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LESSON 1

Financial Management- An Overview

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STRUCTURE

- 1.1 Learning Objectives
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1.1 LEARNING OBJECTIVES

- To understand the evolution and growth of finance function.
- To understand that maximising shareholders' wealth is preferable to maximising profits.
- To discover the Agency cost and how to address it.
- To understand the concept of corporate governance and CSR from financial management perspective of the company.



1.1 INTRODUCTION

The goal of financial management is to maximize the value of the company and, by extension, the wealth of the company's owners or shareholders. This is done by planning, raising, and using the necessary financial resources in the best way possible. Financial management is all about planning, getting the money you need, and using it in the best way possible. Recently, managing a company's finances has become a separate and important part of managing the company as a whole. The effectiveness and quality of the financial decisions that are made by a company largely determine whether or not that company will be successful in business. In this context, the role of financial manager takes on a very important significance. A company's financial manager is accountable for all of the company's financial activities, including the planning, raising, distribution, and control of funds in the most efficient manner possible. As a result, financial management pertains to the administration of the finances of a company.

1.2 MEANING OF FINANCIAL MANAGEMENT

Financial management is the job of a company's managers to plan and control how the company's money is used. In other words, it is focused on acquiring, financing, and managing assets to achieve the overall goal of the business, which is primarily to maximise shareholder value.

It aims to obtain capital at the lowest possible cost and use it to maximise return while maintaining the optimal degree of risk.

According to Phillipatus, *"Financial Management is concerned with the managerial decisions that result in the acquisition and financing of short term and long-term credits for the firm."*

In terms of Joshep and massie, "Financial management is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations".

There are two basic aspects of financial management viz., procurement of funds and an effective use of these funds to achieve business objectives.

Procurement of funds-

Since money can be obtained from various sources, getting it is always a complicated problem for businesses. Several of the funding options for a business enterprise include: equity (owners' capital); bonds; bank borrowing; angel financing; and so on.



Different sources of funds have different characteristics in terms of risk, cost, and control. The cost of funds should be kept to a bare minimum, which necessitates a careful balancing of risk and control factors. Another important factor to consider when selecting a source of new business finance is striking a balance between equity and debt to ensure the funding structure suits the business.

Let's talk about equity and debt in terms of cost, control, and risk. The funds raised through the issuance of equity shares are the least risky for the firm because there is no need to repay equity capital unless the firm is liquidated.

However, in terms of cost, equity capital is typically the most expensive source of funds. This is because shareholders' dividend expectations are typically higher than the prevalent interest rate, and dividends are an appropriation of profit that is not allowable as an expense under the Income Tax Act.

Furthermore, the issuance of new public shares or a further public offering may dilute the control of existing shareholders.

The funds raised through the issuance of debt or the raising of loans are the riskiest for the firm because there is a requirement to repay principal and interest amounts in the form of instalment payments, whether the firm is profitable or not. As a company, you have to pay it. It's a kind of legal obligation.

But on the other side, if a company issues debt, then it can claim a deduction for interest, which is provided by the Income Tax Act. That is why we say that debt is cheaper than equity because it provides a tax advantage. It will benefit us by lowering the amount of tax.

Aside from that, if a company raises funds by issuing debt, there is no dilution of the company's ownership. It will simply create an obligation that the company must meet in terms of timely repayment of interest and the principal amount of money.

Utilization of Fund-

As the financial manager of your company, you need to use money in the best way possible. You must identify instances where funds are sitting idle or where proper use of funds is not being made. All funds are obtained at a certain cost and with a certain amount of risk. There is no point in running the business if these funds are not used in such a way that they generate an income greater than the cost of acquiring them. As a result, it is critical to use the funds wisely and profitably.

There are two ways to study the scope of financial management:



1. The Traditional Approach, and
2. The Modern Approach.

1.4 SCOPE OF FINANCIAL MANAGEMENT

1.4.1 The Traditional Approach

The scope of financial management was restricted by this approach to the process of raising and administering the funds that were necessary for businesses to meet their financial obligations. This strategy put more and more emphasis on companies getting the money they needed to meet their different financial needs. This emphasis has led to the following results:

- The emergence of an increasing number of financial institutions to satisfy the demand for business financing.
- The creation of a variety of different financial instruments, such as shares, debentures, bonds, and so on, could have been used to raise funds.

As a result, the traditional approach centred on the task of determining how the required funds could be raised from the combination of sources that were available in the most effective manner. The function of finance was concerned with the acquisition of finances in order to finance the activities of expanding or diversifying the business. The function of finance was not an essential part of the daily managerial activities.

- There is no emphasis on the wise use of funds. The main criticism of this approach is that it focuses solely on the acquisition of funds. The more important aspect of funds, namely their cautious use or allocation, was totally neglected.
- The long-term resources were the primary focus of attention, and the long-term finances were the only ones that were of any significance. The idea of working capital and how to effectively manage it was essentially non-existent at the time.
- This approach was a way of looking at finance from the outside. It said that the finance function was all about getting money and managing it. It focused on the relationship between the company and the people who give it money. So, everything was looked at from the point of view of the people who gave money, i.e., from the outside. Questions like how to spend money wisely, how to predict expected returns, how to keep the cost of capital as low as possible, etc. were completely ignored.



1.4.2 The Modern Approach-

Due to changes in technology, industrialization, rapid economic growth, more competition, the creation of management information systems, and the rise of professional management, the definition of financial management has changed to include decisions about both raising money and using it wisely. So, the modern approach includes not only the process of getting money but also the process of putting that money to good use among an organization's assets. This method sees financial management as an integrated part of overall management and gives a conceptual and analytical framework for making financial decisions.

1.5 EVOLUTION OF FINANCIAL MANAGEMENT

Over time, the nature and scope of financial management have evolved and broadened. Over the last 50 years, financial management has evolved gradually. There are three stages in the evolution of financial management. During the second half of the twentieth century, finance emerged as a distinct field of study. However, some casual references to the finance function had been made prior to that. The evolution of finance functions and changes in their scope resulted from two factors: 1. Continuous growth and diversity in business 2. The gradual introduction of new financial analysis tools.

1.5.1 Traditional Phase upto 1940

At first, finance was considered to be a component of economics and received no special attention. Owners of businesses were more focused on daily operations. In the past, managing cash and preserving records all fell under the responsibility of the financial manager. A financial manager was only specifically requested when it was necessary for him to look for fresh sources of funding whenever there was a perceived need for the funds.

- The function of finance was concerned with the acquisition of finances in order to finance the activities of expanding or diversifying the business. The function of finance was not an essential part of the daily managerial activities.
- The finance function was specifically considered from the perspective of the fund suppliers, i.e., the lenders, both individuals and institutions.
- The long-term resources were the primary focus of attention, and the long-term finances were the only ones that were of any significance. The idea of working capital and how to effectively manage it was essentially non-existent at the time.
- At the time, finance was more descriptive than analytical.



1.5.2 Transitional Phase

During this period, financial management was almost identical in terms of its nature and scope as it was during the traditional phase. In spite of this, there was a growing emphasis placed on planning, acquiring, managing, and controlling cash in order to meet the day-to-day monetary requirements of the company.

1.5.3 Modern Phase

The finance function has become increasingly analytical and decision oriented as a result of the gradual increase in competition and the rapid growth in business that has occurred in recent years, as well as the regular occurrence of boom and recession in economic activities. The scope of the finance function has been expanded even further, and it now not only includes methods of acquiring funds at episodic events, but also the most efficient utilisation possible through the utilisation of data based on analytical decision making.

Now, a finance manager's job is more like that of a professional manager. He or she is in charge of getting the company to raise capital, allocating the capital to different projects, and measuring the results of each project. The function of finance now encompasses both the acquisition of funds and the distribution of those funds.

The development of the theory of portfolio management in 1952 by Harry Markowitz, the Theory of Leverage and Valuation of firm by Modigliani and Miller in 1958, and the Option Valuation Model by Black and Scholes in the 1973s are all considered to be significant milestones in the journey that led to the development of modern financial management.

These new developments actually mark the beginning of the process of developing an integrated theory of financial management. This theory will ultimately include such topics as the theory of efficient capital markets, capital budgeting, the theory of capital structure, dividend policy, working capital management, risk and uncertainty dimensions of financial decision making, and so on.

1.6 DECISIONS OR FUNCTION OF FINANCIAL MANAGEMENT

1.6.1 Capital Budgeting Decisions-

The most crucial choices a company makes involve its capital budgeting decisions. These decisions involve a long-term commitment of available funds with the hope of receiving a sufficient return on them in the future.



It should be noted that capital budgeting decisions have an impact on the business's survival and growth. Hence, any wrong decision in this context may have an adverse impact on the survival and future growth prospects of the business.

In capital budgeting decisions, a financial manager tries to find profitable opportunities where they can generate more cash inflows than cash outflows. Here we need to take the following decisions as a financial manager in capital budgeting:

Whether we should invest in a particular project or not.

Whether we should continue investing in a particular project or discontinue it.

When making decisions regarding capital budgeting, one must balance the potential for loss with the potential for gain. The risk associated with investing in a small plant or project is significantly lower than the risk associated with investing in a large plant or project. On the other hand, a small project typically results in a smaller return than a large project does. Before deciding on the best size for the project to take on, it is important to do a thorough risk and return assessment.

1.6.2 Financing Decisions-

Financing decisions are those where capital formation (capital structure) has to be finalized. Once the requirement for funds is established, a decision has to be taken regarding the sources from where such funds can be arranged at minimum cost.

When, where, and how to acquire funds to meet the firm's investment needs. As a financial manager, we need to determine the proportion of debt and equity. We always strive for an optimal capital structure when the market value of a share is maximised.

While taking a decision regarding the formation of capital, the following factors must be properly evaluated:

Risk & Return-

Because interest on debt is tax deductible, debt capital is typically considered to be more cost effective than equity capital. Additionally, due to the fact that debt is paid before equity, investors face a lower level of risk, and as a result, they require a lower rate of return on debt investments. But from the perspective of the company, having an excessive amount of debt is riskier than having equity capital because debt obligations have to be met regardless of whether or not the company is making a profit.



On the one hand, debt has a lower cost of capital, so employing more debt would mean higher returns; however, this would also mean taking on more risk. On the other hand, equity capital gives a lower return due to its higher cost of capital, but it takes on less risk.

Control-

If a company is going to raise funds by issuing debt in the market, then it will not impact the ownership of the company, and there will be no diversification of ownership. But at the same time, if the company is issuing equity in the market, then there will be a diversification of ownership of the company, which leads to less control for existing shareholders over the company.

1.6.3 Dividend Decisions-

In the dividend decision, the decision is to be made whether to distribute the dividend or not. A company's finance manager needs to determine what portion of its profit after taxes should be kept in the company to meet future investment requirements and what portion should be given to shareholders in the form of dividends. Should the company keep all of the profits for itself, keep some and give the rest away, or distribute all of the profits?

The decision regarding the dividend also involves a risk return trade-off. Investors typically anticipate dividends due to the fact that dividends resolve the future uncertainty that is attached to capital gains. Therefore, a company should pay out dividends. When a company that has profitable investment opportunities pays dividends, however, the company is forced to raise capital from external sources, which is a more expensive option than keeping the money it has already earned. As a result, the return on projects is lower. In the case of growing businesses, a high dividend pay-out carries a lower risk but also leads to a lower return, whereas a low dividend pay-out carries a higher risk but ultimately results in a higher return. Therefore, a firm has to strike a balance between dividends and retained earnings so as to satisfy investors' expectations.

1.6.4 Working Capital Decisions-

The management of a company's short-term or current assets, such as inventory, cash, and receivables, as well as the management of the company's short-term or current liabilities, such as creditors and bills payable, are both aspects of working capital management. Management of working capital involves addressing the following issues:

- What are some potential sources for raising funds for the short term?



- How much of the total amount should be raised from each of the various sources of short-term funding?
- What are the optimal levels of cash and inventory that should be maintained?
- When dealing with customers, what kind of credit policy should the company implement?

The manager of finances is responsible for estimating the total amount of funds required for working capital as well as individual investments in various components. If a company follows a conservative policy regarding its working capital and makes larger investments in its current assets, it will increase its liquidity and, as a result, lower its risk of going bankrupt; however, this will have a negative impact on the company's ability to generate profits.

On the other hand, if a company decides to implement an aggressive policy regarding its working capital, it may be able to boost its profitability by limiting its investment in working capital; however, this will result in an unfavourable liquidity position for the company. Both risk and return, as well as profitability and liquidity, are inversely related to one another. Therefore, the finance manager should have optimum level of working capital.

1.7 OBJECTIVE/GOAL OF FINANCIAL MANAGEMENT

Each and every business is created with certain goals or objectives to be achieved during its lifetime. An operationally useful criterion is required for financial management. This criterion would serve as a yardstick for various financial decisions, including capital budgeting, capital structure, dividend policy, and working capital management. The goal is to establish a structure within which the most effective choices regarding one's financial situation can be made. The vision, mission, and overall goals and objectives of the corporation should serve as the basis for determining what the objective of financial management should be. The objective would provide a framework within which optimal financial decisions can be taken.

1.7.1 Profit Maximization Objective

Profit maximisation was emphasised as an important goal of financial management during the traditional phase. Profit is the primary goal of any business. It can be said that the majority of businesses exist primarily to make money. Profit is the yardstick for measuring the efficiency of business operations. Profit maximisation as a financial management objective means that all financial decisions in a company are guided by the amount of profits that the financial



decision generates or saves. Unprofitable projects and alternative investment options would be rejected. If there are insufficient funds to finance all profitable investment projects, the ones with the highest profits will be chosen.

Advantages of Profit Maximization

- The primary goal of most businesses is to earn profits.
- Profit can be used to assess the success of business operations.
- Profit maximization ensures efficient use of scarce financial resources by allocating these resources to uses that generate the highest profits.

Limitations of Profit maximization

- **Profit a vague and confusing concept-** The term profit is not specifically defined. It can refer to overall profit, incremental profit, profit before taxes, or profit after taxes.
- **Ignorance of risk-** The goal of maximising profits must be approached with a comprehension of the risks that are involved. There is a direct relationship between the levels of risk and profits. There are a lot of high-profit opportunities that involve higher risks. The greater the risk, the greater the potential for gain. If increasing profits is the main objective, consideration of the **risk aspect is totally ignored**. This suggests that financial managers are willing to go along with highly risky propositions if they will result in large profits. In actuality, risk is a very significant factor that must be weighed against the desired level of profit, but these two factors must be kept in proper proportion.
- **It ignores time value of money-** There is no consideration given to the order in which benefits will be received (cash inflows). It does not make any difference between cash inflows occurring at different points in time.
- **Based on Accounting Profit-** Management can easily affect accounting profits by changing the accounting policies that are used to figure out accounting profits.
- **Against corporate responsibility-** The concept of corporate responsibility is in direct conflict with the purpose of maximising profits. If the main purpose of a company is to maximise its objectives, then the company may engage in a variety of immoral and illegal acts that would not normally be wanted. The purpose of a business organisation is not merely to maximise profits; rather, it is to produce value for the company's owners as well as for its other stakeholders. It is considered impractical,



inappropriate, and immoral in today's modern business world to maximise profits at all costs.

1.7.2 Shareholder Wealth Maximization objective-

The maximisation of shareholder wealth is regarded as the goal of modern-day financial management. It overcomes the limitations of the Profit Maximization objective and provides a realistic objective by being based on the concept of cash flows and taking into consideration the timing of benefits.

The current market value of the company's shares, as well as reserves, surplus, and accumulated profits, are all part of the wealth of the company's shareholders. However, the market value of a share is the most important component here.

The market value of the shares, also known as the market capitalization, is equal to the market price multiplied by the total number of outstanding shares.

$$\text{Market Capitalization} = \text{Market price of share} * \text{total number of outstanding shares}$$

As a result, the company's financial manager should make all financial decisions in order to maximise the market value of the company's shares. Now, considering that the total number of shares will not change over the course of some specified amount of time, the objective of the finance manager should be to achieve the highest possible market price for each share, with the goal of increasing the wealth of the shareholders. A finance manager has the potential to achieve a higher share price more quickly by selecting projects with high risk and high return. On the other hand, this strategy might fail, which would lead to a significant drop in share prices. If shareholders are unhappy with the way management is operating the company or the progress it is making, they can voice their displeasure by selling company shares, which will result in a decrease in the price of those shares.

This is also referred to as "maximizing value or ensuring that your net present worth is as high as possible. This objective is to maximise, for the benefit of shareholders, the net present value of a course of action. This is based on the assumption that the financial manager will work towards increasing the value of shareholders' total investments as much as possible. In this context, the goal of the finance managers would be to increase the value of each and every investment project that the company chooses to pursue and implement. In order to accomplish this, the net present value of a project is calculated using the project's anticipated



cash inflows and outflows, in addition to the firm's cost of capital (discount rate). You can calculate the net present value (NPV) of a project by deducting the present value of all cash outflows associated with the project from the present value of all cash inflows experienced by the project over the course of its lifetime.

$$\text{Net present value} = \text{Present value of cash inflows} - \text{Present value of cash outflow}$$

The objective of maximising the wealth of shareholders takes into account cash flows, the timing of benefits, and risks associated with expected benefits. Because it is based on the idea of cash flows and takes into account both the timing of benefits and the risks associated with them, it is capable of overcoming the constraints that are imposed by the objective of profit maximisation and offers a more realistic objective.

Advantages of shareholders' wealth maximization

- (i) The goal of wealth maximisation is to increase the value of shareholders' investments as well as their overall wealth. Therefore, is regarded as a more valuable goal than maximising profits.
- (ii) Unlike profit, the concept of cash flows is clear and unambiguous, and it serves as the foundation for this method. In this context, cash inflow is regarded as an advantage, while cash outflow is considered a cost associated with a specific decision.
- (iii) The process of maximising wealth takes into account the order in which benefits (cash inflows) and expenses take place (cash outflows). As a result, it takes into account the value that money has over time.
- (iv) The process of maximising wealth takes into account the risk that is associated with the occurrence of cash flows.
- (v) The goal of wealth maximisation is to direct a company's financial resources towards those activities that will yield the greatest financial return for the company's shareholders.
- (vi) The goal of maximising the wealth of shareholders contributes to the maintenance of the economic well-being of the society as a whole by promoting the effective utilisation of the limited financial resources available to the society.

Criticism of shareholders' wealth maximization objective

Even the intention of maximising wealth for shareholders is being called into question as more people are becoming concerned about the social responsibility of corporations.



Maximizing wealth is criticised on the grounds that its only goal is to maximise the wealth of shareholders, and it does not consider the welfare of other important stakeholders in the company, such as management, creditors, employees, suppliers, distributors, customers, and so on. This is one of the main criticisms levelled against wealth maximisation. The criteria for wealth maximisation is to maximise the price at which a company's shares are sold on the market. However, in the real world, the price of a company's shares is influenced by a large number of factors over which the company has no control. In order to manipulate the market price of the share, the management might also engage in unethical business practises. As a result, there is a growing demand for the objective of maximising the wealth of stakeholders, as opposed to the objective of maximising the wealth of shareholders.

1.8 AGENCY ISSUES

Ownership and management are two separate concepts in today's modern business enterprises. The agency problem refers to the potential for conflicts of interest to arise in business organisations as a result of the separation of ownership and management. When one person or organisation, known as the principal, hires another person or organisation, known as the agent, to carry out some service on their behalf, an agency relationship is formed between the principal and the agent. For performing required services, decision-making powers are delegated to the agent by the principal.

The following are the two most common types of agency relationships that occur in business organisations from the perspective of financial management:

1. between shareholders and managers
2. between shareholders and creditors

1.8.1 Agency Problem I (shareholders Vs Managers)

The fact that managers in several large firms own only a very small percentage of the total firm's shares is the root cause of the large majority of agency conflicts that occur between shareholders and managers. Because of this, a number of managerial goals that are in competition with the objective of maximising the wealth of shareholders end up taking priority. The following reasons explain why this occurs:

1. By actively pursuing the rapid expansion of the company, managers are attempting to reduce the likelihood of a hostile takeover of the company and to improve their own job security.



2. The goal of managers is to lead large organisations so that they can improve their power and status as well as their financial and non-financial benefits.
3. Managers may also look into the possibility of creating additional job opportunities for managers at the middle and lower levels of the organisation.
4. Managers may avoid taking high investment and financing risks that may otherwise be needed to maximize shareholders' wealth. Such "satisfying" behaviour of managers will frustrate the objective of Shareholder Wealth Maximization as a normative guide.

In addition, a **moral hazard problem** may also occur because managers who are acting in their capacity as agents of Shareholders (the principal) may use the delegated authority to take actions that are in their interest rather than in the interest of Shareholders. This may cause a conflict of interest. The reason for this is that shareholders are unable to keep track of everything that managers do and all of the decisions they make.

Agency costs are the costs that are incurred by shareholders to minimise both agency conflicts and the moral hazard problem. More specifically, agency costs are the costs that are incurred by shareholders to ensure that managers pursue the goal of maximising shareholder wealth.

The following is a list of the primary types of agency costs that the shareholders are responsible for bearing:

1. Costs incurred for the purpose of monitoring managerial actions, such as the price of conducting audits
2. The costs associated with establishing an organisational structure that reduces the likelihood of managers pursuing conflicting goals. For example in the case, the expense of recruiting Independent investors to serve on the board of directors.
3. The opportunity costs incurred as a result of restrictions imposed by shareholders on the ability of managers to take actions that are designed to increase the wealth of shareholders.

The following are examples of mechanisms that shareholders commonly use to ensure that managers prioritise the maximisation of shareholder wealth over any other competing goals:-

1. **Managerial Compensation Plans:** These plans are made to attract and keep good managers and to encourage them to do things that increase the wealth of shareholders. These plans are designed with the following goals in mind: because managers are more likely to pursue the goal of shareholder wealth maximisation through increasing the firm's



share prices if they themselves hold a large amount of funds in shares, the majority of large companies provide managers with stock bonuses or executive stock options, both of which allow them to purchase shares in the future at a given price.

2. **Direct Intervention by Shareholders:** This might take the form of shareholders proposing changes to the way the company operates, nominating a candidate for the board of directors, or supporting a motion during the annual general meeting even if managers are against it.
3. **The Threat of Firing:** Shareholders have become more organised and aware of their rights in recent years. As a result, the possibility of a large corporation's top management being removed has significantly increased.
4. **The Threat of Hostile Takeovers-** These are possible outcomes that can occur in the event that the share price of a company is significantly discounted in comparison to its intrinsic price or actual worth. When a hostile takeover occurs, the majority of managers are either fired or, if they are allowed to keep their jobs, they suffer a loss of power and position. So, there is a significant incentive for management to aim towards the maximisation of share prices in order to reduce the possibility of an unfriendly acquisition.

1.8.2 Agency Conflict II (Shareholders Vs Creditors)

Creditors, who are lenders of funds to the company, want the following things: Stability in the firm's earnings so that they can timely meet all obligations of payment of interest and repayment of principle; Investment of funds in projects with lower levels of risk; and Maintenance of a healthy amount of current and fixed assets that can be converted into cash in the event that the company is unable to meet its obligations.

But, in order to maximise shareholder wealth, shareholders may take action through management, causing the company to do the following:

Invest funds in risky projects that cause instability and fluctuation in earnings; Sell assets that were safe backups for creditors, and borrow additional funds that increase the riskiness and chance of default for both existing and new creditors.

As a result, managers, who act as agents for both shareholders and creditors, ought to behave in a manner that is relatively balanced. They shouldn't take any actions that will benefit one side at the expense of the other in order to ensure that the legitimate claims of both sides will be protected and satisfied.



1.9 FINANCIAL MANAGEMENT AND OTHER AREAS OF MANAGEMENT

Financial management is not a completely separate field because it is an important part of the management process as a whole. It makes a lot of use of related disciplines and fields of study, like accounting, economics, production, marketing, and quantitative methods. Even though these fields of study are related, there are important differences between them. The following are some of the relationships that will be discussed:

1.9.1 Financial Management and Accounting-

Financial accounting is the process of keeping track of financial transactions so that interested parties can get useful information. Financial management procedures for managing the finance-related transactions for the purpose of maximizing shareholders' wealth over a period of time.

The main focus of financial accounting is the "accurate recording" and "accurate reporting" of finance-related transactions. The focus of financial management is on future decision-making. Therefore, accuracy can't be guaranteed.

The success of financial management depends on the successful implementation of financial accounting. Hence, financial management and financial accounting are not contrary; rather, they complement each other.

1.9.2 Financial Management and Economics-

Different economic theories help financial managers make decisions when they are faced with real-life business situations. So, it's important for a financial manager to understand economic concepts like analysing demand and supply, how costs change over time, pricing theory, marginal analysis, and models for making the most money in different market situations. The most important things for a finance manager are budgeting, forecasting, planning for profits, and evaluating alternative investment proposals. In order to be successful in fund raising, a finance manager needs to have a solid understanding of how financial institutions and the capital market operate.

1.9.3 Financial Management and Production department-

During day-to-day business activities, various decisions are taken, like purchase policies, supplier selection, timing of purchases, whether to make or buy, whether to retain or replace



existing machines, etc. All these decisions have financial implications, and therefore, finance is regarded as a very important factor.

1.9.4 Financial Management and Marketing-

Marketing managers are in charge of making marketing plans, predicting what customers will want, deciding on pricing, product promotion, product mix, market segmentation, targeting, and positioning, as well as the choice of distribution channels and the length of those channels. In these situations, every choice has a payoff in the form of benefits gained compared to costs that have to be paid over time. The marketing department and the finance managers work together to figure out whether or not different marketing strategies are financially viable. After all, the finance manager approves funding for selected proposals.

1.9.5 Financial Management and Statistics-

In the modern era, financial management has moved toward a more analytical and empirical approach. This needs a wide range of statistical tools and methods, such as measures of central tendency and measures of dispersion, correlation and regression, sampling and estimation, hypothesis testing, and many others. These methods are widely used for taking financial management decisions like capital budgeting, capital structure, dividends, working capital, etc.

1.10 CORPORATE GOVERNANCE AND CORPORATE SOCIAL RESPONSIBILITY

Corporate Governance-

A system designed to ensure that businesses are run in a manner that is beneficial to all of the stakeholders is known as "corporate governance." These are the various parties that have a vested interest in the organization's efficient operation, continued growth, and continued prosperity. These include the company's shareholders, management, and employees, as well as its banks and other financial institutions, society, and various governments. These stakeholders have divergent interest.

Stakeholders	Interest of stakeholders in the company
Shareholders	Maximization of wealth by increasing the market price (share) of the company.



Management	High-paying remuneration and incentives; power and status within the company; and actual control over its operations.
Bank and Lenders	Get repayment of the interest and principal (instalment) amounts on time.
Employees	Job security, promotion and retirement benefits etc.
Government	The organisation should be run in an honest and fair manner, and its taxes should be paid to the government in a timely manner.
Society	Safe products, environment friendly products.

The existence of competing interests among the various stakeholders gives rise to the requirement for efficient corporate governance. The term "corporate governance" refers to a set of rules, procedures, and customs, among other things, that a company must adhere to in order to successfully manage its business in a way that is beneficial to all of its stakeholders. The objective of maximising the wealth of shareholders is also consistent with the objective of achieving maximum value for all stakeholders. When it comes to the management of the company, good corporate governance will bring about increased transparency and fairness. The company will be monitored independently and will give full and honest disclosure of relevant information's in its various reports.

Corporate Social Responsibility-

Should business be concerned about the well-being of society as a whole? Should a business exist solely to maximise the wealth of its shareholders, or should it also care for its employees, customers, and society as a whole? Is it the business's responsibility to provide safe working conditions for employees, safe products for customers, and a safe environment for society? Should the company donate a portion of its profits to charity? The answers to all of these questions are dependent on how socially responsible a business is. In today's business environment, it is impossible to avoid social responsibility. The fulfilment of these social responsibilities will come at a price. But there is no way out. Being socially responsible will ultimately benefit the company in the long run. All of India's leading corporations are involved in corporate social responsibility (CSR) programmes in areas such as education, health, job creation, skill development, and empowerment of the weaker sections of society.



1.11 SUMMARY

- The goal of financial management is to make sure that money is raised (through financing) and spent (on assets, working capital, etc.) in the best way possible.
- In today's world, good financial management involves more than just getting (procurement) money. It also involves making three different kinds of decisions about investments, dividends, and financing.
- Investment decisions relate to the selection of various assets in which a company should commit its funds in order to maximise returns on its investment with the overall goal of wealth maximization.
- The acquisition of required funds at the required time with the lowest possible cost of capital is the primary concern of the financing decision.
- Dividend decision decides the portion of profit to be distributed among shareholders and the portion of profit to be retained in the business for further investment.
- During the traditional phase, the only focus of financial management was the acquisition of funds.
- The modern phase of financial management is concerned with both the acquisition of funds and their efficient and effective utilisation to achieve the best possible results.
- In today's real-world situations, which are uncertain and multi-period in nature, shareholder wealth maximisation is a better objective than profit maximisation.
- There is a possibility that managers will act against the interests of the shareholders in order to achieve the goals that they have set for themselves. The term for this dilemma is known as the agency problem.

1.12 SELF ASSESSMENT QUESTIONS

- Q1. If you are a financial manager in your company, then what are the major types of financial management decisions that you would take while doing your job? Describe.
- Q2. Traditional financial management was concerned with raising of funds as well as optimum utilization. Do you agree? Explain.
- Q3. Profit maximization should be the objective of financial management. Do you agree? Explain.



- Q4. “The corporate firm will attempt to maximize the shareholders’ wealth by taking action that increase the current value per share of existing stock of the firms” Comment.

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1.14 SUGGESTED READINGS

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LESSON 2

THE TIME VALUE OF MONEY

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STRUCTURE

- 2.1 Learning Objectives
- 2.2 Introduction
- 2.3 Time Lines and Notation
- 2.4 Future Value of a Single Cashflow
- 2.5 Simple Interest
- 2.6 Doubling Period
- 2.7 Effective versus Nominal Rate
- 2.8 Present Value of a Single Cashflow
- 2.9 Present Value of an Uneven Series
- 2.10 Relationship between $FVIF(k,n)$ and $PVIF(k,n)$
- 2.11 Shorter Discounting Period
- 2.12 Annuity
 - 2.12.1 Time Line for the Annuity
 - 2.12.2 Time Line for the Annuity
 - 2.12.3 Sinking Fund Factor
 - 2.12.4 Present Value of an Annuity
 - 2.12.5 Capital Recovery Factor
- 2.13 Relationship between $FVIFA(k,n)$ and $PVIFA(k,n)$
- 2.14 Present Value of a Growing Annuity
- 2.15 Present Value of a Perpetuity
- 2.16 Important Steps to Solve Problems (The Time Value of Money)
- 2.17 Self-Practice Problems



2.1 LEARNING OBJECTIVES

After studying this lesson carefully, you should be able to:

- understand the significance of The Time Value of Money.
- understand how to compare two different cashflows which occur at different point of time.
- know the value of the projected cashflows at any specific time (as per your need and requirements) irrespective of wherever cashflow actually occurs.
- understand the relationship between present value and future value.
- design the payments/receipts planning by using the concept that any specific point of time(as per need or convenience)

Value of Total Cash Inflows = Value of Total Cash Outflows

- plan the future strategy based on expected cashflows (inflows/outflows).

2.2 INTRODUCTION

Money has time value as it earns interest. Besides, if left for compounding, it earns interest on the principal amount and also on the previously earned interest. As a result, a rupee invested today can grow to a rupee plus interest and interest-on-the-interest at some future period. A rupee today is more valuable than a rupee at some future date. The reasons are as follows:

- In general, current consumption is preferred in comparison to future consumption.
- Given timeframe to us, our capital can be productively employed to generate positive returns.
- The purchasing power of a rupee today is more than the purchasing power of the same later on. (We have assumed the inflationary period)

In real life situations, cashflows occur at different point of time. It really becomes difficult to compare the cashflows which actually occur at different point of time or may be with different magnitude. Thus, we need to deal with the magnitude as well as direction. Indeed, it becomes a gigantic task and a reasonable level of understanding the nuances of the time value of money immensely helps us. For example, to compare the cashflows which have occurred at different point of time, we need to bring all given cashflows at the same point of time (either by discounting or compounding). Needless to say, it becomes extremely important to understand the conceptual framework along with the insights of the time value of the money.

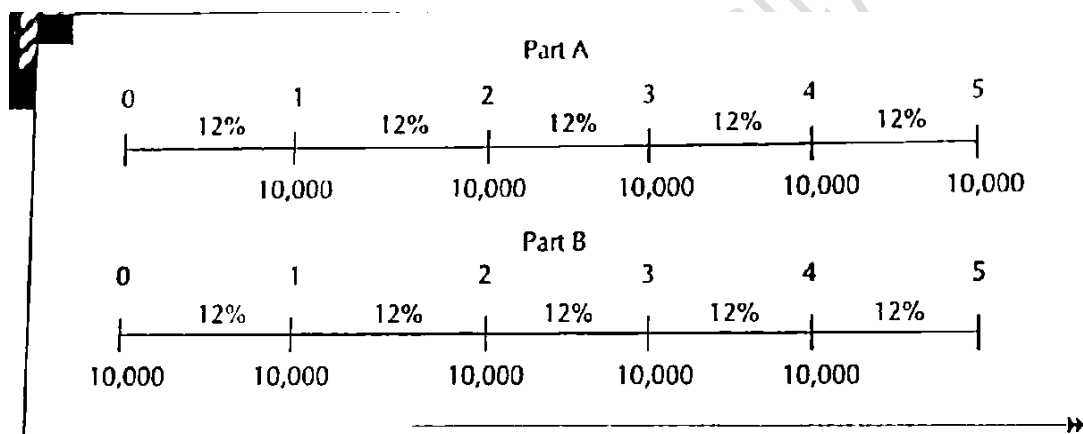


Thus, the tools of compounding and discounting come in forefront and understanding the multi-faceted aspects of the time value of the money becomes extremely important and helpful for making financial decisions.

2.3 TIME LINES AND NOTATION

When cashflows occur at different point of time, it is important for us to use the time line. A time line refers to plotting the given cashflows against the time period where it actually occurs. It shows the timing and the amount of each cashflow in a cash flow stream. For example, a cashflow stream of INR 10,000 at the end of each year for the next five years along with an interest rate @ 12% is as follows:

Time Line



Here, 0(zero) refers to the period right now i.e., the present time. Any cashflow which occurs right now is already in present value terms and hence it does not require further adjustment. Further, we need to understand the difference between a *period of time* and a *point in time*. For example, Period 2 is the two years portion of time between point 0 and point 2 and so on. The cashflow occurring at point 2 is the cashflow that occurs at the end of period 2. Finally, we need to specify the discount rate for each period on the time line. It is worth noting that discounting/compounding rate may differ from period to period as per the given situation. In general, a cashflow occurring at the end of year n is equivalent to the cashflow occurring at the beginning of the year $(n+1)$.



2.4: FUTURE VALUE OF A SINGLE CASHFLOW

Let us assume one deposits INR 20,000 for a period of three years which fetches a return of 9% per annum. At the end of 3 years, this deposit would grow as follows:

Year	Amount (in INR)	Amount (in INR)
1 st year	Principal amount at the beginning of 1 st year	20,000
	Interest for the year (INR 20,000 $\times$ 0.09)	1,800
	Thus, new principal amount at the end of the 1 st year	21,800
2 nd year	Principal amount at the beginning of the 2 nd year	21,800
	Interest for the year (INR 21,800 $\times$ 0.09)	1,962
	Thus, new principal amount at the end of the 2 nd year	23,762
3 rd year	Principal amount at the beginning of the 3 rd year	23,762
	Interest for the year (INR 23,762 $\times$ 0.09)	2138.58
	Principal at the end of 3 rd year	25900.58

The process of investing money and reinvesting the interest earned on it is called compounding. Now, the future value of a single cashflow after n years (along with the interest earned on it) @ k percent is as follows:

$$FV_n = \text{Amount (Present Value)} \times (1+k)^n$$

In the above equation, $(1+k)^n$ is referred to as $FVIF_{(k,n)}$ and it is read as *Future Value Interest Factor at the rate of k percent for n years*. In short, we call $(1+k)^n$ as **Future Value Interest Factor (or simply the Future Value Factor)**.

For better understanding, let us find out the future value of amount A at the end of n years with an interest rate k percent per annum. Let us further assume that FV_i represents the future value at the end of i years.

Now, we have

Future value at the end of 1st year (FV_1) $A \times (1+k)$ i.e. $A \times (1+k)^1$



Future value at the end of 2nd year(FV₂)[$\underline{A \times (1+k)}$] $\times (1+k)$ i.e. $A \times (1+k)^2$

Future value at the end of 3rd year(FV₃)[$\underline{A \times (1+k)^2}$] $\times (1+k)$ i.e. $A \times (1+k)^3$

Future value at the end of 4th year(FV₄)[$\underline{A \times (1+k)^3}$] $\times (1+k)$ i.e. $A \times (1+k)^4$

.....

.....

