 variable cost is 56% and fixed cost is ₹ 6,00,000. It has a debt of ₹ 45,00,000 at 9% and equity of ₹ 55,00,000.

- i) What is the firm's ROI?
- ii) Does it have favourable financial leverage?
- iii) If the firm belongs to an industry whose capital turnover is 3, does it have a high or low capital turnover?
- iv) What are the operating, financial and combined leverages of the firm?
- v) If the sales is increased by 10% by what percentage EBIT will increase?
- vi) At what level of sales the EBT of the firm will be equal to zero?
- vii) EBIT increases by 20%, by what percentage EBT will increase?

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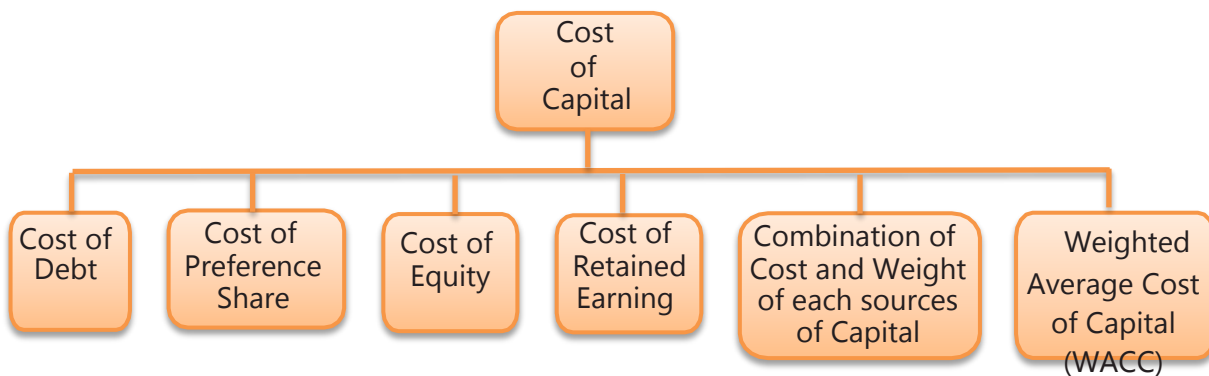
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Cost of Capital

CHAPTER OVERVIEW



4.1 Introduction

- The cost of capital i.e. cost of having capital for long period from different sources of finance. Generally the sources of finance for non - corporate entity could be either internal (savings, investments in current and non-current assets etc.) or external borrowings (loan from financial institutions, local borrowings etc.).

4.2 Meaning of Cost of Capital

- Cost of capital is the return expected by the providers of capital (i.e. shareholders, lenders and the debt-holders) to the business as a compensation for their contribution to the total capital.
- When an entity (corporate or others) procured finances from either sources as listed above, it has to pay some additional amount of money besides the principal amount.
- The additional money paid to these financiers may be either one off payment or regular payment at specified intervals.
- This additional money paid is said to be the cost of using the capital and it is called the cost of capital.
- This cost of capital expressed in rate is used to discount/ compound the cashflow or stream of cashflows.
- Cost of capital is also known as 'cut-off' rate, 'hurdle rate', 'minimum rate of return' etc. It is used as a benchmark for:
 - a) Framing debt policy of a firm.
 - b) Educating Capital budgeting decisions.

4.3 Significance of the Cost of Capital

- The cost of capital is important to arrive at correct amount and helps the management or an investor to take an appropriate decision.
- The correct cost of capital helps in the following decision making:

i) Evaluation of investment options:

The **estimated benefits (future cashflows) from available investment opportunities (business or project) are converted into the present value of benefits by discounting them with the relevant cost of capital.** Here it is pertinent to mention that every investment option may have different cost of capital hence it is very important to use the cost of capital which is relevant to the options available. Here Internal Rate of Return (IRR) is treated as cost of capital for evaluation of two options (projects).

ii) Performance Appraisal:

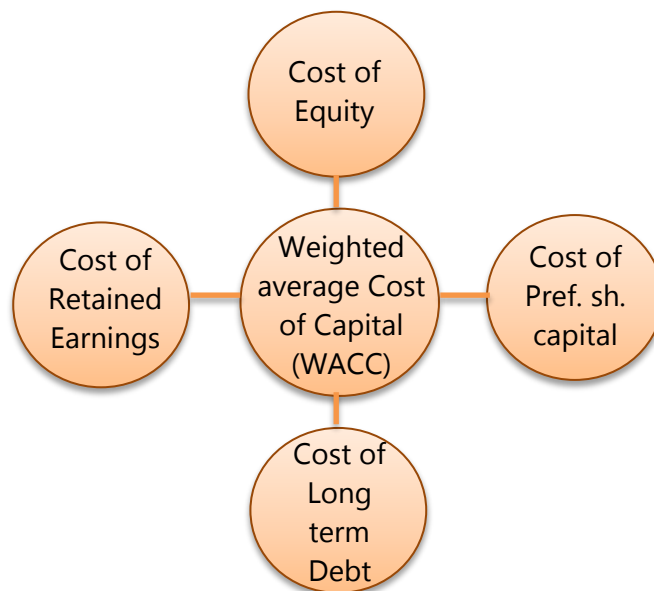
Cost of capital is used to **appraise the performance of a particular project or business.** The performance of a project or business is compared against the cost of capital which is known here as cut-off rate or hurdle rate.

iii) Designing of optimum credit policy:

While appraising the credit period to be allowed to the customers, the **cost of allowing credit period is compared against the benefit/ profit earned by providing credit to customer of segment of customers.** Here cost of capital is used to arrive at the present value of cost and benefits received.

4.4 Determination of the Cost of Capital

- The **cost of capital can either be explicit or implicit.** The cash outflow of an entity towards the utilization of capital which is clear and obvious is termed as explicit cost of capital.
- These **outflows may be interest payment to debenture holders, repayment of principal amount to financial institution or payment of dividend to shareholders** etc. On the other hand implicit cost is the cost which is actually not a cash outflow but it is an opportunity loss of foregoing a better investment opportunity by choosing an alternative option.
- An entrepreneur for example, uses its bank deposits which earns interest @ of 9% p.a. for the business purpose. Using its bank deposits for business purpose means forgoing interest earnings from the bank on this deposit.
- The cost of capital in this case will be 9% interest that could have been earned by not investing the deposit for the business purpose. This opportunity loss of 9% is called implicit cost capital or opportunity cost.
- The two factors which are considered to determine the cost of capital are:
 - i) **Source of Finance**
 - ii) **Reciprocal payment of the using finance.**
- We will discuss the cost of capital of each source of finance separately.



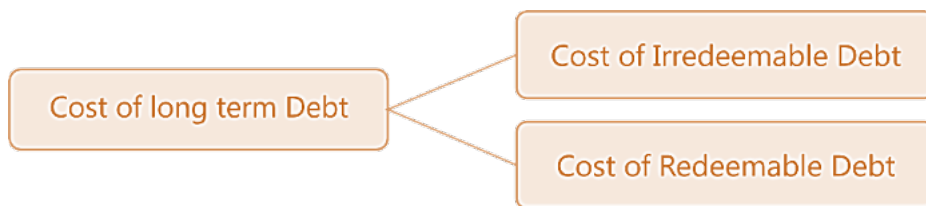
4.5 Cost of Long Term Debt

- External borrowings or debt instruments **do not confers ownership to the providers of finance.**
- The **providers of the debt fund do not participate in the affairs of the company but enjoys the charge on the profit before taxes.**
- Long term debt includes long term loans from the financial institutions, capital from issuing debentures or bonds etc. (In the next chapter we will discuss in detail about the sources of long term debt.).
- As discussed above the external borrowing or debt includes long term loan from financial institutions, issuance of debt instruments like debentures or bonds etc. **The calculation of cost of loan from a financial institution is similar to that of redeemable debentures.** Here we confine our discussion of cost debt to Debentures or Bonds only.

4.5.1 Features of debentures or bonds:

- Face Value:** Debentures or Bonds are **denominated with some value**; this denominated value is called face value of the debenture. Interest is calculated on the face value of the debentures. E.g. If a company issue 9% Non- convertible debentures of ₹ 100 each, this means the face value is ₹ 100 and the interest @ 9% will be calculated on this face value.
- Interest (Coupon) Rate:** Each **debenture bears a fixed interest (coupon) rate** (except Zero coupon bond and Deep discount bond). Interest (coupon) rate is applied to face value of debenture to calculate interest, **which is payable to the holders of debentures periodically.**
- Maturity period:** Debentures or Bonds **has a fixed maturity period for redemption.** However, in case of irredeemable debentures maturity period is not defined and it is taken as infinite.
- Redemption Value:** Redeemable debentures or bonds are **redeemed on its specified maturity date.** Based on the debt covenants the redemption value is determined. **Redemption value may vary from the face value of the debenture.**
- Benefit of tax shield:** The **payment of interest to the debenture holders are allowed as**

expenses for the purpose of corporate tax determination. Hence, interest paid to the debenture holders save the tax liability of the company. Saving in the tax liability is also known as tax shield.



4.5.2 Cost of Irredeemable Debentures

- The cost of debentures which are not redeemed by the issuer of the debenture is known as irredeemable debentures.
- Cost of debentures not redeemable during the life time of the company is calculated as below:

$$\text{Cost of Irredeemable Debenture } (K_d) = \frac{I}{NP} (1-t)$$

Where,

K_d = Cost of debt after tax

I = Annual interest payment

NP = Net proceeds of debentures or current market price

t = Taxrate

4.5.3 Cost of Redeemable Debentures (using approximation method)

- The cost of redeemable debentures will be calculated as below:

$$\text{Cost of redeemable Debenture } (K_d) = \frac{I(1-t) + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}}$$

Where,

I = Interest Payment

NP = Net proceeds from debentures in case of new issue of deb or Current market price in case of existing debt.

RV = Redemption value of debentures

t = Tax rate applicable to the company

n = Life of debentures.

- The above formula to calculate cost of debt is used where only interest on debt is tax deductible. Sometime, debts are issued at discount and/ or redeemed at a premium. If

discount on issue and/ or premium on redemption are tax deductible, the following formula can be used to calculate the cost of debt.

$$\text{Cost of redeemable Debenture (K}_d\text{)} = \frac{I + \frac{(RV - NP)}{n}}{\frac{(RV + NP)}{2}} (1 - t)$$

4.5.4 Cost of Debt using Present value method [Yield to maturity (YTM approach)]

- The cost of redeemable debt (K_d) is also calculated by discounting the relevant cash flows using Internal rate of return (IRR). (The concept of IRR is discussed in the Chapter- Investment Decisions).
- Here YTM is the annual return of an investment from the current date till maturity date. So, YTM is the internal rate of return at which current price of a debt equals to the present value of all cashflows.
- The relevant cash flows are as follows:

Year	Cash flows
0	Net proceeds in case of new issue/ Current market price in case of existing debt (NP or P ₀)
1 to n	Interest net of tax [I(1-t)]
n	Redemption value (RV)

- Steps to calculate relevant cash flows:
 Step-1: Identify the cash flows
 Step-2 : Calculate NPVs of cash flows as identified above using two discount rates.
 Step-3 : Calculate IRR

4.5.5 Amortisation of Bond

- A bond may be amortised every year i.e. principal is repaid every year rather than at maturity.
- In such a situation, the principal will go down with annual payments and interest will be computed on the outstanding amount. The cash flows of the bonds will be uneven.
- The formula for determining the value of a bond or debenture that is amortised every year is as follows:

$$V_B = \frac{C_1}{(1+K_d)^1} + \frac{C_2}{(1+K_d)^2} + \dots + \frac{C_n}{(1+K_d)^n}$$

$$V_B = \sum_{t=1}^n \frac{C_t}{(1+K_d)^t}$$

4.5.6 Cost of Convertible Debenture

- Holders of the convertible debentures has the option to either get the debentures redeemed into the cash or get specified numbers of companies shares in lieu of cash.
- The calculation of cost of convertible debentures are very much similar to the redeemable debentures. While determining the redeemable value of the debentures, it is assumed that all the debenture holders will choose the option which has the higher value and accordingly it is considered to calculate cost of debt.

1 A Company issues ₹ 10,00,000, 12% debentures of ₹ 100 each. The debentures are redeemable after the expiry of fixed period of 7 years. The Company is in 35% tax bracket.

