

MC 2.2



**M.COM.
SEMESTER - II**

**(REVISED SYLLABUS
AS PER NEP 2020)**

CORPORATE FINANCE

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Programme Name: M.Com (Advanced Accountancy)

Course Name: Corporate Finance

Total Credits: 04

University assessment: 50

Total Marks: 100

College assessment: 50 Aims & Objectives:

- 1) To enhance the abilities of learners to develop the objectives of Financial Management
- 2) To enable the learners to understand, develop and apply the techniques of investment in the financial decision making in the business corporates
- 3) To enhance the abilities of learners to analyses the financial statements

Course outcomes:

- CO1. The learners will be able to identify the scope of financial management in practice.
- CO2. The learners will be able to conceptualize the concept of valuation of securities.
- CO3. The learners will be able to explain the concepts of financial accounting in general.
- CO4. The learners will be able to identify and undertake various managerial decisions required in day-to-day business practices.

MODULE I: (2 CREDITS)

Unit 1: Scope and Objectives of Corporate Financial Management

- A. Financial Needs of the Corporate Sector, Sources of Financing, Factors Affecting Corporate Finance Environmental, Social and Governance (ESG) Considerations: Ownership Structure and ESG Integration Process
- B. New Age Financing: Debt Securitization and Green Bonds , Venture Capital Fund: Methods of Venture Capital Financing and Venture Capital Funds in India

Unit 2: Time Value of Money

- A. Concept, Time Value of Money and its Significance, Present Value V/s Future Value Annuity, Techniques of Discounting, Techniques of Compounding
- B. Valuation of Bonds: Introduction, Types, and various models Calculation of Bond Valuation and Yield to Maturity

MODULE II : (2 CREDITS)

Unit 3: Financial Analysis -Application of Ratio Analysis in Financial Decision Making

- A) Profitability Ratios: Gross Profit Ratio, Operating Profit Ratio, Return on Capital Employed Efficiency Ratios: Sales to Capital Employed, Sales to Fixed Assets, Profit to Fixed Assets, Stock Turnover Ratio, Debtors Turnover Ratio, Creditors Turnover Ratio
- B) Liquidity Ratios: Current Ratio, Quick Ratio
Stability Ratio: Capital Gearing Ratio, Interest Coverage Ratio Investor's Analysis, Earnings per Share, P/E Ratio and Dividend Yield

Unit 4: Financial Decisions

- A) Cost of Capital - Introduction, Definition of Cost of Capital, Measurement of Cost of Capital, WACC, Marginal Cost of Capital
- B) Capital Structure Decisions - Meaning, Choice of Capital Structure, Importance, Optimal Capital Structure, EBIT – EPS Analysis, Cost of Capital, Capital Structure and Market Price of Share, Capital Structure Theories, Dividend Policy - Payout Ratio

References:

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- Financial Management: Conceptual Approach: Kulkarni, P. V/ Satyaprasad, B. G. Himalaya
- Financial Management: Text & Problems: Khan, M. Y/ Jain, P. K. TMH
- Financial Management: Theory & Practice: Chandra, Prasanna TMH
- Financial Management: Theory, Concepts & Problems: Rustagi, R. P. Galgotia

Programme Name: M.Com (Advanced Accountancy)

Course Name : Advanced Trends in Accounting - II

Total Credits: 02

Total Marks: 50

University assessment: 25

College assessment: 25 Aims & Objectives

1. To understand Financial Report and its Technicalities.
2. To know GST and its practicality.

Course outcomes:

CO1. Learners will be able to prepare Financial report and do its analysis.

CO2. Learners will be able to activate GST masters in Tally and set up GST rate, Update Party GSTIN and updating GST in service ledgers.

MODULE I: (2 CREDITS)

Unit 1: Financial Report

- A) Trial Balance-** Phase of the accounting process, Ledger balances on a particular date and classification of errors
- B) Profit and loss account-**Introduction, purpose, analysis of report, direct and indirect cost and format of profit and loss account. **Balance sheet-**Features, Purpose, importance, and balance sheet formats.

Unit 2: Goods and Services Tax (GST)

- A) About Goods and Services Tax (GST)-**An introduction including concept of GST, need and benefit of GST.
- B) GST taxes and invoices-** GST rate, application of CGST, SGST AND IGST, Printing of tax invoices and computation of GST liability. **Activating GST masters in Tally-**GST compliance, setting up of GST rate, Updating Party GSTIN and Updating GST in service Ledgers.

References:

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- Financial Accounting - Dr. V. K. Goyal, Published by Excel Books
- Financial Management: Kishore, R. M. Taxman Allied Service
- Financial Management: Kuchhal, S. C. Chaitanya
- Indirect Taxes: Law and Practice by V.S. Datey, Taxmann
- Indirect Taxes by V.S. Balchandra, Sultan Chand and Sons, New Delhi
- GST Law & practice with Customs & FTP by V.S. Datey, Taxmann
- GST Law & practice with Customs & FTP by Sanjiv Agarwal, Snow White Publications
- Indirect taxes (Containing GST, Customs & FTP) by Mohd. Rafi, Bharat Publications
- Official Guide To Financial Accounting Using TALLY.ERP 9 3rd Revised And Updated Edition Book, Tally Education Pvt Ltd
- Implementing Tally ERP 9 Book, Asok k Nadhani
- Tally Erp 9 Power Of Simplicity Book, Shraddha Singh Navneet Mehra

SCOPE AND OBJECTIVES OF CORPORATE FINANCIAL MANAGEMENT

- A. 1. **Financial Needs of the Corporate Sector**
 2. **Sources of Financing**
 3. **Factors Affecting Corporate Finance**
 4. **Environmental, Social and Governance (ESG)**
 Considerations
 5. **Ownership Structure and ESG Integration Process**

Unit Structure :

- 1.0 Objectives
- 1.1 Introduction
- 1.2 Key Aspects of Corporate Financial Needs
- 1.3 Factors Influencing Corporate Financial Needs
- 1.4 Meaning of Environmental, Social and Governance (ESG)
- 1.5 ESG'S Three Core Principles
- 1.6 Advantages And Limitations of ESG
- 1.7 Impact of Ownership Structure on ESG
- 1.8 ESG Integration

1.0 OBJECTIVES

The objective of this chapter is:

- 1. Study key aspects of corporate financial needs
- 2. Analyze the factors influencing corporate financial needs
- 3. Describe ESG-related risk exposures and investment opportunities may be identified and evaluated.
- 4. Evaluate ESG risk exposures as well as investment opportunities related to a company.

A. 1. FINANCIAL NEEDS OF THE CORPORATE SECTOR

Introduction: New Age Financing

In today's dynamic and innovation-driven economy, traditional sources of finance are often insufficient to meet the evolving needs of businesses,

especially startups and environmentally conscious ventures. This has given rise to New Age Financing, a modern approach to raising capital through innovative and alternative financial instruments.

New Age Financing includes tools like Debt Securitization, which transforms illiquid assets into marketable securities, and Green Bonds, which support eco-friendly and sustainable projects. Additionally, Venture Capital Funds play a pivotal role by providing early-stage funding to high-potential startups, thereby fueling entrepreneurship and technological advancement.

These financing methods reflect a shift from conventional banking channels to more flexible, market-driven, and impact-oriented solutions, enabling businesses to grow while aligning with broader economic, social, and environmental goals.

1.1 INTRODUCTION

One of the most crucial things an entrepreneur or businessperson does when starting a new project or company is to find funding sources. The company's finances are its lifeblood, enabling seamless operations and supporting businesses' effective growth. It is almost impossible to start and run a business without sufficient sources of business finance. Operating expenses, asset purchases (such as real estate, buildings, and machinery), research and development, expansion plans, acquisitions, cash flow management, unexpected expenses, and dividend payments to shareholders are the main financial needs of the corporate sector. Depending on the needs of the business, these activities require access to both short-term and long-term capital from a variety of sources, including bank loans, debt financing, and equity offerings.

1.2 KEY ASPECTS OF CORPORATE FINANCIAL NEEDS

- **Fixed Capital:** Fixed capital refers to the financing for long-term assets like land, buildings, plant, machinery, equipment, vehicles etc.
- **Working Capital:** The working capital involves funding for day-to-day operations like payroll, inventory management, and accounts payable.
- **Research and Development (R&D):** Research and development includes funding for technological development for new product or processes, marketing research and innovation,
- **Expansion:** Money required to expand operations substantially, buy out other businesses, or enter new markets.
- **Debt Financing:** Debt financing refers to issuing bonds or taking out bank loans to finance operations of business concern.

- **Equity Financing:** Equity financing refers to issuing shares to investors in order to raise money.
- **Cash Flow Management:** Cash Flow Management refers to monitoring and controlling the inflow and outflow of cash to secure financial strength.
- **Utilization of Resources:** With high utilization of resources, companies often need to invest in new facilities to satisfy growing demand. Hence, company can compare actual output to the potential output.
- **Risk Management:** Risk management refers to the process of searching, assessing and controlling challenges about capital, earnings and operations of an organization. This risk includes financial uncertainties, technological issues, accidents, legal liabilities and natural disasters. Risk management includes utilizing financial instruments like insurance to mitigate potential risks.

1.3 FACTORS INFLUENCING CORPORATE FINANCIAL NEEDS

Financial needs can vary between companies and even among departments within the same company. These decisions are influenced by a combination of internal and external factors.

Internal Factors

- **Nature of Business:** Financial decisions are heavily influenced by the type of the firm. A manufacturing firm, for instance, might make significant investments in fixed assets, resulting in a capital structure with a higher proportion of long-term capital. A trading corporation, on the other hand, might put more money into present assets.
- **Legal Form:** Financial decisions are influenced by a company's legal framework. Comparing joint organizational models to partnerships or sole proprietorships, the former may have better financing terms.
- **Company size:** Another important factor is a company's size. While small businesses may need less money and be able to lease some assets at a reduced cost, large businesses need a significant amount of cash to operate. Larger, more well established companies with a significant market presence is frequently relied upon by smaller or start up businesses.
- **Ownership:** A company's ownership structure may have an impact on how decisions are made. It could be simpler for businesses with limited ownership to make choices that are best for the company.
- **Earnings:** When making financial decisions, a company's income stability and earnings risk are taken into consideration. Retaining earnings to reassure shareholders may be preferred in cases of unstable

income or significant earnings risk. On the other hand, a more liberal dividend policy can be the outcome of steady income or low profits risk.

- **Business Cycle:** When making decisions, financial managers need to take the business cycle stage into account. Financial decisions can be greatly impacted by market conditions during an expansion, recession, or recovery.
- **Liquidity:** A more generous dividend policy may be adopted by businesses with good liquidity balances. Businesses with short-term financial commitments or responsibilities may choose to implement a cautious dividend policy.
- **Asset Composition:** Decisions on financing may be influenced by the assets shown on a company's balance sheet. While a larger percentage of current assets would need short-term financing, more fixed assets might result in long-term financing.
- **Economic Life:** Borrowing preferences are influenced by the anticipated economic life of assets. Businesses may match the anticipated economic life of assets with the conditions of their borrowing.
- **Growth stage:** Startups need a lot of money for their first activities throughout the growth stage of a firm, like entering a new market, creating new products, and stepping up marketing. Even existing organizations may need money for expansion.
- **Term of Credit:** Financial decisions are influenced by the terms and availability of credit. When deciding whether to pay dividends, businesses take credit term into account.
- **Management Philosophy:** Decisions may be influenced by an organization's financial management philosophy. While some financial managers take a more aggressive stance, others take a more conservative one, prioritizing liquidity over profitability.

External Factors

- **Financial Market development:** Decisions are influenced by the condition of financial markets. Financial managers may choose to use a mixed capital structure in developed markets with a wide range of investors and institutions. In these markets, share holder preferences can lean toward a generous dividend policy.
- **Economic Conditions:** Financial decisions are significantly influenced by the economy. Financial managers may look for investment possibilities during times of economic recovery, while a more cautious attitude is required during downturns.
- **Government Regulations:** When making financial decisions, government laws are quite important. These rules, which affect

borrowing, reporting, and other financial issues, can differ from one jurisdiction to another.

- **Taxation:** Financial decisions are influenced by tax considerations. To reduce tax obligations and benefit from tax exemptions, financial managers may modify capital structures, bonus distributions, inventory valuation techniques, and depreciation strategies.
- **Industry dynamics:** Different industries have unique financing needs based on their capital intensity and growth potential.

2. Sources of Finance – Satisfying demand by producing and distributing goods and services is the focus of business. Businesses need finance for a variety of operations. Finance is therefore referred to as the "vital blood" of any company. Business finance is the term used to describe a company's need for funding to support its many operations. Retained earnings, trade credit, factoring, debentures, public deposits, lease financing, etc are a few examples of several funding sources. There are several ways for a business to raise money. Each source has unique characteristics that need to be carefully considered in order to determine the most practical way to get funding. No single financing source is ideal for all organizations.

Depending on the circumstance, goal, expense, and risk involved, a source may be chosen. When an entrepreneur chooses to start a firm, funding is necessary. For instance, money is required to purchase equipment, furniture, and other fixed assets. In a similar vein, money is required for routine tasks like purchasing supplies or covering employee salaries. A firm also requires money to grow. For instance, long-term financing—which can be obtained through owned or borrowed funds—may be required if a business want to raise money to meet its fixed capital requirements. Similarly, short-term sources might be used if the objective is to meet the business's daily demands.

A business cannot function without adequate capital. The initial investment made by the entrepreneur might not always be sufficient to cover all of the company's financial requirements. A businessman must therefore search for a variety of additional sources where the demand for funding can be met. Therefore, managing a corporate organization necessitates having a thorough awareness of the financial requirements and knowing where to find different funding sources.

1. Retained Earnings—

Typically, a business does not distribute all of its profits to shareholders as dividends or release all of its earnings. The business may keep a portion of its net profits for use in the future. We call this retained earnings. It can be used for profit ploughing, self-financing, or internal funding. A number of variables, including as net earnings, dividend policy, and the organization's age, affect the amount of profit that can be reinvested in the business.

2. Trade Credit –

Credit granted by one trader to another for the acquisition of goods and services is known as trade credit. Trade credit makes it possible to buy products without having to pay for them right away. Such credit appears as "sundry creditors" or "accounts payable" in the buyer of goods' records. Trade credit is often used by businesses as a short-term financing option. It is given to customers who are well-reviewed and in sound financial standing. A number of factors, including the reputation of the buying company, the seller's financial standing, the quantity of purchases, the seller's payment history, and the level of competition in the market, influence the amount and duration of credit that is granted. Different industries and individuals may have different trade credit conditions.

3. Factoring –

A financial service known as factoring involves the "factor" offering a range of services to the client, including: Bill discounting (with or without recourse) and debt collection. This involves selling the factor receivables from the sale of products or services at a specific discount. The factor safeguards the business against any losses from bad debts and assumes full responsibility for credit supervision and debt collection from the buyer. The two fundamental ways of factoring are non-recourse and recourse. Using recourse factoring does not protect the client from the risk of bad debts. In contrast, non-recourse factoring entails the factor taking on all credit risk, meaning that in the event that the loan defaults, the customer will receive full reimbursement of the invoice.

Among other things, factors use the enormous amounts of data they keep on company trade histories to provide information about the creditworthiness of potential customers. For those who use factoring services, this can help them avoid doing business with customers who have a poor payment history. Additionally, Factors might offer suitable consulting services in fields like as marketing, finance, and so forth.

4. Public Deposit –

Deposits collected from the general public by organizations are known as public deposits. Public deposits frequently have greater interest rates than bank deposits. A specific form must be filled out by anyone wishing to donate money to an organization.

The organization provides a deposit receipt as evidence of payment in exchange. Public deposits can be used to cover a company's medium- and short-term financial demands. Both the organization and the depositor benefit from deposits. The cost of deposits to the company is less than the cost of borrowing from banks, even though depositors get greater interest rates than banks. Businesses frequently look for deposits from the public for a maximum of three years. Public deposit acceptance is governed by Reserve Bank of India.

5. Lease Financing –

An asset's owner gives another party the right to use the asset in exchange for a monthly payment under a lease, which is a legally binding agreement. Stated differently, it refers to the renting of an asset for a specific period of time. The term "lessor" refers to the owner of the assets, and "lessee" refers to the party that uses them. In return for the use of the asset, the lessee pays the lessor a fixed, recurring amount known as the lease rental.

The terms and circumstances governing the lease arrangements are contained in the lease contract. The asset will be given back to the owner at the conclusion of the lease. A vital instrument for the company's modernization and diversification is lease financing.

6. Commercial Papers –

Commercial Paper (CP) is a promissory note that is not secured. It was initially established in India in 1990 to provide investors with an extra tool and to enable highly rated corporate borrowers to diversify their short-term borrowing sources.

In order to meet their short-term funding needs for their operations, principal dealers and all-India financial institutions were then permitted to issue CP. CPs are available for investment by a variety of entities, including individuals, banks, other corporate organizations (registered or incorporated in India), unincorporated bodies, Non-Resident Indians (NRIs), and Foreign Institutional Investors (FIIs). With maturities ranging from seven days to a year from the date of issuance, CP can be issued in denominations of Rs. 5 lakh or multiples of that amount.

7. Issue of Shares –

The smallest portion of a company's capital is called a share. Small portions of the company's capital are distributed to the general public in the form of shares. "Share Capital" is the term used to describe the money obtained via the issuance of shares. It's similar to an Owner's Fund.

There are two types of shares which can be issued:

a. Equity Shares:

These are shares that have ownership and voting rights but do not pay a set dividend. The term "owner of the firm" refers to the equity shareholders of the business. They are paid based on the profitability of the business rather than receiving a fixed dividend.

b. Preference Shares:

Shares with a little preference over equity shares are known as preference shares. Preference in the case of a liquidation, stockholders are entitled to receive their money before equity shareholders and get a fixed dividend

rate. However, they are not able to vote in the management of the company.

8. Debentures:

Debentures are a good way to raise money for long-term debt. Debentures with a fixed rate of interest are one way for a business to raise money. A company's debenture acknowledges that it has borrowed a certain sum of money, which it promises to pay back later. Holders of debentures are considered creditors of the business. Holders of debentures get a specified amount of interest at predefined intervals, such six months or a year. Credit rating agencies like CRISIL (Credit Rating and Information Services of India Ltd.) are required to evaluate publicly traded debentures based on a number of criteria, including the company's track record, profitability, ability to pay off debt, creditworthiness, and perceived lending risk.

9. Commercial Bank:

Commercial banks play a vital role in providing finances for various purposes and time periods. Banks provide loans to business organizations in a various waysuch as overdrafts, cash credits,term loans, bill discounting and the issuance of letters of credit. The type, size, and length of the loan, as well as the bank, all affect the interest rate applied to these credits.

10. Financial Institutions:

Numerous financial institutions have been established in the country by the government to provide funds to the company. They offer loan and owned capital for long- and medium-term requirements. Due to the nation's industrial growth, these organizations are frequently referred to as "Development Banks." These institutes offer organizations technical support, management services, and financial assistance in addition to conducting surveys. Financial institutions offer capital for an organization's modernization, reorganization, and growth.

1.4 MEANING OF ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG)

Environmental, social and governance (ESG) is a framework which adapted to evaluate business practices and performance of an organization on various sustainability and ethical issues. Additionally, it offers a means of quantifying business risks and opportunities in those domains. ESG investing is the practice of some investors in capital markets using ESG criteria to assess businesses and decide on their investment strategies. The purpose of an ESG program is to guarantee accountability and the implementation of systems and procedures to manage a company's impact, such as its carbon footprint and how it treats employees, suppliers, and other stakeholders, even though sustainability, ethics, and corporate governance are typically thought of as non-financial performance

indicators. In order to prepare businesses for long-term success, ESG initiatives also support larger business sustainability initiatives.

1.5 ESG'S THREE CORE PRINCIPLES

Business and IT executives are becoming more aware of ESG as a useful method of conducting business as the number of ESG funds for investment management rises. Every facet of ESG is crucial to the endeavour to raise a business's awareness of ethical and sustainable business practices. Details on ESG standards used by investors and businesses are provided below.

Environmental

An organization's total impact on the environment, as well as the possibilities and threats it may encounter due to environmental concerns like climate change and resource protection policies, are all considered environmental factors.

The following are a few examples of environmental elements that might be used as ESG criteria:

- Carbon footprint, including greenhouse gas emissions
- Energy consumption and efficiency
- Air and water pollution
- Biodiversity loss
- Deforestation
- Natural resource depletion
- Waste management

Social

The way a business interacts with various groups of people, such as its employees, suppliers, customers, and community members, is referred to as social factors. Examples of the criteria utilized are as follows:

- Adequate pay for employees, including a living wage.
- Employee experience and engagement.
- Workplace health and security.
- Diversity, equity and inclusion programs.
- Data protection and privacy policies.
- Customer satisfaction levels.
- Fair treatment to suppliers and customers
- Funding of projects or institutions which provide help to vulnerable communities.

- Community relations: this refers to how the company engages with and impacts the local community in which it operates.
- Support for labour standards and human rights.

Governance

Governance elements look at how a business manages itself, with an emphasis on internal controls and procedures to uphold adherence to laws, industry standards, and corporate guidelines.

Examples include the following:

- Board composition, including its diversity and structure.
- Company management and leadership.
- Financial transparency and business integrity.
- Executive compensation policies.
- Ethical business practices.
- Regulatory compliance and risk management initiatives.
- Whistleblower programs.
- Rules about corruption, conflicts of interest, bribery, political donations and lobbying.

1.6 ADVANTAGES AND LIMITATIONS OF ESG

4.3.1 Advantages of ESG practices -

The advantages of ESG practices for investors and companies are as follows:

- **New customers for additional growth -**

Customers and corporate clients that take ESG factors into account when making purchases are likely to look for goods or services from ESG-focused businesses.

- **Investment returns and sustainability can provide mixture-**

When compared to standard funds, sustainability funds can yield returns that are on par with or greater. Global financial services firm Morgan Stanley claims that in 2023, sustainable funds beat traditional funds in every significant asset class and geographical area.

- **Attract and retain efficient employees-**

By giving workers a feeling of purpose, ESG can boost overall productivity and employee motivation.

- **ESG investing encourages companies to take other positive investment decisions-**

Businesses that implement ESG efforts typically concentrate on a variety of ethical and environmental challenges. ESG, for instance, is in accordance with the triple bottom line, an accounting methodology that focuses on sustainability and allows businesses to assess their whole economic worth as well as their social and environmental effect.

- **Costs Reduction**

Over time, operating costs, energy bills, and other expenses can be decreased when a firm adopts ESG practices.

4.3.2 Limitations of ESG practices are as follows:

- **Adopt ESG strategy as per structure of company -**

The administration of ESG efforts and ESG investing are made more difficult by the possibility that one company's ESG strategy won't work for another. Complicating matters further is the requirement to integrate ESG initiatives into both long-term plans and daily corporate operations.

- **Use authentic ESG strategy -**

Businesses that only sometimes pay attention to ESG, utilize it as a gimmick to improve their brand image, or ignore it in their overall business plan are unlikely to succeed. For instance, a business that engages in "green washing," which involves making exaggerated or misleading claims about its environmental initiatives, may experience negative customer feedback that lowers sales and the stock's value.

- **Negative impact of economic trends -**

Even if there are success stories, a company's stock performance is not always excellent when ESG is a focus. The performance of businesses and ESG funds can be adversely impacted by shifts in the economy, economic trends, and market conditions in addition to other internal issues.

- **Creation of balanced investment portfolio can be difficult for investors-**

It could be more difficult for investors who are committed to an ESG-led investment strategy to build a balanced portfolio that supports long-term objectives.

- **Performance reporting of different ESG criteria can be difficult -**

Since the majority of ESG criteria aren't directly related to financial data, it takes more work to produce measurable performance outcomes. Furthermore, because reporting frameworks and standards aren't routinely used, there are knowledge gaps between ESG data and the supply chain.

5. Ownership Structure and ESG Integration Process

"Ownership Structure and ESG Integration Process" would normally describe how a company's ownership structure (family-owned, public, and institutional investors, for example) can affect the amount of Environmental, Social, and Governance (ESG) factors taken into account in its operations and decision-making. It would also describe the precise procedures for incorporating ESG considerations into the investment process depending on the ownership structure.

1.7 IMPACT OF OWNERSHIP STRUCTURE ON ESG

1. Concentrated Ownership –

How possible short-term considerations could cause concentrated ownership (by a family, for example) to place less attention on ESG.

2. Institutional Ownership:

How businesses might be pressured to enhance their ESG processes by institutional investors with strict ESG mandates.

3. Foreign Ownership:

Foreign investors' possible beneficial impact on a business's ESG disclosure and practices.

4. Identifying Material ESG Issues:

Determining which ESG elements are most relevant to a certain business based on its operations and industry.

5. ESG Data Collection and Analysis:

Collecting information about a business's ESG performance from a range of sources, such as industry benchmarks, sustainability reports, and surveys.

6. ESG Assessment and Scoring:

Calculating a score by comparing the company's ESG performance against predetermined standards.

7. ESG Integration into Investment Decisions:

Integrating the ESG evaluation into the process of analyzing and choosing investments.

8. Engagement with Companies:

Actively interacting with businesses through proxy voting, shareholder voting, and communication in order to discuss and enhance their ESG practices.

1.8 ESG INTEGRATION

ESG integration refers to “the process of including ESG factors in investment analysis and decisions for better manage risks and improve returns”.

Seven steps to ESG integration – the Robeco approach

Long-term changes in markets, nations, and businesses are generated by sustain ability and these changes may have an effect on performance in the future. According to this view, the corporation views sustainability is one of the factors that add value to their investing process, much like they do when they examine market momentum or financials. Therefore, they incorporate it into their investment procedures for both fixed income and fundamental and quantitative stocks. Every professional investor will approach it differently, thus there is no right or wrong way to accomplish it.

The seven steps to integrated sustainability are as follows:

1. Defining your investment belief

Robeco has made sustainability is a clear strategic decision and a genuine commitment. The company thinks it improves long-term returns and helps people make more educated investing decisions.

2. Embedding it in the organization, the multiplier effect

It is impossible for integrated sustainability to succeed without top-down management commitment. After that is established, other workers can join in on a growing basis, resulting in a "multiplier effect" that ultimately leads to everyone contributing.

3. Creating a sustainability investing framework

Robeco's research capability, investment teams, and active ownership team are the three key pillars that support the integrated sustainability investing framework.

4. Having access to leading research

Robeco's patented Corporate Sustainability Assessment (CSA) and Country Sustainability Ranking (CSR) are the primary tools used to access research. These, in turn, concentrate on issues unique to the industry and the nation that propel long-term growth and profitability. In their own way, both are world-class models that are proprietary.

5. ESG integration: each investment process requires its own approach

Equipped with their findings, the investment teams are in charge of incorporating financially significant ESG data into every phase of the investment procedure. This could be achieved by incorporating ESG

performance into the credit analysis or by measuring the effect of ESG factors on conventional measures like sales and margin growth.

6. Using active ownership to enhance performance and take responsibility

A key component of their strategy for sustainable investing is active ownership. Here, they assume accountability and look for ways to improve the ESG performance of investee firms by using Robeco's position as an asset manager and, consequently, as a stock or bondholder.

7. Raising the bar as global challenges continue to shape markets

Global ESG problems remain significant despite the financial industry's success in integrating ESG in one way or another into their investment portfolios. As a result, the bar is always being lifted in an effort to raise standards across the SI spectrum before evaluating the effect on investments.

Exercises for practice:

A. Multiple Choice Questions

1. Under the provisions of the Companies Act, the company can issue
 - a. Only equity shares
 - b. Only Preference Shares
 - c. **Preference and Equity Shares**
 - d. None of these
2. The value of the firm usually based on
 - a. **The value of equity**
 - b. The value of debt and equity
 - c. The value of debt
 - d. The value of assets plus liabilities
3. Shareholders wealth increases with the increase in
 - a. Market value of the firm
 - b. EPS
 - c. **Dividend and market value of the firm**
 - d. Market price of the equity shares
4. Leasing of machinery can be shown under
 - a. Fixed Asset
 - b. Investment decision
 - c. **Financing decision**
 - d. Capital budgeting decision
5. For corporate wealth maximization is the value maximization.
 - a. **Stakeholders**
 - b. Equity shareholders
 - c. Employees
 - d. Debenture holders

6. Listed companies can be valued as per
 - a. **Market value**
 - b. Book value
 - c. Salvage value
 - d. Liquidation value
7. Unlisted companies can be valued as per
 - a. Market value method
 - b. **Net asset method**
 - c. Both a & b
 - d. None of these
8. To describe all the policies, procedures, systems and relationships to oversee the successful and legal operations of the enterprise, term can be used.
 - a. Corporate policy
 - b. **Corporate governance**
 - c. Corporate oversight
 - d. Corporate strategy
9. Permanent working capital
 - a. Includes fixed assets
 - b. Change with seasonal needs
 - c. Includes accounts payables
 - d. **Is the amount of current assets required to satisfy a firm's long-term minimum needs.**
10. of the following would not be financed from working capital.
 - a. Account Receivable
 - b. Credit sales
 - c. Cash float
 - d. **A new personal computer for the office**
11. Buying an account receivable of a company nonrecourse basis is known as
 - a. Billing
 - b. Trading
 - c. **Factoring**
 - d. Forfeiting
12. A central location for keeping securities on deposit is called as
 - a. Instrument
 - b. **Depository**
 - c. Institutions
 - d. None of the above
13. is not a fee-based financial service.
 - a. **Lease Financing**
 - b. Corporate Counselling
 - c. Issue Management
 - d. Profit Management

14. The letter 'E' in the ESG in Corporate Finance stands for
 - a. **Environmental**
 - b. Expressive
 - c. Educational
 - d. Employment
15. The letter 'S' in the ESG in Corporate Finance stands for
 - a. Security
 - b. **Social**
 - c. Systematic
 - d. Stakeholders
16. The letter 'G' in the ESG in Corporate Finance stands for
 - a. **Governance**
 - b. Government
 - c. Global
 - d. Geographical
17. Factors examine how a company's policies focusing on internal controls and practices to maintain compliance with regulations.
 - a. Environmental
 - b. Social
 - c. **Governance**
 - d. None of these
18. factors address how a company treats different groups of people in the society.
 - a. Environmental
 - b. **Social**
 - c. Governance
 - d. None of these
19. ESG factors can influence a company's financial performance by
 - a. Limiting investment opportunities
 - b. Through tax incentives
 - c. Increasing operational costs
 - d. **Affecting reputation, operational costs and compliance**
20. Under environmental, social and governance risks, is most likely an example of a social factor.
 - a. Deforestation
 - b. **Equity and diversity**
 - c. Shareholders right
 - d. None of the above

B. Explain the following terms in One or Two lines.

1. Fixed Capital
2. Working Capital
3. Debt Financing
4. Retained Earning
5. Public Deposit
6. Trade Credit
7. Lease Financing
8. Factoring
9. Commercial Papers
10. Risk Management

C. Answer the following questions in detail.

1. What are the key aspects of corporate financial needs?
2. Explain the factors influencing corporate financial needs.
3. Write the various sources of finance.
4. What do you mean by 'ESG' consideration? Explain the core principles of 'ESG'.
5. Write various advantages and limitations of ESG practices for investors.
6. Write short note on 'Ownership Structure and ESG Integration Process'.



NEW AGE FINANCING

Unit Structure :

- 2.0 Learning Objectives
- 2.1 New Age Financing: Debt Securitization and Green Bonds
- 2.2 Feature of Debt Securitization
- 2.3 The Mechanics of Securitization
- 2.4 Benefits of Debt Securitization
- 2.5 Issuers Can Be Diverse, Including
- 2.6 Green Bond Principles (GBP)
- 2.7 Requirements for Issuing A Green Bond
- 2.8 Challenges and Risks
- 2.9 Venture Capital
- 2.10 Types of Venture Capital Funds
- 2.11 Challenges Faced by Venture Capital Funds
- 2.12 Conclusion
- 2.13 Exercise

2.0 LEARNING OBJECTIVES

After completing this unit, learners will be able to:

- Understand the concepts and significance of new age financing tools like debt securitization and green bonds.
- Explain the process, benefits, and risks associated with debt securitization.
- Identify the purpose and impact of green bonds in sustainable finance.
- Describe the methods of venture capital financing and their relevance to start-up growth.
- Analyze the structure and development of venture capital funds in India, along with key trends and initiatives.

2.1 NEW AGE FINANCING: DEBT SECURITIZATION AND GREEN BONDS

Debt Securitization

Introduction

Debt securitization and green bonds are innovative financing mechanisms that play a crucial role in modern financial markets. Debt securitization provides companies with access to funding and risk management tools, while green bonds contribute to sustainable development by financing environmentally friendly projects. Both instruments offer unique benefits to issuers and investors, contributing to the evolution of new age financing. Debt securitization is a financial process where illiquid assets, such as loans or receivables, are pooled together and converted into marketable securities. These securities are then sold to investors, providing the originator with immediate cash flow and transferring the risk to the investors.

Debt securitization is a financial process where illiquid assets, such as loans or receivables, are pooled together and converted into marketable securities. These securities are then sold to investors, providing the originator with immediate cash flow and transferring the risk to the investors

2.2 FEATURE OF DEBT SECURITISATION

1. Pooling of Assets: This is the fundamental first step. Various types of debt instruments are bundled together into a pool. The assets in this pool are typically illiquid, meaning they aren't easily bought and sold. They generate future cash flows, but accessing that cash immediately can be difficult. Common types of assets included in pools are:

- **Residential Mortgages:** Loans secured by homes.
- **Commercial Mortgages:** Loans secured by commercial properties.
- **Auto Loans:** Loans for purchasing vehicles.
- **Credit Card Receivables:** Outstanding balances on credit cards.
- **Student Loans:** Loans for financing education.
- **Corporate Loans:** Loans to businesses.
- **Lease Receivables:** Payments due on leased equipment.

It's important that the assets within the pool are relatively homogeneous – they share similar characteristics like credit quality, interest rates, and maturity dates. This homogeneity makes it easier to assess the overall risk profile of the pool.

2. **Creation of Securities:** The pooled assets serve as collateral for the creation of new financial instruments. These instruments, known as Asset-Backed Securities (ABS), are sold to investors. The cash flows generated by the underlying assets are used to make payments to the ABS holders. These securities can take various forms, but bonds are the most common.
3. **Sale to Investors:** The newly created ABS are offered to a broad range of investors, including both institutional and individual investors.
 1. **Institutional Investors:** These are large entities like pension funds, insurance companies, mutual funds, hedge funds, and banks.
 2. **Individual Investors:** Retail investors can also participate, often through mutual funds or exchange-traded funds (ETFs) that specialize in ABS.

The sale of these securities provides the originator (the entity that bundled the assets) with immediate cash.

4. **Risk Transfer:** A crucial aspect of securitization is the transfer of risk. Primarily, the credit risk (the risk that borrowers will default on their loans) is transferred from the originator to the investors who purchase the ABS. While the originator may still have some involvement (e.g., as the servicer of the loans), the primary financial risk shifts to the investors. This is why investors must carefully evaluate the quality of the underlying assets.

2.3 THE MECHANICS OF SECURITIZATION

1. Origination: The Foundation of the Process

The securitization process starts with a financial institution—a bank, mortgage company, credit union, or other lender—originating loans or acquiring other assets. These assets represent debts owed to the institution. The types of assets that can be securitized are diverse and include:

1. **Residential Mortgages:** Loans secured by residential properties, like single-family homes or multi-family dwellings. These can be prime (high credit quality) or subprime (lower credit quality).
2. **Commercial Mortgages:** Loans secured by commercial real estate, such as office buildings, shopping centers, or industrial warehouses.
3. **Auto Loans:** Loans used to finance the purchase of vehicles.
4. **Credit Card Receivables:** Outstanding balances on credit cards. These are revolving debts, meaning the balance fluctuates.
5. **Student Loans:** Loans taken out for educational expenses.

6. **Corporate Loans:** Loans made to businesses, including leveraged loans and syndicated loans.
7. **Equipment Leases:** Lease agreements for equipment, where the payments represent future cash flows.
8. **Other Assets:** In theory, almost any asset that generates a predictable stream of future payments can be securitized.

2. Pooling: Creating a Diversified Portfolio

The originator then assembles a large number of these individual assets into a pool or portfolio. This isn't a random collection; the pool is carefully constructed to achieve specific objectives:

1. **Diversification:** The pool is designed to diversify risk. For example, a mortgage pool might include loans from different geographic regions, with varying interest rates, loan terms, and borrower credit scores. Diversification reduces the impact of any single loan defaulting.
2. **Homogeneity (to some extent):** While diversification is important, the assets within specific sub-pools or tranches are often relatively homogeneous. This simplifies the process of assessing the overall risk profile and predicting cash flows.
3. **Matching Securities Characteristics:** The pool is structured to align with the desired characteristics of the securities that will be issued, such as their expected yield, maturity, and risk profile.

3. Special Purpose Vehicle (SPV): Isolating the Assets

A critical step is the creation of a Special Purpose Vehicle (SPV). This is a legally independent entity, often structured as a trust, specifically designed to hold the pooled assets. The SPV is bankruptcy-remote. This means that if the originator goes bankrupt, the assets held by the SPV are protected and cannot be claimed by the originator's creditors. This isolation of assets is a major benefit for investors, as it reduces their exposure to the originator's financial health.

4. Tranching: Creating Securities with Varying Risk and Return

1. **The SPV issues securities,** and these are often divided into different tranches. Each tranche represents a different level of risk and expected return:
2. **Senior Tranches (e.g., AAA-rated):** These are the most secure tranches. They have the first claim on the cash flows generated by the underlying assets. They are the least likely to experience losses, but they also offer the lowest yields. These tranches are attractive to risk-averse investors.
3. **Mezzanine Tranches (e.g., A-rated, BBB-rated):** These tranches have a higher risk than senior tranches and offer a higher potential

return. They have a lower priority on cash flows than senior tranches and will absorb losses before the senior tranches.

4. **Junior/Equity Tranches (e.g., BB-rated, unrated):** These are the riskiest tranches. They are the last to receive payments and are the first to absorb losses. They offer the highest potential returns but are only suitable for investors with a high risk tolerance.

This tranching structure allows investors to select securities that align with their specific risk and return objectives.

5. Credit Enhancement: Bolstering the Securities' Creditworthiness

In addition to tranching, several techniques are employed to enhance the creditworthiness of the securities:

1. **Overcollateralization:** The pool of assets includes more value than is needed to cover the promised payments to investors. This excess value acts as a buffer against potential losses.
2. **Subordination (as described in Trenching):** The prioritization of payments to senior tranches.
3. **Reserve Funds:** Cash reserves are established to cover potential shortfalls in cash flows from the underlying assets.
4. **Third-Party Guarantees or Insurance:** In some cases, a third party may provide a guarantee or insurance on some or all of the tranches.

6. Servicing: Managing the Asset Pool

A servicer is responsible for collecting payments from the borrowers and managing the underlying assets in the pool. The servicer plays a vital role in the securitization process. Their responsibilities include:

1. Collecting principal and interest payments.
2. Handling delinquencies and defaults.
3. Managing any foreclosures or repossessions.
4. Distributing cash flows to investors according to the terms of the securities.

The servicer may be the original lender, or it could be a specialized third-party company.

7. Distribution: Selling the Securities to Investors

The securities issued by the SPV are sold to investors in the capital markets. These investors can be:

1. **Institutional Investors:** Pension funds, insurance companies, mutual funds, hedge funds, banks, and other large institutional investors.

- 2. Individual Investors:** Retail investors can also participate in the securitization market, often through mutual funds or exchange-traded funds (ETFs) that invest in asset-backed securities.

The proceeds from the sale of the securities provide the originator with immediate cash flow.

In essence, securitization transforms illiquid assets into liquid securities, providing a source of funding for originators and a range of investment opportunities for investors. However, it's crucial to remember that securitization involves risks, especially credit risk and prepayment risk, that investors must carefully assess.

Types of Securitized Assets:

Securitization isn't limited to just one type of debt. A wide range of assets that generate future cash flows can be bundled and securitized.

Various types of assets that are commonly securitized:

Types of Mortgages:

Residential Mortgages:

Residential mortgages, loans secured by residential properties, are the most prevalent type of securitized asset. They form the basis of Mortgage-Backed Securities (MBS). Within this category, we find two main sub-types:

Agency Residential Mortgage-Backed Securities (Agency RMBS): ** These are issued by government-sponsored enterprises (GSEs) in the United States, Agency RMBS carry an implied or explicit guarantee from the government, making them generally considered safer investments. This government backing lowers the risk for investors, which translates to lower interest rates for borrowers.

Non-Agency Residential Mortgage-Backed Securities (Non-Agency RMBS) (or Private-Label RMBS): These are issued by private institutions, such as banks, mortgage companies, and other financial entities. Unlike Agency RMBS, they do not have a government guarantee. As a result, they carry a higher level of credit risk.

Commercial Mortgages:

Commercial mortgages, loans secured by commercial properties, are also frequently securitized. These loans are used to finance a wide range of properties, including:

* **Office Buildings: ** From small local offices to large high-rise towers.

* **Retail Spaces: ** Shopping malls, strip centers, and individual retail stores.

* **Industrial Warehouses: ** Facilities used for manufacturing, storage, and distribution.

* **Apartment Buildings: ** Multi-family residential properties.

* **Hotels and Motels: ** Properties used for lodging.

Commercial Mortgage-Backed Securities (CMBS) are typically structured with multiple tranches, similar to RMBS, offering investors a range of risk and return profiles. The performance of CMBS is tied to the performance of the underlying commercial properties and the ability of the borrowers to generate sufficient income to service their debt.

Asset-Backed Securities (ABS):

Asset-Backed Securities (ABS) represent a broader category encompassing securities backed by various types of assets other than residential or commercial mortgages. These assets share the characteristic of generating future cash flows. Some common examples include:

* **Auto Loans: ** Loans used to finance the purchase of cars, trucks, and other vehicles. The collateral is the vehicle itself. Repossession and resale of the vehicle are key factors in mitigating losses in auto loan ABS.

* **Credit Card Receivables: ** These are the outstanding balances owed by credit card holders. Unlike mortgages or auto loans, credit card debt is typically revolving, meaning the balance fluctuates as cardholders make purchases and payments. ABS backed by credit card receivables are structured to reflect this revolving nature.

* **Student Loans: ** Loans used to fund education. These can be government-backed (like in the US) or private. The long-term nature of student loans makes them suitable for securitization.

* **Equipment Loans: ** Loans used by businesses to finance the purchase of equipment, such as machinery, computers, or transportation vehicles. The equipment itself serves as collateral.

* **Lease Receivables: ** Payments due on leases, such as auto leases, equipment leases, or even aircraft leases.

* **Small Business Loans (SBA Loans): ** Loans guaranteed by the Small Business Administration (in the US, for example) can also be securitized.

The structure and characteristics of ABS vary depending on the type of underlying asset. However, they all share the fundamental principle of pooling assets and using them to back securities that are sold to investors. Understanding the specific risks and characteristics of each asset type is essential for investors considering investing in ABS.

Debt securitization offers a range of advantages to both the entities that initiate the process (originators) and the investors who purchase the resulting securities.

- 1. Funding Source:** Securitization acts as a powerful funding mechanism. By converting illiquid assets (like loans) into readily tradable securities, originators, such as banks, can free up capital that was previously tied up. This newly available capital can then be used to originate more loans, fueling further lending activity and economic growth. This is particularly crucial for institutions like banks, which must carefully manage their balance sheets and capital adequacy ratios. Securitization allows them to expand their lending capacity without necessarily increasing their overall assets.
- 2. Risk Management:** Securitization enables originators to transfer credit risk – the risk that borrowers will default on their loans – to a wider pool of investors. This diversification of risk is a significant benefit. If a few borrowers in a securitized pool default, the impact is spread across many investors, rather than being concentrated with the originator. This reduces the originator's exposure to losses from any specific type of loan or borrower segment. It allows them to manage and mitigate their overall portfolio risk more effectively.
- 3. Lower Cost of Capital:** By pooling assets and creating securities, originators can often access funding at a lower cost than traditional methods, like taking out a bank loan or issuing corporate bonds. The reason is that the securitized securities are often more attractive to a broader range of investors due to their structure and credit enhancements. This increased demand can lead to lower interest rates (or yields) on the securities, translating to a lower cost of capital for the originator.
- 4. Investment Opportunities:** Securitization creates a diverse array of investment opportunities for investors with varying risk appetites. The tranching structure, in particular, plays a key role here. Investors can choose tranches that align with their desired level of risk and return. Risk-averse investors might opt for senior tranches, which offer lower yields but are considered safer. Investors seeking higher returns might choose junior tranches, accepting the greater risk of potential losses. This flexibility makes securitization attractive to a wide range of institutional and individual investors.
- 5. Improved Liquidity:** One of the most significant benefits of securitization is that it transforms illiquid assets into marketable securities, significantly enhancing their liquidity. Loans, by their nature, are not easily bought and sold. However, the securities backed by those loans can be traded in the capital markets. This increased liquidity makes it easier for institutions to manage their assets and

liabilities. They can quickly buy or sell these securities as needed, adjusting their portfolios in response to market conditions.

Challenges and Risks of Debt Securitization:

While securitization offers numerous benefits, it also comes with certain challenges and risks that need to be carefully considered.

1. **Complexity:** Securitization transactions are inherently complex. They involve numerous parties (originators, SPVs, servicers, trustees, underwriters, rating agencies, investors) and intricate legal structures. This complexity can make it difficult for investors, especially smaller or less sophisticated ones, to fully understand the risks involved. It requires specialized knowledge and expertise to analyze the structure and assess the creditworthiness of the securities.
2. **Credit Risk:** At its core, securitization involves credit risk – the risk that borrowers will default on their loans. Even with careful pooling and credit enhancements, there's always the possibility that some borrowers will be unable to repay their debts. Accurate credit risk assessment is absolutely critical for the success of a securitization. Investors rely on credit ratings from agencies and their own due diligence to evaluate this risk.
3. **Prepayment Risk:** Borrowers may choose to prepay their loans, especially if interest rates decline. This prepayment can disrupt the expected cash flows to investors. Prepayment risk is particularly relevant for mortgage-backed securities. If a large number of borrowers prepay their mortgages, investors may receive their principal back sooner than anticipated, potentially having to reinvest it at lower interest rates.
4. **Liquidity Risk:** While securitization generally improves liquidity, some securitized products, particularly those with complex structures or lower credit ratings, may have limited liquidity. This means that if investors need to sell these securities quickly, they may find it difficult to do so or may have to sell them at a discounted price.
5. **Regulatory Risk:** The securitization market is subject to regulations, and changes in these regulations can significantly impact the market. The 2008 financial crisis, which was partly fueled by the collapse of the subprime mortgage market, clearly demonstrated the significant regulatory risks associated with complex securitizations. New regulations can affect the structure of securitizations, the types of assets that can be securitized, and the level of disclosure required.
6. **Transparency:** Lack of transparency in some securitizations can be a major problem. If investors don't have access to clear and complete information about the underlying assets, the pool structure, and the risks involved, they cannot make informed investment decisions. This information asymmetry can lead to mispricing of securities and

increase the potential for losses. Increased transparency is essential for a healthy and well-functioning securitization market.