Future value at the end of nth year (FV_n)[$\underline{A \times (1+k)^{(n-1)}}$] $\times (1+k)$ i.e. $A \times (1+k)^n$

$$\therefore FV_n = \text{Amount} \times (1+k)^n$$

where,

FV_n = Future value of the amount at the end of n years

k = Interest rate (in decimal)

n = Number of years

In the above equation, $(1+k)^n$ is referred to as $FVIF_{(k,n)}$. Now, we would rewrite the above equation as

$$FV_n = A \times FVIF_{(k,n)}$$

For solving future value problems, we need to find out the future value factors.

For this, let us consider an example:

Example: Aryan deposits INR5,000 in a bank today which pays 12percent interest per annum and it is compounded annually. How much will the deposit grow at the end of 16 years?

Solution:

Future value of the deposit amount at the end of 16th year (FV₁₆)

$$= \text{INR } 5000 \times FVIF_{(12\%,16)}$$

$$= \text{INR } 5000 \times 6.130 = \text{INR } 30,650$$

Thus, the deposit would become INR 30,650 at the end of 16 years.

Note: The Annuity/present/future value tables suffers with lots of limitations. It contains values for a limited number of interest rates. Thus, we would require our own way of calculation such as using a calculator, excel etc.

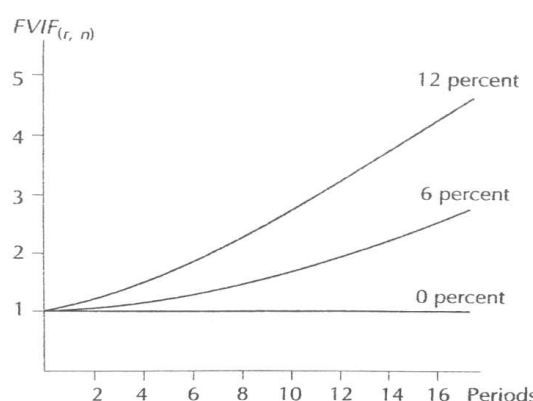
***FVIF_(k,n) for various combinations***

n/k	6%	7%	10%	12%
2	1.124	1.145	1.210	1.254
4	1.262	1.311	1.464	1.574
6	1.419	1.501	1.772	1.974
8	1.594	1.718	2.144	2.476
10	1.791	1.967	2.594	3.106

2.5: SIMPLE INTEREST

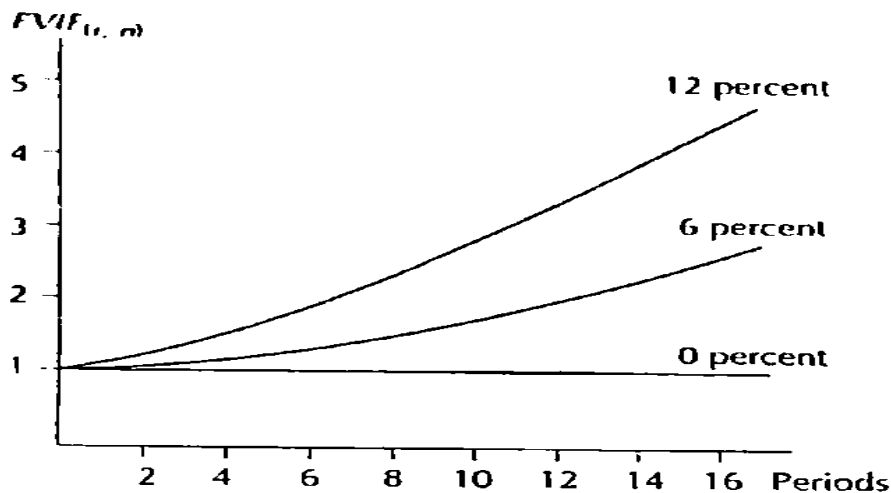
As of now, we have assumed that the investment is done at compound rate of interest which actually assumes that each interest payment is reinvested further to earn interest for the rest of the period. In such case, the value of the investment at the end of the future period is computed as follows:

$$\begin{aligned} \text{Future Value} &= \text{Present Value} \times [1 + (\text{Interest rate} \times \text{Number of years})] \\ &= PV \times [1 + (k \times n)] \end{aligned}$$





Graphic View of Compounding



For example, an investment of INR 91,000 with an interest rate of 10 percent simple interest rate in 11 years would be equal to:

$$\text{INR } 91,000 [1 + (0.11 \times 5)] = \text{INR } 91,000 \times 1.55 = \text{INR } 1,41,050$$

2.6 DOUBLING PERIOD

Rule of 72

In general, we tend to get information on number of years or rate of interest which would make our investment doubled. By using FVIF table, it is indeed time consuming and we often lack ready reference. Thus, for ready and quick reference, we use Rule of 72, the doubling period concept. It simply states that for doubling the investment, the multiplication of the rate of interest and number of years would be 72. For example, if the rate of interest is 8 percent per annum, then to double our investment, it should take around 9 years ($72/8 = 9$). Similarly, to double our investment in 6 years, we need to invest our money at the rate of 12% ($72/6 = 12$). This short-cut method suffers with limitations and for precision, we need to use $FVIF_{(k,n)}$.

Rule of 69

If we need more precision in terms of value what we obtain from the Rule of 72, we would use Rule of 69. By this rule, the doubling period is equal to:

**0.35 + 69/ Interest Rate (in %)**

For example, the doubling period for the 12 percent interest rate would be equal to:

$$0.35 + 69/12 = 0.35 + 5.75 = 6.1 \text{ years}$$

Thus, for doubling the amount with interest rate @ 12% per annum would be 6.1 years. Also, we can verify that the required doubling period as per the Rule of 72 would be 6 years ($72/12 = 6$). Hence, we would find different doubling period values as per the Rule of 69 and Rule of 72 respectively.

2.7 EFFECTIVE VERSUS NOMINAL RATE

The general relationship between the effective interest rate and the stated annual interest rate is as follows:

$$\text{Effective interest rate} = [1 + \text{Nominal Annual Interest Rate} / m]^m - 1$$

Example:

Compute the effective rate of interest when nominal rate of interest is 24% per annum and it is compounded annually, semi-annually, quarterly and monthly.

Solution:

When compounding is done annually, we have $m = 12/12 = 1$

$$\begin{aligned} \therefore \text{Required effective rate of interest} &= [1 + 0.24/1]^1 - 1 = [1 + 0.24]^1 - 1 \\ &= [1.24]^1 - 1 = 0.24 = 24\% \end{aligned}$$

When compounding is done semi-annually, we have $m = 12/6 = 2$

$$\begin{aligned} \therefore \text{Required effective rate of interest} &= [1 + 0.24/2]^2 - 1 = [1 + 0.12]^2 - 1 \\ &= [1.12]^2 - 1 = 0.2544 = 25.44\% \end{aligned}$$

When compounding is done quarterly, we have $m = 12/3 = 4$

$$\begin{aligned} \therefore \text{Required effective rate of interest} &= [1 + 0.24/4]^4 - 1 = [1 + 0.06]^4 - 1 \\ &= [1.06]^4 - 1 = 0.2625 - 1 = 26.25\% \end{aligned}$$

When compounding is done monthly, we have $m = 12/1 = 12$

$$\begin{aligned} \therefore \text{Required effective rate of interest} &= [1 + 0.24/12]^{12} - 1 = [1 + 0.02]^{12} - 1 \\ &= [1.02]^{12} - 1 = 0.2682 = 26.82\% \end{aligned}$$



Thus, we conclude the above results in the tabular form as follows:

Compounding	Nominal Rate (in %)	Effective Rate (in %)	Remarks
<i>Annually</i>	24%	24%	24% = 24%
<i>Semi-annually</i>	24%	25.44%	25.44% > 24%
<i>Quarterly</i>	24%	26.25%	26.25% > 24%
<i>Monthly</i>	24%	26.82%	26.82% > 24%

By the above table, the relationship between effective rate of interest and nominal rate of interest can be very well understood i.e., effective rate of interest is always greater or equal to nominal rate of interest. Now, we would write the relationship as follows:

Effective rate of interest $\geq$ Nominal rate of interest

2.8 PRESENT VALUE OF A SINGLE CASHFLOW

Let us assume that at the end of n years, the value of the amount is A . Now, the present value is:

$$PV = A \times PVIF_{(k,n)}$$

where,

PV = Present value of the cashflow occurring at the end of n years

A = Value of the amount at the end of n years

$PVIF_{(k,n)}$ = Present value interest factor at the rate of k % for n years

k = Interest rate (in %)

n = Number of years



$PVIF_{(k,n)}$ is read as *Present Value Interest Factor at the rate of k percent for n years*. It is a **discounting factor** and hence the present value of any amount is always smaller than the actual amount.

Example: Compute the present value of INR 70,000 receivable 9 years from now and rate of discount is 16 percent?

Solution:

Required Present Value

$$= \text{INR } 70,000 \times PVIF_{(16\%,9)}$$

$$= \text{INR } 70,000 \times 0.263$$

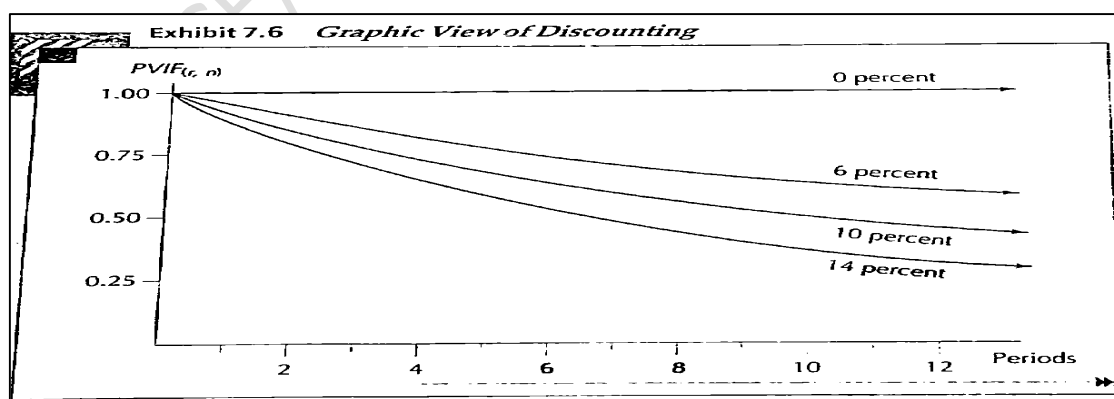
$$= \text{INR } 18,410$$

Value of $PVIF_{(k,n)}$ for various combinations of k and n

n/r	8%	10%	12%	14%
4	0.735	0.683	0.636	0.592
6	0.630	0.565	0.507	0.456
8	0.540	0.467	0.404	0.351
10	0.463	0.386	0.322	0.270
12	0.397	0.319	0.257	0.208

Graphic View of Discounting

The above table graphically depicts how the Present Value Interest Factor varies in response to changes in interest rate and time. The $PVIF_{(k,n)}$ declines as the interest rate and length of time increases.





2.9 PRESENT VALUE OF AN UNEVEN SERIES

In real life situations, we often come across uneven cashflow streams. For example, the dividend stream for the equity share is usually uneven and fluctuating.

The present value of an uneven cashflow stream is calculated as follows:

$$PV_n = A_1/(1+k) + A_2/(1+k)^2 + A_3/(1+k)^3 + \dots + A_n/(1+k)^n = \sum A_i/(1+k)^i$$

where,

PV_n = Present Value of a Cashflow stream

A_i = Cashflow occurring at the end of year i

k = Discount rate

n = Duration of the Cashflow stream

The following table shows the calculation of the present value of an uneven cash flow stream using a discount rate of 10 percent.

Year	Cashflow (in INR)	PVIF _(10%,n)	Present Value of each Cash Flow (in INR)
3	2,000	0.751	1502
5	7,000	0.621	4347
8	11,000	0.467	5137
10	17,000	0.386	6562
12	25,000	0.319	7975
Present Value (in total)			25,523

2.10 RELATIONSHIP BETWEEN $FVIF_{(k,n)}$ And $PVIF_{(k,n)}$

$$FVIF_{(k,n)} \times PVIF_{(k,n)} = 1$$

$$PVIF_{(k,n)} = 1/FVIF_{(k,n)}$$

$$FVIF_{(k,n)} = 1/PVIF_{(k,n)}$$

2.11 SHORTER DISCOUNTING PERIOD

Sometimes cash flows have to be discounted more frequently than once a year say for example semi-annually, quarterly, monthly, or daily. In such case of intra-year compounding,



the shorter discounting period implies that the number of periods increase and the discount rate applicable per period decreases. The general formula for calculating the present value in the case of shorter discounting period is as follows:

$$PV = FV_n (1/1 + k/m)^{mn}$$

where,

PV = present value

FV_n = Cash flow after n year

m = frequency of compounding i.e. number of times per year discounting is done

k = annual discount rate

n = Number of years

For better understanding, let us consider a cashflow of INR 10,000 which is supposed to be received at the end of 4th year. Now, to compute the present value of this cashflow when the compounding is done quarterly and the discount rate is 12 percent, we would proceed as follows:

In the given case, as the compounding is done quarterly $\therefore m = 4$. Now, the present value is:

Now,

$$\begin{aligned} PV &= \text{INR } 10,000 \times PVIF_{(k/m, mn)} = \text{INR } 10,000 \times PVIF_{(12\%/4, 4 \times 4)} \\ &= \text{INR } 10,000 \times PVIF_{(3\%, 16)} = \text{INR } 10,000 \times 0.6232 = \text{INR } 6,232 \end{aligned}$$

Thus, the required present value of INR 10,000 which is expected to be received at the end of 4th year along with interest rate 12% per annum being compounded quarterly is INR 6,232.

2.12 ANNUITY

An annuity can be defined as a stream of equal cashflows occurring at regular intervals. For example, EMIs, Insurance premium, Recurring deposits etc.

If the cashflows occur at the end of the period, the annuity is called **Regular Annuity**. Similarly, if the cashflows occur at the beginning of the period, it is referred to as **Annuity Due**. If the annuity begins with some deferment period, it is referred to as **Deferred Annuity**. It is interesting to note that the deferred annuity may be either Annuity due or Regular



annuity. The important fact to be noted here is that annuity table is made on the basic assumption that the cashflows occurs at the end of the period.

2.12.1: Future Value of Annuity

$$FVA_n = \text{Amount} \times FVIFA_{(k,n)}$$

$$\text{where, } FVIFA_{(k,n)} = [(1+k)^n - 1]/k$$

k = Interest rate (in %)

n= Number of years

In the above equation, $[(1+k)^n - 1]/k$ is referred to as $FVIFA_{(k,n)}$ and it is read as *Future Value Interest Factor Annuity at the rate of k percent for n years*. In short, we call it as Future Value Interest Factor Annuity (or simply the Future Value Annuity Factor). The concept of future value of annuity can be applied in a variety of contexts.

Example:

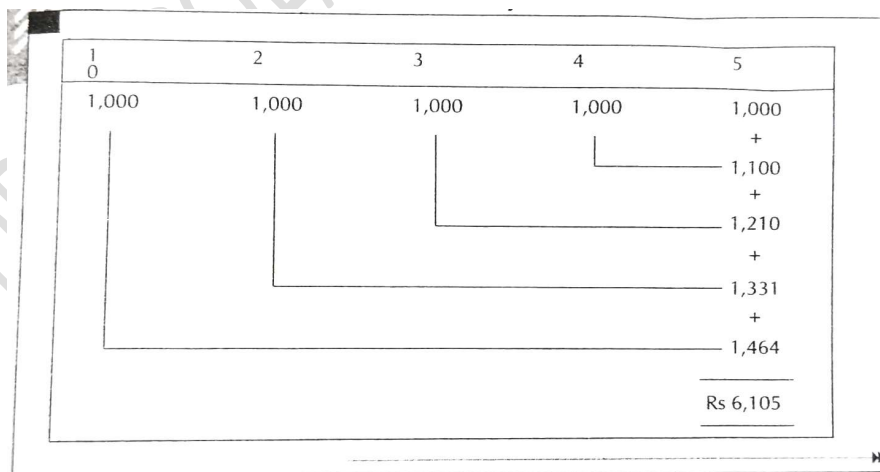
Suppose you deposit INR1,000 annually for 5 years and your deposit earn a compound interest rate of 10 percent. Compute the value of the accumulated deposit at the end of 5 years assuming that each deposit occurs at the end of the year.

Solution:

The required value of the deposit at the end of 5 years

$$= \text{INR } 1,000 \times FVIFA_{(10\%,5)} = \text{INR } 1,000 \times 6.105 = \text{INR } 6,105$$

2.12.2 TimeLine for the Annuity



**Value of $FVIFA_{(k,n)}$ for Various Combinations of k and n**

n/k	6%	8%	10%	12%	14%
2	2.060	2.080	2.100	2.120	2.140
4	4.375	4.507	4.641	4.779	4.921
6	6.975	7.336	7.716	8.115	8.536
8	9.897	10.636	11.436	12.299	13.232
10	13.181	14.487	15.937	17.548	19.337
12	16.869	18.977	21.384	24.133	27.270

2.12.3: Sinking Fund Factor

The inverse of $FVIFA_{(k,n)}$ is referred to as Sinking Fund Factor.

Thus, the Sinking Fund Factor is equal to $k/[(1+k)^n - 1]$

k = Interest rate (in %)

n = Number of years

If we need to get a target amount in future by depositing an equal amount at the end of every year, we need to simply multiply the target amount by sinking fund factor to arrive at the required amount which needs to be deposited at the end of every year.

2.12.4: Present Value of an Annuity

$PVA = \text{Amount} \times PVIFA_{(k,n)}$

Where, $PVIFA_{(k,n)} = [(1+k)^n - 1]/k (1+k)^n$

k = Interest rate (in %)

n = No. of years

In the above equation, $[(1+k)^n - 1]/k (1+k)^n$ is referred to as $PVIFA_{(k,n)}$ and it is read as *Present Value Interest Factor Annuity at the rate of k percent for n years*. In short, we call it as Present Value Interest Factor Annuity (or simply the Present Value Annuity Factor). The concept of present value of annuity is extensively utilized for financial evaluation of a project.

Example: Suppose you deposit INR 23,000 annually for 12 years and your deposit earn a compound interest rate of 8 percent. Compute the present value of the accumulated deposit assuming each deposit occurs at the end of the year.

**Solution:**

The required present value of the deposit

$$= \text{INR } 23000 \times \text{PVIFA}_{(8\%,12)} = \text{INR } 23,000 \times 7.536 = \text{INR } 1,73,328$$

Thus, the required present value of the accumulated deposit is INR 1,73,328.

PVIFA_(k,n) for different combinations of k and n

n/r	6%	8%	10%	72%	14%
2	1.833	1.783	1.737	1.690	1.647
4	3.165	3.312	3.170	3.037	2.914
6	4.917	4.623	4.355	4.111	3.889
8	6.210	5.747	5.335	4.968	4.639
10	7.360	6.710	6.145	5.650	5.216
12	8.384	7.536	6.814	6.194	5.660

2.12.5 Capital Recovery Factor

The inverse of $\text{PVIFA}_{(k,n)}$ is referred to as Capital Recovery Factor. Thus, the Capital Recovery Factor is equal to $[k \times (1+k)^n] / [(1+k)^n - 1]$

where,

k = Interest rate (in %)

n = Number of years

If we need to get a target amount right now in lieu of depositing an equal amount at the end of every year for n years, we need to simply multiply the target amount by capital recovery factor. This would give us the amount which we actually need to deposit at the end of every year for n years.

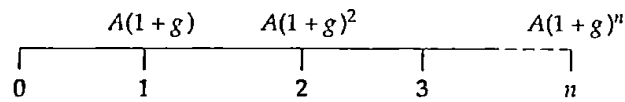
2.13 RELATIONSHIP BETWEEN $\text{FVIFA}_{(k,n)}$ And $\text{PVIFA}_{(k,n)}$

$$\text{FVIFA}_{(k,n)} \times \text{PVIF}_{(k,n)} = \text{PVIFA}_{(k,n)}$$

$$\text{PVIFA}_{(k,n)} \times \text{FVIF}_{(k,n)} = \text{FVIFA}_{(k,n)}$$

2.14 PRESENT VALUE OF A GROWING ANNUITY

A cash flow that grows at a constant rate for a specified period of time is a growing annuity. The time line of a growing annuity is shown below:



The present value of a growing annuity can be determined using the following formula:

$$\text{PV of a Growing Annuity} = A(1+g) \left(\frac{1 - \frac{(1+g)^n}{(1+r)^n}}{r-g} \right) \quad (7.7)^2$$

The above formula can be used when the growth rate is less than the discount rate i.e., $g < r$.

Example: Suppose you have the right of mining for the next 20 years over which you expect to get 100 tons per year. The current price per ton INR 5,000, but it is expected to increase at a rate of 6 percent per year. The discount rate is 10 percent. Compute the present value of the expected income from this mine.

Solution:

The required present value of the expected income from mine

$$= \text{INR } 5,000 \times 100 \times (1.06) [1 - (1.06^{20}/1.10^{20})] / [0.10 - 0.06]$$

$$= \text{INR } 69,34,392$$

2.15: Present Value of a Perpetuity

A perpetuity is perpetual annuity i.e., it is an annuity of infinite duration. The present value of a perpetuity is expressed as follows:

$$PV_{\infty} = A/k$$

where, P_{∞} = Present Value of Perpetuity

A = Amount (equal cashflows)

Note: Future Value of perpetuity cannot be determined.

2.16: IMPORTANT STEPS TO SOLVE PROBLEMS (THE TIME VALUE OF MONEY)

Step I: Make a Time Line.

Step II: Plot the Cashflow Streams (Inflow as well as Outflow) on the Time Line against the period it has occurred.



Step III: Choose a Focal Time.

Step IV: At the Focal Time, the equation would be as follows:

PV or FV of Inflows = PV or FV of Outflows

Step V: After solving the above equation, we get the desired/unknown value.

Note:

Note: While using the table (discounting/compounding), we need to be extremely cautious to observe whether the given annuity is Annuity Due or Regular Annuity. As annuity table is made on the basic assumption that it is a regular annuity, hence, in the case of Annuity Due, we first convert this into regular annuity and thereafter we use annuity table.

Also, we need to be very careful while plotting the cashflow streams on the time line. Also, inflows and outflows must be clearly distinguished. For example, we can plot the inflow and outflow as follows:

Inflow of INR 700	INR 700
Outflow of INR 9,000	(INR 9,000)

2.17 SUMMARY

- Money has a time value. If left for compounding, it earns interest on the principal amount and also on the previously earned interest.
- A cash flow refers to the cash which we either expect to receive (a cash inflow) or cash we expect to pay someone (a cash outflow).
- The reasons for Time Value of Money are because of people prefer current consumption to future consumption, we can productively employ our capital generate positive returns and finally the presence of inflation makes our money more powerful today than a year hence. The purchasing power of a rupee today is more than what we have later on.
- Future value at the end of n^{th} year is $(FV_n) = A \times (1+k)^n$
In this equation, $(1+k)^n$ is referred to as $FVIF_{(k,n)}$.
- For doubling period, we use Rule of 72 and Rule of 69. Rule of 72 is simpler in comparison to Rule of 69 because of less precision.



- The general relationship between the effective interest rate and the stated annual interest rate is

$$\text{Effective interest rate} = [1 + \text{Nominal Annual Interest Rate} / m]^m - 1.$$

$$\text{Effective rate of interest} \geq \text{Nominal rate of interest}$$

- The present value of a single cash flow is $PV = A \times PVIF_{(k,n)}$
 - The present value of an uneven cashflow stream is $PV_n = \sum A_i(1+k)^i$
 - The Relationship between $FVIF_{(k,n)}$ and $PVIF_{(k,n)}$ is $FVIF_{(k,n)} \times PVIF_{(k,n)} = 1$
 - The general formula for calculating the present value in the case of shorter discounting period is $PV = FV_n (1/1 + k/m)^{mn}$
 - An annuity can be defined as a stream of constant cashflows occurring at regular intervals for a finite period. If the cashflows occur at the end of the period, it is called Regular Annuity. On the other side, if the cashflows occur at the beginning of the period, it is referred to as Annuity Due. If the annuity begins with some deferment period, it is referred to as Deferred Annuity. Interestingly, deferred annuity would be either Annuity due or Regular annuity.
 - The present value of an annuity is equal to $PVA = \text{Amount} \times PVIFA_{(k,n)}$
 - The inverse of $PVIFA_{(k,n)}$ is referred to as Capital Recovery Factor and the inverse of $FVIFA_{(k,n)}$ is referred to as Sinking Fund Factor.
 - The Relationship between $FVIFA_{(k,n)}$ and $PVIFA_{(k,n)}$ is $FVIFA_{(k,n)} \times PVIFA_{(k,n)} = PVIFA_{(k,n)}$
 - A perpetuity is an annuity of infinite duration. The PV perpetuity is A/k .
 - The important steps solve the problems of The Time Value of Money are as follows:
 - Make a Time Line.*
 - Plot the Cash flow Streams (Inflow as well as Outflow) on the Time Line*
 - Choose a Focal Time. (It is the most important step)*
 - At the Focal Time, we have*
$$PV(FV) \text{ of Cash Inflows} = PV(FV) \text{ of Cash Outflows}$$
- While solving the above, we would get the desired/unknown value



2.18 SELF-PRACTICE PROBLEMS

1. Compute the value of a deposit INR 8,900 today after 9 years if the interest rate is 13 percent per annum.
2. If you deposit INR 8,000 today at 6 percent rate of interest, how many years (roughly) will this amount grow to INR 2,56,000? Use the rule of 72 for computation.
3. You have deposited INR 7,000 today @ 8% interest per annum. How long would this take to become INR 56,000?
4. Ramesh offers you INR 40,000 at the end of 12 years for a deposit of INR 5,000 right now. Compute the interest rate implied in his offer.
5. Akshat deposits INR 4,000 at the end of each year for first 7 years, and Rs.9,000 a year for 13 years thereafter. How much amount he can expect to be accumulated at the end of 25 years, if the rate of interest is 6 percent per annum and the compounding is done annually?
6. Aryan saves INR 4,000 each year for 4 years, and INR 12,000 for 6 years thereafter. If the rate of interest is 7 percent per annum compounded annually, compute the accumulated value of his savings at the end of 10 years.
7. XYZ Ltd offers you to pay an amount of INR 2,50,000 at the end of 7 years if you agree to deposit INR 24,000 each year for first 5 years. Compute the interest rate earned on your deposit.
8. Compute the present value of an income stream which provides INR 20,000 at the end of year 1, INR 45,000 at the end of year 4 and INR 90,000 during each of the years 9 through 15. Assume the interest rate @ 8 percent per annum.
9. Sudarshan promises you to pay INR 62,000 annually for 4 years if you agree to deposit with him INR 95,000 right now. Compute the interest rate offered by Sudarshan. Assume that the first payment occurs at the end of 2nd year.
10. Rajesh requires INR 95,000 at the beginning of each year from 2018 to 2022. For this, how much should he deposit (in equal amounts) at the end of each year from 2011 to 2015, if the interest rate is 9 percent per annum.



11. After seven years, Mr Lokesh will receive a pension of INR 12,000 per month for 20 years. How much can Mr Lokesh borrow now at 7.5 percent interest rate so that the borrowed amount is paid with 35 percent of the pension amount?

The interest will be accumulated till the first pension amount becomes receivable.

12. Mugabe Corporation has to retire INR 25 million of debentures each at the end of 6, 7, and 8 years from now. How much should the firm deposit in a sinking fund account annually for 4 years, in order to meet the debenture retirement need?

The net interest rate earned is 7 percent.

Case Study

Mr. Suresh wants your advice on his investment plan. He is 55 years and has INR 3,00,000 in the bank. He plans to work for 5 years more and retire at the age of 60. His present salary is INR 9,00,000 per year. He expects his salary to increase at the rate of 15 percent per year until his retirement. He has decided to invest his bank balance and future savings in a balanced mutual fund scheme that he believes to get a return of 6 percent per year. You come forward to help him in answering few questions given below. You have chosen to ignore the tax factor.

- Once he retires at the age of 60, he would like to withdraw INR 12,00,000 per year for his routine needs for the coming 20 years (His life expectancy is 80 years). Each annual withdrawal will be made at the end of the year.
- Compute the value of his investments to meet his retirement need when he turns 60 years.
- How much should he deposit each year in saving scheme for the next 15 years so that he withdraws INR 12,00,000 per annum from the beginning of the 16th year for a period of 20 years? His savings would occur at the end of each year.
- Suresh is curious to keep aside INR 9,00,000 per year for donation in the last 4 years of his life. Each donation is expected to be made at the beginning of the year. Also, he has decided to maintain INR 30,00,000 for his granddaughter's educational support at the end of his life.
- Compute the value of his accumulated wealth. The accumulated wealth must fulfil his need for donation and granddaughter's educational expenses.
- Suresh wants to find out the present value of his lifetime income from salary. His current salary is paid at the end of the year which is INR 9,00,000. Compute the



present value of his total salary income. Assume that his salary will increase @ 15 percent per annum until retirement and the discount rate is 6% per annum.

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LESSON 3

COST OF CAPITAL

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STRUCTURES

- 3.1 Learning Objectives
- 3.2 Introduction
- 3.3 Various Classifications of Costs of Capital
- 3.4 Measurement of Specific Costs of Capital
 - 3.4.1 Cost of Debt
 - (a) Cost of perpetual debt
 - (b) Cost of redeemable debt
 - 3.4.2 Cost of Preference Share Capital
 - (a) Cost of irredeemable preference share capital
 - (b) Cost of redeemable preference share capital
 - 3.4.3 Cost of Equity Capital
 - (a) Dividend Approach
 - (b) Capital Asset Pricing Model (CAPM) Approach
 - 3.4.4 Cost of Retained Earnings
- 3.5 Measurement of Weighted Average Costs of Capital
- 3.6 International Dimension to Cost of Capital
- 3.7 Summary
- 3.8 Glossary
- 3.9 Answers to In-Text Questions
- 3.10 Self-Assessment Questions
- 3.11 References
- 3.12 Suggested Readings



3.1 LEARNING OBJECTIVES

- Understanding the concept of cost of capital, implicit cost, explicit cost, historical cost and future cost, average cost and marginal cost
- Measurement of cost of debt: perpetual and redeemable
- Measurement of cost of preference share capital: irredeemable and redeemable
- Measurement of cost of equity
- Understanding of the Capital Asset Pricing Model (CAPM)
- Understanding the concept of retained earnings implicit cost
- Determination or measurement of weighted average cost of capital
- Understanding of the cost of capital in the international scenario

3.2 INTRODUCTION

The cost of capital plays a significant and crucial role in any firm's investment and financing decisions. No investment project can be evaluated without taking into account the cost of capital. The firm uses the cost of capital as an indicator or a measuring stick to determine how beneficial is a project for the firm. Debt, preference share capital, equity capital and retained earnings are amongst the various sources of finance a firm can raise. All these sources have some cost which is widely known as the cost of capital of any organisation. In other words, the cost of capital is that rate of return; an organisation or an entity needs to pay to the providers of finance which may be agreed upon or is expected by them. It compensates the suppliers of funds for a time as well as risk. In terms of capital budgeting, the cost of capital is the discount rate used to figure out the present value of the expected future cash flows to decide whether the project is worth accepting for maintaining the market value of the firm constant.

Prof. Ezra Solomon defines the cost of capital as “the minimum required rate of earning or the cut-off rate for capital expenditure”

The cost of capital is also known as the discount rate, the minimum required rate of return, the cut-off rate or the hurdle rate. It is the combination of the risk-free rate of return and a premium for undertaking risk about the project.



The cost of capital which is the minimal or lowest required rate of return envisaged by the providers of funds depends on the prevailing risk-free rate of return and the associated risk factors of the firm. The risk-free rate is the interest or the rate of return on government securities and the risk associated with the firm can be a business risk or financial risk or both. These three factors play a major role in determining the cost of capital of any firm. Business risk is the uncertainty associated with the firm not being able to meet its fixed operating expenses and financial risk is the uncertainty associated with the firm not being able to meet its fixed financing costs such as interest on debt and dividend on preference shares.

3.3 VARIOUS CLASSIFICATIONS OF COSTS OF CAPITAL

The cost of capital can be categorised in numerous ways:

- Specific cost and the composite cost
- Implicit and Explicit cost
- Historical and Future cost
- Average and Marginal cost

Specific cost and Composite Cost

The cost of raising each source of finance individually is termed as the specific cost of capital of that source. Thus, we have the cost of debt (redeemable and perpetual), cost of preference shares capital (irredeemable and redeemable), cost of equity share capital and that of retained earnings. Combining the individual cost of various sources of finances gives us the composite cost of capital or the combined cost of capital or the overall cost of capital. The cost of raising debt is an example of a specific cost while if the firm's overall cost of capital of all sources (debt, preference and equity capital along with retained earnings) combined together is say 9%, then it is called as composite cost.

Implicit and Explicit cost

Implicit cost is the opportunity cost and arises when different alternative use of funds is being considered. According to James Porterfield, "Implicit costs is the rate of return associated with the best investment opportunity that will be foregone if the project under consideration by the firm is accepted." These costs are known to be *economic* costs.

Explicit cost is the cost or amount being paid by the firm to raise and utilise finances. It may be either the stated rate or otherwise which a firm bears to use the finances. It is the interest rate at which the present value of cash inflows (raising funds) equals the present value of the



cash outflows related to utilising of funds (interest, dividend etc). These costs are known to be *out-of-pocket* costs.

Implicit costs do not require any outlay of cash whereas explicit costs entail cash outflow. Explicit costs are measurable and thus recorded but implicit costs cannot be measured and thus not recorded.

Retained earnings used as a source of finance will not have any explicit costs but only implicit costs.

If the firm has issued 9% preference share capital, then this 9% is the explicit cost. But when say the retained earnings could be used elsewhere giving a return of 12%, then this 12% is the implicit cost of retained earnings

Historical and Future Cost

Costs that have already been incurred are the historical cost whereas the expected or anticipated cost of a project's funding is known as the future cost. The knowledge of historical and future costs helps in making a comparative analysis of actual and projected costs.

The cost of existing sources of funds is the historical cost while if the firm raises capital in future at say 15%, then this 15% is the future cost of capital.

Average and Marginal Costs

The average cost of capital is the weighted average cost of each given fund type, with weights being the percentage of different sources of long-term funds in the firm's balance sheet. Its computation involves determining the cost of each given source of capital and then assigning each source a weight as per the proportion and then finding out the sum of the product of the individual costs with the assigned weight.

Marginal cost is the incremental cost or the differential costs incurred for raising new funds. This cost is being used for the evaluation of any long-term investment for which additional finances need to be raised exclusively at a cost. Suppose a firm raises additional debt, then the cost of raising this additional debt is the marginal cost.

3.4 MEASUREMENT OF SPECIFIC COSTS OF CAPITAL

3.4.1 Cost of Debt

The cost of debt may be described as the required rate of return which must be earned by investments financed through debt to keep the earnings of equity shareholders constant. Outflows related to debt involve the payment of interest and principal as per the terms of the



debt. Interest is always payable on the face value of the debt even if the debt is issued on premium or discount or at par.

The cost of debt is calculated both for perpetual (irredeemable) and redeemable debt.

(a) Cost of Perpetual Debt

Perpetual debt just involves payment of interest on the face value of the debt and hence the calculation of the cost of perpetual debt is simple.

The cost of perpetual debt is given by

$$k_i = I / SP$$

$$k_d = I (1-t) / SP$$

Where,

I = Annual interest payment on a debt

SP = Sale proceeds of debt

t = Tax rate

k_i = Before-tax cost of perpetual debt

k_d = After-tax cost of perpetual debt

Example 3.1 X ltd. has issued an 8 per cent perpetual (irredeemable) debt of ₹ 5,00,000 and the prevailing tax rate of 25 per cent. Find out the cost of debt (before tax and after-tax) assuming the debt is offered at (i) par, (ii) 5 % premium, and (iii) 5 % discount.

Solution:

(i) Debt offered at par

Before-tax cost of perpetual debt, $k_i = ₹ 40,000 / ₹ 5,00,000 = 8$ per cent

After-tax cost of perpetual debt, $k_d = k_i (1 - t) = 8\% (1 - 0.25) = 6$ per cent

(ii) Offered at a premium

Before-tax cost of perpetual debt, $k_i = ₹ 40,000 / ₹ 5,25,000 = 7.62$ per cent

After-tax cost of perpetual debt, $k_d = k_i (1 - t) = 7.62\% (1 - 0.25) = 5.71$ per cent

(iii) Offered at discount

Before-tax cost of perpetual debt, $k_i = ₹ 40,000 / ₹ 4,75,000 = 8.42$ per cent

After-tax cost of perpetual debt, $k_d = k_i (1 - t) = 8.42\% (1 - 0.25) = 6.32$ per cent

**(b) Cost of Redeemable Debt**

Redeemable debt involves payment of interest and principal of the debt. When the repayment of the principal is only at maturity the calculation of the cost of redeemable debt is calculated using (i) the trial-and-error method (ii) Short cut method.