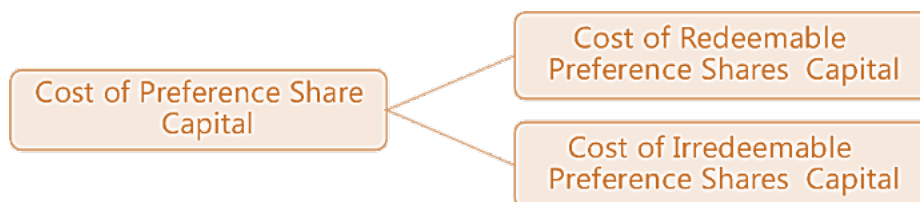
Required:

- Calculate the cost of debt after tax, if debentures are issued at –
(a) Par (b) 10% Discount (c) 10% Premium
- If brokerage is paid at 2%, what will be the cost of debentures, if issue is at par?

2 A company is considering raising funds of ₹ 100 Lakhs by one of the two alternative methods, viz. 14% Institutional Term loan and 13% Non-convertible debentures. The term loan option would attract no major incidental cost. The Debentures would be issued at a discount of 2.5% and would involve cost of issue of ₹ 1 lakh. Advise the company as to the better option based on Effective Cost of Capital. Assume Tax rate of 50%.

4.6 Cost of Preference Share Capital

- The preference share capital is paid dividend at a specified rate on face value of preference shares. Payment of dividend to the preference shareholders are not mandatory but are given priority over the equity shareholder.
- The payment of dividend to the preference shareholders are not charged as expenses but treated as appropriation of after tax profit.
- Hence, dividend paid to preference shareholders does not reduce the tax liability to the company. Like the debentures, Preference share capital can be categorised as redeemable and irredeemable. Accordingly cost of capital for each type will be discussed here.



4.6.1 Cost of Redeemable Preference Shares

- Preference shares issued by a company which are redeemed on its maturity is called redeemable preference shares.
- Cost of redeemable preference share is similar to the cost of redeemable debentures with the exception that the dividends paid to the preference shareholders are not tax deductible. Cost

of preference capital is calculated as follows:

$$\text{Cost of Redeemable Preference Share (K}_p\text{)} = \frac{\frac{\text{PD} + (\text{RV} - \text{NP})}{n}}{\frac{(\text{RV} + \text{NP})}{2}}$$

Where,

PD = Annual preference dividend

NP = Net proceeds on issue of preference shares

RV = Redemption value of debentures

n = Life of preference shares

- The cost of redeemable preference share could also be calculated as the discount rate that equates the net proceeds of the sale of preference shares with the present value of the future dividends and principal payments.

4.6.2 Cost of Irredeemable Preference Shares

- The cost of irredeemable preference shares is similar to calculation of perpetuity. The cost is calculated by dividing the preference dividend with the current market price or net proceeds from the issue.
- The cost of irredeemable preference share is as below:

$$\text{Cost of Irredeemable Preference Share (K}_p\text{)} = \frac{\text{PD}}{P_0}$$

Where,

PD = Annual preference dividend

P₀ = Net proceeds in issue of preference shares

3 If R Energy is issuing preferred stock at ₹ 100 per share, with a stated dividend of ₹ 12, and a floatation cost of 3% then, **what is the cost of preference share?**

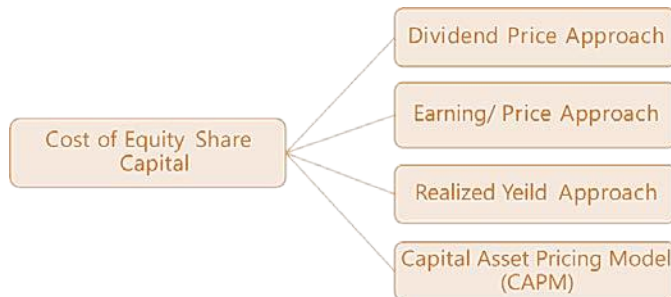
4 A company issued 40,000, 12% Redeemable Preference Share of ₹ 100 each at a premium of ₹ 5 each, redeemable after 10 years at a premium of ₹ 10 each. The floatation cost of each share is ₹ 2.

You are required to calculate cost of preference share capital ignoring dividend tax.

4.7 Cost of Equity share capital

- It may prima facie appear that equity capital does not carry any cost. But this is not true. The market share price is a function of return that equity shareholders expect and get. **If the company does not meet their requirements, it will have an adverse effect on the market share price.** Also, **it is relatively the highest cost of capital.** Due to relative higher risk, equity shareholders expect higher return hence, the cost of capital is also high.

- In simple words, **cost of equity capital** is the rate of return which equates the present value of expected dividends with the market share price. In theory, the management strives to maximize the position of equity holders and the effort involves many decisions.



- Different methods are employed to compute the cost of equity share capital.

4.7.1 Dividend Price Approach

- This is also known as **Dividend Valuation Model**. This model makes an assumption that the market price of a share is the present value of its future dividends stream.
- As per this approach the cost of equity is the rate which equates the future dividends to the current market price. Here, cost of equity capital is computed by dividing the expected dividend by market price per share.
- **Dividend Price Approach with Constant Dividend:** In this approach dividend is constant, which means there is no-growth or zero growth in dividend. The cost of equity can be calculated as follows:

$$\text{Cost of Equity } (K_e) = \frac{D}{P_0}$$

Where,

K_e = Cost of equity

D = Expected dividend

P_0 = Market price of equity (ex- dividend)

- This model assumes that dividends are paid at a constant rate to perpetuity. It ignores taxation.
- **Dividend Price Approach with Constant Growth:** As per this approach the rate of dividend growth remains constant. Where earnings, dividends and equity share price all grow at the same rate, the cost of equity capital may be computed as follows:

$$\text{Cost of Equity } (K_e) = \frac{D_1}{P_0} + g$$

Where,

$D_1 = [D_0 (1 + g)]$ i.e. next expected dividend

P_0 = Current Market price per share

g = Constant Growth Rate of Dividend

- In case of newly issued equity shares where floatation cost is incurred, the cost of equity share with an estimation of constant dividend growth is calculated as below:

$$\text{Cost of Equity (K}_e\text{)} = \frac{D_1}{P_1 - f} + g$$

Where, F = Flotation cost per share.

4.7.2 Earning/ Price Approach

- The advocates of this approach co-relate the earnings of the company with the market price of its share.
- Accordingly, the cost of equity share capital would be based upon the expected rate of earnings of a company.
- The argument is that each investor expects a certain amount of earnings, whether distributed or not from the company in whose shares he invests. Thus, if an investor expects that the company in which he is going to subscribe for shares should have at least a 20% rate of earning, the cost of equity share capital can be construed on this basis.
- Suppose the company is expected to earn 30% the investor will be prepared to pay ₹ 150 (30/20 *100) for each share of ₹ 100.
- **Earnings/ Price Approach with Constant Earnings:**

$$\text{Cost of Equity (K}_e\text{)} = \frac{E}{P}$$

Where,

E = Current earnings per share

P = Market price per share

Since practically earnings do not remain constant and the price of equity shares is also directly influenced by the growth rate in earnings. The above formula need to be modified to reflect the growth element.

- **Earnings/ Price Approach with Growth in Earnings:**

$$\text{Cost of Equity (K}_e\text{)} = \frac{E}{P} + g$$

Where,

E = Current earnings per share

P = Market price per share

g = Annual growth rate of earnings.

The Earning Price Approach is similar to the dividend price approach; only it seeks to nullify the effect of changes in the dividend policy.

- **Estimation of Growth Rate**

The calculation of 'g' (the growth rate) is an important factor in calculating cost of equity

share capital. Generally two methods are used to determine the growth rate, which are discussed below:

i) Average Method

It calculated as below :

$$\text{Current dividend } (D_0) = D_n (1+g)^n \text{ or}$$

$$\text{Growth rate } (g) = \sqrt[n]{\frac{D_0}{D_n}} - 1$$

Where,

D_0 = Current dividend,

D_n = Dividend in n years ago

Trick: Growth rate can also be found as follows:

Step-I: Divide D_0 by D_n , find out the result, then refer the FVIF table,

Step-II: Find out the result found at Step-I in corresponding year's row

Step-III: See the interest rate for the corresponding column. This is the growth rate.

ii) Gordon's Growth Model

Unlike the Average method, Gordon's growth model attempts to derive a future growth rate. As per this model increase in the level of investment will give rise to an increase in future dividends. This model takes Earnings retention rate (b) and rate of return on investments (r) into account to estimate the future growth rate.

It can be calculated as below:

$$\text{Growth } (g) = b \times r$$

Where,

r = rate of return on fund invested

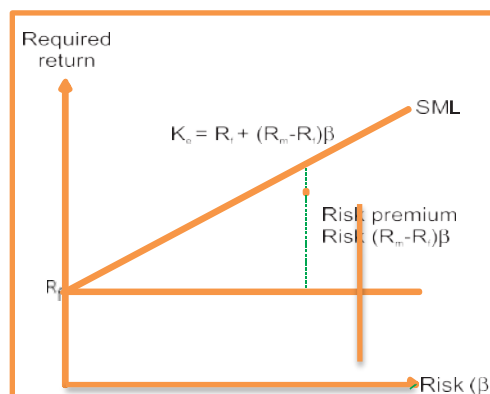
b = earnings retention ratio/ rate

4.7.3 Realized Yield Approach

- According to this approach, the average rate of return realized in the past few years is historically regarded as 'expected return' in the future.
- It computes cost of equity based on the past records of dividends actually realised by the equity shareholders.
- Though, this approach provides a single mechanism of calculating cost of equity, it has unrealistic assumptions like risks faced by the company remain same; the shareholders continue to expect the same rate of return; and the reinvestment opportunity cost (rate) of the shareholders is same as the realised yield.
- If the earnings do not remain stable, this method is not practical.

4.7.4 Capital Asset Pricing Model (CAPM) Approach

- CAPM model describes the risk-return trade-off for securities. It describes the linear relationship between risk and return for securities.
- The risks, to which a security is exposed, can be classified into two groups:
 - Unsystematic Risk:** This is also called **company specific risk** as the risk is related with the **company's performance**. This type of risk can be reduced or eliminated by diversification of the securities portfolio. **This is also known as diversifiable risk.**
 - Systematic Risk:** It is the macro-economic or market specific **risk under which a company operates**. This type of risk cannot be eliminated by the diversification hence, it is non-diversifiable. The examples are **inflation, Government policy, interest rate etc.**
- As **diversifiable risk can be eliminated by an investor through diversification, the non-diversifiable risk is the risk which cannot be eliminated**; therefore a business should be concerned as per CAPM method, solely with non-diversifiable risk.
- The non-diversifiable risks are assessed in terms of beta coefficient (b or β) through fitting regression equation between return of a security and the return on a market portfolio.



Cost of Equity under CAPM

- Thus, the cost of equity capital can be calculated under this approach as:

$$\text{Cost of Equity (Ke)} = R_f + \beta (R_M - R_f)$$

Where,

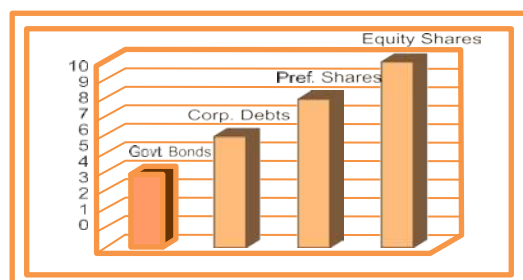
K_e = Cost of equity capital

R_f = Risk free rate of return

β = Beta coefficient

R_M = Rate of return on market portfolio

$(R_M - R_f)$ = Market premium



Risk Return relationship of various securities

- Therefore, **Required rate of return = Risk free rate + Risk premium**
- a) The idea behind CAPM is **that investors need to be compensated in two ways- time value of money and risk.**
- b) The **time value of money** is represented by the risk-free rate in the formula and compensates the investors for placing money in any investment over a period of time.
- c) The other half of the formula **represents risk and calculates the amount of compensation the investor needs for taking on additional risk.** This is calculated by taking a risk measure (beta) which **compares the returns of the asset to the market over a period of time and compares it to the market premium.**
- The CAPM says that the **expected return of a security or a portfolio equals the rate on a risk-free security plus a risk premium.** If this expected return does not meet or beat the required return, then the **investment should not be undertaken.**
- The shortcomings of this approach are:
 - a) **Estimation of betas with historical data is unrealistic; and**
 - b) **Market imperfections may lead investors to unsystematic risk**
- Despite these shortcomings, the **CAPM is useful in calculating cost of equity, even when the firm is suffering losses.**
- The basic factor behind determining the cost of equity share capital is to **measure the expectation of investors from the equity shares of that particular company.** Therefore, the whole question of determining the cost of equity shares hinges upon the factors which go into the expectations of particular group of investors in a company of a particular risk class.