Green Bonds

Introduction

Green bonds are debt instruments specifically created to raise capital for projects that have a positive environmental impact. They are a crucial tool in the transition to a low-carbon and sustainable economy, enabling investors to support environmentally friendly initiatives while also earning a financial return.

Meaning

Green bonds are essentially fixed-income securities (like regular bonds) where the issuer commits to using the raised capital exclusively for eligible green projects. This commitment to environmental purpose is the defining characteristic that sets green bonds apart from conventional bonds. Green bonds are debt instruments specifically designed to raise capital for projects that have a positive impact on the environment. They represent a powerful tool for channeling investments towards a more sustainable future.

2.5 ISSUERS CAN BE DIVERSE, INCLUDING

1. **Corporations:** Companies across various sectors, from renewable energy providers to manufacturers committed to sustainable practices.
2. **Governments:** National, regional, and municipal governments seeking to finance green infrastructure and environmental initiatives.
3. **Supranational Institutions:** Organizations like the World Bank, the European Investment Bank (EIB), and other multilateral development banks.
4. **Other Entities:** Universities, non-profits, and other organizations undertaking environmentally beneficial projects.

The European Investment Bank (EIB) is widely recognized for issuing the first green bond in 2007, then known as a "Climate Awareness Bond." This pioneering issuance marked a turning point in sustainable finance, demonstrating the feasibility of raising capital specifically for climate-related projects. The EIB's leadership played a crucial role in establishing the green bond market and inspiring other institutions to issue green bonds.

Features of Green Bonds:

1. **Use of Proceeds:** This is the cornerstone of a green bond. The issuer must allocate the funds raised specifically to eligible green projects. This "use of proceeds" commitment is what makes the bond "green." Transparency in how the funds are used is paramount.

2. **Project Evaluation and Selection:** Issuers typically establish a framework outlining the criteria for selecting eligible green projects. This framework often involves environmental impact assessments and adherence to specific standards or certifications. Transparency in the project selection process is vital for investor confidence.
3. **Management of Proceeds:** Issuers must track and manage the funds separately to ensure they are used exclusively for the designated green projects. This often involves dedicated accounts or systems to track the flow of funds and prevent any commingling with other funding sources.
4. **Reporting:** Green bond issuers are expected to provide regular reports on the allocation of proceeds and the environmental impact of the funded projects. These reports often include key performance indicators (KPIs) related to emissions reductions, energy savings, or other relevant metrics. Transparency in reporting is essential for demonstrating the environmental benefits of the bond issuance.
5. **External Review:** Many green bonds undergo external review or certification by independent third-party organizations. These reviewers assess the environmental credentials of the projects and verify that the bond issuance aligns with established green bond standards, such as the Green Bond Principles (GBP). External review adds credibility and reduces the risk of "greenwashing."

Categories of Eligible Green Projects:

The range of projects that qualify for green bond financing is broad and covers a wide spectrum of environmental initiatives:

1. **Renewable Energy:** Development and deployment of renewable energy technologies, such as solar, wind, hydro, geothermal, and biomass.
2. **Energy Efficiency:** Investments in projects that reduce energy consumption, including building retrofits, energy-efficient appliances, smart grids, and industrial process improvements.
3. **Clean Transportation:** Financing for electric vehicles, public transportation projects, charging infrastructure, and other sustainable transportation solutions.
4. **Sustainable Water Management:** Projects focused on water conservation, wastewater treatment, water recycling, and improving water access and efficiency.
5. **Pollution Prevention and Control:** Investments in technologies and processes that reduce or prevent pollution, including waste management, recycling, and air pollution control.

6. **Sustainable Agriculture and Forestry:** Projects that promote sustainable farming practices, reforestation, afforestation, and responsible land management.
7. **Climate Change Adaptation:** Projects that help communities and ecosystems adapt to the impacts of climate change, such as flood defenses, drought-resistant crops, and coastal protection.
8. **Green Buildings:** Construction or renovation of buildings that meet high environmental standards, such as LEED certification or other green building rating systems.

Green Bonds vs. Traditional Bonds:

The fundamental distinction between green bonds and traditional bonds lies in the use of proceeds. Traditional bonds raise capital for general corporate purposes, infrastructure development, or other broad objectives. Green bonds, on the other hand, specifically earmark the funds raised for environmentally beneficial projects. This direct link to positive environmental impact is the defining characteristic that makes green bonds unique and attractive to investors seeking to align their portfolios with sustainability goals. While financial return is still a primary consideration, green bond investors also value the positive environmental contribution their investments make.

Uses of Green Bonds:

The funds raised through green bond issuances are exclusively used to finance or refinance projects that contribute to environmental sustainability. These projects span a wide range of areas, including:

1. **Renewable Energy:** Developing and deploying renewable energy technologies like solar, wind, hydro, geothermal, and biomass. This includes financing the construction of wind farms, solar power plants, and other renewable energy infrastructure.
2. **Energy Efficiency:** Investing in projects that reduce energy consumption, such as building retrofits, energy-efficient appliances, smart grids, and improvements in industrial processes. This aims to minimize energy waste and promote conservation.
3. **Clean Transportation:** Financing the development and deployment of electric vehicles, public transportation projects, charging infrastructure, and other sustainable transportation solutions. This seeks to reduce reliance on fossil fuels and promote cleaner modes of transport.
4. **Sustainable Water Management:** Projects focused on water conservation, wastewater treatment, water recycling, and improving water access and efficiency. This addresses water scarcity and promotes responsible water use.

5. **Pollution Prevention and Control:** Investing in technologies and processes that reduce or prevent pollution, including waste management, recycling, air pollution control, and remediation of contaminated sites.
6. **Sustainable Agriculture and Forestry:** Projects that promote sustainable farming practices, reforestation, afforestation, and responsible land management. This contributes to preserving biodiversity and promoting sustainable land use.
7. **Climate Change Adaptation:** Projects that help communities and ecosystems adapt to the impacts of climate change, such as flood defenses, drought-resistant crops, and coastal protection.
8. **Green Buildings:** Construction or renovation of buildings that meet high environmental standards and certification or other green building rating systems.

2.6 GREEN BOND PRINCIPLES (GBP)

The Green Bond Principles (GBP), developed by the International Capital Market Association (ICMA), provide a set of guidelines and recommendations for issuing green bonds. These principles are designed to promote transparency, integrity, and best practices in the green bond market. **They focus on four core components:**

1. **Use of Proceeds:** This is the most fundamental principle. The issuer must clearly define how the funds raised will be used and ensure that they are exclusively allocated to eligible green projects. Transparency in the use of proceeds is essential for investor confidence. The GBP provides a list of eligible green project categories (as described above).
2. **Process for Project Evaluation and Selection:** The issuer needs to establish a clear process for evaluating and selecting green projects. This process should include:
 - a) Defining environmental sustainability objectives.
 - b) Identifying criteria for project eligibility.
 - c) Assessing and managing potential environmental and social risks associated with the projects.
 - d) Demonstrating how the projects align with the defined green bond categories.
3. **Management of Proceeds:** The issuer must maintain appropriate systems and processes to track and manage the funds raised through the green bond issuance. This typically involves segregating the green bond proceeds in a dedicated account or using a tracking system to ensure that the funds are used exclusively for the designated green projects. Transparency and independent audits are often recommended.

4. **Reporting:** Issuers are expected to provide regular and publicly accessible reports on the allocation of proceeds and the environmental impact of the funded projects. These reports should include relevant metrics and key performance indicators (KPIs) to demonstrate the environmental benefits achieved. Transparency in reporting is crucial for accountability and investor confidence.

2.7 REQUIREMENTS FOR ISSUING A GREEN BOND

Who are eligible to issue Green bonds:

- 1) **Corporations:** Companies in any sector can issue green bonds to finance their sustainable initiatives.
- 2) **Governments:** National, regional, and municipal governments can issue green bonds to fund green infrastructure projects and other environmental programs.
- 3) **Supranational Institutions:** Organizations like the World Bank and other multilateral development banks are major issuers of green bonds.

To issue a green bond, the issuer typically needs to:

- 1) Develop a green bond framework that outlines the use of proceeds, project selection process, management of proceeds, and reporting commitments.
- 2) Obtain an external review or certification from a reputable third-party organization.
- 3) Engage investment banks as underwriters to help structure and market the bond.
- 4) Disclose relevant financial and environmental information to investors.

Pricing of Green Bonds:

The pricing of green bonds is generally similar to that of conventional bonds, influenced by market conditions, credit ratings, and prevailing interest rates. While there isn't always a significant lower yield for green bonds, investor demand for sustainable investments can sometimes create a slight pricing advantage for issuers. The increasing demand for green bonds is driving greater liquidity and standardization in the market.

Types of Green Bonds

- 1) **Use of Proceeds Bonds:** The most common type. The proceeds are earmarked exclusively for eligible green projects.
- 2) **Green Project Bonds:** Similar to use of proceeds bonds, but the proceeds are linked to a specific green project or a portfolio of projects.

- 3) **Sustainability Bonds:** These bonds finance projects with both environmental and social benefits. They combine green objectives with other sustainability goals.
- 4) **Sustainability-Linked Bonds (SLBs):** These bonds have financial characteristics (e.g., coupon rate) that are linked to the issuer's achievement of specific sustainability targets. They are different from traditional green bonds because the proceeds are not necessarily tied to green projects, but the issuer's overall sustainability performance matters.

Benefits of Green Bonds

- 1) **Access to Green Finance:** Green bonds provide issuers with access to a growing pool of investors who are specifically interested in sustainable investments.
- 2) **Enhanced Reputation:** Issuing green bonds can enhance an organization's reputation and demonstrate its commitment to environmental sustainability.
- 3) **Positive Environmental Impact:** Green bonds directly contribute to financing projects that address critical environmental challenges, such as climate change, resource depletion, and pollution.
- 4) **Investor Diversification:** Green bonds offer investors the opportunity to diversify their portfolios and invest in assets that align with their sustainability goals.
- 5) **Potential Cost Savings:** In some cases, issuers may be able to access slightly lower borrowing costs by issuing green bonds.

2.8 CHALLENGES AND RISKS

- 1) **Greenwashing:** The risk that issuers may exaggerate the environmental benefits of their projects to attract investors. Robust standards and verification processes are needed to mitigate this risk.
- 2) **Lack of Standardization:** The lack of consistent definitions and standards for green bonds can make it difficult for investors to compare different bonds and assess their environmental impact.
- 3) **Data Availability and Reporting:** Accurate and reliable data on the environmental impact of green projects is essential for investor confidence. Improved reporting frameworks are needed.
- 4) **Additionality:** Ensuring that green bond financing leads to additional positive environmental impact, rather than simply relabeling existing activities, is a key challenge.
- 5) **Market Maturity:** While the green bond market is growing rapidly, it is still relatively small compared to the overall bond market.

- 1) **Debt Instruments:** Both are debt instruments used to raise capital.
- 2) **Investor Base:** Both attract a wide range of investors, including institutional investors and individuals.
- 3) **Market Growth:** Both are experiencing significant growth in recent years.
- 4) **Differences between Debt Securitization and Green Bonds:**
- 5) **Underlying Assets:** Debt securitization involves pooling various types of debt, while green bonds are linked to green projects.
- 6) **Purpose:** Debt securitization aims to provide funding and manage risk, while green bonds focus on financing environmentally friendly initiatives.
- 7) **Impact:** Debt securitization primarily has financial implications, while green bonds have both financial and environmental impacts.

Conclusion

Both debt securitization and green bonds are important tools in the world of finance. Debt securitization helps companies manage risk and access funding, while green bonds play a crucial role in financing a sustainable future. Both markets are constantly evolving, with new innovations and challenges emerging. Understanding the complexities, benefits, and risks associated with these instruments is essential for both issuers and investors.

2.9 VENTURE CAPITAL

Venture capital (VC) is a specialized form of private equity that empowers nascent and entrepreneurial companies to secure funding before generating substantial revenue or profits. VC funds, distinct from mutual and hedge funds, target high-risk, high-growth potential startups with a long investment timeframe. These funds adopt an active, hands-on approach, often taking board seats and providing strategic guidance to their portfolio companies. VC investment strategies typically employ a "barbell" approach, making numerous small investments in diverse startups, anticipating that a few will yield significant returns, thereby mitigating overall risk. VC plays a crucial role in the entrepreneurial ecosystem, fueling innovation and growth across various stages, from initial seed funding to late-stage financing. Understanding the VC landscape, including exit strategies and real-world applications, is essential for entrepreneurs and investors navigating the complexities of business finance. VC investments are characterized by their focus on early-stage, high-potential companies, their active investor involvement, and their long-term perspective.

- **Venture Capital Investment Cycle:** Venture capitalists provide funding to high-potential companies with the goal of significant growth. The investment strategy involves an eventual exit, where the investor liquidates their stake for profit. A standard investment period includes two years of capital injection and a five-year period for generating returns. Investors typically aim for a tenfold return on their initial investment.
- **Sources of Venture Capital:** Funding comes from diverse sources, including specialized venture capital firms. Investment banks and other financial institutions also provide venture capital. High-net-worth individuals, known as angel investors, are another source.
- **Venture Capital Fund Structure:** Venture capital firms create pooled investment funds, gathering capital from various investors. These firms also invest their own capital to demonstrate commitment and align interests with their investors.
- **Definition of Venture Capitalists:** Venture capitalists are individuals or groups that specialize in funding early-stage, high-growth companies. They operate independently or through organized investment partnerships.
- **Strategic Timing for Venture Capital:** Seeking venture capital is critical during expansion phases, as it provides both capital and valuable business, financial, and legal expertise. Venture capitalists offer expert guidance, industry connections, and strategic insights for business development. Securing venture capital is advantageous when startups face increased competitive pressures, providing resources for survival and growth.

Features of Venture Capital Fund:

1. **Focus on High-Risk, High-Reward Ventures:** Venture capital (VC) is specifically targeted towards small to medium-sized businesses and startups that, while presenting a significant risk, also offer the potential for substantial returns. This inherent risk-reward profile is a defining characteristic of VC investments.
2. **Commercialization of Innovative Ideas:** A primary purpose of VC is to provide the necessary capital for businesses to transform their novel product or service ideas into commercially viable realities. VC firms often invest in companies that are in the early stages of development, helping them to bridge the gap between concept and market launch.
3. **Long-Term Investment Commitment:** VC is characterized by a long-term investment horizon, typically spanning 5 to 10 years. Venture capitalists adopt a patient approach, understanding that startups require considerable time to develop and scale. They are prepared to wait for the potential returns, which may be realized through an acquisition or public offering.

- 4. Active Investor Participation:** Beyond providing financial backing, venture capitalists actively engage with the companies they invest in. This involvement includes strategic guidance, operational assistance, participation in board meetings, mentorship, and facilitating introductions to potential partners and customers.
- 5. Strategic Disinvestment for Capital Infusion:** Venture capital firms may strategically disinvest in a company after it demonstrates promising growth. This disinvestment is not solely for-profit generation but often to infuse additional capital into the company, supporting further expansion and development.
- 6. Targeted at Small and Medium-Sized Enterprises (SMEs):** Venture capital is primarily offered to SMEs, not large-scale industries. This focus allows VCs to provide crucial support to emerging businesses that may not have access to traditional funding sources.

Advantages of Venture Capital:

1. Debt-Free Capital Infusion:

Unlike traditional loans, venture capital investments do not require startups to take on debt obligations. This is crucial for early-stage companies that may not have the collateral or consistent revenue streams to secure loans. The equity-based nature of VC funding allows startups to focus on growth without the pressure of immediate debt repayment. This capital enables investments in critical areas like research and development, marketing, and scaling operations, which are essential for long-term success.

2. Expert Mentorship and Strategic Guidance:

Venture capitalists bring a wealth of experience, often having worked with numerous startups and established businesses. They provide strategic guidance on business planning, market analysis, and operational efficiency, helping startups avoid common pitfalls. Their extensive networks can open doors to potential customers, partners, and industry experts, accelerating the startup's growth trajectory.

3. Enhanced Credibility and Validation:

Securing funding from reputable venture capitalists acts as a stamp of approval, signaling to the market that the startup has significant potential. This validation enhances the startup's credibility with potential customers, suppliers, and future investors. It also makes it easier to attract top talent, as individuals are more likely to join a company backed by established investors.

4. Accelerated Growth Potential:

Venture capital provides the necessary resources to rapidly scale operations, expand market reach, and accelerate product development. This infusion of capital allows startups to seize market opportunities

quickly and gain a competitive edge. It enables investments in marketing and sales, which are crucial for rapid customer acquisition and revenue growth.

5. Access to Business Expertise:

Venture capitalists often have a strong understanding of business operations, including human resource management, financial planning, and strategic decision-making. This expertise is invaluable to new entrepreneurs who may lack experience in these areas.

They can provide guidance on best practices and help startups build a solid foundation for sustainable growth.

6. Non-Repayable Funding:

Unlike loans, venture capital investments do not require repayment, even if the business fails. This reduces the financial risk for entrepreneurs and allows them to focus on innovation and growth without the burden of debt. It also aligns the interests of the investors with the success of the company.

7. Valuable Network Connections:

Venture capitalists have extensive networks of industry contacts, potential customers, and other investors. They can leverage these connections to introduce startups to valuable partnerships and business opportunities. This can significantly accelerate the startup's growth and market penetration.

8. Facilitation of Additional Capital:

Venture capitalists often have connections to other investors and can facilitate future funding rounds. Their involvement can increase the startup's visibility and attract interest from other investors. This can lead to higher valuations and greater access to capital for continued growth.

9. Technological Advancement Support:

- Venture capital allows startups to invest in cutting-edge technologies and infrastructure. This is essential for staying competitive in rapidly evolving markets.
- It enables startups to develop innovative products and services that can disrupt existing industries.

Disadvantages of Venture Capital (In Detail):

1. Dilution of Ownership and Control:

In exchange for funding, venture capitalists receive equity in the company, which dilutes the founders' ownership stake. This can lead to a loss of control over strategic decisions, as investors may have a significant say in

how the company is run. Founders need to carefully balance the need for capital with the desire to maintain control.

2. Pressure for Aggressive Growth:

Venture capitalists expect high returns on their investments, which can create pressure for startups to achieve rapid growth within short timelines. This can lead to a focus on short-term gains at the expense of long-term sustainability. Startups may feel compelled to take on excessive risk to meet investor expectations.

3. Limited Availability and Intense Competition:

Venture capital funding is highly competitive, and not all startups are able to secure it. Investors are selective and typically invest in companies with strong management teams, innovative products, and high growth potential. Startups need to have a compelling value proposition and a well-defined business plan to attract VC interest.

4. Potential for Strategic Misalignment:

Differences in strategic vision or priorities between founders and investors can lead to conflicts and disagreements. This can hinder decision-making and create tension within the company. It's essential for founders to choose investors who share their vision and values.

5. Loss of Majority Stake:

As a company goes through multiple funding rounds, the founders' ownership stake can be further diluted. This can eventually lead to a loss of majority control, giving investors significant influence over the company's direction.

6. Conflicts of Interest:

Venture capitalists often take board seats, which can create conflicts of interest between their responsibilities to the company and their own investment objectives. This can lead to disagreements over strategic decisions and potential conflicts of loyalty.

7. Time-Consuming Due Diligence:

The venture capital funding process involves extensive due diligence, which can be time-consuming and disruptive to the startup's operations. Investors need to thoroughly assess the company's financials, market potential, and management team before making an investment. This process can delay funding and create uncertainty for the startup.

8. Challenges in Securing VC:

Startups without existing networks or connections may find it difficult to access venture capital firms or investors. Building relationships with venture capitalists requires time and effort. This can be a significant hurdle for early-stage startups that lack established connections.

2.10 TYPES OF VENTURE CAPITAL FUNDS

1. **Seed Funding (Seed Capital):** Seed funding, the initial capital infusion, serves as the bedrock for nascent businesses, enabling entrepreneurs to translate abstract ideas into concrete business concepts. Its primary objective is to finance the preliminary stages of company development. This includes vital activities such as conducting thorough market research to understand the target audience and competitive landscape, engaging in product research and development to create a prototype or proof of concept, crafting a comprehensive business plan outlining the company's strategy, financials, and milestones, and covering initial operational expenses like legal fees, office space, and essential equipment. Seed funding often originates from the entrepreneurs' personal savings, friends and family members, angel investors who are high-net-worth individuals investing in early-stage companies, and occasionally, very early-stage venture capital firms. Due to the inherent high failure rate of startups, seed funding is characterized by its relatively small capital amounts and is considered the riskiest investment phase.
2. **Startup Capital:** Building upon the foundation of seed funding, startup capital empowers companies to transition from the conceptual phase to operational development. This funding facilitates the creation of a functional product prototype, the development of a minimum viable product (MVP) for market testing, the recruitment of key management personnel to drive growth, and the establishment of initial marketing and sales efforts. Startup capital, generally exceeding seed funding amounts, is utilized to validate the business model and prepare for scaling, often sourced from venture capital firms specializing in early-stage investments.
3. **First-Stage Funding (Series A):** First-stage funding, or Series A funding, represents the first substantial venture capital investment round, provided to companies that have demonstrated product-market fit and are poised for operational scaling. This capital supports commercial manufacturing and production, the expansion of sales and marketing initiatives, the development of a robust customer base and revenue generation, and the scaling of the team and infrastructure. Series A funding, typically a significant capital infusion, is employed to accelerate growth and establish a strong market presence. Investors in this round commonly anticipate substantial revenue growth and a clear pathway to profitability.
4. **Expansion Funding (Growth Capital):** Expansion funding caters to companies that have achieved success in their core market and are seeking to expand their operational reach. This capital supports ventures into new geographic markets, the development of new product lines or services, investments in updated equipment and technology, and acquisitions to expand market share. Expansion funding, often a large capital infusion, is utilized to fuel rapid growth and increase market dominance. Investors in this stage typically seek

companies with a proven track record of success and a well-defined expansion strategy.

5. **Late-Stage Funding (Pre-IPO Funding):** Late-stage funding is directed towards companies nearing an initial public offering (IPO) or acquisition. This capital prepares companies for the transition to the public market or funds further growth before an acquisition. Activities supported include scaling operations to meet increased demand, improving financial reporting and compliance, strengthening the management team, and building brand awareness. Late-stage funding, typically a substantial capital investment, aims to maximize the company's valuation before a liquidity event. Investors in this round often look for companies with a strong track record of revenue growth and a clear path to profitability.
6. **Bridge Funding (Mezzanine Financing):** Bridge funding is a short-term financial solution designed to bridge the gap between late-stage funding and an IPO or acquisition. It covers short-term expenses and ensures a seamless transition. This funding supports covering expenses related to the IPO process, such as legal and accounting fees, meeting short-term working capital needs, and maintaining operational stability during the transition. Bridge funding, typically a short-term loan or convertible debt repaid with IPO or acquisition proceeds, is considered a lower-risk investment compared to earlier venture capital stages.

2.11 CHALLENGES FACED BY VENTURE CAPITAL FUNDS

1. **Sourcing High-Quality Deals:** The very foundation of a successful venture capital fund lies in its ability to consistently identify and secure access to promising investment opportunities. This task, however, is far from straightforward. The venture capital landscape is intensely competitive, with numerous funds vying for the attention of a limited pool of truly disruptive startups. To overcome this, funds must cultivate robust and expansive networks, actively participate in industry events, and leverage their reputation to attract top-tier entrepreneurs. The process of due diligence, which involves thoroughly evaluating potential investments, is both time-consuming and resource-intensive. Many deals, despite initial promise, ultimately fail to meet the stringent investment criteria of the fund.
2. **Accurate Due Diligence and Risk Assessment:** Investing in early-stage companies is inherently fraught with risk, primarily because many of these ventures lack established revenue streams or proven business models. Venture capitalists must therefore undertake rigorous due diligence, meticulously assessing the market potential, technological feasibility, and the management team's capabilities. Predicting the long-term success of these companies in rapidly evolving markets is a formidable challenge. Unforeseen technological disruptions, shifts in consumer behavior, or the emergence of new competitors can easily derail even the most promising ventures.

Consequently, venture capitalists must possess a keen ability to navigate uncertainty and make informed decisions based on incomplete information.

- 3. Managing Portfolio Company Performance:** Venture capital funds play a highly active role in guiding the development and growth of their portfolio companies, providing not only financial backing but also strategic advice and operational support. Striking the right balance between providing hands-on involvement and allowing entrepreneurs the necessary autonomy to execute their vision is a delicate art. Funds must diligently monitor the performance of their portfolio companies, proactively identifying potential issues, and intervening when necessary to mitigate risks or capitalize on opportunities. This requires a significant commitment of resources and a deep reservoir of expertise. The ability to provide effective mentorship and guidance can significantly impact the success of a portfolio company.
- 4. Exiting Investments at Optimal Valuations:** Realizing returns on venture capital investments typically hinges on the successful execution of an exit strategy, such as an initial public offering (IPO) or an acquisition by a larger company. Timing the market and securing favorable exit terms can be exceptionally challenging, as market conditions and company performance can fluctuate unpredictably. Finding suitable acquirers or navigating the complexities of the IPO process requires specialized knowledge, experience, and strong negotiation skills. Delays or missteps in the exit process can significantly impact the fund's overall returns.
- 5. Maintaining Investor Relations and Raising Subsequent Funds:** Venture capital firms rely heavily on the capital provided by limited partners (LPs), and maintaining strong and transparent relationships with these investors is absolutely essential. Providing regular and transparent reporting on fund performance, delivering consistent returns, and articulating a clear and compelling investment strategy are crucial for retaining existing LPs and attracting new capital. The ability to demonstrate a track record of success is paramount for a fund's future fundraising efforts. Investor confidence is a critical component of a fund's success.
- 6. Adapting to Technological Disruption:** The rapid pace of technological innovation presents both opportunities and challenges for venture capital funds. Funds must remain constantly vigilant, staying abreast of emerging trends and disruptive technologies that have the potential to reshape entire industries. Identifying and investing in companies that are at the forefront of innovation requires deep domain expertise, a forward-thinking mindset, and a willingness to embrace change. Failure to recognize and adapt to new technologies can lead to missed investment opportunities and ultimately result in portfolio underperformance.

- 7. Navigating Regulatory and Economic Uncertainty:** Venture capital investments are inherently subject to a wide range of regulatory changes and economic fluctuations, which can significantly impact portfolio company valuations and exit opportunities. Global economic downturns, geopolitical instability, or shifts in regulatory policies can create substantial uncertainty and reduce investor confidence. Venture capital funds must be prepared to navigate these challenges, adapting their investment strategies and portfolio management practices to mitigate risks and capitalize on opportunities. The ability to adapt to changes is vital.
- 8. Talent Acquisition and Retention:** Venture capital firms require a team of highly skilled professionals with expertise in investment analysis, due diligence, and portfolio management. Attracting and retaining top talent in a highly competitive market can be a significant challenge. Building a strong team with diverse perspectives, complementary skills, and a shared commitment to the fund's mission is essential for long-term success. A strong team provides better decision making, and better overall fund performance.

2.12 CONCLUSION

Venture capital funds play a crucial role in the startup ecosystem, providing essential funding and support to early-stage companies. Understanding the different types of funds, the challenges they face, and the benefits they offer is essential for both startups seeking funding and investors looking to participate in this dynamic asset class. The venture capital landscape is constantly evolving, with new trends and challenges emerging. Staying informed and adaptable is key to success in this exciting field.

2.13 EXERCISE

Q.1 Choose the correct alternate and answer the following :

1. Debt securitization involves:
 - a) Issuing equity shares.
 - b) Pooling illiquid assets into marketable securities.
 - c) Investing in precious metals.
 - d) Trading foreign currencies.

Answer: b) Pooling illiquid assets into marketable securities.

2. Green bonds are specifically used to finance:
 - a) General corporate expenses.
 - b) Environmentally friendly projects.
 - c) High-risk speculative ventures.
 - d) Luxury goods production.

Answer: b) Environmentally friendly projects.

3. A Special Purpose Vehicle (SPV) in securitization is used to:
- Increase the originator's liabilities.
 - Isolate the pooled assets.
 - Manage the originator's daily operations.
 - Reduce the originator's revenue.

Answer: b) Isolate the pooled assets.

4. The Green Bond Principles (GBP) were developed by:
- The United Nations.
 - The International Capital Market Association (ICMA).
 - The World Trade Organization.
 - The Federal Reserve.

Answer: b) The International Capital Market Association (ICMA).

Q.2 Write Short Notes on:

- Debt Securitization
- Special Purpose Vehicle (SPV) in Securitization
- Green Bond Principles (GBP)
- Types of Securitized Assets: Residential Mortgages
- Benefits of Green Bonds for Issuers

Q.3 Answer in Brief :

- What are the key features of debt securitization, and how does it benefit originators?
- Explain the role of credit enhancement in securitized products.
- How do green bonds differ from traditional bonds, and what are the categories of eligible green projects?
- Describe the process for project evaluation and selection in green bond issuances.
- What are the challenges and risks associated with debt securitization?
- Who are the eligible entities that can issue green bonds, and what are the general requirements?



TIME VALUE OF MONEY

Unit Structure :

- 3.0 Learning Objectives
- 3.1 Concept of Time Value of Money and Its Significance
- 3.2 Present Value Vs. Future Value (Lumpsum Payment or One Time Payment)
- 3.3 Present Value Vs. Future Value of Annuity or Even Cash Inflows
- 3.4 Present Value Vs. Future Value of Uneven Cashflows
- 3.5 Present Value of A Perpetuity
- 3.6 Effective Interest Rate
- 3.7 Doubling Period – Rule of 72 and Rule Of 69
- 3.8 Applications of Time Value of Money
- 3.9 Solved Illustration
- 3.10 Exercises and Assessments

3.0 LEARNING OBJECTIVES:

After reading this chapter, the learner will be able to

- Understand the concept of the Time Value of Money (TVM).
- Explain why money today is worth more than money in the future.
- Identify the key components of TVM.
- Define and differentiate between simple and compound interest.
- Understand the impact of compounding on investments.
- Calculate future and present values using different compounding methods.
- Apply discounting techniques to value investments.
- Understand annuities and perpetuities.
- Apply TVM concepts in financial decision-making.
- Understand real-world applications like loans, mortgages, and investments.

3.1 CONCEPT OF TIME VALUE OF MONEY AND ITS SIGNIFICANCE

A basic financial concept known as the Time Value of Money (TVM) holds that an amount of money invested now has greater potential for growth than the same amount in the future. The ideas of interest rates, investment choices, and financial planning are all based on this idea.

Significance of TVM

- Helps in financial decision-making.
- Essential for investment analysis.
- Used in capital budgeting.
- Plays a crucial role in retirement and loan planning.

Key Components of TVM

1. **Present Value (PV):** A future sum of money's present value, discounted at a particular interest rate, is represented by PV. It is useful to figure out how much money you will need now to reach a specific financial objective later on.

Why is Present Value Important?

- It helps in comparing investment opportunities.
 - It accounts for risk and inflation.
 - It is used to evaluate business projects and financial planning.
2. **Future Value (FV):** Future Value (FV) represents the amount of money an investment or a sum will grow into at a future date, given a certain interest rate.

Why is Future Value Important?

- Helps in financial goal setting and retirement planning.
 - Determines how much money an investment will yield over time.
 - Used in business decisions related to capital investment.
3. **Interest Rate (r):** The interest rate (r) represents the cost of borrowing or the return on investment, expressed as a percentage per year. It determines how much an initial investment will grow over time.

Types of Interest Rates:

Simple Interest: Interest is calculated only on the original principal.

- Formula: $SI = P \times r \times n$
- Example: ₹10,000 invested at 5% simple interest for 3 years:
- $SI = 10,000 \times 0.05 \times 3 = ₹1,500$

Total amount after 3 years = ₹11,500.

Compound Interest: Interest is calculated on both the principal and previously earned interest.

Time Value of Money

- Formula: $FV = P \times (1 + r)^n$
- Example: ₹10,000 invested at 5% compound interest for 3 years:

$$F.V. = P.V. \times (1 + r)^n$$

$$F.V. = 10,000 \times (1 + 0.05)^3$$

$$F.V. = 10,000 \times (1.05)^3$$

$$F.V. = 10,000 \times 1.1576$$

$$F.V. = 11,576.00$$

Here, compound interest results in a higher return than simple interest.

Why is Interest Rate Important?

- It determines how much return an investment generates.
- It influences decisions in loans and mortgages.
- Higher interest rates mean greater future values and lower present values.

4. Time Period (n): The time period (n) represents the number of years, months, or days an investment or loan lasts. It significantly impacts both the future value and present value calculations.

Why is Time Period Important?

- The longer the time period, the higher the future value due to compounding.
- Shorter time periods mean lower growth in investments.
- It affects the rate at which money should be discounted in present value calculations.

Example:

If in the above example, you invest ₹10,000 at 5% p.a. for **5 years** instead of **3 years**, the future value changes significantly:

$$F.V. = P.V. \times (1 + r)^n$$

$$F.V. = 10,000 \times (1 + 0.05)^5$$

$$F.V. = 10,000 \times (1.05)^5$$

$$F.V. = 10,000 \times 1.2763$$

$$F.V. = 12,763$$

More years = more growth in value due to compounding.

5. Compounding & Discounting:

Compounding: Compounding is the process of reinvesting interest earned so that money grows exponentially over time.

Formula for Compounding:

$$CF = (1 + r)^n$$

Example:

If the interest rate is 9% and invested for 6 years, the compounding factor indicated the value of ₹1 after 6 years at 9% interest rate will be:

$$CF = (1 + r)^n$$

$$CF = (1 + 0.09)^6$$

$$CF = (1.09)^6$$

$$CF = 1.6771$$

This shows how money grows faster with compounding over multiple periods.

Discounting: Discounting is the reverse of compounding. It is the process of determining the **present value** of a future sum of money by applying a discount rate.

Formula for Discounting:

$$DF = \frac{1}{(1 + r)^n}$$

Example:

If you expect to receive a sum of money in 8 years and the discount rate is 7%:

$$DF = \left(\frac{1}{(1 + r)^n} \right)$$

$$DF = \left(\frac{1}{(1 + 0.07)^8} \right)$$

$$DF = \left(\frac{1}{(1.07)^8} \right)$$

$$DF = 0.582009104565038$$

This shows the value of ₹1 to be received with interest rate of 7% and after a time period of 8 years will be 0.5820.

How to Calculate the Compounding Factor Using Simple Calculator:

Let's suppose we want to find $(1.10)^5$. Since we have to only use the **simple calculator**, we take the following steps to find the value of $(1.10)^5$

We, will press 1.10 and **press twice multiply** ('x' symbol) on the calculator and we will **press the equal** to ('=' symbol) for **4 times**, simple

rule will be to press = button for a 1 time less than the given time period. So, since here n is 5 years, we will press equal to for 4 times that is n-1. We will take the answer upto 4 decimals in order to maintain the uniformity.

(At the end we will get 1.6105)

How to Calculate the Discounting Factor Using Simple Calculator:

Here, we can use a shortcut on calculator to directly arrive at the value of **1 Divided by 1.05 to the power of n**. We will have to press 1 divide (“/” symbol) by 1.10 on the calculator for n times i.e. in this illustration 5 times. Sometimes for Casio calculator the answer may not arrive with this step, so they will have to calculate the same as 1.10 and press divide symbol (/) twice and “k” will appear on your calculator screen and now press 1 and press equal to (=) symbol for 5 times. Again, to keep uniformity, we will keep the value restricted up to 4 decimals.

3.2 PRESENT VALUE VS. FUTURE VALUE (LUMP SUM PAYMENT OR ONE TIME PAYMENT)

These calculations are used when the investment is to be done for one time. Like investing in a FD or one time investment scheme.

Future Value

$$FV = PV \times (1 + r)^n$$

Where,

FV = Future Value

PV = Present Value

r = rate of interest

n = no. of periods

Key Assumptions:

- The interest rate remains constant over the period.
- Interest is compounded at regular intervals (e.g., annually, semi-annually).

Example:

Example:

Calculate the Future Value of ₹ 1,00,000 invested in a FD for a period of 5 years bearing interest rate of 10%.

Solution:

$$FV = PV \times (1 + r)^n$$

$$FV = 1,00,000 \times (1 + 0.10)^5$$

$$FV = 1,00,000 \times (1.10)^5$$

$$FV = 1,00,000 \times 1.6105$$

$$FV = 1,61,050$$

PRESENT VALUE

Present Value (PV) is the current worth of a future sum of money or stream of cash flows, discounted at a specific interest rate.

Example:

If Ms. Sapna expects to have an amount of ₹2,50,000 after 5 years, how much should be the amount she has to invest today if the bank is offering 8% interest rate?

Solution:

$$PV = FV \times \left(\frac{1}{(1 + r)^n} \right)$$

$$PV = 2,50,000 \times \left(\frac{1}{(1 + 0.08)^5} \right)$$

$$PV = 2,50,000 \times \left(\frac{1}{(1.08)^5} \right)$$

$$PV = 2,50,000 \times 0.6806$$

$$PV = 1,70,150$$

3.3 PRESENT VALUE VS. FUTURE VALUE OF ANNUITY OR EVEN CASH INFLOWS

Future Value (FV) of an Annuity

The future value of an annuity refers to the accumulated value of a series of equal payments made at regular intervals, assuming a specific interest rate. Annuity can be of two types:

a. Annuity Regular or Ordinary Annuity or Annuity beginning at the end of year 1:

So, if Ms. Shalu starts an Annuity for the Calendar year January to December 2025, her first annuity would be paid on 31st December 2025

b. Annuity Due or Annuity beginning at the beginning of the year 0:

So, if Ms. Shalu starts an Annuity for the Calendar year January to December 2025, her first annuity would be paid on 01st January 2025

These concepts are applied in the present value and future value of time value and thus we can get 4 categories based on annuity

- i. Future Value of Ordinary Annuity
- ii. Future Value of Annuity Due
- iii. Present Value of Ordinary Annuity
- iv. Present Value of Annuity Due

3.3.1 Future value of an annuity regular or ordinary annuity

Formula:

$$FV_{AF} = A \times \left(\frac{(1 + r)^n - 1}{r} \right)$$

What will be the future value of ₹ 40,000 deposited annually at the end of the year to be received after 8 years at interest rate of 12% p.a. compounded annually? What will be your answer if the number of years is changed to 6 years? What will be your answer if in situation (a), the period is 10 years

$$F.V. = Ax \left(\frac{(1 + r)^n}{r} \right)$$

$$FV = 12,00,000x \left(\frac{(1 + 0.12)^{10} - 1}{0.12} \right)$$

$$FV = 12,00,000x \left(\frac{1.12^{10} - 1}{0.12} \right)$$

$$FV = 12,00,000x \left(\frac{2.1058}{0.12} \right)$$

$$FV = 12,00,000x17.5483$$

$$FV = 2,10,57,960$$

3.3.2 Future value of an annuity due:

Formula

$$FV_{AF} = A \times \left(\frac{(1 + r)^n - 1}{r} \right) x (1 + r)$$

Example:

An employee of a bank deposits ₹ 30,000 into his PPF A/c at the beginning of each year for 15 years. What is the amount he will

accumulate in his PPF at the end of 15 years, if the rate of interest given by PPF authorities is 9%?

Solution:

$$FV = Ax \left(\frac{(1 + r)^n}{r} \right) x (1 + r)$$

$$FV = 30,000x \left(\frac{(1 + 0.09)^{15} - 1}{0.09} \right) x (1 + 0.09)$$

$$FV = 30,000x \left(\frac{1.09^{15} - 1}{0.09} \right) x (1.09)$$

$$FV = 30,000x \left(\frac{2.6425}{0.09} \right) x (1.09)$$

$$FV = 30,000x 29.3611x 1.09$$

$$FV = 9,60,107.97$$

3.3.3 Present Value (PV) of an Annuity Ordinary

The present value of an annuity represents the current worth of a series of future payments, discounted at a particular interest rate. Such annuities are assumed to be made at the end of the year.

Formula:

$$P.V._{AF} = A x \left(\frac{(1 + r)^n - 1}{r(1 + r)^n} \right)$$

Example:

What will be the present value of ₹ 15,000 invested annually at interest rate of 16% for 8 years?

Solution:

$$PV = A x \left(\frac{(1 + r)^n - 1}{r(1 + r)^n} \right)$$

$$PV = 40,000x \left(\frac{(1 + 0.12)^{10} - 1}{0.12x(1 + 0.12)^{10}} \right)$$

$$PV = 40,000x \left(\frac{1.12^{10} - 1}{0.12x1.12^{10}} \right)$$

$$PV = 40,000x \left(\frac{2.1058}{0.3727} \right)$$

$$PV = 40,000x 5.6501$$

$$PV = 2,26,004$$

Rather than solving this in this manner we can use a shortcut technique provided we have either **GT function** on the calculator or **M+ function**

If we have GT function, we can do the calculation in following way

Press $1 \div 1.12$ and press $=$ for 10 times. After that you will get the answer on your screen as 0.3219, after this press GT on your calculator, you will get the answer as 5.6502. Now you can directly multiply this with the “Annuity” or “A” and you will get the answer near to the answer, the difference is just the rounding difference and both the answers will be treated as correct. Please Note: if you are using Casio Calculator and the answer doesn’t arrive using this method, you will have to use $1.12 \div \div 1$ (Press the division symbol (/) twice and “k” will appear on the calculator screen.

If we have don’t GT function, we can do the calculation in following way:

Press $1 \div 1.12$ and press $=$ and after that press M+ and repeat the process for another 9 times (Total 10 times). After that you will get the answer on your screen as 0.3219, after this press MRC on your calculator, you will get the answer as 5.6502. Now you can directly multiply this with the “Annuity” or “A” and you will get the answer near to the answer, the difference is just the rounding difference and both the answers will be treated as correct.

Please Note: if you are using Casio Calculator and if the answer doesn’t arrive using this method, you will have to use $1.12 \div \div 1$ (Press the division symbol (/) twice and “k” will appear on the calculator screen and press M+ for 10 times after that you will get the answer on your screen as 0.3219, after this press MRC on your calculator, you will get the answer as 5.6502. Now you can directly multiply this with the “Annuity” or “A” and you will get the answer near to the answer, the difference is just the rounding difference and both the answers will be treated as correct.

Short Cut Method Solution:

$$PV = A \times \left(\frac{(1+r)^n - 1}{r(1+r)^n} \right)$$

$$PV = 40,000 \times 5.6502$$

$$PV = 2,26,008$$

3.3.4 Present Value (PV) of an Annuity Due

The present value of an annuity represents the current worth of a series of future payments, discounted at a particular interest rate. Such annuities are assumed to be made at the beginning of the year. Here in calculation, we

usually take a year less than that given in the sum i.e. we take $n-1$ and we add the A at the end of the period.

Formula:

$$PV = Ax \left(\frac{(1+r)^{n-1}}{rx(1+r)^{n-1}} \right) + A$$

Example:

Find out the present value of an annuity of ₹ 13,600 over 9 years when discounted at 7% if the payments are made at the beginning of each year.

Solution:

$$PV = Ax \left(\frac{(1+r)^{n-1}}{rx(1+r)^{n-1}} \right) + A$$

$$PV = 13,600x \left(\frac{(1+0.07)^{9-1} - 1}{0.07x(1+0.07)^{9-1}} \right) + 13,600$$

$$PV = 13,600x \left(\frac{1.07^8 - 1}{0.07x1.07^8} \right) + 13,600$$

$$PV = 13,600x \left(\frac{0.7182}{0.1203} \right) + 13,600$$

$$PV = 13,600x5.9701 + 13,600$$

$$PV = 81,193.36 + 13,600$$

$$PV = 94,793.36$$

Here too, we can use shortcut method to arrive at the solution. We have to follow the steps mentioned above, just that we will have to take years a $n-1$.

3.4 PRESENT VALUE VS. FUTURE VALUE OF UNEVEN CASHFLOWS

The uneven cashflows cannot be solved using the formula as the formula is applicable only for the even cash inflows or annuity. Therefore, we have to use table to solve this type of problems and use the interest factor table. The interest factor is calculated in the similar manner or even factor table may be used:

3.4.1 Future Value of Uneven Cash Inflows

Example

Mr. Madan invests ₹ 5,000, ₹ 10,000, ₹ 15,000, ₹ 20,000 and ₹ 25,000 at the **end of each year** for 5 years. Calculate the value at the end of 5 years compounded annually if the rate of interest is 5% p.a.

Solution:

Year	Annuity	CF = (1+r) ⁿ	CF = (1+r) ⁿ	
1	5,000	(1.05) ⁴	1.21550625	6,077.53
2	10,000	(1.05) ³	1.157625	11,576.25
3	15,000	(1.05) ²	1.1025	16,537.50
4	20,000	(1.05) ¹	1.05	21,000.00
5	25,000	(1.05) ⁰	1	25,000.00
				80,191.28

Example:

Mr. Madan invests ₹ 5,000, ₹ 10,000, ₹ 15,000, ₹ 20,000 and ₹ 25,000 **at the beginning of each year** for 5 years. Calculate the value at the end of 5 years compounded annually if the rate of interest is 5% p.a.

Solution:

Year	Annuity	CF = (1+r) ⁿ	CF = (1+r) ⁿ	
1	5,000	(1.05) ⁵	1.27628156	6,381.41
2	10,000	(1.05) ⁴	1.21550625	12,155.06
3	15,000	(1.05) ³	1.157625	17,364.38
4	20,000	(1.05) ²	1.1025	22,050.00
5	25,000	(1.05) ¹	1.05	26,250.00
				84,200.85

3.4.2 Present Value of Uneven Cash Inflows

Example:

An investment scheme requires an initial investment of ₹ 2,00,000 and is expected to produce the following cash inflows:

Year	1	2	3	4	5	6	7
Cash Flows (₹)	50,000	57,000	60,000	80,000	40,000	35,000	12,000

If the cost of capital is 12 percent, is it worth investing?

Solution:

Year	Cash Flows (₹)	DF @ 12%	
1	50,000	0.8929	44,645.00
2	57,000	0.7972	45,440.40
3	60,000	0.7118	42,708.00
4	80,000	0.6355	50,840.00
5	40,000	0.5674	22,696.00
6	35,000	0.5066	17,731.00
7	12,000	0.4523	5,427.60
			<u>2,29,488.00</u>

3.5 PRESENT VALUE OF A PERPETUITY

The **Present Value of a Perpetuity** is the current value of a stream of equal payments that continue **forever**. It is commonly used in financial valuation, especially for preferred stocks, endowments, or perpetual bonds.

- A **perpetuity** assumes the cash flow never stops.
- The discount rate is crucial—it represents the time value of money.
- The **lower** the discount rate, the **higher** the present value, and vice versa.

Assumptions:

- Payments are **equal and regular**.
- Payments continue **indefinitely**.
- Discount rate remains **constant** over time.
- First payment typically occurs **after one period**.

Formula:

$$PV = \frac{A}{r}$$

Where:

- **PV** = Present Value of the perpetuity
- **A** = Cash flow per period (payment)
- **r** = Discount rate or interest rate per period

Example: Mr. Ram has made an investment in which he will receive 60,000 for life time. If the rate of interest is 7.5%, what will be the present value of the annuity?

$$PV = \frac{A}{r}$$

$$PV = \frac{60,000}{0.075}$$

$$PV = 8,00,000$$

3.6 EFFECTIVE INTEREST RATE

The **Effective Interest Rate (EIR)**, also called the **Effective Annual Rate (EAR)**, is the **real return** on an investment or the **true cost** of a loan, considering the effects of compounding over a year. It reflects the actual interest earned or paid after accounting for compounding frequency.