The formula for the calculation of the cost of debt by the trial-and-error method is given by-

$$CI_0 = \sum_{t=1}^n \frac{COI_t}{(1 + K_d)^t} + \frac{COP_n}{(1 + K_d)^n}$$

Where,

CI_0 = Net cash proceeds from the issue of debt

$COI_1 + COI_2 + \dots + COI_n$ = Cash outflow on account of interest payments in periods 1,2 and so on, till maturity after adjusting tax savings on interest payment.

COP_n = Principal repayment on maturity

k_d = Cost of debt after tax

If the repayment of the principal is in several instalments instead of a one-time payment at maturity, then the formula for calculation of the cost of debt is given by

$$CI_0 = \sum_{t=1}^n \frac{COI_t + COP_t}{(1 + K_d)^t}$$

The cost of debt using short cut method is given by –

$$K_d = \frac{I(1-t) + (RV - SP)/N}{(RV + SP)/2}$$

Where,

k_d = Cost of debt post-tax

I = Interest payable on the debt annually

RV = Amount payable on redemption of debt

SP = Sale proceeds of debt

N = Number of years of the life of debt



However, the shortcut method cannot be used in the case of principal repayment in instalments.

Example 3.2 X ltd. offers a 10 per cent redeemable debt of ₹ 5,00,000 face value for 5 years and the applicable tax rate is 25 per cent. Determine the cost of debt after tax assuming the debt is offered at a 10 per cent discount and the floatation cost involved is estimated to be 2%.

Solution: Calculation of the cost of debt by the trial-and-error method –

$$CI_0 = ₹5,00,000 - ₹50,000 \text{ (discount -10\%)} - ₹ 10,000 \text{ (floatation cost- 2\%)} = ₹4,40,000$$

Cash outflow on account of interest payments in years 1,2,3,4, and 5 after adjusting tax savings on interest payments = ₹ 50,000 - ₹12,500 (tax) = ₹37,500

$$COP_n = \text{Principal repayment at the end of 5}^{\text{th}} \text{ year} = ₹5,00,000$$

$$4,40,000 = \sum_{t=1}^5 \frac{37500}{(1+k_d)^t} + \frac{500000}{(1+k_d)^5}$$

The cost of debt k_d in the given equation can be obtained by the trial-and-error method similar to the calculation of IRR in capital budgeting decisions.

$$4,40,000 = 37,500 (PVIFA_{r,5}) + 5,00,000 (PVIF_{r,5})$$

Trying with $r = 10\%$

$$37,500 (3.791) + 5,00,000 (.621) = 4,52,663$$

Trying with $r = 11\%$

$$37,500 (3.696) + 5,00,000 (.593) = 4,35,100$$

$$\text{Hence, by interpolation- } k_d = 10\% + \frac{452663 - 440000}{452663 - 435100} = 10\% + .721$$

$$k_d = 10.721\%$$

By shortcut method-

$$k_d = \frac{I(1-t) + (RV - SP)/N}{(RV + SP)/2}$$



$$k_d = \frac{50,000 (1-.25) + (5,00,000 - 4,40,000)/5}{(5,00,000 + 4,40,000)/2}$$

$$k_d = \frac{37,500 + 12,000}{4,70,000} = 10.53\%$$

3.4.2 Cost of Preference Share Capital

Preference shares have the characteristics of both debt as well as equity share capital. They are entitled to dividends at the given fixed rate. However, the dividend payment is not entitled to the tax deduction as it is an appropriation of profits and not an expense. There are two kinds of Preference shares: (i) Preference shares that cannot be redeemed (Irredeemable) (ii) Preference shares that are to be redeemed after the specified tenure (redeemable).

(a) Cost of preference shares which are irredeemable

The calculation of the cost of preference share capital which is irredeemable is given by-

$$k_p = PD / SP$$

Where,

PD = Annual dividend on preference shares

SP = Sale proceeds on the issue of preference shares

k_p = cost of irredeemable preference share

Example 3.3 X ltd. has offered 10 per cent irredeemable preference shares of ₹ 5,00,000 and the floatation cost is 2 per cent. Determine the cost of preference share capital if it is offered at (i) par, (ii) 5 % premium, and (iii) 5 % discount.

Solution:

(i) Preference shares offered at par

Cost of preference shares, $k_p = ₹ 50,000 / ₹ 4,90,000 = 10.20$ per cent

(ii) Offered at a premium

Cost of preference shares, $k_p = ₹ 50,000 / ₹ 5,15,000 = 9.71$ per cent

(iii) Offered at discount

Cost of preference shares, $k_p = ₹ 50,000 / ₹ 4,65,000 = 10.75$ per cent

**(c) Cost of Preference Shares which are redeemable**

Redeemable preference share capital involves the payment of dividends and capital. The calculation of cost of preference share capital which is redeemable can be calculated using (i) Trial-and-error method (ii) Short cut method.

The trial-and-error method: the cost of redeemable preference share is given by-

$$P_0 = \sum_{t=1}^n \frac{PD_t}{(1 + K_p)^t} + \frac{P_n}{(1 + K_p)^n}$$

where,

P_0 = Net cash proceeds from the issue of redeemable preference shares

$PD_1 + PD_2 + \dots + PD_n$ = Cash outflow on account of annual dividend payments in periods 1,2 and so on, till redemption.

P_n = Capital repayment on redemption

K_p = Cost of preference shares which are redeemable

The cost of preference shares capital which is redeemable, using short cut method is given by –

$$K_p = \frac{PD + (RV - SP)/N}{(RV + SP)/2}$$

Where,

K_p = Cost of redeemable preference share capital

PD = Annual dividend payment on preference share capital

RV = Amount payable on redemption of preference share capital

SP = Sale proceeds of preference share capital

N = Number of years for redemption of preference shares

Example 3.4 X ltd. offers 10 per cent redeemable preference shares of nominal value ₹ 1,000 per share which are to be redeemed at the end of 25 years from now. Find out the cost of preference share capital assuming the preference shares are issued at par and the floatation cost involved is estimated to be 2.5%.



Solution: By shortcut method-

$$k_p = \frac{PD + (RV - SP)/N}{(RV + SP)/2}$$

$$K_p = \frac{100 + (1,000 - 975)/25}{(1,000 + 975)/2}$$

$$K_p = \frac{100 + 1}{987.5} = 10.23\%$$

Hence, the cost of redeemable preference share capital is 10.23%.

3.4.3 Cost of Equity Share Capital

The cost of equity capital is the lowest or minimal rate of return a business need to generate on that part of investment which is financed by equity, to keep the market price of its shares stable. Equity shareholders are those individuals or entities who are real risk takers in the company and hence desire a return higher than the return given to debt providers and preference shareholders. They get dividends on their investments even though that's not a legal binding on the company to pay and is paid only if the company makes a sufficient profit. It becomes imperative to consider the expected rate of return to figure out the cost of equity capital. And figuring out the expected return is a very difficult task. Different approaches have been developed to sort this issue: (i) Dividend approach (ii) Capital Asset Pricing Model (CAPM) Approach.

(a) Dividend Approach

This approach is based on the **Dividend valuation model**. This method measures the cost of equity on the basis of desired rate of return in the context of dividend pay-out in future on the equity shares. Consequently, cost of equity capital which is usually written as k_e , is the discount rate that equals the present value of all expected future dividends to the net proceeds from the sale of a share (in case of new share or additional shares are being issued) or the current market price of a share (in case of existing share purchase from market).

When dividends grow at a constant rate (g), uniformly perpetually k_e is given by:

$$P_0(1 - f) = \sum_{t=1}^{\infty} \frac{D_1(1 + g)^{t-1}}{(1 + K_e)^t}$$



or,

$$P_0 = \frac{D_1}{k_e - g}$$

or,

$$k_e = \frac{D_1}{P_0} + g$$

Where,

D_1 = Dividend which is expected at the end of first year

P_0 = Price of the equity shares currently prevailing in the market or the net proceeds per share

g = Growth rate in dividend (assumed to be constant growth rate)

k_e = cost of equity capital

When dividends grow at a varying rate, k_e is given by:

$$P_0(1 - f) = \sum_{t=1}^5 \frac{D_0(1 + g_1)^t}{(1 + K_e)^t} + \sum_{t=6}^{\infty} \frac{D_5(1 + g_2)^{t-5}}{(1 + K_e)^t}$$

Where,

g_1 = growth rate in dividend for first 5 years

g_2 = growth rate in dividend for 5th year onwards

Nonetheless, the dividend growth model suffers with many practical issues like it can be applied only for those companies which pay dividend and doesn't take into account the risk factor involved in forecasting growth rates of dividends.

Example 3.5

The current market price of equity shares of X ltd. is ₹ 1,000 and expected dividend at the end of current year is ₹ 88. Determine the cost of equity capital if the dividend grows at a constant rate of 5%.

Solution: Cost of equity capital when the growth rate is constant is calculated by-

$$k_e = \frac{D_1}{P_0} + g$$



$$k_e = \frac{88}{1000} + .05$$

$$k_e = .138 = 13.8\%$$

Example 3.6

X Ltd. forecasts a growth rate of 10 percent p.a. for next three years and then it is likely to fall and stabilise at 7 percent p.a. The dividend paid during last year was ₹ 5 and the desired rate of return of equity investors is 12 percent. Determine the value of the equity share of X Ltd. as on date using dividend model.

Solution: Intrinsic value of an equity share of X Ltd. is the sum of the present values of (i) dividends during years 1 through 3 and (ii) the expected market price immediately after 3 years, based on constant growth rate of 7 percent per annum

Present value of dividends of year 1-3

Year	Dividend	PVIF (12%)	PV of dividend
1	5.5	.893	4.91
2	6.05	.797	4.82
3	6.65	.712	4.74
Total			14.47

At the end of year 3, the market price of equity share will be

$$P_3 = \frac{D_4}{k_e - g}$$

$$P_0 = \frac{7.13}{.12 - .07}$$

$$P_0 = 142.42$$

Present value of ₹ 142.42 = $142.42 \times .712 = 101.40$

Intrinsic value of equity share as on date is ₹ 14.47 + ₹ 101.40 = ₹ 115.87

(b) Capital Asset Pricing Model Approach

The alternative method to determine cost of equity capital is the CAPM approach. CAPM was originally developed to have a better understanding of the behaviour of security prices



and offers a mean for investors to evaluate the influence of prospective investments in shares and other securities on their overall portfolio risk and return. It basically explains the risk reward trade-off for shares.

Assumptions of the CAPM approach:

- i. There are no restrictions on investments
- ii. All investors have same (identical) expectations with respect to returns, variance and correlation of returns of all securities.
- iii. All investors have the same piece of information which is freely available in the market.
- iv. Market prices cannot be significantly impacted by any single investor.
- v. No taxes exist on investments and income in the economy.

As per CAPM approach, the investor is concerned with only the systematic risk (non-diversifiable risk) as the unsystematic risk (diversifiable) can be eliminated by the investor with the help of holding a diversified portfolio. As per CAPM, the systematic risk is of a security is measured in term of coefficient: beta. Beta (β) is a measure to compare how volatile a security's return is to the returns of a diversified (broad based) portfolio. Beta may be described as an indicator to depict how closely the return on a security/ investment moves with the return n market. Beta of a broad-based market portfolio is one. Beta coefficient of any security of one would mean that the risk of that specified security is same as that of the risk of the market. This means that the security returns completely move in the same direction and magnitude as of the market returns. A negative beta coefficient shows that the relationship is in the opposite direction. Beta coefficient of zero (0) indicates that there is no market related risk.

With the perspective of the cost of equity capital, Capital Asset Pricing Model describes the association between the desired rate of return (cost of equity capital) and the systematic (non-diversifiable) risk of the firm with the help of beta.

$$k_e = r_f + b(k_m - r_f)$$

Where,

k_e = cost of equity capital

r_f = rate of risk free return

b = beta coefficient of the security

k_m = return on market portfolio

**Example 3.7**

X Ltd. wishes to determine its cost of equity capital. The risk-free rate of return is 8 percent and the beta of the security is 1.4. The return expected on the market portfolio is 11.5 percent.

Solution: As per CAPM, cost of equity capital: $k_e = r_f + b(k_m - r_f)$

$$k_e = .08 + 1.4 (.115 - .08)$$

$$k_e = .08 + .049$$

$$k_e = .129 = 12.9\%$$

The CAPM approach of calculating cost of equity capital considers risk in the form of beta coefficient which is completely ignored by the dividend approach and also the CAPM approach helps in determining the cost of equity for those firms who do not pay dividends. However, the dividend approach provides for adjustment of floatation cost incurred for raising equity which is ignored in CAPM approach. And also, CAPM faces practical difficulties in the right estimation of beta coefficient and risk-free rate of return.

1.4.4 Cost of Retained Earnings

Retained earnings of a company as a source of finance, has no obligations for payment of any interest or dividend. It does not have any explicit cost but involves implicit cost. As the earnings would have been distributed as dividends if not retained by the company and the shareholders could have earned something on it or consumed it. Shareholders have to forego dividends and this is the opportunity cost of retained earnings. Cost of retained earnings can thus be defined as the opportunity cost or the returns foregone by the shareholders on the dividends.

External yield criteria approach may be used to determine the cost of equity capital. This approach lays that the cost of retained earnings is the return that the company could have earned had it invested this money in any external investment rather than distributing it to shareholders in the form of dividend. The company need to choose such investment which has the same level of risk as that of the company itself. Thus, external yield approach represents an opportunity cost which is justifiable from economic point of view. We can infer that the opportunity cost which can be used consistently (k_r) is likely to be equal to k_e . However, k_r is bound to be lower than k_e because of floatation cost and dividend distribution tax along with personal tax on dividend income of shareholders.



The cost of capital is the composite cost of capital or the overall cost of capital or the weighted average cost of capital is the weighted average cost of each individual source of finance.

The use of weighted average over simple average is required because of the different proportions of the various sources of funds being used by the company in its capital structure. Weighted average cost of capital (k_o) is calculated as follows:

- i. Determining the cost of each specific source of fund
- ii. Assigning weights to each source of fund
- iii. Calculating the product of each specific cost with respective weights and then adding up all together

It can be shown as: $k_o = k_d w_d + k_p w_p + k_e w_e + k_r w_r$

Weights can be historical weights or marginal weights. Historical weights can again be categorised into book value weights or market value weights.

Marginal weights use that percentage or proportion of each source of finance, the company plans to raise additionally and use. The basis of weights is the additional or new or incremental raising of funds. The marginal weights can be used to calculate WACC when the project is financed through raising of fresh funds only. It cannot be used when the existing sources of finance are being utilised. It also ignores the existing capital structure of the firm.

Historical weights utilise the existing proportion of the various sources of finance in the current capital mix of the organisation. Historical weights can be book value weights or market value weights. Book value weights represent the proportion of various sources of finance as recorded in the books or the financial statements of the company. Whereas market value weights are based on the market value of various sources of finance (debt, equity and preference shares) of the organisation, when they are traded in the market. Market value weights are preferred as the amount of fresh capital to be raised can be determined and the genuine cost of capital in true sense can be calculated. However, getting market prices of various sources of finance is not operationally easy and also weights based on market prices fluctuate too much. From operational stand point, book value weights are easy and straightforward and also the organisations' capital structure and its target capital structure is based on book value weights. So, taking book value weights aid in analysing the capital structure.

**Example 3.8**

X Ltd.'s cost of capital of various sources of finance is:

Debt (after tax) 10 per cent

Preference share 15 percent

Equity share 20 percent

The capital structure of X Ltd.:

Debt ₹ 15,00,000

Preference capital ₹ 10,00,000

Equity capital ₹ 75,00,000

Determine the weighted average cost of capital of X Ltd. using book value weights.

Solution:

Means of finance	Amount (₹)	Weight	Cost (%)	Weighted Cost
Debt	15,00,000	.15	.10	.015
Preference Share	10,00,000	.10	.15	.015
Equity Share	75,00,000	.75	.20	.15
Total	1,00,00,000	1.00		.180

Weighted average cost of capital (WACC) of X Ltd. is 18%.

Example 3.9

X Ltd.'s cost of capital of individual sources of finance is:

Debt (after tax) 8 per cent

Preference shares 12 percent

Equity shares 18 percent

The capital structure of X Ltd. as shown in books:

Debt ₹ 25,00,000

Preference capital ₹ 15,00,000



Equity capital ₹ 60,00,000

The market value of these sources of finance is as follows:

Debt ₹ 23,00,000

Preference capital ₹ 18,00,000

Equity capital ₹ 79,00,000

Find out the weighted average cost of capital of X Ltd. using market value weights.

Solution:

Means of finance	Amount (₹)	Weight	Cost (%)	Weighted Cost
Debt	23,00,000	.192	.08	.0153
Preference Share Capital	18,00,000	.15	.12	.018
Equity Share	79,00,000	.658	.18	.1185
Total	1,20,00,000	1.00		

Weighted average cost of capital (WACC) of X Ltd. is 15.18%.

International cost of capital has not been defined properly but it can be taken as the opportunity cost of investing which is being forgone in favour of investment in any foreign market. It is referred as the minimum expected or required rate of return on investments made in foreign markets which helps in drawing funds into that market. As risk and return go hand in hand, meaning higher the risk higher will be the expected return. This transmits into a higher international cost of capital in developing and emerging economies. These economies are highly unstable and therefore the high risk. Thus, the concept of cost of capital in international scenario is similar to the cost of capital concept in general parlance.

There are various approaches towards international cost of capital like: The World Capital Asset Pricing Model (CAPM), The World Multifactor CAPM Model, Goldman Model, The Sovereign Spread Volatility Ratio Model etc. CAPM and Multifactor CAPM are the most widely accepted approaches for determination of international cost of capital in liquid markets. However, both of these approaches do not work in emerging markets. CAPM needs to be modified in these emerging economies for the specific nature of risk and potential economic and financial shocks specific to that foreign market.



The cost of capital in international markets can be determined using the reference rate or the risk-free rate in the home market and then adding a risk premium, which is in specific reference to the foreign market getting investment. This risk premium has to be calculated taking into account the various shocks the economy is vulnerable to and not just on the basis of the price signals emanating from these economies.

3.7 SUMMARY

- The cost of capital is the discount rate used to figure out the present value of the expected future cash flows to decide whether the project is worth accepting for maintaining the market value of the firm constant.
- Implicit cost is the opportunity cost and arises when different alternative use of funds is being considered. Explicit cost is the cost being paid by the firm to raise and use funds.
- The cost of debt is the rate of return which must be earned by investments financed through debt to keep the earnings of equity shareholders constant.

- The cost of perpetual debt is given by

$$k_i = I / SP$$

$$k_d = I(1-t) / SP$$

- The cost of redeemable debt is given by shortcut method,

$$K_d = \frac{I(1-t) + (RV - SP)/N}{(RV + SP)/2}$$

- The cost of redeemable preference share is given by-

$$P_0 = \sum_{t=1}^n \frac{PD_t}{(1 + K_p)^t} + \frac{P_n}{(1 + K_p)^n}$$

- The cost of equity capital is the minimal or lowest rate of return an organisation must generate on that part of the investment which is financed by equity, to preserve the market value of its shares.

- **Cost of equity capital, k_e** = $\frac{D_1}{P_0} + g$ by dividend model



- CAPM describes the association between the desired rate of return (cost of equity capital) and the systematic (non-diversifiable) risk of the firm with the help of beta.

$$k_e = r_f + b(k_m - r_f)$$

- Cost of retained earnings can be defined as the opportunity cost or the returns foregone by the shareholders on the dividends.
- The composite cost of capital or the overall cost of capital denoted by k_o (WACC) is the weighted average cost of each individual means of finance.

$$k_o = k_d w_d + k_p w_p + k_e w_e + k_r w_r$$

- **Marginal weights** use that percentage or proportion of each source of finance, the company plans to raise additionally and use.
- **Historical weights** use the existing proportion of the various sources of finance in the current capital mix of the organisation. These weights may be based on either book value of different means of finance or on the market value of different means of finance utilised by the organisation.

3.8 GLOSSARY

- The **cost of capital** is the discount rate used to figure out the present value of the expected future cash flows.
- **Cost of debt before tax** is the return to debt investors.
- **Risk free rate** is taken as return on government securities.
- **Cost of Equity** is the return expected by equity shareholders
- **Cost of preference share capital** is the preference shareholders earn
- **Beta** (β) is a measure to compare volatility of any financial assets return to the returns of a diversified portfolio.
- The **overall cost of capital** is the weighted average cost of each individual source of finance.
- **WACC** is the weighted average cost (overall cost of capital) of all sources of long-term capital employed by the firm.
- **Marginal cost of capital** is cost of raising one extra unit of capital.
- **Historical weights** are the existing proportion of sources of capital.
- **Marginal Weights** are the proportion of new funds being raised.

**3.9 ANSWERS TO IN-TEXT QUESTIONS**

- 1.(a) incorrect
- (b) incorrect
- (c) incorrect
- (d) incorrect
- (e) incorrect
- (f) correct

- 2.(a) higher
- (b) Debt
- (c) Beta
- (d) Explicit, implicit
- (e) Equity
- (f) constant
- (g) dividend yield method
- (h) Cost of equity
- (i) increases

3.10 SELF-ASSESSMENT QUESTIONS

1. Why is cost of capital important in financial decision making?
2. What do you understand by “Marginal cost of capital?”
3. What is business risk? Discuss the reasons of it.
4. Explain financial risk.
5. How does the tax rate affect the cost of capital.
6. Explain how is debt a cheaper source of finance than equity.
7. Examine the different methods for determining cost of equity capital.
8. Explain how the cost of capital affects the process of evaluation of the proposals of capital budgeting.
9. “As retained earnings do not have any explicit costs, its free of cost.” Critically examine.
10. Explain the rationale of using market value weights for determining WACC.



11. Calculate the overall cost of capital (WACC) given that k_e is 18%, and the company wants to raise and invests ₹15 crores in a project:
- a) The company wants to maintain a debt equity ratio of 1:1.
 - b) It expects to retain ₹ 3 crores of its profits and intends to use for the funding of this project.
 - c) The first ₹ 2 crores raised through debt will be at interest rate of 10% and thereafter at the interest rate of 12%.
 - d) The applicable tax rate is 25%.

3.11 REFERENCES

Fundamentals of Financial Management, J.V. Horne & J.M. Wachowicz, 13th ed. Prentice Hall

Fundamentals of Financial Management, I.M. Pandey, Theory and Practices, 11th ed., Vikas Publishing House

Financial Management: Text Problem and Cases, M.Y. Khan & P.K. Jain, 8th ed., Tata McGraw Hill Publishing Co. Ltd.

Financial Management: Theory, Concepts and Problems with excel applications and case studies, 6th revised edition Dr. R. S. Rustagi, Taxmann.

Fundamentals of Financial Management: with Excel application supplement, Surender Singh and Rajeev Kaur, Mayur Paperbacks.

3.12 SUGGESTED READINGS

Latest edition of the following text books to be used

Fundamentals of Financial Management, J.V. Horne & J.M. Wachowicz, Prentice Hall

Fundamentals of Financial Management, I.M. Pandey, Theory and Practices, Vikas Publishing House

Financial Management: Text Problem and Cases, M.Y. Khan & P.K. Jain, Tata McGraw Hill Publishing Co. Ltd.



LESSON 4

INVESTMENT DECISIONS

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STRUCTURE

- 4.1 Learning Objectives
- 4.2 Introduction
 - 4.2.1 Importance of Capital Budgeting Decisions
- 4.3 Types of Capital Budgeting Decision Situations
- 4.4 Estimation of Cost and Benefits
 - 4.4.1 Cash Flows Vs Accounting Profits
 - 4.4.2 Incremental/Differential/Relevant Cost-Benefit Measurement
- 4.5 PROCESS OF CAPITAL BUDGETING
 - 4.5.1. Steps in Capital Budgeting Evaluation Process
 - 4.5.2 Assumptions of Capital Budgeting
 - 4.5.3 Cash Flows of the Project
- 4.6 Evaluation Techniques
 - 4.6.1 Traditional Techniques/Non-Time-Adjusted Techniques
 - 4.6.1.1 Payback Period
 - 4.6.1.2 Accounting Rate of Return
 - 4.6.2 Discounted Cashflow Techniques
 - 4.6.2.1 Net Present Value (NPV)
 - 4.6.2.2 Internal Rate of Return (IRR)
- 4.7 NPV vs IRR
- 4.8 Profitability Index (PI) Method
- 4.9 Summary
- 4.10 Self-Assessment Questions
- 4.11 References & Suggested Readings



4.1 LEARNING OBJECTIVES

- To discuss the relevance and need of long term asset mix decisions
- To familiarize and train the students with the process of identifying the costs and benefits from an investment proposal
- To discuss the concept, application, interpretation and critical analysis of various non-time value of money adjusted and time value of money adjusted capital budgeting evaluation techniques
- To discuss the situations of conflicting rankings by NPV and IRR techniques

4.2 INTRODUCTION

Investment decisions refer to the investment in long-term asset or fixed asset mix decisions which provide returns during its useful economic life. These assets operate for more than a year. These decisions involve a substantial cost (cash outflow) at the beginning of the operations (cost of new machine, plant, manufacturing/service facility etc.) with benefits (cash inflows) occurring over a long period of time. Proposed investment decisions may lead to increase in net benefits either through increase in revenue or decrease in costs. Thus, capital budgeting decisions relate to selection of a long-term asset or investment proposal or course of action that generally involves use of funds today but generate regular and recurring benefits in future. It may include the purchase of land, building, plant, machinery etc. or on a program of research to develop innovative products and promotional/advertising/marketing campaign. The objective is to create a portfolio of long-term investments that will make the maximum contribution to the owners' wealth in a given situation.

Capital budgeting decisions could fall into the following categories:

- Addition to existing long-term assets
- Modification of the existing long term assets
- Replacement of old with the new long term assets
- Disposition of long term assets

4.2.1 Importance of Capital Budgeting Decisions

Long term asset mix decisions are major decisions that shape the present and future of any business organization. They determine the return earning capacity of a business organization and thus has a significant impact on the wealth of the owners/shareholders. A change in the wealth creation capability will impact the investment decisions of both the current and



potential investors. It also determines the creditworthiness of the business entity leading to easy access to debt avenues to fund these and other business expenses. Business entities with greater access to capital markets are able to raise funds at a lower cost due to lower risk attached to their investments which gives a boost to their market valuations. Capital budgeting decisions are highly important because of the following four reasons:

- **Long term Effects-** Decisions to purchase or not purchase certain long-term assets will impact the overall operations of the business entity in the long run. It will determine the scale, process, efficiency and market share of the entity in the long run as these assets have a useful life of more than a year. These are strategic decisions that have long term bearing on the profitability of the firm.
- **Substantial Investment of Funds-** It involves an engagement of a large block of capital resources available and for a longer duration. Capital being a scarce with an opportunity cost attached to it makes it essential for the business to utilize it the most optimal way by parking the funds in the best investment opportunity available. Therefore, utmost care has to be taken in making long term asset mix decisions. It is a basic principle to spend more time and effort in decisions that need the deployment of a large chunk of the available funds and is followed even in personal purchases. We are more careful in buying a house versus a car versus a laptop versus daily needs (stationary, edible items etc.)
- **Irreversible Nature-** These decisions become all the more important because it is very difficult to reverse the investment in fixed assets. It entails a relatively large loss of value in a short span of time due to non-availability of structured and organized market for old assets. A large sum of money is lost in dismantling the assets with the installation costs becoming sunk costs at the same time. Sometimes, it is also difficult to sell customized assets appropriate for a particular business setup which results in large losses on their sale.
- **Competitive Strength-** Capital budgeting decisions result in investment of firm's resources in the assets that help them to build and maintain the competitive strength of the entity. Investment in an automated machine may result in cost efficiency and superior quality of goods and services. R&D expenditures may lead to innovations that resolve the existing problems of society or increase the utility of existing products with large commercial value attached to it. Thus it determines and gives a competitive edge against other firms in the same industry.



4.3 TYPES OF CAPITAL BUDGETING DECISION SITUATIONS

Decision making of investment in long term assets can be majorly classified into 3 situations or cases:

1. **Accept/Reject:** This situation refers to evaluation of a single investment project/proposal. It also includes the evaluation of independent projects where there is more than one investment project under consideration at the same time, but the projects are not substitute/mutually exclusive to each other. The acceptance/rejection of one project is not dependent on the acceptance/rejection of the other projects. Therefore, the single project or each project in the latter case is accepted for investment if the return earned is greater than the required rate of return.
2. **Mutually Exclusive:** This situation refers to the circumstance when more than one investment options are available (type of technology, location of business, brand of machine etc.) for the same business purpose. All the options are acceptable based on the accept/reject criterion of minimum rate of return or possible positive wealth creation. Since the requirement is of only one type of technology/location/brand of machine, thus acceptance of one will result in the rejection of the other. The option which generates the maximum wealth on the total capital available is chosen over other.
3. **Capital Rationing:** We will accept/invest in all the projects that generate positive wealth in the presence of availability of infinite capital resources. Capital turns out to be scarce and is thereby limited in reality. This makes it inevitable to optimally ration the available investible budget in the portfolio of projects that will maximize the existing wealth based on the available profitable projects.

4.4 ESTIMATION OF COSTS AND BENEFITS

4.4.1 Cash Flows Vs Accounting Profits

Measurement of costs and benefits from a project raises a debate on what is a better way of capturing the costs and benefits- Profits or Cash Flows? Accounting principles and standards provide ample flexibility to the business entities to change or choose different approaches of reporting various items in the P&L Account to ensure that financial statements give a more transparent and appropriate view of the state of affairs. This results in a different profit number based on the method of depreciation, stock valuation and allocation of expenses used



by different accountants for the same transactions. This makes profit a very ambiguous measure whereas cash flows are based on actual inflow and outflow of real cash and cannot be manipulated unlike profits. Profits are based on accrual system which further make it vulnerable to management of reported earnings by use of discretionary accruals and does not take into consideration the time element of money. This further compound the evaluation problem for projects with unequal lives. Thus, cash flows are a more objective and transparent metric and thereby a superior measure of capturing the wealth/value creation by projects. They are not ambiguous, cannot be managed/manipulate and take into account the time preference for money.

4.4.2 Incremental/Differential/Relevant Cost-Benefit Measurement

We should include or try to capture all the benefits and costs that will arise solely due to the undertaking of the proposed investment. All the cash flows arising from the project which are incremental in nature must be estimated and used in the evaluation process. Cash flows that will occur irrespective of the undertaking of the project under consideration are not relevant to the evaluation for acceptance/rejection of the project. For example. R&D expenses, marketing survey expenses, allocated overheads etc. already incurred to develop a new product or find out if the production can be increased are sunk costs. They have been incurred even before the investment in the new machine or project and would have happened even if the result of the R&D/market survey would be opposite to the expected positive result. Change in cash flows of existing projects/machines/products because of the new projects/machines/products are incremental and thus relevant for the evaluation of the new project under consideration for investment.

4.5 PROCESS OF CAPITAL BUDGETING

4.5.1. Steps in Capital Budgeting Evaluation Process

The process involved in the evaluation of capital budgeting projects is based on the following sequence of steps:

1. Estimate the costs and benefits from the project
2. Estimate the minimum required rate of return
3. Convert these costs and benefits to a single figure
4. Compare this against a predetermined amount, rate or time period
5. Make a choice based on the accept/reject criterion of various evaluation techniques.



4.5.2 Assumptions of Capital Budgeting

1. All the cash flows take place at the end of each time period
 2. There is no change in the risk i.e. quantum and timing of cash flows are known with certainty
 3. Existence of perfect capital markets
 4. Projects are infinitely divisible but they exhibit decreasing return to scale
 5. Cash flows are independent of each other overtime and other investment decisions
 6. Rational decision parties
 7. It is a well-behaved project or conventional cash flow projects
- Cash Flows of the Project Only incremental cash flows are considered for evaluating a project. The cash flows that generate only due to the acceptance of the project should be considered whether they are inflow or outflow.

Relevant Cash Outflows	Irrelevant Cash Outflows
Variable Wages/salaries	Allocated overheads (existing)
Variable material cost	Sunk Costs
Increase in fixed cost	
Increase in overheads	
Cost of project/machine/investment	
Increase in taxes	

- **Changes in working capital** – only changes in requirements are considered which will have an effect in the initial cash outlay, during the economic life and at the end of the project.

4.5.3 Cash Flows of the Project

- **Tax effect** – It can have a positive effect in terms of carried over losses and negative effect due tax outflow on profits
- **Depreciation & Amortization effect** – These don't have any effect on cash flows directly but have a positive impact in terms of reducing the tax which is a cash outflow



- **Effect on Indirect overheads** – The indirect expenses/overheads are allocated to the different products on the basis of wages paid, materials used etc. If these are not affected by the project, these overheads are ignored.
- **Effect on other projects** – If the new project is not economically independent, its effects should be considered on the existing projects.

Cost of New Machine
 + Installation Cost
 + / - Working Capital
 - Sale Proceeds

Initial Cash Outlay

Estimation of Cash Flows

Years	Cash Sales Revenue	Less Cash Operating Cost	Cash Inflows before tax	Less depreciation	Operating cash Inflow before tax	less tax	Profit after tax	Add Depreciation	Operating Cash flow after tax	add/less decrease/increase in working capital	add salvage value	add/less tax effect of sale	Cash flow after tax
1													
2													
3													
4													
5													

Calculation of Depreciation

Depreciation is calculated according to the Income Tax Act.

Assets are grouped together into different blocks and each block is charged the same rate of depreciation on the written down value of the block.

WDV of the block at the beginning of the year

(+) Purchase of new assets within the block during the year

(-) Sale/salvage proceeds of assets from the block during the year

= WDV of the block at the end of the year

Depreciation = Depreciation rate (%) * WDV at the end

Short Term Capital Loss/Gain

Sale/salvage proceeds of assets from the block during the year



- (-) WDV of the block at the beginning of the year
- (-) Purchase of new assets within the block during the year
- = Short Term Capital Gain/Short Term Capital Loss

$$\text{Tax Effect of Sale} = \text{Short Term Capital Gain/Loss} * \text{Tax Rate (\%)}$$

Loss will reduce the taxable profits and result in reduction in taxes. Gain will increase the taxable profits and result in increase in taxes. Thus tax effect of loss is treated as inflow (add) whereas for gains it is treated as an outflow (less).

If the block of assets continues to exist after sale of the machinery, then losses are not recognized and the remaining WDV is depreciated over the years whereas profits are recognized in the same year as Short term Capital Gain

If the block of assets ceases to exist after sale of the machinery, then both losses and profits are recognized in the same year as Short term Capital Loss/Gain

Example

An iron ore company is considering investing in a new processing facility. The company extracts ore from an open pit mine. During a year, 1,20,000 tonnes of ore is extracted. If the output from the extraction process is sold immediately upon removal of dirt, rocks and other impurities, a price of Rs 500 per ton of ore can be obtained. The company has estimated that its extraction costs amount to 50 per cent of the net realisable value of the ore. As an alternative to selling all the ore at Rs 500 per tonne, it is possible to process further 25 per cent of the output. The additional cash cost of further processing would be Rs 50 per ton. The proposed ore would yield 60 per cent final output, and can be sold at Rs 1,500 per ton. For additional processing, the company would have to instal equipment costing Rs.80 lakhs. The equipment is subject to 10 per cent depreciation per annum on reducing balance (WDV) basis/method. It is expected to have useful life of 5 years. Additional working capital requirement is estimated at Rs.8 lakhs. The company's cut-off rate for such investments is 15 per cent. Corporate tax rate is 30 per cent. Assuming there is no other plant and machinery subject to 10 per cent depreciation, should the company instal the equipment if the expected salvage is Rs 10 lakhs.

Cash Outflows

Cost Of Machine	80,00,000
+Additional Working Capital	8,00,000
Total Cash Outflow	88,00,000

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Cash Inflows

Years	Cash sales Revenue	Less: Cash Operating Cost	Cash Inflows Before Tax	Less: Depreciation	Operating Cash flows Before Tax	Less: Tax	Earnings After Tax
1		12000000	1500000	800000	9700000	2910000	6790000
2		12000000	1500000	720000	9780000	2934000	6846000
3		12000000	1500000	648000	9852000	2955600	6896400
4		12000000	1500000	583200	9916800	2975040	6941760
5		12000000	1500000	0	10500000	3150000	7350000

Earnings After Tax	Plus: Depreciation After Tax	Cash Inflows After Tax	Plus: Salvage VALUE	Plus: Working Capital	Tax Benefit	CFAT
6790000	800000	7590000	0	0	0	7590000
6846000	720000	7566000	0	0	0	7566000
6896400	648000	7544400	0	0	0	7544400
6941760	583200	7524960	0	0	0	7524960
7350000	0	7350000	1000000	800000	1334640	10484640

Depreciation Schedule		
Years	Depreciation Base	Depreciation
1	80,00,000	800000
2	7200000	720000
3	6480000	648000
4	5832000	583200
5	5248800	Nil

Note – No depreciation is charged in the terminal year as the block consists of a single asset

Years	CFAT	PV
1	7590000	₹ 66,00,000
2	7566000	₹ 57,20,983
3	7544400	₹ 49,60,565
4	7524960	₹ 43,02,420
5	10484640	₹ 52,12,719
Total Present Value		₹ 2,67,96,688
Cash Outflows		₹ 88,00,000
Net Present Value		₹ 1,79,96,688

Since the NPV is positive, the machine should be installed



4.6 EVALUATION TECHNIQUES

4.6.1 Traditional Techniques/Non Time Adjusted Techniques

4.6.1.1 Payback Period

The payback period is the length of time required to recover the initial cash outlay on the project. For example, if a project involves a cash outlay of ₹ 800,000 and generates cash inflows of ₹ 100,000, ₹ 250,000, ₹ 250,000, and ₹ 200,000, in the first, second, third, and fourth years, respectively, its payback period is 4 years because the sum of cash inflows during 4 years is equal to the initial outlay. If the amount of cash inflow is a uniform amount, the payback period is calculated by dividing the initial cash outflow by regular inflows. For eg. If a project involves a cash outlay of ₹600,000 and generates yearly cash inflows of ₹100,000, the payback period will be $600000/100000 = 6$ years.