5 A company has paid dividend of ₹ 1 per share (of face value of ₹ 10 each) last year and it is expected to grow @ 10% next year. **Calculate the cost of equity if the market price of share is ₹ 55.**

6 ABC Company's Equity share is quoted in the market at ₹ 25 per share currently. The company pays a dividend of ₹ 2 per share and the investor's market expects a growth rate of 6% per year. You are required to:

- a) **Calculate the company's Cost of Equity Capital.**
- b) **If the Anticipated Growth Rate is 8% p.a., calculate the indicated Market price per share.**
- c) **If the company issues 10% Debentures of face value of ₹ 100 each and realizes ₹ 96 per Debenture while the debenture are redeemable after 12 years at a premium of 12 %, what will be the cost of debentures? (Tax = 50%)**

6a Pogo Ltd has an EPS of ₹ 9 per share. Its Dividend payout ratio is 40%. Its Earning and Dividends are expected at 5% per annum. **Find out the cost of Equity Capital under various approaches, if its Market Price is ₹ 36 per share.**

6b GTAYCT Ltd is a large company with several thousand shareholders. An investors buys 100 shares of the company at the beginning of the year at a market price of ₹ 225. The par value of each share is ₹ 10. During the year, the company pays a dividend at 25%. The price of the share at the end of the year is ₹ 267.50. **Calculate the total return on the investment. Suppose the investor seels the shares ta end of the year, what would be the cash inflows at the end of the year.**

6c

Calculate the Cost of Equity Capital of H Ltd whose Risk Free Return equals 10%. The firm's beta is 1.75 and the Return on the Market Portfolio is 15%.

4.8 Cost of Retained Earnings

- Like another source of fund, **retained earnings involve cost**. It is the opportunity cost of dividends foregone by shareholders.
- The given figure depicts **how a company can either keep or reinvest cash or return it to the shareholders as dividends**. (Arrows represent possible cash flows or transfers.) If the cash is reinvested, the opportunity cost is the expected rate of return that shareholders could have obtained by investing in financial assets.
- The cost of retained earnings is often used interchangeably with the cost of equity, as cost of retained earnings is nothing but the expected return of the shareholders from the investment in shares of the company. However, sometime cost of retained earnings remains below the cost of equity due to saving in floatation cost and existence of personal tax.
- The Cost of Retained Earnings (K_S) is calculated as below:

In absence of any information on personal tax (t_p):

Cost of Retained Earnings (K_S) = Cost of Equity Shares (K_E)

If there is any information on personal tax (t_p):

$$K_S = K_E - t_p$$

- Floatation Cost:** The new issue of a security (debt or equity) involves some expenditure in the form of underwriting or brokerage fees, legal and administrative charges, registration fees, printing expenses etc. The sum of all these cost is known as floatation cost. This expenditure is incurred to make the securities available to the investors. Floatation cost is adjusted to arrive at net proceeds for the calculation of cost of capital.

7

MP Ltd. retains ₹ 7,50,000 out of its current earnings. The expected rate of return to the shareholders, if they had invested the funds elsewhere is 10%. The brokerage is 3% and the shareholders come in 30% tax bracket. Calculate the cost of retained earnings.

4.9 Effective Interest Rate (EIR) Method

- After the introduction to Effective Interest Rate Method under **Ind AS 109**, one should be familiar with this concept as well.
- Though students will study this concept and the related standard in detail in the subject of Accounting/Financial reporting, a brief and relevant part of it, is stated here for reference only.
- Definition of 'Effective Interest Method':** It is 'the rate that **exactly discounts estimated future cash payments or receipts through the expected life of the financial asset or financial liability** to the gross carrying amount of a financial asset or to the amortised cost of a financial liability.
- When calculating the effective interest rate, an entity shall estimate the expected cash flows by

considering **all the contractual terms of the financial instrument** (for example, prepayment, extension, call and similar options) but shall not consider the expected credit losses (ECL).

- The calculation includes all fees and points paid or received between parties to the contract that are an integral part of the effective interest rate, transaction costs, and all other premiums or discounts.
- **Application of EIR Method:** For floating (variable)-rate financial assets or financial liabilities, **periodic re-estimation of cash flows** to reflect the movements in the **market rates of interest alters the effective interest rate**.
- If the floating (variable)-rate financial asset or financial liability is recognized initially at an amount equal to the principal receivable or payable on maturity, **re-estimating the future interest payments normally has no significant effect on the carrying amount of the asset or the liability**.
- So, depending on Materiality an appropriate approach for amortisation can be determined. **If the amount of transaction costs, premiums or discount is not significant the straight line amortisation can be done**. If the amounts are significant EIR rate, for amortising these amounts may be applied.

4.10 Weighted Average Cost of Capital

- WACC is also known as the **overall cost of capital of having capitals from the different sources** as explained above. WACC of a company **depends on the capital structure of a company**.
- It weighs the cost of capital of a particular source of capital with its proportion to the total capital. The weighted average cost of capital for a firm is of use in two major areas:-
 1. **In consideration of the firm's position;**
 2. **Evaluation of proposed changes necessitating a change in the firm's capital.**Thus, a weighted average technique may be used in a quasi-marginal way to evaluate a proposed investment project, such as the construction of a new building.
- Thus, weighted average cost of capital **is the weighted average after tax costs of the individual components of firm's capital structure**. That is, the after tax **cost of each debt and equity is calculated separately and added together to a single overall cost of capital**.

The steps to calculate WACC is as follows:

Step 1: Calculate the total capital from all the sources.

(i.e. Long term debt capital + Pref. Share Capital + Equity Share Capital + Retained Earnings)

Step 2: Calculate the proportion (or %) of each source of capital to the total capital.

$$\left[\text{i.e. } \frac{\text{Equity Share Capital (for Example)}}{\text{Total Capital (as calculated in step 1 above)}} \right]$$

Step 3: Multiply the proportion as calculated in Step 2 above with the respective cost of capital.

(i.e. $K_e \times$ Proportion (%) of equity share capital (for example) calculated in Step 2 above)

Step 4: Aggregate the cost of capital as calculated in Step 3 above. This is the WACC. (i.e. $K_e + K_d + K_p + K_s$ as calculated in Step 3 above)

addition to the nominal value of share capital. Here the value of equity will generally not reflect historic asset values, as well as the future prospects of an organisation.

- **Market Value (MV):** Market value weight is more correct and represent a firm's capital structure. It is preferable to use MV weights for the equity. While using MV, reserves such as share premium and retained profits are ignored as they are in effect incorporated into the value of equity. It represents existing conditions and also take into consideration the impacts of changing market conditions and the current prices of various security. Similarly, in case of debt MV is better to be used rather than the BV of the debt, though the difference may not be very significant.

8

The following details are provided by the Global Limited:

Particulars	Amount (₹)
Equity Share Capital	65,00,000
12% Preference Share Capital	12,00,000
15% Redeemable Debentures	20,00,000
10% Convertible Debenture	8,00,000

The cost of equity capital for the company is 16.30% and Income Tax rate for the company is 30%. You are required to calculate the Weighted Average Cost of Capital (WACC) of the company.

9

SRK Limited has obtained funds from the following sources, the specific cost are also given against them:

Particulars	Amount (₹)	Cost of Capital
Equity Share Capital	30,00,000	15%
Preference Shares	8,00,000	8%
Retained earnings	12,00,000	11%
Debentures	10,00,000	9% (before Tax)

You are required to calculate weighted average cost of capital. Assume that Corporate tax rate is 30 percent.

10

The capital structure of All in one Ltd is – Equity Capital ₹ 5 Lakhs, Reserve and Surplus ₹ 2 Lakhs and Debentures ₹ 3 Lakhs. The Cost of Capital before tax are – (a) Equity – 18% and (b) Debentured – 10%. You are required to compute the Weighted Average Cost of Capital, assuming a tax rate of 35%.

11

PC Ltd. has the following capital structure on October 31, 2015:

Particulars	Amount (₹)
Equity Share Capital (2,00,000 shares of ₹ 10 each)	20,00,000
Reserves and Surplus	20,00,000
12% Preference Shares	10,00,000
9% Debentures	30,00,000
Total	80,00,000

The market price of equity share is ₹ 30. It is expected that the company will pay next year a dividend of ₹ 3 per share, which will grow at 7% forever. Assume 40% income tax rate.

You are required to **compute weighted average cost of capital using market value weights.**

12

The capital structure of Super Ltd. is as under:

9% Debenture	₹ 2,75,000
11% Preference shares	₹ 2,25,000
Equity shares (face value : ₹ 10 per share)	₹ 5,00,000
	₹ 10,00,000

Additional information:

- ₹ 100 per debenture redeemable at par has 2% floatation cost and 10 years of maturity. The market price per debenture is ₹ 105.
- ₹ 100 per preference share redeemable at par has 3% floatation cost and 10 years of maturity. The market price per preference share is ₹ 106.
- Equity share has ₹ 4 floatation cost and market price per share of ₹ 24. The next year expected dividend is ₹ 2 per share with annual growth of 5%. The firm has a practice of paying all earnings in the form of dividends.
- Corporate Income-tax rate is 35%.

Required : **Calculate Weighted Average Cost of Capital (WACC) using market value weights**

13

Geeta Ltd. has furnished the following information:

i) Earning per share (ESP)	₹ 4
ii) Dividend payout ratio	25%
iii) Market price per share	₹ 40
iv) Rate of tax	30%
v) Growth rate of dividend	8%

The company wants to raise additional capital of ₹ 10 lakhs including debt of ₹ 4 lakhs. The cost of debt (before tax) is 10% upto ₹ 2 lakhs and 15% beyond that.

Compute the after tax cost of equity and debt and the weighted average cost of capital.

14

Golmal Limited has in issue 5,00,000 ₹ 1 ordinary shares whose current ex-dividend market price is ₹ 1.50 per share. The company has just paid a dividend of 27 paise per share, and dividends are expected to continue at this level for some time. **If the company has no debt capital, what is the weighted average cost of capital?**

15

Macro Limited wishes to raise additional finance of ₹ 10 lakhs for meeting its investment plans. It has ₹ 2,10,000 in the form of retained earnings available for investment purposes. Further details are as following:

(1)	Debt / equity mix	30% / 70%
(2)	Cost of debt - Upto ₹ 1,80,000	10% (before tax)
	- Beyond ₹ 1,80,000	16% (before tax)
(3)	Earnings per share	₹ 4
(4)	Dividend pay out	50% of earnings
(5)	Expected growth rate in dividend	10%
(6)	Current market price per share	₹ 44
(7)	Tax rate	50%

You are required:

- To determine the pattern for raising the additional finance.
- To determine the post-tax average cost of additional debt.
- To determine the cost of retained earnings and cost of equity, and
- overall weighted average after tax cost of additional finance

16

The following is the capital structure of a Company:

Source of capital	Book value (₹)	Market value (₹)
Equity shares @ ₹ 100 each 9% Cumulative	80,00,000	1,60,00,000
preference shares @ ₹ 100 each	20,00,000	24,00,000
11% Debentures	60,00,000	66,00,000
Retained earnings	40,00,000	Nil
	2,00,00,000	2,50,00,000

The current market price of the company's equity share is ₹ 200. For the last year the company had paid equity dividend at 25 per cent and its dividend is likely to grow 5 per cent every year. The corporate tax rate is 30 per cent and shareholders personal income tax rate is 20 per cent.

You are required to calculate:

- Cost of capital for each source of capital.
- Weighted average cost of capital on the basis of book value weights.
- Weighted average cost of capital on the basis of market value weights

17

Determine the cost of capital of Best Luck Limited using the book value (BV) and market value (MV) weights from the following information:

Source of capital	Book value (₹)	Market value (₹)
Equity shares	1,20,00,000	2,00,00,000
Retained earnings	30,00,000	-
Preference shares	36,00,000	33,75,000
Debentures	9,00,000	10,40,000

Compute the Additional information :

- Equity** : Equity shares are quoted at ₹ 130 per share and a new issue priced at ₹ 125 per share will be fully subscribed; flotation costs will be ₹ 5 per share.
- Dividend** : During the previous 5 years, dividends have steadily increased from ₹ 10.60 to ₹ 14.19 per share. Dividend at the end of the current year is expected to be ₹ 15 per share.
- Preference shares** : 15% Preference shares with face value of ₹ 100 would realize ₹ 105 per share.
- Debentures** : The company proposes to issue 11-year 15% debentures but the yield on debentures of similar maturity and risk class is 16% ; flotation cost is 2%.
- Tax** : Corporate tax rate is 35%. Ignore dividend tax.