Explanation:

- Nominal rate does **not** reflect compounding.
- EIR tells you what you are actually earning or paying.
- More frequent compounding → Higher EIR.

Formula:

$$ER = \left(\left(1 + \left(\frac{r}{m} \right)^{n \times m} \right) - 1 \right) \times 100$$

Where,

ER = Effective Interest Rate

r=rate of interest

n=no. of period

m=no. of time compounding is done.

Let's understand the concept of 'n' and 'm' with a simple example.

Suppose the interest is compounded half yearly for 1 year, the interest will be paid twice in a year, so the n=1 and m = 2, similarly, if the interest is compounded quarterly and the time period is 2 year, so the n will be 2 and m will be 4. similarly, if the interest is compounded monthly and the time period is 3 years, so the n will be 3 and m will be 12.

Example: Find the effective rate of 16% if the interest is compounded:

a. Yearly b. Half-yearly c. Quarterly d. Monthly

a. Yearly

$$ER = \left(\left(1 + \left(\frac{r}{m} \right)^{n \times m} \right) - 1 \right) \times 100$$

$$ER = ((1 + 0.16)^1 - 1) \times 100$$

$$ER = (1.16^1 - 1) \times 100$$

$$ER = (1.16 - 1) \times 100$$

$$ER = 0.16 \times 100$$

$$ER = 16$$

b. Half Yearly

$$ER = \left(\left(1 + \left(\frac{r}{m} \right)^{n \times m} \right) - 1 \right) \times 100$$

$$ER = ((1 + 0.08)^2 - 1) \times 100$$

$$ER = (1.08^2 - 1) \times 100$$

$$ER = (1.1664 - 1) \times 100$$

$$ER = 0.1664 \times 100$$

$$ER = 16.64$$

c. Quarterly

$$ER = \left(\left(1 + \left(\frac{r}{m} \right)^{n \times m} \right) - 1 \right) \times 100$$

$$ER = ((1 + 0.04)^4 - 1) \times 100$$

$$ER = (1.04^4 - 1) \times 100$$

$$ER = (1.1699 - 1) \times 100$$

$$ER = 0.1699 \times 100$$

$$ER = 16.99$$

d. Monthly

$$ER = \left(\left(1 + \left(\frac{r}{m} \right)^{n \times m} \right) - 1 \right) \times 100$$

$$ER = ((1 + 0.0133)^{12} - 1) \times 100$$

$$ER = (1.0133^{12} - 1) \times 100$$

$$ER = (1.1718 - 1) \times 100$$

$$ER = 0.1718 \times 100$$

$$ER = 17.18$$

3.7 DOUBLING PERIOD – RULE OF 72 AND RULE OF 69

The Doubling Period is the time it takes for an investment to double in value at a fixed annual interest rate, assuming compounding.

1. Rule of 72

Formula:

$$\text{Doubling Period} = \frac{72}{r}$$

Where:

- r = Annual interest rate (in percent)

Key Features:

- Easy to use mental math rule.
- Most accurate for interest rates between 6% and 10%.
- Widely used in finance and investing.

Example:

If the interest rate is 9%:

$$\text{Doubling Period} = \frac{72}{9} = 8 \text{ years}$$

So, your investment will double in approximately 8 years.

Rule of 69 (or 69.3)

Formula:

$$\text{Doubling Period} = \frac{69}{r} + 0.35$$

Key Features:

- More accurate than Rule of 72 for continuous compounding.
- Useful for theoretical finance and academic purposes.

Example:

At an interest rate of 9%:

$$\frac{69}{9} + 0.35; 7.67 + 0.35 = 8.02 \text{ years}$$

So, under continuous compounding, the doubling time is just over 8 years.

Comparison Table:

Interest Rate (%)	Rule of 72	Rule of 69.3
6%	12.00 years	11.90 years
8%	9.00 years	8.91 years
10%	7.20 years	6.93 years
12%	6.00 years	5.78 years

Which Rule to Use?

Rule	Use When...
Rule of 72	Quick, general-purpose estimates
Rule of 69	Continuous compounding or theoretical use

3.8 APPLICATIONS OF TIME VALUE OF MONEY

Loan Amortization

Loan payments are structured so that each payment covers interest and principal reduction.

Investment Valuation

Investors use TVM to compare projects, bonds, and other financial instruments.

Retirement Planning

TVM helps individuals determine how much they need to save for retirement.

3.9 SOLVED ILLUSTRATION

Illustration 01:(Simple Interest)

How much interest will be earned on ₹ 2,000 at 6% simple interest for 2 years?

Solution 01:

$$\text{Simple Interest} = P \times N \times R$$

$$\text{Simple Interest} = 2,000 \times 2 \times 6\%$$

$$\text{Simple Interest} = 240$$

Illustration 02:(Simple Interest)

Ms. Sneha deposited ₹ 50,000 in a bank for four years with the interest rate of 5.5% p.a. How much total amount would she earn?

Solution 02:

Total Amount = Principal + Simple Interest

$$\text{Total Amount} = 50,000 + 11,000^*$$

$$\text{Total Amount} = 61,000$$

WN 1:

$$\text{Simple Interest} = P \times N \times R$$

$$\text{Simple Interest} = 50,000 \times 4 \times 5.5\%$$

$$\text{Simple Interest} = 11,000$$

Illustration 03: (FV – Lumpsum)

A bank offers a return of 9% p.a. on the investment for a period of 8 years. If you invest a sum of ₹ 1,50,000 in the scheme, how much amount will be received by you?

Solution 03:

$$FV = PV \times (1 + r)^n$$

$$FV = 1,50,000 \times (1 + 0.09)^8$$

$$FV = 1,50,000 \times (1.09)^8$$

$$FV = 1,50,000 \times 1.9926$$

$$FV = 2,98,890$$

Illustration 04: (FV – Lumpsum - Compounding)

A sum of ₹ 10,000 is invested at annual rate of interest of 10%. What is the amount after two years if compounding is done (a) Annually (b) Semi-annually (c) Quarterly (d) Monthly?

Solution 04:

<i>(a) Annually</i>	<i>(b) Semi – annually</i>
$FV = PV \times (1 + r)^n$ $FV = 10,000 \times (1 + 0.1)^2$ $FV = 10,000 \times (1.1)^2$ $FV = 10,000 \times 1.21$ $FV = 12,100$	$FV = PV \times (1 + r)^n$ $FV = 10,000 \times (1 + 0.05)^4$ $FV = 10,000 \times (1.05)^4$ $FV = 10,000 \times 1.2155$ $FV = 12,155$
<i>(c) Quarterly</i>	<i>(d) Monthly</i>
$FV = PV \times (1 + r)^n$ $FV = 10,000 \times (1 + 0.025)^8$ $FV = 10,000 \times (1.025)^8$ $FV = 10,000 \times 1.2184$ $FV = 12,184$	$FV = PV \times (1 + r)^n$ $FV = 10,000 \times (1 + 0.008333)^{24}$ $FV = 10,000 \times (1.008333)^{24}$ $FV = 10,000 \times 1.2204$ $FV = 12,204$

Illustration 05: (PV– Lumpsum)

Mr. Jay plans to go for foreign trip after 4 years. How much should he deposits on present day in bank so that he receives ₹8,38,956 after 5 years. Rate of interest is 6%.

Solution 05:

$$P.V. = F.V. \times \left(\frac{1}{(1 + r)^n} \right)$$

$$P.V. = 8,38,956 \times \left(\frac{1}{(1 + 0.06)^5} \right)$$

$$P.V. = 8,38,956 \times \left(\frac{1}{(1.06)^5} \right)$$

$$P.V. = 8,38,956 \times 0.7473$$

$$P.V. = 6,26,951.82$$

Illustration 06: (PV– Lumpsum)

If Ms Sapna expects to have an amount of ₹ 80,000 after 6 years, how much should be the amount she has to invest today if the bank is offering 10% interest rate?

Solution 06:

$$P.V. = F.V. \times \left(\frac{1}{(1 + r)^n} \right)$$

$$P.V. = 80,000 \times \left(\frac{1}{(1 + 0.06)^6} \right)$$

$$P.V. = 80,000 \times \left(\frac{1}{(1.06)^6} \right)$$

$$P.V. = 80,000 \times 0.7473$$

$$P.V. = 59,784$$

Illustration 07: (Future Value Annuity Ordinary)

The Konkan co-operative bank is offering 8 years recurring deposit investment scheme, which offers investment earning interest at 11% p.a. compounded annually, how much will an investor get if he invests ₹ 1,00,000 at the end of each year in this scheme.

Solution 07:

$$F.V. = Ax \left(\frac{(1 + r)^n}{r} \right)$$

$$FV = 1,00,000 \times \left(\frac{(1 + 0.1)^8 - 1}{0.1} \right)$$

$$FV = 1,00,000 \times \left(\frac{1.1^8 - 1}{0.1} \right)$$

$$FV = 1,00,000 \times \left(\frac{1.1436}{0.1} \right)$$

$$FV = 1,00,000 \times 11.436$$

$$FV = 11,43,600$$

Illustration 08: (Future Value of Annuity Ordinary)

Four equal annual payments of ₹ 5,000 are made into a deposit account at the end of each year that pays 8 percent interest per year. What is the future value of this annuity at the end of 4 years?

Solution 08:

$$F.V. = Ax \left(\frac{(1 + r)^n}{r} \right)$$

$$FV = 5,000 \times \left(\frac{(1 + 0.08)^4 - 1}{0.08} \right)$$

$$FV = 5,000 \times \left(\frac{1.08^4 - 1}{0.08} \right)$$

$$FV = 5,000x\left(\frac{0.3605}{0.08}\right)$$

$$FV = 5,000x4.5063$$

$$FV = 22,531.50$$

Illustration 09: (Future Value Annuity Due)

Z invests ₹ 10,000 every year starting from today for next 10 years. Suppose interest rate is 8% per annum compounded annually. Calculate future value of the annuity.

$$FV = Ax\left(\frac{(1+r)^n}{r}\right)x(1+r)$$

$$FV = 1,00,000x\left(\frac{(1+0.08)^{10}-1}{0.08}\right)x(1+0.08)$$

$$FV = 1,00,000x\left(\frac{1.08^{10}-1}{0.08}\right)x(1.08)$$

$$FV = 1,00,000x\left(\frac{1.1589}{0.08}\right)x(1.08)$$

$$FV = 1,00,000x14.4863x1.08$$

$$FV = 15,64,520.40$$

Illustration 10: (Future Value Annuity Due)

Ms. Siddhi invests ₹ 25,000 every year starting from today for next 5 years. Suppose interest rate is 6% per annum compounded annually. Calculate future value of the annuity.

Solution 10:

$$F.V. = Ax\left(\frac{(1+r)^n}{r}\right)$$

$$FV = 25,000x\left(\frac{(1+0.06)^5-1}{0.06}\right)$$

$$FV = 25,000x\left(\frac{1.06^5-1}{0.06}\right)$$

$$FV = 25,000x\left(\frac{0.3382}{0.06}\right)$$

$$FV = 25,000x5.6367$$

$$FV = 1,40,917.50$$

Illustration 11: (Present Value – Annuity Ordinary)

What will be the present value of ₹ 20,000 invested annually for 17 years, if the rate of interest is 18%?

Solution 11:

$$\begin{aligned}
 PV &= Ax \left(\frac{(1 + r)^n}{rx(1 + r)^n} \right) \\
 PV &= 20,000x \left(\frac{(1 + 0.18)^{17} - 1}{0.18x(1 + 0.18)^{17}} \right) \\
 PV &= 20,000x \left(\frac{1.18^{17} - 1}{0.18x1.18^{17}} \right) \\
 PV &= 20,000x \left(\frac{15.6722}{3.001} \right) \\
 PV &= 20,000x 5.2223 \\
 PV &= 1,04,446
 \end{aligned}$$

Illustration 12: (Present Value – Annuity Ordinary)

What will be the present value of ₹ 15,000 invested annually at interest rate of 16% for 8 years?

Solution:

$$\begin{aligned}
 PV &= Ax \left(\frac{(1 + r)^{n-1}}{rx(1 + r)^{n-1}} \right) + A \\
 PV &= 15,000x \left(\frac{(1 + 0.16)^{8-1} - 1}{0.16x(1 + 0.16)^{8-1}} \right) + 15,000 \\
 PV &= 15,000x \left(\frac{1.16^7 - 1}{0.16x1.16^7} \right) + 15,000 \\
 PV &= 15,000x \left(\frac{1.8262}{0.4522} \right) + 15,000 \\
 PV &= 15,000x 4.0385 + 15,000 \\
 PV &= 60,577.5 + 15,000 \\
 PV &= 75,577.5
 \end{aligned}$$

Illustration 13: (Present Value – Annuity Due)

What will be the present value of ₹ 2,000 invested today annually at interest rate of 16% for 5 years?

Solution 13:

$$\begin{aligned}
 PV &= Ax \left(\frac{(1 + r)^{n-1}}{rx(1 + r)^{n-1}} \right) + A \\
 PV &= 2,000x \left(\frac{(1 + 0.16)^{5-1} - 1}{0.16x(1 + 0.16)^{5-1}} \right) + 2,000 \\
 PV &= 2,000x \left(\frac{1.16^4 - 1}{0.16x1.16^4} \right) + 2,000
 \end{aligned}$$

$$PV = 2,000x \left(\frac{0.8106}{0.2897} \right) + 2,000$$

$$PV = 2,000x 2.7981 + 2,000$$

$$PV = 5,596.20 + 2000$$

$$PV = 7,596.20$$

Illustration 14: (Present Value – Annuity Due)

Mr. Xavier has an investment proposal in which he has to invest 38,950 every year starting from today for next 15 years which offers interest @ 9.5%. What should be the present value of such investment?

Solution 14:

$$PV = Ax \left(\frac{(1+r)^{n-1}}{r(1+r)^{n-1}} \right) + A$$

$$PV = 38,950x \left(\frac{(1+0.00095)^{15-1} - 1}{0.00095x(1+0.00095)^{15-1}} \right) + 38,950$$

$$PV = 38,950x \left(\frac{1.00095^{14} - 1}{0.00095x1.00095^{14}} \right) + 38,950$$

$$PV = 38,950x \left(\frac{0.0134}{0.001} \right) + 38,950$$

$$PV = 38,950x 13.4 + 38,950$$

$$PV = 5,21,930 + 38,950$$

$$PV = 5,60,880$$

Illustration 15: (Future Value – Uneven Cashflow End of the year)

Mr. Ankit invests ₹ 5,400, ₹ 6,500, ₹ 8,700, ₹ 9,650, ₹ 10,800 and ₹ 11,820 at the beginning of each year. Calculate the value at maturity if the rate of interest is 11% p.a. compounded annually.

Solution:

Year	Annuity	CF = (1+r) ⁿ	CF = (1+r) ⁿ	
1	5,400	(1.11) ⁵	1.27628156	6,891.92
2	6,500	(1.11) ⁴	1.21550625	7,900.79
3	8,700	(1.11) ³	1.157625	10,071.34
4	9,650	(1.11) ²	1.1025	10,639.13
5	10,800	(1.11) ¹	1.05	11,340.00
6	11,820	(1.11) ⁰	1	11,820.00
				58,663.17

Illustration 16: (Future Value – Uneven Cashflow Beginning of the year)

Ms. Sushmita invests ₹ 8,400, ₹ 15,200, ₹ 20,700, ₹ 10,650, ₹ 6,800, ₹ 22,125, ₹ 27,500 and ₹ 32,640 at the beginning of each year. Calculate the value at maturity if the rate of interest is 13% p.a. compounded annually.

Solution:

Year	Annuity	CF = (1+r) ⁿ	CF = (1+r) ⁿ	
1	8,400	(1.11) ⁸	1.47745544	12,410.63
2	15,200	(1.11) ⁷	1.40710042	21,387.93
3	20,700	(1.11) ⁶	1.34009564	27,739.98
4	10,650	(1.11) ⁵	1.27628156	13,592.40
5	6,800	(1.11) ⁴	1.21550625	8,265.44
6	22,125	(1.11) ³	1.157625	25,612.45
7	27,500	(1.11) ²	1.1025	30,318.75
8	32,640	(1.11) ¹	1.05	34,272.00
				1,73,599.58

3.10 EXERCISES AND ASSESSMENTS

Multiple Choice Questions (MCQs)

- What does the Time Value of Money concept state?
 - Money today is worth less than money in the future
 - Money today is worth more than money in the future
 - Money does not change value over time
 - None of the above

Answer: b) Money today is worth more than money in the future

- Which formula is used for calculating compound interest?
 - $SI = P \times r \times t$
 - $FV = PV \times (1 + r)^t$
 - $FV = PV \times r \times t$
 - $PV = FV \times (1 + r)^t$

Answer: b) $FV = PV \times (1 + r)^t$

True/False

- Compound interest grows at a linear rate. (False)
- Discounting is the process of finding the future value of money. (False)

Match the Pair

Term	Definition
Present Value	Value of future sum today
Future Value	Value of a sum at a future date
Annuity	Series of equal periodic payments
Perpetuity	Payment that continues indefinitely

Brief Questions

1. Define the Time Value of Money.
2. Differentiate between simple and compound interest.

Short Notes

1. Importance of TVM in financial planning.
2. Concept of annuities and their types.

Future Value Interest Factor $FV_{IF} = PV \times (1 + r)^n$

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.1700	1.1800	1.1900	1.2000
2	1.0201	1.0404	1.0609	1.0816	1.1025	1.1236	1.1449	1.1664	1.1881	1.2100	1.2321	1.2544	1.2769	1.2996	1.3225	1.3456	1.3689	1.3924	1.4161	1.4400
3	1.0303	1.0612	1.0927	1.1249	1.1576	1.1910	1.2250	1.2597	1.2950	1.3310	1.3676	1.4049	1.4429	1.4815	1.5209	1.5609	1.6016	1.6430	1.6852	1.7280
4	1.0406	1.0824	1.1255	1.1699	1.2155	1.2625	1.3108	1.3605	1.4116	1.4641	1.5181	1.5735	1.6305	1.6890	1.7490	1.8106	1.8739	1.9388	2.0053	2.0736
5	1.0510	1.1041	1.1593	1.2167	1.2763	1.3382	1.4026	1.4693	1.5386	1.6105	1.6851	1.7623	1.8424	1.9254	2.0114	2.1003	2.1924	2.2878	2.3864	2.4883
6	1.0615	1.1262	1.1941	1.2653	1.3401	1.4185	1.5007	1.5869	1.6771	1.7716	1.8704	1.9738	2.0820	2.1950	2.3131	2.4364	2.5652	2.6996	2.8398	2.9860
7	1.0721	1.1487	1.2299	1.3159	1.4071	1.5036	1.6058	1.7138	1.8280	1.9487	2.0762	2.2107	2.3526	2.5023	2.6600	2.8262	3.0012	3.1855	3.3793	3.5832
8	1.0829	1.1717	1.2668	1.3686	1.4775	1.5938	1.7182	1.8509	1.9926	2.1436	2.3045	2.4760	2.6584	2.8526	3.0590	3.2784	3.5115	3.7589	4.0214	4.2998
9	1.0937	1.1951	1.3048	1.4233	1.5513	1.6895	1.8385	1.9990	2.1719	2.3579	2.5580	2.7731	3.0040	3.2519	3.5179	3.8030	4.1084	4.4355	4.7854	5.1598
10	1.1046	1.2190	1.3439	1.4802	1.6289	1.7908	1.9672	2.1589	2.3674	2.5937	2.8394	3.1058	3.3946	3.7072	4.0456	4.4114	4.8068	5.2338	5.6947	6.1917
11	1.1157	1.2434	1.3842	1.5395	1.7103	1.8983	2.1049	2.3316	2.5804	2.8531	3.1518	3.4785	3.8359	4.2262	4.6524	5.1173	5.6240	6.1759	6.7767	7.4301
12	1.1268	1.2682	1.4258	1.6010	1.7959	2.0122	2.2522	2.5182	2.8127	3.1384	3.4985	3.8960	4.3345	4.8179	5.3503	5.9360	6.5801	7.2876	8.0642	8.9161
13	1.1381	1.2936	1.4685	1.6651	1.8856	2.1329	2.4098	2.7196	3.0658	3.4523	3.8833	4.3635	4.8980	5.4924	6.1528	6.8858	7.6987	8.5994	9.5964	10.6993
14	1.1495	1.3195	1.5126	1.7317	1.9799	2.2609	2.5785	2.9372	3.3417	3.7975	4.3104	4.8871	5.5348	6.2613	7.0757	7.9875	9.0075	10.1472	11.4198	12.8392
15	1.1610	1.3459	1.5580	1.8009	2.0789	2.3966	2.7590	3.1722	3.6425	4.1772	4.7846	5.4736	6.2543	7.1379	8.1371	9.2655	10.5387	11.9737	13.5895	15.4070
16	1.1726	1.3728	1.6047	1.8730	2.1829	2.5404	2.9522	3.4259	3.9703	4.5950	5.3109	6.1304	7.0673	8.1372	9.3576	10.7480	12.3303	14.1290	16.1715	18.4884
17	1.1843	1.4002	1.6528	1.9479	2.2920	2.6928	3.1588	3.7000	4.3276	5.0545	5.8951	6.8660	7.9861	9.2765	10.7613	12.4677	14.4265	16.6722	19.2441	22.1861
18	1.1961	1.4282	1.7024	2.0258	2.4066	2.8543	3.3799	3.9960	4.7171	5.5599	6.5436	7.6900	9.0243	10.5752	12.3755	14.4625	16.8790	19.6733	22.9005	26.6233
19	1.2081	1.4568	1.7535	2.1068	2.5270	3.0256	3.6165	4.3157	5.1417	6.1159	7.2633	8.6128	10.1974	12.0557	14.2318	16.7765	19.7484	23.2144	27.2516	31.9480
20	1.2202	1.4859	1.8061	2.1911	2.6533	3.2071	3.8697	4.6610	5.6044	6.7275	8.0623	9.6463	11.5231	13.7435	16.3665	19.4608	23.1056	27.3930	32.4294	38.3376

Future Value Ordinary Annuity Factor $FV_{AF} = Ax \left(\frac{(1 + r)^n - 1}{r} \right)$

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0100	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1100	2.1200	2.1300	2.1400	2.1500	2.1600	2.1700	2.1800	2.1900	2.2000
3	3.0301	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3421	3.3744	3.4069	3.4396	3.4725	3.5056	3.5389	3.5724	3.6061	3.6400
4	4.0604	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.6410	4.7097	4.7793	4.8498	4.9211	4.9934	5.0665	5.1405	5.2154	5.2913	5.3680
5	5.1010	5.2040	5.3091	5.4163	5.5256	5.6371	5.7507	5.8666	5.9847	6.1051	6.2278	6.3528	6.4803	6.6101	6.7424	6.8771	7.0144	7.1542	7.2966	7.4416
6	6.1520	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	7.9129	8.1152	8.3227	8.5355	8.7537	8.9775	9.2068	9.4420	9.6830	9.9299
7	7.2135	7.4343	7.6625	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	9.7833	10.0890	10.4047	10.7305	11.0668	11.4139	11.7720	12.1415	12.5227	12.9159
8	8.2857	8.5830	8.8923	9.2142	9.5491	9.8975	10.2598	10.6366	11.0285	11.4359	11.8594	12.2997	12.7573	13.2328	13.7268	14.2401	14.7733	15.3270	15.9020	16.4991
9	9.3685	9.7546	10.1591	10.5828	11.0266	11.4913	11.9780	12.4876	13.0210	13.5795	14.1640	14.7757	15.4157	16.0853	16.7858	17.5185	18.2847	19.0859	19.9234	20.7989
10	10.4622	10.9497	11.4639	12.0061	12.5779	13.1808	13.8164	14.4866	15.1929	15.9374	16.7220	17.5487	18.4197	19.3373	20.3037	21.3215	22.3931	23.5213	24.7089	25.9587
11	11.5668	12.1687	12.8078	13.4864	14.2068	14.9716	15.7836	16.6455	17.5603	18.5312	19.5614	20.6546	21.8143	23.0445	24.3493	25.7329	27.1999	28.7551	30.4035	32.1504
12	12.6825	13.4121	14.1920	15.0258	15.9171	16.8699	17.8885	18.9771	20.1407	21.3843	22.7132	24.1331	25.6502	27.2707	29.0017	30.8502	32.8239	34.9311	37.1802	39.5805
13	13.8093	14.6803	15.6178	16.6268	17.7130	18.8821	20.1486	21.5145	22.9534	24.5227	26.2116	28.0291	29.9847	32.0887	34.3519	36.7862	39.4040	42.2187	45.2445	48.4966
14	14.9474	15.9739	17.0863	18.2919	19.5986	21.0151	22.5505	24.2149	26.0192	27.9750	30.0949	32.3926	34.8827	37.5811	40.5047	43.6720	47.1027	50.8180	54.8409	59.1959
15	16.0969	17.2934	18.5989	20.0236	21.5786	23.2760	25.1290	27.1521	29.3609	31.7725	34.4054	37.2797	40.4175	43.8424	47.5804	51.6595	56.1101	60.9653	66.2607	72.0351
16	17.2579	18.6393	20.1569	21.8245	23.6575	25.6725	27.8881	30.3243	33.0034	35.9497	39.1899	42.7533	46.6717	50.9804	55.7175	60.9250	66.6488	72.9390	79.8502	87.4421
17	18.4304	20.0121	21.7616	23.6975	25.8404	28.2129	30.8402	33.7502	36.9737	40.5447	44.5008	48.8837	53.7391	59.1176	65.0751	71.6730	78.9792	87.0680	96.0218	105.9306
18	19.6147	21.4123	23.4444	25.6454	28.1324	30.9057	33.9990	37.4502	41.3013	45.5992	50.3959	55.7497	61.7251	68.3941	75.8364	84.1407	93.4056	103.7403	115.2659	128.1167
19	20.8109	22.8406	25.1169	27.6712	30.5390	33.7600	37.3790	41.4463	46.0185	51.1591	56.9395	63.4397	70.7494	78.9692	88.2118	98.6032	110.2846	123.4135	138.1664	154.7400
20	22.0190	24.2974	26.8704	29.7781	33.0660	36.7856	40.9955	45.7620	51.1601	57.2750	64.2028	72.0524	80.9468	91.0249	102.4436	115.3797	130.0329	146.6280	165.4180	186.6880

Future Value Annuity Due Factor $FV_{AF} = Ax \left(\frac{(1+r)^n - 1}{r} \right) \times (1+r)$

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.0100	1.0200	1.0300	1.0400	1.0500	1.0600	1.0700	1.0800	1.0900	1.1000	1.1100	1.1200	1.1300	1.1400	1.1500	1.1600	1.1700	1.1800	1.1900	1.2000
2	2.0301	2.0604	2.0909	2.1216	2.1525	2.1836	2.2149	2.2464	2.2781	2.3100	2.3421	2.3744	2.4069	2.4396	2.4725	2.5056	2.5389	2.5724	2.6061	2.6400
3	3.0604	3.1216	3.1836	3.2465	3.3101	3.3746	3.4399	3.5061	3.5731	3.6410	3.7097	3.7793	3.8498	3.9211	3.9934	4.0665	4.1405	4.2154	4.2913	4.3680
4	4.1010	4.2040	4.3091	4.4163	4.5256	4.6371	4.7507	4.8666	4.9847	5.1051	5.2278	5.3528	5.4803	5.6101	5.7424	5.8771	6.0144	6.1542	6.2966	6.4416
5	5.1520	5.3081	5.4684	5.6330	5.8019	5.9753	6.1533	6.3359	6.5233	6.7156	6.9129	7.1152	7.3227	7.5355	7.7537	7.9775	8.2068	8.4420	8.6830	8.9299
6	6.2135	6.4343	6.6625	6.8983	7.1420	7.3938	7.6540	7.9228	8.2004	8.4872	8.7833	9.0890	9.4047	9.7305	10.0668	10.4139	10.7720	11.1415	11.5227	11.9159
7	7.2857	7.5830	7.8923	8.2142	8.5491	8.8975	9.2598	9.6366	10.0285	10.4359	10.8594	11.2997	11.7573	12.2328	12.7268	13.2401	13.7733	14.3270	14.9020	15.4991
8	8.3685	8.7546	9.1591	9.5828	10.0266	10.4913	10.9780	11.4876	12.0210	12.5795	13.1640	13.7757	14.4157	15.0853	15.7858	16.5185	17.2847	18.0859	18.9234	19.7989
9	9.4622	9.9497	10.4639	11.0061	11.5779	12.1808	12.8164	13.4866	14.1929	14.9374	15.7220	16.5487	17.4197	18.3373	19.3037	20.3215	21.3931	22.5213	23.7089	24.9587
10	10.5668	11.1687	11.8078	12.4864	13.2068	13.9716	14.7836	15.6455	16.5603	17.5312	18.5614	19.6546	20.8143	22.0445	23.3493	24.7329	26.1999	27.7551	29.4035	31.1504
11	11.6825	12.4121	13.1920	14.0258	14.9171	15.8609	16.8685	17.9771	19.1407	20.3843	21.7132	23.1331	24.6502	26.2707	28.0017	29.8502	31.8239	33.9311	36.1802	38.5805
12	12.8093	13.6803	14.6178	15.6268	16.7130	17.8821	19.1406	20.4953	21.9534	23.5227	25.2116	27.0291	28.9847	31.0887	33.3519	35.7862	38.4040	41.2187	44.2445	47.4966
13	13.9474	14.9739	16.0863	17.2919	18.5986	20.0151	21.5505	23.2149	25.0192	26.9750	29.0949	31.3926	33.8827	36.5811	39.5047	42.7270	46.1027	49.8180	53.8409	58.1959
14	15.0969	16.2934	17.5989	19.0236	20.5786	22.2760	24.1290	26.1521	28.3609	30.7725	33.4054	36.2797	39.4175	42.8424	46.5804	50.6955	55.1101	59.9653	65.2607	71.0351
15	16.2579	17.6393	19.1569	20.8245	22.6575	24.6725	26.8881	29.3243	32.0034	34.9497	38.1899	41.7533	45.6717	49.9804	54.7175	59.9250	65.6488	71.9390	78.8502	86.421
16	17.4304	19.0121	20.7616	22.6975	24.8404	27.2129	29.8402	32.7502	35.9737	39.5447	43.5088	47.8837	52.7391	58.1176	64.0751	70.6730	77.9792	86.0680	95.0218	104.9366
17	18.6147	20.4123	22.4144	24.6454	27.1324	29.9057	32.9990	36.4502	40.3013	44.5992	49.3959	54.7407	60.7251	67.3941	74.8364	83.1407	92.4056	102.7403	114.2659	127.1167
18	19.8109	21.8406	24.1169	26.6712	29.5390	32.7600	36.3790	40.4463	45.0185	50.1591	55.9395	62.4397	69.7494	77.9692	87.2118	97.6032	109.2846	122.4135	137.1664	153.7400
19	21.0190	23.2974	25.8704	28.7781	32.0660	35.7856	39.9955	44.7620	50.1601	56.2750	63.2028	71.0524	79.9468	90.0249	101.4436	114.3797	129.0323	145.6280	164.1810	185.6880
20	22.2392	24.7833	27.6765	30.9692	34.7193	38.9927	43.8652	49.4229	55.7645	63.0025	71.2651	80.6987	91.4699	103.7684	117.8101	133.8405	152.1385	173.0210	196.8474	224.0256

Present Value Interest Factor $PV_{IF} = FVx \left(\frac{1}{(1+r)^n} \right)$

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.9901	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	1.9704	2.0200	2.0300	2.0400	2.0500	2.0600	2.0700	2.0800	2.0900	2.1000	2.1100	2.1200	2.1300	2.1400	2.1500	2.1600	2.1700	2.1800	2.1900	2.2000
3	2.9410	3.0604	3.0909	3.1216	3.1525	3.1836	3.2149	3.2464	3.2781	3.3100	3.3421	3.3744	3.4069	3.4396	3.4725	3.5056	3.5389	3.5724	3.6061	3.6400
4	3.9020	4.1216	4.1836	4.2465	4.3101	4.3746	4.4399	4.5061	4.5731	4.6410	4.7097	4.7793	4.8498	4.9211	4.9934	5.0665	5.1405	5.2154	5.2913	5.3680
5	4.8534	5.2040	5.3091	5.4163	5.5256	5.6371	5.7507	5.8666	5.9847	6.1051	6.2278	6.3528	6.4803	6.6101	6.7424	6.8771	7.0144	7.1542	7.2966	7.4416
6	5.7955	6.3081	6.4684	6.6330	6.8019	6.9753	7.1533	7.3359	7.5233	7.7156	7.9129	8.1152	8.3227	8.5355	8.7537	8.9775	9.2068	9.4420	9.6830	9.9299
7	6.7282	7.4343	7.6625	7.8983	8.1420	8.3938	8.6540	8.9228	9.2004	9.4872	9.7833	10.0890	10.4047	10.7305	11.0668	11.4139	11.7720	12.1415	12.5227	12.9159
8	7.6517	8.5830	8.8923	9.2142	9.5491	9.8975	10.2598	10.6366	11.0285	11.4359	11.8594	12.2997	12.7573	13.2328	13.7268	14.2401	14.7733	15.3270	15.9020	16.4991
9	8.5660	9.7546	10.1591	10.5828	11.0266	11.4913	11.9780	12.4876	13.0210	13.5795	14.1640	14.7757	15.4157	16.0853	16.7858	17.5185	18.2847	19.0859	19.9234	20.7989
10	9.4713	10.9497	11.4639	12.0061	12.5779	13.1808	13.8164	14.4866	15.1929	15.9374	16.7220	17.5487	18.4197	19.3373	20.3037	21.3215	22.3931	23.5213	24.7089	25.9587
11	10.3676	12.1687	12.8078	13.4864	14.2068	14.9716	15.7836	16.6455	17.5603	18.5312	19.5614	20.6546	21.8143	23.0445	24.3493	25.7329	27.1999	28.7551	30.4035	32.1504
12	11.2551	13.1421	14.1920	15.0258	15.9171	16.8609	17.8685	18.9771	20.1407	21.3843	22.7132	24.1331	25.6502	27.2707	29.0017	30.8502	32.8239	34.9311	37.1802	39.5805
13	12.1337	14.6803	15.6178	16.6268	17.7130	18.8821	20.1406	21.4953	22.9534	24.5227	26.2116	28.0291	29.9847	32.0887	34.3519	36.7862	39.4040	42.2187	45.2445	48.4966
14	13.0037	15.9739	17.0863	18.2919	19.5986	21.0151	22.5505	24.2149	26.0192	27.9750	30.0949	32.3926	34.8827	37.5811	40.5047	43.6720	47.1027	50.8180	54.8409	59.1959
15	13.8651	17.2934	18.5989	20.0236	21.5786	23.2760	25.1290	27.1521	29.3609	31.7725	34.4054	37.2797	40.4175	43.8424	47.5804	51.6955	56.1101	60.9653	66.2607	72.0351
16	14.7179	18.6393	20.1569	21.8245	23.6575	25.6725	27.8881	30.3243	33.0034	35.9497	39.1899	42.7533	46.6717	50.9804	55.7175	60.9250	66.6488	72.9390	79.8502	87.4421
17	15.5623	20.0121	21.7616	23.6975	25.8404	28.2129	30.8402	33.7502	36.9737	40.5447	44.5088	48.8837	53.7391	59.1176	65.0751	71.6730	78.9792	87.0680	96.0218	105.9366
18	16.3983	21.4123	23.4144	25.6454	28.1324	30.9057	33.9990	37.4502	41.3013	45.5992	50.3959	55.7407	61.7251	68.3941	75.8364	84.1407	93.4056	103.7403	115.2659	128.1167
19	17.2260	22.8406	25.1169	27.6712	30.5390	33.7600	37.3790	41.4463	46.0185	51.1591	56.9395	63.4397	70.7494	78.9692	88.2118	98.6032	110.2846	123.4135	138.1664	154.7400
20	18.0456	24.2974	26.8704	29.7781	33.0660	36.7856	40.9955	45.7620	51.1601	57.2750	64.2028	72.0524	80.9468	91.0249	102.4436	115.3797	130.0329	146.6280	165.4180	186.6880

Present Value Ordinary Annuity Factor $PV_{AF} = Ax \left(\frac{(1+r)^n - 1}{rx(1+r)^n} \right)$

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.9901	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091	0.9009	0.8929	0.8850	0.8772	0.8696	0.8621	0.8547	0.8475	0.8403	0.8333
2	1.9704	1.9416	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7591	1.7355	1.7125	1.6901	1.6681	1.6467	1.6257	1.6052	1.5852	1.5656	1.5465	1.5278
3	2.9410	2.8839	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.5313	2.4869	2.4437	2.4018	2.3612	2.3216	2.2832	2.2459	2.2096	2.1743	2.1399	2.1065
4	3.9020	3.8077	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.2397	3.1699	3.1024	3.0373	2.9745	2.9137	2.8550	2.7982	2.7432	2.6901	2.6386	2.5887
5	4.8534	4.7135	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.8897	3.7908	3.6959	3.6048	3.5172	3.4331	3.3522	3.2743	3.1993	3.1272	3.0576	2.9906
6	5.7955	5.6014	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.4859	4.3553	4.2305	4.1114	3.9975	3.8887	3.7845	3.6847	3.5892	3.4976	3.4098	3.3255
7	6.7282	6.4720	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	5.0330	4.8684	4.7122	4.5638	4.4226	4.2883	4.1604	4.0386	3.9224	3.8115	3.7057	3.6046
8	7.6517	7.3255	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.5349	5.3349	5.1461	4.9676	4.7988	4.6389	4.4873	4.3436	4.2072	4.0776	3.9544	3.8372
9	8.5660	8.1622	7.7861	7.4353	7.1078	6.8017	6.5126	6.2449	5.9952	5.7590	5.5370	5.3282	5.1317	4.9464	4.7716	4.6065	4.4506	4.3030	4.1633	4.0315
10	9.4713	8.9626	8.5302	8.1109	7.7127	7.3401	7.0036	6.7011	6.4249	6.1646	5.9216	5.6942	5.4826	5.2861	5.1018	4.9322	4.7686	4.6141	4.4689	4.3325
11	10.3676	9.7868	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.8052	6.4951	6.2065	5.9377	5.6869	5.4527	5.2337	5.0286	4.8364	4.6460	4.4685	4.3271
12	11.2551	10.5753	9.9450	9.3851	8.8633	8.3838	7.9427	7.5361	7.1607	6.8137	6.4924	6.1944	5.9176	5.6603	5.4246	5.2004	4.9884	4.7932	4.6105	4.4432
13	12.1337	11.4534	10.8350	9.9856	9.3936	8.8527	8.3577	7.9038	7.4869	7.1034	6.7499	6.4235	6.1218	5.8424	5.5831	5.3423	5.1183	4.9095	4.7147	4.5327
14	13.0037	12.1062	11.2961	10.5631	9.9698	9.2950	8.5855	8.2442	7.7862	7.3667	6.9819	6.6282	6.3025	6.0021	5.7245	5.4675	5.2293	5.0081	4.8023	4.6106
15	13.8651	12.8493	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	8.0607	7.6061	7.1909	6.8019	6.4624	6.1422	5.8474	5.5755	5.3242	5.0916	4.8759	4.6755
16	14.7179	13.7579	12.8611	11.6523	10.8378	10.1059	9.4666	8.8514	8.3126	7.8217	7.3792	6.9740	6.6039	6.2651	5.9542	5.6685	5.4085	5.1624	4.9377	4.7266
17	15.5623	14.2919	13.1661	11.2657	11.2741	10.4773	9.7633	9.2126	8.5436	8.0232	7.5488	7.1196	6.7291	6.3729	6.0427	5.7487	5.4746	5.2223	4.9897	4.7746
18	16.3983	14.9920	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.7556	8.2014	7.7016	7.2497	6.8399	6.4674	6.1280	5.8178	5.5339	5.2732	5.0333	4.8123
19	17.2260	15.7285	14.3238	13.1339	12.0853	11.1876	10.3356	9.6036	8.9501	8.3649	7.8393	7.3658	6.9389	6.5504	6.1982	5.8775	5.5855	5.3162	5.0700	4.8455
20	18.0456	16.5314	14.8773	13.5903	12.4242	11.4699	10.5940	9.8181	9.1285	8.5136	7.9633	7.4694	7.0248	6.6231	6.2593	5.9288	5.6278	5.3527	5.1009	4.8696

Present Value Ordinary Annuity Factor

$$PV_{AF} = Ax \left(\frac{(1+r)^n - 1}{r(1+r)^{n-1}} \right) + A$$

Time Value of Money

Rate Year	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	1.9901	1.9804	1.9709	1.9615	1.9524	1.9434	1.9346	1.9259	1.9174	1.9091	1.9009	1.8929	1.8850	1.8772	1.8696	1.8621	1.8547	1.8475	1.8403	1.8333
3	2.9704	2.9416	2.9135	2.8861	2.8594	2.8334	2.8080	2.7833	2.7591	2.7355	2.7125	2.6901	2.6681	2.6467	2.6257	2.6052	2.5852	2.5656	2.5465	2.5278
4	3.9410	3.8839	3.8286	3.7751	3.7232	3.6730	3.6243	3.5771	3.5313	3.4869	3.4437	3.4018	3.3612	3.3216	3.2832	3.2459	3.2096	3.1743	3.1399	3.1065
5	4.9020	4.8077	4.7171	4.6299	4.5460	4.4651	4.3872	4.3121	4.2397	4.1699	4.1024	4.0373	3.9745	3.9137	3.8550	3.7982	3.7432	3.6901	3.6386	3.5887
6	5.8534	5.7135	5.5797	5.4518	5.3295	5.2124	5.1002	4.9927	4.8897	4.7908	4.6959	4.6048	4.5172	4.4331	4.3522	4.2743	4.1993	4.1272	4.0576	3.9906
7	6.7955	6.6014	6.4172	6.2421	6.0757	5.9173	5.7665	5.6229	5.4859	5.3553	5.2305	5.1114	4.9975	4.8887	4.7845	4.6847	4.5892	4.4976	4.4098	4.3255
8	7.7282	7.4720	7.2303	7.0021	6.7864	6.5824	6.3893	6.2064	6.0330	5.8684	5.7122	5.5638	5.4226	5.2883	5.1604	5.0386	4.9224	4.8115	4.7057	4.6046
9	8.6517	8.3255	8.0197	7.7327	7.4632	7.2098	6.9713	6.7466	6.5348	6.3349	6.1461	5.9676	5.7988	5.6389	5.4873	5.3436	5.2072	5.0776	4.9544	4.8372
10	9.5660	9.1622	8.7861	8.4353	8.1078	7.8017	7.5152	7.2469	6.9952	6.7590	6.5370	6.3282	6.1317	5.9464	5.7716	5.6065	5.4506	5.3030	5.1633	5.0310
11	10.4713	9.9826	9.5302	9.1109	8.7217	8.3601	8.0236	7.7101	7.4177	7.1446	6.8892	6.6502	6.4262	6.2161	6.0188	5.8332	5.6586	5.4941	5.3389	5.1925
12	11.3676	10.7868	10.2526	9.7605	9.3064	8.8869	8.4987	8.1390	7.8052	7.4951	7.2065	6.9377	6.6869	6.4527	6.2337	6.0286	5.8364	5.6560	5.4865	5.3271
13	12.2551	11.5753	10.9540	10.3851	9.8633	9.3838	8.9427	8.5361	8.1607	7.8137	7.4924	7.1944	6.9176	6.6603	6.4206	6.1971	5.9884	5.7932	5.6105	5.4392
14	13.1337	12.3484	11.6350	10.9856	10.3936	9.8527	9.3577	8.9038	8.4869	8.1034	7.7499	7.4235	7.1218	6.8424	6.5831	6.3423	6.1183	5.9095	5.7147	5.5327
15	14.0037	13.1062	12.2961	11.5631	10.8986	10.2950	9.7455	9.2442	8.7862	8.3667	7.9819	7.6282	7.3025	7.0021	6.7245	6.4675	6.2293	6.0081	5.8023	5.6106
16	14.8651	13.8493	12.9379	12.1184	11.3797	10.7122	10.1079	9.5595	9.0607	8.6061	8.1909	7.8109	7.4624	7.1422	6.8474	6.5755	6.3242	6.0916	5.8759	5.6755
17	15.7179	14.5777	13.5611	12.6523	11.8378	11.1059	10.4466	9.8514	9.3126	8.8237	8.3792	7.9740	7.6039	7.2651	6.9542	6.6685	6.4053	6.1624	5.9377	5.7296
18	16.5623	15.2919	14.1661	13.1657	12.2741	11.4773	10.7632	10.1216	9.5436	9.0216	8.5488	8.1196	7.7291	7.3729	7.0472	6.7487	6.4746	6.2223	5.9897	5.7746
19	17.3983	15.9920	14.7535	13.6593	12.6896	11.8276	11.0591	10.3719	9.7556	9.2014	8.7016	8.2497	7.8399	7.4674	7.1280	6.8178	6.5339	6.2732	6.0333	5.8122
20	18.2260	16.6785	15.3238	14.1339	13.0853	12.1581	11.3356	10.6036	9.9501	9.3649	8.8393	8.3658	7.9380	7.5504	7.1982	6.8775	6.5845	6.3162	6.0700	5.8435



VALUATION OF BONDS

Unit Structure :

- 4.0 Learning Objectives
- 4.1 Introduction to Bond
- 4.2 Bond Valuation
- 4.3 Types of Bonds
- 4.4 Models of Bond Valuation
- 4.5 Yield to Maturity (YTM)
- 4.6 Duration of Bond
- 4.7 Relationship Between Bond Price and Interest Rate
- 4.8 Practical Sums
- 4.9 Summary

4.0 LEARNING OBJECTIVES

After studying this chapter, learners will be able to:

- Understand the fundamental concept of bond valuation.
- Identify different types of bonds and their characteristics.
- Explain various bond valuation models including fixed-rate, zero-coupon, and perpetual bonds.
- Perform calculations for determining the value of different types of bonds.
- Compute the Yield to Maturity (YTM) of a bond using appropriate techniques.
- Analyze the impact of interest rate changes on bond prices.
- Differentiate between bond price and bond yield and understand their relationship.

4.1 INTRODUCTION TO BOND

Meaning of Bond: A bond is a **debt instrument** used by governments, corporations, and other entities to **raise capital**. When you purchase a bond, you are essentially **lending money** to the issuer in exchange for:

- **Periodic interest payments** (called **coupon payments**), and
- **Repayment of the principal** (called **face value or par value**) on a specified **maturity date**.

Key Features of a Bond:

Term	Explanation
Issuer	Entity borrowing money (e.g., government or company)
Bondholder	Investor who lends money to the issuer
Face Value	The amount repaid at maturity
Coupon Rate	Annual interest rate paid on the bond
Maturity Date	The date on which the bond is repaid
Market Price	Current price at which the bond is trading

Example:

If a company issues a **₹1,000 bond** at **10% coupon rate** for **5 years**, it promises to:

- Pay ₹100 as interest every year for 5 years
- Repay ₹1,000 at the end of 5 years

Why Bonds Are Issued:

- **Governments** issue bonds to finance public projects and manage national debt.
- **Companies** issue bonds to fund expansion, R&D, or operational needs.