One might utilise the payback term as a deciding factor when deciding whether to accept or reject investment proposals. This approach may be used, for example, to compare the actual payback to a predefined payback, or the payback established by management in terms of the maximum amount of time the initial investment must be returned. The project would be approved if the actual payback duration is smaller than the projected payback; if not, it would be refused. The payback can also be applied as a ranking system. Projects that are mutually incompatible may be prioritised in order of the length of the payback period when taking that into consideration. Thus, the project having the shortest pay back may be assigned rank one, followed in that order so that the project with the longest pay back would be ranked last. Obviously, projects with shorter payback period will be selected.

One major drawback of this method of evaluation is that it does not consider time value of money. Moreover, it completely ignores all cash inflows after the payback period. It is biased against projects with long gestation periods such as infrastructure projects.

Is Payback Period an appropriate evaluation measure for projects?

1. **Simplicity** – It is simple and easy to understand and calculate.
2. **Sufficiency** – the method does not consider the total benefits arising out of the proposal over its lifetime. It only gives importance to cash flows occurring till the payback period and thus does not fulfill this condition
3. **Objectivity** – It is objective as benefits are based on cash flows and not on the accounting profit



4. **Consistency** – This method is not consistent with the objective of maximizing shareholders' wealth as it is only concerned with the speed of recovery of the initial investment. It does not consider the overall wealth creation capability of a project
5. **Reasonable** – The assumption of reinvestment rate of cash flows made under this method are not reasonable as it does not consider the time value of money and thus does not assume any reinvestment rate.

4.6.1.2 Accounting Rate of Return

Accounting rate of return (ARR) is a method of evaluation also known as Average rate of return. It is calculated by dividing the Average profit obtained from the project by the Average book value of the investment. The average profits after taxes are determined by adding up the after-tax profits expected for each year of the project's life and dividing the result by the number of years. In the case of annuity, the average after-tax profits are equal to any year's profits. The average investment is determined by dividing the net investment by number of years. For eg.

Year	Investment	Profit after tax (PAT)
1	40000	30000
2	30000	32000
3	50000	34000
4	60000	36000
5	70000	38000
Total	250000	170000

$$\text{Average Investment} = 250000/5 = 50000$$

$$\text{Average PAT} = 170000/5 = 34000$$

$$\text{ARR} = 34000/50000 = 68\%$$

Points to consider:

- The higher the ARR, more attractive is the project.
- As an accept-reject criterion, the actual ARR would be compared with a predetermined or a minimum required rate of return or cut-off rate.
- It is simple and easy to calculate
- Since it is calculated using an average method, it can also be calculated using limited data

**Shortcomings:**

- It is based upon accounting profit, rather than cash flow which is generally considered a better measure
- It does not account for time value of money
- It does not provide any guidance on what the target return should be
- It does not differentiate between the size of the investment required for each project. Competing investment proposals may have the same ARR, but may require different average investments

4.6.2 Discounted Cashflow Techniques**4.6.2.1 Net Present Value (NPV)**

Definition – Net Present Value (NPV) is the present value of outflows subtracted from the present value of inflows in each year

$$NPV = \sum_{t=1}^n \frac{CF_t}{(1+K)^t} + \frac{S_n + W_n}{(1+K)^n} - \sum_{t=0}^n \frac{CO_t}{(1+K)^t}$$

Decision Rule – When $NPV > 0$, the project should be accepted as it would lead to value addition

When $NPV < 0$, the project should be rejected as it would lead to value destruction

Zero NPV of the project means that the firm is indifferent to the project. The acceptance/rejection of the project would not lead to change in the value of the firm.

Example. Calculate the NPV of the project with the cash flows given in the table and having an initial outflow of Rs. 60,000. Let the interest rate be 20%.

Year	1	2	3	4	5
Cash Inflows	15000	18000	20000	23000	26000

Ans. The Present Value (PV) Factor can be calculated using the table

Year	1	2	3	4	5
Cash Inflows	15000	18000	20000	23000	26000
PV Factor	0.869565	0.7561437	0.657516	0.571753	0.497177
PV	13043.48	13610.586	13150.32	13150.32	12926.6
NPV	5881.309				



The NPV is calculated by subtracting the outflow (Rs. 60000) from the sum of the total inflows (Rs. 65881).

Is NPV an appropriate evaluation measure for projects?

1. **Simplicity**– It is difficult to calculate as compared to conventional methods such as average rate of return and payback period
2. **Sufficiency** – This method considers the total benefits arising out of the proposal over its lifetime.
3. **Objectivity**– Benefits are based on cash flows and not on the accounting profit
4. **Consistency**– This method is consistent with the objective of maximizing shareholders' wealth as it helps in selecting projects with the highest wealth addition capacity amongst the available investment options
5. **Reasonable** – The assumptions made under this method are reasonable as it assumes that the reinvestment rate is the cost of capital which is a quite conservative estimate.

In a nutshell, the present value approach is a strategy for choosing investment projects that is theoretically sound. However, it also has some restrictions. First of all, in contrast to the pay back technique or even the ARR approach, it is challenging to calculate, comprehend, and utilize. Naturally, this is a small problem. The computation of the necessary rate of return to discount the cash flows is the second, and more significant, issue with the present value technique. Because various discount rates would result in different present values, the discount rate is the most crucial component employed in present value calculations. With a change in the discount rate, a proposal's relative attractiveness will alter.

4.6.2.2 Internal Rate of Return (IRR)

Definition - Internal Rate of Return (IRR) is the rate of discount that equates the present value of cash inflows to cash outflows. Here, $NPV=0$

$$\text{Zero} = \sum_{t=1}^n \frac{CF_t}{(1+r)^t} + \frac{S_n + W_n}{(1+r)^n} - CO_0$$

Decision Rule – If $IRR > \text{rate of discount } (k)$, the project should be accepted

If $IRR < \text{rate of discount } (k)$, the project should not be accepted

How is IRR calculated?



Method 1: When the cash flows are in the form of annuities

1. Calculate the payback period by dividing the cash outflow by the cash inflows
2. Look for the values closest payback value in the Present Value for Annuity (PVAF) Table corresponding to the number of years
3. Take the value closest to the payback period value. One value should be more than the PB period and the other smaller than the value
4. Determine the IRR value by interpolation

$$IRR = r - \left(\frac{PB - DF_r}{DF_{rL} - DF_{rH}} \right)$$

Example. A project costs Rs 40,000 and is expected to generate cash inflows of Rs 10000 annually for 5 years. Calculate the IRR of the project

Ans. Payback Period: $40000/10000 = 4$

Using PVAF table, we find the value 4 between 7% (value of 4.100) and 8% (value of 3.99). The value of IRR thus lies between 7% and 8%.

$$IRR = 7 + (4.100 - 4) / (4.100 - 3.99) = 7.9\%$$

Using the higher interest rate,

$$IRR = 8 - (4 - 3.99) / (4.100 - 3.99) = 7.9\%$$

Method 2: When the cash flows is a mixed stream

1. Divide the total cash flows over the life of the project by the number of years to get a fake annuity
2. Determine the payback period (PB) by dividing the total inflows by the fake annuity
3. The value from the table of Present Value of Annuity (PVAF) closest to the value determined in step 2 will be a close approximation of the IRR
4. There is an adjustment required according to the actual cash flows. If the cash flows at the beginning of the cash flow stream are higher than the average cashflows, revise the IRR upwards. This is because greater recovery of funds is happening in the initial years. Similarly, if the cash flows during the beginning are lower than average cash flow, the IRR should be revised downwards



5. The actual value of the IRR can be value be determined by trial and error. The npv is calculated at the indicative IRR arrived using the above steps. We use the method of interpolation after we get two rates, one at which the NPV is negative and the other at which it is positive. The difference between the two rates should not be kept more than 1 %. Interpolation assumes that the PVFs are evenly distributed between two rates of interest, which is false as the discounting factors are based on an exponential function. Therefore, larger is the range between the two rates used for interpolation, larger will be the inaccuracy of the IRR calculated using interpolation.

Example. The firm wants to invest in a project that produces the cash flows as given in the table. Calculate the IRR of the project if the initial investment is 60000

Year	1	2	3	4	5
Cash Inflows	15000	18000	20000	23000	26000

Ans. The total inflows from the project are Rs. 102000, which when divided by the life of the project gives us a fake annuity of Rs. 20400.

Then the initial investment of Rs. 60000 is divided by the fake annuity of Rs. 20400 giving us a Payback Period of 2.94.

Now we find the value closest to the PB value from the PVAF table, we obtain value of 2.99 (interest rate of 20%) and value of 2.92 (interest rate of 21%)

Since the actual cash flows are smaller (follow an increasing trend) in the initial years, thus the trial and error to get 2 rates with positive and negative NPV for interpolation, will start at a rate slightly lower than 20%. How much lower to start is a matter of intuitive judgement?

Is IRR an appropriate evaluation measure for projects?

1. **Simplicity** – This method involves calculation using trial and error and hence it is a difficult measure.
2. **Sufficiency** – The method considers the total benefits arising out of the proposal over its lifetime as all the cash flows are discounted back
3. **Objectivity** – Benefits are based on cash flows of the project and not on the accounting profit
4. **Consistency** – The method has the objective of shareholder wealth maximization but does not meet this condition when comparing two projects with highly different initial outlays.



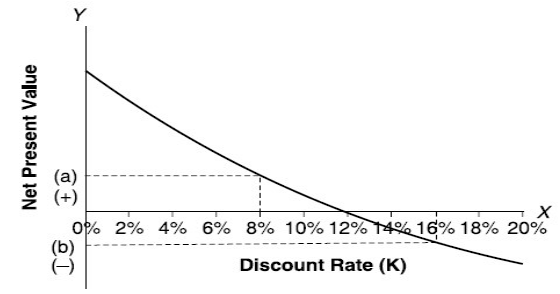
- 5. Reasonable** – The assumptions made under this method are not reasonable as it assumes the reinvestment rate to be IRR itself. It is not realistic to assume that the cash flows can be invested in a similarly profitable projects in all years in future having the same IRR as the project under consideration.

Its theoretical soundness notwithstanding, the IRR suffers from serious limitations.

First, it involves tedious calculations. As shown above, it generally involves complicated computational problems. Secondly, it produces multiple rates which can be confusing. Thirdly, in evaluating mutually exclusive proposals, the project with the highest IRR would be picked up to the exclusion of all others. However, in practice, it may not turn out to be the one which is the most profitable and consistent with the objectives of the firm, that is, maximisation of the shareholders' wealth. Finally, under the IRR method, it is assumed that all intermediate cash flows are reinvested at the IRR itself. Fourthly, IRR for projects with unconventional cash flows may be indeterminate. Finally, the same accept/reject rule (IRR should be greater than WACC/required rate) is not feasible for borrowing projects.

4.7 NPV vs IRR

NPV and IRR would give the same results in conventional investment projects where outflows tend to occur at earlier stages and are followed by a series of cash flows. Here both the decision rules converge i.e. $NPV > 0$ and $IRR > \text{discount rate}$. This happens as IRR is the rate at which NPV is 0 and thus if IRR is greater than WACC (discounting rate used in NPV), the discounting factors at WACC will be larger in comparison to IRR (lower the rate higher the PVF). This will result in increase in present value of cash inflows of the project whereas the value of initial outlay remain same as the PVF at any rate today will be 1. Hence the NPV at WACC lower than IRR will be positive. The situations in which the two methods will give a concurrent accept/reject decision will be in respect of conventional and independent projects. A conventional investment is one in which the cash flow pattern is such that an initial investment (outlay or cash outflow) is followed by a series of cash inflows. Thus, in the case of such investments, cash outflows are confined to the initial period. The independent proposals refer to investments the acceptance of which does not preclude the acceptance of others so that all profitable proposals can be accepted and there are no constraints in accepting all profitable projects.



However, they can offer contradictory results. In such cases, we divide the projects into mutually exclusive categories which can be of two types: -

1. **Technical Exclusiveness:** Here the alternative projects offer differing profitability. We choose the one with the higher profitability.
2. **Financial Exclusiveness:** Here a project offering higher profit may be selected over a project offering higher profitability due to capital rationing. (The exclusiveness due to limited funds)

The three major conflicts that arise here are: -

Size Disparity Problem: This can be attributed to differing initial investments in the mutually exclusive projects. Here, if the cash outlay of a project is more than the other, NPV and IRR may give differing rankings.

Example

Particular	Project A	Project B
Outflows	(10000)	(14000)
Inflows at end of Year 1	13000	18000
IRR	30%	29%
Hurdle Rate	10%	10%
NPV	1818.18	2585.03



Thus the 2 projects rank differently under the 2 methods. When faced with mutually exclusive projects, each having a positive NPV, the one with the largest NPV will have the most beneficial effect on shareholders' wealth and thus should be selected.

Incremental analysis involves computation of IRR of the incremental outlay of the project requiring bigger initial investment

Time Disparity Problem: Here the projects differ on the basis of the timing of the cash flows to be generated. Even if the project outlays are same, the cash flows may be different in different time periods which might give conflicting rankings. Here, we give priority to NPV over IRR.

Example

Time	CFATS of Project A	CFATS of Project B
0	-11500	-11500
1	6000	3000
2	5000	4000
3	4000	5000
4	1500	6000
IRR	20.06%	18.21%
NPV @ 9%	2364.36	2730.48

Projects with unequal lives (Life Disparity): If projects have unequal lives, they can have conflicting rankings. Here we can adjust the time horizons to a common standard assuming that the technology, price of capital asset and operating costs and revenues stays the same. We thus compare in multiples of the project up to a common time frame. This referred to as the **Common Time Horizon Approach**. The NPV for the common time frame is compared to select the project with the highest NPV.

Another method is the **equivalent annual net present value (EANPV)** which is determined by dividing the NPV of cash flows of the project by the annuity factor corresponding to the life of the project at the given cost of capital. The project with the higher EANPV is selected.


Example: Common time horizon Approach

Particulars		Project A	Project B
Initial outlay		10000	20000
	Inflows after taxes		
Year-end 1		8000	8000
2		7000	9000
3		nil	7000
4		nil	6000
Required rate of return		10%	

Project A			
Year	Cash flows	PV factor	Total present value
0	(10000)	1.000	(10000)
1	8000	0.909	7272
2	7000	0.826	5782
3	(10000)	0.826	(8260)
3	8000	0.751	6008
4	7000	0.683	4781
NPV			5583



Project B			
Year	Cash flows	PV factor	Total present value
0	(20000)	1.000	(20000)
1	8000	0.909	7272
2	9000	0.826	7434
3	7000	0.751	5257
4	6000	0.683	4098
NPV			4061

Example: EANPV Approach

Determination of NPV Initial Outlay of Project A= Rs. 100000 Initial Outlay of Project B= Rs. 125000					
Project	Years	CFAT per annum	PV factor @ 10%	Total PV of CFATs	NPV
A	5	30000	3.791	113730	13730
B	8	27000	5.335	144045	19045

EANPV of the Project = NPV/PVAF for the life of the project @ cost of capital

EANPV (A) = $13730/3.791 = 3621.74$

EANPV (B) = $19045/5.335 = 3569.82$



4.8 PROFITABILITY INDEX (PI) METHOD

Definition – PI measures the present value of returns divided by the total amount invested.

$PI = \text{Present value cash inflows} / \text{Present value of cash outflows}$

Decision Rule – If $PI > 1$, the project should be accepted

If $PI < 1$, the project should not be accepted

PI is related to NPV. When $PI > 1$ then NPV is positive but if $PI < 1$, NPV is negative

Is PI an appropriate evaluation measure for projects?

1. **Simplicity** – It is relatively simple and easy to understand and calculate
2. **Sufficiency** – The method considers the total benefits arising out of the proposal over its lifetime
3. **Objectivity** – Benefits are based on cash flows of the project and not on the accounting profit
4. **Consistency** – The method has the objective of shareholder wealth maximisation
5. **Reasonable** – The assumptions made under this method are reasonable. The reinvestment rate is same as NPV method

Example: Calculate the PI of the project with the cashflows given in the table and having an initial outflow of Rs. 60,000. Let the interest rate be 20%.

Solution: The Present Value (PV) Factor can be calculated using the table

Year	1	2	3	4	5
Cash Inflows	15000	18000	20000	23000	26000
PV Factor	0.869565	0.7561437	0.657516	0.571753	0.497177
PV	13043.48	13610.586	13150.32	13150.32	12926.6
NPV	5881.309				

Present Value (PV) of total Inflows = Rs. 65881

Total Outflows = Rs. 60000

$PI = 65881 / 60000$

= 1.09



The PI complies with nearly all of the criteria for a good investment criterion, much like the other discounted cash flow approaches. It takes into account every aspect of capital budgeting, including the sum of benefits and the time value of money, among others. It is a good approach to capital budgeting conceptually. Despite being NPV-based, it is a more effective evaluation method in a capital-rationing scenario than NPV.

For example, two projects may have the same NPV of Rs 20,000, but project A requires a Rs 70,000 initial investment whereas project B just requires a Rs 50,000 beginning investment. The PI approach will advise choosing Project B as the best option. However, the NPV technique will yield equal rankings for both projects.

Because the PI technique assesses the value of projects in terms of their relative rather than absolute magnitudes, it is thus preferable to the NPV method. However, the NPV technique might be preferable to the PI method in some instances that are mutually incompatible. However, this approach is more challenging to comprehend. Additionally, it requires less processing than IRR but more than the conventional approaches. PI method based ranking and selection of projects will give the most optimal portfolio of projects that will maximise the overall wealth generated on the total capital available, when the projects are perfectly divisible. It appears to be the best approach in this situation as it ensures that each rupee of capital generates the maximum possible NPV possible from the available investment options.

4.9 SUMMARY

- Investment or capital budgeting/long term asset mix decisions refer to the selection of assets/projects that will need substantial commitments of funds today and will generate return over the useful life which is more than one year. These decisions may result in increase in revenue or decrease in cost or both. They include replacement, expansion, modification etc. of the existing production and service facilities.
- Investment decisions are important as they
 - have long term impact on the business
 - involve substantial amount of funds
 - are irreversible in nature
 - determine the competitive strength



- There are two decision making situations of:
 - **Accept/Reject**- Pertaining to a single/independent project
 - **Mutually Exclusive**- Selection of one out of many available options.
- Cash flows are used as a measure of costs and benefits as it is more precise, cannot be manipulated and considers time value of money unlike accounting profits. The incremental cash flows are only relevant for the decision making.
- Depreciation calculation is based on the block of assets rule of Income Tax Act. Depreciation is included in the analysis despite being a non-cash expense as it impacts the tax outflow calculation.
- Traditional Techniques of Evaluation:
 - **Payback Period** - It refers to the time period required to recover the initial investment. The investment is accepted if the calculated payback is equal to or less than the required period. It fulfills the simplicity and objectivity conditions but does not satisfy the sufficiency, consistency and reasonableness conditions.
 - **Accounting Rate of return** - It is average rate of profits earned during the life of the asset/project. It fulfills the simplicity and sufficiency conditions but does not satisfy the objectivity, consistency and reasonableness conditions.
- Time Adjusted Techniques of Evaluation:
 - **Net Present Value (NPV)**- It is difference between the present value of cash inflows and outflows calculated at the required/hurdle rate. The investment is accepted if the NPV is greater than 0. It fulfills the simplicity, sufficiency, objectivity, consistency and reasonableness conditions.
 - **Internal rate of Return (IRR)**- It is the expected annualized average rate of return generated by the investment project. It is the rate at which the present value of cash inflows is equal to cash outflows. The investment is accepted if the IRR is greater than the required/hurdle rate. It fulfills the sufficiency, objectivity, and consistency but does not satisfy the simplicity and reasonableness conditions.
 - **Profitability Index (PI)**- PI is the relative form of NPV technique. It is the NPV/present value of cash inflow earned per rupee of initial outflow. The investment is accepted if the PI is greater than 0/1. It fulfills the simplicity,



sufficiency, objectivity, consistency and reasonableness conditions. It is used under capital rationing circumstances.

- NPV and IRR may give conflicting results/rankings in case of mutually exclusive projects under 3 circumstances:
 - Projects with unequal lives (EANPV or Common Horizon Approach is used)
 - Project with disparity in timing/pattern of cash flows (NPV is preferred)
 - Projects with unequal size (Incremental NPV/IRR is used)

4.10 SELF-ASSESSMENT QUESTIONS

1. Why are cash flows a superior metric over accounting profits for estimating the costs and benefits of an investment decision?
2. Differentiate between ARR and Payback Period method of capital budgeting.
3. Compare NPV and IRR techniques. Comment on the situations when these techniques give conflicting results.
4. Which technique is more appropriate in a capital rationing situation and why?
5. Write short notes on the following:
 - EANPV vs Common Time Horizon approach
 - Incremental cash flow analysis
 - Importance of capital budgeting
 - Depreciation estimation under capital budgeting decisions
6. A company plans to invest in a project costing Rs. 1,00,000 with an expected life of 5 years and the salvage value of Rs. 10,000. The project requires an additional working capital of Rs. 10,000 and is expected to earn a profit after tax of Rs. 15,000 per annum during its life. Calculate the Accounting Rate of Return of this project?
7. Determine the average rate of return from the following data of two machines, A and B and comment on which machine is better.



	Machine A	Machine B
Cost	50000	50000
Year	PAT	PAT
1	3000	10000
2	6000	9000
3	8000	8000
4	9000	6000
5	10000	3000
	36000	36000
Estimated life (in years)	5	5
Estimated Salvage Value	2000	2000

8. A project requires a cash outflow of Rs. 40000 and is expected to generate cash inflows over next five years as follows:

Year	1	2	3	4	5
CFATs	5000	10000	18000	8000	5000

What is the payback period of this project? What is the payback period of the project if the project requires Rs. 15000 as the cash outflow?

9. Tata Sons Ltd is planning to purchase a plant to expand its production. The cost of the plant is Rs. 25 lakhs and has a useful life of 5 years. It belongs to the block of 25% depreciation on w.d.v basis. It is the only asset in the block. It will be scrapped at Rs. 5 lakhs at the end of its life. PBDT will increase by Rs. 8 lakhs p.a. and the fixed cost will decrease by Rs. 50000 p.a. Tax rate is 30% and the required rate of return is 10%. Advise using NPV technique, whether it is worthwhile to invest in the new plant.



10. RIL Ltd is planning to replace a manually operated rig with a fully automated rig to improve its production efficiency. The cost of the new rig is Rs. 10 lakhs and has a useful life of 4 years. It belongs to the block of 20% depreciation on w.d.v basis. It will be scrapped at Rs. 1 lakh at the end of its life. The current realizable value of the old rig is Rs. 2 lakhs. It was purchased 3 years back at Rs. 6 lakhs and has a remaining useful life of 4 years. Sales will increase by Rs. 3 lakhs p.a. and the variable cost is 40 percent of sales. Sales will grow at the rate of 10% every year. Additional working capital required at the end of first year will be Rs. 1 lakh. The old rig belongs to the same block and there are no other assets in the block. Tax rate is 30% and the required rate of return is 12%. Advise using NPV technique, whether it is worthwhile to replace the old rig with the fully automated variant.
11. Evaluate the two projects based on the Profitability Index technique. The cost of capital is 12 %.

	Project A	Project B
Cash outflow	40000	35000
Cash inflows		
1	50000	30000
2	49000	32000

1.12 REFERENCES & SUGGESTED READINGS

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LESSON 5

RISK ANALYSIS IN CAPITAL BUDGETING

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STRUCTURE

- 5.1 Learning Objectives
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- 5.4 Sources of Risk
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5.1 LEARNING OBJECTIVES

- To explain the concept and measurement of risk
- To incorporate the element of risk in capital budgeting/investment decisions
- To describe and explain the various risk adjusted techniques of evaluation in capital budgeting decisions

5.2 INTRODUCTION

It is difficult to ignore the significance of the risk factor in capital planning. Profitability and risk are actually intertwined. It is quite likely that a project with a high chance of success will simultaneously raise the firm's perceived risk. This risk vs profit trade-off would affect how investors see the company both before and after a certain proposal is accepted. Investors



would not view a company favorably if it accepted a plan that increased the firm's risk, for example. This can negatively affect the share price, the firm's overall value, and its objective. As a result, the risk component must be taken into account while analyzing capital budgeting.

When investing in a project, there is an opportunity cost due to the degree of risk involved. Risk must be adjusted in order to determine if the project's profits are commensurate with the risks taken and whether investing in the project is preferable to other available investment opportunities. Moreover, risk adjustment is necessary in order to determine the true value of the Cash Inflows. A higher risk will result in a larger risk premium and hence a higher expected return.

5.3 DEFINITION OF RISK

As already established, risk analysis should be integrated in the capital budgeting approach. In general, if all other factors are equal, a company would be wise to accept a project that is less dangerous and reject the ones that are highly risky. This proposal is consistent with the premise that the management is averse to risk. The advantages of the project are taken into account while making the capital budgeting choice. Cash flows are used to measure these advantages. On the basis of several assumptions, future returns are estimated. In other words, the real returns in terms of cash inflows rely on a number of variables including the pricing, sales volume, advertising campaign's efficacy, competition, production expenses, and so forth.

The status of the economy, the rate of inflation, among others, have an impact on each of these factors. The accuracy with which these characteristics are predicted will have a significant impact on the projections of future returns and, consequently, the dependability of the investment choice. There are good grounds to think that regardless of how thoroughly the variables affecting future returns from the project are predicted, the actual returns will not exactly match the estimate. In other words, the estimates and actual returns will differ. Technically speaking, this is called risk. The word risk with regard to capital budgeting/investment choice may, thus, be defined as the variability in the actual returns originating from a project during its working life, in proportion to the projected return as forecasted at the time of making the capital budgeting decision.

The risk scenario is one in which it is known how likely it is that a specific event will occur. Under the circumstances of ambiguity, these probabilities are unknown. Therefore, the distinction between risk and uncertainty is that variability in risk is lower than in uncertainty. In other words, there is a difference between the two in a strict mathematical sense:



Uncertainty refers to the outcomes of a particular event that are too unknown to attach any probability of occurrence, whereas risk refers to a group of distinct outcomes for a given occurrence that may be assigned probabilities. Risk therefore arises whenever the decision-maker is able to assign probabilities to potential outcomes. This occurs when the decision-maker has historical information to draw upon, in order to assign probability to prior initiatives of a similar nature. When a decision-maker lacks historical data from which to create a probability distribution and must rely instead on educated estimates to create a subjective probability distribution, there is uncertainty.

For instance, if the proposed initiative is entirely new to the company, the decision-maker may be able to subjectively assign probability to alternative possibilities through study and conversation with others. There would be no danger in such circumstances if the future profits were definite, that is, if they could be predicted with accuracy. The risk associated with the investment choice would be higher, the less accurately they are predicted. The type of project will determine the risk and return variability.

An example of risk-free investment is the U.S. Treasury Bonds which are issued and backed by the federal government. Except in these rare instances, the investment choice is plagued by the issue of unpredictable returns, which can vary greatly depending on the decision's nature and objective. As a result, choosing to launch a new product rather than expanding an existing one will result in more unpredictable profits. The projections of returns from capital budgeting projects that focus on cost reduction will also be less risky than those that aim to increase revenues. In regards to capital budgeting, risk is essentially the difference between expected and actual returns. The more variation there is between the two, the riskier the project will be.

5.4 SOURCES OF RISK

- 1) **Project Specific Risks** - Risks that are unique to a certain project and have an impact on its cash flows include risks connected to the project's timely completion, resource misallocation, incorrect cash flow calculation, and more. Eg - Risks associated with building a dam are unique and different compared to building a windmill.
- 2) **Firm-specific risk**: This category includes risks that are unique to a given company, such as a downgrade in credit rating of the company, a change in top management, breach of intellectual property rights and other laws and regulations, conflicts with employees, etc. All of these elements have an impact on an entity's cash flows and



ability to acquire finance. For instance, technology risk varies between two IT companies.

- 3) **Industry-Specific Risks** - Hazards relevant to the industry in which the firm operates. Risks include government regulation, changes in technology, entry of new players, etc. For instance, the alcoholic beverages sector is subject to legal age restrictions.
- 4) **Competition Risk** - Dangers associated with competition in the market where a firm operates are known as competition risks. These risks include entrance risk for competitors, product dynamism, and changes in customer taste and preference, among others.
- 5) **Economic Risk** - These risks are associated with macro-economic conditions, such as adjustments to central banks' monetary and fiscal policies. They include implementation of a new tax regime, inflation control measures, adjustments to GDP, changes in aggregate demand, savings, net disposable income, etc.
- 6) **International risk** - These risks relate to situations brought on by global economic conditions, such as limitations on free trade, barriers to market access, economic crashes, bilateral agreements, and geographic and political circumstances. For instance, limiting the outsourcing of labor to other countries

5.5 SENSITIVITY ANALYSIS

Sensitivity analysis is one tool that conveys risk in more specific terms. It reveals the degree to which estimation mistakes affect the predicted project parameters such as ' predicted cash flow, discount rate, and project life. The study along these lines is crucial since there will always be estimation mistakes and because the future is never definite. By considering a variety of potential outcomes while assessing a project, sensitivity analysis corrects estimating inaccuracies. To give the decision-maker insight into the diversity of the results, sensitivity analysis uses a procedure that involves evaluating a project using a variety of predicted cash flows. Distinct cash flow projections are given by sensitivity analysis based on three different hypotheses: the worst case scenario, (ii) the base case scenario (most likely), and (iii) the best case scenario in terms of project outcomes.

5.5.1 Assigning Probability

Sensitivity analysis offers many estimates of how much money a project will make in the future. As a result, it is better than forecasting a single value since it provides a more accurate understanding of the returns' variability. But it has a drawback in that it doesn't reveal the



likelihood of these variants happening. The likelihood of the occurrence of the changes should also be provided in order to address this flaw in sensitivity analysis and produce a more accurate forecast. Therefore, a more accurate way to quantify cash flow variability would be to assign probabilities to predicted cash flows. The idea of probability is useful since it expresses the likelihood in percentage terms of each potential cash flow. For instance, if chances of realizing a certain cash flow were slim, we can assign a low 30% probability to it.

Similarly, if a cash flow has a probability of 1, it will definitely happen. Eg - in the case of contractual obligations of cash outflow). On the other hand, probability of 0 means that the cash flow prediction has no chance of ever happening. As a result, the likelihood of getting a specific cash flow forecast would be anywhere between zero and one. There are two processes in quantifying return variability. First, probabilities are assigned based on the likelihood that a specific cash flow forecast will materialize. Probabilities can be assigned in an objective or subjective manner.

The term "objective probability" refers to the determination of a probability based on several observations made in distinct yet identical circumstances and based on past experiences of events occurring or not. However, because they do not meet the condition of independent observations recurring over time, objective probability is not very useful in capital budgeting circumstances. Instead, they are founded on a single occurrence. Subjective or individual probability assignments are those that are not supported by the objective evidence of several trials of the same occurrence. It is the process of arbitrarily assigning probability to cash flow forecasts based on personal experience and judgment.

Calculating the project's estimated return is the second phase. The anticipated value of a project is a weighted average return, where the weights are the probability given to the various expected occurrences. It is arrived at by multiplying the predicted cash flows by the assigned probabilities.

Sensitivity analysis may also be used to determine the impact of changes in important factors, such as sales volume, profit margins, cost of raw materials, interest expenses, cost of capital, and so on, on the anticipated outcome (expressed in terms of NPV) of the proposed investment project. Keeping the impact of other variables constant, just one variable is taken into account for analytical purposes at one particular moment.

Example - an amusement park determines a positive NPV of Rs 1 crore for investment in a new ride, requiring a cash outlay of Rs 30 lakhs. Its senior management may want to know



the impact of change in ticket prices on the NPV of the project. If a small rise in ticket prices causes demand and subsequently revenue to fall drastically, the project may result in a negative NPV. Hence, it can be concluded that the proposed ride is a high risk project. On the other hand, if it turns out that the NPV remains positive despite a 20% decline in income, the project might be considered to have low risk. In addition, the management could do sensitivity tests in light of rising variable expenses. The identified important factors to the basic NPV can then be subjected to sensitivity analysis in this manner. If a modest adjustment results in a magnified change in NPV, the project is considered to be extremely sensitive.

These illustrations effectively show how valuable sensitivity analysis is as a method of determining the risks connected to the proposed project. To evaluate the effects of changes in important factors on NPV, a visual depiction will be equally helpful; the flatter the curve, the lower the risk; the steeper the curve, the riskier the project is. Determining how sensitive the NPV is to changes in any of the key variables and identifying which variable has the biggest impact on the NPV are thus the main goals of sensitivity analysis. Clearly, sensitivity analysis gives the decision-maker a good understanding of how risky the project is.

5.6 METHODS TO ADJUST RISK IN CAPITAL BUDGETING

1. Risk-adjusted Discount Rate Approach
2. Certainty-Equivalent Approach
3. Decision-tree Approach
4. Probability Distribution Approach

5.6.1 Risk-adjusted Discount Rate Approach

The risk-adjusted discount rate approach (RADR) is a method used to calculate the present value of future cash flows by taking into account the risk associated with those cash flows. In other words, it is a method used to determine the value of an investment based on the expected return and the level of risk involved.

The RADR approach is commonly used in finance, especially in corporate finance, to evaluate potential investment opportunities. The basic concept behind the RADR approach is that an investor should demand a higher rate of return for investments that carry a higher level of risk. This is because riskier investments are less certain and therefore require a higher return to compensate for the added uncertainty.



To calculate the RADR, a company must first determine the risk-free rate, which is the rate of return on an investment with no risk, such as a U.S. Treasury bond. The risk-free rate serves as a benchmark for the expected rate of return on a particular investment. The company must then determine the expected rate of return for the specific investment being considered. This expected rate of return is based on factors such as the investment's industry, historical performance, and projected growth.

Once the risk-free rate and expected rate of return have been determined, the company can then calculate the risk premium. The risk premium is the additional rate of return that investors demand for taking on the specific risks associated with the investment. This risk premium is based on the riskiness of the investment and is calculated by subtracting the risk-free rate from the expected rate of return.

The risk premium is then multiplied by the probability of the investment achieving its expected return. The probability of achieving the expected return is calculated based on factors such as the company's track record, the current economic climate, and any potential industry-specific risks. The result is a risk-adjusted discount rate, which is used to calculate the present value of the investment's expected cash flows.

The RADR approach is a useful tool for evaluating investment opportunities because it takes into account the level of risk involved. By considering the risk associated with an investment, the RADR approach provides a more accurate picture of the potential return on investment. This approach is particularly important for companies that operate in industries with high levels of risk, such as the technology or pharmaceutical industries.

It is possible to apply the Risk-adjusted Discount Rate Approach to both the NPV and the IRR. The risk-adjusted rate would be used to compute NPV if the NPV approach were to be used to analyze a capital expenditure decision. The plan would proceed if the NPV is positive. If the NPV is negative, the project should be abandoned. If the internal rate of return (IRR) was the decision criterion, it would be compared to the risk-adjusted required rate of return (RADR). The proposal would be approved if the IRR is more than the risk-adjusted rate; otherwise, it would not.

$$NPV = \sum_{t=1}^n \frac{CFAT_t}{(1 + K_r)^t} - CO$$

$CFAT_t$ = expected Cash flow after tax in year t

K_r = risk adjusted discount rate

CO = Cash outflow



Illustration: Find whether the project should be accepted or not:

Year	Cash Inflow
1	50,000
2	45,000
3	40,000
4	37,500
Initial Outlay	1,00,000

Risk-free discount rate 6%

Risk adjusted rate 20%

Solution.