18

Pooja Ltd. has the following book value capital structure:

Equity Capital (in shares of ₹ 10 each, fully paid up- at par)	₹ 15 crores
11% Preference Capital (in shares of ₹ 100 each, fully paid up- at par)	₹ 1 crore
Retained Earnings	₹ 20 crores
13.5% Debentures (of ₹ 100 each)	₹ 10 crores
15% Term Loans	₹ 12.5 crores

The next expected dividend on equity shares per share is ₹ 3.60; the dividend per share is expected to grow at the rate of 7%. The market price per share is ₹ 40.

Preference stock, redeemable after ten years, is currently selling at ₹ 75 per share.

Debentures, redeemable after six years, are selling at ₹ 80 per debenture.

The Income tax rate for the company is 40%.

i) Required

Calculate the current weighted average cost of capital using:

- book value proportions; and
- market value proportions.

ii) Define the weighted marginal cost of capital schedule for the company, if it raises ₹ 10 crores next year, given the following information:

- the amount will be raised by equity and debt in equal proportions;
- the company expects to retain ₹ 1.5 crores earnings next year;
- the additional issue of equity shares will result in the net price per share being fixed at ₹ 32;
- the debt capital raised by way of term loans will cost 15% for the first ₹ 2.5 crores and 16% for the next ₹ 2.5 crores.

4.11 Marginal Cost of Capital

- The marginal cost of capital may be defined as the **cost of raising an additional rupee of capital**. Since the capital is raised in substantial amount in practice, marginal cost is referred to as the **cost incurred in raising new funds**. Marginal cost of capital is derived, **when the average cost of capital is calculated using the marginal weights**.
- The marginal weights represent the proportion of funds the firm intends to employ. Thus, the problem of choosing between the book value weights and the market value weights does not arise in the case of marginal cost of capital computation.
- To calculate the marginal cost of capital, the **intended financing proportion should be applied as weights to marginal component costs**. The marginal cost of capital should, therefore, be calculated in the composite sense. When a firm raises funds in proportional manner and the component's cost remains unchanged, there will be no difference between average cost of capital (of the total funds) and the marginal cost of capital. **The component costs may remain constant upto certain level of funds raised and then start increasing with amount of funds raised**.
- For example, the cost of debt may remain 7% (after tax) till ₹ 10 lakhs of debt is raised, between ₹ 10 lakhs and ₹ 15 lakhs, the cost may be 8% and so on. Similarly, if the firm has to use the external equity when the retained profits are not sufficient, the cost of equity will be higher because of the floatation costs. When the components cost start rising, the average cost of capital will rise and the marginal cost of capital will however, rise at a faster rate.

19

The Sneha Ltd. has following capital structure at 31st December 2015, which is considered to be optimum:

	(₹)
13% Debenture	3,60,000
11% Preference share capital	1,20,000
Equity share capital (2,00,000 shares)	19,20,000

The company's share has a current market price of ₹ 27.75 per share. The expected dividend per share in next year is 50 percent of the 2015 EPS. The EPS of last 10 years is as follows. The past trends are expected to continue.

Year	2006	2007	2008	2009	2010	2011	2012
EPS (₹)	1.00	1.120	1.254	1.405	1.574	1.762	1.974

The company can issue 14 percent new debenture. The company's debenture is currently selling at ₹ 98. The new preference issue can be sold at a net price of ₹ 9.80, paying a dividend of ₹ 1.20 per share. The company's marginal tax rate is 50%.

- Calculate the after tax cost (a) of new debts and new preference share capital, (b) of ordinary equity, assuming new equity comes from retained earnings.
- Calculate the marginal cost of capital.
- How much can be spent for capital investment before new ordinary share must be sold? (Assuming that retained earnings available for next year's investment is 50% of 2015 earnings.)
- What will be marginal cost of capital (cost of fund raised in excess of the amount calculated in part (iii) if the company can sell new ordinary shares to net ₹ 20 per share? The cost of debt and of preference capital is constant.

20

Taranjeet Limited has the following book value capital structure:

Equity Share Capital (150 million shares, ₹ 10 par)	₹ 1,500 million
Reserves and Surplus	₹ 2,250 million
10.5% Preference Share Capital (1 million shares, ₹ 100 par)	₹ 100 million
9.5% Debentures (1.5 million debentures, ₹ 1,000 par)	₹ 1,500 million
8.5% Term Loans from Financial Institutions	₹ 500 million

The debentures of ABC Limited are redeemable after three years and are quoting at ₹ 981.05 per debenture. The applicable income tax rate for the company is 35%.

The current market price per equity share is ₹ 60. The prevailing default-risk free interest rate on 10-year GOI Treasury Bonds is 5.5%. The average market risk premium is 8%. The beta of the company is 1.1875.

The preferred stock of the company is redeemable after 5 years is currently selling at ₹ 98.15 per preference share.

Required:

- Calculate weighted average cost of capital of the company using market value weights.
- Define the marginal cost of capital schedule for the firm if it raises ₹ 750 million for a new project. The firm plans to have a debt of 20% of the newly raised capital. The beta of new project is 1.4375. The debt capital will be raised through term loans, it will carry interest rate of 9.5% for the first ₹ 100 million and 10% for the next ₹ 50 million.

21

Hritik Ltd. has the following book-value capital structure as on March 31, 2015.

	(₹)
Equity share capital (2,00,000 shares)	40,00,000
11.5% Preference shares	10,00,000
10% Debentures	30,00,000
	80,00,000

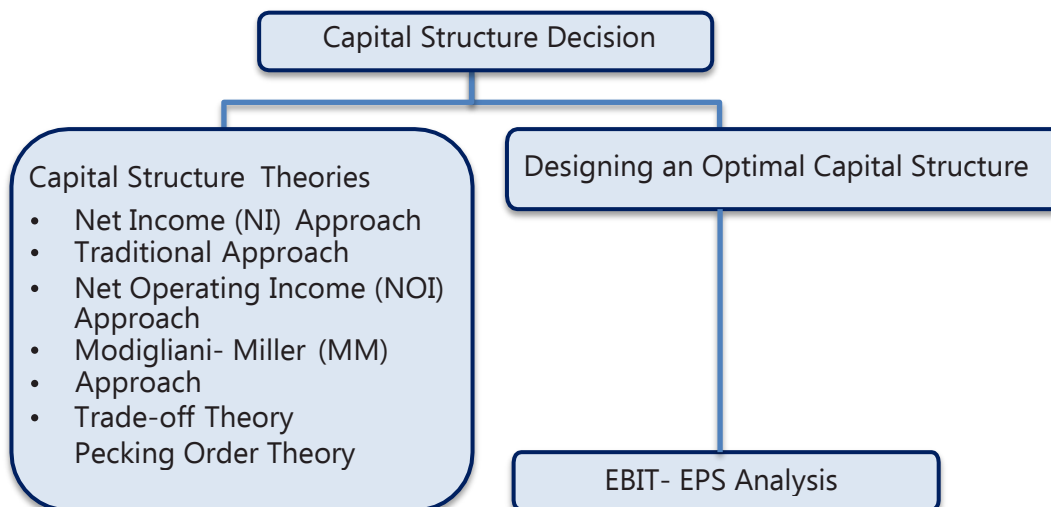
The equity shares of the company are sold for ₹ 20. It is expected that the company will pay next year a dividend of ₹ 2 per equity share, which is expected to grow by 5% p.a. forever. Assume a 35% corporate tax rate.

Required:

- Compute weighted average cost of capital (WACC) of the company based on the existing capital structure.
- Compute the new WACC, if the company raises an additional ₹ 20 lakhs debt by issuing 12% debentures. This would result in increasing the expected equity dividend to ₹ 2.40 and leave the growth rate unchanged, but the price of equity share will fall to ₹ 16 per share.

Capital Structure

CHAPTER OVERVIEW



5.1 Meaning of Capital Structure

- Capital structure is the combination of capitals from different sources of finance. The capital of a company consists of equity share holders' fund, preference share capital and long term external debts.
- The source and quantum of capital is decided on the basis of need of the company and the cost of the capital. However, the objective of a company is to maximise the value of the company and it is prime objective while deciding the optimal capital structure.
- Capital Structure decision refers to deciding the forms of financing (which sources to be tapped); their actual requirements (amount to be funded) and their relative proportions (mix) in total capitalisation.

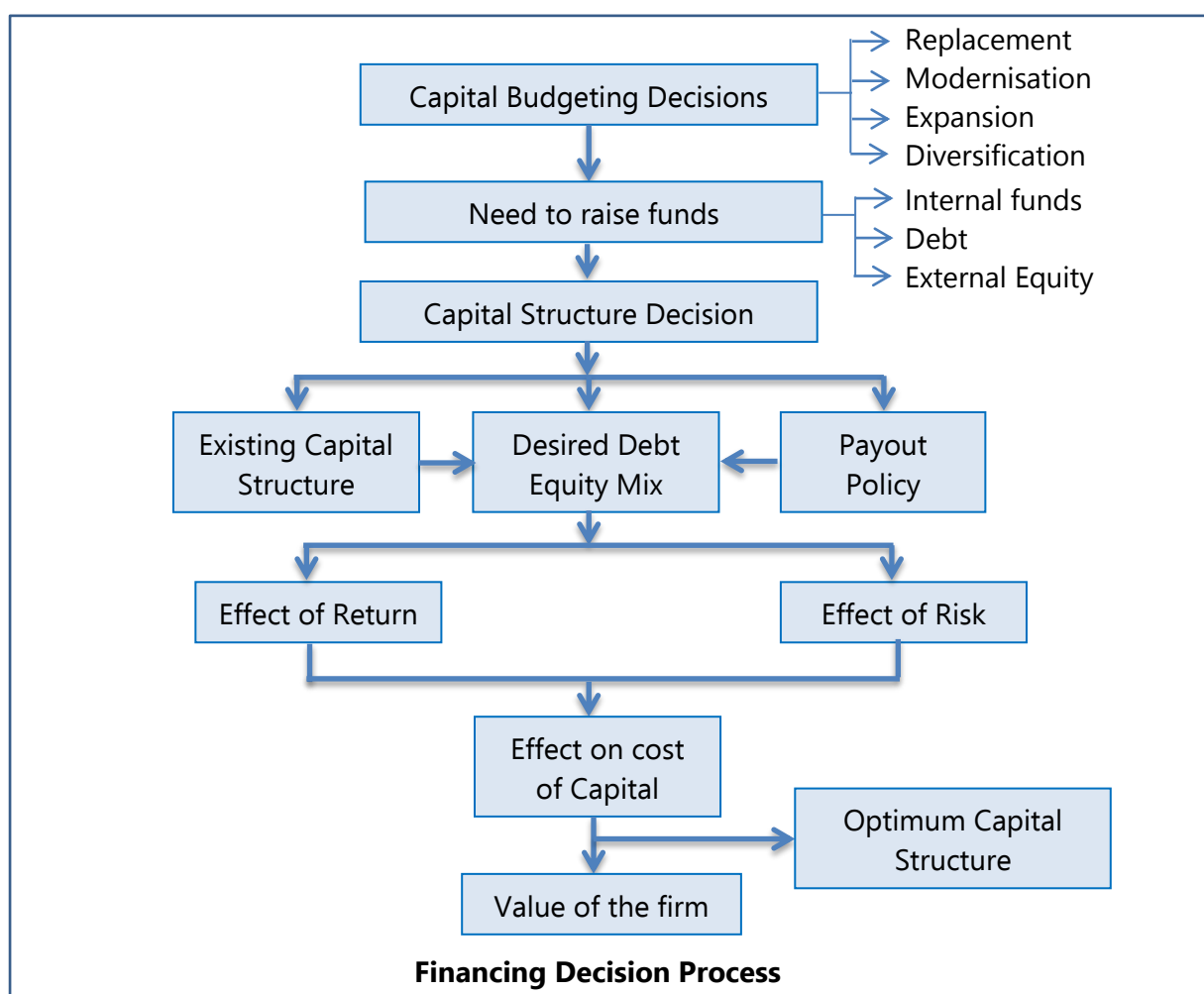
$$\text{Value of the firm} = \frac{\text{EBIT}}{\text{Overall cost of capital/Weighted average cost of capital}}$$

$$K_O = (\text{Cost of debt} \times \text{weight of debt}) + (\text{Cost of equity} \times \text{weight of equity})$$

$$K_O = \{K_D \times D / (D+S)\} + \{K_E \times S / (D+S)\}$$

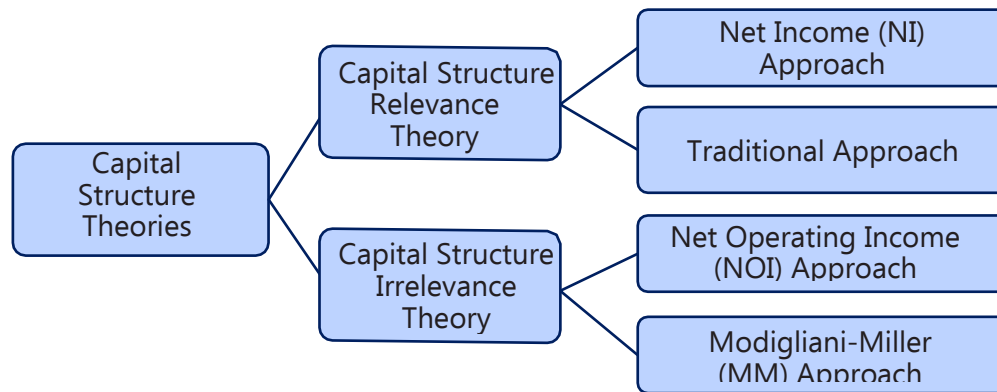
Where:

- K_O is the weighted average cost of capital (WACC)
 - K_D is the cost of debt
 - D is the market value of debt
 - S is the market value of equity
 - K_e is the cost of equity
- Capital structure decision will decide weight of debt and equity and ultimately overall cost of capital as well as Value of the firm. So capital structure is relevant in maximizing value of the firm and minimizing overall cost of capital.
- Whenever funds are to be raised to finance investments, capital structure decision is involved. A demand for raising funds generates a new capital structure since a decision has to be made as to the quantity and forms of financing. The process of financing or capital structure decision is depicted in the figure below.