Why Investors Buy Bonds:

- To earn **stable and predictable income**
- To **diversify their investment portfolio**
- To take advantage of **lower risk compared to equity** (though this depends on the issuer's creditworthiness)

4.2 BOND VALUATION

Bond valuation is a method used to determine the fair value of a bond based on its future cash flows. It helps investors make informed decisions by comparing a bond's market value with its intrinsic value.

Key Terms

- **Face Value (Par Value):** Amount to be repaid at maturity.
- **Coupon Payment:** Periodic interest paid to bondholders.
- **Maturity Date:** The date on which the face value is repaid.
- **Discount Rate:** The required rate of return or market rate.

4.3 TYPES OF BONDS

Here is a **detailed explanation in paragraph form** for each type of bond, along with a relevant example where applicable. This content is suitable for inclusion in your **Self-Learning Material (SLM)** under the section **"Types of Bonds"**:

1. Fixed-Rate Bonds

Fixed-rate bonds are the most common type of bonds where the interest (also called the **coupon**) remains constant throughout the life of the bond. Investors receive a **predetermined interest payment annually or semi-annually**, regardless of market fluctuations. This makes fixed-rate bonds attractive to conservative investors looking for **predictable income**.

Example: A 5-year bond with a face value of ₹1,000 and a fixed coupon rate of 8% will pay ₹80 every year to the bondholder and repay ₹1,000 at the end of 5 years.

2. Floating-Rate Bonds

Floating-rate bonds, also known as **variable rate bonds**, have interest payments that change periodically based on a benchmark interest rate such as **MIBOR (Mumbai Interbank Offer Rate)** or **LIBOR (London Interbank Offer Rate)**. These bonds protect investors from interest rate risk, as the coupon adjusts with market rates.

Example: A bond may pay interest as "MIBOR + 2%". If MIBOR is 5%, the bond will pay a 7% coupon for that period.

3. Zero-Coupon Bonds

Zero-coupon bonds do not pay any periodic interest. Instead, they are **issued at a deep discount** to their face value and are **redeemed at par** on the maturity date. The difference between the issue price and the face value represents the investor's return. These bonds are ideal for long-term goals where periodic income is not needed.

Example: A zero-coupon bond may be issued at ₹700 and redeemed at ₹1,000 after 10 years. The investor earns ₹300 over 10 years as interest income.

4. Convertible Bonds

Convertible bonds are hybrid securities that offer the benefits of both debt and equity. These bonds give the bondholder the **option to convert** the bond into a **predetermined number of equity shares** of the issuing company, usually at a specific time and conversion price. These are attractive for investors expecting the company's stock price to rise.

Example: A company issues a convertible bond of ₹1,000 that can be converted into 20 shares of the company after 3 years. If the share price rises significantly, converting the bond into shares could yield higher returns.

5. Perpetual Bonds

Perpetual bonds, also known as **consols**, have **no maturity date**. The issuer pays a **fixed coupon forever**, without any obligation to repay the principal. These bonds are riskier than regular bonds and usually offer **higher yields** to attract investors. They are used by institutions that seek long-term capital without the burden of repayment.

Example: A perpetual bond with a face value of ₹1,000 and an annual interest rate of 9% will continue to pay ₹90 every year for as long as the bond exists.

6. Inflation-Indexed Bonds

Inflation-indexed bonds are designed to **protect investors from inflation**. Both the **interest payments and the principal** are adjusted periodically based on an official **inflation index** (like the Consumer Price Index or CPI). These bonds ensure that the real value of returns remains constant despite rising prices.

Example: If the coupon is 4% and inflation is 6%, the effective interest payment is adjusted to reflect inflation, thereby maintaining the purchasing power of the investor.

7. Callable Bonds

Callable bonds give the **issuer the right to redeem the bond early**, before the scheduled maturity date. This feature is usually exercised when **interest rates fall**, allowing the issuer to refinance at lower rates. Since this introduces reinvestment risk for investors, callable bonds typically offer higher coupon rates as compensation.

Example: A 10-year bond may be callable after 5 years. If interest rates drop after 5 years, the issuer may repay the bond early and issue new bonds at a lower rate.

8. Puttable Bonds

Puttable bonds provide the **bondholder with the right to sell the bond back to the issuer** at a predetermined price before maturity. This feature protects investors in case interest rates rise or the issuer's credit quality

declines. Due to this added flexibility, these bonds may offer slightly lower coupon rates compared to non-puttable bonds.

Example: An investor holding a 10-year puttable bond may choose to sell it back to the issuer after 5 years if better investment opportunities are available or if market conditions worsen.

Summary Table

Type	Explanation
Fixed-Rate Bonds	Pay a constant interest (coupon) until maturity.
Floating-Rate Bonds	Coupon varies with benchmark rates.
Zero-Coupon Bonds	No periodic interest; issued at a discount and redeemed at par.
Convertible Bonds	Can be converted into equity shares of the issuer.
Perpetual Bonds	No maturity date; pay interest indefinitely.
Inflation-Indexed Bonds	Interest and principal adjust with inflation index.
Callable Bonds	Can be redeemed early by the issuer.
Puttable Bonds	Can be sold back early by the investor.

4.4 MODELS OF BOND VALUATION

A. Present Value Model (for Fixed-Rate Bonds)

This formula is combination of PV Lumpsum (used finding the one time value of principal amount to be received at the end of the bond period) & Present Value of Annuity(used for finding the present value of the Interest to be received at the end of every year). We can also use table to find the answer.

$$\text{Value of Bond} = \left[Ix \left(\frac{(1+r)^n - 1}{rx(1+r)^n} \right) + Px \left(\frac{1}{(1+r)^n} \right) \right]$$

Where:

I=Interest Amount (Coupon Amount)

P= Principal Amount

r = Discount rate (market rate)

n = Number of years to maturity

B. Zero-Coupon Bond Valuation

The formula is that of present value of lumpsum payment

$$\text{Bond Value} = \frac{F}{(1 + r)^n}$$

Where,

F=Face Value

Only the face value is discounted as there are no intermediate cash flows.

C. Perpetual Bonds (Consol Bonds)

The formula was similar to the present value of perpetuity.

$$\text{Bond Value} = \frac{I}{r}$$

Where,

I = Interest Amount

r = Discount Rate

These bonds pay a constant coupon forever.

4.5 YIELD TO MATURITY (YTM)

Yield to Maturity (YTM) refers to the total return an investor can expect to earn on a bond **if it is held until its maturity date**. It is a measure that combines the bond's **current market price**, the **interest payments** (also known as coupon payments) received regularly, and the **face value** that will be repaid at the end of the bond's life. Essentially, YTM gives the **average annual return** the investor will earn, assuming that all payments are made as scheduled and that the bond is not sold before maturity.

For example, imagine you buy a bond for ₹950, and it pays you ₹50 as interest every year. After 5 years, you will receive ₹1,000 as the principal amount. The Yield to Maturity calculates how much you are earning **each year**, not just from the interest, but also by considering the gain you make when the bond value increases from ₹950 to ₹1,000. This makes YTM a very useful tool for comparing bonds with different interest rates, prices, and maturity periods, as it gives a **realistic picture of the bond's return**.

In short, YTM helps investors understand the **true earning potential** of a bond investment when they plan to keep it until the end.

Formula:

$$\text{YTM} = \frac{I + \frac{\text{R.V.} - \text{N.P.}}{n}}{\frac{\text{R.V.} + \text{N.P.}}{2}}$$

Where,

I = Interest

R.V. = Redemption Value

N.P. = Net Proceeds/Market Value

n = no of years/periods

4.6 DURATION OF BOND

Duration is a measure that tells us **how sensitive a bond's price is to changes in interest rates**. In simple words, it shows **how long it takes, on average, to get back your invested money** in the bond, considering both the interest payments you receive and the final repayment at maturity. While the bond's **maturity** is the exact number of years until it repays the face value, **duration** gives a more accurate picture of the time it takes to recover your full investment.

For example, if you invest in a 10-year bond that pays interest every year, you start getting some of your money back through these payments before the 10 years are up. So, the **duration will be less than 10 years**. Duration is important because it helps investors understand the **risk** of bond investments: **the longer the duration, the more the bond's price will fall if interest rates rise**. In short, bonds with higher duration are **more sensitive to interest rate changes**, while those with shorter duration are less affected.

Thus, duration is not just about time—it's a powerful tool for measuring a bond's exposure to **interest rate risk** and helping investors make smart choices in changing market conditions.

4.7 RELATIONSHIP BETWEEN BOND PRICE AND INTEREST RATE

- Bond prices and interest rates are **inversely related**.
- If market interest rates rise, bond prices fall.
- If market interest rates fall, bond prices rise.

4.8 PRACTICAL SUMS

Illustration 01:

A company issues 1,00,000 9% Bonds with NV ₹ 1,000. It has Coupon rate of 9% and duration of 8 years.

Requirement:

- a. What will be the value of the bond, if the expectation of an investor is 11%.
- b. Will you purchase the bond if it is currently listed at ₹ 890 and also comment on the valuation of the bond in market.

- c. Will your answer change in 'b.' above if the value of the bond in the market is ₹ 910.

Solution 01

a. Statement Showing Calculation of Value of the Bond.

Year	Coupon Rate @ 9%	Discounting Factor @ 11%	DCF
1	90.00	0.9009	81.08
2	90.00	0.8116	73.04
3	90.00	0.7312	65.81
4	90.00	0.6587	59.28
5	90.00	0.5935	53.42
6	90.00	0.5346	48.11
7	90.00	0.4817	43.35
8	1,090.00	0.4339	472.95
			897.05

$$\text{Coupon} = 1,000 \times 9\% = 90$$

b. Yes, we will purchase the Bond, if it is valued at ₹ 890, since it is undervalued in the market.

c. If the market value of the Bond is ₹ 910, we will not purchase the bond, since it is overvalued in the market.

Illustration 02:

A company issues 8,00,000 15% Bonds with N.V. ₹ 1,000 with the duration of 5 years. What shall be the value of the bond, if the expectation of an investor is 13%.

Further, Will you purchase the bond if it is currently listed at ₹ 1,000 and also comment on the valuation of the bond in market.

Will your answer change if the value of the bond in the market is ₹ 1,150.

Solution 02:

Year	Coupon Rate @ 15%	Discounting Factor @ 13%	DCF
1	150.00	0.8850	132.75
2	150.00	0.7831	117.47
3	150.00	0.6931	103.97
4	150.00	0.6133	92.00
5	1,150.00	0.5428	624.22
			1,070.40

$$\text{Coupon} = 1,000 \times 15\% = 150$$

Illustration 03:

A company issues 10,00,000 14% Bonds with N.V. ₹ 10,000 with the duration of 5 years. What shall be the value of the bond, if the expectation of an investor is 12%.

Note: Interest is credited half yearly.

Solution 03:

Period	Coupon Rate @ 7%	Discounting Factor @ 6%	DCF
1	700.00	0.9434	660.38
2	700.00	0.8900	623.00
3	700.00	0.8396	587.72
4	700.00	0.7921	554.47
5	700.00	0.7473	523.11
6	700.00	0.7050	493.50
7	700.00	0.6651	465.57
8	700.00	0.6274	439.18
9	700.00	0.5919	414.33
10	10,700.00	0.5584	5,974.88
			10,736.14

Since Half Yearly = Time Period will be Twice a year, hence

$$\text{Coupon Rate} = \frac{14}{2} = 7$$

$$\text{Discounting Factor} = \frac{12}{2} = 6$$

Time Duration = 5 Years = 5 x 2 = 10 Periods.

Illustration 04:

Mad. Ltd. has issued fully convertible debentures with face value of ₹ 1,000 with coupon rate of 12% p.a. which will convert in 25 equity shares of ₹ 10 each at the end of 9 years. Find out the value of debentures if the expected rate of return of an investor is 10% and expected market price of one share after 9 years is ₹ 48.

Solution 04:

Statement Showing Calculation of the Present Value of the Bond

Year	Coupon Rate @ 12.00	Discounting Factor @ 10.00	DCF
1	120.00	0.9091	109.09
2	120.00	0.8264	99.17
3	120.00	0.7513	90.16
4	120.00	0.6830	81.96
5	120.00	0.6209	74.51
6	120.00	0.5645	67.74
7	120.00	0.5132	61.58
8	120.00	0.4665	55.98
9	1,320.00	0.4241	559.81
			1,200.00

Year 9: [Interest + R.V. of Debenture]; [120 + (25 Equity Shares x 48(MPS))] = ₹ 1,320

Valuation of Bonds

Illustration 5:

Sanjana Ltd. has issued a debenture with face value of ₹ 10,000 bearing interest @ 15% p.a. payable half yearly maturing after 5 years at par. The expected rate of return of an investor is 12%. Should the investor buy the debentures if the current price of debenture is ₹ 10,600?

Solution 05:

Statement Showing Calculation of the Present Value of the Bond

Year	Coupon Rate @ 7.50	Discounting Factor @ 6.00	DCF
1	750.00	0.9434	707.55
2	750.00	0.8900	667.50
3	750.00	0.8396	629.70
4	750.00	0.7921	594.08
5	750.00	0.7473	560.48
6	750.00	0.7050	528.75
7	750.00	0.6651	498.83
8	750.00	0.6274	470.55
9	750.00	0.5919	443.93
10	10,750.00	0.5584	6,002.80
			11,104.15

Illustration 06:

Cairo Ltd.'s bond with a par value of ₹ 500 is currently traded at ₹ 435. The coupon rate is 12% and it has a maturity period of 7 years. What is yield to maturity?

Solution 06:

$$YTM = \frac{I + \frac{R.V. - N.P.}{n}}{\frac{R.V. + N.P.}{2}}$$

$$YTM = \frac{60 + \frac{500 - 435}{7}}{\frac{500 + 435}{2}}$$

$$YTM = \frac{60 + \frac{65}{7}}{\frac{935}{2}}$$

$$YTM = \frac{60 + 9.29}{717.5}$$

$$YTM = \frac{69.29}{467.5}$$

$$YTM = 14.82\%$$

Illustration 07:

What is YTM of each bond? Which bond will you recommend for investment?

Bond	Coupon Rate	Maturity	Price/ ₹ 100 Par Value
Bond X	11%	10 years	₹ 76
Bond Y	12%	7 years	₹ 69

Solve by Yourself:

Answer:

Bond	YTM
Bond X	15.23%
Bond Y	19.43%

Confirm your Answer

$YTM = \frac{I + \frac{R.V. - N.P.}{n}}{\frac{R.V. + N.P.}{2}}$ $YTM = \frac{11 + \frac{100 - 76}{10}}{\frac{100 + 76}{2}}$ $YTM = \frac{11 + \frac{24}{10}}{\frac{176}{2}}$ $YTM = \frac{11 + 2.4}{138}$ $YTM = \frac{13.4}{88}$ $YTM = 15.23\%$	$YTM = \frac{I + \frac{R.V. - N.P.}{n}}{\frac{R.V. + N.P.}{2}}$ $YTM = \frac{12 + \frac{100 - 69}{7}}{\frac{100 + 69}{2}}$ $YTM = \frac{12 + \frac{31}{7}}{\frac{169}{2}}$ $YTM = \frac{12 + 4.43}{134.5}$ $YTM = \frac{16.43}{84.5}$ $YTM = 19.44\%$
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Illustration 08:

A Bond of ₹ 1,000 has a coupon rate of 8% per annum and Maturity period of 3 years. The bond is currently selling at ₹ 910. What is the yield to maturity in the investment of this bond?

Solution 08:

$$YTM = \frac{I + \frac{R.V. - N.P.}{n}}{\frac{R.V. + N.P.}{2}}$$

$$YTM = \frac{80 + \frac{1000 - 910}{3}}{\frac{1000 + 910}{2}}$$

$$YTM = \frac{80 + \frac{90}{3}}{\frac{1910}{2}}$$

$$YTM = \frac{80 + 30}{1455}$$

$$YTM = \frac{110}{955}$$

$$YTM = 11.52\%$$

Illustration 09:

A bond with face value ₹ 1,000 yields 6% returns with maturity value of 4 years. Currently the market price of the bond is 840. Calculate the yield to maturity investment in the bond.

Try Yourself:

Answer:

$$YTM = \frac{I + \frac{R.V. - N.P.}{n}}{\frac{R.V. + N.P.}{2}}$$

$$YTM = \frac{60 + \frac{1000 - 840}{4}}{\frac{1000 + 840}{2}}$$

$$YTM = \frac{60 + \frac{160}{4}}{\frac{1840}{2}}$$

$$YTM = \frac{60 + 40}{1420}$$

$$YTM = \frac{100}{920}$$

$$YTM = 10.87\%$$

Illustration 10:

Calculate the duration of Bond from the following details.

Face Value = ₹ 1,000

Coupon Rate (payable annually) = 13 %

Years to Maturity = 5 years

Redemption value = ₹ 1,000

Current Market Price = ₹ 1,036

Yield To Maturity = 12%

Solution 10:

Statement showing calculation of Duration of Bond				
1	2	3	4 = 2 x 3	5 = 1 x 4
Year	Coupon Rate @ 13.00	Discounting Factor @ 12.00	PVCF	Year x PVCF
1	130.00	0.8929	116.08	116.08
2	130.00	0.7972	103.64	207.27
3	130.00	0.7118	92.53	277.60
4	130.00	0.6355	82.62	330.46
5	1,130.00	0.5674	641.16	3,205.81
			1,036.02	4,137.22

$$\text{Duration of Bond} = \frac{\sum \text{Year x PVCF}}{\sum \text{PVCF}}$$

$$\frac{4,137.22}{1,036.02}$$

$$\text{Duration of Bond} = 3.99 \text{ Years}$$

Illustration 11:

The following data is available for a bond. Face value is ₹ 100, Coupon rate is 15%, years to maturity is 8 years, and redemption value is ₹ 100. YTM is 18%. Calculate duration of bond.

Solution 11:

Statement showing calculation of Duration of Bond				
1	2	3	4 = 2 x 3	5 = 1 x 4
Year	Coupon Rate @ 15.00	Discounting Factor @ 18.00	PVCF	Year x PVCF
1	15.00	0.8475	12.71	12.71
2	15.00	0.7182	10.77	21.55
3	15.00	0.6086	9.13	27.39
4	15.00	0.5158	7.74	30.95
5	15.00	0.4371	6.56	32.78
6	15.00	0.3704	5.56	33.34
7	15.00	0.3139	4.71	32.96
8	115.00	0.2660	30.59	244.72
			87.76	436.39

$$\text{Duration of Bond} = \frac{\sum \text{Year} \times \text{PVCF}}{\sum \text{PVCF}}$$

Valuation of Bonds

$$\frac{436.39}{87.76}$$

Duration of Bond = 4.97 Years

4.9 SUMMARY

- Bond valuation involves determining the present value of future cash flows.
- Various models apply depending on the type of bond.
- YTM helps investors evaluate bond performance.
- Understanding these concepts is essential for financial decision-making.

Self-Check Questions

A.

1. What is the main purpose of bond valuation?
 - A. To determine company profit
 - B. To assess stock value
 - C. To find the present value of future bond cash flows
 - D. To measure bondholder wealth

2. Which type of bond **does not** pay periodic interest?
 - A. Fixed-Rate Bond
 - B. Zero-Coupon Bond
 - C. Floating-Rate Bond
 - D. Callable Bond

3. A bond's **Yield to Maturity (YTM)** represents:
 - A. The fixed coupon rate
 - B. The total return expected if held to maturity
 - C. The maturity period
 - D. The bond's face value

4. Which of the following bonds provides the issuer with the right to redeem before maturity?
 - A. Convertible Bond
 - B. Puttable Bond
 - C. Callable Bond
 - D. Zero-Coupon Bond
5. A **perpetual bond** is characterized by:
 - A. No interest payments
 - B. Maturity after 10 years
 - C. Interest payments continuing indefinitely
 - D. Fixed short-term maturity

Answers to MCQs

1. C. To find the present value of future bond cash flows
2. B. Zero-Coupon Bond
3. B. The total return expected if held to maturity
4. C. Callable Bond
5. C. Interest payments continuing indefinitely

State whether the following statements are True or False

1. A floating-rate bond pays a fixed rate of interest.
2. Yield to Maturity (YTM) includes both interest and capital gain/loss.
3. Zero-coupon bonds are always issued at a premium.
4. The value of a bond falls when interest rates rise.
5. Duration measures the bond's maturity period only.
6. Callable bonds are favourable to investors when interest rates rise.
7. The present value of all future cash flows equals the bond's value.
8. Perpetual bonds have no maturity date.
9. Inflation-indexed bonds protect against rising prices.
10. A bond sold at par has its coupon rate equal to the market rate.

Answers to True / False

1. False
2. True
3. False
4. True

5. False
6. False
7. True
8. True
9. True
10. True

C. Match the Pair

3. Match the Pairs – 10 Items

A

1. Zero-Coupon Bond
2. Callable Bond
3. YTM
4. Duration
5. Convertible Bond
6. Floating-Rate Bond
7. Inflation-Indexed Bond
8. Perpetual Bond
9. Puttable Bond
10. Bond Valuation

B

- a. Redeemable before maturity by issuer
- b. Converts to equity
- c. Pays no interest
- d. Measures interest rate sensitivity
- e. Return if held to maturity
- f. Adjusts with benchmark rates
- g. Adjusts with price levels
- h. No maturity date
- i. Investor can redeem early
- j. PV of future cash flows

Answer Key:

1-c, 2-a, 3-e, 4-d, 5-b, 6-f, 7-g, 8-h, 9-i, 10-j

D. Brief Answer Questions

1. What is a bond?
2. What is the meaning of Yield to Maturity?
3. State the formula for bond valuation.
4. What are zero-coupon bonds?
5. What is the importance of duration in bond investing?
6. How is a floating-rate bond different from a fixed-rate bond?
7. What is a perpetual bond?
8. Explain callable and puttable bonds.

9. What factors affect bond prices?
10. Define inflation-indexed bonds.

E. Short Notes (Write in 100–150 words)

1. Fixed-Rate Bonds
2. Zero-Coupon Bonds
3. Yield to Maturity (YTM)
4. Bond Duration
5. Convertible Bonds
6. Callable Bonds
7. Puttable Bonds
8. Perpetual Bonds
9. Bond Valuation Formula
10. Factors Affecting Bond Prices

F. Unsolved illustrations

1. A 5-year bond has a face value of ₹1,000 and pays a 10% annual coupon. If the market rate is 8%, calculate the value of the bond.
2. A bond with a face value of ₹1,000 pays ₹120 annually for 4 years. If the market rate is 9%, calculate the current price of the bond.
3. A bond has a face value of ₹1,000, 3 years to maturity, and an annual coupon of ₹70. If the market interest rate is 10%, find the bond's value.
4. A perpetual bond pays ₹150 annually. If the required rate of return is 6%, calculate the bond's value.
5. A zero-coupon bond with face value ₹2,000 matures in 5 years. If the market interest rate is 7%, calculate its current value.
6. A bond with a face value of ₹1,000 is priced at ₹970. It pays an annual coupon of ₹80 and matures in 3 years. Find the approximate YTM.
7. A bond with face value ₹1,000 and annual interest of ₹100 is currently priced at ₹1,080. It matures in 4 years. Calculate its approximate YTM.
8. A 5-year bond pays ₹90 annually, face value ₹1,000, current market price ₹920. Find the YTM.



FINANCIAL RATIO – I

Unit Structure:

5.1 Introduction

5.2 Need for Financial Ratios

5.3 Advantages & Disadvantages of Financial Ratios

5.4 Types of Financial Ratios

5.5. Question

5.1 INTRODUCTION

Financial ratio analysis is a fundamental tool in the evaluation of a company's financial health, performance, and overall stability. It involves the use of quantitative data from financial statements to assess various aspects of an organization's operations and financial position. By comparing numerical values from balance sheets, income statements, and cash flow statements, analysts, investors, and stakeholders can gain insights into a company's profitability, liquidity, solvency, and efficiency.

The primary objective of financial ratio analysis is to facilitate decision-making by providing a comprehensive understanding of a company's financial performance over time and in comparison, to industry benchmarks. This analysis enables stakeholders to identify strengths, weaknesses, and potential risks, thus aiding in strategic planning and investment decisions.

Financial ratios are typically categorized into several key groups, each serving a distinct purpose:

1. **Liquidity Ratios:** Measure the company's ability to meet short-term obligations (e.g., current ratio, quick ratio).
2. **Profitability Ratios:** Assess the company's ability to generate profit relative to revenue, assets, or equity (e.g., net profit margin, return on assets, return on equity).
3. **Solvency Ratios:** Evaluate the company's capacity to meet long-term obligations (e.g., debt-to-equity ratio, interest coverage ratio).
4. **Efficiency Ratios:** Indicate how effectively the company utilizes its assets and liabilities (e.g., inventory turnover, accounts receivable turnover).

- 5. Market Value Ratios:** Reflect the company's stock market performance and investor perceptions (e.g., price-to-earnings ratio, earnings per share).

Conducting financial ratio analysis provides valuable insights into the company's operational effectiveness, financial health, and future growth potential. It serves as a critical component of financial analysis for internal management, investors, creditors, and other stakeholders. By understanding and applying financial ratios, decision-makers can make informed choices that align with the organization's strategic objectives.

5.2 NEED FOR FINANCIAL RATIOS

Financial ratios play a pivotal role in the comprehensive evaluation of a company's financial standing. They offer a systematic method to interpret raw financial data, making it easier to assess a company's performance, stability, and potential for growth. These ratios are essential for various stakeholders, including management, investors, creditors, and regulators, each of whom relies on them to make informed decisions.

For management, financial ratios provide insights into operational efficiency, profitability, and cash flow management, enabling better strategic planning and resource allocation. Investors use these ratios to evaluate the company's profitability, risk levels, and overall financial health before making investment decisions. Creditors assess the company's liquidity and solvency ratios to determine its ability to repay loans and meet financial obligations.

Moreover, financial ratios are crucial for benchmarking performance against industry standards and competitors. They help identify strengths and weaknesses, guiding corrective actions and strategic improvements. Additionally, regulators and analysts use these ratios to monitor compliance with financial regulations and detect signs of financial distress.

Overall, financial ratios serve as indispensable tools for assessing financial performance, supporting decision-making, and fostering transparency and accountability in business operations.

Objectives:

After studying financial ratios, the students will be able to:

- **Interpret Financial Health:**
 - Understand the overall financial position of a company through profitability, liquidity, solvency, and efficiency ratios.
- **Profitability Analysis:**
 - Assess how effectively a company generates profit from its operations (e.g., Net Profit Margin, Return on Assets, Return on Equity).

- **Liquidity Assessment:**
 - Evaluate the company's ability to meet short-term obligations (e.g., Current Ratio, Quick Ratio).
- **Solvency and Leverage:**
 - Analyze the company's long-term financial stability and debt management (e.g., Debt-to-Equity Ratio, Interest Coverage Ratio).
- **Efficiency and Activity Ratios:**
 - Measure how efficiently the company utilizes its assets (e.g., Inventory Turnover, Accounts Receivable Turnover).
- **Market Performance:**
 - Understand market-based ratios like Earnings Per Share (EPS), Price-to-Earnings (P/E) Ratio, and Dividend Yield.
- **Comparative Analysis:**
 - Perform benchmarking by comparing ratios with industry standards and competitors.
- **Trend Analysis:**
 - Identify patterns in financial ratios over time to predict future performance.
- **Decision-Making:**
 - Use financial ratios to support investment, credit, and management decisions.
- **Limitations Awareness:**
 - Recognize the limitations of financial ratios, such as accounting methods, inflation effects, and non-quantifiable factors.
- These competencies will help students develop critical thinking skills and practical insights for analyzing financial statements in both academic and professional contexts.

5.3 ADVANTAGES & DISADVANTAGES OF FINANCIAL RATIOS

Advantages of Financial Ratios

Financial ratios offer numerous advantages in analyzing a company's performance and financial health. Firstly, they **simplify complex financial data** into easily understandable metrics, making it easier to evaluate performance. Ratios allow for **comparative analysis** across companies, industries, and time periods, helping stakeholders assess how a company

stands against competitors or industry benchmarks. They also facilitate **trend analysis**, enabling investors and managers to identify patterns and predict future performance.

Additionally, ratios can serve as **early warning indicators**, signaling financial distress or operational inefficiencies before they become critical issues. Financial ratios are widely used in **decision-making processes**, helping investors, creditors, and management make informed choices about investments, lending, and business strategies. Moreover, they provide a standardized method for measuring profitability, liquidity, solvency, and efficiency, promoting consistency in financial evaluations. Overall, financial ratios are essential tools for evaluating financial performance, enhancing transparency, and supporting strategic planning.

Disadvantages of Financial Ratios

Despite their benefits, financial ratios have several limitations. One major drawback is that they **depend on the accuracy of financial statements**, which may be influenced by accounting policies or manipulation. Ratios can also be **misleading without context**, as they do not consider external factors like market conditions or inflation. Additionally, they often provide a **snapshot view** rather than a comprehensive picture of long-term performance. Different industries may have varying standards for certain ratios, making **cross-industry comparisons unreliable**.

Moreover, financial ratios do not account for **qualitative factors** such as management quality, brand value, or customer satisfaction. Ratios like the current ratio can be distorted by temporary fluctuations in assets or liabilities, leading to **misinterpretations**. Lastly, excessive reliance on financial ratios without considering broader financial and economic data may result in **poor decision-making**. Therefore, while financial ratios are useful, they should always be used in conjunction with other financial and non-financial information.

Financial ratios are critical tools for analyzing the financial performance of a company. They help stakeholders evaluate various aspects of a company's financial health. Below is an in-depth explanation of the major types of financial ratios:

5.4 TYPES OF FINANCIAL RATIOS

1. Liquidity Ratios

Liquidity ratios measure a company's ability to pay off its short-term obligations using its current assets. These ratios indicate the company's financial flexibility and short-term stability.

- **Current Ratio:**

Formula:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

This ratio shows the company's ability to cover its short-term liabilities with its short-term assets. A ratio above 1 indicates good liquidity, while below 1 may signal liquidity issues.

- **Quick Ratio (Acid-Test Ratio):**

Formula:

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$$

This ratio excludes inventory from current assets, providing a more stringent measure of liquidity. It is useful when inventory is not easily converted into cash.

- **Cash-Ratio:**

Formula:

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Cash Equivalents}}{\text{Current Liabilities}}$$

This ratio measures the company's ability to pay off liabilities using only cash or cash equivalents.

2. Profitability Ratios

Profitability ratios assess how well a company generates profit from its operations. They reflect the company's overall efficiency and earning capability.

- **Gross Profit Margin:**

Formula:

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Revenue}} \times 100$$

This ratio shows the percentage of revenue remaining after deducting the cost of goods sold. A higher ratio indicates better efficiency in producing goods or services.

- **Net Profit Margin:**

Formula:

$$\text{Net Profit Margin} = \frac{\text{Net Profit}}{\text{Revenue}} \times 100$$

It represents the percentage of profit remaining after all expenses are deducted from revenue. This ratio indicates how much of each dollar earned translates into profit.

- **Return on Assets (ROA):**

Formula:

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}} \times 100$$

This measures how efficiently the company utilizes its assets to generate profit.

- **Return on Equity (ROE):**

Formula:

$$\text{ROE} = \frac{\text{Net Income}}{\text{Shareholder's Equity}} \times 100$$

This ratio shows how effectively the company generates returns for its shareholders.

3. Efficiency (Activity) Ratios

Efficiency ratios measure how well a company utilizes its assets and liabilities to generate sales or revenue.

- **Inventory Turnover Ratio:**

Formula:

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

This ratio indicates how quickly inventory is sold and replaced. A high ratio suggests efficient inventory management.

- **Accounts Receivable Turnover Ratio:**

Formula:

$$\text{Accounts Receivable Turnover} = \frac{\text{Net Credit Sales}}{\text{Average Accounts Receivable}}$$

It shows how efficiently the company collects payments from customers. A higher ratio means faster collection.

- **Asset Turnover Ratio:**

Formula:

$$\text{Asset Turnover} = \frac{\text{Net Sales}}{\text{Total Assets}}$$

This ratio indicates how efficiently the company uses its assets to generate sales.

4. Solvency (Leverage) Ratios

Solvency ratios evaluate a company's long-term financial stability and its ability to meet long-term obligations.

- **Debt-to-Equity Ratio:**

Formula:

$$\text{Debt-to-Equity} = \frac{\text{Total Debt}}{\text{Shareholders' Equity}}$$

This ratio shows the proportion of debt used to finance the company's assets compared to shareholders' equity. A higher ratio indicates greater financial risk.

- **Interest Coverage Ratio:**

Formula:

$$\text{Interest Coverage} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

This ratio measures how easily a company can pay interest on outstanding debt. A higher ratio signifies better financial health.

- **Debt Ratio:**

Formula:

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

It shows the percentage of assets financed by debt.

5. Market Performance Ratios

Market performance ratios evaluate the company's performance from the investor's perspective.

- **Earnings Per Share (EPS):**

Formula:

$$\text{EPS} = \frac{\text{Net Income}}{\text{Total Outstanding Shares}}$$

This ratio represents the portion of profit allocated to each outstanding share of stock.

- **Price-to-Earnings (P/E) Ratio:**

Formula:

$$\text{P/E Ratio} = \frac{\text{Market Price per Share}}{\text{Earnings per Share}}$$

It indicates how much investors are willing to pay per dollar of earnings.

- **Dividend Yield:**

Formula:

$$\text{Dividend Yield} = \frac{\text{Dividend per Share}}{\text{Market Price per Share}} \times 100$$

This ratio shows the return on investment from dividends alone.

6. Coverage Ratios

Coverage ratios assess a company's ability to cover fixed obligations like interest payments or lease expenses.

- **Interest Coverage Ratio:**

Formula:

$$\text{Interest Coverage} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

This ratio indicates how easily the company can meet interest payments.

- **Debt Service Coverage Ratio (DSCR):**

Formula:

$$\text{DSCR} = \frac{\text{Net Operating Income}}{\text{Total Debt Service}}$$

It measures the company's ability to cover total debt obligations.

Conclusion

Financial ratios play a vital role in evaluating a company's financial performance from different perspectives. Each type of ratio provides unique insights into a company's operational efficiency, profitability, liquidity, and financial stability. However, while these ratios offer valuable information, they must be interpreted carefully alongside other financial data, market conditions, and qualitative factors. A comprehensive analysis combining multiple ratios is essential for making well-informed business decisions.

- **APPLICABILITY OF FINANCIAL RATIOS**

Ratios are indispensable in financial and FX analysis, providing critical insights into profitability, risk, efficiency, and valuation. Their applications range from:

- **Corporate decision-making** (capital structure, liquidity, efficiency).
- **Investment analysis** (valuation, return performance, solvency).

- **FX trading strategies** (arbitrage detection, risk management, exchange rate efficiency).

1. Financial Analysis & Decision-Making

Financial ratios provide insight into a company's health, profitability, and risk profile. Investors, analysts, and managers use these metrics to make informed decisions.

A. Performance Measurement

- **Return on Equity (ROE) = Net Income / Shareholder's Equity**
 - Measures how effectively a company generates profit from shareholders' investments.
 - Higher ROE suggests efficient use of equity; low ROE may indicate poor management.
- **Return on Assets (ROA) = Net Income / Total Assets**
 - Assesses a company's ability to generate profits from its total assets.
 - Useful for comparing firms with different capital structures.
- **Return on Capital Employed (ROCE) = EBIT / Capital Employed**
 - Evaluates profitability relative to total capital deployed in the business.
 - More comprehensive than ROE since it accounts for both debt and equity.

B. Liquidity & Solvency Assessment

- **Current Ratio = Current Assets / Current Liabilities**
 - Indicates a company's ability to cover short-term liabilities with short-term assets.
 - A ratio >1 suggests good liquidity; too high may indicate inefficient use of assets.
- **Quick Ratio (Acid-Test) = (Current Assets - Inventory) / Current Liabilities**
 - Stricter liquidity measure that excludes inventory, which may not be quickly converted to cash.
- **Interest Coverage Ratio = EBIT / Interest Expense**
 - Measures a company's ability to meet interest payments.
 - A low ratio signals financial distress, while a high ratio indicates strong debt coverage.

C. Valuation & Investment Decisions

- **Price-to-Earnings (P/E) Ratio = Market Price per Share / Earnings per Share (EPS)**
 - Indicates how much investors are willing to pay per dollar of earnings.
 - High P/E suggests growth expectations; low P/E may indicate undervaluation.
- **Enterprise Value to EBITDA (EV/EBITDA) = (Market Cap + Debt - Cash) / EBITDA**
 - Used to assess a company's overall valuation, accounting for debt and cash.
 - Lower EV/EBITDA ratios suggest undervaluation compared to peers.
- **Dividend Yield = Annual Dividend per Share / Market Price per Share**
 - Helps income-focused investors assess cash returns from stock investments.

2. FX Trading & Arbitrage Strategies

Foreign exchange (FX) traders and institutional investors use specialized ratios to identify arbitrage opportunities, assess risk, and optimize trading strategies.

A. Identifying Arbitrage Opportunities

- **Triangular Arbitrage Ratio = Cross Rate / Implied Cross Rate**
 - Used to detect mispricing across three currency pairs in triangular arbitrage.
 - A ratio $\neq 1$ suggests a profit opportunity by exploiting price discrepancies.
- **Covered Interest Rate Parity (CIRP) Ratio = $(1 + \text{Domestic Interest Rate}) / (1 + \text{Foreign Interest Rate}) \times (\text{Spot Rate} / \text{Forward Rate})$**
 - Ensures that interest rate differentials are reflected in FX forward contracts.
 - If CIRP is violated, arbitrageurs can profit by borrowing in one currency and investing in another.

B. Measuring Exchange Rate Efficiency

Financial Ratio – I

- **Real Exchange Rate (RER) = (Nominal Exchange Rate × Domestic Price Level) / Foreign Price Level**
 - Determines whether a currency is overvalued or undervalued in purchasing power terms.
 - A higher RER suggests overvaluation, while a lower RER indicates undervaluation.
- **Uncovered Interest Rate Parity (UIRP) Ratio = (1 + Domestic Interest Rate) / (1 + Foreign Interest Rate) - Expected Spot Rate Change**
 - Helps traders anticipate currency movements based on interest rate differentials.

C. Risk Management in FX Trading

- **Value-at-Risk (VaR) = Portfolio Exposure × Expected Volatility × Z-Score (Confidence Level)**
 - Estimates potential portfolio losses due to FX fluctuations.
 - Traders use VaR to set stop-loss levels and capital requirements.
- **Sharpe Ratio = (Portfolio Return - Risk-Free Rate) / Standard Deviation of Returns**
 - Measures risk-adjusted return; a higher Sharpe ratio indicates better risk-adjusted performance.
- **Hedge Ratio = Hedge Position / Exposure**
 - Used in currency hedging to determine the optimal amount of hedge needed against FX risk.

3. Corporate Strategy & Risk Management

A. Capital Structure Decisions

- **Debt-to-Equity Ratio = Total Debt / Shareholder's Equity**
 - Indicates a company's reliance on debt financing.
 - Higher values suggest increased financial risk but potential for higher returns.
- **Leverage Ratio = Total Debt / Total Assets**
 - Measures the proportion of a company's assets financed by debt.
 - Higher leverage may increase returns but also raises financial distress risk.

B. Operational Efficiency

- **Asset Turnover Ratio = Revenue / Total Assets**
 - Shows how efficiently a company generates revenue from its assets.
 - Higher ratios indicate better asset utilization.
- **Inventory Turnover Ratio = Cost of Goods Sold (COGS) / Average Inventory**
 - Measures how quickly inventory is sold and replaced.
 - High turnover suggests efficient inventory management, while low turnover may indicate overstocking.

C. Mergers & Acquisitions (M&A) Valuation

- **Enterprise Value (EV) Multiples = EV / EBITDA or EV / Revenue**
 - Used to compare acquisition targets across industries.
 - Lower multiples suggest undervaluation, making a company an attractive acquisition.
- **Goodwill Ratio = Goodwill / Total Assets**
 - Assesses the impact of intangible assets acquired in M&A deals.
 - A high ratio may indicate potential overpayment for acquisitions.

5.5. QUESTION

5.5.1 State True or False:

1. A high Current Ratio always indicates a company's financial strength.
2. Return on Assets (ROA) measures how efficiently a company generates profit using its assets.
3. A negative Debt-to-Equity Ratio means a company has no debt.
4. The Price-to-Earnings (P/E) Ratio helps investors determine if a stock is overvalued or undervalued.
5. A low Gross Profit Margin means a company is highly profitable.
6. Interest Coverage Ratio below 1 indicates financial distress.
7. A company with a high Asset Turnover Ratio efficiently uses its assets to generate revenue.
8. The Quick Ratio is always higher than the Current Ratio.
9. An increasing Debt-to-Equity Ratio always means financial trouble.

10. A declining Net Profit Margin suggests lower profitability.

Financial Ratio – I

1. False: A very high current ratio may indicate inefficiency, as excess cash or inventory is not being used productively.
2. True: ROA shows how well a company converts its assets into net income.
3. False: A negative ratio indicates negative equity, often due to accumulated losses exceeding assets.
4. True: A high P/E may suggest overvaluation, while a low P/E could indicate undervaluation.
5. False: A low gross margin suggests high production costs relative to revenue, reducing profitability.
6. True: If EBIT is less than interest expenses, the company struggles to cover its debt obligations.
7. True: A high ratio indicates strong asset utilization and sales efficiency.
8. False: The Quick Ratio excludes inventory, making it equal to or lower than the Current Ratio.
9. False: Higher debt can boost returns if used wisely; financial distress depends on repayment ability.
10. True: Lower margins indicate rising costs or reduced pricing power, hurting profits.

5.5.2. Answer the following:

1. Why are financial ratios important in business analysis?
2. What does the Current Ratio tell us about a company's liquidity?
3. How does the Debt-to-Equity Ratio impact financial stability?
4. Why is the Return on Equity (ROE) ratio important for investors?
5. What does the Gross Profit Margin tell us about a company's pricing strategy?
6. How can the Interest Coverage Ratio indicate financial distress?
7. What does the Asset Turnover Ratio reveal about a company's efficiency?
8. Why is the Price-to-Earnings (P/E) Ratio important in stock valuation?



FINANCIAL RATIOS - II

Unit Structure:

6.1 Objective

6.2. Sums

6.1. OBJECTIVE

When solving financial ratio problems, the learning objectives typically include:

1. **Understanding Financial Ratios** – Define and explain key financial ratios, such as liquidity, profitability, solvency, and efficiency ratios.
2. **Calculating Ratios** – Accurately compute financial ratios using given financial statements (e.g., balance sheet, income statement).
3. **Interpreting Ratios** – Analyze the meaning of each ratio and what it indicates about a company's financial health.
4. **Comparing Performance** – Use financial ratios to compare a company's performance over time or against industry benchmarks.
5. **Identifying Strengths and Weaknesses** – Assess financial strengths and weaknesses to support decision-making.
6. **Applying Ratios to Decision-Making** – Use financial ratio analysis to make informed business or investment decisions.
7. **Understanding Limitations** – Recognize the limitations of financial ratios and the importance of considering other qualitative factors.

6.2. SUMS

You are required to calculate the following:

- a) Working capital turnover,
- b) Fixed assets turnover,
- c) Capital turnover. The information available is as under:

CapitalemployedRs.4,00,000

Current assets Rs.2,00,000; Current liabilities Rs.40,000 Net
fixed assets Rs.2,50,000; Sales Rs.5,00,000

Solution:**1. Working capital turnover ratio:**

Sales/ Working capital

Sales: 500000 and Working capital = Current assets – Current liabilities

= 200000 – 40000 = 160000

Working Capital Turnover ratio = 500000 / 160000 = **3.125 Times****2. Fixed assets turnover ratio:**F.A Turnover ratio = Sales / Fixed Assets
Sales 500000 and Net F.A 250000= 500000 / 250000 = **2 times****3. Capital turnover ratio**

Sales/ Capital Employed

Sales = 500000; and capital employed 400000

Capital Turnover Ratio = 500000 / 400000 = **1.25 times****Problem-1**

The following Trading and Profit and Loss Account of Fantasy Ltd. for the year 31-3-2000 is given below:

Particular	Rs.	Particular	Rs.
To Opening Stock	76,250	By Sales	5,00,000
“Purchases	3,15,250	By Closing stock	98,500
“Carriage and Freight	2,000		
“Wages	5,000		
“Gross Profit b/d	<u>2,00,000</u>		
	<u>5,98,500</u>		<u>5,98,500</u>
To Administration expenses	1,01,000	By Gross Profit b/d	2,00,000
“Selling and Dist. Expenses	12,000	“Non-operating incomes:	
“Non-operating expenses	2,000	“Interest on Securities	1,500
“Financial Expenses	7,000	“Dividend on shares	3,750
Net Profit c/d	<u>84,000</u>	“Profit on sale of shares	<u>750</u>
	2,06,000		2,06,000

Calculate:

1. Gross Profit Ratio 2. Expenses Ratio 3. Operating Ratio 4. Net Profit Ratio

5. Operating (Net) Profit Ratio 6. Stock Turnover Ratio.

$$\begin{aligned} \text{Solution-1. Gross Profit Margin} &= \left\{ \frac{\text{Gross profit}}{\text{Sales}} \right\} \times 100 \\ &= \left\{ \frac{2,00,000}{5,00,000} \right\} \times 100 \\ &= 40\% \end{aligned}$$

$$\begin{aligned} 2. \text{ Expenses Ratio} &= \frac{\text{Op. Expenses}}{\text{Net Sales}} \times 100 \\ &= (1,13,000 / 5,00,000) \times 100 \\ &= 22.60\% \\ &= 22.60\% \end{aligned}$$

$$\begin{aligned} 3. \quad \text{Operating Ratio} &= \frac{\text{Cost of goods sold} + \text{Op. Expenses}}{\text{Net Sales}} \times 100 \\ &= \frac{3,00,000 + 1,13,000}{5,00,000} \times 100 \\ &= 82.60\% \end{aligned}$$

Cost of Goods sold = Op. stock + purchases + carriage and Freight + wages – Closing Stock

$$= 76,250 + 315,250 + 2,000 + 5,000 - 98,500$$

$$= \text{Rs. } 3,00,000$$

$$\begin{aligned} 4. \quad \text{Net Profit Ratio} &= \frac{\text{Net Profit}}{\text{Net Sales}} \times 100 \\ &= \frac{84,000}{5,00,000} \times 100 \\ &= 16.8\% \end{aligned}$$

$$5. \quad \text{Operating Profit Ratio} = \frac{\text{Op. Profit}}{\text{Net Sales}} \times 100$$

Operating Profit=Sales–(Op. Exp.+Admin Exp.)