Year	Cash Inflow	Coefficient	NPV of cash flows (at 20%)	NPV of cash flows (at 38%)
0	-100000	1	-100000	-100000
1	50,000	0.83333333	41666.66667	36231.88406
2	45,000	0.69444444	31250	27173.91304
3	40,000	0.5787037	23148.14815	20128.82448
4	37,500	0.48225309	18084.49074	15725.64412
NPV			14149.30556	-739.7342995

Given the expected cash flows and estimated risk-adjusted discount rate, the project's expected NPV is positive, and the project should be accepted. If the risk-adjusted discount rate is 38 per cent, the NPV will be negative (Rs 739.73). Then, the project will have to be rejected. If the riskiness of the return from the same project differs for future periods, different rates of discount for different future periods can be used.

One of the key benefits of the RADR approach is that it allows companies to make more informed investment decisions. By taking into account the level of risk associated with an investment, companies can better assess the potential return and make more strategic decisions. This can help companies avoid investing in projects that have a low probability of success or that carry a high level of risk.



Another benefit of the RADR approach is that it can be used to compare investment opportunities with different levels of risk. By calculating the risk-adjusted discount rate for each investment, companies can determine which investments offer the best risk-adjusted return. This can help companies prioritize investments and allocate resources more effectively.

However, there are also some limitations to the RADR approach. One of the key challenges is determining the appropriate level of risk for a particular investment. The level of risk can be difficult to quantify and is often subjective. Additionally, the RADR approach relies on assumptions about future performance, which may not always be accurate. Finally, the RADR approach is only one of many tools that can be used to evaluate investment opportunities and should be used in conjunction with other methods to get a more comprehensive picture of potential risks and returns.

In conclusion, the risk-adjusted discount rate approach is a powerful tool for evaluating investment opportunities. By taking into account the level of risk associated with an investment, companies can make more informed decisions and allocate resources more effectively. While the approach has its limitations, it is a valuable tool for any company looking to evaluate potential investment opportunities and maximize returns while minimizing risk.

5.6.2 Certainty-Equivalent Approach

The Certainty-Equivalent Approach is a method used in capital budgeting to assess the value of an investment based on its expected cash flows and the investor's risk tolerance. This approach takes into account the fact that investors are often risk-averse and may require additional compensation to take on uncertain cash flows. The certainty-equivalent approach allows investors to compare investment options with different levels of risk and uncertainty, and determine the minimum return they would require to accept an investment with risky cash flows.

The basic idea of the certainty-equivalent approach is to calculate the certain cash flow that would provide the same level of satisfaction as the expected cash flow of an investment with uncertain cash flows. This certain cash flow is known as the certainty equivalent, and it represents the minimum amount of guaranteed cash flow that an investor would accept in lieu of the uncertain cash flow of the investment. To calculate the certainty equivalent, an investor must first determine their risk tolerance, which is the minimum return they require for taking on a given level of risk.



Once the investor's risk tolerance has been established, the next step is to use a risk premium to adjust the expected cash flow of the investment for the level of risk associated with the investment. The risk premium is the additional return an investor requires for taking on risk, and it is typically calculated as the difference between the expected return on a risk-free investment and the expected return on the investment being evaluated. Thus the certainty equivalent coefficient is calculated by dividing the certain cash flow (that gives the same satisfaction) by the corresponding risky cash flow. For example, if riskless amount of Rs. 19000 at the end of first year gives the same utility as risky amount of Rs. 20000 then the certainty equivalent coefficient will be $19000/20000 = 0.95$. It means 95 paisa of certain/risk-free cash flow is equally preferred to Re. 1 by the management at the end of first year. The value of certainty equivalent coefficient decreases with time period as risk is higher in time periods further in the future. The riskless cash flows are obtained as a product of risky cash flows and the respective certainty equivalent coefficient. These cash flows are then discounted at the riskless rate and not the cost of capital to calculate the NPV. In case of IRR technique, the IRR calculated using the riskless cash flows are compared with the riskless rate and not the WACC for acceptance/rejection of the project.

Illustration

Year	Coefficient	Cash Inflow
1	0.95	50,000
2	0.8	45,000
3	0.77	40,000
4	0.7	37,500
Year 1	$0.95 \times 50,000$	47,500
Year 2	$0.80 \times 45,000$	36,000
Year 3	$0.77 \times 40,000$	30,800
Year 4	$0.70 \times 37,500$	26,250

Initial Outlay 1,00,000

WACC= 10%

Risk-free rate = 7%



$$\text{NPV} = [(47,500/(1 + 0.07)^1) + (36,000/(1 + 0.07)^2) + (30,800/(1 + 0.07)^3) + (26,250/(1 + 0.07)^4)] - 1,00,000$$

$$\text{NPV} = 21,004.29$$

Since the NPV is positive, the project should be accepted on the certainty equivalent cash flow basis.

The NPV approach or the IRR method can be used as the decision-criterion in this situation. If the NPV of the certainty-equivalent cash flow is positive, the proposal would be accepted using the NPV technique; otherwise, it would be rejected. If the IRR technique is used, the internal rate of return (r), which compares the risk-free discount rate to the present value of certainty-equivalent cash inflows and outflows, would be used. As is customary with this methodology, the investment proposal would be approved if r surpasses the risk-free rate. Otherwise, it would be turned down. By comparing the certainty equivalents of the two investment options, the investor can determine which option provides the best value for their risk tolerance.

The certainty-equivalent approach is a useful tool in capital budgeting because it allows investors to compare investment options with different levels of risk and uncertainty. By adjusting the expected cash flows of an investment for the level of risk associated with it, investors can calculate the minimum return they require to be compensated for taking on risk, and compare that return to the expected return of the investment. This approach can help investors make more informed investment decisions and choose the option that provides the best balance between risk and return. RADR Approach incorporates risk involved in capital budgeting by adjusting the discount rate whereas certainty equivalent approach works by adjusting the cash flows.

5.6.3 Decision-tree Approach

Capital budgeting decisions are often complex and involve a lot of uncertainty. Decision tree analysis is one approach that organizations can use to make informed capital budgeting decisions.

A decision tree is a graphical representation of a decision-making process. It is a model that is used to evaluate the outcomes of different decisions based on a set of probabilities. Decision trees are useful in capital budgeting because they can help decision-makers visualize and quantify the potential outcomes of different investment opportunities.



The decision tree is made up of three main components: decision nodes, chance nodes, and end nodes. A decision node represents a point in the decision-making process where a decision must be made. A chance node represents a point in the process where an uncertain event may occur. An end node represents the final outcome of the decision-making process.

The decision tree begins with a decision node that represents the choice of whether or not to invest in a particular project. If the decision is made to invest, the next decision node represents the choice of which investment option to choose. The chance nodes represent the uncertain events that may occur during the life of the investment, such as changes in interest rates, changes in the economy, or changes in consumer demand.

Each chance node is associated with a set of probabilities that reflect the likelihood of different outcomes. The probabilities are typically based on historical data, expert opinions, or other sources of information. The probabilities are used to calculate the expected value of each decision path, which is the sum of the products of the probabilities and the payoffs for each outcome.

The end nodes represent the final outcomes of the decision-making process. These outcomes can be either positive or negative, and they are associated with a specific payoff or cost. The payoffs and costs can be in the form of cash flows, net present value, internal rate of return, or other measures of financial performance.

The decision tree analysis is conducted by calculating the expected value of each decision path. The decision path with the highest expected value is considered to be the optimal decision. The decision tree analysis provides decision-makers with a systematic and transparent approach to evaluate investment opportunities and select the best option. The decision tree analysis is particularly useful in capital budgeting because it can help decision-makers deal with uncertainty and risk. Capital budgeting decisions often involve a significant amount of risk, and decision-makers need to be able to evaluate the potential outcomes of different investment options under different scenarios. The decision tree analysis also helps decision-makers to identify the critical factors that influence the outcomes of the investment. For example, if the decision tree analysis reveals that the outcome of an investment is highly sensitive to changes in interest rates, decision-makers can focus on developing strategies to manage interest rate risk.

In addition to providing a systematic approach to evaluate investment opportunities, the decision tree analysis can also help decision-makers to communicate their decisions to stakeholders. Decision trees are easy to understand, and they can help decision-makers explain the rationale for their decisions in a clear and concise manner.



The decision-tree approach in capital budgeting involves several steps:

Step 1: Identify the Investment Opportunities

The first step in the decision-tree approach is to identify potential investment opportunities. These could be projects, products, or services that the organization is considering investing in to generate long-term returns.

Step 2: Identify the Relevant Factors

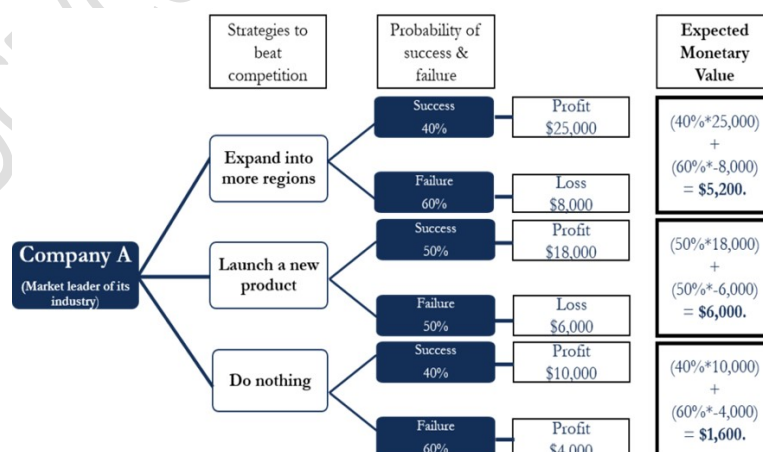
The second step is to identify the relevant factors that could impact the success or failure of the investment opportunities. These factors could include market conditions, competition, regulatory changes, economic conditions, and other variables that could influence the investment's performance.

Step 3: Develop the Decision Tree

The third step in the decision-tree approach is to create a decision tree that maps out the potential outcomes of each investment opportunity. The decision tree should include the various possible outcomes, the probability of each outcome, and the expected returns associated with each outcome. Decision trees can be created using software tools or even hand-drawn diagrams.

Step 4: Analyze the Decision Tree

The fourth step is to analyze the decision tree to determine the best investment opportunity. Decision-makers can use a variety of methods to evaluate the decision tree, such as the net present value (NPV) method, the internal rate of return (IRR) method, or the payback period method.





Despite its many advantages, the decision tree analysis also has some limitations. One of the main limitations is the difficulty of accurately estimating the probabilities of different outcomes. The accuracy of the probabilities is essential to the accuracy of the expected value calculation. If the probabilities are inaccurate, the expected value calculation will also be inaccurate.

Another limitation is the assumption that decision-makers are rational and can accurately evaluate the potential outcomes of different investment options. In reality, decision-makers may be subject to biases and may not have all the information they need to make informed decisions.

In conclusion, decision tree analysis is a useful tool for capital budgeting decisions. It provides decision-makers with a systematic and transparent approach to evaluate investment opportunities and select the best option

5.6.4 Probability Distribution Approach

One of the most common methods used in capital budgeting is the net present value (NPV) approach, which involves calculating the present value of expected cash inflows and outflows associated with an investment. However, the NPV approach is often based on point estimates of future cash flows, which can be uncertain and subject to significant risk.

To address these issues, capital budgeting practitioners often use a probability distribution approach to estimate the expected NPV of a project. The probability distribution approach involves developing a probability distribution of expected cash flows and using this distribution to estimate the expected NPV.

Developing a Probability Distribution of Expected Cash Flows

To develop a probability distribution of expected cash flows, capital budgeting practitioners often use historical data and expert opinions to estimate the possible outcomes associated with a project. For example, if a project involves investing in new equipment to increase production capacity, practitioners might consider different levels of production and potential revenue streams. They would then estimate the probability of each possible outcome occurring, based on historical data and expert opinions.

To develop a probability distribution, practitioners must first identify the possible outcomes associated with a project. In the example of investing in new equipment to increase production capacity, possible outcomes might include increased production, decreased production, or production that stays the same. Next, practitioners would estimate the probability of each possible outcome occurring. This might involve analyzing historical



production data or consulting with subject matter experts to develop a more accurate estimate.

Once the possible outcomes and their probabilities have been identified, practitioners can use this information to develop a probability distribution. A probability distribution represents the range of possible outcomes and their associated probabilities. For example, a normal probability distribution might be used to represent the possible outcomes associated with a project. The distribution might show the expected level of production on the x-axis and the probability of that level of production on the y-axis. The area under the curve represents the probability of different levels of production occurring.

Calculating the Expected NPV

Once a probability distribution of expected cash flows has been developed, practitioners can use this distribution to calculate the expected NPV. The expected NPV is calculated as the weighted average of the NPV for each possible outcome, where the weights are the probabilities of each outcome. For example, if a project has three possible outcomes with probabilities of 20%, 50%, and 30%, practitioners would calculate the expected NPV as follows:

$$\text{Expected NPV} = (\text{NPV}_1 \times 0.20) + (\text{NPV}_2 \times 0.50) + (\text{NPV}_3 \times 0.30)$$

Where NPV_1 , NPV_2 , and NPV_3 represent the NPV for each of the three possible outcomes.

Using Sensitivity Analysis to Evaluate the Impact of Different Assumptions

One of the benefits of using a probability distribution approach is that it allows for a more comprehensive analysis of a project's potential outcomes. However, the approach requires a significant amount of data and expertise to create an accurate probability distribution. Additionally, there is always some uncertainty in the estimates. Therefore, it is important to carefully evaluate the inputs used in creating the probability distribution and to use sensitivity analysis to assess the impact of different assumptions on the expected NPV.

Sensitivity analysis involves testing the impact of different assumptions on the expected NPV. For example, practitioners might test the impact of changing the estimated probabilities of different outcomes or the estimated cash flows associated with each outcome. By testing the impact of different assumptions, practitioners can better understand the risk associated with a project and make more informed investment decisions.



5.7 SUMMARY

- Risk analysis should be integrated in the capital budgeting approach. In general, if all other factors are equal, a company would be wise to accept a project that is less dangerous and reject the ones that are highly risky.
- The risk scenario is one in which the probability of occurrence of a specific event is known. Under the circumstances of uncertainty, these probabilities are unknown.
- Sources of Risk:
 - **Project Specific Risks**
 - **Firm Specific Risks**
 - **Industry-Specific Risks**
 - **Competition Risk**
 - **Economic Risk**
 - **International Risk**
- **Sensitivity Analysis:** This approach helps to find the predicted results for different combinations and variations in the forecasted parameters/inputs such as cash flows, growth rate, cost, sales, discounting rate etc. This helps in testing the worthiness of a project for a range of input values and thus accounts for inaccuracies in prediction.
- Methods to adjust Risk in Capital Budgeting:
 - **Risk-adjusted Discount Rate Approach (RADR)** - Cash Flows are discounted at the RADR to determine the NPV. RADR is based on risk free rate and risk premium for the risk involved in the investment project.
 - **Certainty-Equivalent Approach (CE)**- The cash flows for different years are multiplied with the CE for the respective years. CE is based on the utility derived from the risky and riskless cash flows in a year. All the riskless cash flows obtained with the help of CE coefficients is discounted at the risk free rate to calculate the NPV. IRR is compared with the risk free rate and not the hurdle rate/cost of capital.
 - **Decision-tree Approach**- A decision tree is a graphical representation of a decision-making process. It is a model that is used to evaluate the outcomes of different decisions based on a set of probabilities. The decision tree is made up of three main components: decision nodes, chance nodes, and end nodes. The decision tree analysis is conducted by calculating the expected value of each decision path.



The decision path with the highest expected value is considered to be the optimal decision.

Probability Distribution Approach- We can use a probability distribution approach to estimate the expected NPV of a project. The probability distribution approach involves developing a probability distribution of expected cash flows and using this distribution to estimate the expected NPV. We use historical data and expert opinions to estimate the possible outcomes associated with a project.

5.8 SELF-ASSESSMENT QUESTIONS

1. Explain the importance of risk analysis in capital budgeting decisions.
2. Explain the different sources of risk for an investment proposal.
3. Differentiate between RADR and Certainty Equivalent approach of risk adjustment in investment decisions.
4. How is Probability Distribution approach used in risk analysis of investment decisions.
5. Explain the method and technique of sensitivity analysis in capital budgeting.
6. Describe the decision tree approach of risk adjustment in capital budgeting.
7. A company is considering to purchase an equipment for Rs. 50000. The machine has a useful life of 4 years and will generate an expected CFATs of Rs. 30000 per annum. WACC is 10% and the RADR is 15%. Is it worthwhile to investment in the new equipment?
8. A company is planning to invest in either of the 2 options available. Use the certainty equivalent (CE) approach to select the project from the two options based on the information given below:

Year	CFATS of Project A	CE of Project A	CFATS of Project A	CE of Project A
0	-30000	1	-30000	1
1	20000	0.85	15000	0.9
2	15000	0.8	30000	0.7
3	40000	0.6	30000	0.65
4	15000	0.55	15000	0.6

The cost of capital is 10% and the risk-free rate is 5%.



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LESSON 6

Capital Structure: Theory and Practice

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STRUCTURE

- 6.1 Learning Objectives
- 6.2 Introduction: Meaning of Capital Structure
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- 6.4 Theories of capital structure
- 6.5 Checklist for optimal capital structure decisions
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6.1 LEARNING OBJECTIVES

- To understand the meaning of capital structure
- To understand the factors affecting capital structure decisions
- To explain about theories of capital structure decisions
- Checklist for optimal capital structure decisions



6.2 INTRODUCTION

Meaning of Capital Structure

Capital Structure is referred to as the ratio of different kinds of securities equity shares, preference shares and long-term borrowings raised by a firm as long-term finance. The capital structure involves two decisions-

- a. Type of securities to be issued are equity shares, preference shares and long-term borrowings (Debentures).
- b. Relative ratio of securities can be determined by process of capital gearing. On this basis, the companies are divided into two-
 1. Highly geared companies - Those companies whose proportion of Debt dominates total capitalization
 2. Low geared companies - Those companies whose equity capital dominates total capitalization.

Capital Structure is to be decided keeping in factor in mind to maximise the earning per share to equity shareholders as they are the real owners of company. The Earning Per Share (EPS) is calculated in such a manner:	Particulars
Earning before interest and tax (EBIT)	
Less: Interest	(XXX)
Earning before tax	
Less Tax	(XXX)
Earning after interest and tax/ Earning available for Shareholders	
Less Preference Dividend	(XXX)
Earning available for equity shareholders	
Earnings per share (Earning available for equity shareholders/ no. of equity shares)	XXX



6.3 FACTORS AFFECTING CAPITAL STRUCTURE DECISIONS

Following are the factors that play an important role in determining the capital structure:

1. **Costs of capital:** It is the cost that is incurred in raising capital from different fund sources. A firm or a business should generate sufficient revenue so that the cost of capital can be met and growth can be financed.
2. **Degree of Control:** The equity shareholders have more rights in a company than the preference shareholders or the debenture shareholders. The capital structure of a firm will be determined by the type of shareholders and the limit of their voting rights.
3. **Trading on Equity:** For a firm which uses more equity as a source of finance to borrow new funds to increase returns. Trading on equity is said to occur when the rate of return on total capital is more than the rate of interest paid on debentures or rate of interest on the new debt borrowed.
4. **Government Policies:** The capital structure is also impacted by the rules and policies set by the government. Changes in monetary and fiscal policies result in bringing about changes in capital structure decisions.
5. **Stability of sales-** An established business which has a growing market and high sales turnover, the company is in position to meet fixed commitments. Interest on debentures must be paid regardless of profit. Therefore, when sales are high, thereby the profits are high, and company is in better position to meet such fixed commitments like interest on debentures and dividends on preference shares. If company is having unstable sales, then the company is not in position to meet fixed obligations. So, equity capital proves to be safe in such cases.
6. **Sizes of a company-** small size business firms capital structure generally consists of loans from banks and retained profits. While on the other hand, big companies having goodwill, stability and an established profit can easily go for issuance of shares and debentures as well as loans and borrowings from financial institutions. The bigger the size, the wider is total capitalization.
7. **Flexibility of financial plan-** In an enterprise, the capital structure should be such that there is both contractions as well as relaxation in plans. Debentures and loans can be refunded back as the time requires. While equity capital cannot be refunded at any point



which provides rigidity to plans. Therefore, in order to make the capital structure possible, the company should go for issue of debentures and other loans.

8. **Choice of investors-** The company's policy generally is to have different categories of investors for securities. Therefore, a capital structure should give enough choice to all kind of investors to invest. Bold and adventurous investors generally go for equity shares and loans and debentures are generally raised keeping into mind conscious investors.
9. **Capital market condition-** In the lifetime of the company, the market price of the shares has got an important influence. During the depression period, the company's capital structure generally consists of debentures and loans. While in period of boons and inflation, the company's capital should consist of share capital generally equity shares.
10. **Period of financing-** When company wants to raise finance for short period, it goes for loans from banks and other institutions, while for long period it goes for issue of shares and debentures.

IN-TEXT QUESTIONS

1. Which of the following falls under the criteria for determining a should capital structure.
(a) Simplicity (b) Flexibility
(c) Minimum risk (d) All of the above
2. Which of the following factors affect capital structure?
(a) Size of business (b) Form of business organisations
(c) Stability of earnings (d) All of the above
3. Voting rights in the company is held by:
(a) Equity shareholders (b) Preference shareholders
(c) Debenture holders (d) All of the above
4. Who are the real owners of company, keeping in whom we have to decide the capital structure of company
(a) Equity shareholders (b) Preference shareholders
(c) Debenture holders (d) All of the above

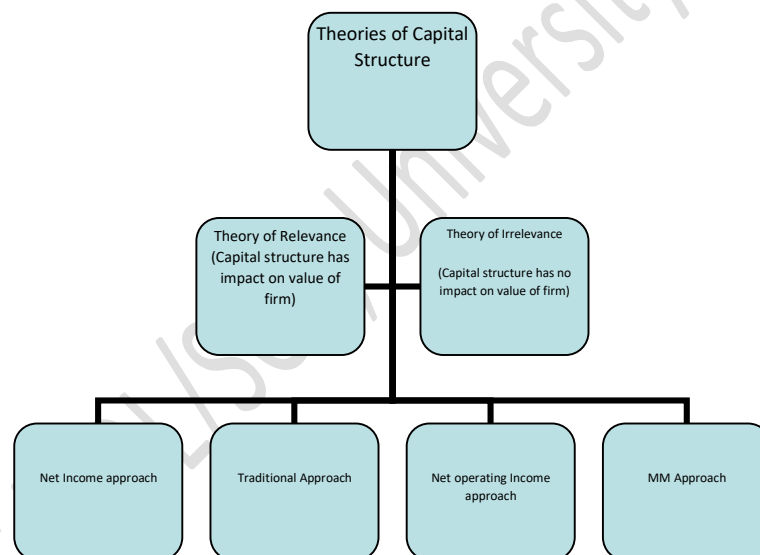
6.4 THEORIES OF CAPITAL STRUCTURE

The capital structure theories explore the relationship between the use of debt and equity financing and the value of the firm. If the use of debt is profitable then it increases the value



of the firm and vice versa. Capital structure theories explain the relationship among the capital structure, the cost of capital and value of the firm. The capital structure of a firm should be such as it maximises the value of the firm (shareholders wealth). Such a capital structure is called optimum capital structure. There are different theories which explain the relationship among capital structure or financing mix (debt–equity ratio), cost of capital and valuation of a company. According to one school of thought, the capital structure affects cost of capital of a company and its value. According to the other school of thought, there is no relationship among the capital structure, cost of capital of a company, and its value. Capital structure theories belong to two categories:

- a) Theories of Relevance
- b) Theories of Irrelevance.



6.4.1 Assumptions of Capital structure

1. The company uses only two sources of funds, that is debt and equity.
2. There are no corporate taxes.
3. The firm's total assets are given, and they do not change. In other words, the investment decisions are assumed to be constant.
4. The dividend pay-out ratio is 100 per cent which means that whole of the earnings is distributed as dividends and there are no retained earnings.
5. The operating profits (EBIT) of the company are given and not expected to grow.



6. The company's total financing remains constant. The company can change its capital structure either by redeeming the debentures with the help of issuing shares or by raising more debt and reducing the equity capital.
7. The business risk remains constant and is assumed to be independent of capital structure and financial risk.
8. All investors have the same probability distribution of future expected operating earnings (EBIT) for a given firm.
9. The firm has a perpetual life.

6.4.2 Net Income Approach

This approach was given by Durand. According to this approach, capital structure decision affects the value of the firm. A change in the capital structure (Financial leverage or Debt-equity ratio) causes a change in the overall cost of capital and the value of the firm. Use of higher debt in the capital structure will decrease the overall cost of capital and increase the value of the firm and the market price of equity shares. On the other hand, a decrease in the use of debt in capital structure will lead to an increase in the overall cost of capital and a decrease in the value of the firm and the market price of equity shares. This approach is based on three assumptions:

- (a) There are no taxes.
- (b) The cost of debt is less than the cost of equity.
- (c) The use of debt does not change the risk perception of investors.

According to NI approach, financial leverage is an important variable in capital structure decision of a company. By making a judicious use of debt and equity, a company can achieve an optimum capital structure. The optimum capital structure is one at which the overall cost of capital (K_0) is minimum, and the value of the firm is maximum. At this capital structure, the market price of the equity share will be the highest. According to NI approach, the value of the firm can be determined as follows:

$$V = S + D$$

Where, V = Total market value of the firm

S = Total market value of equity

Market value of equity (S) = Earnings available for equity shareholders (NI)/ K_e

Earnings available for equity shareholders = $EBIT - I$

D = Total market value of debt

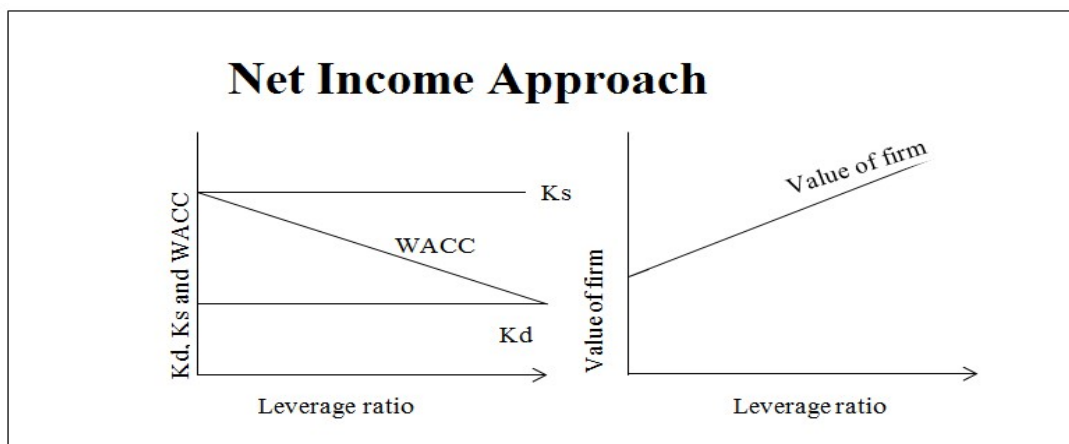
K_e = Equity capitalisation rate (K_e)

Overall cost of capital or weighted Average Cost of capital can be calculated as:



$$K_o = EBIT/V$$

where K_o = Overall cost of capital



Example: 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 firm and overall capitalisation rate according to Net income Approach. (b) If the debenture debt is increased to Rs 3,00,000, what shall be the value of firm and overall capitalisation rate?

Sol. Net Income	Rs 80,000
Less Interest on 8% Debentures of Rs 2,00,000	(16,000)
Earnings available for equity shareholders	64,000

$$\text{Market Value of equity (S)} = 64,000 * 100/10 = \text{Rs } 6,40,000$$

$$\text{Market Value of Debt} = \text{Rs } 2,00,000$$

$$\text{Value of the firm (S+ D)} = \text{Rs } 8,40,000$$

$$K_o = EBIT/V * 100$$

$$= 80,000 / 8,40,000 * 100 = 9.52\%$$

b) If debenture is increased to Rs 3,00,000

Net Income	Rs 80,000
Less Interest on 8% Debentures of Rs 3,00,000	(24,000)



Earnings available for equity shareholders 56,000

Market Value of equity (S) = $56,000 * 100/10 = \text{Rs } 5,60,000$

Market Value of Debt = Rs 3,00,000

Value of the firm (S+ D) = Rs 8,60,000

$K_o = \text{EBIT}/V * 100$

$= 80,000 / 8,60,000 * 100 = 9.30\%$

Thus, with the increase in debt financing the value firm is increased and the overall cost of capital has decreased.

6.4.3 Traditional Approach

Net Income (NI) Approach and Net Operating Income (NOI) Approach are the two extremes of the relationship between the capital structure and value of the firm. While Net Income Approach explains that the capital structure affects the overall cost of capital and the total value of the firm, the Net Operating Income Approach suggests that the capital structure is totally irrelevant. Traditional Approach is a compromising viewpoint between Net Income Approach and Net Operating Income Approach. Partly it has the features of both the approaches. Therefore, it is a mid-way approach. The Traditional Approach is similar to the NI Approach to the extent that it says that leverage affects the overall cost of capital and total value of the firm. However, it does not accept the viewpoint of NI Approach that the value of the firm will necessarily increase for all degrees of financial leverage. It is similar to the viewpoint of NOI Approach that beyond a certain degree of leverage, the overall cost of capital increases, as a result of which the total value of the firm decreases. But it is different from the NOI Approach as it does not accept the view that the overall cost of capital is constant for all degrees of leverage. The essence of the Traditional Approach is that a firm by making a judicious use of debt and equity in its capital structure can increase its total value and decrease the overall cost of capital. This is because debt is a cheaper source of finance due to tax deductibility of interest in comparison to equity shares. The use of cheaper source of funds (debt) by replacing equity capital will reduce the overall cost of capital. However, if the debt is raised further, it will increase financial risk for the investors, leading to an higher equity capitalisation rate (K_e). But the increase in equity capitalisation rate (K_e) may not be so high as to offset the benefit of cheaper debt. But, if the debt is increased further, it will increase financial risk both for equity shareholders and creditors. They will demand higher rate of return from the firm. In other words, it will increase the equity capitalisation rate (K_e)



as well as the cost of debt (K_d). Thus, the use of debt beyond a certain point will raise the overall cost of capital and decrease the value of the firm. Hence, the use of debt up to a certain point will increase the value of the firm and beyond that point it will decrease the value of the firm. At this level of debt-equity mix, the capital structure of the firm would be optimum. At this level, the overall cost of capital would be the minimum. At this level, the marginal real cost of debt (both implicit and explicit) would be equal to the real cost of equity. In conclusion, it can be said that financial leverage is favourable up to a certain level but after a certain point it starts operating adversely.

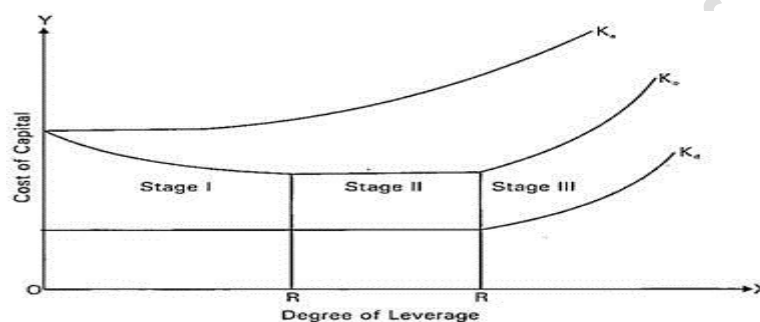


Fig. Traditional Approach.

Example: Compute the market value of firm, value of shares and the average cost of capital from the following:

	Rs
Net operating Income	2,00,000
Total Investment	10,00,000
Equity capitalisation rate:	
If firm uses no Debt.	10%
If firm uses Rs 4,00,000 Debt.	11%
If firm uses Rs 6,00,000 Debt.	13%



Assume that Rs 4,00,000 Debenture can be raised at 5% rate of interest whereas Rs 6,00,000 debentures can be raised at 6%

Solution: Computation of Market value of firm & the average cost of capital

	No Debt	Rs 4,00,000 5% Debentures	Rs 6,00,000 6% Debentures
Net operating Income	Rs 2,00,000	Rs 2,00,000	Rs 2,00,000
Less Interest on debt	Nil	20,000	36,000
Earnings available for equity shareholders	2,00,000	1,80,000	1,64,000
Ke	10%	11%	13%
Market value of Equity (s) $S = \text{EBIT} - I / k_e$	20,00,000	16,36,363	12,61,538
Market value of debt	Nil	4,00,000	6,00,000
Value of firm	20,00,000	20,36,363	18,61,538
Average cost of capital $\text{EBIT} / V * 100$	$200000 / 20,00,000 * 100$ 10%	$200000 / 20,36,363 * 100$ 9.8%	$200000 / 18,61,538 * 100$ 10.7%

Thus, it is clear that when debt is increased to Rs 4,00,000 then value of firm increases and overall cost of capital is reduced but when debt is increased to Rs 6,00,000 debentures, the value of firm decreases and overall cost of capital increases.



6.4.4 Net Operating Income (NOI) Approach

This approach was also suggested by Durand but it is opposite to Net Income approach. According to this approach, the value of the firm is independent of its capital structure. The change in capital structure does not cause change in the value of the firm, market price of shares and weighted average cost of capital. According to this approach, the market values the firm as a whole and it does not split the value of the firm into value of the equity and value of the debt. The overall cost of capital (K_o) is constant for all degrees of financial leverage. The value of the firm is ascertained as follows:

$$V = \text{EBIT} / K_o$$

Where V = Value of firm

EBIT = Earnings before interest and tax

K_o = Overall cost of capital

The value of equity is residual, which is calculated by deducting the value of debt (D) from the total value of the firm (V).

$$\text{Thus, total value of equity (S)} = V - D$$

When a company increases the proportion of debt in its capital structure, it increases the financial risk for equity shareholders. As a result of increase in the financial risk, the equity shareholders expect higher rate of return from the company to get compensated for higher risk. It means, it increases the cost of equity K_e . In this way, the benefit of using cheaper debt is neutralised by the implicit cost of equity, as a result of which overall cost of capital remains the same. The cost of equity or equity capitalisation rate is calculated as below:

$$\text{Cost of equity or Equity capitalisation rate (K}_e\text{)} = \text{EBIT} - I / S * 100$$

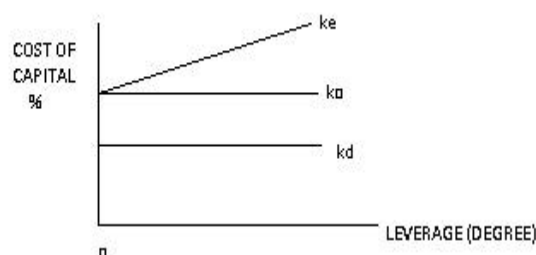
According to NOI approach, there is nothing like optimum capital structure as the total value of the firm and market price of shares are not affected by the level of financial leverage.

Assumptions: This approach is based on the following assumptions:

1. The overall cost of capital (K_o) remains constant for all degrees of financial leverage or debt-equity ratio.
2. There are no corporate taxes.
3. The investors value the firm as a whole and do not split the value of the firm into value of equity and value of debt.



4. The increase of proportion of debt in the capital structure results in an increase in the financial risk which causes an increase in the cost of equity (K_e).
5. The weighted average or overall cost of capital (K_o) remains constant.



The concept will be explained with the help of example:

Example: (a) A company expects a net income of Rs 1,00,000. It has Rs 5,00,000 6% Debentures. The overall capitalisation rate is 10%. Calculate the value of the firm and the equity capitalisation rate (cost of equity) according to the Net Operating Income Approach.

(b) If the debenture debt is increased to Rs 7,50,000. What will be the effect on the value of the firm and the equity capitalisation rate?

Solution: Net Operating Income = Rs 1,00,000

Overall Cost of Capital (K_o) = 10%

Market Value of the firm (V) = $EBIT / K_o = Rs\ 1,00,000 / .10 = Rs\ 10,00,000$

Value of equity (S) = $V - D = Rs\ 10,00,000 - Rs\ 5,00,000 = Rs\ 5,00,000$

Cost of equity (K_e) = $EBIT - I / S * 100 = Rs\ 70,000 / Rs\ 5,00,000 * 100 = 14\%$

b) Market Value of the firm (V) = $EBIT / K_o = Rs\ 1,00,000 / .10 = Rs\ 10,00,000$ (same as in (a))

Now $D = Rs\ 7,50,000$

So, Value of equity (S) = $V - D = Rs\ 10,00,000 - Rs\ 7,50,000 = Rs\ 2,50,000$

So, Cost of equity (K_e) = $EBIT - I / S * 100 = Rs\ 55,000 / Rs\ 2,50,000 * 100 = 22\%$

Thus, it is evident that value of firm remains constant, and cost of equity increases due to increase in degree of financial leverage.

6.4.5 Modigliani-Miller (MM) Approach

The Modigliani-Miller (MM) approach is also similar to the net Operating Income approach. However, the NOI approach does not provide operational justification for irrelevance of capital structure to the valuation of the firm, and it is of definitional nature while MM approach provides behavioural justification for constant cost of capital and value of the firm.