5.2 Capital Structure Theories

- The following approaches explain the relationship between cost of capital, capital structure and value of the firm:



- (a) Net Income (NI) approach
- (b) Traditional approach
- (c) Net Operating Income (NOI) approach
- (d) Modigliani-Miller (MM) approach

However, the following assumptions are made to understand this relationship.

- There are only two kinds of funds used by a firm i.e. debt and equity.
- The total assets of the firm are given. The degree of average can be changed by selling debt to purchase shares or selling shares to retire debt.
- Taxes are not considered.
- The payout ratio is 100%.
- The firm's total financing remains constant.
- Business risk is constant over time.
- The firm has perpetual life.

5.2.1 Net Income (NI) Approach

- According to this approach, capital structure decision is relevant to the value of the firm. An increase in financial leverage will lead to decline in the weighted average cost of capital (WACC), while the value of the firm as well as market price of ordinary share will increase.
- Conversely, a decrease in the leverage will cause an increase in the overall cost of capital and a consequent decline in the value as well as market price of equity shares.
- From the above diagram, K_e and K_d are assumed not to change with leverage. As debt increases, it causes weighted average cost of capital (WACC) to decrease.
- The value of the firm on the basis of Net Income Approach can be ascertained as follows:

$$\text{Value of Firm (V)} = S + D$$

Where,

V = Value of the firm

S = Market value of equity

D = Market value of debt

$$\text{Market value of equity (S)} = \frac{\text{NI}}{K_e}$$

Where,

NI = Earnings available for equity shareholders

K_e = Equity Capitalisation rate

- Under, NI approach, the value of the firm will be maximum at a point where weighted average cost of capital (WACC) is minimum. Thus, the theory suggests total or maximum possible debt financing for minimising the cost of capital. The overall cost of capital under this approach is :

$$\text{Overall cost of capital} = \frac{\text{EBIT}}{\text{Value of the firm}}$$

- Thus according to this approach, the firm can increase its total value by decreasing its overall cost of capital through increasing the degree of leverage. The significant conclusion of this approach is that it pleads for the firm to employ as much debt as possible to maximise its value.

1

The following data relates to four Firms –

Firm	A	B	C	D
EBIT	₹ 2,00,000	₹ 3,00,000	₹ 5,00,000	₹ 6,00,000
Interest	₹ 20,000	₹ 60,000	₹ 2,00,000	₹ 2,40,000
Equity Capitalization Rate	12%	16%	15%	18%

Assuming that there are no taxes and Interest rate on debt is 10%, Determine the value and WACC of each firm using the Net Income Approach. What happens if firm A borrows ₹ 2,00,000 at 10% to repay Equity Capital?

5.2.2 Traditional Approach

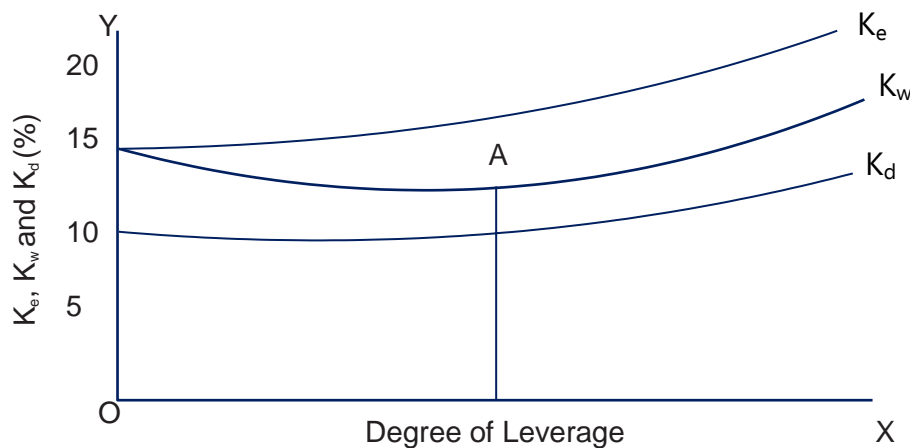
- This approach favours that as a result of financial leverage up to some point, cost of capital comes down and value of firm increases.
- However, beyond that point, reverse trends emerge. The principle implication of this approach is that the cost of capital is dependent on the capital structure and there is an optimal capital structure which minimises cost of capital.
- At the optimal capital structure, the real marginal cost of debt and equity is the same.
- Before the optimal point, the real marginal cost of debt is less than real marginal cost of equity and beyond this optimal point the real marginal cost of debt is more than real marginal cost of equity.

2

RST Ltd is expecting an EBIT of ₹ 4 Lakhs for F.Y. 2015- 16. Presently the company is financed entirely by Equity Share Capital of ₹ 20 Lakhs with equity capitalization rate of 16%. The company is contemplating to redeem a part of the capital by introducing Debt Financing. The company has two options to raise Debt to the extent of 30% or 50% of the total fund.

It is expected that for debt financing upto 30%, the rate of Interest will be 10% and equity Capitalization rate will increase to 17%. If the company opts for 50% debt, then the interest rate will be 12% and Equity Capitalization rate will be 20%.

You are required to compute the Value of the Company and its overall Cost of Capital under different options, and also state which is the best option.



- The above diagram suggests that cost of capital is a function of leverage. It declines with K_d (debt) and starts rising. This means that there is a range of capital structure in which cost of capital is minimised.
- Optimum capital structure occurs at the point where value of the firm is highest and the cost of capital is the lowest.
- According to net operating income approach, capital structure decisions are totally irrelevant. Modigliani-Miller supports the net operating income approach but provides behavioural justification. The traditional approach strikes a balance between these extremes.

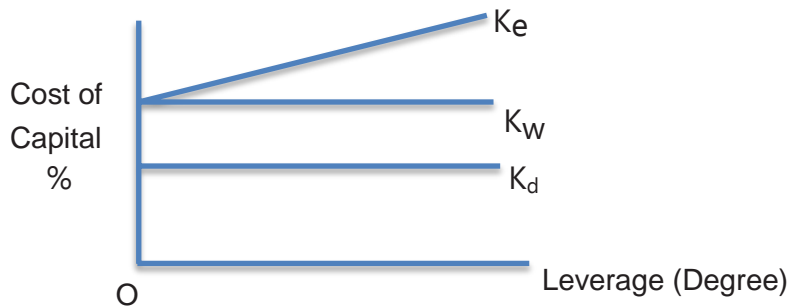
Main Highlights of Traditional Approach

- The firm should strive to reach the optimal capital structure and its total valuation through a judicious use of the both debt and equity in capital structure. At the optimal capital structure, the overall cost of capital will be minimum and the value of the firm will be maximum.
- Value of the firm increases with financial leverage upto a certain point. Beyond this point the increase in financial leverage will increase its overall cost of capital and hence the value of firm will decline. This is because the benefits of use of debt may be so large that even after offsetting the effect of increase in cost of equity, the overall cost of capital may still go down. However, if financial leverage increases beyond an acceptable limit, the risk of debt investor may also increase, consequently cost of debt also starts increasing. The increasing cost of equity owing to increased financial risk and increasing cost of debt makes the overall cost of capital to increase.

5.2.3 Net Operating Income Approach (NOI)

- NOI means earnings before interest and tax (EBIT). According to this approach, capital structure decisions of the firm are irrelevant.

- Any change in the leverage will not lead to any change in the total value of the firm and the market price of shares, as the overall cost of capital is independent of the degree of leverage. As a result, the division between debt and equity is irrelevant.
- As per this approach, an increase in the use of debt which is apparently cheaper is offset by an increase in the equity capitalisation rate. This happens because equity investors seek higher compensation as they are opposed to greater risk due to the existence of fixed return securities in the capital structure.



- The above diagram shows that K_0 (Overall capitalisation rate) and K_d (debt – capitalisation rate) are constant and K_e (Cost of equity) increases with leverage.

3

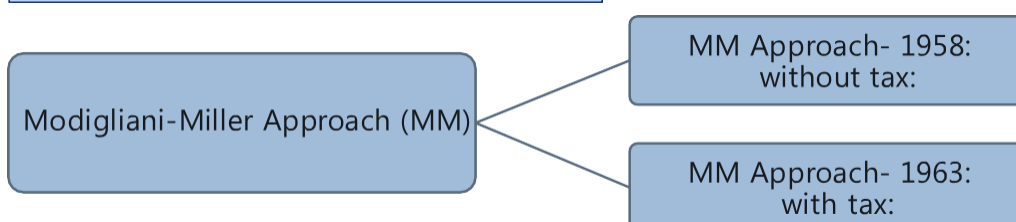
Alpha Limited and Beta Limited are identical except for capital structures. Alpha Ltd. has 50 per cent debt and 50 per cent equity, whereas Beta Ltd. has 20 per cent debt and 80 per cent equity. (All percentages are in market-value terms). The borrowing rate for both companies is 8 per cent in a no-tax world, and capital markets are assumed to be perfect.

- (i) If you own 2 per cent of the shares of Alpha Ltd., what is your return if the company has net operating income of ₹ 3,60,000 and the overall capitalisation rate of the company, K_0 is 18 per cent? (ii) What is the implied required rate of return on equity?
- Beta Ltd. has the same net operating income as Alpha Ltd. (i) What is the implied required equity return of Beta Ltd.? (ii) Why does it differ from that of Alpha Ltd.?

5.2.4 Modigliani-Miller Approach (MM)

- The NOI approach is **definitional or conceptual and lacks behavioral significance**.
- It **does not provide operational justification for irrelevance of capital structure**.
- However, Modigliani-Miller approach provides behavioral **justification for constant overall cost of capital and therefore, total value of the firm**.

MM Approach- 1958: without tax:



- This approach describes, in a perfect capital market where there is **no transaction cost and no taxes**, the **value and cost of capital of a company remain unchanged irrespective of change in the capital structure**. The approach is based on further additional **assumptions** like:

- a) Capital markets are perfect. All information is freely available and there are no transaction costs.
- b) All investors are rational.
- c) Firms can be grouped into 'Equivalent risk classes' on the basis of their business risk.
- d) Non-existence of corporate taxes.

■ Based on the above assumptions, Modigliani-Miller derived the following three propositions:

- i) Total market value of a firm is equal to its expected net operating income divided by the discount rate appropriate to its risk class decided by the market.