Financial Ratio – II

$$\frac{87,000}{5,00,000} \times 100$$

$$= 17.40\%$$

6. Stock Turnover Ratio = $\frac{\text{Cost of goods sold}}{\text{Avg. Stock}}$

$$\frac{3,00,000}{87,375}$$

$$= 3.43 \text{ times}$$

Problem-2

The Balance Sheet of Punjab Auto Limited as on 31-12-2002 was as follows:

Particular	Rs.	Particular	Rs.
Equity Share Capital	40,000	Plant and Machinery	24,000
Capital Reserve	8,000	Land and Buildings	40,000
8% Loan on Mortgage	32,000	Furniture & Fixtures	16,000
Creditors	16,000	Stock	12,000
Bank overdraft	4,000	Debtors	12,000
Taxation:		Investments (Short-term)	4,000
Current	4,000	Cash in hand	12,000
Future	4,000		
Profit and Loss A/c	<u>1,000</u>		
	1,20,000		1,20,000

From the above, compute (a) Current Ratio (b) Quick Ratio (c) Debt-Equity Ratio and (d) Proprietary Ratio.

Solution–2 (Problem related to Balance Sheet Ratio)

1. Current Ratio =	$\frac{\text{Current Assets}}{\text{Current liabilities}}$
	Current Assets = Stock + debtors + Investments (short term) + Cash In hand
	Current Liabilities = Creditors + bank overdraft + Provision for Taxation (current & Future)

$CA=12000+12000+4000+12000$
$= 40,000$
$CL=16000+ 4000+4000+4000$
$= 28,000$
$=\frac{40,000}{28,000}$
$=1.43 :1$

2. Quick Ratio =	<u>Quick Assets</u> Quick Liabilities
	Quick Assets =Current Assets -Stock
	Quick Liabilities =Current Liabilities–(BOD + PFT future)
	$QA=40,000-12,000$ $= 28,000$
	$QL=28,000-(4,000+4,000)$ $= 20,000$
	$=\frac{28,000}{20,000}$
	$=1.40 :1$

3. Debt– Equity Ratio=	<u>Long Term Debt (Liabilities)</u> Shareholders Fund
	LTL=Debentures +long term loans
	SHF=Eq.Sh.Cap. +Reserves & Surplus + Preference Sh. Cap.–Fictitious Assets
	$LTL= 32,000$
	$SHF=40,000+8,000+12,000$ $= 60,000$
	$=\frac{32,000}{60,000}$
	$=0.53 :1$

4. Proprietary Ratio =	<u>Shareholders Funds</u>
	Total Assets
	SHF=Eq.Sh.Cap.+Reserves & Surplus + Preference Sh. Cap.–Fictitious Assets
	Total Assets=Total Assets–Fictitious Assets
	SHF=40,000+8,000+12,000 = 60,000
	TA= 1,20,000
	= <u>60,000</u> 1,20,000
	=0.5:1

Problem -3

The details of Shreenath Company are as under:

Sales(40%cashsales)	15,00,000
Less: Cost of sales	<u>7,50,000</u>
Gross Profit:	7,50,000
Less: Office Exp.(including interest on debentures)	1,25,000
Selling Exp.	<u>2,50,000</u>
	<u>1,25,000</u>
Profit before Taxes:	5,00,000
Less: Taxes	<u>2,50,000</u>
Net Profit:	2,50,000

Balance Sheet

Particular	Rs.	Particular	Rs.
Equity share capital	20,00,000	Fixed Assets	55,00,000
10%Preference share capital	20,00,000	Stock	1,75,000
Reserves	11,00,000	Debtors	3,50,000
10%Debentures	10,00,000	Bills receivable	50,000
Creditors	1,00,000	Cash	2,25,000
Bank	1,50,000	Fictitious Assets	1,00,000
overdraft Bills payable	45,000		
Outstanding expenses	<u>5,000</u>		
	64,00,000		64,00,000

Beside the details mentioned above, the opening stock was of Rs. 3,25,000. Taking 360 days of the year, calculate the following ratios; also discuss the position of the company:

(1)Gross profit ratio (2)Stock turnover ratio (3) Operating ratio (4) Current ratio (5) Liquid ratio (6) Debtors ratio (7) Creditors ratio (8) Proprietary ratio (9) Rate of return on net capital employed (10) Rate of return on equity shares.

Solution–3 (Problem related to Composite Ratio)

1. Gross Profit Margin=	<u>Gross profit</u> Sales	X100
	<u>7,50,000</u> 15,00,000	X100
	=50%	
2. Stock Turnover Ratio=	<u>Cost of goods sold</u>	
	Avg. Stock	
	Avg. stock= <u>Opening Stock + Closing Stock</u> 2	
	COGS=Sales–GP	
	<u>3,25,000+1,75,000</u>	
	2	
	AS= 2,50,000	
	COGS=15,00,000–7,50,000	
	7,50,000	
	<u>=7,50,000</u> 2,50,000	
	=3times	

3. Operating Profit Ratio=	<u>Operating Profit</u> x100 Net Sale
	Operating Profit=Sales–(Op. Exp.+ COGS.)
	OP=15,00,000–(7,50,000+1,25,000+25,000)
	= 6,00,000
	(excluding Interest on Debentures)
	= (6,00,000/15,00,000)100
	=40%
	Current Assets Current Liabilities
	CA=1,75,000+3,50,000+50,000+2,25,000
	= 8,00,000
	CL=1,00,000+1,50,000+45,000+5,000
	= 3,00,000
	=8,00,000
	3,00,000
	=2.67:1

4. Current Ratio=	<u>Current Assets</u> Current Liabilities
	CA=1,75,000+3,50,000+50,000+2,25,000
	= 8,00,000
	CL=1,00,000+1,50,000+45,000+5,000
	= 3,00,000
	= <u>8,00,000</u> 3,00,000
	= 2.67:1

5.QuickRatio/ Liquid Ratio	<u>Liquid Assets</u> LiquidLiabilities	
	(Liquid)Quick Assets=Current Assets -Stock	
	(Liquid)Quick Liabilities=Current Liabilities – BOD	
	QA=8,00,000–1,75,000 = 6,25,000	
	QL=3,00,000–1,50,000 = 1,50,000	
		$\frac{=6,25,000}{1,50,000}$
	=4.17 :1	

6.DebtorsRatio	<u>Debtors + Bills receivable</u> Credit sales	X365/360 days
	$= \frac{3,50,000+50,000}{9,00,000}$ (60%of 15,00,000)	X360days
	=0.444	X360days
	=160days	
7.CreditorsRatio	<u>Creditors + Bills payable</u> Credit Purchase	X365/360 days
	$= \frac{1,00,000+45,000}{7,50,000}$ Notes: If credit purchase could not find out at that point Cost of Goods sold consider Credit purchase	X360days
	=0.193	X360 days
	=69days	

8. Proprietary Ratio	<u>Shareholders Funds</u> Total Assets	
	SHF=Eq.Sh. Cap. + Reserves & Surplus + Preference Sh. Cap.–Fictitious Assets	
	Total Assets=Total Assets –Fictitious Assets	
	SHF=20,00,000+20,00,000+11,00,000– 1,00,000 = 50,00,000	
	TA=64,00,000–1,00,000 = 63,00,000	
		= <u>50,00,000</u> 63,00,000
	=0.79 :1	

Notes:

Rate of Return on Capital Employed		Rate of Return on Share holders Fund		Rate of return on Equity Shareholders Fund	
<u>=EBIT</u> Capital employed	X100	<u>=PAT</u> SHF	X100	<u>=PAT– Pref. Div.</u> ESHF	X100
CE = Eq Sh. Cap. + Pref. Sh. Cap. + Reserves & Surplus + Debenture + Long Term Loan – Fictitious Assets		SHF=Eq.Sh.Cap.+Pref.Sh.Cap. + Reserves & Surplus –Fictitious Assets		ESHF =Eq.Sh.Cap. +Reserves & Surplus–Fictitious Assets	
Sales				15,00,000	
Less: Cost of goods sold				7,50,000	
Gross profit				7,50,000	

Less: Operating expenses (including Depreciation)	1,50,000
Earnings before Interest & Tax(EBIT)	6,00,000
Less: Interest Cost	1,00,000
Earnings before Tax(EBT)	5,00,000
Less: Tax liability	2,50,000
Earnings after Tax (EAT/PAT)	2,50,000
Less: Preference share dividend	2,00,000
Distributional Profit	50,000

9.		10.		11.	
Rate of Return on Capital Employed		Rate of Return on Share holders Fund		Rate of return on Equity Shareholders Fund	
= <u>EBIT</u>	X100	= <u>PAT</u>	X100	= <u>PAT– Pref.Div.</u>	X100
Capital employed		SHF		ESHF	
CE = Eq Sh. Cap. + Pref. Sh. Cap. + Reserves & Surplus + Debenture Long Term Loan – Fictitious Assets		SHF = Eq. Sh. Cap. + Pref. Sh. Cap. + Reserves & Surplus – Fictitious Assets		ESHF = Eq.Sh.Cap.+ Reserves & Surplus– Fictitious Assets	
CE=20,00,000+20,00,000 11,00,000 +10,00,000 1,00,000		SHF=20,00,000+20,00,000 11,00,000–1,00,000		ESHF = 20,00,000 + 11,00,000– 1,00,000	
=60,00,000		=50,00,000		=30,00,000	
= <u>6,00,000</u>	X100	= <u>2,50,000</u>	X100	= <u>50,000</u>	X100
60,00,000		50,00,000		30,00,000	
=10%		=5%		= 1.67%	

From the following particulars extracted from the books of Ashok & Co.Ltd compute the following ratios and comment:

(a)Current ratio (b) Acid Test Ratio (c)Stock-Turnover Ratio (d)Debtors Turnover Ratio (e) Creditors' Turnover Ratio, and Average Debt Collection period.

	1-1-2002	31-12-2002
	Rs.	Rs.
Bills Receivable	30,000	60,000
Bills Payable	60,000	30,000
Sundry Debtors	1,20,000	1,50,000
Sundry Creditors	75,000	1,05,000
Stock-in-trade	96,000	1,44,000

Additional information:

- (a) On 31-12-2002, there were assets: Building Rs. 2,00,000, Cash Rs. 1,20,000 and Cash at Bank Rs. 96,000.
- (b) CashpurchasesRs.1,38,000andPurchasesReturnswereRs.18,000.
- (c) CashesalesRs.1,50,000andSalesreturnswereRs.6,000.

Rateofgrossprofit25%onsalesandactualgrossprofitwasRs.1,50,000.

Trading Account

Particular	Amount Rs.	Particular	Amount Rs.
To Opening Stock	96,000	By Sales: Cash:	1,50,000
To Purchase: 1,38,000 Cash:		Credit: <u>4,56,000</u>	
Credit: <u>3,78,000</u>		6,06,000	
5,16,000		Less: S/R <u>6,000</u>	6,00,000
Less: P/R <u>18,000</u>	4,98,000	By Closing Stock	1,44,000
To Gross Profit	1,50,000		
	<u>7,44,000</u>		<u>7,44,000</u>

1. Gross Profit Margin=	$\frac{\text{Gross profit}}{\text{Sales}}$	X100
	$25\% = \frac{1,50,000}{\text{Sales}}$	X100
	$\text{Sales} = \frac{1,50,000}{25}$	X100
	Sales=6,00,000	

2. Current Ratio =	$\frac{\text{Current Assets}}{\text{Current liabilities}}$	
	Current Assets=Stock+debtors + Bills receivable + Cash+ Bank Balance	
	Current Liabilities=Creditors + Bills payable	
	CA=1,44,000+1,50,000+60,000+1,20,000+96,000 = 5,70,000	
	CL=1,05,000+30,000 = 1,35,000	
		$\frac{=5,70,000}{1,35,000}$
		=4.22:1

3. Acid Test Ratio =	$\frac{\text{Cash \& Cash Equivalent Assets}}{\text{Liquid Liabilities}}$	
	Cash & Cash equivalent Assets=Cash + Bank + Short term Investments	
	(Liquid) Quick Liabilities=Current Liabilities– BOD	
	=1,20,000+96,000 = 2,16,000	
	QL=1,05,000+30,000 = 1,35,000	
		$\frac{=2,16,000}{1,35,000}$
		=1.6:1

4. Stock Turnover Ratio=	$\frac{\text{Cost of goods sold}}{\text{Avg. Stock}}$
	$\text{Avg. stock} = \frac{\text{Opening Stock} + \text{Closing Stock}}{2}$
	$\text{COGS} = \text{Sales} - \text{GP}$
	$\frac{96,000 + 1,44,000}{2}$
	$\text{AS} = 1,20,000$
	$\text{COGS} = 6,00,000 - 1,50,000$ $4,50,000$
	$\frac{4,50,000}{1,20,000}$ $= 3.75 \text{ times}$
5. Debtors Ratio= (Average debt collection Period)	$\frac{\text{Debtors} + \text{Bills Receivable}}{\text{days}} \times 365 \text{ Credit Sale}$
	$\{(1,50,000 + 60,000) / 4,56,000\} \times 365 \text{ days}$ $= 168 \text{ days}$

6. Creditors Ratio =	$\frac{\text{Creditors} + \text{Bills payable}}{\text{Credit Purchase}}$	$\times 365 / 360 \text{ days}$
	$\frac{1,05,000 + 30,000}{3,78,000}$	$\times 365 \text{ days}$
	0.357	$\times 365 \text{ days}$
	$= 130 \text{ days}$	

Problem-5

Particular	Rs.	Particular	Rs.
Equity		Fixed Assets	20,00,000
Shares of Rs. 10 each	10,00,000	Investments	2,00,000
10% Pref. Sh. of Rs. 100 each	4,00,000	Closing Stock	2,00,000
Reserves and Surplus	7,00,000	Sundry Debtors	4,60,000
15% Debentures	5,00,000	Bills Receivable	60,000
Sundry Creditors	2,40,000	Cash at Bank	60,000
Bank Overdraft	1,60,000	Preliminary Expenses	<u>20,000</u>
	30,00,000		30,00,000

Following is the summarized Balance Sheet of Mona Ltd. as on 31-3-04.

Summarised Profit and Loss Account is as under for the year ending on 31-3-'04:

Sales (25% Cash sales) ₹ 80,00,000

Less: Cost of goods sold ₹ 56,00,000

Gross Profit ₹ 24,00,000

Net profit (Before interest and tax 50%) ₹ 9,00,000

Calculate the following ratios:

- (1) Rate on Return on Capital Employed (2) Proprietary Ratio (3) Debt-Equity (4) Capital gearing Ratio (5) Debtors Ratio (365 days of the year.) (6) Rate of Return on Shareholders' Funds (7) Rate of Return on Equity shareholders fund

Solution-5
Statement of Profitability

Financial Ratio – II

Sales	80,00,000
Less: Cost of goods sold	56,00,000
Gross profit	24,00,000
Less: Operating expenses (including Depreciation)	15,00,000
Earnings before Interest & Tax (EBIT)	9,00,000
Less: Interest Cost	75,000
Earnings before Tax (EBT)	8,25,000
Less: Tax liability (50%)	4,12,500
Earnings after Tax (EAT/PAT)	4,12,500
Less: Preference share dividend	40,000
Distributional Profit	3,72,500

1.		6.		7.	
Rate of Return on Capital Employed		Rate of Return on Shareholders Fund		Rate of return on Equity Shareholders Fund	
$\frac{\text{EBIT}}{\text{Capital employed}} \times 100$		$\frac{\text{PAT}}{\text{SHF}} \times 100$		$\frac{\text{PAT} - \text{Pref. Div.}}{\text{ESHF}} \times 100$	
CE = Eq Sh. Cap. + Pref. Sh. Cap. + Reserves & Surplus + Debenture + Long Term Loan – Fictitious Assets		SHF = Eq. Sh. Cap. + Pref. Sh. Cap. + Reserves & Surplus – Fictitious Assets		ESHF = Eq.Sh.Cap.+ Reserves & Surplus– Fictitious Assets	

CE=10,00,000+4,00,000 7,00,000+5,00,000–20,000 =25,80,000		SHF=10,00,000 +4,00,000 7,00,000-20,000 =20,80,000		+ESHF=10,00,000+7,00,000 –20,000 =16,80,000	
= $\frac{9,00,000}{25,80,000}$	X100	= $\frac{4,12,500}{20,80,000}$	X100	= $\frac{3,72,500}{16,80,000}$	X100
=34.88%		=19.83%		= 22.17 %	
2. Proprietary Ratio		<u>Shareholders Funds</u> Total Assets			
		SHF=Eq.Sh.Cap. + Reserves & Surplus + Preference Sh. Cap.–Fictitious Assets			
		Total Assets=Total Assets–Fictitious Assets			
		SHF=10,00,000+7,00,000+4,00,000- 20,000 = 20,80,000			
		TA=30,00,000–20,000 = 29,80,000			
		= $\frac{20,80,000}{29,80,000}$			
		=0.70 :1			

3. Debt–Equity Ratio=	<u>Long Term Debt(Liabilities)</u>	<u>Shareholders Fund</u>
	LTL=Debentures + long term loans	
	SHF=Eq.Sh.Cap.+ Reserves & Surplus+ Preference Sh.Cap.–Fictitious Assets	
	LTL= 5,00,000	
	SHF=10,00,000+7,00,000+4,00,000-20,000 = 20,80,000	
	= $\frac{5,00,000}{20,80,000}$	
	=0.24 :1	

4.CapitalGearingRatio	<u>Fixed Interestor Dividend Securities</u> Equity Shareholders Fund	
	FIS=Debentures+ Preference share capital	
	ESHF=Eq.Sh.Cap + Reserves & Surplus– Fictitious Assets	
	LTL= 9,00,000	

ESHF=10,00,000+7,00,000-20,000	
= 16,80,000	
= <u>9,00,000</u>	
16,80,000	
= 0.54 :1	

5.DebtorsRatio (Avg. debt collection period)	<u>Debtors + Bills receivable</u> Credit sales	X365/360days
	= <u>4,60,000+60,000</u>	X365days
	60,00,000	
	=0.461	X365 days
	= 31.63days = 32days (Aprox.)	

Unsolved Problems

Problem1

The Balance Sheet as on 2002 and 2003 are as under:

Liabilities	2022	2023	Assets	2022	2023
Equity share capital	1,00,000	1,25,000	Land and Buildings	50,000	75,000
General Reserve	12,500	15,000	Plant Machinery	57,500	55,000
Profit & Loss A/c	10,000	7,500	Stock	10,000	12,500
Creditors	5,000	6,250	Debtors	7,500	10,000
Bills payable	3,750	7,500	Cash & Bank	5,000	7,500
O/s. Expenses	1,250	3,750	Bills Receivable	2,500	5,000
Provident Fund	7,500	5,000	Preliminary Exp.	7,500	5,000
	1,40,000	1,70,000		1,40,000	1,70,000

Particulars	2022	2023	Particulars	2022	2023
To Op. Stock	5,000	10,000	By Sales	62,500	1,12,500
To Purchase	37,500	47,500	By Closing Stock	10,000	12,500
To Office Exp.	7,500	10,000	By Profit on Sale of Furniture	2,500	----
To Selling exp.	5,000	12,500			
To Fin. Exp.	2,500	15,000			
To Net Profit	17,500	30,000			
	75,000	1,25,000		75,000	1,25,000

Profit & Loss A/c.

Find out (1) Current Ratio (2) Stock Turnover Ratio (3) Gross Profit Ratio (4) Liquid Ratio (5) Debtor Ratio (working days 300) (6) Return on Equity Capital employed (7) Ownership Ratio.

Problem2

Following are incomplete Trading & Profit and Loss A/c. and Balance Sheet.

Particular	Rs.	Particular	Rs.
To Op. stock	3,50,000	By Sales	(?)
To Purchase	(?)	By Closing Stock	(?)
To Purchase Return	87,000		
To Gross Profit	7,18,421		
	14,96,710		14,96,710

Trading A/c.

Financial Ratio – II

Profit & Loss A/c. Balance Sheet

Particular	Rs.	Particular	Rs.
To Office Exp.	3,70,000	By Gross Profit	7,18,421
To Int.on Deb.	30,000	By Commission	(?)
To Tax. Provision	18,421		
To Net Profit	3,50,000		
	(?)		(?)

Particular	Rs.	Particular	Rs.
Paid Up Capital	5,00,000	Plant & machinery	7,00,000
General Reserve	(?)	Stock	(?)
P&La/c.	(?)	Debtors	(?)
10% Debenture	(?)	Bank	62,500
Current Liabilities	6,00,000	Other Fixed Assets	(?)
	(?)		(?)

Find out missing items with the help of other details are as under:

1. Current Ratio was 2:1.
2. Closing Stock is 25% of Sales.
3. Proposed Dividend was 40% of paid up capital.
4. Gross profit Ratio was 60%.
5. Amount transfer to General Reserve is same as proposed Dividend.
6. Balance of P&L Account is calculated 10% of proposed dividend.
7. Commission income is 1/7 of Net profit.
8. Balance of General reserve is twice the current year transfer amount.

Problem 3

From the following information prepare the Balance Sheet of ABB Ltd
Showing the details of working:

Paid up capital	Rs. 50,000
Plant and Machinery	Rs. 1,25,000
Total Sales (p.a.)	Rs. 5,00,000
Gross Profit	25%

Annual Credit Sales	80% of net sales
Current Ratio	2
Inventory Turnover	4
Fixed Assets Turnover	2
Sales Returns	20% of sales
Average collection period	73 days
Creditor trade credit	2
Cash to Inventory	1:15
Total debt to current Liabilities	3

Problem 4

The following is the Balance Sheet of a company as on 31st March:

Liabilities	Rs.	Assets	Rs.
Share Capital	2,00,000	Land and Buildings	1,40,000
Profit & Loss Account	30,000	Plant and Machinery	3,50,000
General Reserve	40,000	Stock	2,00,000
12% Debentures	4,20,000	Sundry Debtors	1,00,000
Sundry Creditors	1,00,000	Bills Receivable	10,000
Bills Payable	50,000	Cash at Bank	40,000
	8,40,000		8,40,000

Calculate :

- (1) Current Ratio
- (2) Quick Ratio
- (3) Inventory to working Capital
- (4) Debt to Equity Ratio
- (5) Proprietary Ratio
- (6) Capital Gearing Ratio
- (7) Current Assets to Fixed Assets

Problem 5

From the following Balance Sheet and additional information, you are required to calculate:

- (i) Return on Total Resources
- (ii) Return on Capital Employed
- (iii) Return on Shareholders Fund

BALANCE SHEET as on 31st Dec.

	Rs.		Rs.
Share Capital (Rs. 10)	8,00,000	Fixed Assets	10,00,000
Reserves	2,00,000	Current Assets	3,60,000
8% Debentures	2,00,000		
Creditors	1,60,000		
	13,60,000		13,60,000

Net operating profit before tax is Rs. 2,80,000. Assume tax rate at 50%. Dividend declared amounts to Rs. 1,20,000. (B.Com. MS.)

Problem6

Extract from financial accounts of X,Y,Z Ltd. are:

	Year I		Year II	
	Assets Rs.	Liabilities Rs.	Assets Rs.	Liabilities Rs.
Stock	10,000		20,000	
Debtors	30,000		30,000	
Payment in Advance	2,000		—	
Cash in hand	20,000		15,000	
Sundry Creditors		25,000		30,000
Acceptances		15,000		12,000
Bank Overdraft		—		5,000
	62,000	40,000	65,000	47,000

Sales amounted to Rs.3,50,000 in the first year and Rs.3,00,000 in the second year.

You are required to comment on the solvency position of the concern with the help of accounting ratios.
(C.A. Final ;M. Com. Madras)



DEFINITION OF COST OF CAPITAL

Unit Structure:

- 7.0 Objectives
- 7.1 Introduction
- 7.2 Definition of Cost of Capital
- 7.3 Measurement of Cost of Capital
- 7.4 Cost of Debt
- 7.5 Cost of Preference Shares
- 7.6 Cost of equity
- 7.7 Cost of Retained Earnings
- 7.8 Weighted Average Cost of Capital (WACC)
- 7.9 Summary
- 7.10 Exercises

7.0 OBJECTIVES

- After studying this chapter you will be able to:
- Understand the concept of Cost of Capital
- Understand the different sources of capital
- Understand the cost of employing each of these sources of capital
- Know the concept of weighted average cost of capital

Cost of Capital

Definition: As it is evident from the name, cost of capital refers to the **weighted average cost of various capital components**, i.e. sources of finance, employed by the firm such as equity, preference or debt. In finer terms, it is the **rate of return**, that must be received by the firm on its investment projects, to attract investors for investing capital in the firm and to maintain its market value.

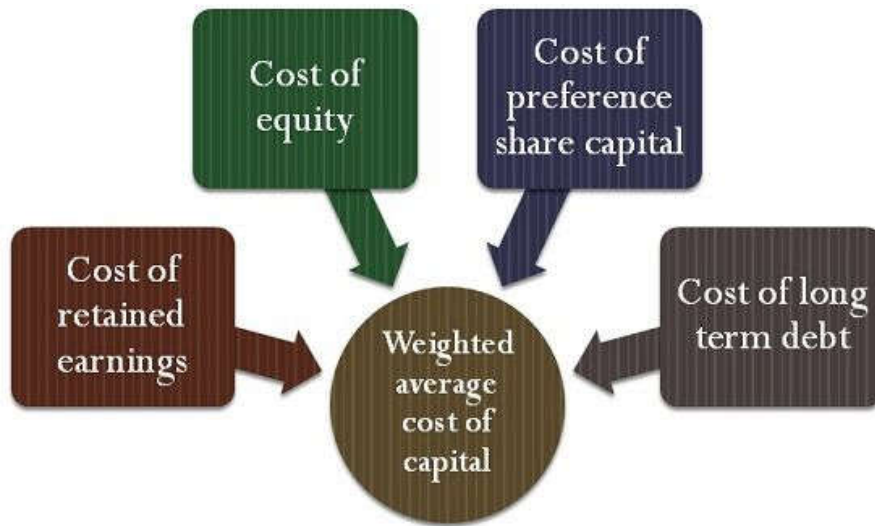
The factors which determine the cost of capital are:

- Source of finance
- Corresponding payment for using finance.

On raising funds from the market, from various sources, the firm has to pay some additional amount, apart from the principal itself. The additional

amount is nothing but the cost of using the capital, i.e. **cost of capital** which is either paid in lump sum or at periodic intervals.

Definition of Cost of Capital



Classification of Cost of Capital

1. **Explicit cost of capital:** It is the cost of capital in which firm's cash outflow is oriented towards utilization of capital which is evident, such as payment of dividend to the shareholders, interest to the debenture holders, etc.
2. **Implicit cost of capital:** It does not involve any cash outflow, but it denotes the opportunity foregone while opting for another alternative opportunity.

To cover the cost of raising funds from the market, cost of capital must be obtained. It helps in assessing firm's new projects because it is the minimum return expected by the shareholders, lenders and debtholders for supplying capital to the business, as a consideration for their share in the total capital. Hence, it establishes a benchmark, which must be met out by the project.

However, if a firm is incapable of reaping the expected rate of return, the value of shares in the market will tend to decline, which will lead to the reduction in the wealth of the shareholders as a whole.

Importance of Cost of Capital

- It helps in **evaluating the investment options**, by converting the future cash flows of the investment avenues into present value by discounting it.
- It is helpful in **capital budgeting decisions** regarding the sources of finance used by the company.

- It is vital in **designing the optimal capital structure** of the firm, wherein the firm's value is maximum, and the cost of capital is minimum.
- It can also be used to **appraise the performance of specific projects** by comparing the performance against the cost of capital.
- It is useful in **framing optimum credit policy**, i.e. at the time of deciding credit period to be allowed to the customers or debtors, it should be compared with the cost of allowing credit period.

Cost of capital is also termed as **cut-off rate, the minimum rate of return, or hurdle rate**.

Concept And Measurement of Cost of Capital

The cost of capital of a firm is the minimum rate of return expected by its investors. It is the weighted average cost of various sources of finance used by the firm. The capital used may be debt, preference shares, retained earnings and equity shares.

- The decision to invest in particular project depends on cost of capital or cut off rate of the firm.
- To achieve the objective of wealth maximization, a firm must earn a rate of return more than its cost of capital.
- Higher the risk involved in the firm, higher is the cost of capital.

Factors Affecting the Cost of Capital of A Firm

1) Risk Free Interest Rate:

The risk-free interest rate, (**rf**), is the interest rate on the risk free and default-free securities. Theoretically speaking, the risk-free interest rate depends upon the supply and demand consideration in financial market for long term funds. The market sources of demand and supply determine the **rf**, which is consisting of two components:

a) Real interest Rate:

The real interest rate is the interest rate payable to the lender for supplying the funds or in other words, for surrendering the funds for a particular period.

b) Purchasing power risk premium:

Investors, in general, like to maintain their purchasing power and therefore, like to be compensated for the loss in purchasing power over the period of lending or supply of funds. So, over and above the real interest rate, the purchasing power risk premium is added to find out the risk-free interest rate. Higher the expected rate of inflation, greater would be the purchasing power risk premium and consequently higher would be the risk-free interest rate.

2) Business Risk:

Another factor affecting the cost of capital is the risk associated with the firm's promise to pay interest and dividends to its investors. The business risk is related to the response of the firm's Earnings Before Interest and Taxes, EBIT, to change in sales revenue. Every project has its effect on the business risk of the firm. If a firm accepts a proposal which is more risky than average present risk, the investors will probably raise the cost of funds so as to be compensated for the increased risk. This premium is added for the business risk compensation is also known as Business Risk Premium.

3) Financial Risk:

The financial risk is a type of risk which can affect the cost of capital of the firm. The particular composition and mixing of different sources of finance, known as the financial plan or the capital structure, can affect the return available to the investors. The financial risk is affected by the capital structure or the financial plan of the firm. Higher the proportion of fixed cost securities in the overall capital structure, greater would be the financial risk.

4) Other Consideration:

The investors may also like to add a premium with reference to other factors. One such factor may be the liquidity or marketability of the investment. Higher the liquidity available with an investment, lower would be the premium demanded by the investor. If the investment is not easily marketable, then the investors may add a premium for this also and consequently demand a higher rate of return.

1. Computation of Cost of Capital

A. Computation of cost of specific source of finance

B. Computation of cost of weighted average cost of capital

2. Computation of specific source of finance

(i) Cost of debt

It is the rate of interest payable on debt.

- Issued at premium or discount

Debenture after tax

(ii) Cost of redeemable debt

The debt is to be redeemed after a certain period during the life time of the firm. Such debt issued is known as redeemable debt.

- Before tax cost of redeemable debt
- After tax cost of redeemable debt

(iii) Cost of preference capital

A fixed rate of dividend is payable on preference shares. Dividend is payable at the discretion of the board of directors and there is no legal binding to pay dividend. In case dividend are not paid, it will affect the fund-raising capacity of the firm. Hence dividends are paid regularly except when there is no profit

- Issued at par
- Issued at premium or discount

Cost of redeemable preference shares

Redeemable preference shares are issued which can be redeemed or cancelled on maturity date.

(iv) Cost of equity share capital

The cost of equity is the maximum rate of return that the company must earn on equity financed position of its investments in order to leave or unchanged the market price of its stock. It may or may not be paid. Shareholders invest money in equity shares on the expectation of getting dividend and the company must earn this minimum rate so that the market price of the shares remains unchanged.

(a) Dividend yield method or dividend / price ratio method

(b) Dividend yield plus growth in dividend method

(c) Earnings yield method

(v) Cost of retained earnings

The retained earnings do not involve any cost because a firm is not required to pay dividend on retained earnings. But shareholder expects return on retained earnings.

Computation of Cost of Capital

Computation of cost of capital consists of two important parts:

1. Measurement of specific costs
2. Measurement of overall cost of capital

3 Measurement of Cost of Capital

It refers to the cost of each specific sources of finance like:

- Cost of equity
- Cost of debt
- Cost of preference share
- Cost of retained earnings

Cost of Equity

Definition of Cost of Capital

Cost of equity capital is the rate at which investors discount the expected dividends of the firm to determine its share value.

Conceptually the cost of equity capital (K_e) defined as the —Minimum rate of return that a firm must earn on the equity financed portion of an investment project in order to leave unchanged the market price of the shares.

Cost of equity can be calculated from the following approach:

- Dividend price (D/P) approach
- Dividend price plus growth (D/P + g) approach
- Earning price (E/P) approach
- Realized yield approach.

Dividend Price Approach

The cost of equity capital will be that rate of expected dividend which will maintain the present market price of equity shares.

Dividend price approach can be measured with the help of the following formula:

$$K_e = D/N_p$$

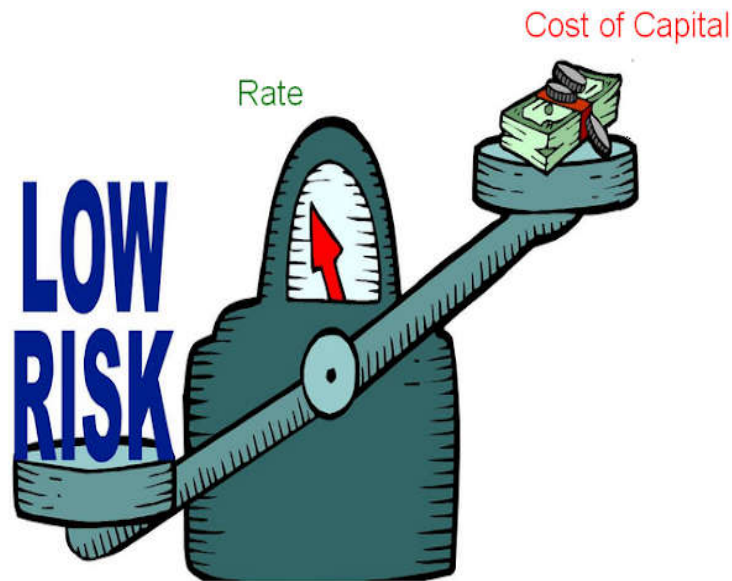
Where,

K_e = Cost of equity capital

D = Dividend per equity share

N_p = Net proceeds of an equity share

Measurement of cost of capital means to calculate the exact cost of capital. For example, there may be different rates of cost of capital between 2% to 30%. But for knowing what is the exact rate of any source of finance, we measure cost of capital with simple formulas.



Cost of Capital Measurement

Measurement of cost of capital is totally related with the risk level of business. In above screenshot, you can see, when the risk is very low. We will pay low cost of capital. Our measuring tool will show also low rate of this cost. Both cost of debt and cost of equity will low. If we have to simplify, we may calculate the weighted average cost of capital. It will also be very low if risk is at low level. But when the risk level of business will increase, we have to pay more cost of capital and rate angle will move to right side in measurement tool.

Because, we have explained all the formulae for calculating cost of capital, so this content, we will explain some examples of measuring cost of capital.

1. Cost of Debt Measurement

B Ltd issues \$ 1,00,000 9% debentures at a premium of 10%. The cost of flotation is 2%. The tax rate applicable is 60%. Measure cost of debt capital.

$$K_{da} = \text{Interest} / NP \times (1-t)$$

$$NP = (1,00,000 + 10,000) - (1,10,000 \times 2/100) = 1,10,000 - 2,200 = 1,07,800$$

$$t = \text{Tax rate}$$

$$= 1,00,000 \times 9\% / 1,07,800 \times (1 - 0.6) = 3.34\%$$

PROBLEM NO 1

Definition of Cost of Capital

- (a) A Ltd. issues Rs. 1, 00,000, 8% debentures at par. The tax rate applicable to the company is 50%. Compute the cost of debt capital.
- (b) B Ltd. issues Rs. 1, 00,000, 8% debentures at a premium of 10%. The tax rate applicable to the company is 60%. Compute the cost of debt capital.
- (c) A Ltd. issues Rs. 1, 00,000, 8% debentures at a discount of 5%. The tax rate is 60%, compute the cost of debt capital.
- (d) B Ltd. issues Rs. 10, 00,000, 9% debentures at a premium of 10%. The costs of floatation are 2%. The tax rate applicable is 50%. Compute the cost of debt-capital.

Solution

at par.

$$K_{db} = I/NP$$

$$I = 1, 00,000 \times 8/100 = 8,000$$

$$NP = \text{Face Value} - \text{Issued expenses}$$

$$NP = 1, 00,000 - 0 = 1, 00,000$$

$$K_{db} = 8,000/1, 00,000$$

$$K_{db} = 0.08 \text{ or } 8\%$$

After Tax Cost of Debt

$$K_{da} = K_{db} (1-T)$$

$$K_{da} = 0.08 (1 - 50\%)$$

$$K_{da} = 0.08 (1 - 0.5)$$

$$K_{da} = 0.08 (0.5)$$

$$K_{da} = 0.04 \text{ or } 4\%$$

at a premium of 10%

$$I = 1, 00,000 \times 8/100 = 8,000$$

$$NP = \text{Face Value} + \text{Premium} - \text{Issued expenses}$$

$$NP = 1, 00,000 + 10\% (1, 00,000 \times 10/100) - 0$$

$$NP = 100000 + 10,000$$

$$NP = 1, 10,000$$

$$K_{db} = 8,000/1, 10,000$$

$$K_{db} = 0.07272 \text{ or } 7.272\%$$

After Tax Cost of Debt

$$K_{da} = K_{db}(1-T)$$

$$K_{da} = 0.07272 (1 - 60\%)$$

$$K_{da} = 0.07272 (1 - 0.6)$$

$$K_{da} = 0.07272 (0.4)$$

$$K_{da} = 0.0290 \text{ or } 2.90\%$$

at a discount of 5%.

$$I = 1,00,000 \times 8/100 = 8,000$$

$$NP = \text{Face Value} - \text{Discount} - \text{Issued expenses}$$

$$NP = 1,00,000 - 5\% (1,00,000 \times 5/100) - 0$$

$$NP = 100,000 - 5,000$$

$$NP = 95,000$$

$$K_{db} = 8,000/95,000$$

$$K_{db} = 0.0842 \text{ or } 8.42\%$$

After Tax Cost of Debt

$$K_{da} = K_{db}(1-T)$$

$$K_{da} = 0.0842 (1 - 60\%)$$

$$K_{da} = 0.0842 (1 - 0.6)$$

$$K_{da} = 0.0842 (0.4)$$

$$K_{da} = 0.0336 \text{ or } 3.36\%$$

at a premium of 10%

$$I = 10,00,000 \times 9/100 = 90,000$$

$$NP = \text{Face Value} + \text{Premium} - \text{Issued expenses}$$

$$NP = 10,00,000 + 10\% (10,00,000 \times 10/100) - 2\% (11,00,000 \times 2/100)$$

$$NP = 10,00,000 + 1,00,000 - 22,000$$

$$NP = 10,78,000$$

$$K_{db} = 90,000/10,78,000$$

$$K_{db} = 0.08348 \text{ or } 8.348\%$$

After Tax Cost of Debt

Definition of Cost of Capital

$$K_{da} = K_{db}(1-T)$$

$$K_{da} = 0.08348 (1 - 50\%)$$

$$K_{da} = 0.08348 (1 - 0.5)$$

$$K_{da} = 0.08348 (0.5)$$

$$K_{da} = 0.04174 \text{ or } 4.174\%$$

Redeemable

Redeemable debt refers to debt which is to be redeemed after the stipulated period.

Cost of debt before tax can be calculated with the help of the following formula

$$K_{db} = \frac{I + (P - NP)/n}{(P + NP)/2}$$

$$(P + NP)/2$$

Where,

I = Annual interest payable

NP = Net proceeds of the debenture

P = Par value of debt

n = Number of years to maturity

PROBLEM NO 2

A company issues Rs. 20, 00,000, 10% redeemable debentures at a discount of 5%. The costs

of floatation amount to Rs. 50,000. The debentures are redeemable after 8 years. Calculate

before tax and after tax. Cost of debt assuming a tax rate of 55%.

Solution

$$K_{db} = \frac{I + (P - NP)/n}{(P + NP)/2}$$

$$(P + NP)/2$$

$$I = 20, 00,000 \times 10/100 = 2, 00,000$$

$$P = 20, 00,000$$

$$NP = \text{Face Value} - \text{Discount} - \text{Issued expenses}$$

$$NP = 20, 00,000 - 5\% (20, 00,000 \times 5/100) - 50,000$$

$$NP = 20,00,000 - 1,00,000 - 50,000$$

$$NP = 1,85,0000$$

$$n = 8 \text{ years}$$

$$K_{db} = \frac{2,00,000 + (20,00,000 - 1,850,000)/8}{(20,00,000 + 1,850,000)/2}$$

$$K_{db} = \frac{200,000 + (150,000)/8}{(38,50,000)/2}$$

$$(38,50,000)/2$$

$$K_{db} = \frac{200,000 + 18,750}{19,25,000}$$

$$19,25,000$$

$$K_{db} = \frac{218,750}{19,25,000}$$

$$19,25,000$$

$$K_{db} = 0.1136 \text{ or } 11.36\%$$

After Tax Cost of Debt

$$K_{da} = K_{db}(1 - T)$$

$$K_{da} = 0.1136 (1 - 55\%)$$

$$K_{da} = 0.1136 (1 - 0.55)$$

$$K_{da} = 0.1136 (0.45)$$

$$K_{da} = 0.05112 \text{ or } 5.11\%$$

2. Cost of Preference Share Capital Measurement

Cost of redeemable preference share capital is calculated with the help of the following

formula:

$$K_p = DP/NP$$

Where,

K_p = Cost of preference share

DP = Fixed preference dividend

NP = Net proceeds of the preference share

PROBLEM NO 3

XYZ Ltd. issues 20,000, 8% preference shares of Rs. 100 each. Cost of issue is Rs. 2 per

share. Calculate cost of preference share capital if these shares are issued
(a) at par, (b) at a

Definition of Cost of Capital

premium of 10% and (c) at a Discount of 6%.

Solution

$$K_p = DP/NP$$

at par

$$DP = 20,000 \times 100 = 20,00,000 \times 8/100 = 1,60,000$$

$$NP = \text{Face Value} - \text{Issued expenses}$$

$$NP = 20,00,000 - (20,000 \times 2 = 40,000)$$

$$NP = 19,60,000$$

$$K_p = 1,60,000/19,60,000$$

$$K_p = 0.0816 \text{ or } 8.16\%$$

at a premium of 10%

$$DP = 20,000 \times 100 = 20,00,000 \times 8/100 = 1,60,000$$

$$NP = \text{Face Value} + \text{Premium} - \text{Issued expenses}$$

$$NP = 20,00,000 + 10\% (20,00,000 \times 10/100) - (20,000 \times 2 = 40,000)$$

$$NP = 20,00,000 + 2,00,000 - 40,000$$

$$NP = 21,60,000$$

$$K_p = 1,60,000/21,60,000$$

$$K_p = 0.0740 \text{ or } 7.40\%$$

at a Discount of 6%.

$$DP = 20,000 \times 100 = 20,00,000 \times 8/100 = 1,60,000$$

$$NP = \text{Face Value} - \text{Discount} - \text{Issued expenses}$$

$$NP = 20,00,000 + 6\% (20,00,000 \times 6/100) - (20,000 \times 2 = 40,000)$$

$$NP = 20,00,000 - 1,20,000 - 40,000$$

$$NP = 18,40,000$$

$$K_p = 1,60,000/18,40,000$$

$$K_p = 0.0869 \text{ or } 8.69\%$$

Cost of irredeemable preference share is calculated with the help of the following formula:

$$K_p = \frac{DP + (P - NP) / n}{(P + NP) / 2}$$

Where,

K_p = Cost of preference share

DP = Fixed preference share

P = Par value

NP = Net proceeds of the preference share

n = Number of maturity period

PROBLEM NO 4

ABC Ltd. issues 20,000, 8% preference shares of Rs. 100 each. Redeemable after 8 years at a

premium of 10%. The cost of issue is Rs. 2 per share. Calculate the cost of preference share

capital.

Solution

$$K_p = \frac{DP + (P - NP) / n}{(P + NP) / 2}$$

$$DP = 20,000 \times 100 = 20,00,000 \times 8/100 = 1,60,000$$

$$P = \text{Face Value} + \text{Premium}$$

$$P = 20,00,000 + 2,00,000 = 22,00,000$$

$$NP = \text{Face Value} - \text{Issued expenses}$$

$$NP = 20,00,000 - (20,000 \times 2) = 19,60,000$$

$$n = 8 \text{ years}$$

$$K_p = \frac{1,60,000 + (22,00,000 - 19,60,000) / 8}{(22,00,000 + 19,60,000) / 2}$$

$$K_p = \frac{1,60,000 + 30,000}{20,80,000}$$

$$K_p = \frac{1,90,000}{20,80,000}$$

$$K_p = \frac{1,90,000}{20,80,000}$$

$$K_p = 0.0913 \text{ or } 9.13\%$$

$$K_p = 0.0913 \text{ or } 9.13\%$$

Cost of Equity Share Capital Measurement

Definition of Cost of Capital

Dividend Price Approach

The cost of equity capital will be that rate of expected dividend which will maintain the Present market price of equity shares. Dividend price approach can be measured with the help of the following formula:

$$K_e = D/NP \text{ (OR) } K_e = D/MP$$

Where,

K_e = Cost of equity capital

D = Dividend per equity share

NP = Net proceeds of an equity share

MP = Market price of an equity share

PROBLEM NO 5

A company issues 10,000 equity shares of Rs. 100 each at a premium of 10%. The company Has been paying 25% dividend to equity shareholders for the past five years and expects to Maintain the same in the future also. Compute the cost of equity capital. Will it make any Difference if the market price of equity share is Rs. 175?

Solution

$$K_e = D/NP$$

$$D = 100 \times 25/100 = \text{Rs } 25$$

$$NP = \text{Face Value} + \text{Premium} - \text{Issued expenses}$$

$$NP = 100 + 10\% (100 \times 10/100 = 10) - 0$$

$$NP = 100 + 10 = 110$$

$$K_e = 25/110 = 0.2272 \text{ or } 22.72\%$$

$$K_e = D/MP$$

$$D = 100 \times 25/100 = \text{Rs } 25$$

$$MP = \text{Rs } 175$$

$$K_e = 25/175 = 0.1428 \text{ or } 14.28\%$$

Dividend Price plus Growth Approach

The cost of equity is calculated on the basis of the expected dividend rate per share plus Growth in dividend.

It can be measured with the help of the following formula:

$$K_e = D/NP + g \text{ (OR) } K_e = D/MP + g$$

Where,

K_e = Cost of equity capital

D = Dividend per equity share

g = Growth in expected dividend

NP = Net proceeds of an equity share

MP = Market price of an equity share

PROBLEM NO 6

A company plans to issue 10000 new shares of Rs. 100 each at a par. The flotation costs are expected to be 4% of the share price. The company pays a dividend of Rs. 12 per share initially and growth in dividends is expected to be 5%.

a) Compute the cost of new issue of equity shares.

b) If the current market price of an equity share is Rs. 120. Calculate the cost of existing

equity share capital

Solution

a) Compute the cost of new issue of equity shares.

$$K_e = D/NP + g$$

$$D = \text{Rs } 12$$

$$NP = \text{Face value} - \text{Issued expenses}$$

$$NP = 100 - 4\% (100 \times 4/100 = 4)$$

$$NP = 100 - 4 = 96$$

$$g = 5\%$$

$$K_e = 12 / 96 + 5\%$$

$$K_e = 0.125 + 0.05$$

$$K_e = 0.175 \text{ or } 17.5\%$$

b) Compute the cost of existing equity share capital

$$K_e = D/MP + g$$

$$D = \text{Rs } 12$$

$$MP = \text{Rs } 120$$

$$g = 5\%$$

$$K_e = 12 / 120 + 5\%$$

$$K_e = 0.10 + 0.05$$

$$K_e = 0.15 \text{ or } 15\%$$

Earning Price Approach

Cost of equity determines the market price of the shares. It is based on the future earnings

prospects of the equity.