In other words, MM approach says that the weighted average cost of capital and hence, the total value of the firm does not change with the change in the capital structure. The behavioural justification in MM approach lies in the arbitrage process. Arbitrage means buying an asset in one market at lower price and selling the same in another market at higher price. This arbitrage process restores equilibrium in both the markets. Assumptions: The MM approach is based on the following assumptions:

1. The dividend pay-out ratio is 100%, that is, there are no retained earnings.
2. There are no corporate taxes.
3. The capital markets are perfect.
4. There are no transaction costs.
5. The investors are free to buy and sell the securities.
6. The investors can borrow without restrictions on the same terms as the firm can.
7. All investors have the same information without cost.
8. The investors are rational in behaviour.
9. All investors have the same expectation of a firm's net operating income (EBIT) and evaluate the firm on that basis.
10. All firms can be divided into equivalent or homogeneous risk class.

It means that the expected earnings have similar risk characteristics.

MM Model: without Corporate Taxes

Market Value of Firm (v) = $EBIT / K_e$

Market Value of equity (s) $S = V - B$

Firm's leveraged cost of equity = Cost of equity + (cost of equity – Cost of debt)

Example: The following information is available regarding A Ltd:

- (i) A Ltd currently has no debt, it is an all-equity company.
- (ii) Expected EBIT = Rs 48 lakhs. EBIT is not expected to increase overnight, so A Ltd is in no growth situation.
- (iii) There are no taxes, so $T = 0$ per cent.
- (iv) A Ltd pays out all its income as dividends.
- (v) If A Ltd begins to use debt, it can borrow at the rate $k_d = 8$ per cent. This borrowing rate is constant, and it is independent of the amount of debt. Any money raised by selling debt would be used to retire common stock, so A Ltd asset would remain constant.



(vi) The risk of A Ltd assets, and thus its EBIT, is such that its shareholders require a rate of return $k_e = 12$ per cent, if no debt is used.

Using MM Model without corporate taxes and assuming a debt of Rs 2 crore; you are required to.

- Determine the firm's total market value.
- Determine the firm's value of equity.
- Determine the firm's leverage cost of equity.

Solution: Firm's Total Value of Firm:

$$V = \text{EBIT}/K_e = \text{Rs } 48,00,000/.12 = \text{Rs } 4 \text{ crores}$$

$$\text{Firm's Market value of equity} = V - D = \text{Rs } 4 \text{ crore} - \text{Rs } 2 \text{ crore} = \text{Rs } 2 \text{ crores}$$

$$\begin{aligned} \text{Firm's leverage cost of equity} &= \text{cost of equity} + (\text{cost of equity} - \text{cost of debt}) \\ &= 12\% + (12\% - 8\%) = 16\% \end{aligned}$$

MM Model: When Corporate Taxes Exists

$$\text{Value of unlevered firm } V_u = \text{EBIT}/K_e (1 - t)$$

$$\text{Value of levered firm } V_L = V_u + tD$$

Where, EBIT = Earnings before interest and tax

S = Market Value of Equity

D = Debt

t = Tax rate

Example: There are two firms A and B which are identical except that does not use any debt in its financing, while B has Rs 2,00,000 5% Debentures in its financing. Both the firms have earnings before interest and tax of Rs 50,000 and the equity capitalisation rate is 10%.

Assuming the corporation tax of 50% calculate the value of the firm using M & M approach.

SOLUTION:

The market value of firm A which does not use any debt.

$$V_u = \text{EBIT} / K_o (1 - t)$$

$$= \text{Rs } 50,000/.10 (1 - .50) = \text{Rs } 2,50,000$$

The market value of firm B which uses Debt of Rs 2,00,000

$$\text{Value of levered firm} = V_u + tD$$

$$= \text{Rs } 2,50,000 + .5 * 2,00,000 = \text{Rs } 3,50,000.$$



IN-TEXT QUESTIONS

5. Net operating income is covered under:
(a) theory of irrelevance (c) Both a and b
(b) theory of irrelevance (d) None of the above
6. Value of firm will remain constant whether project is financed from debt or equity is stated under which theory
(a) Net Income approach (c) Traditional approach
(b) Net operating income approach (d) All the above
7. In case of Net Income approach, what will be the impact of increase in debt on overall cost of capital?
(a) Increase (c) No impact
(b) Decrease
8. In case of Net operating Income approach, what will be the impact of increase in debt on value of firm?
(a) Increase (c) No impact
(b) Decrease
9. In case of Net operating Income approach, what will be the impact of increase in debt on overall cost of capital?
(a) Increase (c) No impact
(b) Decrease
10. Under Net operating income approach what will be the value of firm if K_o is 12% and Net operating income is 2,40,000 and debt is Rs 5,00,000:
(a) 15,00,000 (c) 25,00,000
(b) 20,00,000 (d) 22,50,000



6.5 CHECK LIST FOR OPTIMAL CAPITAL STRUCTURE

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

- There should be maximum utilisation of leverage.
- Capital structure should be flexible so that it can be easily altered as per the requirement.
- To avoid undue financial/business risk with the increase of debt.
- Use of debt should be within capacity of firm. It should be in position to meet its loan and interest liabilities.
- There should be minimum loss of control risk.
- It should avoid undue restrictions on usage of debt.
- It should be simple and easy to understand and operate.
- It should minimise the cost of financing and maximising earning per share.

6.6 FINANCIAL DISTRESS AND CAPITAL STRUCTURE (BANKRUPTCY AND AGENCY COSTS)

When firm uses more and more debt of leverage in its capital structure the financial risks of firm increases then it will be difficult for firm to pay the fixed interest liability to the lenders and may force the firm to liquidate then firm may run into the costs of financial distress and bankruptcy, the firm which are less levered and use more of equity may not have to face bankruptcy costs because they not have to pay dividends to shareholders in case of insufficient profits. Bankruptcy costs includes the direct costs of litigation and managing the firm in liquidation. It is fact that due to the use of leverage the firm enjoys the tax benefits, but the bankruptcy costs work against its advantage. Thus, firm must do cost benefit analysis for optimal capital structure decisions.

Further when firm raises debt the lenders of debt put unjustified restrictions in loan utilisation agreement which leads to lesser independence of management in decision making called as agency costs. With the increase of debt proportion in capital structure of firm lenders put on more and more restrictions/conditions on firm even charging higher rate of interest. Thus, highly levered firm must bear more agency costs than unlevered firm.



IN-TEXT QUESTIONS

11. For optimum capital structure the level of leverage should be:

- (a) Minimum
- (b) Maximum
- (c) average

12. Bankruptcy cost will be high in case of

- (a) High levered firm
- (b) less levered firm
- (c) both a and b
- (d) none of the above

6.7 SUMMARY

Capital Structure is referred to as the ratio of different kinds of securities equity shares, preference shares and long-term borrowings raised by a firm as long-term finance. The capital structure involves two decisions-

A firm which uses more debt to increase the value of firm is known as highly levered firm.

A firm which uses less debt in capital structure is known as less levered firm.

The use of more debt to increase earnings per share is also known as trading on equity or financial leverage.

Further there are many factors which impact the capital structure decision are as follows:

costs of capital; Degree of Control; Trading on Equity; Government Policies; Stability of sales; sizes of a company; flexibility of financial plan; Choice of investors; Capital market condition; Period of financing.

Further theory of capital structure divide in two parts:

Theory of relevance: which says the value of firm will be increase with increase in debt in total capitalisation which is further classified into two categories i.e., Net income approach and traditional approach.



Theory of irrelevance: which says the value of firm will be increase with increase in debt in total capitalisation which is further classified into two categories i.e., Net operating income approach and MM approach.

Every firm has objective to achieve the target of optimal capital mix and taking into consideration factors as usage of leverage, flexibility, helpful in reducing overall cost of capital, with in capacity limit of firm, should have minimum loss of control and should be easy to use.

Bankruptcy and agency costs: A company using high amount of debt in its capital proportion have to face sometimes bankruptcy and agency costs as compared to unlevered firm because company have to pay interests even in case of insufficient profits and sometimes lender charging higher rate of interests as well as undue restrictions on usage of loan amount which is known as agency costs.

6.9 GLOSSARY

Capital Structure: It is proportion of equity capital and debt in total capital of firm.

Levered firm: Firm which uses debt in its capital structure is said levered firm.

Unlevered firm: Firm which uses debt in its capital structure is said levered firm.

6.10 ANSWERS TO INTEXT QUESTIONS

1. d	7.b
2. d	8. c
3. a	9. c
4. a	10. b
5. b	11. b
6. b	12.a

6.11 SELF-ASSESSMENT QUESTIONS

1. What is meant by capital structure? Discuss the factors affecting capital structure.



2. What is an optimum capital structure? Bring out the qualities of an optimum capital structure.
3. Write short notes on the following:
 - (i) Significance of Capital Structure
 - (ii) Trading on Equity
 - (iii) Optimum Capital Structure
 - (iv) Debt Capacity
4. What do you mean by flexible capital structure? Is a flexible capital structure more costly?
5.
 - (i) Is debt a cheaper source than equity share capital? If so, why?
 - (ii) How do the considerations of control and size affect the capital structure decision
6. Explain Net Operating Income (NOI) Approach to capital structure. How is it different from (NI) Approach?
7. Briefly discuss the MM Approach to capital structure. What are the limitations of this approach?
8. What is Optimum Capital Structure? Explain fully Traditional Approach to Capital Structure.
9. Two companies M and N are identical. The financial detail of both the companies are given as below:

Particulars	Company M	Company N
Total Assets	60,00,000	60,00,000
EBIT	20%	20%
10% debenture	36,00,000	
Equity capital	44,00,000	60,00,000
Capitalisation rate	15%	15%



Compute the value of M and N using (i) Net Income Approach (ii) Net operating income approach. [Ans. (i) M Ltd. 64,00,000 N Ltd. 40,00,000 (ii) M Ltd 58,00,000 N Ltd. 40,00,000]

10. The firms A and B are identical all respects including risk factors except for Debt Equity Mix. Firm A as issued 12% debentures of Rs 15 lakhs, while B has issued only equity. Both the firms earn 30% before interest and taxes on their total assets of Rs 25 lakhs. Assuming a tax rate of 50% and capitalisation rate of 20% for an all-equity company, you are required to compute the value of two firms, using.

(i) Net Income Approach (ii) New Operating Income Approach.

[Ans. (i) Firm A Rs. 29,25,000; Firm B Rs.18,75,000 (ii) Firm A Rs.25,25,000; Firm B Rs.18,75,000]

11. 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 firm and overall capitalisation rate according to the net income Approach (ignore income tax)

[Ans. Value of firm Rs. 8,40,000; Overall capitalisation rate 9.51%]

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LESSON 7

LEVERAGE AND EBIT-EPS ANALYSIS

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STRUCTURE

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1.1 LEARNING OBJECTIVES

- Understand the concept of leverage
- Learn different types of leverage and study the relationship between them
- Study the relationship between sales and profit
- Understanding the concept of EBIT-EPS analysis



7.2 INTRODUCTION

Financial management has become a fascinating and engaging field of study for both academic researchers and professional financial managers. All decisions made by an individual or a corporation that have financial repercussions fall under the category of financial management. The basic idea of finance is that it deals with the study of money and its flow.

It is the key role of a finance manager of any company. So before moving on to the concept of leverage, one must understand what are the key areas a finance manager must focus on. A finance manager must ensure that all decisions about the raising and use of resources are made effectively and that no resources are left unused. His role and responsibilities become more significant as the organization gets bigger and there are more financial transactions.

According to modern approach, the three key decisions for which a finance manager is responsible are:

- Where does the firm invest its money – Long-term assets or short term current asset? (Investment Decision)
- What will the sources of funds, i.e., how, and where to acquire funds to meet the investment requirement of a firm – Debt or Equity (Financing Decision)
- Whether distribute all its profit to shareholders or to reinvest in the company? (Dividend Decision)

This chapter focuses on two major techniques (Leverage Analysis and EBIT-EPS Analysis) that helps the finance manager to make an informed financial decisions making regarding when, where and how a corporation should acquire funds. Since a company typically benefits the greatest when the market value of its share increases, which not only signals the firm's growth but also increases investor wealth. The important factors which a finance manager needs to take into consideration while designing a optimal capital structure are cost, risk, liquidity, control and condition of the market.

Thus, finance manager role is not limited to budgeting. He must plan, arrange, manage, and control financial activities to help the company meet its financial goals. Finance Managers are extremely concerned with the risk and return for shareholders as it relates to the organization's debt-equity balance. If the borrowed funds exceed the funds provided by the owners, the earnings of the shareholders increase and raises the organization's risk at the same time. The return and risk to the shareholders will be very low in a case where the



proportion of equity funds exceeds the proportion of borrowed money. This emphasises the need of having an ideal capital structure where risk and shareholder return are balanced. Finance managers can make informed decisions about their short-term and long-term goals by carefully considering the impact of capital structure, where risk and shareholder return are balanced. Thus, the use of leverage and EBIT-EPS analysis aids in putting the overall situation into proper perspective.

Thus, planning, arranging, managing, and controlling financial activities, such as the acquisition and use of an organization's funds, is known as financial management. It entails applying general management ideas to the company's financial resources.

The concept of leverage comes under the financing decision being taken by the financial manager. The financing decision focuses on various sources of finance in the enterprise, i.e., shareholder's funds or borrowed funds. It focuses majorly on -

- c. How much fund is needed? and
- d. How to decide the sources of funds and choose the best combination to raise the required funds?

7.3 CONCEPT OF LEVERAGE

The term “leverage” refers to a company’s capacity to increase the return to its owners by utilising fixed-cost resources or finances. Leverage is the use of fixed assets or funds for which a company must pay fixed charges or a fixed rate of interest (fixed financial obligations), regardless of the volume of operations or the volume of operating profit.

Fixed operating costs result from the usage of fixed assets by a company and fixed financial costs incurs when it uses sources of capital structure for which it must pay fixed cost. The risk and expected return are higher the more leverage there is, and vice versa. Given that a fixed cost or return has a major impact on the profits available to equity shareholders, leverage can either be favourable or unfavourable.

The proportionate relationship between debt and equity is referred to as the capital structure. While liabilities plus equity on the balance sheet's left side show a company's financial structure. The techniques which are commonly used to quantify the risk-return characteristics between alternative capital structures (long-term sources only) are leverage and EBIT-EPS Analysis.



Leverage means the relationship between any two interrelated variables. Algebraically, the formula for leverage is-

$$\text{Leverage} = \% \text{ Change in Dependent Variable} / \% \text{ Change in Independent Variable}$$

It reflects the degree of responsiveness in the dependent variable to a change independent variable.

Example 1- A firm increased its advertising expenses from Rs. 50,000 to Rs. 60,000 which resulted in the increase of sales of T.V. from 1000 units to 1500 units. Thus, the leverage will be-

$$\begin{aligned}\text{Leverage} &= \% \text{ Change in unit sold} / \% \text{ Change in Advertising Expenses} \\ &= 50/20 = 2.5\end{aligned}$$

This means that the percentage change in the number of units sold is 2.5 times the percentage change in advertising.

7.4 RELATIONS BETWEEN SALES AND PROFIT

A company's sales income directly affects its operating profit, which in turn determines how much profit is made accessible to equity owners. Operating profits (EBIT) can be used to determine the functional relationship between sales revenue and EPS as follows:

Sales Revenue	EBIT
(Variable Cost)	(Interest)
Contribution	PBT
(Fixed Cost)	(Tax)
EBIT	PAT

The left side of the table demonstrates how the level of EBIT is influenced by the level of sales revenue, and the right side demonstrates how the level of profit after taxes, or EPS, is influenced by the level of EBIT.



7.5 OEPRATING LEVERAGE

Operating Leverage focuses on a fixed component of the cost. The operating leverage quantifies how closely sales revenue and profitability are related. It gauges the impact of shifting sales revenue levels on EBIT levels. To determine operating leverage, the percentage change in EBIT is divided by the percentage change in sales revenue.

$$\text{Operating Leverage} = \% \text{ Change in EBIT} / \% \text{ Change in Sales Revenue}$$

Example 2- The following are the details of the sale done by Mr. Arun Traders-

Particulars	Scenario 1	Scenario 2
Sales (Units)	5000	6000
Selling Price (SP)	10	10
Sales Revenue (Sales * SP)	50000	60000
Variable Cost (VC)	7	7
Total Profit (EBIT) (Sales* (SP-VC))	15000	18000

Thus, from the above details operating leverage can be calculated as-

$$\text{Operating Leverage} = \% \text{ Change in EBIT} / \% \text{ Change in Sales Revenue}$$

$$= \text{Increase in EBIT/EBIT} / \text{Increase in Sales Revenue/Sales Revenue}$$

$$= 3000/15000 / 10000/50000 = 1$$

When the Operational Leverage is 1, it means that the EBIT level is in direct relation to the total amount of sales. This is because the entire cost is variable (no fixed costs) in the structure. Whenever the percentage change in EBIT is more than the percentage change in sales then OL will be greater than 1 and vice-versa. The existence of a fixed element in the firm's cost structure leads to the emergence of the OL. Thus, the firm's position or capacity to increase the impact of a change in sales above the level of EBIT is described as the OL.

Degree of Operating Leverage (DOL)

The degree of operating leverage is the relationship between a percentage change in the profits resulting from a percentage change in sales.

$$\text{Degree of Operating Leverage} = \text{Contribution} / \text{EBIT}$$



The DOL would be higher if fixed costs were higher relative to variable costs. At any given sales volume, the DOL may also be measured as a percentage of the contribution to the EBIT.

The following aspects can be inferred from the above discussion-

- The OL is the percentage change in EBIT caused by a 1% change in sales. Fixed cost in the cost structure is the primary reason for OL to occur. Without fixed cost, there will not be OL. The percentage change in EBIT will be equal to the percentage change in sales.
- A positive DOL indicates that the company is functioning over the break-even point and that both the EBIT and sales will fluctuate in the same manner.
- A negative DOL indicates that the company is operating below the break-even point, which will result in a negative EBIT.

Significance and Application of Operating Leverage

A firm's risk often increases with the amount of operating leverage. When operating leverage is significant, a little increase in sales will lead to a larger increase in EBIT and vice-versa. Thus, the presence of substantial operating leverage indicates a high-risk circumstance. The company can safeguard itself from the risks of operating leverage and the ensuing operating risk by operating sufficiently above the break-even point. Operating leverage approaches its maximum near break-even point. In making capital budgeting decisions also operating leverage is very crucial. Capital budgeting was the initial application for which this idea was developed. By considering the quantity of fixed-cost investment and its potential implications, long-term profit planning is also achieved.

7.6 FINANCIAL LEVERAGE

The Financial Leverage (FL) gauges how closely EBIT and EPS are related and represents how changes in EBIT affect EPS levels. The FL is calculated as the percentage change in EPS divided by the percentage change in EBIT. It evaluates how sensitive EPS is to a change in EBIT.

$$\text{Financial Leverage} = \% \text{ change in EPS} / \% \text{ change in EBIT}$$

$$= \text{Increase in EPS} / \text{Increase in EBIT}$$



Example 2- The following are the details of the profit earned by Mr. Arun Traders-

Particulars	Scenario 1	Scenario 2
EBIT	5000	6000
Interest & Tax	0	0
Equity Share Capital	100000	100000
No. of Shares	1000	1000
EPS – (PAT/No. of shares)	5000/1000 = 5	6000/1000 = 6

Thus, from the above details financial leverage can be calculated as-

$$\begin{aligned}
 \text{Financial Leverage} &= \% \text{ Change in EPS} / \% \text{ Change in EBIT} \\
 &= \text{Increase in EPS} / \text{Increase in EBIT} \\
 &= 1/5 / 1000/5000 = 1
 \end{aligned}$$

As a result, the FL may be described as an increase in EPS of a certain percentage that corresponds to an equal increase in EBIT. The company's increase in EPS may be greater than proportionate to the level increase in EBIT. In other words, an increase or decrease in EBIT has a greater impact on EPS levels. This magnifying effect is made possible by fixed finance charges.

Degree of Financial Leverage (DFL)

The degree of financial leverage is the relationship between a percentage change in the EPS resulting from a percentage change in the profit.

$$\text{Degree of Financial Leverage} = \text{EBIT} / \text{PBT (EBIT- Financial Charge)}$$

The DFL is majorly affected by the fixed financial charge. At any given profit volume, the DFL may also be measured as a percentage of EBIT to the PBT.

The following aspects can be inferred from the above discussion-

- Financial leverage can be stated as a relationship between a change in EBIT results in a change in EPS. Fixed financial costs (in the form of interest and dividends on preferred stock) cause the FL to emerge. There will not be an FL if there is no definite



financial liability i.e., the percentage change in EPS and EBIT will be the same percentage and FL will be 1.

- A positive FL indicates that the company is running at an EBIT level over the financial break-even threshold and that both EPS and EBIT will fluctuate in the same direction as EBIT.
- A negative FL indicates that the company is running below the point at which it will break even financially and result in a negative EPS.

Significance and Application of Financial Leverage

Planning for the capital structure and planning for profits both benefit from financial leverage. The use of financial leverage assists the company's financial managers in determining the capital structure. Financial risk and fixed cost are both elevated by significant financial leverage. A rise in fixed expenses could drive the business into liquidation. A small rise in EBIT will result in a larger increase in EPS when financial leverage is high. Yet, even a minor decrease in EBIT will result in a big loss in EPS, or it could disappear. Thus, the presence of significant financial leverage denotes a high-risk situation. The corporation can protect itself from the risks of financial leverage and the resulting financial risk by operating sufficiently above the financial break-even point.

7.7 COMBINED LEVERAGE

The Combined Leverage (CL) is a result of the OL and the FL, not a separate sort of leverage analysis. The CL may be defined as the percentage change in EPS for a specific percentage change in the amount of sales revenue.

Combined Leverage = OL X FL = % Change in EPS / % Change in Sales

Both operating and financial leverage magnifies the returns and collectively affects income. The ability of the company to cover its fixed costs (both operating and financial) is a key factor in both leverages. If both leverages are used, the outcome will reveal the impact of shifting sales relative to shifting taxable earnings.

The following aspects can be inferred from the above discussion-

- The change in EPS as a result of a change in sales level is known as the combined leverage.



- A positive CL indicates that both the EPS and sales will fluctuate in the same direction and that the leverage is being calculated for a sales level higher than the break-even level.
- A negative CL indicates that EPS will be negative and that the leverage is being computed at sales levels that are below the financial break-even level.

SOLVED**Illustration 1**

From the following data available for two companies, compute DOL, DFL and DCL and comment on the relative risks of the firm.

<u>Particulars</u>	<u>Priya Ltd.</u>	<u>Supriya Ltd.</u>
Sales	5,00,000	4,00,000
Variable Cost	30% of sales	30% of sales
Fixed Cost	30,000	40,000
Interest	1,50,000	1,00,000

Particulars	Priya Ltd.	Supriya Ltd.
Sales	5,00,000	4,00,000
(Variable Cost)	(150000)	(120000)
Contribution	3,50,000	2,80,000
(Fixed Cost)	(30,000)	(40,000)
EBIT	3,20,000	2,40,000
(Interest)	(1,50,000)	(1,00,000)
EBT	1,70,000	1,40,000
DOL = Contribution/ EBIT	1.09	1.17
DFL = EBIT/ EBT	1.88	1.71
DCL= DOL X DFL	2.06	2

The operating leverage is higher in Supriya Ltd. as compare to Priya Ltd, therefore operating risk of Supriya Ltd. is higher than Priya Ltd.



The financial leverage is higher in Priya Ltd. as compare to Supriya Ltd, therefore financial risk of Priya Ltd. is higher than Supriya Ltd.

The total risk measured by the degree of combined leverage is higher in Priya Ltd. as compare to Supriya Ltd, therefore total of Priya Ltd. is higher than Supriya Ltd.

Illustration 2 The following data is available for Rimjhim Ltd.

Particulars	Rs.
Sales	10,00,000
Variable Cost	4,00,000
Fixed Cost	1,80,000
Debt	5,00,000
Interest on Debt	10%
Equity Capital	5,50,000

Calculate ROI, Operating, Financial and Combined Leverage. Also ascertain the level at which EBIT is zero.

Solution -

1. **ROI –**

$$\begin{aligned}\text{EBIT} &= \text{Sales} - \text{VC} - \text{FC} = 10,00,000 - 4,00,000 - 1,80,000 \\ &= 4,20,000\end{aligned}$$

$$\text{ROI} = \text{EBIT} / \text{Total Capital} = 4,20,000 / 10,50,000 = 0.4 \text{ (40\%)}$$

2. **DOL = Contribution/EBIT**

$$= 6,00,000 / 4,20,000 = 1.43$$

3. **DFL = EBIT/EBT**

$$= 4,20,000 / 3,70,000 = 1.14$$

4. **DCL = OL X FL = 1.43 X 1.14 = 1.62**

5. **Sales Level when EBIT will be 0**

$$\begin{aligned}\text{P/V ratio} &= \text{Contribution} / \text{Total Sales} * 100 \\ &= 6,00,000 / 10,00,000 * 100 = 60\%\end{aligned}$$

$$\text{Fixed Cost} = 1,80,000 + 50,000 = 2,30,000$$



$$\begin{aligned}\text{BEP} &= \text{FC} / \text{P/V Ratio} = 2,30,000/60\% \\ &= 3,83,333\end{aligned}$$

Illustration 3 Using the data below, prepare the income statement and find EPS of Anish Ltd.-

Variable Cost as a %age of sales- 50%

Interest expense- Rs 4,00,000

DOL- 5

DFL- 3

Income Tax rate- 50%

No. of Equity Shares- 5000

Solution-

Income Statement	
Particulars	Amount
Sales	30,00,000
(VC)	(15,00,000)
Contribution	15,00,000
(FC)	(9,00,000)
EBIT	6,00,000
(Interest)	(4,00,000)
EBT	2,00,000
(Tax)	(1,00,000)
EAT	1,00,000
Equity Shares	5000
EPS	20

Working Notes-

1. $\text{DFL} = \text{EBIT} / (\text{EBIT} - \text{Interest})$

3 = $\text{EBIT} / (\text{EBIT} - 4,00,000)$

3 EBIT- 12,00,000 = EBIT

$\text{EBIT} = 12,00,000/2 = \text{Rs } 6,00,000$



2. $DOL = (Sales - VC) / EBIT$
 $5 = (S - 0.2 S) / 6,00,000$
 $(S - 0.5 S) = 30,00,000$
3. $VC = 0.5 \times Sales = 0.5 \times 30,00,000 = 15,00,000$
4. $FC = Sales - VC - EBIT$
 $= 30,00,000 - 15,00,000 - 6,00,000 = 9,00,000$

Illustration 4 Calculate different types of leverages from the information given below-

Sales = 10,000

VC – 50% of Sales

EBIT = 3,000

EBT = 1,500

Tax Rate – 50%

Calculate %age change in EPS if sales increased by 10%.

Solution-

Particulars	Amount
Sales	10,000
(VC)	5,000
Contribution	5,000
(FC)	2,000
EBIT	3,000
(Interest)	1,500
EBT	1,500
(Tax)	750
EAT	750

1. $DOL = Contribution / EBIT = 1.67$
2. $DFL = EBIT / EBT = 2$
3. $DCL = DOL \times DFL = 3.33$
4. $DCL = \% \text{ age change in EPS} / \% \text{ age change in Sales}$



$$3.33 = \% \text{ age change in EPS} / 10\%$$

$$\begin{aligned} \% \text{age change in EPS} &= 3.33 \times 10\% \\ &= 33.3\% \end{aligned}$$

7.8 EBIT-EPS ANALYSIS

EBIT-EPS research examines how various financing structures or financial leverage affect the amount of profit available to shareholders. EBIT-EPS Analysis is used to research the impact of leverage. It entails contrasting alternate finance ideas under various alternative financing strategies. To finance its investment activities, a company might choose from different capital structures. The companies can choose to be an all-equity firm, an equity-preference firm, or any of the various other combinations of stock, preference shares, and borrowed cash. Yet, for all of these scenarios, the amount of sales revenue and the level of EBIT are meaningless because the financing scheme does not affect on either. In actuality, the EBIT level and sales are impacted by investment decisions. Given a level of EBIT, a certain mix of financing will result in a specific EPS, therefore there will be different EPS for various financing patterns.

A business may choose from the following options to raise capital:

- All Equity
- All Debt
- A combination of Debt, and Equity
- A Combination of Debt, Equity and Preference share

Example 3- To start a project, a corporation is considering raising an additional Rs. 10,00,000 in funding. The project is expected to generate an EBIT of Rs. 3,00,000. There are the following alternate strategies available:

1. To raise Rs. 10,00,000 via equity shares worth Rs. 100 each.
2. To raise Rs. 3,00,000 through equity and the remaining 7000, 10% Preference shares priced at Rs 100.
3. To raise Rs. 5,00,000 via equity shares and Rs. 5,00,000 via 10% Debentures



4. To raise Rs 3,00,000 through equity shares, Rs 3,00,000 through 10% Debentures, and Rs 4,00,000 through 10% preference shares.

What alternative is better given that the corporation is in the 50% tax bracket?

	Option 1	Option 2	Option 3	Option 4
Equity Share Capital	10,00,000	3,00,000	5,00,000	3,00,000
10% Pref. Share Capital	-	7,00,000	-	4,00,000
10% Debentures	-	-	5,00,000	3,00,000
Total Funds	10,00,000	10,00,000	10,00,000	10,00,000
EBIT	3,00,000	3,00,000	3,00,000	3,00,000
(Interest)	-	-	(50000)	(30000)
PBT	3,00,000	3,00,000	2,50,000	2,70,000
(Tax)- 50%	(150000)	(150000)	(125000)	(135000)
PAT	1,50,000	1,50,000	1,25,000	1,35,000
(Preference Dividend)	-	(70000)	-	(40000)
Profit for Equity Shareholders	1,50,000	80,000	1,25,000	95,000
Equity Shares	10000	3000	5000	3000
EPS	15	22.67	25	31.67

In this instance, the financial plan associated with option 4 appears to be the greatest because it produces the highest EPS of 31.67. The company has used all available financial leverage in this proposal. On a total investment of Rs. 10,00,000, the company anticipates making an EBIT of Rs. 3,00,000, which will result in a 30% profit. This return is 15% after taxes, or 30% multiplied by (1-.5). However, the cost of 10% debentures after taxes is 5%, or 10% (1-.5), while the cost of preference shares after taxes is just 10%. The company has used 30% debt, 40% preference shares, and 30% equity share capital in option 4, and the benefits of using 30% debt (which has an after-tax cost of only 5%) and 40% is invested in preference shares, which only cost 10%. As a result, the company projects an EPS of Rs. 31.67.

If the company decides to use just equity funding, the EPS will be Rs. 15, which is exactly equal to the return on investment after taxes. Nevertheless, in option 2, where 70% of the funds are raised by issuing 12% preference shares, the additional 7.6% is made available to equity shareholders, increasing EPS from Rs. 15 to Rs. 22.67. The extra advantage flowing to equity shareholders increases further in Option 3 (where 10% debt is also introduced), and the EPS further rises to Rs. 25. Since the after-tax cost of preference shares and debentures is lower than the after-tax return on total investment, the company anticipates an improvement in EPS as more and more debt and preference share funding is accessed.



As a result, the financial leverage only benefits EPS if the ROI exceeds the cost of debt. If the ROI is lower than the cost of debt, it will more likely have a negative impact. Because of this Financial leverage is also known as a *"twin-edged sword"*. The below mentioned example will explain how EBIT will vary in different economic condition and will explain how high debt financing can be suicidal for the firm. Thus, finance manager needs to strike off a balance and reach to optimal capital structure.

Varying EBIT with different patterns-

Suppose there are three firms Anita Ltd., Binita Ltd. and Vinita Ltd. Except for leverage, these companies are identical in every way. The following is a presentation of the financial positions of the three companies:

Capital Structure	Anita Ltd.	Binita Ltd.	Vinita Ltd.
Equity Share Capital (Rs. 100 each)	10,00,000	5,00,000	2,50,000
8% Debentures	-	5,00,000	7,50,000
Total Capital	10,00,000	10,00,000	10,00,000

Depending on the state of the economy, these companies are anticipated to generate a ROI at various levels. The ROI is anticipated to be 10% under typical circumstances, but it may vary by 3% on either side depending on whether the economy is doing well or poorly.

The following presentations are pertinent and have been shown:

	Poor	Normal	Good
Total Assets	10,00,000	10,00,000	10,00,000
ROI	7%	10%	13%
EBIT	70000	100000	130000

Anita Ltd. (0% Leverage)			
Particulars	Poor	Normal	Good
EBIT	70,000	1,00,000	1,30,000
(Interest)	-	-	-
PBT	70,000	1,00,000	1,30,000
(Tax @ 50%)	(35,000)	(50,000)	(65,000)
PAT	35,000	50,000	65,000
Equity Shares	10,000	10,000	10,000
EPS	3.5	5	6.5



Binita Ltd. (50% Leverage)			
Particulars	Poor	Normal	Good
EBIT	70,000	1,00,000	1,30,000
(Interest)	(40,000)	(40,000)	(40,000)
PBT	30,000	60,000	90,000
(Tax @ 50%)	(15,000)	(30,000)	(45,000)
PAT	15,000	30,000	45,000
Equity Shares	5,000	5,000	5,000
EPS	3	6	9

Vinita Ltd. (75% Leverage)			
Particulars	Poor	Normal	Good
EBIT	70,000	1,00,000	1,30,000
(Interest)	(60,000)	(60,000)	(60,000)
PBT	10,000	40,000	70,000
(Tax @ 50%)	(5,000)	(20,000)	(35,000)
PAT	5,000	20,000	35,000
Equity Shares	2,500	2,500	2,500
EPS	2	8	14

The impact of financial leverage on shareholder returns under different EBIT levels can be examined based on the numbers mentioned above. For this reason, the EPS of various companies in normal economic conditions, which is 10%, may both be taken at 100, and position of other EBIT and EPS numbers may be shown on a relative basis as follows:

	Poor	Normal	Good
EBIT	70	100	130
Anita Ltd. (0% Leverage)			
EPS	70	100	130
%age from Normal	-30%	-	+30%
Binita Ltd. (50% Leverage)			
EPS	50	100	150
%age from Normal	-50%	-	+50%
Vinita Ltd. (75% Leverage)			
EPS	25	100	175
%age from Normal	-75%	-	+75%



The above data clearly shows that the EBIT level increases by 30% (or from 10% to 13%) when economic conditions shift from normal to good. Due to the lack of leverage at the company Anita Ltd., its EBIT cannot be amplified, resulting in a 30% increase in EPS for the year. Nonetheless, the company Binita Ltd. (with 50% leverage) was able to improve Earnings (from Rs. 6 to Rs. 9). Similarly, Vinita Ltd. was able to boost EPS by 75% while using leverage of 75%. (From Rs. 8 to Rs. 14). So, the leverage has a magnifying effect on the EPS when the economy improves.

On the other side, the situation is simply reversed if the economy worsens and the EBIT level drops by 30% (from 10% ROI to 7% ROI). In this instance, Anita Ltd. EPS only decreases by 30% (from Rs. 5 to Rs. 3.5), whereas Binita Ltd. EPS (with 50% leverage) decreases by 50%. (From Rs. 6 to Rs. 3). The decline is more extreme as EPS drops by 75% in the case of Z & Co. (from Rs. 8 to Rs. 2). So, the magnifying effect on the EPS when economic conditions decline is greater when leverage is high. Thus, because of this financial leverage is called a 'double-edged sword'

Financial Break-even Level

A company's EBIT level is said to be at a financial break-even point if it is enough to pay the fixed financial costs. The following formula can be used to determine EBIT's financial break-even point:

The financial break-even EBIT level if the company invests only in debt (and not preferred shares) is:

$$\text{Financial Break-even Level EBIT} = \text{Interest Charge}$$

The firm's financial breakeven EBIT will be decided by both the interest charge and the fixed preference dividend if the firm has invested in both debt and preference share capital. It should be emphasized that while the financial break-even point is before taxes, the preference dividend is only due from profit after taxes. In such a case, the financial break-even point is as follows-

$$\text{Financial Break-even Level EBIT} = \text{Interest Charge} + \text{Preference Dividend} / (1-t)$$

Indifference Point/Level

An EBIT level is said to be indifferent when the EPS stays constant regardless of the debt-to-equity ratio. A company may assess the impact of various financial strategies on the level of EPS for a specific level of EBIT while constructing a capital structure. The company may



have two or more financial strategies that provide the same EPS for a specific EBIT is regarded as an indifference level of EBIT. The indifference point analysis makes use of the financial break-even point and the return from different capital arrangements.

The after-tax cost of debt is just equal to the ROI at the EBIT indifference level. The company would not care whether the money is raised by the issue of debt securities or by the issue of stock.

Suppose if we **continue with Example 3** and assume that we have an existing share capital of Rs. 5,00,000 and we must raise an additional Rs 10,00,000. In option 1, we have issued all equity shares while in Option 2, debt is issued.