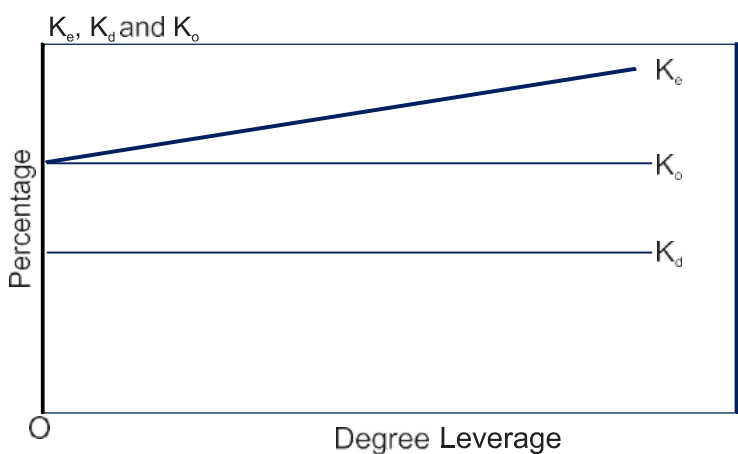
$$\text{Value of levered firm } (V_G) = \text{Value of unlevered firm } (V_U)$$

$$\text{Value of a firm} = \frac{\text{Net Operating Income (NOI)}}{K_0}$$

- ii) A firm having debt in capital structure has higher cost of equity than an un-levered firm. The cost of equity will include risk premium for the financial risk. The cost of equity in a levered firm is determined as under:

$$K_e = K_0 + (K_0 - K_d) \frac{\text{Debt}}{\text{Equity}}$$

- iii) The structure of the capital (financial leverage) does not affect the overall cost of capital. The cost of capital is only affected by the business risk.



- It is evident from the above diagram that the average cost of the capital (K_0) is a constant and not affected by leverage.
- The operational justification of Modigliani-Miller hypothesis is explained through the functioning of the arbitrage process and substitution of corporate leverage by personal leverage.
- Arbitrage refers to buying asset or security at lower price in one market and selling it at a higher price in another market. As a result, equilibrium is attained in different markets.
- This is illustrated by taking two identical firms of which one has debt in the capital structure while the other does not.
- Investors of the firm whose value is higher will sell their shares and instead buy the shares of

the firm whose value is lower.

- They will be able to earn the same return at lower outlay with the same perceived risk or lower risk. They would, therefore, be better off.
- The value of the levered firm can neither be greater nor lower than that of an unlevered firm according to this approach. The two must be equal. There is neither advantage nor disadvantage in using debt in the firm's capital structure.
- The approach considers capital structure of a firm as a whole pie divided into equity, debt and other securities. No matter how the capital structure of a firm is divided (among debt, equity etc.), there is a conservation of investment value. Since the total investment value of a corporation depends upon its underlying profitability and risk, it is invariant with respect to relative changes in the firm's financial capitalisation.
- According to MM, since the sum of the parts must equal the whole, therefore, regardless of the financing mix, the total value of the firm stays the same.
- The shortcoming of this approach is that the arbitrage process as suggested by Modigliani-Miller will fail to work because of imperfections in capital market, existence of transaction cost and presence of corporate income taxes.

MM Approach- 1963: with tax

- In 1963, MM model was amended by incorporating tax, they recognised that the value of the firm will increase or cost of capital will decrease where corporate taxes exist.
- As a result, there will be some difference in the earnings of equity and debt-holders in levered and unlevered firm and value of levered firm will be greater than the value of unlevered firm by an amount equal to amount of debt multiplied by corporate tax rate.
- MM has developed the formulae for computation of cost of capital (K_0), cost of equity (K_e) for the levered firm.

i) Value of levered company = Value of an unlevered company + Tax benefit

$$\text{Or, } V_G = V_U + TB$$

ii) Cost of equity in a levered company (K_{eg}) = $K_{eu} + (K_{eu} - K_d) \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$

Where,

K_{eg} = Cost of equity in a levered company

K_{eu} = Cost of equity in an unlevered company

K_d = Cost of debt

T = Tax rate

iii) WACC in a levered company (K_{og}) = $K_{eu}(1-tL)$

Where,

K_{og} = WACC of a levered company

K_{eu} = Cost of equity in an unlevered company

T = Tax rate

$$L = \frac{\text{Debt}}{\text{Debt} + \text{Equity}}$$

4 One – Third of total market value of Hari limited consists of loan stock, which has a cost of 10%. Another company, guru Limited is identical in every respect to hari limited, except that its capital structure in all - equity, and its cost of equity is 16%. **According to Modigliani and miller, if we ignored taxation and tax relief on debt capital, what would be the cost of equity of Hari limited?**

5 Z Ltd.'s operating income (before interest and tax) is ₹ 9,00,000. The firm's cost of debt is 10 per cent and currently firm employs ₹ 30,00,000 of debt. The overall cost of capital of firm is 12 per cent.

Required: **Calculate cost of equity.**

6 ABC Ltd adopts constant - WACC approach, and believes that its cost of Debt and overall cost of capital is at 9% and 12% respectively. If the ratio of the market value of debt to the market value of equity is 0.8, **what rate of return do equity shareholders earn?** Assume that there are no taxes.

7 PNR Ltd and PXR Ltd are identical in every respect except capital structure. PNR Ltd does not employ Debts in its Capital structure whereas PXR Ltd employs 12% Debentures amounting to ₹ 20,00,000.

The following additional information is given –

- i) Income Tax rate is 30%
- ii) EBIT ₹ 5,00,000
- iii) The Equity Capitalization rate of PNR Ltd is 20%
- iv) All assumptions of Modigliani - miller approach are met.

Calculate-

- a) **Value of both the companies**
- b) **Weighted Average Cost of Capital of both the companies.**

8 RES Ltd. is an all equity financed company with a market value of ₹ 25,00,000 and cost of equity (K_e) 21%. The company wants to buyback equity shares worth ₹ 5,00,000 by issuing and raising 15% perpetual debt of the same amount. Rate of tax may be taken as 30%. After the capital restructuring and applying MM Model (with taxes), you are required to calculate:

- i) **Market value of RES Ltd.**
- ii) **Cost of Equity (K_e)**
- iii) **Weighted average cost of capital (using market weights) and comment on it.**

9

The data relating to two companies Karna Ltd and Arjun Ltd, belonging to the same risk class, are as under –

Particulars	Karna Ltd	Arjun Ltd
Number of Equity Shares	90,000	1,50,000
Market price per share	₹ 1.20	₹ 1.00
6% Debentures	₹ 60,000	NIL
Profit Before Interest	₹ 18,000	₹ 18,000

There are no taxes. Bheem is an Investor holding 10% stake in Karna Ltd. **What is the benefit / loss to bheem, if he switches his holding to Arjun Ltd? When will this arbitrage process end?**

10

Zeta Ltd is presently financed entirely by equity shares. The current Market value is ₹ 6,00,000. A Dividend of ₹ 1,20,000 has just been paid. This level of dividend is expected to generate Net cash receipts of ₹ 1,05,000 per annum indefinitely. The project would be financed by issuing ₹ 5,00,000 debentures at 18% Interest Rate. Ignoring tax consideration –

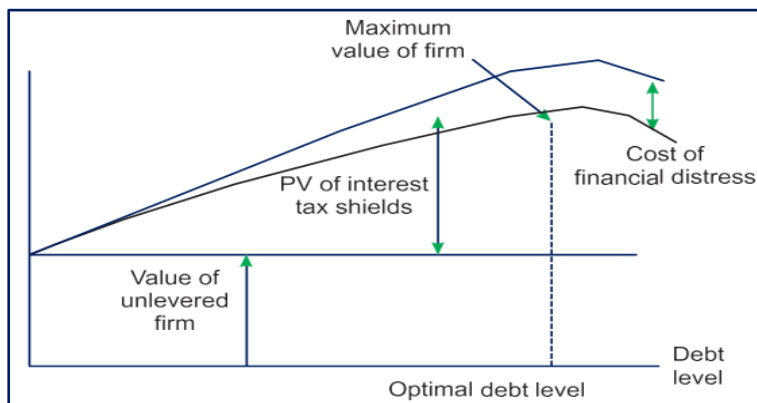
- Calculate the value of Equity shares & the gain made by shareholders, if the cost of equity rises to 21.6%**
- Prove that the weighted Average Cost of Capital is not affected by gearing.**

5.2.5 The Trade-off Theory

- The trade-off theory of capital structure refers to the **idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits.**
- Tradeoff theory of capital structure basically entails **offsetting the costs of debt against the benefits of debt.**
- Trade-off theory of capital structure primarily deals with the two concepts - **cost of financial distress and agency costs.**
- An important purpose of the trade-off theory of **capital structure is to explain the fact that corporations usually are financed partly with debt and partly with equity.**
- It states that there is an advantage to financing with debt, the tax benefits of debt and there is a cost of financing with debt, the **costs of financial distress including bankruptcy costs of debt and non-bankruptcy costs** (e.g. staff leaving, suppliers demanding disadvantageous payment terms, bondholder/stockholder infighting, etc).
- The marginal benefit of further **increases in debt declines as debt increases**, while the marginal cost increases, so that a firm that is optimizing its overall value will focus on this trade-off when choosing **how much debt and equity to use for financing.**
- Modigliani and Miller in 1963 introduced the tax benefit of debt. **Later work led to an optimal capital structure which is given by the trade-off theory.** According to Modigliani and Miller, the attractiveness of debt decreases with the personal tax on the interest income.
- A firm experiences financial distress when the firm is unable to cope with the debt holders' obligations. **If the firm continues to fail in making payments to the debt holders, the firm can**

even be insolvent.

- The first element of trade-off theory of capital structure, considered as the cost of debt is usually the **financial distress costs or bankruptcy costs of debt**.
- The direct cost of financial distress refers to the cost of insolvency of a company. Once the proceedings of insolvency start, the assets of the firm may be needed to be sold at distress price, which is generally much lower than the current values of the assets. **A huge amount of administrative and legal costs is also associated with the insolvency.**
- Even if the company is not insolvent, the financial distress of the company may include a number of indirect costs like - cost of employees, cost of customers, cost of suppliers, cost of investors, cost of managers and cost of shareholders.
- The firms may often experience a dispute of interests among the management of the firm, debt holders and shareholders. These disputes generally give birth to agency problems that in turn give rise to the agency costs.
- The agency costs may affect the capital structure of a firm. There may be two types of conflicts - shareholders-managers conflict and shareholders-debt holders conflict. **The introduction of a dynamic Trade- off theory of capital structure makes the predictions of this theory a lot more accurate and reflective of that in practice.**



- As the Debt-equity ratio (i.e. leverage) increases, there is a trade-off between the interest tax shield and bankruptcy, causing an optimum capital structure, D/E^*

5.2.6 Pecking order theory

- This theory is based on Asymmetric information, which **refers to a situation in which different parties have different information**. In a firm, managers will have better information than investors. This theory states that firms prefer to issue debt when they are positive about future earnings. **Equity is issued when they are doubtful and internal finance is insufficient.**
- The pecking order theory argues that the capital structure decision is affected by manager's choice of a source of capital that gives higher priority to sources that reveal the least amount of information.
- Myres has given the name '**PECKING ORDER**' theory as here is no well-defined **debt- equity target and there are two kind of equity internal and external**. Now **Debt is cheaper than both internal and external equity because of interest**. Further internal equity is less than external equity particularly because of no transaction/issue cost, no tax etc.
- Pecking order theory suggests that managers may use various sources for raising of fund in the following order.

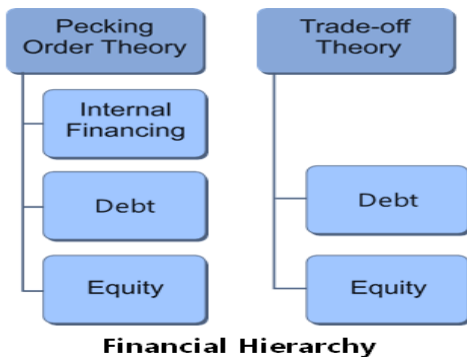
- 1) Managers first choice is to use internal finance
- 2) In absence of internal finance they can use secured debt, unsecured debt, hybrid debt etc.
- 3) Managers may issue new equity shares as a last option.

So briefly under this theory rules are

Rule 1: Use internal financing first.

Rule 2: Issue debt next

Rule 3: Issue of new equity shares at last



5.3 Factors Determining Capital Structure

5.3.1 Choice of source of funds

- A firm has the choice to raise funds for financing its investment proposals from different sources in different proportions. It can:
 - a) Exclusively use debt (in case of existing company), or
 - b) Exclusively use equity capital, or
 - c) Exclusively use preference share capital (in case of existing company), or
 - d) Use a combination of debt and equity in different proportions, or
 - e) Use a combination of debt, equity and preference capital in different proportions, or
 - f) Use a combination of debt and preference capital in different proportion (in case of existing company).
- The choice of the combination of these sources is called capital structure mix. But the question is which of the pattern should the firm choose?