The formula for calculating the cost of equity according to this approach is as follows.

$$K_e = E / NP \text{ (OR) } K_e = E / MP$$

Where,

K_e = Cost of equity capital

E = Earnings per share

NP = Net proceeds of an equity share

MP = Market price of an equity share

PROBLEM NO 7

A firm is considering an expenditure of Rs. 75 lakhs for expanding its operations.

The relevant information is as follows:

Number of existing equity shares = 10 lakhs

Market value of existing share = Rs. 100

Net earnings = Rs. 100 lakhs

i) Compute the cost of existing equity share capital.

ii) Compute new equity capital assuming that new shares will be issued at a price of Rs. 92

per share and the costs of new issue will be Rs. 2 per share.

Solution

i) Cost of existing equity share capital:

$$K_e = E / MP$$

Earnings per share (E) = Profit after tax / No of shares

$$E = 100,00,000 / 10,00,000 = \text{Rs } 10$$

$$MP = \text{Rs } 100$$

$$K_e = 10/100 = 0.10 \text{ Or } 10\%$$

ii) Cost of Equity Capital

$$E = \text{Rs } 10$$

$$NP = \text{Face value} - \text{Issued expenses}$$

$$NP = 92 - 2 = 90$$

$$K_e = 10/90 = 0.1111 \text{ Or } 11.11\%$$

PROBLEM NO 8

A company is considering an expenditure of \$ 60 lakhs for expanding its operations. The relevant information is as follows.

Number of existing equity shares = 10 Lakhs

Market Value of existing share = \$ 60

Net Earnings = \$ 90 Lakhs

Measure the cost of existing equity share capital of new equity capital assuming that new shares will be issued at a price of \$ 52 per share and the cost of new issue will be \$ 2 per share.

Cost of existing equity share capital

$$K_e = EPS / MP$$

EPS = Earnings per share

$$= \$ 90 / 10 = \$ 9$$

$$K_e = 9/60 \times 100 = 15\%$$

Cost of New Equity Share Capital

$$K_e = EPS / NP$$

$$= 9 / (52-2) \times 100 = 18\%$$

Cost of Retained Earning Measurement

Definition of Cost of Capital

A company's return available to shareholders is 15%. The average tax rate of shareholders is 40% and it is expected that 2% is brokerage cost that shareholders will have to pay while investing their dividends in alternative securities. What is the cost of retained earnings?

$$\text{Cost of Retained Earnings} = K_r = K_e (1 - t) (1 - b)$$

K_e = rate of return available to shareholders

t = tax rate

b = brokerage cost

$$K_r = 15\% (1 - 0.4) (1 - 0.02)$$

$$= 15\% \times 0.6 \times 0.98$$

$$= 8.82\%$$

Cost of retained earnings can be calculated with the help of the following formula:

$$K_r = K_e (1 - T) (1 - B)$$

Where,

K_r = Cost of retained earnings

K_e = Cost of equity

T = Tax rate

B = Brokerage cost

PROBLEM NO 9

A firm's K_e (return available to shareholders) is 10%, the average tax rate of shareholders is 30% and it is expected that 2% is brokerage cost that shareholders will have to pay while investing their dividends in alternative securities. What is the cost of retained earnings?

Solution

$$\text{Cost of Retained Earnings, } K_r = K_e (1 - t) (1 - b)$$

Where,

K_e = rate of return available to shareholders 10% (OR) 0.10

t = tax rate 30% (OR) 0.30

b = brokerage cost 2% (OR) 0.02

So,

$$K_r = 10\% (1-30\%) (1-2\%)$$

$$K_r = 0.10 (1 - 0.30) (1 - 0.02)$$

$$K_r = 0.10 (0.7) (0.98)$$

$$K_r = 0.0686 \text{ (OR) } 6.86\%$$

WEIGHTED AVERAGE COST OF CAPITAL

The weighted average cost of capital (WACC) is the average rate that a business pays to finance its assets. It is calculated by averaging the rate of all of the company's sources of capital (both debt and equity), weighted by the proportion of each component.

PROBLEM NO 10

From the following particulars relating to the capital structure of Bee Ltd, calculate the overall cost of capital, using i) Book value weights ii) Market Value weights.

Sources of funds	Book Value (Rs)	Market Value (Rs)	After tax (%)
Equity Share Capital	45,000	90,000	14
Preference Capital	10,000	10,000	10
Debentures	30,000	30,000	8
Retained Earnings	15,000	-----	13

Solution

Computation of Weighted Average Cost of Capital

Book value weights

Sources of funds	Amount (Rs)	Proportion (w)	After tax (%) (x)	Weighted cost in% (w)x(x)
Equity Share Capital	45,000	$45,000/100,000=0.45$	14	6.30
Preference Capital	10,000	$10,000/100,000=0.10$	10	1.00
Debentures	30,000	$30,000/100,000=0.30$	8	2.40
Retained Earnings	15,000	$15,000/100,000=0.15$	13	1.95
Total	1,00,000			11.65

Computation of Weighted Average Cost of Capital

Market value weights

Definition of Cost of Capital

Sources of funds	Amount (Rs)	Proportion (w)	After tax (%) (x)	Weighted cost in% (w)x(x)
Equity Share Capital	90,000	$90,000/130000=0.692$	14	9.69
Preference Capital	10,000	$10,000/130000=0.077$	10	0.77
Debentures	30,000	$30,000/130000=0.231$	8	1.85
Retained Earnings	----	----	----	-----
Total	1,30,000			12.31

ILLUSTRATION 16

Cost of equity of a company is 10.41% while cost of retained earnings is 10%. There are 50,000 equity shares of Rs.10 each and retained earnings of Rs.15,00,000. Market price per equity share is Rs.50. Calculate WACC using market value weights if there are no other sources of finance.

SOLUTION

Book value of paid-up equity capital = ₹5,00,000

Book value of retained earnings = ₹15,00,000

Ratio Paid up equity capital & retained earnings = $500000:1500000=1:3$

Market value of paid equity capital & retained earnings = ₹50,000 x ₹50 = ₹25,00,000
Market value of paid-up equity capital = ₹25,00,000 x $\frac{1}{4}$ = ₹6,25,000

Market value of retained earnings = ₹25,00,000 x $\frac{3}{4}$ = ₹18,75,000

Calculation of WACC using market value weights

Source of capital	Market Value	Weights	Cost of capital	WACC (K _o)
	(₹)	(a)	(b)	(c) = (a)×(b)
Equity shares	6,25,000	0.25	0.1041	0.0260
Retained earnings	18,75,000	0.75	0.1000	0.0750
	25,00,000	1.000		0.1010

WACC(K_o)=0.1010or10.10%

ILLUSTRATION 17

CALCULATE the WACC using the following data by using:

- (a) Book value weights
- (b) Market value weights

The capital structure of the company is as under:

	(₹)
Debentures(₹100perdebenture)	5,00,000
Preference shares(₹100pershare)	5,00,000
Equity shares (₹10pershare)	10,00,000
	20,00,000

The market prices of these securities are:

Debentures ₹105 per debenture

Preference shares ₹110 per preference share

Equity shares ₹24 each

Additional information:

- (1) ₹100 per debenture redeemable at par, 10% coupon rate, 4% floatation costs, 10-year maturity.
- (2) ₹100 per preference share redeemable at par, 5% coupon rate, 2% floatation cost and 10-year maturity.
- (3) Equity shares have ₹4 floatation cost and market price ₹24 per share.

The next year expected dividend is ₹1 with annual growth of 5%. The firm has practice of paying all earnings in the form of dividend.

Corporate tax rate is 50%. Assume that floatation cost is to be calculated on face value

Solution

Definition of Cost of Capital

$$\text{Cost of Equity } (K_e) = \frac{D_1}{P_0 - F} + g = \frac{1}{24 - 4} + 0.05 = 0.1 \text{ or } 10\%$$

$$\text{Cost of Debt } (K_d) = \frac{I(1-t) + \left(\frac{RV - NP}{n} \right)}{\left(\frac{RV + NP}{2} \right)} = \frac{10(1-0.5) + \left(\frac{100 - NP}{n} \right)}{\left(\frac{RV + NP}{2} \right)}$$

$$\text{Cost of debt } = K_d = \frac{10(1-0.5) + \frac{(100-96)}{10}}{\frac{(100+96)}{2}} = \frac{(5+0.4)}{\left(\frac{98}{2} \right)} = 0.055 \text{ (approx.)}$$

$$\text{Cost of preference shares } = K_p = \frac{\left(\frac{5 + \frac{2}{10}}{\frac{198}{2}} \right)}{\left(\frac{99}{2} \right)} = \left(\frac{5.2}{99} \right) = 0.053 \text{ (approx.)}$$

Calculation of WACC using book value weights

Source of capital	Book Value	Weights	After tax cost of capital	WACC (K _o)
	(₹)	(a)	(b)	(c)=(a)×(b)
10% Debentures	5,00,000	0.25	0.055	0.0137
5% Preference shares	5,00,000	0.25	0.053	0.0132
Equity shares	10,00,000	0.50	0.10	0.0500
	20,00,000	1.00		0.0769

WACC(K_o)=0.0769 or 7.69%

Calculation of WACC using market value weights

Source of capital	Market Value	Weights	After tax cost of capital	WACC (K _o)
	(₹)	(a)	(b)	(c) = (a)×(b)
10% Debentures (₹105×5,000)	5,25,000	0.151	0.055	0.008
5% Preference shares (₹110×5,000)	5,50,000	0.158	0.053	0.008
Equity shares (₹24×1,00,000)	24,00,000	0.691	0.10	0.069
	34,75,000	1.000		0.085

WACC(K_o)=0.085 or 8.5%

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 up to 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 soon. 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.

ILLUSTRATION 18

ABC Ltd. has the following capital structure EXAMINE which is considered to be optimum as on 31st March, 2017.

	(₹)
14% Debentures	30,000
11% Preference shares	10,000
Equity Shares (10,000 shares)	1,60,000
	2,00,000

The company share has a market price of ₹ 23.60. Next year dividend per share is 50% of year 2017 EPS. The following is the trend of EPS for the preceding 10 years which is expected to continue in future.

Year	EPS (₹)	Year	EPS (₹)
2008	1.00	2013	1.61
2009	1.10	2014	1.77
2010	1.21	2015	1.95
2011	1.33	2016	2.15
2012	1.46	2017	2.36

The company issued new debentures carrying 16% rate of interest and the current market price of debenture is ₹ 96.

Definition of Cost of Capital

Preference share ₹ 9.20 (with annual dividend of ₹1.1pershare) were also issued. The company is in 50% tax bracket.

(A) CALCULATE after tax:

(i) Cost of new debt

(ii) Cost of new preference shares

(iii) New equity share (assuming new equity from retained earnings)

(B) CALCULATE marginal cost of capital when no new shares are issued.

(C) DETERMINE the amount that can be spent for capital investment before new ordinary shares must be sold. Assuming that retained earnings for next year's investment are 50 percent of 2017.

(D) COMPUTE marginal cost of capital when the fund exceeds the amount calculated in (C), assuming new equity is issued at ₹ 20 per share?

SOLUTION

(A) (i) Cost of new debt

$$K_d = \frac{I(1-t)}{P_0}$$

$$= \frac{16(1-0.5)}{96} = 0.0833$$

(ii) Cost of new preference shares

$$K_p = \frac{PD}{P_0}$$

$$= \frac{1.1}{9.2} = 0.12$$

9.2

(iii) Cost of new equity shares

$$K_e = \frac{D_1}{P_0} + g$$

$$= \frac{1.18}{23.60} + 0.10 = 0.05 + 0.10 = 0.15$$

Calculation of D_1

$$D_1 = 50\% \text{ of } 2013 \text{ EPS} = 50\% \text{ of } 2.36 = ₹1.18$$

(B) Calculation of marginal cost of capital

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2)×(3)=(4)
Debenture	0.15	0.0833	0.0125
Preference Share	0.05	0.12	0.0060
Equity Share	0.80	0.15	0.1200
	Marginal cost of capital		0.1385

(C) The company can spend the following amount without increasing marginal cost of capital and without selling the new shares:

$$\text{Retained earnings} = (0.50) (2.36 \times 10,000) = ₹11,800$$

The ordinary equity (Retained earnings in this case) is 80% of total capital
 $11,800 = 80\% \text{ of Total Capital}$

Capital investment before issuing equity =

?

$$= ₹11,800$$

$$14,750$$

$$= 0.80$$

(D) If the company spends in excess of ₹14,750 it will have to issue new shares.

$$(E) \quad \text{Capital investment before issuing equity} = ₹ \frac{1.18}{20} + 0.10 = 0.159$$

The marginal cost of capital will be :

Type of Capital	Proportion	Specific Cost	Product
(1)	(2)	(3)	(2)×(3)=(4)
Debentures	0.15	0.0833	0.0125
Preference Shares	0.05	0.1200	0.0060
Equity Shares (New)	0.80	0.1590	0.1272
			0.1457

7.9 SUMMARY

Definition of Cost of Capital

Cost of Capital: In simple terms Cost of capital refers to the discount rate that is used in determining the present value of the estimated future cash proceeds of the business/new project and eventually deciding whether the business/new project is worth undertaking or not. It is also the minimum rate of return that a firm must earn on its investment which will maintain the market value of share at its current level. It can also be stated as the opportunity cost of an investment,

i.e. the rate of return that a company would otherwise be able to earn at the same risk level as the investment that has been selected.

Components of Cost of Capital: In order to calculate the specific cost of each type of capital, recognition should be given to the explicit and the implicit cost. The cost of capital can be either explicit or implicit. The explicit cost of any source of capital may be defined as the discount rate that equals the present value of the cash inflows that are incremental to the taking of financing opportunity with the present value of its incremental cash outflows. Implicit cost is the rate of return associated with the best investment opportunity for the firm and its shareholders that will be foregone if the project presently under consideration by the firm was accepted.

Measurement of Specific Cost of Capital for each source of Capital: The first step in the measurement of the cost of the capital of the firm is the calculation of the cost of individual sources of raising funds. From the viewpoint of capital budgeting decisions, the long-term sources of funds are relevant as they constitute the major sources of financing the fixed assets. In calculating the cost of capital, therefore the focus is on long-term funds and which are: -

- Long term debt (including Debentures)
- Preference Shares
- Equity Capital

Retained Earnings

Weighted Average Cost of Capital: - WACC (weighted average cost of capital) represents the investors' opportunity cost of taking on the risk of putting money into a company. Since every company has a capital structure

i.e. what percentage of funds comes from retained earnings, equity shares, preference shares, debt and bonds, so by taking a weighted average, it can be seen how much cost/interest the company has to pay for every rupee it borrows/invest. This is the weighted average cost of capital.

7.10 EXERCISES

MCQ

1. **The cost of equity shares or debt is known as _____.**

- a. The specific cost of capital
- b. The related cost of capital
- c. The burden on the shareholder
- d. None of the above

Answer: a

2. **Which of the following methods involves computing the cost of capital by dividing the dividend by market price/net proceeds per share?**

- a. Adjusted price method
- b. Price earning method
- c. Dividend yield method
- d. Adjusted dividend method

Answer: c

3. **In weighted average cost of capital, an organization can affect its cost of capital through _____.**

- a. The policy of investment
- b. The policy of capital structure
- c. The policy of dividends
- d. All of the above

Answer: d

4. **_____ is the rate of return for the most viable investment opportunity for a company that they will forgo by selecting any other project.**

- a. Implicit cost
- b. Specific cost
- c. Explicit cost
- d. None of the above

Answer: a

5. **What is Marginal Cost?**

- a. It is the cost of raising an additional unit of capital
- b. It is the additional cost of capital when the company decides to raise finance for its operations
- c. It is the weighted average cost of raising finance
- d. All of the above

Answer: a

6. Which of the following statements are true?

- a. When the dividends, earnings and the price of an equity share are growing at the same rate, the dividend growth method can compute the cost of equity capital
- b. The risk premium for a stock is arrived at by adding the risk-free rate to the market rate of return
- c. Both a and b are false
- d. Both a and b are true

Answer: d

7. The premium that is considered to be the difference between the current yield on treasury bonds and the expected return on common stock is _____.

- a. Current risk premium
- b. Past risk premium
- c. Expected premium
- d. None of the above

Answer: a

8. Which among the following figures is not relevant while calculating the cost of the redeemable preference shares?

- a. Earnings per share
- b. Flotation cost
- c. Discount
- d. None of the above

Answer: a

9. Which of the following factors affecting the cost of capital can be controlled by the firm?

- a. Tax rates
- b. Dividend policy
- c. Level of interest rates
- d. All of the above

Answer: b

10. Which of the following is an uncontrollable factor that affects the cost of capital for a firm?

- a. Capital structure policy
- b. Debt service charges
- c. Investment policy
- d. None of the above

Answer: d

11. _____ is the cost that is used to raise the common equity of a firm by reinvestment of the internal earnings.
- a. Cost of reserve assets
 - b. Cost of stocks
 - c. Cost of mortgage
 - d. Cost of common equity

Answer: d

12. Which of the following factors affects the determination of the cost of capital for a firm?
- a. Operating and financing decisions
 - b. General economic factors
 - c. Market conditions
 - d. All of the above

Answer: d

13. The cost of capital for a firm _____.
- a. Is the return required on the total assets of a firm
 - b. Refers to the internal rate of return
 - c. Varies inversely with the overall cost of debt
 - d. None of the above

Answer: a

14. The cost of equity share capital is greater than the cost of debt because _____.
- a. Equity shares carry a higher risk than debts
 - b. The face value of equity shares is lower than the face values of debentures in most cases
 - c. Equity shares do not provide a fixed dividend rate
 - d. Equity shares are not easily saleable

Answer: a

15. The cost of preference share capital is calculated by _____.
- a. Dividing the price per preference share by the fixed dividend per share
 - b. Dividing the book value per preference share by the fixed dividend per share
 - c. Dividing the price per preference share by the fixed dividend per share and then adding the growth rate
 - d. Dividing the price per preference share by the fixed dividend per share and then adding the risk premium

Answer: a

True or false

Definition of Cost of Capital

1. Capital structure in essence is a firm's mix of long-term financing. **TRUE**
2. The company cost of capital is the expected rate of return that investors demand from the company's assets and operation. **TRUE**
3. Amazon.com exhibits lower weighted-average cost of capital than Intel. **FALSE**
4. Weighted-average cost of capital is the expected rate of return on a portfolio of all the firm's securities, adjusted for tax savings due to interest payments. **TRUE**
5. If a project has zero NPV when the expected cash flows are discounted at the weighted-average cost of capital, then the project's cash flows are just sufficient to give debt holders and shareholders the return they require. **True**
6. McDonalds weighted average cost of capital is lower than that of Wal-Mart. **FALSE**
7. There are two costs of debt finance. The explicit cost of debt is the rate of interest that bondholders demand. But there is also an implicit cost, because over-borrowing increases the required rate of return to equity. **TRUE**
8. The weighted-average cost of capital is the return the company needs to earn after tax in order to satisfy all its security holders. **TRUE**
9. If the firm decreases its debt ratio, both the debt and the equity will become riskier. The debtholders and equity holders require a higher return to compensate for the increased risk. **FALSE**
10. If we ignore taxes, the overall cost of capital will stay constant as the fractions of debt and equity change. **TRUE**
11. The company cost of capital does not make an adjustment for the tax effect. **TRUE**
12. The riskiness of equity securities typically exceeds that of debt securities for firms. **TRUE**

Exercises

1. Why is the cost of capital the minimum acceptable rate of return on an investment?
2. How is the Cost of Debt Capital ascertained? Give examples.
3. How will you calculate the Cost of Preferences Share Capital?
4. Which method of calculating the cost of equity shares would be most appropriate for the following firms:

5. A profitable firm that has never paid a dividend, but has had steady growth in earnings.
6. An electricity company that has paid a dividend every year for the last eighty years.
7. How would you find the cost of capital for proprietorship or partnership?
8. Can you think of any ways to do this "? List them.
9. "Retained earnings does not have cost" comment.
10. Discuss various uses of the concept of Cost of Capital.
11. Determine the cost of capital for the following securities. These are issued by different firms and the tax rate is 40 percent.
12. A seven-year debenture with a coupon interest of 10 percent. The debenture matures in five years and has a current market price of Rs. 90 as against its par value of Rs. 100.
13. A preference share pays 7 percent dividend. Par value is Rs. 100 per share and its current market price is Rs. 80.
14. A firm issued 100 10% debentures, each of Rs. 100 at 5% discount. The debentures are to be redeemed at the end of 10th year. The tax rate is 50%. Calculate cost of debt capital.
15. A company has issued 11% debentures for Rs. 2,00,000. The underwriting, brokerage and other issuance costs amount to Rs. 10,000. The terms of debenture issue provide for repayment of principal in 5 equal instalments starting at the end of the first year. The tax rate is 60%. Calculate cost of debt capital.
16. There are two firms, A and B. The firm A has no debt and is totally financed by equity capital. The firm B has Rs. 200 lakhs outstanding debt and pays an interest rate of 10%. The firm's net income after-taxes are calculated using three tax rates, 0, 25 and 50 percent and the resulting values of net incomes are compared. Assume that the earnings before interest and taxes of both firms is Rs. 100 lakhs each. Calculate cost of debt capital.
17. A company raised loan by selling 250 debentures with 10% rate of interest at premium of Rs. 5 per debentures (Par value = Rs. 100), redeemable at the end of 10th year. Underwriting and other issuance costs amounted to 3% of the proceeds. The tax rate is 50%. Calculate cost of debt capital.
18. A firm intends to issue 10,000 10% debentures each of Rs. 10. What is the cost of capital if the firm desires to sell at 5% premium. The tax rate is 50%.

19. A firm issued 10,000, 10% debentures of Rs. 10 each at a premium of .5% with a maturity period of 20 years. The tax rate is 50%. Find the cost of capital.
20. A company is planning to issue 9% preference shares expected to sell at Rs. 85 per share. The costs of issuing and selling the shares are expected to be Rs. 3 per share.
21. A company issued Rs. 100 preference shares with a 7% dividend on a price of Rs. 110 with a provision to redeem the capital at the end of 5-year period. Calculate cost of preference share capital.
22. A firm has Rs. 5 EPS and 10% growth rate of earnings over a period of 3 years. The current market price of equity share is Rs. 50
23. A firm has Rs. 3 EPS and 10% growth rate of earnings over a period of 3 years. The current market price of equity share is Rs. 100. Compute the cost of equity capital.
24. A firm issues 8.1 % non-redeemable preferences share of Rs. 10 each for Rs. 1000, underwriting costs are 6% of the sale price. Compute the cost of capital if shares are issued at discount of 2.5 percent and at premium of 5%.



CAPITAL STRUCTURE

Unit Structure:

- 8.0 Learning Outcome
- 8.1 Introduction
- 8.2. Factors Determining Capital Structure
- 8.3. EBIT-EPS analysis
- 8.4. Importance of Capital Structure
- 8.5. Theories of Capital Structure
- 8.6. Question

8.0 LEARNING OUTCOME

After completing this module student will be able to:

1. Understand the meaning of Capital Structure
2. Know about the Optimal Capital Structure
3. Understand the planning of Capital Structure
4. Know the concept of Capital Gearing
5. Understand the determinant of Capital Structure

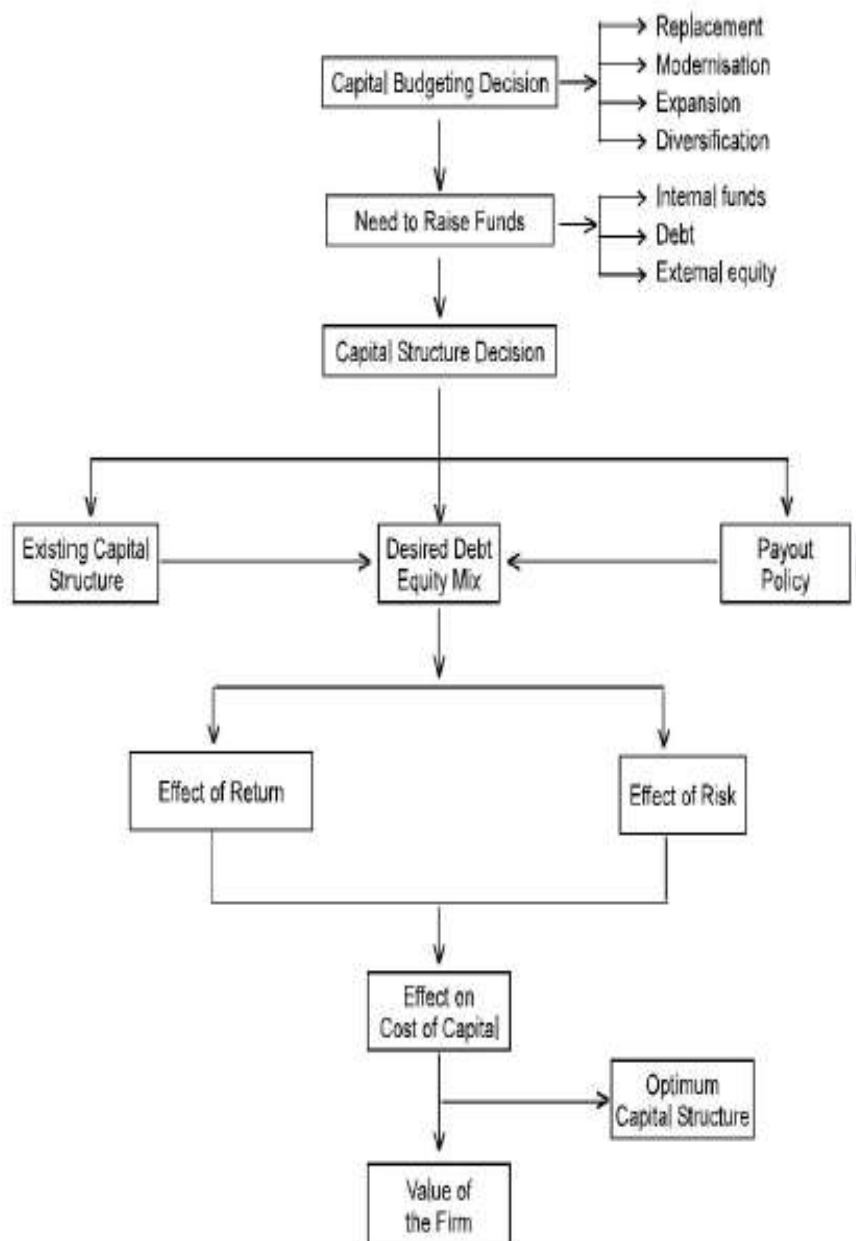
8.1 INTRODUCTION

Gersten berg defines Capital Structure as the types of securities issued by a company and the proportionate amount that make up capitalisation. In other words, it refers to the composition or make up or mix of capital i.e. in what proportion equity capital, preference share capital, debentures etc. have been issued. But the question arises how this proportion is to be determined.

Gersten berg has laid down the following two general principles:

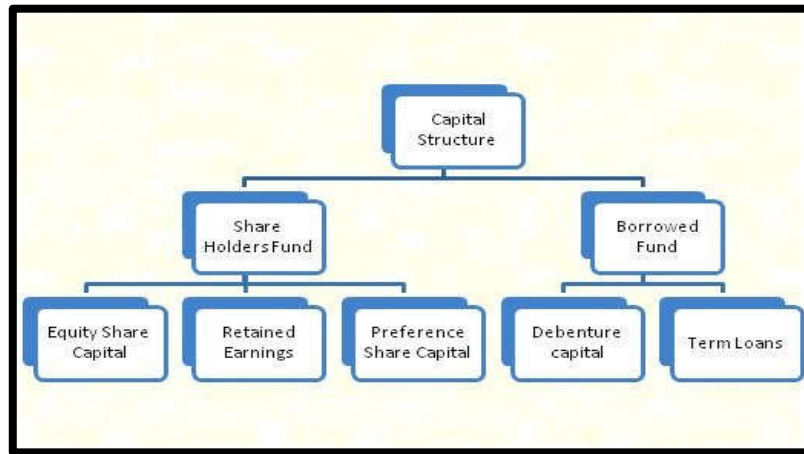
1. The greater the stability of earnings, the higher may be the ratio of bonds to stock in the capital structure.
2. The capital structure should be balanced with a sufficient equity cushion to absorb the shocks of business cycle and to afford flexibility.

A capital structure decision refers to deciding the forms of financing i.e. which sources to be tapped, their actual requirement and the relative proportion in total capitalisation. Thus, whenever funds are to be raised for long term perspective to finance investment, capital structure decision is involved. The form or quality of financing in capital structure depends upon the nature of requirement of finance. The process of financing or capital structure decision is shown in the figure below:



Capital structure refers to the proportions or combinations of equity share capital, preference share capital, debentures, long-term loans, retained earnings and other long-term sources of funds in the total amount of capital which a firm should raise to run its business. Capital structure of a company refers to the make-up of its Capitalization and it includes all long-term capital resources viz., loans, reserves, shares and bonds. Capital structure refers to an arrangement of the different components of business

funds, i.e. shareholder's funds and borrowed funds in proper proportion. A business organization utilizes the funds for meeting the everyday expenses and also for budgeting high-end future projects.



8.1.1. Shareholder's Funds

The owner's funds refer to generating capital by issuing new shares or utilizing the retained earnings to meet up the company's financial requirement. However, it is an expensive means of acquiring funds. The three sources of capital acquisition through shareholder's funds are as follows:

- **Equity Share Capital:** The new shares are issued to the equity shareholders who enjoy the ownership of the company are liable to get dividends in proportion to the profits earned by the company. They are also exposed to the risk of loss associated with the company.
- **Preference Share Capital:** The preference shareholders enjoy a fixed rate of dividends along with preferential rights of receiving the return on capital in case of the company's liquidation, over the equity shareholders. However, they have limited rights of voting and control over the company.
- **Retained Earnings:** The Company sometimes utilize the funds available with it as retained earnings accumulated by keeping aside some part of the profit for business growth and expansion.

8.1.2. Borrowed Funds

The capital which is acquired in the form of loans from the external sources is known as borrowed funds. These are external liabilities of the firm, which leads to the payment of interests at a fixed rate. However, there is a tax deduction on such borrowings; it creates a burden on the company. Following are the various types of borrowed funds:

Debentures: It is a debt instrument which the companies and the Government Issue to the public. Though the rate of interest is quite high on debentures, they are not by any collateral or security.

Term Loans: The fund acquired by the company from the bank at a floating or fixed rate of interest is known as a term loan. This is an appropriate source of fund for the companies which have a good and strong financial position.

8.2. FACTORS DETERMINING CAPITAL STRUCTURE

1. Cash Flow Position:

The decision related to composition of capital structure also depends upon the ability of business to generate Sufficient cash flow. A company employs more of debt securities in its capital structure if company is sure of generating Sufficient cash Inflow whereas if there is shortage of cash then it must employ more of equity in its capital structure as there is no liability of company to pay its equity shareholders.

2. Interest Coverage Ratio (ICR):

It refers to number of time companies' earnings before interest and taxes (EBIT) cover the interest payment obligation.

$$\text{ICR} = \text{EBIT} / \text{Interest}$$

High ICR means companies can have more of borrowed fund securities whereas lower ICR means less borrowed fund securities.

3. Debt Service Coverage Ratio (DSCR):

It is one step ahead ICR, i.e., ICR covers the obligation to pay back interest on debt but DSCR takes care of return of interest as well as principal repayment.

$$\text{DSCR} = \frac{\text{Profit after tax} + \text{Depreciation} + \text{Interest} + \text{Non Cash Exp. written off}}{\text{Preference Dividend} + \text{Interest} + \text{Repayment obligation}}$$

If DSCR is high then company can have more debt in capital structure as high DSCR indicates ability of company to repay its debt but if DSCR is less then company must avoid debt and depend upon equity capital only.

4. Return on Investment:

Return on investment is another crucial factor which helps in deciding the capital structure. If return on investment is more than rate of interest then company must prefer debt in its capital structure whereas if return on investment is less than rate of interest to be paid on debt, then company should avoid debt and rely on equity capital.

5. Cost of Debt:

If firm can arrange borrowed fund at low rate of interest, then it will prefer more of debt as compared to equity.

6. Tax Rate:

High tax rate makes debt cheaper as interest paid to debt security holders is subtracted from income before calculating tax whereas companies have to pay tax on dividend paid to shareholders. So high end tax rate means prefer debt whereas at low tax rate we can prefer equity in capital structure.

7. Cost of Equity:

Another factor which helps in deciding capital structure is cost of equity. Owners or equity shareholders expect a return on their investment i.e., earning per share. As far as debt is increasing earnings per share (EPS), then we can include it in capital structure but when EPS starts decreasing with inclusion of debt then we must depend upon equity share capital only.

8. Floatation Costs:

Floatation cost is the cost involved in the issue of shares or debentures. These costs include the cost of advertisement, underwriting statutory fees etc. It is a major consideration for small companies but even large companies cannot ignore this factor because along with cost there are many legal formalities to be completed before entering into capital market. Issue of shares, debentures require more formalities as well as more floatation cost. Whereas there is less cost involved in raising capital by loans or advances.

9. Risk Consideration:

Financial risk refers to a position when a company is unable to meet its fixed financial charges such as interest, preference dividend, payment to creditors etc. Apart from financial risk business has some operating risk also. It depends upon operating cost; higher operating cost means higher business risk. The total risk depends upon both financial as well as business risk.

If firm's business risk is low then it can raise more capital by issue of debt securities whereas at the time of high business risk it should depend upon equity.

10. Control:

The equity shareholders are considered as the owners of the company and they have complete control over the company to take all the important decisions for managing the company.

Trading on Equity:

8.2.1. Situation I:

Total Capital=Rs50Lakhs

Equity Capital=Rs50Lakhs(5,00,000shares@Rs10each) Debt = Nil

Tax rate=30% p.a.

Earnings before interest and tax (EBIT)=Rs7,00,000 Situation II:

Total Capital = Rs50 Lakhs

Equity Capital = Rs40Lakhs (4,00,000shares@Rs10each) Debt = Rs 10 Lakhs

Tax rate = 30% p.a. Interest on debt=10%

Earnings before interest and tax (EBIT) = Rs7,00,000 Situation III:

Total Capital = Rs50 Lakhs

Equity Capital = Rs30 Lakhs (3,00,000 shares @ Rs10 each) Debt = Rs 20 Lakhs

Tax rate = 30% p.a. Interest on debt = 10%

Earnings before interest and tax (EBIT) = Rs7, 00,000

Ans:

Calculation of Earnings per share (EPS) in all the situations.

	Situation I	Situation II	Situation III
EBIT (Earnings Before Interest and Tax) Less: Interest	7,00,000 0	7,00,000 -1,00,000 (10% of 10 lakhs)	7,00,000 -2,00,000 (10% of 20 lakhs)
EBT (Earnings Before Tax) Less: Tax (30% of EBT)	7,00,000 -2,10,000 (30% of 7 lakhs)	6,00,000 -1,80,000 (30% of 6 lakhs)	5,00,000 -1,50,000 (30% of 5 lakhs)
EAT (Earning After Tax)	4,90,000	4,20,000	3,50,000
EPS (EAT / No. of Equity Shares)	Rs.0.98 [4,90,000 / 5,00,000]	Rs.1.05 [4,20,000 / 4,00,000]	Rs.1.16 [3,50,000 / 3,00,000]

If we compare the above table, we can see that in situation III equity shareholders get maximum return followed by II situation and least earning in I situation. Hence it is proof that more debt brings more income for owners in the capital structure.

8.3. EBIT-EPS ANALYSIS:

If the level of EBIT is low from HPS point of view, equity is preferable to debt. If the EBIT is high from EPS point of view, debt financing is preferable to equity. If ROI is less than the interest on debt, debt financing decreases ROE. When the ROI is more than the interest on debt, debt financing increases ROE.

8.4. IMPORTANCE OF CAPITAL STRUCTURE:



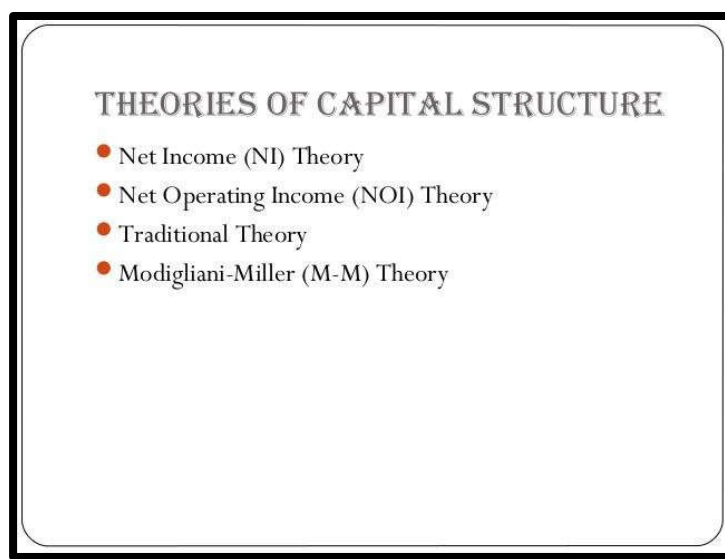
- i. **Return Maximization:** A well-designed capital structure provides a scope of increasing the earnings per share, which ultimately maximizes the return for equity shareholders and recover the cost of borrowings.
- ii. **Flexibility:** It also facilitates the expansion or contraction of the debt capital to suit the business strategies and conditions.
- iii. **Solvency:** A sound capital structure helps to maintain liquidity in the firm because an unplanned debt capital leads to the burden of interest payments, ultimately reducing the cash in hand.
- iv. **Increases Firm's Value:** Investors prefer to put in their money in the company, which has a sound capital structure. Thus, leading to a rise in the market value of the firm's shares and securities.

- v. **Reduces Financial Risk:** Balancing the proportion of debt and equity in the business through capital structure assist the business firms in managing and minimizing risk.
- vi. **Minimizes Cost of Capital:** It provides for planning the long-term debt capital of the company strategically and thus reducing the cost of capital.
- vii. **Optimum Utilization of Funds:** A well planned, strategically designed and systematically arranged capital structure assists the companies in generating maximum output from the available funds.

8.4.1 Features of the Good Capital Structure:

- i. **Profitability:** it should ensure most profits are earned. It should offer the least cost of financing with maximum returns
- ii. **Solvency:** the structure should not lead the company to a point it risks being insolvent. Too much debt threatens a company's solvency so any debt taken should be manageable
- iii. **Flexibility:** should things change the capital structure should be one that can be easily maneuvered to meet new market demands

8.5. THEORIES OF CAPITAL STRUCTURE



8.5.1. Net Income (NI) Approach:

This approach is based upon the following assumptions:

- There are no corporate taxes.
- The cost of debt is less than the cost of equity i.e. the capitalization rate of debt is less than the rate of equity capitalization. This prompts the firm to borrow.

- The debt capitalization rate and the equity capitalization rate remain constant.
- The proportion of the debt does not affect the risk perception of the investors. Investors are only concerned with their desired return.
- The cost of debt remains constant at any level of debt.
- Dividend Payout ratio is 100%.

The total market value of a firm on the basis of Net Income Approach is $V=S+D$ Where, V = Total market value of a firm

S = Market value of equity shares

= Earnings Available to Equity Shareholders (E) ÷ Equity Capitalization Rate (K_e) D = Market value of debt,

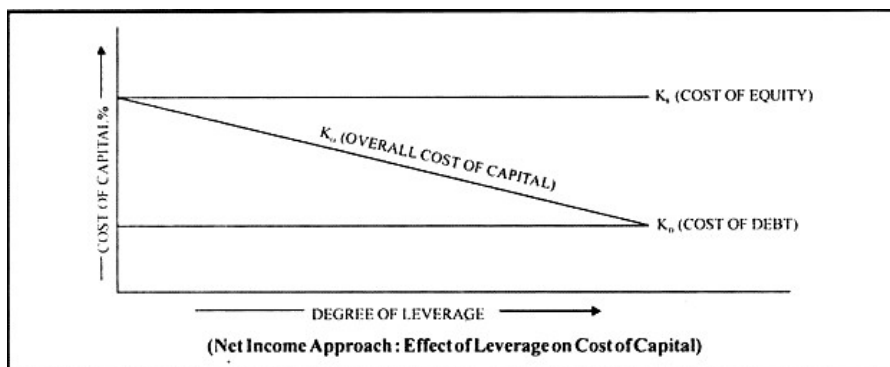
= Total Interest payment on Debenture (I_d) ÷ Cost of Debt Capital (K_d) Overall Cost of Capital or Weighted Average Cost of Capital can be calculated as: $K_0 = EBIT \div V$

$$K_0 = W_1 \times K_d + W_2 \times K_e$$

W_1 = Proportion of Market value of the Debt Capital in The Total value of the Firm (i.e) Relevant Weight of the Debt Capital

W_2 = Proportion of Market value of the Equity Capital in The Total value of the Firm (i.e)

Relevant Weight of the Equity Capital



$$K_0 = \frac{S}{V} K_e + \frac{D}{V} K_d$$

Where,

D = Total market Value of Debt Capital

S = Total Market Value of Equity Share Capital $V = D + S$

$V = \text{Total market Value of Debt Capital} + \text{Total Market Value of Equity Share Capital}$

Capital Structure

Example1:

XLtd.is expecting anannual EBIT of Rs. 1 Lakh. The company has Rs.4 Lakhs in10% debentures. The cost of equity capital or Capitalisation rate is 12.5%.

Ans:

Calculation of the Value of the Firm	
Net Income (EBIT)	₹ 1,00,000
Less : Interest on 10% Debentures of ₹ 4,00,000	40,000
Earnings available to equity shareholders	60,000
Market Capitalisation Rate	12.5%
Market Value of Equity (S) = $60,000 \times \frac{100}{12.5}$	4,80,000
Market Value of Debentures (D)	4,00,000
Value of the Firm (S + D)	8,80,000

Calculation of Value of the Firm if Debenture Debt is Raised to ₹ 3,00,000	
Net Income	₹ 80,000
Less : Interest on 8% Debentures of ₹ 3,00,000	24,000
Earnings available to equity shareholders	56,000
Equity Capitalisation Rate 10%	10%
Market Value of Equity = $56,000 \times \frac{100}{10}$	5,60,000
Market Value of Debentures	3,00,000
Value of the Firm	8,60,000
Overall Capitalisation Rate = $\frac{80,000}{8,60,000} \times 100 = 9.30\%$	

Example2:

A company expects a net income of Rs. 80,000. It has Rs. 2,00,000, 8% Debentures. The equity Capitalisation rate of the company is 10%. Calculate the value of the firm and overall Capitalisation rate according to the Net Income Approach (Without Tax Rate)

Ans:

(a) Calculation of the Value of the Firm	
Net Income	₹ 80,000
Less : Interest on 8% Debentures of ₹ 2,00,000	16,000
Earnings available to equity shareholders	64,000
Equity Capitalisation Rate	10%
Market Value of equity (S) = $64,000 \times \frac{100}{10}$	6,40,000
Market Value of Debentures (D)	2,00,000
Value of the Firm (S + D)	8,40,000
Calculation of Overall Capitalisation Rate	
Overall Cost of Capital (k_w) = $\frac{\text{Earnings}}{\text{Value of the firm}} \left(\frac{\text{EBIT}}{V} \right)$	
= $\frac{80,000}{8,40,000} \times 100 = 9.52\%$	

If In the Above Example 2: The Debenture Debt Is Increased to Rs. 3,00,000, What Will Be the Value of The Firm and The Overall Capitalization Rate. (Without Tax Rate)

Ans:

8.5.2.Net Operating Income Approach:

The NOI approach is based on following assumptions:

- There are no corporate taxes.
- Cost of debt remains constant at all level of debt.
- Overall cost of capital remains constant.
- Value of the firm depends on expected net operating income and overall capitalization rate or the opportunity cost of capital.
- Net operating income of the firm is not affected by the degree of financial leverage.
- The operating risk or business risk does not change with the change in debt equity mix.
- WACC does not change with the change in financial leverage.

$$V = \text{EBIT} \div K_0$$

Where, V = Value of a firm

EBIT = Net operating income or Earnings before interest and tax K_0 = Overall cost of capital

The Market Value of Equity, According to This Approach Is the Residual Value Which Is Determined by Subtracting the Market Value of Debentures from The Total Market Value of The Firm.

$$S = V - D$$

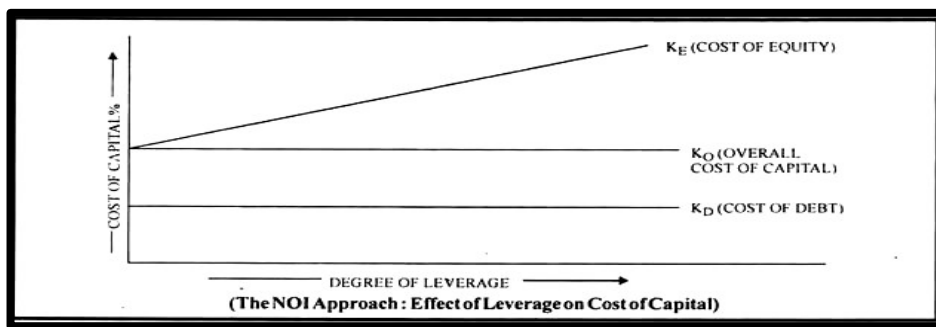
Where, S = Market value of equity shares V = Total market value of a firm

D = Market value of debt

The cost of equity or equity capitalization rate can be calculated as below:

$$\text{Cost of Equity or Equity Capitalisation Rate } (K_e) = \frac{\text{Earnings after Interest and Before Tax}}{\text{Market Value of Firm} - \text{Market Value Debt}}$$

$$\frac{\text{EBIT} - I}{V - D} \quad K_e = K_0 + (K_0 - K_d) \left(\frac{D}{S} \right)$$



Example:1

P Ltd Has Operating Profit of Rs.100000. Its Overall Cost of Capital 10%. Cost of Debt capital is 6%. The Company has Employed Debt Capital Rs. 500000.

1. Calculate the Value of Equity Capital and Cost of Equity Capital Under NOI Approach.
2. What Will Be Implication Increase of Debt Capital firm Rs. 500000 to Rs.700000.