	Option 1	Option 2
Equity Share Capital (Existing)	5,00,000	5,00,000
Equity Share Capital (New)	10,00,000	-
10% Debentures	-	10,00,000
Total Funds	15,00,000	15,00,000
EBIT	1,50,000	1,50,000
(Interest)		(100000)
PBT	1,50,000	50,000
(Tax)- 50%	(75000)	(25000)
Profit for Equity Shareholders	75,000	25,000
Equity Shares	15000	5000
EPS	5	5

So, regardless of whether the additional funds are raised by the issuing of equity share capital or by the issue of 10% debt, the EPS is anticipated to be Rs. 5 at the EBIT level of Rs. 1,50,000. This EBIT level of Rs. 1,50,000 is known as the indifference level of EBIT.

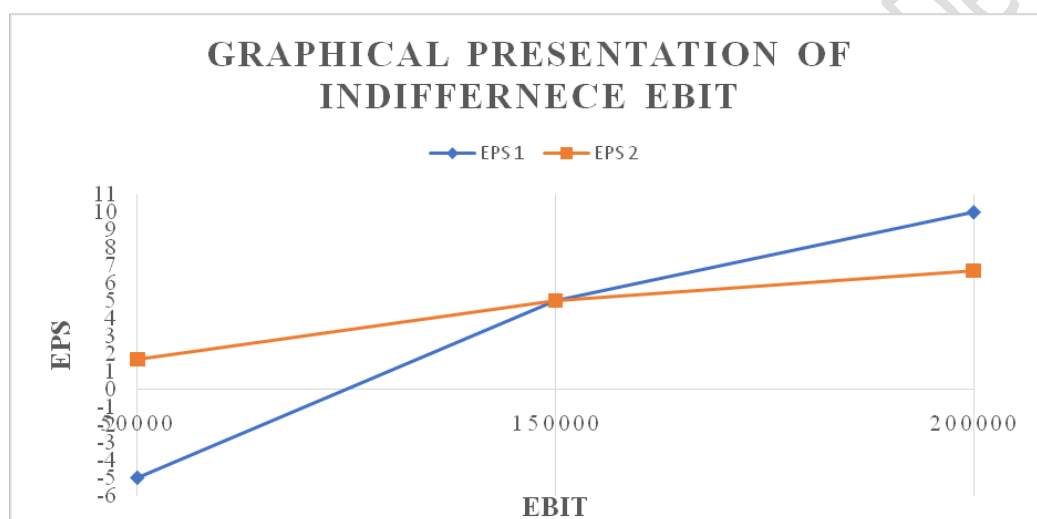
The following table shows the EPS for both financial plans if the company expects EBIT of Rs. 50,000 or Rs. 2,00,000

	Option 1		Option 2	
Equity Share Capital (Existing)	5,00,000	5,00,000	5,00,000	5,00,000
Equity Share Capital (New)	10,00,000	10,00,000	-	-
10% Debentures	-	-	10,00,000	10,00,000
Total Funds	15,00,000	15,00,000	15,00,000	15,00,000
EBIT	50,000	2,00,000	50,000	2,00,000
(Interest)	-	-	(100000)	(100000)



PBT	50,000	2,00,000	(50,000)	1,00,000
(Tax)- 50%	25000	100000	(25000)	(50000)
Profit for Equity Shareholders	25,000	1,00,000	(25,000)	50,000
Equity Shares	15000	15000	5000	5000
EPS	1.67	6.67	-5	10

Graphically the data can be plotted as follows-



According to the data and graph, the EPS for a leveraged option (i.e., debt financing) is lower at Rs. (5) than the EPS for an unlevered option, which is Rs. 1.67, for an EBIT level below the indifference level of Rs. 1,50,000. But, in the case of a levered option, the EPS is greater at Rs. 10 compared to Rs. 6.67 in the case of an unlevered option if the EBIT is higher than the indifference level.

From the perspective of the equity shareholders, if the company expects to generate precisely the same amount of EBIT at the point where the EBIT-EPS lines cross, it would not care which capital structure it chose because the EPS would be the same under either scenario.

Indifference level of EBIT may be ascertained graphically or algebraically. The formula for different scenarios is as follows-

1. The indifference level for an All-equity plan and Debt-Equity plan will be arrived as follows-

$$\text{EBIT} (1-t) / N_1 = (\text{EBIT} - \text{Interest} (1-t)) / N_2$$



2. The indifference level for an Debt-Equity plan and Debt-Equity plan will be arrived as follows-

$$(\text{EBIT} - \text{Interest} (1-t)) / N_1 = (\text{EBIT} - \text{Interest} (1-t)) / N_2$$

3. The indifference level for an All-equity plan and Equity-Preference plan will be arrived as follows-

$$\text{EBIT} (1-t) / N_1 = \text{EBIT} - \text{Interest} (1-t) - \text{PD} / N_2$$

4. The indifference level for an All-equity plan and Equity-Preference-Debt plan will be arrived as follows-

$$\text{EBIT} (1-t) / N_1 = (\text{EBIT} - \text{Interest} (1-t) - \text{PD}) / N_2$$

The value of EBIT in the above equations is indifference level of EBIT and the EPS under the two financial plans will be same.

Shortcomings of EBIT/EPS Analysis

EBIT-EPS aids in making a better financial strategy. However, it might come with two issues, specifically:

1. There won't be an EBIT indifference point if neither of the two alternative financial plans—which are mutually exclusive—invokes the issuance of fresh equity shares.

If in **example 3**, no equity share will be issued, i.e., either 10% debt or 10% preference shares are issued then-

$$(\text{EBIT} - 1,00,000) (1-0.5) / 5000 = \text{EBIT} (1-0.5) - 1,00,000 / 5000$$

$$0.5 \text{ EBIT} - 50,000 = 0.5 \text{ EBIT} - 1,00,000$$

$$0 = -50,000$$

2. Sometimes, a particular collection of alternative financial strategies may produce negative EPS, resulting in a negative indifference level of EBIT.

SOLVED ILLUSTRATIONS

Illustration 5 Amit Ltd. existing capital structure consists of equity capital – 1,000 share of Rs. 100 each. Now the company wants to expand and had to raise 5,00,000 to fulfil its business requirement. The company has following alternatives -

- I. Issue 10% Debentures
- II. 10% Preference share of Rs 50 each



III. Issue equity share capital of Rs 100 each

Level of EBIT is 2,00,000 and Tax is charged @50%

Solution-

Particulars	I	II	III
Equity Share Capital (Existing)	10,00,000	10,00,000	10,00,000
Equity Share Capital (New)	-	-	5,00,000
12% Pref. Share Capital	-	5,00,000	-
10% Debentures	5,00,000	-	-
Total Funds	15,00,000	15,00,000	15,00,000
EBIT	2,00,000	2,00,000	2,00,000
(Interest)	(50,000)	-	-
PBT	1,50,000	2,00,000	2,00,000
(Tax)- 50%	75,000	1,00,000	1,00,000
PAT	(75,000)	1,00,000	(1,00,000)
(Preference Dividend)	-	(60,000)	-
Profit for Equity Share holders	75,000	40,000	1,00,000
Equity Shares	1,000	1,000	1,500
EPS	75	40	66.67

Since EPS is highest in Option I, thus it is the optimal choice of alternative.

Illustration 6 Omax Ltd. has currently capital of Rs. 10,00,000 in the form of 1,000 shares of Rs 100 each. It has following plans to raise Rs. 5,00,000.

- Issue of equity shares 2,000 of Rs 100 each and Debentures @10% of remaining Rs. 3,00,000.
- Issues of Preference shares for Rs. 5,00,000 carrying dividend of 12%
- Issue of equity shares 1,000 of Rs 100 each, preference shares for Rs. 1,00,000 carrying dividend of 12% and Debentures @10% of remaining Rs. 3,00,000.

Calculate indifference point between, assume tax @ 50%

- Plan a and b
- Plan b and c
- Plan a and c

**Solution-**

$$a) (EBIT - 30,000) (1-0.5) / 3000 = [(EBIT-0) (1-0.5) - 60,000] / 1000$$

$$0.5 EBIT - 15,000 = 1.5 EBIT - 180000$$

$$EBIT = 165000$$

$$b) [(EBIT-0) (1-0.5) - 60,000] / 1000 = [(EBIT - 30,000) (1-0.5) - 12,000] / 2000$$

$$EBIT - 120000 = 0.5 EBIT - 15000 - 12000$$

$$EBIT = 186000$$

$$c) (EBIT - 30,000) (1-0.5) / 3000 = [(EBIT - 30,000) (1-0.5) - 12,000] / 2000$$

$$2(0.5 EBIT - 15,000) = 3(0.5 EBIT - 15000 - 12000)$$

$$EBIT = 102000$$

The relationship between two associated variables is determined in leverage analysis. Operational leverage, financial leverage, and combined leverage are all calculated in financial management. The relationship between sales and EBIT is established by the operating relationship. It gauges the impact of shifting sales revenue levels on EBIT levels. Fixed costs lead to the appearance of operating leverage. The financial leverage gauges how quickly the EPS adjusts to changes in EBIT. The fixed financial charges, such as interest and dividends on preferred stock, are what cause the financial leverage to occur. The percentage change in EPS for a percentage change in sales can also be calculated using combined leverage. Leverage is beneficial in many aspects some of them are- how operating leverage aids in planning fixed asset investments, financial leverage aids in planning capital structures, combined leverage aids in profit planning, etc.

The effects of various capital structure types can also be examined using EBIT-EPS analysis. The impact of various capital mix types on EPS is considered by the EBIT-EPS Analysis. Given a certain level of EBIT, a specific combination of different sources will produce that level of EPS, so different financing strategies would result in different levels of EPS. The EBIT level at which a company's EPS is zero is known as the financial break-even level of EBIT. A level of EBIT that is indifferent is one where both financial strategies result in the same EPS. The company would not care if money is raised through one capital mix or another because both will result in the same level of EPS at a different level of EBIT.

So, we can conclude that high financial leverage should not be used by a company because if the company has high operating leverage. Similarly, a company with low operating leverage



would benefit from having high financial leverage. The likelihood of taking on additional risk will rise if both leverages are increased.

7.10 PRACTICAL PROBLEMS

- From the following data available for two companies, compute DOL, DFL and DCL and comment on the relative risks of the firm.

Particulars	P Ltd.	S Ltd.
Sales	5,00,000	3,50,000
Variable Cost	40% of sales	40% of sales
Fixed Cost	30,000	25,000
Interest	1,00,000	90,000

Answer-

Particulars	P Ltd.	S Ltd.
DOL	1.11	1.14
DFL	1.59	1.95
DCL	1.76	2.21

- Sumit Ltd. existing capital structure consists of equity capital- 1,500 share of Rs. 100 each. Now the company wants to expand and had to raise 7,00,000 to fulfil its business requirement. The company has following alternatives-

- Issue 10% Debentures
- 12% Preference share of Rs 50 each
- Issue equity share capital of Rs 100 each

Level of EBIT is 2,00,000 and Tax is charged @50%

Advise which method is best mode of financing for Amit Ltd.

Answer- Option III is the best

- Calculate different types of leverages from the information given below-
 - Sales = 12,000
 - VC – 50% of Sales



- c. EBIT = 3,000
- d. EBT = 2,000
- e. Tax Rate – 50%

Calculate %age change in EPS if sales increased by 5%.

Answer-

DOL	2
DFL	1.5
DCL	3
%change in EPS	15

Illustration 1 From the following data available for two companies, compute DOL, DFL and DCL and comment on the relative risks of the firm.

Particulars	Priya Ltd.	Supriya Ltd.
Sales	5,00,000	4,00,000
Variable Cost	30% of sales	30% of sales
Fixed Cost	30,000	40,000
Interest	1,50,000	1,00,000

Solution-

Particulars	Priya Ltd.	Supriya Ltd.
Sales	5,00,000	4,00,000
(Variable Cost)	(150000)	(120000)
Contribution	3,50,000	2,80,000
(Fixed Cost)	(30,000)	(40,000)
EBIT	3,20,000	2,40,000
(Interest)	(1,50,000)	(1,00,000)
EBT	1,70,000	1,40,000
DOL = Contribution/ EBIT	1.09	1.17
DFL = EBIT/ EBT	1.88	1.71
DCL= DOL X DFL	2.06	2

The operating leverage is higher in Supriya Ltd. as compare to Priya Ltd, therefore operating risk of Supriya Ltd. is higher than Priya Ltd.



The financial leverage is higher in Priya Ltd. as compare to Supriya Ltd, therefore financial risk of Priya Ltd. is higher than Supriya Ltd.

The total risk measured by the degree of combined leverage is higher in Priya Ltd. as compare to Supriya Ltd, therefore total of Priya Ltd. is higher than Supriya Ltd.

Illustration 2 The following data is available for Rimjhim Ltd.

Particulars	Rs.
Sales	10,00,000
Variable Cost	4,00,000
Fixed Cost	1,80,000
Debt	5,00,000
Interest on Debt	10%
Equity Capital	5,50,000

Calculate ROI, Operating, Financial and Combined Leverage. Also ascertain the level at which EBIT is zero.

Solution-

6. **ROI-**

$$\begin{aligned}\text{EBIT} &= \text{Sales} - \text{VC} - \text{FC} = 10,00,000 - 4,00,000 - 1,80,000 \\ &= 4,20,000\end{aligned}$$

$$\text{ROI} = \text{EBIT} / \text{Total Capital} = 4,20,000 / 10,50,000 = 0.4 \text{ (40\%)}$$

7. **DOL** = Contribution / EBIT

$$= 6,00,000 / 4,20,000 = 1.43$$

8. **DFL** = EBIT/EBT

$$= 4,20,000 / 3,70,000 = 1.14$$

9. **DCL** = OL X FL = 1.43 X 1.14 = 1.62

10. **Sales Level when EBIT will be 0**

$$\begin{aligned}\text{P/V ratio} &= \text{Contribution} / \text{Total sales} * 100 \\ &= 6,00,000 / 10,00,000 * 100 = 60\%\end{aligned}$$

$$\text{Fixed Cost} = 1,80,000 + 50,000 = 2,30,000$$

$$\begin{aligned}\text{BEP} &= \text{FC} / \text{P/V Ratio} = 2,30,000 / 60\% \\ &= 3,83,333\end{aligned}$$



7.11 GLOSSARY

- **Return on investment (ROI)** is a performance metric used to assess an investment's effectiveness or profitability or to compare the effectiveness of several investments. ROI aims to quantify the amount of return on a specific investment in relation to the cost of the investment.
- The measure of a company's profitability per share of its stock is its **Earnings per share**. EPS might be reduced by issuing additional shares through secondary offerings, convertible instruments, or employee stock options.
- **EBIT**, or earnings before interest and taxes, is a measure of how profitable a business is. Revenue less costs, excluding taxes and interest, is the formula for calculating EBIT. Operating earnings, operating profit, and profit before interest and taxes are other names for EBIT.
- The **Profit Volume (P/V) Ratio** measures the rate at which profit fluctuates in response to changes in sales volume. It is one of the crucial ratios for determining profitability because it shows the contribution made in relation to sales.

7.12 ANSWER IN TEXT QUESTIONS

- | | |
|--|---|
| 1. (b) Business | 9. (d) $[(EBIT - I)(1 - T) - D_p]/N_0$ |
| 2. (c) $OL = 1$ | 10. (b) Negative |
| 3. (a) Financial | 11. (c) Examining EPS results for alternative financing plans at varying EBIT levels. |
| 4. (d) All the above | 12. (d) $EBIT = ₹ 16,75,000$ |
| 5. (c) Relationship between interrelated variables | 13. (d) None of these |
| 6. (a) Sales | 14. (a) Dividend paid last year |
| 7. (d) Financial Leverage | 15. (b) $EBIT = \text{Zero}$ |
| 8. (c) Multiplied by | |

**7.13 SELF-ASSESSMENT QUESTIONS**

1. Describe the meaning of leverage. Explain different types of leverage.
 2. What is Operating Leverage? State its application.
 3. What do you mean by Financial Leverage? Analyse how financial leverage affects EPS.
 4. Differentiate between financial and operating leverage. How can the two leverages be calculated?
 5. Write a short note on Combined Leverage. Explain its significance.
 6. How can EBIT-EPS analysis be used to select the optimal financing mix?
 7. Define EBIT –EPS Analysis. State how is it different from leverage analysis.
 8. Describe the relationship between EBIT and EPS in the capital structure decision framework.
 9. What are the flaws of the EBIT–EPS Analysis?
4. From the following data available for two companies, compute DOL, DFL and DCL and comment on the relative risks of the firm.

Particulars	P Ltd.	S Ltd.
Sales	5,00,000	3,50,000
Variable Cost	40% of sales	40% of sales
Fixed Cost	30,000	25,000
Interest	1,00,000	90,000

Answer-

Particulars	P Ltd.	S Ltd.
DOL	1.11	1.14
DFL	1.59	1.95
DCL	1.76	2.21

5. Sumit Ltd. existing capital structure consists of equity capital- 1,500 share of Rs. 100 each. Now the company wants to expand and had to raise 7,00,000 to fulfil its business requirement. The company has following alternatives-

IV. Issue 10% Debentures



V. 12% Preference share of Rs 50 each

VI. Issue equity share capital of Rs 100 each

Level of EBIT is 2,00,000 and Tax is charged @50%

Advise which method is best mode of financing for Amit Ltd.

Answer- Option III is the best

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LESSON 8

DIVIDEND POLICY DECISIONS

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STRUCTURE

- 8.1 Learning Objectives
- 8.2 Introduction
- 8.3 Factors determining Dividend Policy
- 8.4 Measures of dividend policies
- 8.5 Theories of Dividend
- 8.6 Forms of Dividend
- 8.7 Dividend Policies in practice
- 8.8 Summary
- 8.9 Glossary
- 8.10 Answers to In-Text Questions
- 8.11 Self-Assessment Questions
- 8.12 References
- 8.13 Suggested Readings

8.1 LEARNING OBJECTIVES

- To acquaint the learner with the meaning, types, and significance of dividends.
- To highlight the various factors which influence the determination of dividend policy.
- To compare dividend policy theories and explain the implications of each for company value.
- To understand the dividend policies followed in practice.

8.2 INTRODUCTION



A business organization always aims to earn profits for its shareholders. The income generated after meeting all obligations by the firm belongs to the shareholders. The part of earnings that is distributed amongst equity shareholders is called dividend. The optimum dividend policy would maximize the value of the firm. The question of what ratio income earned to retain or distribute is a dividend decision or policy.

The main issue involving a firm's dividend decision is whether to retain and invest the profits for future growth needs or distribute them among the shareholders. Along with the amount, the timing of dividends plays a vital role in influencing a company's market value. Thus, Dividend policy also pertains to the stability or continuity of dividends. Moreover, the firm must choose between the different types of dividends – cash or stock. Hence, the formulation of a dividend policy is a complex decision. It needs careful consideration of various factors. The financial manager needs to be aware of the capital market trends and the government's tax policies, besides the rationale behind the company's investment program. Next, let's try understanding the management's motivations for paying dividends.

A clientele-based explanation: Investors can be grouped according to their preference for dividends and capital gains. These groups are referred to as clientele. Notably, investors in the low tax brackets may invest in dividend-paying stocks and vice versa. In contrast, low-tax-bracket investors (corporations and pension funds) may choose high dividend payouts. The possible explanation could be that investors like dividends as it addresses the concerns of a substantial number of investors regarding the uncertain future firm performance. Generally, investor confidence is higher for a firm paying continuous dividends.

The informational content of dividends or signaling effect: In the real world, information asymmetry exists, which is the difference in the information available to insiders and outsiders. The firm's management has access to more information about the firm's current and future performance than the shareholders. In such a situation, dividends can signal to the market that you believe you have good future cash flow prospects. Suppose management decides to reduce dividends per share. In that case, it sends a negative signal about the firm's future performance, resulting in a fall in the share's market price. Thus, in practice, companies refrain from increasing dividends unless they wish to continue in the future. Likewise, firms do not cut dividends unless they are in financial distress, which suggests deterioration in the company's long-term growth prospects. However, dividend initiation could send mixed signals to the stakeholders. On the one hand, it offers belief in an optimistic future (a positive sign); on the other, it could mean that the company lacks profitable reinvestment opportunities—a negative symbol.



Agency Issues Between shareholders and managers: Agency costs reflect the inefficiencies due to the divergence of interests between managers and stockholders. One aspect of the agency issue is that managers may be incentivized to overinvest (empire building), leading to investment in some negative NPV projects, reducing stockholder wealth. One way to reduce agency costs is to pay more dividends. Generally, a growing firm has a higher proportion of retained earnings than dividends, in contrast to mature firms.

Generally, a stable dividend policy (in the form of a constant dividend per share or a constant dividend payout ratio) benefits the firm.

Constant dividend per share means a fixed dividend is paid each year to the shareholders, irrespective of the fluctuations in the earnings. However, the policy may be reviewed after a few years, and the dividend would then be changed and kept steady for the future.

The constant dividend payout ratio is when a company consistently pays out a set portion of its earnings as dividends to its shareholders. For example, if a company has a payout ratio of 50%, it pays out half of its earnings as dividends. A constant dividend payout ratio policy provides stability and predictability for shareholders, who can count on a consistent income level from their investments. It can also signal to investors that the company has a solid and stable financial position and is committed to returning value to its shareholders.

8.3 FACTORS DETERMINING DIVIDEND POLICY

Several factors can affect a company's dividend policy, including:

- **Financial performance** - A company's financial performance, including its earnings, cash flow, and debt levels, can significantly determine its dividend policy. Companies with strong financial performance are more likely to pay dividends. In contrast, companies with weaker financial performance may reduce or eliminate dividends.
- **Growth prospects** - Companies with high growth potential may reinvest earnings into the business instead of paying dividends to support future growth.
- **Investment opportunities** - Companies may also consider the availability of attractive investment opportunities when making decisions about their dividend policy. Companies with a high demand for capital may choose to retain earnings to finance growth.
- **Expected volatility of future earnings** - Firms tie their target payout ratio to long-run sustainable profits. They are reluctant to increase dividends unless the reversal is



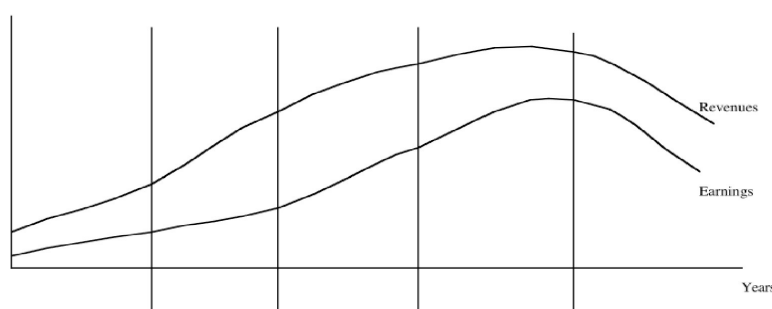
not anticipated shortly. Hence, when earnings are volatile, firms are more cautious in changing dividend payout.

- **Industry and competition** - The level of competition and the characteristics of the industry in which a company operates can also impact its dividend policy. For example, companies in highly competitive industries may choose to retain earnings to invest in research and development or to acquire new technology.
- **Tax considerations** - Dividend tax rates can also play a role in a company's dividend policy. Generally, in countries where capital gains are taxed at a favorable rate compared to dividends, high-tax-bracket investors (like some individuals) prefer low dividend payouts and vice versa.
- **Flotation costs** - When a company issues new shares of common stock, a flotation cost of 3% to 7% is taken from the capital raised to pay for investment bankers and other costs associated with issuing the new stock. Since retained earnings have no such fee, the cost of new equity capital is always higher than that of retained earnings. Larger companies typically have lower flotation costs as compared to smaller companies. Generally, the higher the flotation costs, the lower the dividend payout, given the need for equity capital in positive NPV projects.
- **Contractual and legal restrictions** - Companies may be restricted from paying dividends by legal requirements or implicit limits caused by the business's cash needs. In some countries, dividends paid cannot be more than retained earnings.
- Debt covenants are designed to protect bondholders and dictate things a company must or must not do. Many covenants require a firm to meet or exceed a particular target for liquidity ratios (e.g., current ratio) and coverage ratios (e.g., interest coverage ratio) before they can pay a dividend.
- **Need for liquidity** - Financial flexibility is significant during times of crisis when liquidity dries up, and credit may be hard to obtain. Thus, it is prudent to conserve funds to face future emergencies.
- **Debt Market conditions** - If the debt market is flushed with funds and the firm has financial flexibility, it may like to distribute its earnings as dividends and raise resources in the debt market to finance the growth opportunity. On the other hand, if the firm has a low credit rating or exhausted its debt capacity, it will be compelled to use internally generated funds for growth and have a low dividend payout ratio.



- **Control considerations** - If a firm pays dividends and raises fresh equity to finance the growth opportunity, it incurs transaction costs and dilutes control.
- **The Nature of Business** is a critical determinant of a company's dividend policy. Enterprises with stable revenues are positioned to formulate consistent dividend policies, for instance, public utilities.

Life Cycle Analysis of dividend policy



I – Start up	II – Rapid Expansion	III – High Growth	IV – Mature Growth	V – Decline	Stage
None	None	Very Low	Increasing	High	Capacity to pay dividends
High, but constrained by infrastructure	High, relative to firm value	Moderate, relative to firm value	Low, as projects dry up	Low, as projects dry up	External funding needs
Negative or low	Negative or low	Low, relative to funding needs	High, relative to funding needs	More than funding needs	Internal funding needs

A firm's dividend policy and financing choice follow its life cycle stage. There are five stages in the growth life cycle: start-up, rapid expansion, high growth, mature growth, and decline stage. The life cycle analysis of dividend policy is a framework for evaluating a company's dividend policy changes over its life cycle. During each stage, the company faces different financial and operational challenges, which can influence its dividend policy.



In conclusion, a company's dividend policy can be influenced by various factors, including its financial performance, growth prospects, industry and competition, investment opportunities, stock price, and tax considerations. Companies should consider all of these factors when deciding their dividend policy.

The objective of the finance manager while formulating the dividend policy is to maximize shareholders' wealth. There are several measures used to evaluate a company's dividend policy, including:

Dividend yield: This is the annual dividend amount divided by the stock price, expressed as a percentage. A high dividend yield can signal that the company is paying a significant portion of its earnings as dividends, which attracts income-seeking investors.

$$\text{Dividend yield} = \text{Dividends per share} / \text{Stock price}$$

Dividend payout ratio: This is the ratio of dividends paid to earnings, expressed as a percentage. In other words, dividend per share to earnings per share. The earnings per share are computed by dividing profits after tax by the number of equity shares outstanding. A high payout ratio suggests that a firm is paying out a significant portion of its earnings as dividends, which can reduce its ability to reinvest in growth opportunities.

$$\text{Dividend payout ratio} = \text{Dividends per share} / \text{Earnings per share}$$

Dividend coverage ratio: This is the ratio of earnings to dividends, expressed as a multiple. A high coverage ratio indicates that the company's profits are more than sufficient to cover its dividends, which can signify financial stability.

These measures can provide valuable insights into a company's dividend policy. Still, they should be evaluated in the context of the company's overall financial position and growth prospects.

8.4 MEASURES OF DIVIDEND POLICIES

The relationship between dividends and firm value is multifaceted. Some argue that dividends can create firm value by signaling the company's financial strength, reducing the cost of capital, and attracting investors. A company that pays consistent and predictable dividends can also increase investor confidence and reduce uncertainty about the future. On the other hand, some argue that paying dividends can reduce firm value by reducing the amount of capital available for reinvestment and growth. Suppose a company has a high payout ratio. In



that case, it may be unable to invest in new projects or opportunities, limiting its future growth prospects. Ultimately, the impact of dividends on firm value depends on multiple factors, including the company's financial position, growth prospects, and market conditions. Companies need to consider their circumstances when deciding on a dividend policy.

8.5 THEORIES OF DIVIDEND

The theory of dividend relevance

It refers to the idea that a company's dividend policy can significantly impact its stock price. According to this theory, investors value dividends because they provide a tangible return on investment. As a result, a company's stock's market price directly relates to its dividends' amount and stability. There are two primary schools of thought within the theory of dividend relevance. The Bird-in-the-Hand Theory states that investors prefer a higher current dividend to a lower recent dividend and a promise of future capital gains. In other words, a company's current dividend payment is more valuable to investors than the possibility of future capital gains. The Tax Preference Theory states that investors prefer a lower current dividend and the option of future capital gains because of the tax benefits associated with capital gains. Capital gains are taxed at a lower rate than dividends in many countries.

Walter Model

Prof. James E. Walter introduced Walter's Model. This model considers the firm's value as the sum of two components - an infinite stream of dividend, D , and an infinite stream of retained earnings, $E - D$, reinvested at a constant rate of k , which are generated each year for an infinite length of time. Thus, it links the value of the firm to the earning level, dividend level, reinvestment rate, and the shareholders' expectations

Basic Assumptions

- Funding of new projects is done through earnings alone.
- The growth opportunities do not alter the firm's risk profile as a whole. Therefore the market capitalization rate remains constant.
- The firm is a going concern, and the pricing model assumes perpetual earnings.
- There is an implied assumption that the reinvestment rate ' k ' remains constant.

The optimum dividend policy is determined based on k .



- If the firm's cost of capital, k , exceeds shareholder's expectations, r , then the optimum dividend policy is 100% retention,
- if $k < r$, then the optimum is 100% payout, and
- when $k = r$, the dividend policy is immaterial.

$$P_0 = \frac{D}{r} + \frac{k(E - D)/r}{r}$$

Where P_0 is the stock's market price

D is the most recent annual dividend payment per share

r is the firm's rate of return

k is the firm's cost of capital

The following illustration helps to understand the relevance of dividend policy under Walters's Model.

$k > r$	$k < r$	$k = r$
$E = \text{Rs. } 20$ $D = \text{Rs. } 10$ $k = 20\%$ $r = 16\%$	$E = \text{Rs. } 20$ $D = \text{Rs. } 10$ $k = 12\%$ $r = 16\%$	$E = \text{Rs. } 20$ $D = \text{Rs. } 10$ $k = 16\%$ $r = 16\%$
$P_0 = \frac{D + \frac{k}{r}(E - D)}{r}$ $= \frac{10 + \frac{0.20}{0.16}(20 - 10)}{.16}$ $= 140.63$	$P_0 = \frac{D + \frac{k}{r}(E - D)}{r}$ $= \frac{10 + \frac{0.12}{0.16}(20 - 10)}{.16}$ $= 109.37$	$P_0 = \frac{D + \frac{k}{r}(E - D)}{r}$ $= \frac{10 + \frac{0.16}{0.16}(20 - 10)}{.16}$ $= 125.00$
The dividend increased to 75% (Rs. 15 per share)		



$P_0 = \frac{15 + \frac{0.20}{0.16}(20-15)}{.16}$ $= 132.81$	$P_0 = \frac{15 + \frac{0.12}{0.16}(20-15)}{.16}$ $= 117.19$	$P_0 = \frac{15 + \frac{0.16}{0.16}(20-15)}{.16}$ $= 125.00$
The dividend decreased to 25% (Rs. 5 per share)		
$P_0 = \frac{5 + \frac{0.20}{0.16}(20-5)}{.16}$ $= 148.44$	$P_0 = \frac{5 + \frac{0.12}{0.16}(20-5)}{.16}$ $= 101.62$	$P_0 = \frac{5 + \frac{0.16}{0.16}(20-5)}{.16}$ $= 125.00$
If the dividend payout increases, the price decreases for a growth firm	If the dividend payout rises, the price increases for a declining firm.	Price remains the same irrespective of dividend payout for a normal firm

Gordon Model

The Gordon Model is named after Myron J. Gordon. It is also known as the Gordon Growth Model, is a mathematical model that assumes that dividends will grow at a constant rate and that the stock price will eventually equal the present value of these future dividends. Its assumptions and conclusions are similar to Walter's model. It has two additional assumptions

- The constant cost of capital is more than the growth rate
- The firm's growth rate is the product of its rate of return and retention ratio.

The formula used is:

$$P = \{EPS * (1-b)\} / (k-g)$$

Where,

P = market price per share

EPS = earnings per share

b= retention ratio of the firm

(1-b) = payout ratio of the firm



k = cost of capital of the firm

g = growth rate of the firm = $b \cdot r$

The bird-in-the-hand argument suggests that increased dividend means increased certainty of the cash flows. Since this helps reduce the discount rate, the firm's value must improve with the increased dividend.

Example: Assume a company has a current dividend per share of Rs 1.50, a discount rate of 10%, and a dividend growth rate of 5%.

Intrinsic value = Rs 1.50 / (0.10 - 0.05) = \$30

Suppose the current market price of the stock is less than this value. In that case, the stock may be considered undervalued and a good investment opportunity. Conversely, the stock may be overvalued if the market price is higher than the intrinsic value.

Theory of irrelevance – MM Hypothesis

The theory of dividend irrelevance, also known as the Miller-Modigliani theorem, states that a company's dividend policy does not affect its stock price or the total return to shareholders. According to this theory, the market adjusts for changes in a company's dividend policy so that the firm's overall value remains the same. Still, there would be a transfer of wealth from old shareholders to new shareholders. Homemade dividend enables individual investors to make their dividend policy by buying and selling shares to adjust current income. They can undo the corporate action in their capacities.

Assumptions of the theory of dividend irrelevance:

- **Perfect capital markets:** Investors have complete and accurate information about the company and its financial condition. All investors homogeneously interpret the information. They can buy and sell securities without transaction costs. It also implies that the shares were infinitesimally divisible and buying/selling actions do not influence the price.
- **No taxes:** There are no taxes on dividends or capital gains, so the tax treatment of dividends does not affect shareholder value.
- **No restrictions on capital:** Investors are free to buy and sell securities as they please, so the company's dividend policy does not affect its capital availability.

The theory of dividend irrelevance suggests that companies can pay dividends, buy back shares, or retain earnings without affecting the company's overall value.



The two propositions of the Modigliani-Miller theory of dividend irrelevance are:

- A firm's dividend policy has no effect on its stock price.

Proposition 1 states that investors are indifferent between receiving dividends and retaining earnings. It also implies that the firm's value is determined solely by its earning power and risk.

- The total return to shareholders (dividends plus capital gains) is determined by the firm's investments' earning power and risk. It is independent of how earnings are divided between dividends and retained earnings.

Proposition 2 means that the firm's dividend policy does not affect the total amount of cash flows that shareholders receive, but only the timing and form of those cash flows. Proposition 2 assumes that the firm can reinvest earnings at the same rate of return as its existing projects, that investors can borrow and lend at the same interest rate, and that there are no other factors that affect the value of the firm's investments.

Overall, the Modigliani-Miller theory of dividend irrelevance suggests that the decision to pay dividends or retain earnings should be based on the firm's investment opportunities and capital needs rather than on the perceived preferences of shareholders. However, the theory has been subject to criticism and refinement over the years. Empirical evidence has shown that dividend policy can affect firm value and investor behavior, especially in the presence of taxes and other frictions.

To understand MM's argument, recognize that any shareholder can construct their dividend policy (at least theoretically). For example, a firm is not paying dividends, and a shareholder wants a 5 percent dividend. They can "create" it by selling 5 percent of their stock. Conversely, suppose a company pays a higher dividend than an investor desires. In that case, the investor can use the unwanted dividends to buy additional company stock shares. If investors can buy and sell shares, creating their dividend policy without incurring costs, the firm's dividend policy would be irrelevant. However, investors who want additional dividends must incur brokerage costs to sell shares and pay taxes on any capital gains. Investors who do not wish dividends incur brokerage costs to purchase shares with their dividends. Because taxes and brokerage costs certainly exist, dividend policy may be relevant.

If the company has 'n' number of equity shares outstanding, then the firm's value is n times P_0 .

$$nP_0 = [1/(1 + k)]*[nD_1 + n P_1]$$



The profits retained depend upon the amount of dividends paid, i.e., nD_1 . Whatever capital funds need is not financed by retained earnings (i.e., $E - nD$) must be financed by the issue of fresh share capital.

$$nP_0 = [1/(1 + k)] * [(nD_1 + n P_1) + mP_1 - mP_1]$$

$$nP_0 = [1/(1 + k)] * [nD_1 + (n + m) P_1 - (I - (E - nD_1))]$$

$$nP_0 = [1/(1 + k)] * [nD_1 + (n + m) P_1 - I + E - nD_1]$$

$$nP_0 = [1/(1 + k)] * [(n + m) P_1 - I + E]$$

MM has concluded that the firm's value, nP_0 , does not depend on D_1 . Since, D_1 is not found in the final equation, the dividend decision and hence the dividend policy is irrelevant.

Under MM Model, the number of new equity shares, m , to be issued can be found as follows:

$$m = [I - (E - nD_1)] \div P_1$$

The table given below illustrates the arbitrage process of MM theory.