5.3.2 Factors affecting capital structure

- While choosing a suitable financing pattern, certain fundamental principles should be kept in minds, to design capital structure, which are discussed below:

1) Financial leverage of Trading on Equity:

- The use of long-term fixed interest bearing debt and preference share capital along with equity share capital is called financial leverage or trading on equity.
- The use of long-term debt increases the earnings per share if the firm yields a return higher than the cost of debt. The earnings per share also increase with the use of preference share capital but due to the fact that interest is allowed to be deducted while computing tax, the leverage impact of debt is much more.
- However, leverage can operate adversely also if the rate of interest on long-term loan is more

than the expected rate of earnings of the firm. Therefore, it needs caution to plan the capital structure of a firm.

2) Growth and stability of sales:

- The capital structure of a firm is highly influenced by the growth and stability of its sale.
- If the sales of a firm are expected to remain fairly stable, it can raise a higher level of debt. Stability of sales ensures that the firm will not face any difficulty in meeting its fixed commitments of interest repayments of debt.
- Similarly, the rate of the growth in sales also affects the capital structure decision. Usually, greater the rate of growth of sales, greater can be the use of debt in the financing of firm. On the other hand, if the sales of a firm are highly fluctuating or declining, it should not employ, as far as possible, debt financing in its capital structure.

3) Cost Principle:

- According to this principle, an ideal pattern or capital structure is one that minimises cost of capital structure and maximises earnings per share (EPS).
- For e.g. Debt capital is cheaper than equity capital from the point of its cost and interest being deductible for income tax purpose, whereas no such deduction is allowed for dividends.

4) Risk Principle:

- According to this principle, reliance is placed more on common equity for financing capital requirements than excessive use of debt.
- Use of more and more debt means higher commitment in form of interest payout. This would lead to erosion of shareholders' value in unfavourable business situation.
- There are two risks associated with this principle:
 - i) **Business risk:** It is an unavoidable risk because of the environment in which the firm has to operate and it is represented by the variability of earnings before interest and tax (EBIT). The variability in turn is influenced by revenues and expenses. Revenues and expenses are affected by demand of firm products, variations in prices and proportion of fixed cost in total cost.
 - ii) **Financial risk:** It is a risk associated with the availability of earnings per share caused by use of financial leverage. It is the additional risk borne by the shareholders when a firm uses debt in addition to equity financing. Generally, a firm should neither be exposed to high degree of business risk and low degree of financial risk or vice-versa, so that shareholders do not bear a higher risk.

5) Control Principle:

- While designing a capital structure, the finance manager may also keep in mind that existing management control and ownership remains undisturbed. Issue of new equity will dilute existing control pattern and also it involves higher cost.
- Issue of more debt causes no dilution in control, but causes a higher degree of financial risk.

6) Flexibility Principle:

- By flexibility it means that the management chooses such a combination of sources of financing which it finds easier to adjust according to changes in need of funds in future too.

- While debt could be interchanged (If the company is loaded with a debt of 18% and funds are available at 15%, it can return old debt with new debt, at a lesser interest rate), but the same option may not be available in case of equity investment.

7) Other Considerations:

- Besides above principles, other factors such as nature of industry, timing of issue and competition in the industry should also be considered.
- Industries facing severe competition also resort to more equity than debt.

Thus, a finance manager in designing a suitable pattern of capital structure must bring about satisfactory compromise between the above principles. The compromise can be reached by assigning weights to these principles in terms of various characteristics of the company.

5.4 Key Concepts for Designing Optimal Structure

- The capital structure decisions are so significant in financial management, as they influence debt – equity mix which ultimately affects shareholders return and risk.
- Since cost of debt is cheaper, firm prefers to borrow rather than to raise from equity. So long as return on investment is more than the cost of borrowing, extra borrowing increases the earnings per share.
- However, beyond a limit, it increases the risk and share price may fall because shareholders may assume that their investment is associated with more risk.
- For an appropriate debt -equity mix, let us discuss some key concepts:-

5.4.1 Leverages

- There are two leverages associated with the study of capital structure, namely operating leverage and financial leverage.
- However, the determination of optimal level of debt is a formidable task and is a major policy decision. Determination of optimal level of debt involves equalising between return and risk.
- EBIT-EPS analysis is a widely used tool to determine level of debt in a firm. Through this analysis, a comparison can be drawn for various methods of financing by obtaining indifference point.
- It is a point to the EBIT level at which EPS remains unchanged irrespective of level of debt-equity mix. The concepts of leverages and EBIT-EPS analysis would be dealt in detail separately for better understanding.

5.4.2 Coverage Ratio

- The ability of the firm to use debt in the capital structure can also be judged in terms of coverage ratio namely EBIT/Interest.
- Higher the ratio, greater is the certainty of meeting interest payments.

5.4.3 Cash flow Analysis

- It is a good supporting tool for EBIT-EPS analysis in framing a suitable capital structure. To determine the debt capacity, cash flow under adverse conditions should be examined.
- A high debt equity ratio is not risky if the company has the ability to generate cash flows. It

would, therefore, be possible to increase the debt until cash flows equal the risk set out by debt.

- The main drawback of this approach is that **it fails to take into account uncertainty due to technological developments or changes in political climate.**
- These approaches as discussed above do not provide solution to the problem of determining an appropriate level of debt. However, with **the information available a range can be determined for an optimum level of debt in the capital structure.**

5.5 Essential Features of a Sound Capital Mix

A sound or an appropriate capital structure should have the following essential features:

- i) Maximum possible **use of leverage.**
- ii) The capital structure should be **flexible.**
- iii) To **avoid undue financial/business risk** with the increase of debt.
- iv) The use of debt should be within the capacity of a firm. **The firm should be in a position to meet its obligation in paying the loan and interest charges as and when due.**
- v) It should involve **minimum possible risk of loss of control.**
- vi) It must **avoid undue restrictions** in agreement of debt.
- vii) The capital structure should be **conservative.** It should be composed of **high grade securities and debt capacity of the company should never be exceeded.**
- viii) The capital structure should be **simple in the sense** that it can be easily managed and also **easily understood by the investors.**
- ix) The debt should be used to the extent that **it does not threaten the solvency of the firm.**

5.6 Optimal Capital Structure

- The theory of optimal capital structure **deals with the issue of the right mix of debt and equity in the long term capital structure of a firm.**
- This theory states that if a company takes on debt, the value of the firm increases up to a point. Beyond that point **if debt continues to increase then the value of the firm will start to decrease.**
- Similarly, if the company is unable to repay the debt within the specified period then it will affect the goodwill of the company in the market and may create problems for collecting further debt.
- Therefore, the company should select its appropriate capital structure with due consideration to the factors mentioned earlier.

5.7 EBIT – EPS Analysis

5.7.1 Relationship between EBIT - EPS

- The basic **objective of financial management is to design an appropriate capital structure which can provide the highest earnings per share (EPS) over the company's expected range of earnings before interest and taxes (EBIT).**
- EPS measures a company's performance for the shareholders. The level of EBIT varies from year to year and represents the success of a company's operations. **EBIT-EPS analysis is a vital**

tool for designing the optimal capital structure of a company.

- The objective of this analysis is to find the EBIT level that will equate EPS regardless of the financing plan chosen.
- The financial leverage affects the pattern of distribution of operating profit among various types of investors and increases the variability of the EPS of the firm.
- Therefore, in search for an appropriate capitals structure for a firm, the financial manager must analyse the effects of various alternative financial leverages on the EPS.
- Given a level of EBIT, EPS will be different under different financing mix depending upon the extent of debt financing. The effect of leverage on the EPS emerges because of the existence of fixed financial charge i.e., interest on debt financial fixed dividend on preference share capital.
- The effect of fixed financial charge on the EPS depends upon the relationship between the rate of return on assets and the rate of fixed charge. If the rate of return on assets is higher than the cost of financing, then the increasing use of fixed charge financing (i.e., debt and preference share capital) will result in increase in the EPS.
- This situation is also known as favourable financial leverage or Trading on Equity. On the other hand, if the rate of return on assets is less than the cost of financing, then the effect may be negative and, therefore, the increasing use of debt and preference share capital may reduce the EPS of the firm.
- Theoretically, the choice is tilted in favour of debt financing for two reasons: (i) the explicit cost of debt financing i.e., the rate of interest payable on debt instruments or loans is generally lower than the rate of fixed dividend payable on preference shares, and (ii) Interest on debt financing is tax-deductible and therefore the real cost (after-tax) is lower than the cost of preference share capital.
- Thus, the analysis of the different types of capital structure and the effect of leverage on the expected EPS will provide a useful guide to selection of a particular level of debt financing. The EBIT-EPS analysis is of significant importance and if undertaken properly, can be an effective tool in the hands of a financial manager to get an insight into the planning and designing of the capital structure of the firm.

11

XYZ Co. has a capital structure of 30% Debt and 70% Equity. The company is considering various proposals costing less than ₹ 30 Lakhs. The company does not want to disturb its present capital structure. Assume Tax rate is 50%. The cost of raising the Debt and Equity are as follows-

Project cost	Cost of Debt	Cost of Debt
Upto ₹ 5 Lakhs	9%	13.00%
Above ₹ 5 Lakhs and upto ₹ 20 Lakhs	10%	14.00%
Above ₹ 20 Lakhs and upto ₹ 40 Lakhs	11%	15.00%
Above ₹ 40 Lakhs and upto ₹ 1 Crore	12%	15.55%

- Compute the projects A and B, Whose fund requirements are ₹ 8 Lakhs and ₹ 22 Lakhs respectively.
- If the projects are expected to yields after tax return of 12%, determine which projects are acceptable.
- Also if ROCE = 11%, determine under what conditions the project would be acceptable.

12

A Company earns a profit of ₹ 3,00,000 per annum after meeting its Interest liability of ₹ 1,20,000 on 12% debentures. The Tax rate is 50%. The number of Equity Shares of ₹ 10 each are 80,000 and the retained earnings amount to ₹ 12,00,000.

The company proposes to take up an expansion scheme for which a sum of ₹ 4,00,000 is required. It is anticipated that after expansion, the company will be able to achieve the same return on investment as at present. The funds required for expansion can be raised either through debt at the rate of 12% or by issuing Equity Shares at par.

Required:

- i) Compute the Earnings per Share (EPS), if:
 - a) The additional funds were raised as debt
 - b) The additional funds were raised by issue of equity shares.
- ii) Advise the company as to which source of finance is preferable.

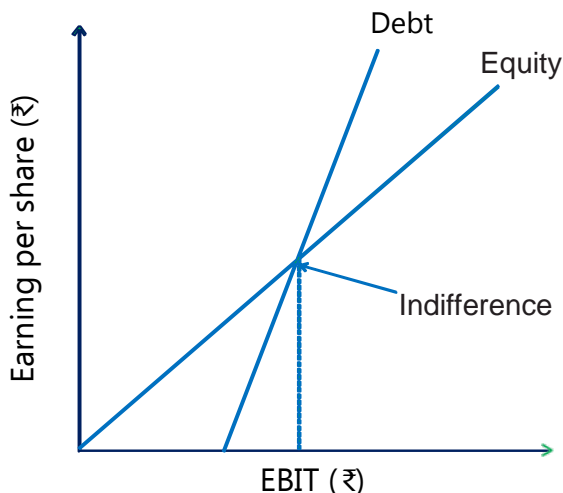
13

India limited requires ₹ 50,00,000 for a new plant. This plant is expected to yield earnings before interest and taxes of ₹ 10,00,000. While deciding about the financial plan, the company considers the objective of maximizing Earnings per share.

It has 3 alternatives to finance the project – by raising Debt of ₹ 5,00,000 or ₹ 20,00,000 or ₹ 30,00,000 and the balance in each case, by issuing equity shares. The company's share is currently selling at ₹ 150, but it is expected to decline to ₹ 125 in case the funds are borrowed in excess of ₹ 20,00,000. The funds can be borrowed at the rate of 9% upto ₹ 5,00,000, at 14% over ₹ 5,00,000 and upto ₹ 20,00,000 and at 19% over ₹ 20,00,000. The tax rate applicable to the company is 40%. Which form of financing should the company choose? Show EPS amount upto two decimal points.