Ans:

1. Calculation of the Value of Equity Capital and Cost of Equity Capital Under NOI Approach

$$V = D + S \quad S = V - D$$

D = Total market Value of Debt Capital

S = Total Market Value of Equity Share Capital

V = Total market Value of Debt Capital + Total Market Value of Equity Share Capital

$$\text{Value of the Firm (V)} = \text{EBIT} \div K_0 \quad V = \text{Rs.}100000 \div 0.10$$

$$V = \text{Rs.}1000000.$$

$$\text{Value of the Debt capital (D)} = I_d \div K_d \quad I_d = (\text{Rs.}500000 \times 6\%)$$

$$D = \frac{\text{Rs.}30000}{0.06}$$

$$D = \text{Rs.}500000$$

$$\text{Value of Equity Share Capital (S)} = V - D \quad S = \text{Rs.}1000000 - \text{Rs.}500000$$

$$S = \text{Rs.}500000.$$

$$\text{Cost of Equity Capital (K}_e\text{)} = \frac{\text{EBIT} - I}{V - D}$$

$$K_e = \frac{100000 - 30000}{500000} \times 100$$

$$K_e = 14\%$$

Or, Cost of Equity Capital Can be Calculated As:

$$K_e = K_0 + (K_0 - K_d) \left(\frac{D}{V} \right)$$

$$\text{Or, } K_e = 0.10 + (0.10 - 0.06) \left(\frac{500000}{500000} \right) \text{ Or, } K_e = 0.10 + 0.04$$

$$\text{Or, } K_e = 14\%.$$

2. Calculation of the Value of Equity Capital and Cost of Equity Capital When Increase of Debt Capital firm Rs.500000 to Rs.700000

Ans:

$$\text{Value of Equity Share Capital (S)} = V - D \quad S = \text{Rs.}1000000 - \text{Rs.}700000$$

$$S = \text{Rs.}300000.$$

$$\text{Value of the Debt capital (D)} = I_d \div K_d \quad I_d = (\text{Rs.}700000 \times 6\%)$$

$$D = \frac{\text{Rs.}42000}{0.06}$$

$$D = \text{Rs.}700000$$

$$\text{Cost of Equity Capital (K}_e\text{)} = \frac{EBIT - I}{V - D}$$

$$K_e = \frac{100000 - 42000}{300000} \times 100$$

$$K_e = 19.33\%$$

Example2:

Company X And Company Y Are in the Same Risk Class and Identical in All Respect Except that company X Uses Debts While Company Y Does not Uses debt Capital. Levered Company Has Rs.900000Debt Capital, carrying10%ofInterest.Both the Company's EBITRs 300000.TaxRate is 50% And Capitalization Rate is 15% for All Equity Company.

1. Calculation Value of Both the Companies Using NI Approach.
2. Calculation Value of Both the Companies Using NOI Approach.
3. Using NOI Approach, Calculate the Overall cost of Capital for Both the Companies.

Ans:

Calculation Value of Both the Companies Using NI Approach:

Capital Structure

Particulars	Company X (Rs)	Company Y (Rs)
Earnings Before Interest and Tax (EBIT)	300000	300000
Less: Interest (Rs.900000 X10%)	(90000)	Nil
Earning Before Tax (EBT)	210000	300000
Less: Tax@50%	(105000)	(150000)
Earnings After Tax (EAT)	105000	150000
Equity Capitalization Rate (K_e)	0.15	0.15
Value of Equity (S) = $(EAT \div K_e)$	700000	1000000
Value of Debt (D) = $(I_d \div K_d)$	900000	Nil
Value of the Firm (V) = S+D	1600000	1000000

Calculation Value of Both the Companies Using NOI Approach

Particulars	Company X (Rs)	Company Y (Rs)
Earnings Before Interest and Tax (EBIT)	300000	300000
Equity Capitalization rate (K_e)	0.15	0.15
Tax rate	0.50	0.50
Vale of the Firm (V) = $\frac{EBIT(1-t)}{K}$	1000000	1000000
Value of Debt (D) = $(I_d \div K_d) (1-t)$	450000	Nil
Value of Equity (S) = V – D	550000	100000
Add: Value of Debt (D)= $(I_d \div K_d)$ before Tax Rate	900000	Nil
Vale of the Firm (V)=S+D	1450000	100000

Q:1 XYZ and Co. has the following Capital Structure

Particulars	Amount in Rs.
Equity Share Capital of Rs. 10 each	100000
10% Preference Share Capital	50000
Reserves & Surplus	50000
8% Debentures	100000
TOTAL	300000

1. By issue of Equity Shares.

2. By issue of 7% Preference Shares

3. By issue of 10% Bonds.

Calculation of Equity Shares:

Old Equity Share Capital = Rs.100000

No. of Equity Shares= Old Share Capital

Face Value of 1 share

100000 = 10000 shares

10

Alternate 1. Old Rs. 100000 + New Rs. 100000 =

No. of Equity Shares = New Share Capital =

Face value of 1 share

10

Particulars	Existing
EBIT	200000
Less: - Interest	
a. Old 8% Debentures (100000*8%)	-8000
b. New 10% Bonds (100000*10%)	nil
EBT	192000
Less: Tax @50%	-96000
EAT	96000
Less: Preference Dividend	
a) Old 10% Preference Share Capital	-5000
(50000*10%)	
b) New 7% Preference Share Capital	nil
(100000*7%)	

EAESH	91000
Formula:	
EPS = EAESH	91000
No of Equity shares	10000
	9.1 per share

Capital Structure

Q:2

Particulars	Amount in Rs.
Equity Share Capital of Rs. 10 each	500000
8% Preference Share Capital	200000
Reserves & Surplus	100000
10% Bonds	200000
Total	1000000

EBIT = Rs.300000, Tax @40%. Company requires Rs. 150000.EBIT remains the same.

There are 3 alternatives.

1. Issue of 11% Debentures
2. Issue of 9% Preference Shares
3. Issue of Equity Share Capital

Computation of EPS and Capital Plans

	Particulars	Existing	I	II	III
1	EBIT	300000	300000	300000	300000
2	Less:- Interest				
	a. Old 10% Bonds (200000*10%)	-20000	-20000	-20000	-20000
	b. New 11% Debentures (100000*10%)		-16500		
3	EBT	280000	263500	280000	280000
4	Less: Tax @40%	-112000	-105400	-112000	-112000

5	EAT	168000	158100	168000	168000	
6	Less: Preference Dividend					
	a) Old 8% Preference Share Capital	-16000	-16000	-16000	-16000	
	(200000*8%)					
	b) New 9% Preference Share Capital			-13500		
	(150000*9%)					
7	EAESH	152000	142100	138500	152000	
	Formula:					
	EPS= EAESH		152000	142100	138500	152000
	No of Equity shares		50000	50000	50000	65000
		Rs.3.04 per share	Rs. 2.842 per share	Rs. 2.77 per share	Rs.2.34 per share	

Calculation of Equity Sh

- 1 Old Equity Share Capital
 No. of Equity Shares = Old Share Ca

Face Value of 1share

500000

10

- 2 Alternate 3. Old Rs. 500000 +
 New Rs. 150000
 Rs. 650000

No. of Equity Shares = New Share
 Capital =

Face Value of 1
 share

650000 shares

10

Ans: Alternative I
should be selected as
EPS is more.

Q:3 XYZ Co. has the following Capital Structure:

Particulars	Amount in Rs.
Equity Share Capital FV = Rs. 100	2000000
Retained Earnings	1000000
9% Preference Share Capital	1200000
7% Debentures	800000
Total	5000000

EBIT = Rs. 900000. Tax Rate
@50%.

The company requires Rs.2500000 for which it has 3 alternatives

1. Issue of Equity Share Capital
2. Issue of 10% Preference Share Capital
3. Issue of 8% Debentures

Which of the 3 financial alternatives would you recommend and why?

	Computation of EPS and Capital Plans					
	Particulars	Existing	I	II	III	
1	EBIT	900000	900000	900000	900000	
2	Less :- Interest					
	a. Old 7% Debentures (800000*7%)	-56000	-56000	-56000	-56000	
	b. New 8% Debentures (2500000*8%)	0	0	0	-200000	
3	EBT	844000	844000	844000	644000	
4	Less: Tax @50%	-422000	-422000	-422000	-322000	
5	EAT	422000	422000	422000	322000	
6	Less: Preference Dividend					
	a) Old 9% Preference Share Capital (1200000*9%)	-108000	-108000	-108000	-108000	
	b) New 10% Preference Share Capital (2500000*10%)	0	0	-250000	0	
7	EAESH	314000	314000	64000	214000	
	Formula:					
	EPS=	EAESH	<u>314000</u>	314000	<u>64000</u>	214000
		No of Equity shares	20000	<u>45000</u>	20000	20000
			Rs.15.7 per share	Rs. 6.97 per share	Rs. 3.2 per share	Rs.10.7 per share

Calculation of Equity Shares :

Capital Structure

1 Old Equity Share Capital = Rs.2000000

No. of Equity Shares = Old Share Capital

Face Value of 1 share

2000000 = 20000 shares

100

2 Alternate 1. Old Rs. 2000000 + New Rs. 2500000

Rs.4500000

No. of Equity Shares =

New Equity Share Capital

Face Value of 1 share

4500000 5000shares

100

Q: 4

XYZ ltd. has the following Capital Structure:	
Particulars	Amount in Rs.
Equity Share Capital @100 each	1000000
10% Preference Share Capital	200000
15% Debentures	600000

It is expected that the company will earn an EBIT of Rs. 400000.
Assume tax rate @40%, the company

wishes to raise Rs. 500000 for which it has 3 options:

1 New 15% Debentures & New 10% Preference Share Capital in equal proportion (50% & 50%)

2 Issue of 10% New Preference Share Capital to the extent of 25% and balance 75% by way of 15 % Debentures.

Working Note :

3 New 14% Debentures.

As a financial manager which of the above proposal would you recommend? Why? Based on EPS.

1. The term capital structure refers to the relationship between various forms of financing such as equity share capital, preference share capital and debentures.

2. Every capital structure decision affects the value of the firm and the optimal capital structure is one which increases the value of the firm and decreases its cost of capital.
3. Optimal capital structure is one that maximizes value of business, minimizes overall cost of capital i.e. flexible, simple and futuristic that ensures adequate control on affairs of the business by the owners and so on.
4. While developing an optimal capital structure for the company, the financial manager should aim at maximizing the long-term market price of equity shares.
5. Capital structure plan is to be prepared very carefully, initially at the time of promotion of company. First of all, the objective of the capital structure should be determined and then the financing decisions should be taken accordingly.

8.6. QUESTION

8.6.1 OBJECTIVE QUESTIONS:

I) Multiple Choice:

1. _____ refers to the mix of a company's debt and equity.
 - a) Capital Structure b) Capital Budgeting
 - b) Capital Stock d) Capital Asset.
2. At indifference point, EPS is _____.
 - a) Zero b) Same
 - b) Positive d) Negative
3. At Indifference level of EBIT, different financial plans have _____.
 - a) Same EPS b) Same EBIT
 - b) Same NPAT d) Same EBT
4. The Capital Structure is influenced by _____ of various sources of Capital.
 - a) Restrictive Covenants b) Tax Advantage
 - c) Cost of capital d) None of the Above

8.6.2.) Answer in brief:

1. What do you understand by the term "Financial Break Even Point"?
2. Determinants of Capital Structure.
3. Explain EBIT- EPS Break Even Chart.

4. How do you go about determining its “optimal capital structure”?
5. Explain the factors affecting Capital Structure.

8.6.3. SUMS FOR SELF STUDY:

Q: 1 XYZ Ltd, is planning for expansion programme which will require Rs. 3000000 and can be funded through one of the following 3 options.

1. Equity share Capital of Rs.100 each
2. 15% Loan
3. 12% Preference share Capital

Present paid up Capital is Rs. 6000000 and annual average EBIT is Rs. 1200000. Assume income Tax @ 50%

after the expansion EBIT is expected to be Rs. 1500000. Calculate the EPS under 3 financial options and suggest

which option gives high return to the equity shareholder

Q: 2 Key information pertaining to the proposed new financing plans of Probability Ltd. is given below:

Sources of Funds	Financing Plans	
	I	II
Equity	15,000 shares of Rs. 100 each	30,000 shares of Rs. 100 each
12% Preference Shares	25,000 shares of Rs. 100 each	----
Debentures	Rs. 5,00,000 at coupon rate of 10%	Rs.15,00,000 at the rate of 11%

If the firm is fairly certain that its EBIT will be Rs. 12,50,000 and tax rate is 50%.

Which plan you would recommend and why?

Q: 3 Gill Ltd has the following Capital Structure:

Particulars	Amount in Rs.
Equity Shares of Rs. 10 each	40,00,000
12% Preference Shares	20,00,000
14% Debentures	60,00,000

The company requires Rs. 30,00,000 to finance expansion program for which the following alternatives are available:

- i) Issue of new Debentures and Preference Shares are in equal proportions.
- ii) Issue of Preference shares to the extent of 20% and 80% to Debentures.
- iii) Issue of new 15% Debentures.

After Expansion Earnings Before Interest and Tax (EBIT) is Rs. 60,50,000. Income Tax rate is 50%

Recommend the best alternative with suitable reason.

Q: 4 Infosys Ltd. has equity shares of Rs.1000 each for Rs. 5 crores. It wishes to raise further Rs. 3 crores for expansion scheme. The company plans the following alternatives:

- a) By issuing equity shares only
- b) By issuing equity shares of Rs. 1 crore and Rs. 2 crores through debentures of 10% p.a.
- c) By raising a Term loan @20% p.a.
- d) By issuing equity shares of Rs. 1 crore and Rs. 2 crores worth of preference shares of 10%.

You are required to suggest the best alternative giving your comment assuming EBIT after expansion will be Rs. 1.5 crores and tax @35%.

Q: 5 MJ's Capital structure consists of the following:

Particulars	Amount in Rs.
Equity Shares of Rs. 100 each	20,00,000
9% Preference Shares	12,00,000
Retained Earnings	10,00,000
7% Debentures	8,00,000

The company earns 12% on capital. The Income tax rate is 50%. The company requires a sum of Rs. 25,00,000 to finance expansion program for which the following alternatives are available to it.

- I) Issue of 20,000 Equity shares at a premium of Rs. 25 per share.
- II) Issue of 10% Preference shares.
- III) Issue of 8% debentures.

It is estimated that the P/E ratio in cases of equity, preference and debenture finance would be 21.4, 17 and 15.7 respectively.

Which of the three financing alternatives would you recommend and why?



DIVIDEND POLICY - I

Unit Structure :

- 9.0 Learning Objectives
- 9.1 Introduction, Meaning and Definition
- 9.2 Importance of Dividend Policy
- 9.3 Types of Dividend Policies
- 9.4 Factors Affecting Dividend Policy
- 9.5 Theories of Dividend Policy
- 9.6 Forms of Dividends
- 9.7 Recent Trends in Dividend Policy
- 9.8 Exercise

9.0 LEARNING OBJECTIVES

After studying this chapter, you will be able to:

- Understand the concept and significance of dividend policy.
- Identify various types and factors affecting dividend policies.
- Evaluate different theories of dividend relevance and irrelevance.
- Apply dividend valuation models like Walter's and Gordon's models.
- Distinguish between various forms of dividends.
- Understand current trends in dividend distribution.

9.1 INTRODUCTION, MEANING AND DEFINITION

A company's earnings can either be retained or distributed as dividends to shareholders. Dividend policy governs this decision and impacts shareholder wealth, market perception, and the long-term financial strategy of a company.

Dividend:

A **dividend** is a **payment made by a company to its shareholders**, typically from its **profits or accumulated earnings**. It represents the **return on investment** for shareholders who own the company's stock.

Key Features of a Dividend:

- **Source:** Paid out of the company's net profit after tax.
- **Form:** Can be in cash, additional shares (stock dividend), or other forms (e.g., property dividends).
- **Frequency:** Commonly paid **quarterly**, **semi-annually**, or **annually**.
- **Not Obligatory:** Unlike interest on debt, dividends are **not legally mandatory**—they are declared at the discretion of the company's board of directors.

Example:

If a company declares a dividend of ₹5 per share, and you own 100 shares, you would receive ₹500 as dividend income.

"A dividend is the portion of corporate earnings distributed by a company to its shareholders, usually in the form of cash or additional shares, as a reward for their investment."

Dividend policy is the framework a company uses to determine the portion of earnings to be paid to shareholders versus what is retained for reinvestment.

9.2 IMPORTANCE OF DIVIDEND POLICY

1. Attracts and Retains Investors

A consistent and transparent dividend policy helps a company attract and retain a loyal base of investors, especially those who rely on regular income, such as retirees, pension funds, or conservative investors. These investors view dividend-paying companies as less risky and more dependable.

Example: Blue-chip companies like **Tata Consultancy Services (TCS)** and **Hindustan Unilever (HUL)** are popular among long-term investors because of their steady dividend payments.

2. Enhances Shareholder Satisfaction and Confidence

When a company shares a portion of its profits through dividends, it boosts shareholder morale and demonstrates a commitment to sharing success. This leads to greater investor trust in management and may encourage reinvestment of those dividends into company shares.

Example: If a company earns ₹10 crore and distributes ₹2 crore as dividends, it shows that the firm values its shareholders while still retaining funds for future growth.

3. Signals Financial Health and Stability

Dividends act as a **signal to the market** about the company's current performance and expected future earnings. A company declaring regular or increasing dividends is perceived as financially sound and confident in its profitability. On the other hand, a reduction or omission of dividends can raise concerns.

Example: When **Infosys** announced a special dividend after a strong quarter, it was seen as a positive signal about the company's growth trajectory and cash reserves.

4. Helps in Stabilizing the Market Price of Shares

Companies with stable dividend policies tend to have **less volatile stock prices**. Regular dividends reduce speculative activity, as investors are more focused on long-term gains than short-term price movements.

Example: A stock paying regular dividends is less likely to experience dramatic price swings during market downturns compared to a non-dividend-paying growth stock.

5. Enables Efficient Use of Profits (Capital Allocation)

Dividend policy helps companies make balanced decisions between **retaining profits for future investments** and **distributing them to shareholders**. By analyzing profitability and growth needs, companies ensure that funds are allocated where they generate the most value.

Example: A tech company might retain more profits to invest in R&D, while a mature utility company with limited growth opportunities may pay a higher portion as dividends.

6. Reduces Agency Costs and Enhances Financial Discipline

Dividend payments reduce the possibility of management misusing retained earnings. When excess cash is returned to shareholders, there is **less opportunity for inefficient investments or empire-building**, promoting better corporate governance.

Example: Instead of using surplus cash to acquire unrelated businesses, a firm may choose to pay dividends, which can prevent value-destroying decisions.

7. Aids in Tax Planning for Investors

Dividend policy can be structured in a way that takes into account the **tax implications** for shareholders. For example, in jurisdictions where capital gains are taxed at a lower rate than dividends, investors may prefer stock buybacks. However, if dividends are taxed favourably, shareholders benefit directly from payouts.

Example: In India, dividend income is added to taxable income, so high-net-worth investors may prefer companies that offer occasional stock buybacks instead of regular dividends.

8. Improves Company's Market Image and Credibility

A firm known for consistently paying dividends builds a **positive reputation** in the market, leading to **higher stock valuations** and easier access to capital. This credibility is especially important during economic downturns or periods of uncertainty.

Example: Even during global recessions, companies like **Reliance Industries** or **ITC Ltd.** continued to reward shareholders, reinforcing their image as stable and investor-friendly entities.

In conclusion, a well-defined dividend policy acts as a powerful tool for **financial communication, governance, and capital management**. It helps companies manage investor expectations, maintain market stability, and ensure that profits are used optimally. The right balance between dividend payout and retained earnings contributes to **long-term shareholder value creation**, which is the ultimate goal of financial management.

Summary Table

Point	Explanation
1. Investor Attraction and Retention	Regular and stable dividends attract investors who seek steady income, such as retirees or conservative investors.
2. Shareholder Satisfaction	Paying dividends rewards shareholders and enhances trust in the company's financial health.
3. Market Price Stability	A consistent dividend policy often reduces share price volatility and builds investor confidence.
4. Signal of Financial Strength	Declaring dividends signals that the company is financially sound and has surplus earnings.
5. Efficient Capital Allocation	Dividend policy helps manage excess cash and ensures optimal use of funds (reinvestment vs. distribution).
6. Control on Agency Costs	Paying out dividends reduces the risk of management misusing retained earnings for unproductive purposes.
7. Tax Planning	Some dividend policies may be structured to benefit shareholders under favourable tax regulations.
8. Reputation and Credibility	A firm known for paying regular dividends often enjoys a strong reputation and favourable market perception.

9.3 TYPES OF DIVIDEND POLICIES

Types of Dividend Policy

Dividend policy refers to the approach a company takes to distribute profits to its shareholders in the form of dividends. Companies adopt different types of dividend policies depending on factors like profitability, future investment plans, cash flow, and shareholder preferences.

1. Stable Dividend Policy: Under a **stable dividend policy**, a company pays a fixed dividend per share or maintains a minimum level of dividend consistently, irrespective of fluctuations in earnings.

Forms of Stability:

- **Constant Dividend Per Share:** The same amount is paid every year.
- **Constant Payout Ratio:** A fixed percentage of net earnings is paid.
- **Stable Rupee Dividend Plus Extra:** A fixed dividend is paid regularly, with an additional dividend in good years.

Features:

- Emphasizes consistency and predictability.
- Builds shareholder confidence.
- Avoids drastic changes in dividend payments.

Advantages:

- Attracts risk-averse investors.
- Improves company reputation.
- Reduces uncertainty in investor returns.

Disadvantages:

- May strain finances during low-profit years.
- Difficult to maintain in volatile industries.

Example: ITC Ltd. follows a stable dividend policy and pays dividends regularly even during economic downturns.

2. Constant Dividend Payout Ratio Policy: In this policy, a fixed percentage of net earnings is paid out as dividends each year, meaning dividend amounts vary with profit levels.

Features:

- Payout aligns directly with profits.
- No guaranteed dividend in loss-making years.
- More common among companies with fluctuating earnings.

Advantages:

- Flexible and aligns dividends with actual earnings.
- Maintains internal cash balance.

Disadvantages:

- Uncertainty for shareholders expecting regular income.
- May lead to dissatisfaction among conservative investors.

Example: A company decides to pay 40% of its profits as dividends. If profit is ₹10 crore, dividend = ₹4 crore; if profit is ₹5 crore, dividend = ₹2 crore.

3. Residual Dividend Policy: Under this policy, dividends are paid **only after all profitable investment opportunities (capital expenditures)** are financed. The "residual" or leftover profit is distributed as dividends.

Features:

- Focuses on funding business growth first.
- Dividend payments vary and may be infrequent.
- Emphasizes reinvestment and long-term value.

Advantages:

- Ensures optimal capital structure.
- Retains earnings for expansion and R&D.

Disadvantages:

- Highly unpredictable dividend payments.
- May disappoint investors seeking steady income.

Example: A company earns ₹8 crore and needs ₹6 crore for expansion. The remaining ₹2 crore is paid as dividends.

4. No Dividend Policy: Some companies may choose **not to pay any dividend** and retain all profits for reinvestment, especially in the early stages of growth or during financial restructuring.

Features:

- Prioritizes growth over payouts.
- Suitable for start-ups or capital-intensive industries.
- Zero dividends can sometimes enhance stock value through reinvested earnings.

Advantages:

- Boosts internal financing.
- Avoids dependence on external debt.

Disadvantages:

- May cause shareholder dissatisfaction.
- Fewer investors might be interested in the stock.

Example: Tech start-ups like **Ola** or **Paytm** reinvest profits and generally don't pay dividends in their early years.

5. Irregular Dividend Policy: Under this policy, dividends are paid **only when the company has excess profits**, without any set pattern. There is **no fixed payout ratio or schedule**.

Features:

- Dividends are distributed at management's discretion.
- Often used when profits are unpredictable.
- No obligation to pay dividends every year.

Advantages:

- Offers flexibility in financial management.
- Helps in conserving cash in lean years.

Disadvantages:

- Uncertainty may reduce investor confidence.
- Not suitable for dividend-focused investors.

Example: A small manufacturing firm may declare dividends only after a particularly good fiscal year, skipping payouts during weaker years.

Summary Table:

Type of Policy	Dividend Amount	Stability	Investor Preference	Focus Area
Stable Dividend Policy	Fixed or slightly variable	High	Risk-averse, income-seeking	Consistency
Constant Payout Ratio	Varies with profit	Medium	Growth + Income	Profit-based
Residual Dividend Policy	Leftover after investments	Low	Growth investors	Reinvestment
No Dividend Policy	None	N/A	Long-term capital gain seekers	100% Retention
Irregular Dividend Policy	Unpredictable	Low	Speculative investors	Flexibility

Conclusion: Each dividend policy has its own **strategic relevance** depending on the company's **growth stage, industry type, profitability,** and **investor expectations**. Mature companies often adopt **stable dividend policies**, while fast-growing firms prefer to **retain earnings**. A well-chosen dividend policy enhances shareholder value and supports the company's long-term financial health.

9.4 FACTORS AFFECTING DIVIDEND POLICY

Dividend policy is influenced by various internal and external factors that determine how much profit a company distributes to its shareholders and how much it retains. These factors reflect the company's financial position, future plans, and shareholder expectations.

1. Profitability of the Company

- A company must have sufficient profits to pay dividends.
- Higher and stable earnings allow companies to declare higher dividends.
- Companies with fluctuating profits may follow a conservative or irregular policy.

Example: A highly profitable company like Infosys pays regular dividends due to consistent earnings.

2. Stability of Earnings

- Companies with stable and predictable earnings are more likely to adopt a stable dividend policy.
- Firms with volatile earnings may prefer to retain profits rather than commit to fixed payouts.

Example: Utility companies with consistent earnings tend to pay stable dividends.

3. Liquidity Position

- Even if a company is profitable, it needs adequate **cash or liquid resources** to pay dividends.
- Lack of liquidity may prevent dividend payments, despite accounting profits.

Example: A company may have high book profits but insufficient cash to pay dividends due to high receivables or inventory.

4. Investment Opportunities

- Companies with **attractive investment or expansion opportunities** may retain earnings for reinvestment instead of paying them as dividends.
- Firms with limited growth prospects may distribute more profits as dividends.

Example: Startups or tech firms like Paytm prefer to reinvest profits for growth.

5. Shareholder Preferences

- Companies may align their dividend policy with the preferences of their investors.
- Retired or conservative investors may prefer regular dividends, while younger investors may prefer capital gains.

Example: A company with a large base of senior citizen shareholders may offer stable dividends.

6. Legal and Contractual Constraints

- Dividend payments are subject to legal restrictions under the Companies Act and contractual obligations (e.g., loan covenants).
- Companies cannot pay dividends out of capital or in violation of debt agreements.

Example: A company under a loan agreement may be restricted from paying dividends without lender approval.

7. Taxation Policy

- The tax treatment of dividends can affect dividend policy.
- If dividends are taxed heavily in shareholders' hands, companies may prefer to retain earnings or go for buybacks.

Example: Changes in dividend distribution tax (DDT) laws have influenced corporate payout decisions in India.

8. Access to Capital Markets

- Companies that have **easy access to external finance** (e.g., through equity or debt markets) may distribute more dividends.
- Firms that find it hard to raise external funds may retain more profits.

Example: Blue-chip companies can afford higher dividends due to easy capital access.

9. Inflation and Economic Conditions

- During inflationary periods, companies may retain more earnings to maintain their capital base and replace assets.
- In a recession, companies may cut dividends to conserve cash.

Example: Many companies reduced or suspended dividends during the COVID-19 pandemic to preserve cash.

10. Control Considerations

- Promoters may prefer retained earnings over issuing new equity to avoid dilution of control.

- This leads to lower dividends and higher reinvestment of profits.

Example: Family-run businesses may follow low dividend payout policies to retain control.

Summary Table: Factors Affecting Dividend Policy

Factor	Impact on Dividend Policy
Profitability	Higher profits → Higher dividends
Earnings Stability	Stable earnings → Stable dividends
Liquidity	More cash → Ability to pay dividends
Investment Opportunities	More opportunities → Lower dividends, more retention
Shareholder Preferences	Conservative investors → Higher dividends
Legal/Contractual Restrictions	May limit or prohibit dividend payments
Taxation Policy	Heavily taxed dividends → Preference for retention
Access to Capital Markets	Easier access → More flexibility to pay dividends
Inflation/Economic Conditions	Inflation/recession → Conservative or reduced dividends
Control Considerations	Desire to avoid dilution → Lower dividends, more retained earnings

Conclusion: Dividend policy is a strategic decision influenced by a combination of **financial, legal, and market-related factors**. A company must carefully balance its dividend decisions to satisfy shareholders while ensuring long-term growth and financial stability.

9.5 THEORIES OF DIVIDEND POLICY

9.5.1 Introduction

Dividend decision is an important aspect of financial management and refers to a company's policy regarding the distribution of profits to shareholders in the form of dividends versus retaining them for reinvestment. The central question is whether dividend decisions influence the value of a firm and the wealth of shareholders.

Two primary theoretical viewpoints exist on this issue:

1. **Relevance Theories:** Argue that dividend decisions do affect the value of the firm.
2. **Irrelevance Theories:** Argue that dividend decisions do not influence the firm's value.

9.5.2 Part I: Relevance Theories of Dividend

Relevance theories assert that the dividend policy of a firm is a significant determinant of its market value. According to these models, shareholders prefer receiving dividends now rather than uncertain capital gains in the future.

1. Walter's Model

Background:

Proposed by Prof. James E. Walter, this model emphasizes that the choice of dividend policy almost always affects the value of the firm. It is one of the earliest models to challenge the dividend irrelevance hypothesis.

Key Assumptions:

- All financing is done through retained earnings (no external financing).
- The internal rate of return (r) and the cost of capital (k) remain constant.
- Earnings and dividends are constant.
- The firm has an infinite life.

Formula:

Walter's formula to determine the market price per share (P) is as follows:

$$P = \frac{D}{Ke} + \frac{\left(\frac{r}{Ke}\right)(E - D)}{Ke}$$

Which is further simplified as:

$$P = \frac{D + \left(\frac{r}{Ke}\right)(E - D)}{ke}$$

Where,

P = Market Price of the share.

E = Earnings per share.

D = Dividend per share.

Ke = Cost of equity/ rate of capitalization/ discount rate.

r = Internal rate of return/ return on investment

Interpretation:

- If $r > k$: The firm should retain earnings; this increases the value of the firm.
- If $r < k$: The firm should distribute dividends; this maximizes the firm's value.
- If $r = k$: The dividend policy has no effect on firm value.

Example:

Assume: Earnings per share = ₹10, Dividend per share = ₹4, $r = 15\%$, $k = 10\%$

Company	Condition of r v/s K_e	Correlation between Size of Dividend and Market Price of share	Optimum dividend payout ratio
Growth	$r > K_e$	Negative	Zero
Constant	$r = K_e$	No correlation	Every payout ratio is optimum
Decline	$r < K_e$	Positive	100%

2. Gordon's Model (Bird-in-Hand Theory)**Background:**

Proposed by Myron J. Gordon, this model is also known as the Bird-in-Hand Theory, based on the idea that investors prefer a certain return (dividends) over uncertain future gains (capital appreciation).

Key Assumptions:

- The firm is an all-equity firm.
- Return on investment (r) and cost of capital (k) are constant.
- The firm's earnings are perpetual.
- Retained earnings are the only source of financing.
- There are no taxes or flotation costs.
- Investors prefer certain dividends.

Formula

According to Gordon's dividend capitalisation model, the market value of a share (P_0) is equal to the present value of an infinite stream of dividends to be received by the share. Thus:

$$P_0 = \frac{E(1 - b)}{K_e - br}$$

Where,

P_0 = Price per share

E = Earnings per share

b = Retention ratio; [Thus $(1 - b)$ = Payout ratio]

K_e = Cost of capital

r = IRR

br = Growth rate (g)

$1 - b$ = D/p ratio (i.e., percentage of earnings distributed as dividends)

The above equation clearly displays the relationship between current earnings (E), dividend policy (b), internal rate of return (r), and the cost of capital (K_e) of an all-equity firm in determining share value (P_0).

9.5.3 Part II: Irrelevance Theory of Dividend

Modigliani and Miller (M-M) Hypothesis

Background:

Proposed in 1961, this is one of the most famous theories in corporate finance. According to M-M, under perfect capital markets, dividend policy is irrelevant to the value of the firm.

Key Assumptions:

- No taxes.
- No transaction costs.
- Perfect and rational capital markets.
- Investors have access to all information (symmetrical information).
- Investment policy is fixed and unaffected by dividend policy.
- There is no difference between internal and external financing.

Core Idea:

Shareholder wealth is determined by the firm's earning capacity and investment decisions, not by the manner in which profits are distributed.

Illustration:

Suppose a firm has earnings per share (EPS) of ₹10. Whether the firm pays this as a dividend or reinvests it in a project that yields the market rate of return, the shareholder's wealth remains unchanged.

Formula:

$$P_0 = \frac{D_1 + P_1}{(1 + K_e)}$$

Where,

P_0 = Prevailing market price of a share.

K_e = Cost of equity capital.

D_1 = Dividend to be received at the end of period one.

P_1 = Market price of the share at the end of period one.

Here, we are required to find the value of P_1 , hence the derived formula will be

$$P_1 = P_0 (1 + K_e) - D_1$$

If the firm sells 'M' number of new shares at time 1 at a price of P, the value of the firm at time 0 will be:

$$M = \frac{I - (X - nD_1)}{P_1}$$

Where

M = Number of new shares to be issued.

P_1 = Price at which new issue is to be made.

I = Amount of investment required.

X = Total net profit of the firm during the period.

nD_1 = Total dividend paid during the period.

Thus, to calculate the number of new shares to be issued, we can use the above formula.

Unlike Walter's and Gordon's models, the above M - M value equation allows for the issue of new shares. As a result, a company can pay dividends and raise capital to pursue the best investing strategy. Thus, unlike the Walter's and Gordon's models, the M - M model does not mix dividend and investment policies.

After applying the above formula, we can prove the irrelevance of dividend policy by applying undermentioned formula to both the cases i.e. if dividend is paid or not paid.

$$V_f \text{ or } nP_0 = \frac{(n + \Delta n)P_1 - I + X}{1 + K_e}$$

Where,

V_f = Value of firm in the beginning of the period

n = number of shares in the beginning of the period

Δn = number of shares issued to raise the funds required

P_1 = Price at the end period of the Shares

I = Amount required for investment

X = Total net profit of the firm during the period.

Criticism:

- In the real world, taxes and transaction costs exist.
- Investors often prefer dividends due to uncertainty in future returns.
- Not all investors have perfect or equal access to information.

Comparison: Relevance vs. Irrelevance Theories

Relevance Theories (Walter & Gordon):

- Dividends affect share price and firm value.
- Investors prefer current dividends.
- Use retained earnings when $r > k$.
- Consider real-world market imperfections.
- Focus on internal financing.

Irrelevance Theory (M-M Hypothesis):

- Dividend policy has no effect on share price.
- Investors are indifferent to dividends.
- Investment policy is separate from dividend decisions.
- Assumes perfect capital markets.
- Allows internal and external financing.

Conclusion

While the Modigliani-Miller model offers a strong argument for dividend irrelevance in a theoretical perfect market, the practical considerations such as taxes, market imperfections, investor preferences, and uncertainty support the relevance of dividend policy. Hence, most companies follow a balanced approach, providing stable dividends while retaining sufficient profits for growth.

Dividends are the portion of profits that a company distributes to its shareholders. Companies can pay dividends in various forms depending on their financial position, cash availability, shareholder expectations, and regulatory environment. The main forms of dividends are:

1. Cash Dividend

Definition:

Cash dividend is the most common form of dividend. It involves the distribution of earnings to shareholders in the form of cash, usually on a per-share basis.

Key Points:

- Paid through electronic transfer or by cheque.
- Typically declared quarterly, semi-annually, or annually.
- Signals strong financial health and positive cash flow.

Example:

If a company declares ₹5 per share as a dividend and a shareholder owns 200 shares, they will receive ₹1,000 ($200 \times ₹5$).

Suitability:

Preferred by investors who seek regular income, such as retirees or conservative investors.

2. Stock Dividend (Bonus Shares)

Definition:

Also called a bonus issue, this involves issuing additional shares to shareholders instead of paying cash. It increases the number of shares held by shareholders, but the total value of holdings remains the same initially.

Key Points:

- Common when the company wants to retain earnings for reinvestment.
- Does not impact the cash reserves of the firm.
- Market price of shares usually adjusts after the issue.

Example:

A 10% stock dividend means a shareholder with 100 shares will receive 10 additional shares, totalling 110 shares.

Suitability:

Useful for companies with high growth opportunities and limited cash.

3. Interim Dividend

Definition:

An interim dividend is declared and paid before the end of the financial year, usually after the quarterly or half-yearly results.

Key Points:

- Declared by the Board of Directors without needing shareholder approval (unlike final dividends).
- Provides early reward to shareholders.

Example:

A company with strong half-yearly profits may declare ₹3 per share as interim dividend before the final dividend is declared.

4. Final Dividend**Definition:**

This is the dividend declared at the end of the financial year after the final accounts have been prepared and audited. It requires approval from shareholders in the Annual General Meeting (AGM).

Key Points:

- Declared once a year.
- Reflects the company's annual profitability.

Example:

If a company earns a net profit of ₹50 crores and declares ₹2 per share as a final dividend, it's distributed to shareholders holding shares on the record date.

5. Special Dividend**Definition:**

A one-time, non-recurring dividend issued by a company in addition to its regular dividends, usually when the company has excess profits or cash.

Key Points:

- Often triggered by asset sales, windfall gains, or exceptional performance.
- Not expected to continue in the future.

Example:

A company sells a subsidiary and declares a one-time special dividend of ₹10 per share.

6. Property Dividend**Definition:**

Instead of cash or stock, a company distributes assets like physical goods, inventory, or shares of a subsidiary to shareholders.

Key Points:

- Rare and used in specific situations.
- Assets are valued at fair market value.

Example:

A company might distribute shares of a subsidiary company it owns as a dividend.

7. Scrip Dividend (Promissory Note)**Definition:**

A scrip dividend is a promissory note to pay shareholders a dividend at a future date when the company has insufficient cash at present.

Key Points:

- Company commits to paying the dividend later.
- Treated as a liability until settled.

Example:

A company declares a ₹4 per share dividend to be paid after six months due to temporary cash shortage.

8. Liquidating Dividend**Definition:**

This is a return of capital rather than profit, usually when a company is partially or fully winding up its operations.

Key Points:

- Reduces the company's capital base.
- Not treated as regular income by shareholders (subject to capital gains tax in many cases).

Example:

If a company decides to close one of its business units, it may distribute the proceeds to shareholders as a liquidating dividend.

Form of Dividend	Description	Example
Cash Dividend	Distribution of earnings to shareholders in the form of cash. Most common and preferred by income-seeking investors.	₹5 per share to shareholders holding 200 shares = ₹1,000.
Stock Dividend (Bonus Shares)	Company issues additional shares instead of paying cash. Helps retain earnings while rewarding shareholders.	10% bonus: 100 shares → 110 shares.

Interim Dividend	Declared before the end of the financial year based on interim profits.	₹3 per share declared after half-yearly results.
Final Dividend	Declared after the end of the financial year and approved in AGM.	₹2 per share declared post-audit and shareholder approval.
Special Dividend	One-time dividend declared due to exceptional events or windfall gains.	₹10 per share after asset sale.
Property Dividend	Distribution of physical assets or subsidiary shares instead of cash.	Shares of a subsidiary given to existing shareholders.
Scrip Dividend	Promissory note to pay dividend in the future when cash is insufficient.	₹4 per share to be paid in 6 months.
Liquidating Dividend	Return of capital, typically when a company is winding up operations.	Proceeds from selling a business unit distributed to shareholders.

Conclusion

Different forms of dividends serve different corporate and shareholder needs. While cash dividends provide immediate income, stock and interim dividends help preserve liquidity and support future growth. The choice of dividend form depends on the company's financial strategy, earnings stability, liquidity, and shareholder expectations.

9.7 RECENT TRENDS IN DIVIDEND POLICY

Dividend policy refers to the strategic decisions a company makes regarding the distribution of profits to shareholders in the form of dividends or share buybacks. In recent years, corporate dividend policies have undergone significant changes due to evolving market dynamics, investor expectations, and regulatory environments. Below are the key recent trends:

1. Increased Use of Buybacks to Return Capital

- **Explanation:** Companies are increasingly opting for **share buybacks** as a way to return excess capital to shareholders instead of traditional cash dividends.

- **Reasons:**
 - **Flexibility:** Buybacks are not seen as long-term commitments like dividends.
 - **Tax Efficiency:** In many jurisdictions, capital gains from buybacks are taxed more favorably than dividends.
 - **EPS Boost:** Buybacks reduce the number of outstanding shares, artificially increasing earnings per share (EPS), which can positively impact stock prices.
- **Examples:** Apple, Microsoft, and many other large corporations regularly use buybacks as a primary tool for capital distribution.

2. Preference for Retention Among Tech Companies

- **Explanation:** Technology companies often prefer to **retain earnings** rather than distribute them to shareholders.
- **Reasons:**
 - **High R&D Needs:** These companies need significant investment in research, innovation, and growth.
 - **Fast Growth Opportunities:** Retained earnings are reinvested into scaling operations, acquiring startups, or entering new markets.
- **Trend Insight:** Even profitable tech giants like Google and Amazon historically paid little or no dividends for many years.

3. Impact of ESG (Environmental, Social, Governance) Considerations

- **Explanation:** Environmental, social, and governance (ESG) priorities are playing a growing role in shaping dividend decisions.
- **Impact:**
 - **Reputation Management:** Companies may reduce dividends or delay buybacks to redirect funds toward ESG initiatives like carbon neutrality or community support.
 - **Investor Pressure:** Shareholders, especially institutional investors, are increasingly demanding that companies adopt sustainable and responsible practices.
- **Result:** Some firms divert capital from dividends to fund ESG-driven strategies, especially during crises (e.g., COVID-19 relief efforts, green initiatives).

4. Dividend Targeting Based on Payout Sustainability and Market Sentiment

- **Explanation:** Firms now aim for a **target payout ratio** that ensures sustainability and aligns with investor expectations.
- **Key Practices:**
 - **Conservative Policies:** Companies are cautious about committing to high dividend payouts unless they are confident in future earnings stability.
 - **Signaling Effect:** Managers use dividend changes to signal future prospects—stable or increasing dividends often indicate financial health.
 - **Market Sensitivity:** Dividend policies are influenced by economic cycles, interest rates, and investor appetite for income versus growth.
- **Example:** During economic downturns, companies may cut or suspend dividends to preserve cash, only reinstating them when conditions improve.

Summary Table: Recent Trends in Dividend Policy

Trend	Key Characteristics	Examples / Implications
1. Rise of Buybacks	Flexible, tax-efficient, EPS-boosting	Apple, Microsoft conduct massive buybacks annually
2. Retention by Tech Firms	Preference for growth and R&D over payouts	Google, Amazon reinvest profits rather than pay dividends
3. ESG Influence on Payouts	Focus on sustainability, social impact, and governance priorities	Funds redirected to environmental or social initiatives rather than to dividends
4. Targeted, Sustainable Dividends	Focus on long-term payout ratios and earnings consistency	Dividends used to signal stability; adjusted based on market and macroeconomic factors

9.8 EXERCISE

Understood! Here's the revised version with **no answers for Brief Answers and Short Notes** as requested:

Multiple Choice Questions (MCQs)

Dividend Policy - I

1. Which of the following best describes a stable dividend policy?
 - a. Varying dividends every year
 - b. No dividends at all
 - c. Paying a fixed percentage of earnings
 - d. Paying a consistent amount of dividend regardless of earnings

2. Which of the following is NOT a factor affecting dividend policy?
 - a. Legal restrictions
 - b. Company profitability
 - c. Government elections
 - d. Shareholder expectations

3. According to the Modigliani-Miller hypothesis, dividend policy is:
 - a. Irrelevant in a perfect market
 - b. Always preferred by shareholders
 - c. Affects the value of the firm
 - d. Encouraged for tax saving

4. Residual dividend policy implies:
 - a. Paying dividends only after financing all investment needs
 - b. Paying dividends before reinvestment
 - c. Paying equal dividends every year
 - d. Paying the entire profit as dividends

5. Which type of company is more likely to retain earnings rather than pay dividends?
 - a. Utility company
 - b. Technology company
 - c. Real estate company
 - d. Insurance company

6. Walter's Model assumes that:
 - a. The firm has fluctuating earnings
 - b. The firm's internal rate of return equals its cost of capital
 - c. The firm has no debt
 - d. Dividends are irrelevant

7. A company preferring buybacks over dividends is likely aiming for:
 - a. Diluting control
 - b. Tax inefficiency
 - c. Flexibility in capital returns
 - d. Guaranteed income to shareholders

8. Dividend payout ratio is calculated as:
 - a. Net profit / Total assets
 - b. Dividends / Net income
 - c. Dividends / Equity
 - d. Retained earnings / Total income

9. ESG considerations affect dividend policy by:
 - a. Reducing investment in community programs
 - b. Increasing dividend payouts to avoid scrutiny
 - c. Encouraging diversion of profits to sustainable initiatives
 - d. Having no effect on financial decisions

10. A stock dividend involves:
 - a. Paying cash to shareholders
 - b. Issuing new shares to shareholders
 - c. Buying back shares
 - d. Paying dividends in foreign currency

Answers:

1-d, 2-c, 3-a, 4-a, 5-b, 6-b, 7-c, 8-b, 9-c, 10-b

True or False

1. Dividend policy affects the capital structure of a firm.
2. A high payout ratio is always sustainable.
3. Tech firms usually follow a high dividend payout approach.
4. Share buybacks reduce the number of outstanding shares.
5. Dividends are mandatory by law for all companies.
6. Dividend signaling theory suggests dividends reflect management's outlook.
7. M-M Hypothesis assumes no taxes or transaction costs.
8. Shareholders may have preferences regarding dividend frequency.
9. A residual dividend policy favors paying dividends first.
10. ESG commitments may reduce funds available for dividend payouts.

Answers:

1-True, 2-False, 3-False, 4-True, 5-False, 6-True, 7-True, 8-True, 9-False, 10-True

Match the Pair

A (Concept)	B (Explanation)
1. Stable Dividend Policy	a. Consistent dividend payout
2. Dividend Signaling	b. Reflects management confidence
3. Buyback	c. Reduces outstanding shares
4. Gordon Model	d. Relevance of dividends
5. Retained Earnings	e. Internal financing
6. Dividend Payout Ratio	f. Dividend / Net Income
7. Walter's Model	g. Assumes constant return and cost
8. ESG Commitments	h. May lead to dividend reduction
9. Stock Dividend	i. Additional shares issued
10. Tech Companies	j. Prefer reinvestment over dividends

Answers:

1-a, 2-b, 3-c, 4-d, 5-e, 6-f, 7-g, 8-h, 9-i, 10-j

Brief Answers (2-3 lines)

1. What is a dividend policy?
2. Why might a company prefer share buybacks over dividends?
3. Explain the concept of residual dividend policy.
4. How does ESG influence dividend decisions?
5. What is the relevance of dividend payout ratio?
6. State the main assumption of the Modigliani-Miller hypothesis.
7. What is dividend signaling theory?
8. Why do tech firms usually retain earnings?
9. What is a stock dividend?
10. What is a stable dividend policy?

Short Notes (5-6 lines)

1. Dividend Policy
2. Types of Dividend Policy
3. Factors Influencing Dividend Policy
4. Walter's Model
5. Gordon's Model
6. Modigliani-Miller Hypothesis
7. Buybacks vs Dividends
8. Dividend Signaling
9. ESG and Dividend Policy
10. Dividend Relevance Vs Irrelevance Debate



DIVIDEND POLICY – II

Unit Structure:

10.1 Practical Sums

10.2 Other Dividend Models

10.0 LEARNING OBJECTIVES

After this chapter Learner will be able to

- Solve the practical sums on the various dividend models
- Understand the implications of different dividend policies

10.1 PRACTICAL SUMS

Illustration 01:

Zappers Ltd. has an EPS of ₹ 60 per share. Capitalization rate and return on investment are 15% and 18% respectively. DETERMINE the optimum dividend payout ratio and the price of the share at the payout of:

a. 0% b. 25% c. 50% d. 75% e. 100%

a. Payout 0%

$$P = \frac{D + \left(\frac{r}{Ke}\right) (E - D)}{ke}$$

$$P = \frac{0 + \left(\frac{0.18}{0.15}\right) (60 - 0)}{0.15}$$

$$P = \frac{0 + (1.2)(60)}{0.15}$$

$$P = \frac{(0 + 72)}{0.15}$$

$$P = 480$$

b. Payout 25%

$$P = \frac{D + \left(\frac{r}{Ke}\right) (E - D)}{ke}$$

$$P = \frac{15 + \left(\frac{0.18}{0.15}\right)(60 - 15)}{0.15}$$

$$P = \frac{15 + (1.2)(45)}{0.15}$$

$$P = \frac{(15 + 54)}{0.15}$$

$$P = 460$$

c. Payout 50%

$$P = \frac{D + \left(\frac{r}{Ke}\right)(E - D)}{ke}$$

$$P = \frac{30 + \left(\frac{0.18}{0.15}\right)(60 - 30)}{0.15}$$

$$P = \frac{30 + (1.2)(30)}{0.15}$$

$$P = \frac{(30 + 36)}{0.15}$$

$$P = 440$$

d. Payout 75%

$$P = \frac{D + \left(\frac{r}{Ke}\right)(E - D)}{ke}$$

$$P = \frac{45 + \left(\frac{0.18}{0.15}\right)(60 - 45)}{0.15}$$

$$P = \frac{45 + (1.2)(15)}{0.15}$$

$$P = \frac{(45 + 18)}{0.15}$$

$$P = 420$$

e. Payout 100%

Dividend Policy - II

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{60 + \left(\frac{0.18}{0.15}\right)(60 - 60)}{0.15}$$

$$P = \frac{60 + (1.2)(0)}{0.15}$$

$$P = \frac{(60 + 0)}{0.15}$$

$$P = 400$$

Illustration 02:

From the following information supplied to you by the Western Ltd., ascertain whether the firm is following an optimal dividend policy as per Walter's Model?

Particulars	
Total Earnings	₹ 16,00,000
No. of equity shares	1,00,000
Dividend paid	₹ 4,00,000
P/E Ratio	10x
Return on Investment (r)	6.25%

The firm is expected to maintain its rate on return on fresh investments.

- A. Also find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share?
- B. Will your decision change if the P/E ratio is 8 and return on investment is 15%?

Hint: $K_e = 1/(\text{P.E. ratio})$

Solution 02:

$$EPS = \frac{16,00,000}{1,00,000} = 16$$

$$DPS = \frac{4,00,000}{1,00,000} = 4$$

$$K_e = \frac{1}{PE \text{ Ratio}} = \frac{1}{10} = 0.10$$

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{4 + \left(\frac{0.0625}{0.1}\right) (16 - 4)}{0.1}$$

$$P = \frac{4 + (0.625)(12)}{0.1}$$

$$P = \frac{(4 + 7.56)}{0.1}$$

$$P = 115.6$$

The payout is not optimal. Since $r < K_e$, optimal payout will be when payout is 100%.

So, here at the optimal level the answer will be:

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{16 + \left(\frac{0.0625}{0.1}\right) (16 - 16)}{0.1}$$

$$P = \frac{16 + (0.625)(0)}{0.1}$$

$$P = \frac{(16 + 0)}{0.1}$$

$$P = 160$$

The price will be at lowest level, when the payout will be 0%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{0 + \left(\frac{0.0625}{0.1}\right) (16 - 0)}{0.1}$$

$$P = \frac{0 + (0.625)(16)}{0.1}$$

$$P = \frac{(0 + 10.08)}{0.1}$$

$$P = 100.8$$

A. Find out what should be the P/E ratio at which the dividend policy will have no effect on the value of the share?

Dividend Policy - II

When the $r=k_e$, there will be no impact of the dividend

So when $K_e=0.0625$ i.e. 6.25%, the dividend policy will have no effect on the value of the share.

Payout = 0%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{0 + \left(\frac{0.0625}{0.0625}\right)(16 - 0)}{0.0625}$$

$$P = \frac{0 + (1)(16)}{0.0625}$$

$$P = \frac{(0 + 16)}{0.0625}$$

$$P = 256$$

Payout=50%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{8 + \left(\frac{0.0625}{0.0625}\right)(16 - 8)}{0.0625}$$

$$P = \frac{8 + (1)(8)}{0.0625}$$

$$P = \frac{(8 + 8)}{0.0625}$$

$$P = 256$$

Payout=100%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{16 + \left(\frac{0.0625}{0.0625}\right)(16 - 16)}{0.0625}$$

$$P = \frac{16 + (1)(0)}{0.0625}$$

$$P = \frac{(16 + 0)}{0.0625}$$

$$P = 256$$

In order that the $K_e = 0.0625$

$$PE \text{ Ratio} = \frac{1}{K_e} = \frac{1}{0.0625} = 16x$$

B. Will your decision change if the P/E ratio is 8 and return on investment is 15%?

If the P/E ratio=8; $K_e = 1/PE$; $K_e = 1/8$; $K_e = 0.125$ i.e. 12.5% and $r = 0.15$ i.e. 15%

Since $r > K_e$ the dividend decision will change i.e.; Price will be highest when Payout is 0%. **So instead of going for 100% payout in A above, we will go for 0% payout.**

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{0 + \left(\frac{0.15}{0.125}\right)(16 - 0)}{0.125}$$

$$P = \frac{0 + (1.2)(16)}{0.125}$$

$$P = \frac{(0 + 19.2)}{0.125}$$

$$P = 153.6$$

Price will be lowest when the payout is 100%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{16 + \left(\frac{0.15}{0.125}\right)(16 - 16)}{0.125}$$

$$P = \frac{16 + (1.2)(0)}{0.125}$$

$$P = \frac{(16 + 0)}{0.125}$$

$$P = 128$$

Illustration 03:

The earnings per share of a Red Ltd. is ₹ 200 and the capitalization rate (Ke) applicable to the company is 16%. The company has before it an option of adopting a dividend payment ratio of:

- a. 0%
- b. 25%
- c. 50%
- d. 75%
- e. 100%.

Using Walter's formula of dividend payout, compute the market value of the company's share of the productivity of retained earnings.

Assumed return on investments (r)

- i. 12%
- ii. 16%
- iii. 20%.

Solution:

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e}$$

Situation i: When IRR = 12 i.e. 0.12 and Ke=16% i.e 0.16 (since r<Ke, price will be highest when payout will be 100% and will be lower as the payout will decrease and will be lowest at 0%)

Condition a = Payout 0%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e}$$

$$P = \frac{0 + \left(\frac{0.12}{0.16}\right)(200 - 0)}{0.16}$$

$$P = \frac{0 + (0.75)(200)}{0.16}$$

$$P = \frac{(0 + 150)}{0.16}$$

$$P = 937.5$$

Condition b= Payout 25%

$$P = \frac{D + \left(\frac{r}{Ke}\right) (E - D)}{ke}$$

$$P = \frac{50 + \left(\frac{0.12}{0.16}\right) (200 - 50)}{0.16}$$

$$P = \frac{50 + (0.75)(150)}{0.16}$$

$$P = \frac{(50 + 112.5)}{0.16}$$

$$P = 1,015.63$$

Condition c= Payout 50%

$$P = \frac{D + \left(\frac{r}{Ke}\right) (E - D)}{ke}$$

$$P = \frac{100 + \left(\frac{0.12}{0.16}\right) (200 - 100)}{0.16}$$

$$P = \frac{100 + (0.75)(100)}{0.16}$$

$$P = \frac{(100 + 75)}{0.16}$$

$$P = 1,093.75$$

Condition d = Payout 75%

$$P = \frac{D + \left(\frac{r}{Ke}\right) (E - D)}{ke}$$

$$P = \frac{150 + \left(\frac{0.12}{0.16}\right) (200 - 150)}{0.16}$$

$$P = \frac{150 + (0.75)(50)}{0.16}$$

$$P = \frac{(150 + 37.5)}{0.16}$$

$$P = 1,171.88$$

Condition e = Payout 100%

Dividend Policy - II

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{200 + \left(\frac{0.12}{0.16}\right) (200 - 200)}{0.16}$$

$$P = \frac{200 + (0.75)(0)}{0.16}$$

$$P = \frac{(200 + 0)}{0.16}$$

$$P = 1,250$$

Situation ii: When IRR = 16 i.e. 0.16 and Ke=16% i.e 0.16 (since r=Ke, price will be same irrespective of the payout ratio)

Condition a = Payout 0%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{0 + \left(\frac{0.16}{0.16}\right) (200 - 0)}{0.16}$$

$$P = \frac{0 + (1)(200)}{0.16}$$

$$P = \frac{(0 + 200)}{0.16}$$

$$P = 1,250$$

Condition b = Payout 25%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{50 + \left(\frac{0.16}{0.16}\right) (200 - 50)}{0.16}$$

$$P = \frac{50 + (1)(150)}{0.16}$$

$$P = \frac{(50 + 150)}{0.16}$$

$$P = 1,250$$

Condition c = Payout 50%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{100 + \left(\frac{0.16}{0.16}\right) (200 - 100)}{0.16}$$

$$P = \frac{100 + (1)(100)}{0.16}$$

$$P = \frac{(100 + 100)}{0.16}$$

$$P = 1,250$$

Condition d = Payout 75%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{150 + \left(\frac{0.16}{0.16}\right) (200 - 150)}{0.16}$$

$$P = \frac{150 + (1)(50)}{0.16}$$

$$P = \frac{(150 + 50)}{0.16}$$

$$P = 1,250$$

Condition e = Payout 100%

$$P = \frac{D + \left(\frac{r}{K_e}\right) (E - D)}{k_e}$$

$$P = \frac{200 + \left(\frac{0.16}{0.16}\right) (200 - 200)}{0.16}$$

$$P = \frac{200 + (1)(0)}{0.16}$$

$$P = \frac{(200 + 0)}{0.16}$$

$$P = 1,250$$

Situation iii: When IRR = 20 i.e. 0.20 and $K_e = 16\%$ i.e. 0.16 (since $r > K_e$, price will be highest when payout will be 0% and will be lower as the payout will increase and will be lowest at 100%)

Condition a = Payout 0%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{0 + \left(\frac{0.2}{0.16}\right)(200 - 0)}{0.16}$$

$$P = \frac{0 + (1.25)(200)}{0.16}$$

$$P = \frac{(0 + 250)}{0.16}$$

$$P = 1,562.50$$

Condition b = Payout 25%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{50 + \left(\frac{0.2}{0.16}\right)(200 - 50)}{0.16}$$

$$P = \frac{50 + (1.25)(150)}{0.16}$$

$$P = \frac{(50 + 187.5)}{0.16}$$

$$P = 1,484.38$$

Condition c = Payout 50%

$$P = (D + (r/K_e)(E - D))/k_e$$

$$P = (100 + (0.2/0.16)(200 - 100))/0.16$$

$$P = (100 + (1.25)(100))/0.16$$

$$P = ((100 + 125))/0.16$$

$$P = 1,406.25$$

Condition d = Payout 75%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{k_e}$$

$$P = \frac{150 + \left(\frac{0.2}{0.16}\right)(200 - 150)}{0.16}$$

$$P = \frac{150 + (1.25)(50)}{0.16}$$

$$P = \frac{(150 + 62.5)}{0.16}$$

$$P = 1,328.13$$

Condition e = Payout 100%

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e}$$

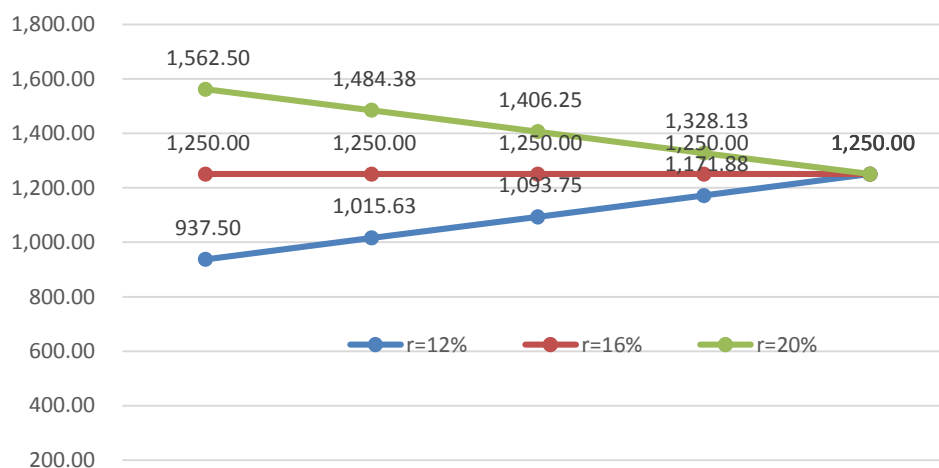
$$P = \frac{200 + \left(\frac{0.2}{0.16}\right)(200 - 200)}{0.16}$$

$$P = \frac{200 + (1.25)(0)}{0.16}$$

$$P = \frac{(200 + 0)}{0.16}$$

$$P = 1,250$$

Graphical Representation of Prices at different payout and $K_e = 16\%$



	Payout 0%	Payout 25%	Payout 50%	Payout 75%	Payout 100%
$r=12\%$	937.50	1,015.63	1,093.75	1,171.88	1,250.00
$r=16\%$	1,250.00	1,250.00	1,250.00	1,250.00	1,250.00
$r=20\%$	1,562.50	1,484.38	1,406.25	1,328.13	1,250.00

Illustration 04:

Sree Ltd. earns a rate of 12% on its total investment of ₹ 6,00,000 in assets. It has 60,000 outstanding common shares at valued at ₹ 10 per share. Discount rate of the firm is 10% and it has a policy of retaining 40% of the earnings. Determine the price of its share using Gordon's Model. What shall happen to the price of the share if the company has payout of:

a. 80%

b. 20%

Solution 04:

When the retention ratio is 40% i.e. 0.40

$$P = \frac{E(1 - b)}{K_e - br}$$

$$P = \frac{1.20(1 - 0.4)}{0.10 - 0.4 \times 0.12}$$

$$P = \frac{1.20(0.6)}{0.10 - 0.048}$$

$$P = \frac{0.72}{0.052}$$

$$P = 13.85$$

Situation a: When payout ratio is 80% (the retention ratio (b) here will be 0.20)

$$P_o = \frac{E(1 - b)}{K_e - (b \times r)}$$

$$P_o = \frac{1.2(1 - 0.2)}{0.1 - (0.2 \times 0.12)}$$

$$P_o = \frac{1.2(0.8)}{0.1 - 0.024}$$

$$P_o = \frac{0.96}{0.076}$$

$$P_o = 12.63$$

Situation b: When payout ratio is 20% (the retention ratio (b) here will be 0.80)

$$P_o = \frac{E(1-b)}{K_e - (b \times r)}$$

$$P_o = \frac{1.2(1-0.8)}{0.1 - (0.8 \times 0.12)}$$

$$P_o = \frac{1.2(0.2)}{0.1 - 0.096}$$

$$P_o = \frac{0.24}{0.004}$$

$$P_o = 60$$

Authors' Note: While in the question, they have mentioned (retaining = 40%) i.e., retention ratio is 40% or $b = 0.40$,

meanwhile while testing the additional condition, they have mentioned payout ratio. i.e. $(1-b)$, thus we have taken

When payout ratio = 80%; $(1-b) = 0.80$, thus $b = 0.20$; and,

When payout ratio = 20%; $(1-b) = 0.20$, thus $b = 0.80$;

Illustration 05:

The following data are available for Unit Ltd.

Particulars	Information
Earnings per share	₹ 8
Rate of return on investment	16%
Rate of return to shareholders	12%

If Gordon's basic valuation formula is applied what will be the price per share when the dividend payout ratio is 0%, 25%, 50%, 60% and 100%.

Solution 05:

$$P_o = \frac{E(1-b)}{K_e - (b \times r)}$$

Situation a.

$$P_o = \frac{8(1-1)}{0.1 - (1 \times 0.12)}$$

Situation b.

$$P_o = \frac{8(1-0.75)}{0.1 - (0.75 \times 0.12)}$$

$$P_0 = \frac{8(0)}{0.1 - 0.12}$$

$$P_0 = \frac{0}{-0.02}$$

$$P_0 = 0$$

$$P_0 = \frac{8(0.25)}{0.1 - 0.09}$$

$$P_0 = \frac{2}{0.01}$$

$$P_0 = 200$$

Situation c.

$$P_0 = \frac{8(1 - 0.5)}{0.1 - (0.5 \times 0.12)}$$

$$P_0 = \frac{8(0.5)}{0.1 - 0.06}$$

$$P_0 = \frac{4}{0.04}$$

$$P_0 = 100$$

Situation d.

$$P_0 = \frac{8(1 - 0.25)}{0.1 - (0.25 \times 0.12)}$$

$$P_0 = \frac{8(0.75)}{0.1 - 0.03}$$

$$P_0 = \frac{6}{0.07}$$

$$P_0 = 85.71$$

Situation e.

$$P_0 = \frac{8(1 - 0)}{0.1 - (0 \times 0.12)}$$

$$P_0 = \frac{8(1)}{0.1 - 0}$$

$$P_0 = \frac{8}{0.1}$$

$$P_0 = 80$$

Author's Note: In situation a, $K_e < g$ and the assumptions requires that, $K_e > g$ hence, there won't be a meaningful value for the share. Thus, we got the value as zero.

Illustration 06: (Understanding the implication table)

Case	Condition of r vs K_e	Optimum dividend payout ratio
Case 1	$r > K_e$	Zero
Case 2	$r = K_e$	There is no optimum ratio
Case 3	$r < K_e$	100%

Solution 06:

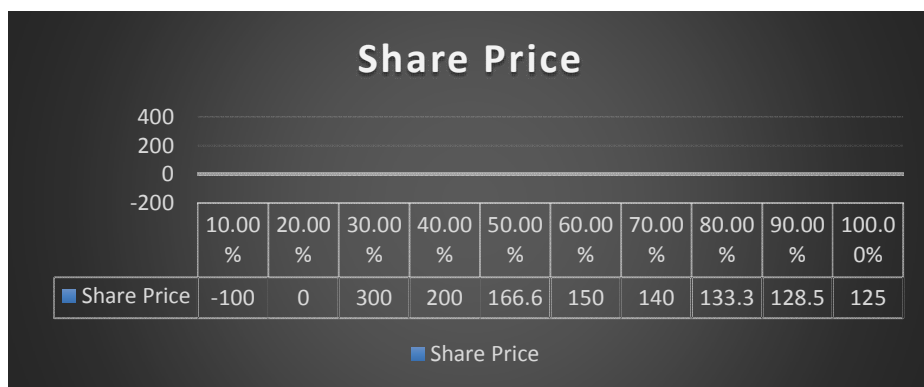
Solving the above sum in the tabular format to show the results

Case 1: $r > K_e$

EPS = ₹ 20; $r = 20\%$; $K_e = 16\%$; Dividend payout (from 10% to 100%)

E	(1-b) (Payout)	Ke	b (retention)	r	(E x (1-b)/Ke - br)
20.00	0.10	0.16	0.90	0.20	(100.00)
20.00	0.20	0.16	0.80	0.20	(Error)
20.00	0.30	0.16	0.70	0.20	300.00
20.00	0.40	0.16	0.60	0.20	200.00
20.00	0.50	0.16	0.50	0.20	166.67
20.00	0.60	0.16	0.40	0.20	150.00
20.00	0.70	0.16	0.30	0.20	140.00
20.00	0.80	0.16	0.20	0.20	133.33
20.00	0.90	0.16	0.10	0.20	128.57
20.00	1.00	0.16	-	0.20	125.00

The highest price will be when dividend payout is zero. Here as we can observe that, the share price increases as and when the payout decreases, but as we approach towards zero, the price turns negative (at payout level 20% and 10%). This is because, at those level $K_e = b r$; or $K_e < b r$, which violates the assumption of the Gordon's model. hence, there is no meaningful value for the share.



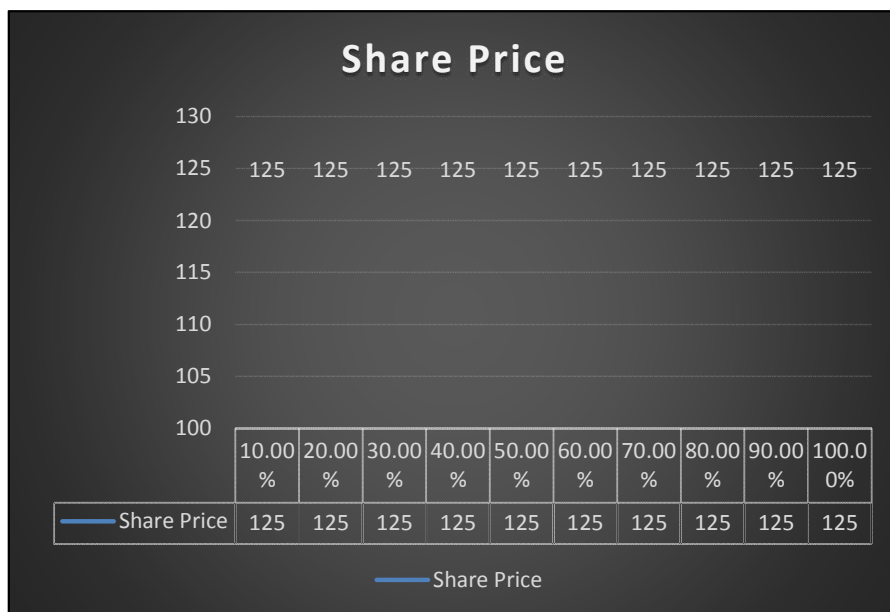
Case 2: $r = K_e$

EPS = ₹ 20; $r = 16\%$; $K_e = 16\%$; Dividend payout (from 10% to 100%)

E	(1-b) (Payout)	Ke	b (retention)	r	(E x (1-b)/Ke - br)
20.00	0.10	0.16	0.90	0.16	125.00
20.00	0.20	0.16	0.80	0.16	125.00
20.00	0.30	0.16	0.70	0.16	125.00
20.00	0.40	0.16	0.60	0.16	125.00
20.00	0.50	0.16	0.50	0.16	125.00
20.00	0.60	0.16	0.40	0.16	125.00

20.00	0.70	0.16	0.30	0.16	125.00
20.00	0.80	0.16	0.20	0.16	125.00
20.00	0.90	0.16	0.10	0.16	125.00
20.00	1.00	0.16	-	0.16	125.00

Here there is no optimum ratio, hence the price is same at each and every dividend payout ratio level.

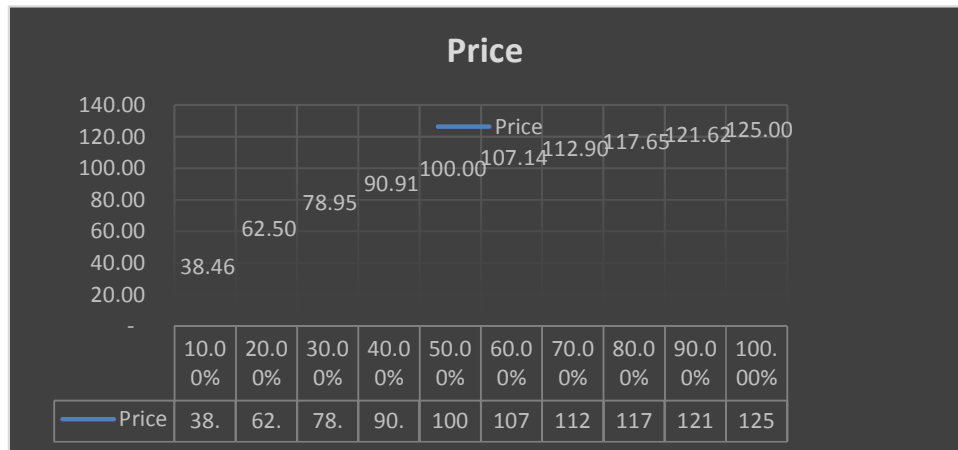


Case 3: $r < K_e$

EPS = ₹ 20; $r = 12\%$; $K_e = 16\%$; Dividend payout (from 10% to 100%)

E	(1-b) (Payout)	K_e	b (retention)	r	$(E \times (1-b)/K_e - br)$
20.00	0.10	0.16	0.90	0.12	38.46
20.00	0.20	0.16	0.80	0.12	62.50
20.00	0.30	0.16	0.70	0.12	78.95
20.00	0.40	0.16	0.60	0.12	90.91
20.00	0.50	0.16	0.50	0.12	100.00
20.00	0.60	0.16	0.40	0.12	107.14
20.00	0.70	0.16	0.30	0.12	112.90
20.00	0.80	0.16	0.20	0.12	117.65
20.00	0.90	0.16	0.10	0.12	121.62
20.00	1.00	0.16	-	0.12	125.00

Here, the value of the share keeps on increasing as and when the payout increases and the maximum price will be attained when dividend payout is 100%.



Thus, the implication of the table

Case	Condition of r vs K_e	Optimum dividend payout ratio
Growth	$r > K_e$	Zero
Constant	$r = K_e$	There is no optimum ratio
Declining	$r < K_e$	100%

Illustration 07:

From the following data, calculate the value of a share of ABC Ltd., under:

- (i) Walter's formula; and
- (ii) Gordon's model.

EPS = ₹ 25; $K_e = 18\%$; $r = 25\%$; retention ratio (b) = 40%

Solution 07:

i. Share Price under Walter's Model:

$$P = \frac{D + \left(\frac{r}{K_e}\right)(E - D)}{K_e}$$

$$P = \frac{15 + \left(\frac{0.25}{0.18}\right)(25 - 15)}{0.18}$$

$$P = \frac{15 + 1.39(10)}{0.18}$$

$$P = \frac{28.89}{0.18}$$

$$P = 160.50$$

ii. Share Price under Gordon's Model:

$$P_0 = \frac{E(1 - b)}{K_e - (b \times r)}$$

$$P_0 = \frac{25(1 - 0.4)}{0.18 - (0.4 \times 0.25)}$$

$$P_0 = \frac{25(0.6)}{0.18 - 0.10}$$

$$P_0 = \frac{15}{0.08}$$

$$P_0 = 187.5$$

Illustration 08:

Shiva Ltd., has 2,00,000 shares outstanding the current market price of the shares ₹ 50 each. The company expects the net profit of ₹ 6,00,000 during the year and it belongs to a rich class for which the appropriate capitalisation rate has been estimated to be 20%. The company is considering dividend of ₹ 2.50 per share for the current year. What will be the price of the share at the end of the year

(i) if the dividend is paid and;

(ii) if the dividend is not paid.

Solution 08:

$$P_0 = \frac{D_1 + P_1}{(1 + K_e)}$$

When Dividend is not declared	When Dividend is declared
$50 = \frac{0 + P_1}{1 + 0.2}$	$50 = \frac{2.5 + P_1}{1 + 0.2}$
$P_1 = 50(1.2) - 0$	$P_1 = 50(1.2) - 2.5$
$P_1 = 60$	$P_1 = 57.5$

Here, the price is different when dividend is declared and not declared, so why it is termed as Dividend Irrelevance theory, let's understand it by further analysis of the theory.

Now let's suppose the company requires a fund of ₹ 8,00,000 for expansion. This amount will be raised through issue of Equity shares. Let's calculate the fresh no. of shares to be issued to raise the funds.

$$M = \frac{I - (X - nD1)}{P1}$$

Dividend is not declared

$$M = \frac{8,00,000 - (6,00,000 - 2,00,000(0))}{60}$$

$$M = \frac{8,00,000 - (6,00,000 - 0)}{60}$$

$$M = \frac{8,00,000 - 6,00,000}{60}$$

$$M = \frac{2,00,000}{60}$$

$$M = 3,333.33 \text{ i.e. } 3,334$$

Do it Yourself for the case, when dividend is declared. Answer: 12,174

Alternatively, we can solve this using the table.

Steps	Particulars	Dividend is not declared	Dividend is declared
(A)	Fund Required for Expansion - (I)	8,00,000	8,00,000
(B)	Existing Profits - (X)	6,00,000	6,00,000
(C)	Less: Dividend Paid - (nD1)	-	(5,00,000)
(D) = (B) - (C)	Balance Funds	(6,00,000)	(1,00,000)
(E) = (A) - (D)	Additional Funds Required	2,00,000	7,00,000
F	(÷) Issue Price of Shares (P ₁)	60.00	57.50
G = (E) ÷ (F)	No. of Shares to be issued (M)	3,333.33	12,173.91
H	No. of Shares to be issued (M) (Round Up)	3,334	12,174

We cannot issue shares in fraction, so we will always round-up to zero decimal to find the no. of shares to be issued. (**Round up** here means

going to next whole number, so whether it 20.01 or 20.99, it will be treated as 21 only.)

Till here, we have found the no. of new shares to be issued. Still Dividend Irrelevance theory is not explained or proved. Let's understand it.

Value of the Firm. V_f or $nP_1 =$

$$V_f = \frac{(n + \Delta n)P_1 - I + X}{1 + Ke}$$

When Dividend is not declared

$$V_f = \frac{(2,00,000 + 3,334)60 - 8,00,000 + 6,00,000}{1 + 0.20}$$

$$V_f = \frac{(2,03,334)60 - 2,00,000}{1.20}$$

$$V_f = \frac{(2,03,334)60 - 2,00,000}{1.20}$$

$$V_f = \frac{1,22,00,040 - 2,00,000}{1.20}$$

$$V_f = \frac{1,20,00,040}{1.20}$$

$$V_f = 1,00,00,033$$

When Dividend is declared

$$V_f = \frac{(2,00,000 + 12,174)57.50 - 8,00,000 + 6,00,000}{1 + 0.20}$$

$$V_f = \frac{(2,12,174)57.50 - 2,00,000}{1.20}$$

$$V_f = \frac{1,22,00,005 - 2,00,000}{1.20}$$

$$V_f = \frac{1,20,00,005}{1.20}$$

$$V_f = 1,00,00,004$$

Alternatively, we can solve this using the table.

Steps	Particulars	Dividend is not declared	Dividend is declared
(A)	Existing Shares	2,00,000.00	2,00,000.00
(B)	Fresh Issue to be made	3,334.00	12,174.00
(C) = (A) + (B)	Total No. of Shares to be issued	2,03,334.00	2,12,174.00
(D)	(x) P1	60.00	57.50
(E) = (C) x (D)	Intermittent Value of the Firm	1,22,00,040.00	1,22,00,005.00
(F)	(-) Fund Required for Expansion - (I)	(8,00,000)	(8,00,000)
(G)	(+) Existing Profit - (X)	6,00,000	6,00,000
(H) = (E) - (F) + (G)	Total Value	1,20,00,040.00	1,20,00,005.00
(I)	(÷) Cost of Equity	1.2	1.2
(J) = (H) ÷ (I)	Value of the Firm	1,00,00,033.33	1,00,00,004.17

Thus, the dividend policy remains irrelevant with respect to the total valuation of the firm.

Illustration 09:

Bansi Ltd. belongs to a risk class for which the appropriate capitalization rate is 12%. It currently has outstanding 20,000 shares selling at ₹ 80 each. The firm is contemplating the declaration of dividend of ₹ 5 per share at the end of the current financial year. The company expects to have a net income of ₹ 4,00,000 and a proposal for making new investments of ₹ 6,00,000. What will be the value of share when dividend is declared and not declared.

Solution 09:

Dividend is not declared	Dividend is declared
$P_0 = \frac{D_1 + P_1}{1 + K_e}$	$P_0 = \frac{D_1 + P_1}{1 + K_e}$
$P_1 = P_0 (1 + K_e) - D_1$	$P_1 = P_0 (1 + K_e) - D_1$
$P_1 = 80(1.12) - 0$	$P_1 = 80(1.12) - 5$
$P_1 = 89.6$	$P_1 = 84.6$

Illustration 10:

Shakti Ltd. has a capital of ₹ 10,00,000 in equity shares of ₹ 100 each. The shares are currently quoted at par. The company proposes to declare a dividend of ₹ 10 per share at the end of the current financial year. The capitalization rate for the risk class to which the company belongs is 15%.

What will be the MP of the share at the end of the year, if

(i) A dividend is not declared.

(ii) A dividend is declared.

(iii) Assuming that the company opts to not pay dividend and opt to pay the dividend and has net profits of ₹ 5,00,000 and makes new investments of ₹ 10,00,000 during the period, how many new shares must be issued? Use the MM Model.

Solution 10:

Statement showing value of the shares under both conditions

Dividend is not declared	Dividend is declared
$P_0 = \frac{D_1 + P_1}{1 + K_e}$	$P_0 = \frac{D_1 + P_1}{1 + K_e}$
$P_1 = P_0 (1 + K_e) - D_1$	$P_1 = P_0 (1 + K_e) - D_1$
$P_1 = 100(1.15) - 0$	$P_1 = 100(1.15) - 10$
$P_1 = 115$	$P_1 = 105$

Statement Showing Calculation of No. of Shares to be issued.

Steps	Particulars	Dividend is not declared	Dividend is declared
(A)	Fund Required for Expansion - (I)	10,00,000	10,00,000
(B)	Existing Profits - (X)	5,00,000	5,00,000
(C)	Less: Dividend Paid - (nD1)	-	(1,00,00,000)
(D) = (B) - (C)	Balance Funds	(5,00,000)	95,00,000
(E) = (A) - (D)	Additional Funds Required	5,00,000	1,05,00,000
F	(÷) Issue Price of Shares (P_1)	115.00	105
G = (E) ÷ (F)	No. of Shares to be issued (M)	4,347.83	1,00,000.00
H	No. of Shares to be issued (M) (Round Up)	4,348.00	1,00,000.00

Statement Showing Calculation of Value Per Share

Steps	Particulars	Dividend is not declared	Dividend is declared
(A)	Existing Shares (n)	10,00,000.00	10,00,000.00
(B)	Fresh Issue to be made	4,348.00	1,00,000.00
(C) = (A) + (B)	Total No. of Shares to be issued	10,04,348.00	11,00,000.00
(D)	(x) P1	115.00	105.00
(E) = (C) x (D)	Intermittent Value of the Firm	11,55,00,020.00	11,55,00,000.00
(F)	(-) Fund Required for Expansion - (I)	(10,00,000)	(10,00,000)
(G)	(+) Existing Profit - (X)	5,00,000	5,00,000
(H) = (E) - (F) + (G)	Total Value	11,50,00,020.00	11,50,00,000.00
(I)	(÷) Cost of Equity	1.15	1.15
(J) = (H) ÷ (I)	Value of the Firm	10,00,00,017.39	10,00,00,000.00

10.2 OTHER DIVIDEND MODELS

10.2.1 ZERO GROWTH MODEL

Zero growth rate model assumes that all dividend paid on the stock remains same till perpetuity. In this case the stock price would be equal to:

$$P_0 = \frac{D}{K_e}$$

Where,

P_0 = Current Market price of share

D = Annual dividend

K_e = Cost of capital

Illustration 11:

Zebra Ltd. is a no growth company and pays a dividend of ₹ 5 per share. If the cost of capital is 10%, calculate the current market price of the share?

Solution 11:

$$P_0 = \frac{D}{K_e}$$

$$P_0 = \frac{5}{0.10}$$

$$P_0 = 50$$

1.5.2 CONSTANT DIVIDEND GROWTH MODEL

The Constant Dividend Growth Model, also known as the Gordon Growth Model, is a method used to value a stock by assuming that dividends will grow at a constant rate indefinitely. It was developed by Myron J. Gordon and Eli Shapiro.

The formula for the Constant Dividend Growth Model is:

$$P_0 = \frac{D_1}{K_e - g}$$

D_1 = Expected Dividend $D_0(1 + g)$

D_0 = Current Dividend or Past Dividend

g = Growth rate or br

K_e = Cost of Equity.

It's important to note that this model makes several assumptions, including a constant growth rate, which may not always hold true in real-world situations. Additionally, it assumes that the cost of equity (K_e) is greater than the growth rate (g).

Investors often use this model as one of the approaches to estimate the intrinsic value of a dividend-paying stock. However, it's essential to consider other factors and use multiple valuation methods for a more comprehensive analysis.

Illustration 12:

Suppose a stock is currently trading at ₹50 per share. The most recent dividend paid was ₹ 2 per share, and the investors expect the dividend to grow at a constant rate of 5%. The required rate of return for the stock is 10%.

You are required to calculate the value of the stock and comment on its pricing in the market.

Solution 12:

Using the Gordon Growth Model formula:

$$P_0 = \frac{D_0 \times (1 + g)}{Ke - g}$$

$$P_0 = \frac{2 \times (1 + 0.05)}{0.10 - 0.05}$$

$$P_0 = \frac{2 \times 1.05}{0.05}$$

$$P_0 = \frac{2.1}{0.05}$$

$$P_0 = 42$$

Therefore, according to the Gordon Growth Model, the intrinsic value of the stock is ₹42.

Since the shares is valued at ₹ 50 in the market, it is overvalued based on constant growth pricing model.

Illustration 13:

Let's consider another scenario where the required rate of return is 8%, and the dividend growth rate is 3%.

Solution 13:

$$P_0 = \frac{D_0 \times (1 + g)}{Ke - g}$$

$$P_0 = \frac{2 \times (1 + 0.03)}{0.08 - 0.03}$$

$$P_0 = \frac{2 \times 1.03}{0.05}$$

$$P_0 = \frac{2.06}{0.05}$$

$$P_0 = 41.20$$

In this case, the intrinsic value of the stock is ₹ 41.20.

Illustration 14:

Consider a stock trading at ₹ 60 per share. The expected dividend to be paid is ₹ 3.18 per share, and the investors expect a constant growth rate of 6%. If the required rate of return is 12%, the Gordon Growth Model is used, calculate the value of the share.

Solution 14:

In this sum, they have mentioned the term, expected dividend is ₹ 3.18, i.e. $D_1 = 3.18$. $D_1 = D_0 \times (1+g)$. Hence, we substitute the numerator straightaway with 3.18.

$$P_0 = \frac{D_0 \times (1+g)}{Ke - g}$$

$$P_0 = \frac{3.18}{0.12 - 0.06}$$

$$P_0 = \frac{3.18}{0.06}$$

$$P_0 = 53$$

So, the intrinsic value of the stock in this case is ₹53.

10.2.3 MULTIPLE GROWTH MODEL

The Multiple Growth Model, also known as the Two-Stage Dividend Discount Model, is used when the dividends of a stock are expected to grow at different rates over different time periods. This model is an extension of the Gordon Growth Model and accommodates multiple phases of dividend growth.

The formula for the Multiple Growth Model is:

$$\underbrace{\frac{D_0(1+g)^1}{(1+r)^1} + \frac{D_1(1+g)}{(1+r)^2} + \dots + \frac{D_{n-1}(1+g)}{(1+r)^n}}_{\text{High Growth Rate Period}} + \underbrace{\frac{D_0(1+g)^n(1+g_n)}{(r-g_n)(1+r)^n}}_{\text{Stable Growth Rate Period}}$$

Where:

Where D = dividend of different periods (like D_0 , D_1 , and so on)

g = higher growth rate

n = number of years in a high growth rate period

g_n = growth rate of the stable growth rate period

r = required rate of return

Let's go through an illustration to better understand the Multiple Growth Model:

Illustration 16:

Suppose a stock is currently trading at ₹ 35 per share. The most recent dividend paid is ₹ 2 per share. The dividends are expected to grow at 8%

for the first three years (Stage 1), and then the growth rate is expected to drop to 4% indefinitely (Stage 2). The required rate of return is 12%. Calculate the value of the share and comment on the market valuation.

Solution 16:

Statement showing valuation of shares

Year	Dividend	DF @ 12%	DCF
1	2.16	0.893	1.93
2	2.33	0.797	1.86
3	2.52	0.712	1.79
3	*32.75	0.712	23.32
			28.90

Therefore, according to the Multiple Growth Model, the intrinsic value of the stock is ₹ 28.90. Since, the value of the share is 28.90 and its market value is ₹ 35, the shares are overpriced in the market.

Working Note.

Dividend			Amount
D0	Given	D0 = 2	2.00
D1	D1 = D0(1+g)	D1 = 2(1+0.08)	2.16
D2	D2 = D1(1+g)	D2 = 2.16(1+0.08)	2.33
D3	D3 = D2(1+g)	D3 = 2.33(1+0.08)	2.52
D4	D4 = D3(1+g2)	D4 = D3(1+2.52)	2.62

Under this method, we calculate the dividend growth till the year the dividend gets stabilized. So, till year 1, 2 and 3, we have taken the dividend post growth.

However, after that, when the growth is stable, we take the value of share at the period before the growth is stabilized. (In above illustration, the growth gets stable from the end of year 4, so we will take the value of the share at the period of year 3.)

$$P_3 = \frac{D_4}{K_e - g};$$

$$P_3 = \frac{2.62}{0.10 - 0.04};$$

Illustration 17:

Mr. Rohit is planning to hold a stock that is expected to have three different growth rates over an 8-year period. The stock is currently trading at ₹ 80 per share, and the most recent dividend paid is ₹ 4 per share. For years 1 to 3, the dividend growth rate is expected to be 10%, during the years 4 to 6, dividend growth rate will be 8%, after which the dividend

growth rate will be constant for the future at 6%, and the cost of equity is expected to be 11%. You are required to calculate the value of the share.

Solution 17:

Year	Dividend	DF @ 11%	DCF
1	4.40	0.901	3.96
2	4.84	0.812	3.93
3	5.32	0.731	3.89
4	5.75	0.659	3.79
5	6.21	0.593	3.68
6	6.71	0.535	3.59
6	142.20	0.535	76.08
			98.92

Therefore, according to the Multiple Growth Model, the intrinsic value of the stock is ₹ 98.92. Since, the value of the share is 98.92 and its market value is ₹ 80, the shares are underpriced in the market.

10.2.4 CAPM MODEL

The Capital Asset Pricing Model (CAPM) is a financial model used to determine the expected return on an investment, considering its risk and the risk-free rate. However, the CAPM is typically used to estimate the required rate of return for equity rather than specifically for dividends. The required rate of return for equity, often denoted as K_e , is a key component in various valuation models, including the Gordon Growth Model.

The CAPM formula is as follows:

$$K_e = R_f + \beta(R_m - R_f)$$

Where:

K_e is the required rate of return on equity.

R_f is the risk-free rate.

B is the beta of the stock (a measure of the stock's systematic risk).

R_m is the expected market return.

To incorporate the CAPM into a dividend valuation model, such as the Gordon Growth Model, you can replace K_e in the model.

It's important to note that the application of the CAPM to valuation models is based on certain assumptions and simplifications, and the accuracy of the model depends on the appropriateness of these assumptions for the specific situation. Additionally, beta β is a crucial parameter in the CAPM, and obtaining an accurate estimate of beta is essential for meaningful results.

Illustration 18:

The management of Nisha Ltd. is considering an investment in a stock, and has requested you want to determine the required rate of return using the CAPM. The risk-free rate is 4%, the beta of the stock is 1.2, and the expected market return is 10%.

Solution 18:

Using the CAPM formula:

$$K_e = R_f + \beta(R_m - R_f)$$

$$K_e = 4 + 1.2(10 - 4)$$

$$K_e = 4 + 1.2(6)$$

$$K_e = 4 + 7.2$$

$$K_e = 11.2\%$$

In this case, the required rate of return for the stock, according to the CAPM, is 11.2%.

10.2.6 GRAHAM & DODD MODEL

This approach is given by B. Graham and D. L. Dodd. They clearly emphasize the relationship between the dividends and the stock market. According to them, the stock value responds positively to high dividends and negatively to low dividends, that is, the share values of those companies rise considerably which pay high dividends and the prices fall in the event of low dividends paid.

Symbolically

$$P = \left[m \left(D + \frac{E}{3} \right) \right]$$

Where P is the market price,

M is the multiplier,

D is dividend per share,

E is Earnings per share.

Illustration 19:

From the following information calculate the value of the share

EPS = ₹ 10; Dividend = ₹ 5, and multiplier is 7.

Solution 19:

$$P = \left[m \left(D + \frac{E}{3} \right) \right]$$

$$P = \left[7 \left(5 + \frac{10}{3} \right) \right]$$

$$P = [7(5 + 3.33)]$$

$$P = [7(8.33)]$$

$$P = 58.67$$

10.2.7 Unsolved illustration:**Illustration 01:**

Determine the market price of a share under Gordon's and Walter's Dividend Model of Lalwani Ltd., given that $k_e = 11\%$; $E = ₹ 20$;

$r =$ i. 12% ; ii. 11% ; and iii. 10%

Calculate the value of share if

a. $b = 90\%$; b. $b = 60\%$ and; c. $b = 30\%$

Illustration 02:

Ketu & Co. earns ₹ 8 per share having capitalization rate of 10 per cent and has a return on investment at the rate of 20 per cent. According to Walter's model, what should be the price per share at 30 per cent dividend payout ratio? Is this the optimum payout ratio as per Walter? If not calculate the value as per the optimum payout ratio.

Illustration 03:

Wall Ltd., has 8 lakhs equity shares outstanding at the beginning of the year 2022. The current market price per share is ₹ 150. The Board of Directors of the company is contemplating ₹ 10 per share as dividend. The rate of capitalization, appropriate to the risk-class to which the company belongs, is 8% :

(i) Based on M-M Approach, calculate the market price of the share of the company, when the dividend is – (a) declared; and (b) not declared.

(ii) How many new shares are to be issued by the company, if the company desires to fund an investment budget of ₹ 5 crores by the end of the year assuming net income for the year will be ₹ 2 crores?

Illustration 04:

Ram Company belongs to a risk class for which the appropriate capitalization rate is 12% . It currently has outstanding 40,000 shares selling at ₹ 125 each. The firm is contemplating the declaration of

dividend of ₹ 8 per share at the end of the current financial year. The company expects to have a net income of ₹4,00,000 and a proposal for making new investments of ₹6,40,000. Show that under the MM assumptions, the payment of dividend does not affect the value of the firm. How many new shares issued and what is the market value at the end of the year?

Illustration 05:

A firm had been paid dividend at ₹ 2 per share last year. The estimated growth of the dividends from the company is estimated to be 5% p.a. DETERMINE the estimated market price of the equity share if the estimated growth rate of dividends (i) rises to 8%, and (ii) falls to 3%. Also FIND OUT the present market price of the share, given that the required rate of return of the equity investors is 15%.

Illustration 06:

XYZ is a company having share capital of ₹ 10 lakhs of ₹ 10 each. It distributed current dividend of 20% per annum. Annual growth rate in dividend expected is 2%. The expected rate of return on its equity capital is 15%. CALCULATE price of share applying Gordons growth Model.

Illustration 07:

Calculate the intrinsic value of the Shares of X Ltd. if the dividend paid in the previous year was ₹ 20 and growth rate expected is 12% and the capitalization rate for this class of shares is 18%. Also calculate the value of the shares if other things remain constant except the following:

- i. If dividend per share in the previous year was ₹ 18
- ii. If growth rate is 10%;
- iii. If growth rate is 14%;
- iv. If Capitalization rate is 15%; and
- v. If Capitalization rate is 21%.