Question No. 14 is deleted as per ICAI Examination Pattern

5.7.2 Financial Break-even and Indifference Analysis



- Financial break-even point is the minimum level of EBIT needed to satisfy all the fixed financial charges i.e. interest and preference dividends. It denotes the level of EBIT for which the company's EPS equals zero.
- If the EBIT is less than the financial breakeven point, then the EPS will be negative but if the expected level of EBIT is more than the breakeven point, then more fixed costs financing instruments can be taken in the capital structure, otherwise, equity would be preferred.
- EBIT-EPS breakeven analysis is used for determining the appropriate amount of debt a company might carry.
- Another method of considering the impact of various financing alternatives on earnings per share is to prepare the EBIT chart or the range of Earnings Chart.
- This chart shows the likely EPS at various probable EBIT levels. Thus, under one particular alternative, EPS may be ₹ 2 at a given EBIT level. However, the EPS may go down if another alternative of financing is chosen even though the EBIT remains at the same level.
- At a given EBIT, earnings per share under various alternatives of financing may be plotted.
- Wherever this line intersects, it is known as break-even point. This point is a useful guide in formulating the capital structure. This is known as EPS equivalency point or indifference point since this shows that, between the two given alternatives of financing (i.e., regardless of leverage in the financial plans), EPS would be the same at the given level of EBIT.
- The equivalency or indifference point can also be calculated algebraically in the following manner:

$$\frac{(EBIT - I_1)(1 - T)}{E_1} = \frac{(EBIT - I_2)(1 - T)}{E_2}$$

Where,

EBIT = Indifference point

E_1 = Number of equity shares in Alternative 1

E_2 = Number of equity shares in Alternative 2

I_1 = Interest charges in Alternative 1

I_2 = Interest charges in Alternative 2

T = Tax-rate

Alternative 1 = All equity finance

Alternative 2 = Debt-equity finance.

5.7.3 Limitations of EBIT-EPS Analysis

- If maximization of the EPS is the only criterion for selecting the particular debt-equity mix, then that capital structure which is expected to result in the highest EPS will always be selected by all the firms. However, achieving the highest EPS need not be the only goal of the firm. The main shortcomings of the EBIT-EPS analysis may be noted as follows:
 - i) **The EPS criterion ignores the risk dimension:** The EBIT-EPS analysis ignores as to what is the effect of leverage on the overall risk of the firm. With every increase in financial leverage, the risk of the firm and therefore that of investors also increases. The EBIT-EPS analysis fails to deal with the variability of EPS and the risk return trade-off.
 - ii) **EPS is more of a performance measure:** The EPS, basically, depends upon the operating profit

which, in turn, depends upon the operating efficiency of the firm. It is a resultant figure and it is more a measure of performance rather than a measure of decision making.

15

Calculate the level of earnings before interest and tax (EBIT) at which the EPS indifference point between the following financing alternatives will occur.

i) Equity share capital of ₹ 6,00,000 and 12% debentures of ₹ 4,00,000.

Or

ii) Equity share capital of ₹ 4,00,000, 14% preference share capital of ₹ 2,00,000 and 12% debentures of ₹ 4,00,000.

Assume the corporate tax rate is 35% and par value of equity share is ₹ 10 in each case.

16

Alpha Limited requires funds amounting to ₹ 80 lakh for its new project. To raise the funds, the company has following two alternatives:

i) To issue Equity Shares of ₹ 100 each (at par) amounting to ₹ 60 lakh and borrow the balance amount at the interest of 12% p.a.; or

ii) To issue Equity Shares of ₹ 100 each (at par) and 12% Debentures in equal proportion.

The Income-tax rate is 30%.

Find out the point of indifference between the available two modes of financing and state which option will be beneficial in different situations.

17

X Ltd. is considering the following two alternative financing plans:

Particulars	Plan – I (₹)	Plan – II (₹)
Equity shares of ₹ 10 each	4,00,000	4,00,000
12% Debentures	2,00,000	-
Preference Shares of ₹ 100 each	-	2,00,000
	6,00,000	6,00,000

The indifference point between the plans is ₹ 2,40,000. Corporate tax rate is 30%.

Calculate the rate of dividend on preference shares.

18

The management of Z Company Ltd. wants to raise its funds from market to meet out the financial demands of its long-term projects. The company has various combinations of proposals to raise its funds. You are given the following proposals of the company:

Proposal	Equity shares (%)	Debts (%)	Preference shares (%)
P	100	-	-
Q	50	50	-
R	50	-	50

- i) Cost of debt and preference shares is 10% each.
- ii) Tax rate – 50%
- iii) Equity shares of the face value of ₹ 10 each will be issued at a premium of ₹ 10 per share.
- iv) Total investment to be raised ₹ 40,00,000.
- v) Expected earnings before interest and tax ₹ 18,00,000.

From the above proposals the management wants to take advice from you for appropriate plan after computing the following:

- Earnings per share
- Financial break-even-point
- Compute the EBIT range among the plans for indifference. Also indicate if any of the plans dominate.

19

ABC Ltd wants to raise ₹ 5,00,000 as additional capital. It has two mutually exclusive financial plans. The current EBIT is ₹ 17,00,000 which is likely to remain unchanged. Tax rate 50%. Other relevant information is –

Present capital structure	3,00,000 Equity shares of ₹ 10 each and 10% bonds of ₹ 20,00,000
Current EBIT	₹ 17,00,000
Current EPS	₹ 2.50
Current Market Price	₹ 25 per share

Financial Plan I	20,000 Equity Shares at ₹ 25 per share.
Financial Plan II	12% Debentures of ₹ 5,00,000

What is the Indifference level of EBIT? Identify the Financial Break-Even Levels and plot the EBIT-EPS lines on graph paper. Which alternative financial plan is better?

20

A Company needs ₹ 31,25,000 for the construction of a new plant. The following three plans are feasible:

Plan I - The Company may issue 3,12,500 equity shares at ₹ 10 per share.

Plan II - The Company may issue 1,56,250 equity shares at ₹ 10 per share and 15,625 debentures of ₹ 100 denomination bearing a 8% rate of interest.

Plan III - The Company may issue 1,56,250 equity shares at ₹ 10 per share and 15,625 cumulative preference shares at ₹ 100 per share bearing a 8% rate of dividend.

- i) If the Company's earnings before interest and taxes are ₹ 62,500, ₹ 1,25,000, ₹ 2,50,000, ₹ 3,75,000 and ₹ 6,25,000, what are the earnings per share under each of three financial plans? Assume a Corporate Income tax rate of 40%.
- ii) Which alternative would you recommend and why?

- iii) Determine the EBIT-EPS indifference points by formulae between Financing Plan I and Plan II and Plan I and Plan III.

21 A new project is under consideration in Zip Ltd., which requires a capital investment of ₹ 4.50 crores. Interest on term loan is 12% and Corporate Tax rate is 50%. If the Debt Equity ratio insisted by the financing agencies is 2 : 1, calculate the point of indifference for the project.

22 Ganesha Limited is setting up a project with a capital outlay of ₹ 60,00,000. It has two alternatives in financing the project cost.

Alternative-I : 100% equity finance by issuing equity shares of ₹ 10 each

Alternative-II : Debt-equity ratio 2:1 (issuing equity shares of ₹ 10 each)

The rate of interest payable on the debts is 18% p.a. The corporate tax rate is 40%.

Calculate the indifference point between the two alternative methods of financing.

23 Yoyo Limited presently has ₹ 36,00,000 in debt outstanding bearing an interest rate of 10 per cent. It wishes to finance a ₹ 40,00,000 expansion programme and is considering three alternatives: additional debt at 12 per cent interest, preference shares with an 11 per cent dividend, and the issue of equity shares at ₹ 16 per share. The company presently has 8,00,000 shares outstanding and is in a 40 per cent tax bracket.

- If earnings before interest and taxes are presently ₹ 15,00,000, what would be earnings per share for the three alternatives, assuming no immediate increase in profitability?
- Develop an indifference chart for these alternatives. What are the approximate indifference points? To check one of these points, what is the indifference point mathematically between debt and common?
- Which alternative do you prefer? How much would EBIT need to increase before the next alternative would be best?

24 Consider a firm that has existing assets in which it has capital invested of ₹ 100 crores. The after tax operating income on asset – in – place is ₹ 15 crores. The Return on capital employed of 15% is expected to be sustained in perpetuity, and company has a cost of capital of 10%. Estimate the present value of Economic Value Added (EVA) to the firm from its assets – in – place.

5.8 Cost of Capital, Capital Structure and Market Price of Share

- The financial leverage has a magnifying effect on earnings per share, such that for a given level of percentage increase in EBIT, there will be more than proportionate change in the same direction in the earnings per share.

- The financing decision of the firm is one of the basic conditions oriented to the achievement of maximisation for the shareholders' wealth.
- The capital structure should be **examined from the view point of its impact on the value of the firm.**
- If the capital structure affects the total value of the firm, a firm should select such a financing mix (a combination of debt and equity) **which will maximise the market value of the firm.**
- Such an **optimum leverage not only maximises the value of the company and wealth of its owners, but also minimises the cost of capital.** As a result, the company is able to increase its economic rate of investment and growth.
- In theory, capital structure can affect the value of the firm by affecting either its expected earnings or cost of capital or both. While financing mix cannot affect the total earnings, it can affect the share of earnings belonging to the share holders. **But financial leverage can largely influence the value of the firm through the cost of capital.**

5.9 Cost of Capital, Capital Structure and Market Price of Share

5.9.1 Over- Capitalisation

- It is a situation where a firm has more capital than it needs or in other words assets are worth less than its issued share capital, and earnings are insufficient to pay dividend and interest.
- This situation mainly arises when the existing capital is not effectively utilized on account of fall in **earning capacity of the company while company has raised funds more than its requirements.**
- The **chief sign of over-capitalisation is the fall in payment of dividend and interest leading to fall in value of the shares of the company.**

a) Causes of Over-Capitalisation:

Over-capitalisation arises due to following reasons:

- Raising more money** through issue of shares or debentures than company can employ profitably.
- Borrowing huge amount at **higher rate than rate at which company can earn.**
- Excessive payment** for the acquisition of fictitious assets such as goodwill etc.
- Improper provision for depreciation**, replacement of assets and distribution of dividends at a higher rate.
- Wrong estimation of earnings** and capitalisation.

b) Consequences of Over-Capitalisation:

Over-capitalisation results in the following consequences:

- Considerable **reduction in the rate of dividend and interest payments.**
- Reduction in the market price** of shares.
- Resorting to **□window dressing□**
- Some companies may opt for reorganization. However, **sometimes the matter gets worse and the company may go into liquidation.**

c) Remedies for Over-Capitalisation:

Following steps may be adopted to avoid the negative consequences of over-capitalisation:

- i) Company should go for thorough reorganization.
- ii) Buyback of shares.
- iii) Reduction in claims of debenture-holders and creditors.
- iv) Value of shares may also be reduced. This will result in sufficient funds for the company to carry out replacement of assets.

5.9.2 Under Capitalisation

- It is just reverse of over-capitalisation. It is a state, when its actual capitalisation is lower than its proper capitalisation as warranted by its earning capacity.
- This situation normally happens with companies which have insufficient capital but large secret reserves in the form of considerable appreciation in the values of the fixed assets not brought into the books.

a) Consequences of Under-Capitalisation:

Under-capitalisation results in the following consequences:

- i) The dividend rate will be higher in comparison to similarly situated companies.
- ii) Market value of shares will be higher than value of shares of other similar companies because their earning rate being considerably more than the prevailing rate on such securities.
- iii) Real value of shares will be higher than their book value.

b) Effects of Under-Capitalisation:

Under-capitalisation has the following effects:

- i) It encourages acute competition. High profitability encourages new entrepreneurs to come into same type of business.
- ii) High rate of dividend encourages the workers' union to demand high wages.
- iii) Normally common people (consumers) start feeling that they are being exploited.
- iv) Management may resort to manipulation of share values.
- v) Invite more government control and regulation on the company and higher taxation also.

c) Remedies:

Following steps may be adopted to avoid the negative consequences of under capitalization:

- i) The shares of the company should be split up. This will reduce dividend per share, though EPS shall remain unchanged.
- ii) Issue of Bonus Shares is the most appropriate measure as this will reduce both dividend per share and the average rate of earning.
- iii) By revising upward the par value of shares in exchange of the existing shares held by them.

5.9.3 Over-Capitalisation vis-à-vis Under-Capitalisation

- From the above discussion it can be said that both over capitalisation and under capitalisation are not good.
- However, over capitalisation is more dangerous to the company, shareholders and the society than under capitalisation.
- The situation of under capitalisation can be handled more easily than the situation of over-

capitalisation.

- Moreover, under capitalisation is not an economic problem but a problem of adjusting capital structure. Thus, under capitalisation should be considered less dangerous but both situations are bad and every company should strive to have a proper capitalisation.