Existing Shares (Nos.)	1,000	1,000	1,000	1,000	1,000
Current Price (Rs.)	500	500	500	500	500
Returns Required (%)	20%	20%	20%	20%	20%
Dividend per Share	-	25	30	35	40
Projected Price (Ex Dividend)	600	575	570	565	560
Investment Required	600,000	600,000	600,000	600,000	600,000
Earnings Available	400,000	400,000	400,000	400,000	400,000
Dividend	-	25,000	30,000	35,000	40,000
New Capital Required	200,000	225,000	230,000	235,000	240,000
Nos of New Shares Issued	333.33	391.30	403.51	415.93	428.57
Total Market Value (Rs.)	800,00	800,00	800,00	800,00	800,00

Impact of Taxes on MM theory of dividend irrelevance

In practice, however, taxes and other market imperfections can make dividend policy-relevant, as they can impact the after-tax return to shareholders. Under perfect market



conditions, the theory of irrelevance holds good. But several real-world factors make the dividend policy relevant. Prominent among these factors are

- Presence of taxes, and
- Frictions in the markets.

When taxes are considered, the MM theory of dividend irrelevance does not hold in its original form because taxes create a cost to investors who receive dividends and a benefit to investors who receive capital gains. This means that investors are not indifferent between dividends and capital gains, and the firm's value is affected by its dividend policy. Specifically, the impact of taxes on the MM theory of dividend irrelevance can be summarized as follows:

1. Taxes on dividends create a cost to investors, reducing future dividends' net present value. This means that a firm that pays dividends will have a lower stock price than one that retains earnings, all else equal. Therefore, firms may retain earnings instead of paying dividends to avoid this tax cost.
2. Taxes on capital gains benefit investors, increasing the net present value of future capital gains. This means that a firm that retains earnings and invests them in profitable projects will have a higher stock price than one that pays dividends, all else equal. Therefore, firms may retain earnings and invest them in profitable projects to generate shareholder capital gains.

Overall, the impact of taxes on the MM theory of dividend irrelevance suggests that the decision to pay dividends or retain earnings should consider the tax preferences of shareholders and the tax consequences for the firm. In particular, firms may pay dividends when their shareholders have a high tax rate on capital gains or excess cash that cannot be invested profitably. Conversely, firms may choose to retain earnings and invest them in profitable projects when their shareholders have a low tax rate on capital gains or attractive investment opportunities.

Neutrality Theory of Dividend

The neutrality theory of dividends, also known as the bird-in-hand theory, suggests that investors prefer to receive dividends rather than capital gains, all else being equal. This theory contrasts with the Modigliani-Miller dividend irrelevance theory, which means that investors are indifferent between receiving dividends and capital gains.

The neutrality theory of dividends assumes that investors value current income more than future income and view dividends as a more certain and predictable source of income than



capital gains. According to this theory, when a firm pays a dividend, it signals to investors that it has sufficient cash flows and stable earnings to support the payout, increasing its perceived value and credibility.

The neutrality theory of dividends mainly implies that firms with a high dividend payout ratio should have a higher stock price than firms with a low or zero payout ratio, all else being equal. This is because a high payout ratio signals to investors that the firm is financially stable and has sufficient cash flows to support the dividend payout, which increases the firm's perceived value and reduces the uncertainty and risk associated with future cash flows.

However, the neutrality theory of dividends has been criticized and refined over the years. Empirical evidence has shown that the relationship between dividend policy and firm value is more complex than initially assumed. In particular, the theory does not consider investors' tax preferences and information asymmetry, as well as the impact of external factors such as market conditions, industry trends, and regulatory environment. Therefore, the decision to pay dividends or retain earnings should be based on a careful analysis of the firm's financial and strategic goals and the preferences and expectations of its shareholders.

Black Scholes dividend theory

The Black-Scholes dividend theory is a modification of the Black-Scholes option pricing model that considers the impact of dividends on the price of an underlying stock. The Black-Scholes option pricing model was developed by Fischer Black and Myron Scholes in 1973, and investors and financial analysts widely use it to value stock options and other financial derivatives.

The Black-Scholes dividend theory assumes that the price of a stock will decrease by the present value of expected future dividends during the life of an option. This means that a stock that pays higher dividends will have a lower option value than one that pays lower dividends, all else equal. The theory is based on the no-arbitrage principle, which suggests that two assets with identical payoffs should have the same price.

The formula for the Black-Scholes dividend model is similar to the original Black-Scholes formula, with an adjustment for the present value of expected dividends:

$$C = S_0 N(d_1) - X e^{(-rT)} N(d_2) - PV(D)$$

where:

C = the call option price

S₀ = the current stock price



X = the option strike price

r = the risk-free interest rate

T = the time to expiration of the option

$$d_1 = (\ln(S_0 / X) + (r + \sigma^2 / 2) T) / (\sigma \sqrt{T})$$

$$d_2 = d_1 - \sigma \sqrt{T}$$

$PV(D)$ = the present value of expected dividends during the life of the option

The Black-Scholes dividend theory has several implications for investors and financial analysts. First, it suggests that the value of a call option will decrease as the expected dividend payments increase because the expected future price of the stock will be lower. Second, it suggests that the value of a put option will increase as the expected dividend payments increase because the expected future price of the stock will be lower. Finally, it suggests that the decision to pay dividends or retain earnings should be based on a careful analysis of the impact on the firm's stock price and option values, as well as the preferences and expectations of its shareholders.

Pecking Order theory

The pecking order theory is a financial theory that describes how companies choose their financing sources. The theory suggests that companies prefer internal financing first, then debt financing, and finally equity financing as a last resort.

The pecking order theory is based on the idea that managers have better information about the company's internal financial condition than external investors and therefore are better equipped to make financing decisions. As a result, managers will generally prefer to use internal financing sources, such as retained earnings, to fund new projects or investments. If internal financing is insufficient, managers will turn to debt financing, as it is generally less expensive than equity financing.

According to the pecking order theory, using equity financing is seen as a last resort. It can be costly and may signal to investors that the company does not have good investment opportunities or is in financial distress. As a result, companies may avoid issuing equity or may do so only when they have exhausted all other financing options.

The pecking order theory has several implications for investors and financial analysts. First, it suggests that companies with high levels of internal financing are generally more financially stable and have better investment opportunities, as they can fund their projects without relying on external financing. Second, it suggests that companies with high debt levels may be perceived as riskier by investors, as they are more vulnerable to changes in interest rates



and have higher debt service obligations. Finally, it suggests that the decision to issue equity should be based on a careful analysis of the company's financial condition, investment opportunities, and the preferences and expectations of its shareholders.

8.6 MEASURES OF DIVIDEND POLICIES

There are several forms of dividends, including:

- A cash dividend is paid when company distributes its earnings to the shareholders through cash payments. It is a way for a company to return a share of profit to its investors and reward them for their investment. Cash dividends are usually paid out regularly (such as quarterly or annually). They can be reinvested in the company or used by the shareholder for other purposes.
- Stock Dividends are also referred to as bonus shares. The issue of bonus shares as a form of dividend is a way for companies to distribute additional shares to shareholders, usually in proportion to their existing holdings. When a company issues bonus shares, the total number of outstanding shares increases, but the market value of each share decreases proportionally.
- Property Dividends represent a payment made in the form of tangible assets, such as real estate or precious metals. It is not a popular way to distribute dividends.
- Liquidating dividends are payments made to shareholders as a return on investment when a company is being dissolved or liquidated.
- A special dividend is a one-time payment outside the company's regular dividend schedule. The type of dividend a company pays, and the amount and frequency of payments, are typically determined by the company's board of directors.

Next, let us understand the concept of bonus shares and share buyback as a form of a dividend.

Bonus shares: The issue of bonus shares as a form of dividend is a way for companies to distribute additional shares to shareholders, usually in proportion to their existing holdings. When a company issues bonus shares, the total number of outstanding shares increases, but the market value of each share decreases proportionally. The main advantage of issuing bonus shares as a form of dividend is that it allows companies to distribute profits to shareholders without reducing their cash reserves. Additionally, bonus shares can temporarily



boost the stock price, as the increased supply of shares can lead to a drop in the market value of each share. However, there are also some disadvantages to issuing bonus shares. For example, diluting existing shares can reduce the company's earnings per share (EPS), negatively impacting the stock price. Additionally, the increased supply of shares can make it more difficult for the company to raise capital. In conclusion, the issue of bonus shares as a form of dividend can provide both benefits and drawbacks for a company, and its suitability will depend on the specific circumstances of each case. Before deciding, companies should consider the potential impact of issuing bonus shares on their financial position, market value, and long-term growth prospects.

Share Buybacks: In a share buyback, companies buy back their shares with cash and either cancel them or keep them in a treasury for reissuing them later. The articles of association of the company should authorize share buyback. Post-buyback cancellation of shares is compulsory in India. A common rationale for share repurchases (versus dividends): 1. Potential tax advantages: Often, capital gains are taxed favorably compared to dividends. 2. Share price support/signaling: Management wants to signal better prospects for the firm. 3. Added flexibility: Reduces the need for "sticky" dividends in the future. 4. Offsets dilution from employee stock options. 5. Increases financial leverage by reducing the equity in the balance sheet, thereby improving the EPS. 6. Use Excess Cash: If a company has excess cash that it cannot effectively reinvest in its business, a share buyback can effectively return value to shareholders.

8.7 DIVIDEND POLICIES IN PRACTICE

In India, the board of directors usually determines a company's dividend policy, which is subject to approval by its shareholders. Companies in India generally have a mix of cash and stock dividends, with cash dividends being the most common.

Many Indian companies follow a stable dividend policy, aiming to maintain a consistent level of dividend payments over time. It provides stability and predictability for shareholders, perceived as a sign of a financially stable and well-run company.

However, some companies in India adopt a residual dividend policy, where they only pay dividends if they have excess cash after investing in growth opportunities. This policy allows companies to adjust their dividend payments based on their financial performance and investment needs. Still, it can also result in a more volatile dividend policy. In recent years, share buybacks have become more common in India as companies seek to return excess cash to shareholders or support their share price. However, the regulations surrounding share



buybacks in India are complex, and companies must adhere to strict guidelines and disclosure requirements. The Companies Act 2013 and the Securities and Exchange Board of India (SEBI) regulations offer a broad regulatory and legal framework for dividend policies in India.

Microsoft Dividend Policy, founded in 1975, declared its first dividend in 2003. It was the first company that had not paid a cash dividend for such a long period.

8.8 SUMMARY

- There are divergent views regarding the impact of dividend policy (dividend payout, D/P ratio) on the share's market price and the firm's value.
- According to one view represented by Walter, Gordon, and others, the D/P ratio is relevant and certainly affects the market price of shares. The value of P is maximum when D is zero (in situations of $r > k$); when $r < k$, the value of $E = D$ gives maximum P.
- Gordon's proposition that the firm's dividend policy is relevant is based on two tenable assumptions: (i) investors are risk averse, and (ii) they put a positive premium on current incomes/dividends.
- The investors evaluate the retained earnings as a risky promise as they perceive the future dividend receipts as uncertain concerning the amount and timing.
- According to Gordon, the market value of a share is equal to the present value of future dividend streams. The P value increases with the D/P ratio and is maximum when there are no retentions.
- Cash dividends can only be paid if available earnings are more than the required funds to meet the desired debt-equity ratio.
- It results in fluctuating dividend payments, as the earnings of a firm and profitable investment opportunities available to it are likely to vary from year to year.
- The dividend payment ratio may vary between zero to one hundred depending on the size of earnings, capital expenditure requirements, and the desired debt-equity ratio.
- The other view, led by Modigliani and Miller (MM), takes a diametrically opposite position and contends that a firm's dividend policy does not affect its value.



- The arguments supporting MM do not stand the test of scrutiny under real-world/business situations. The significant factors affecting the validity of the MM model are (i) tax effect, (ii) flotation cost, (iii) transaction and inconvenience costs, (iv) preference for current dividend, and (v) resolution of uncertainty.
- The available empirical evidence seems to support the view that dividend policy is relevant. A firm should try to follow an optimum dividend policy that maximizes the shareholder's wealth in the long run

8.9 GLOSSARY

Dividend: a portion of a company's profits paid to shareholders.

Dividend yield: a financial ratio that measures the amount of dividends paid relative to a company's stock price.

Payout ratio: the proportion of a company's earnings paid out as dividends.

Information content of dividends: a company's dividend policy contains information about its prospects, which can affect its stock price.

Clientele effect: the idea that companies attract a particular type of investor based on their dividend policy and that changing the policy can result in a change in the composition of the company's investor base.

Signaling effect: the idea that a company's dividend policy sends a signal to the market about its financial health.

Agency costs are the costs associated with monitoring and controlling managers who may not act in the best interest of shareholders.

Dividend irrelevance: the idea that a company's dividend policy has no impact on its stock price and that investors are indifferent to whether a company pays dividends or not.

Dividend relevance: the idea that a company's dividend policy impacts its stock price and that investors prefer companies that pay higher dividends.

Walter's model: a theory that states that the dividend policy of a company has an impact on its stock price, but only under certain conditions, such as the presence of taxes and transaction costs.

Bird-in-the-hand theory states that investors prefer a current dividend to a future capital gain. Therefore companies that pay higher dividends will have a higher stock price.



Modigliani-Miller theorem (MM theorem): a theory that states that a company's dividend policy is irrelevant in a perfect capital market and that the market will correctly value a company regardless of whether it pays dividends or not.

Share buyback: a process where a company repurchases its shares, reducing the number of outstanding shares and increasing the value of remaining shares.

Retention ratio: the proportion of a company's earnings that are not paid out as dividends but are instead retained for reinvestment in the business.

8.11 ANSWERS TO IN-TEXT QUESTIONS

- | | |
|--|-------------------|
| 1. (a) To reward shareholders for their investment | 4. (a) Rs 356.25 |
| 2. (b) Retention Ratio = $100 - \text{DPR}$ | 5. Rs 800 |
| 3. Less | 6. Scrip Dividend |

8.11 SELF-ASSESSMENT QUESTIONS

1. What is a dividend policy?
2. Why do companies choose to pay dividends?
3. What are the different types of dividends?
4. What factors influence a company's decision to pay dividends?
5. How does the payout ratio impact a company's dividend policy?
6. What is the impact of dividends on a company's stock price?
7. What are the benefits and drawbacks of paying dividends?

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LESSON 9

WORKING CAPITAL MANAGEMENT

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STRUCTURE

- 9.1 Learning Objectives
- 9.2 Introduction
- 9.3 Classification of Working Capital
- 9.4 Working Capital Policies and Management
- 9.5 Risk Return Trade off
- 9.6 Cash Management
- 9.7 Receivable Management
- 9.8 Summary
- 9.9 Glossary
- 9.10 Answers to In-Text Questions
- 9.11 Self-Assessment Questions
- 9.12 References
- 9.13 Suggested Readings

9.1 LEARNING OBJECTIVES

- Comprehending working capital management policies and strategies.
- Analysing the impact of working capital policies on organisation's profitability, liquidity & solvency position
- Evaluating cash management techniques to maximize shareholder's wealth.
- Deploying account receivable management tactics to build value for firm.

9.2 INTRODUCTION

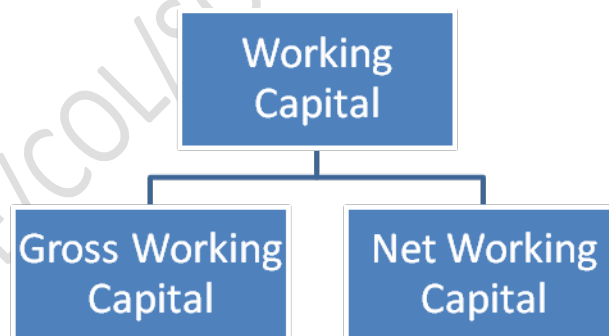


A company's working capital is a gauge of its liquidity and immediate financial stability. Every business needs funds to carry out its operations by acquiring resources for ongoing operations or funding new projects. Working capital is the money needed by a company to cover its ongoing day-to-day expenses. Existence of working capital is indispensable in a firm. Some industries with longer production cycles, slower inventory turnover and longer gestation period may have greater working capital requirements. In contrast, retail businesses with daily interactions with thousands of consumers may frequently generate short-term money far more quickly and may have fewer working capital requirements.

Working capital is centred on current assets and current liabilities. Current assets are the liquid resources belonging to the entity that can be converted into cash in less than a year. For instance, bank balance, cash in hand, inventories, bills receivables, investments in short-term securities, debtors, and prepaid expenses. The current liability is another element of working capital. The total of all current liabilities is the amount that business entity owes to outsiders and must pay within a year. The current liabilities include bills payable, creditors, accounts payable and outstanding expenses.

9.3 CLASSIFICATION OF WORKING CAPITAL

Working capital can be referred to in two distinct ways: gross working capital and net working capital



Gross working capital (also referred to as total working capital) is a firm's total investment in its current assets. It is a quantitative concept. Decisions pertaining to gross working capital focus on optimum investment in current assets and source of financing them. Excessive investment in current assets may diminish a firm's profitability while inadequate investment can cause hindrances in carrying out daily operations and can endanger firm liquidity in meeting current financial commitments. Changing business activity will lead to change in



working capital needs and will warrant prompt action from management. It is inevitable to strive for equilibrium.

Net working capital is the difference between current assets and current liabilities for a business. It is a qualitative concept where the balance sheet's current assets and current liabilities are compared and the resulting gap is labelled as the company's net working capital. It is an estimation of the amount that has to be deployed from the permanent source of funds to fulfill working capital needs as the extent to which current liabilities can get delayed, makes funds available to provide for the rest of the working capital needs.

The company's liquidity position is assessed by Net Working Capital (NWC). If a business has a sizable positive net working capital, it indicates the company's strong short-term financial health because it means the company has enough liquid assets to cover immediate obligations and internally fund business expansion. A very high net working capital may point to excessive inventory. Negative net working capital indicates inefficient asset utilization and raises the possibility of a liquidity problem for the organization. Even with significant investments in fixed assets, a business may still experience operational and financial difficulties if short term liabilities become due. This could result in increased borrowing, untimely payments to creditors and suppliers, and a consequent decline in the company's corporate credit rating. The company may even have to file for bankruptcy. Decisions pertaining to net working capital also includes optimum mix of Non-current and current funds for financing the current assets.

Net working capital = Current Assets – Current Liabilities

Considering periodicity: The need for operating cash is ongoing. When business activity is at its peak or during a specific season, more working capital is needed. Working capital can be classified into two groups as follows based on periodicity:

1. Permanent operating capital
2. Variable working capital

(a) **Permanent working capital** refers to the portion of working capital that is permanently used up in financing for current assets for the smooth operation of the business. There is a minimal amount of current assets needed to run the business in a smooth fashion throughout the year even during slack period. Hence funds are invested to provide for the minimal level of current assets at all times and also known as fixed working capital.



- (b) **Temporary or variable working capital** refers to a temporary and varying quantity of working capital needed over and above permanent working capital to meet the needs of changing business activities over time. Variable working capital can shift from one asset to another and fluctuates according to the growth or decline in business activity. Extra sum may be needed during the year's busiest business seasons. To fulfil the seasonal liquidity of the economy, additional working capital is necessary. Additional working capital could also be required to supply additional current assets to meet unforeseen events or special activities like the execution of special projects or intensive marketing campaigns.

Figure 9.1 depicts and brings out differences in permanent and variable working capital. It showcases that permanent working capital may be changing (growing or falling) at a constant rate over a period of time or may remain stable for years. Temporary working capital is varying at all times as can be seen in Figure 9.1.

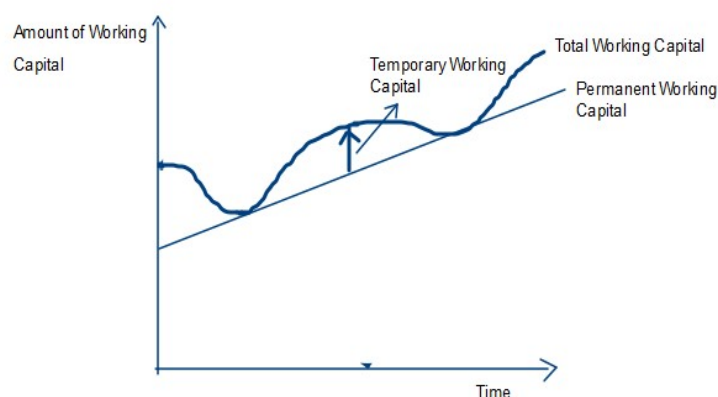
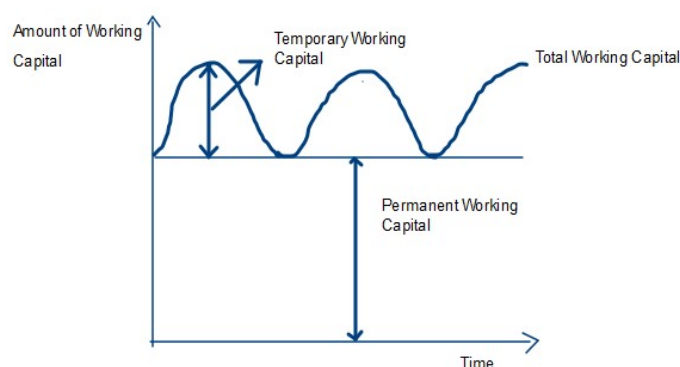
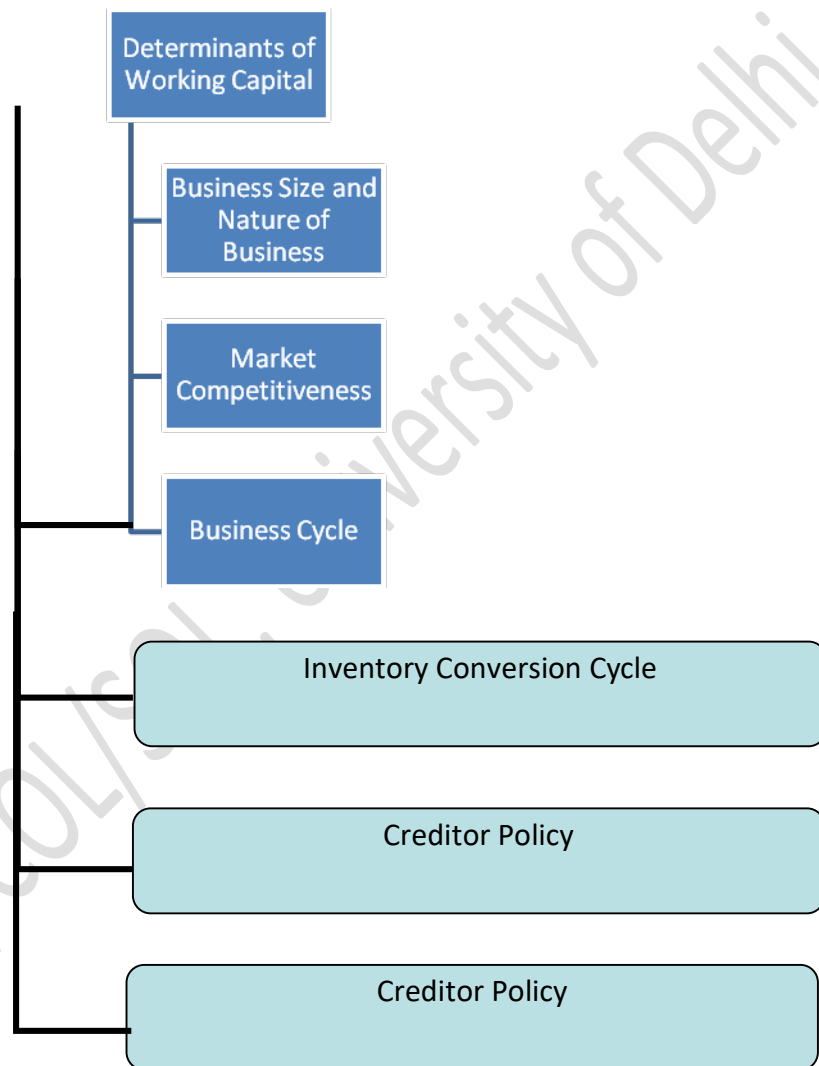




Fig 9.1: Fixed & Variable Working Capital

DETERMINANTS OF WORKING CAPITAL

The amount of working capital depends on the following factor.



1. Business Size and Nature of Business

A company's need for working capital is largely impacted by the nature of its line of work and scale of operations. Trading and financial companies invest very little in fixed assets, but they need to invest a lot of money in working capital. To meet the varied and ongoing



demand of its consumers, retail businesses must maintain enormous stockpiles of a variety of commodities. Similarly a public utility mostly uses fixed assets in its operations, but a merchandising department often relies on inventory and receivables. Compared to huge corporations, smaller businesses have lower proportions of cash, receivables, and inventories.

2. Market Competitiveness

If the conditions prevailing in the market are competitive and substitutes to firm's offerings are available, then the firm needs to follow liberal credit policy for its customers and it needs to maintain adequate inventory to meet the customer orders as and when they are placed.

3. Business Cycle

Volume of sales has the most direct relation with the extent of working capital. Sales volumes change drastically as the economy enters into boom, depression or recessionary cycles. During times of prosperity, business increases, and during times of depression, it decreases. As a result, times of prosperity require more working capital, whereas times of depression require less.

4. Inventory Conversion Cycle

The inventory conversion cycle, also known as the production cycle, is the length of time it takes to transform raw resources into completed goods. The better the efficiency, the longer the production cycle. Short production cycle will warrant a lesser amount of working capital. The amount of working capital is influenced by inventory turnover and the cost per unit of the sold commodities. The amount of working capital increases as this expense rises.

5. Creditor Policy

Terms of purchase and sales also have a bearing on working capital. The loan security is significant to creditors. If creditors of a firm follow a conservative approach of credit disbursement then they may desire the firm to have high liquidity. On the other hand, less money will be invested in inventory if the credit terms for purchases are more advantageous and those for sales are restrictive. Working capital needs might be decreased with more benevolent lending terms i.e. If a business is given more time to pay creditors or its suppliers, it will have lesser working capital needs. A company with better credit lines will require less operating capital.

6. Seasonal Fluctuations

The amount of variable working capital is impacted by seasonal fluctuations in sales. The demand for certain goods may frequently be of a seasonal nature. So inventories are



purchased during certain seasons only. The size of the working capital in one period may, therefore, be bigger than that in another. Seasonality component must be factored while forecasting demand and estimating raw material requirements.

9.4 WORKING CAPITAL POLICIES & ITS MANAGEMENT

Management of working capital comprises managing inventory, cash, debtors, short term marketable securities and creditors. Actual sales in previous year and sales forecast for the year indicates the extent and composition of various current assets required. A considerable amount of financial manager's time and firm's investment is devoted to working capital. Investment decisions of the firm determine its profitability, growth prospects and build value for the firm in the long run. Hence extent of investment in current assets and its source of funding must be constantly reviewed as they are critical to firms' immediate profitability and its value in long run. Suboptimal decisions in working capital management may not support sales growth or may tie up idle assets and lead to loss worthy circumstances. Short-term capital decisions are imperative from a liquidity and profitability perspective so that it helps in maximizing shareholders wealth.

Following are policies pertaining to amount of investment in current assets:

Current Asset to Sales Ratio

Sales volume & sales forecast for the year directly influences the extent and composition of various current assets required. Sales forecast may not corroborate with actual demand. In that case the extent of current assets determined on the basis of sales forecast might turn out to be inadequate or excessive. During an unexpected rise in demand, the current assets will have to be risen, landing firms in a tight working capital position. To avoid such circumstances, financial managers should determine the minimum working capital required at all times and safety cover for each of current assets for different sales levels.

Conservative Policy: Firms following conservative policy are risk averse and add more than proportionately to current assets in relation to addition in sales activity. Firms adopting conservative policy generally have high current asset to fixed asset ratio.

Aggressive Policy: Firms following aggressive policy are risk taking and add less than proportionately to current assets in relation to addition in sales posing the threat of illiquidity



and insolvency. Firms adopting aggressive policy generally have low current asset to fixed asset ratio.

Moderate Policy: Moderate policy meets above mentioned policies in the middle. Firm following moderate policy adds up to current assets in the same proportion as addition in sales activity.

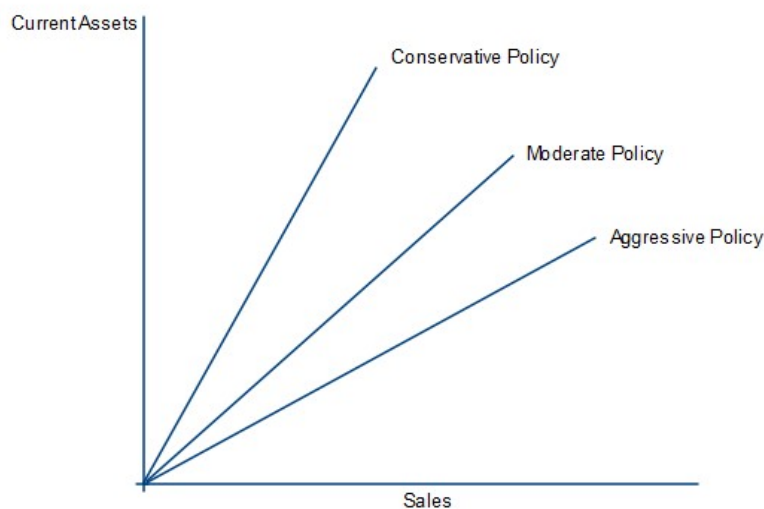


Fig 9.2 Working Capital Policies

Policies for Financing Current Assets

Current assets may be financed using long term funds like owner's equity, retained earnings, bank loan etc or short-term funds like commercial paper, short term debt from bank or factoring of receivables.

According to the levels of risk involved and mix of short term & long-term funds, three general strategies—hedging, aggressive, and conservative—can help a corporation finance its working capital more effectively.

Conservative Strategy

An organization adopting conservative approach that is majorly dependent on a long-term source of financing to finance minimum working capital needed at all times as well as part of cyclical working capital. A firm only uses this method when it is necessary to minimize risk as much as possible. Deploying long term funds does away with any possibility of shortage or illiquidity. To ensure low risk, the management strictly controls the credit restrictions.



Additionally, to ensure adequate cash flow, current assets must always be greater than current liabilities. For low-risk, short-term sources are used as little as possible. Therefore, following a cautious working capital financing policy result in underutilization of funds, which lowers returns and compromises growth. Firms may invest under-utilized funds in short term securities. Figure 9.3 depicts conservative approach.

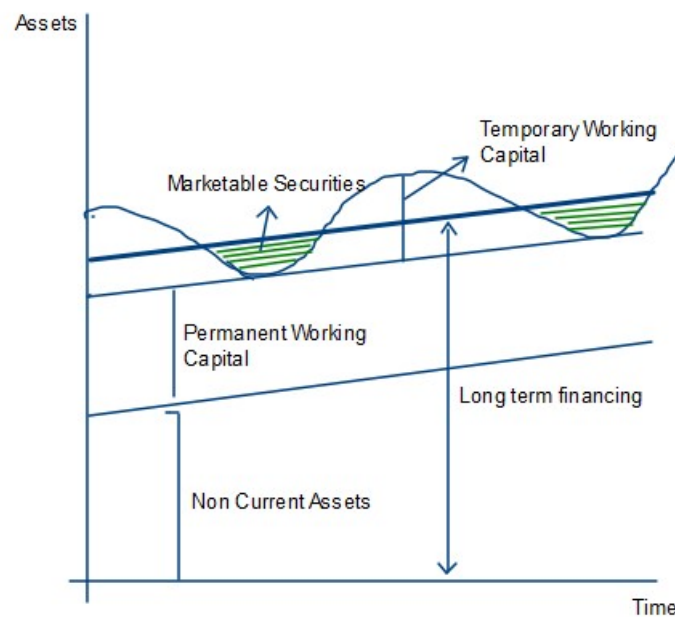


Fig 9.3 Financing of Working Capital- Conservative Approach

Aggressive Strategy

Aggressive policies carry the most risk and, as a result, have the potential for increased growth. It doesn't presume to have any reserves on hand to meet unforeseen working capital needs. It implies that only a small fraction of long-term borrowing is used to fund permanent operating capital. Short-term borrowing is used to cover the remaining costs and temporary working capital, including seasonal changes. Companies that follow this strategy make sure that the value of their current assets, such as debtors, is kept to a minimum by requiring prompt payments or limiting credit sales. The management further asserts that payments to creditors are delayed. This working capital policy is an option for organizations looking to grow more quickly. However, due to the high level of risk, sound business judgment and adept money management are essential. This strategy entails the biggest risk but also offers



the best chance to lower interest costs and boost a company's profitability. Figure 9.4 depicts an aggressive approach.

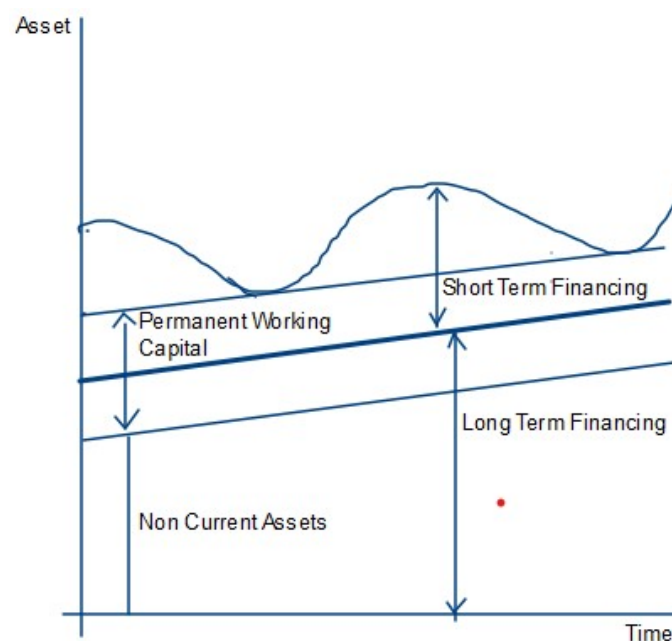


Fig 9.4 Financing of Working Capital- Aggressive Approach

3. Hedging Strategy

Adopting this method, also known as a matching policy, guarantees that a company's current assets and short-term liabilities are always in balance. This policy basically seeks to strike a compromise between the two extreme approaches, both in terms of risk and growth potential. This approach suggests matching the expected life of the asset with that of the funding source. For example, if a company wishes to finance machinery having a life of 20 years, it may finance the same by issuing a 20-year bond with its principal value equivalent to cost of machinery. Similarly, a firm may raise funds via commercial paper having a tenure of a month to finance inventory. Thereby most organizations observing this strategy use long-term sources of finance to invest in fixed current assets and resort to short-term funding options for current asset financing.

Figure 9.5 depicts the hedging/moderate approach. The non-current assets and fixed working capital making up for total fixed assets are being financed via long term source of funds while temporary working capital is financed through short term financing.

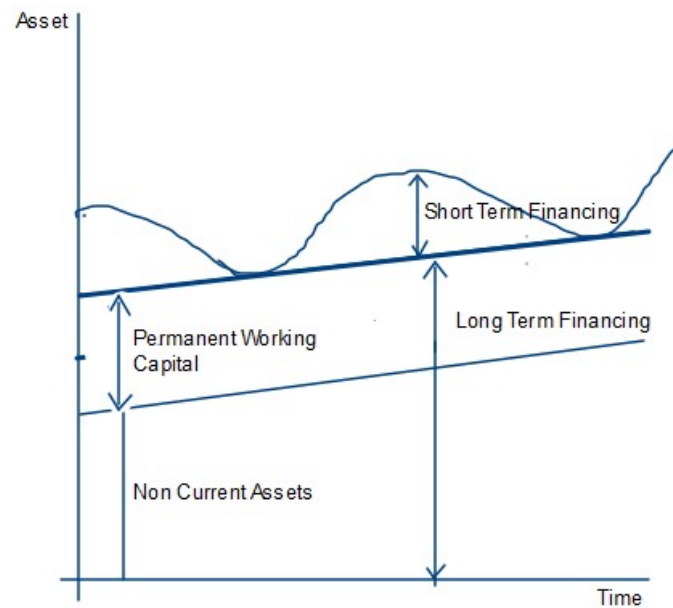


Fig 9.5 Financing of Working Capital- Hedging Approach

IN-TEXT QUESTIONS

1. In which of the following, the permanent working capital is financed by long-term sources of funds?
 - (a) Hedging Approach
 - (b) Aggressive Approach
 - (c) Conservative Approach
 - (d) All of the above.
2. Negative Net Working Capital implies that:
 - (a) Long-term funds have been used for long-term assets
 - (b) Long-term funds have been used for current assets
 - (c) Short-term funds have been used for fixed assets
 - (d) Short-term funds have been used for current assets
3. Management of working capital implies trade-off between:
 - (a) Cost and Revenue
 - (b) Assets and Liabilities
 - (c) Debtors and Creditors
 - (d) Liquidity and Profitability
4. Gross Working Capital is equal to:
 - (a) Total Assets
 - (b) Total Liabilities
 - (c) Total Current Assets
 - (d) Total Current Liabilities



9.5 RISK RETURN TRADE OFF

Liquidity v/s Profitability

The risk return trade off in working capital is predominantly about the tussle between liquidity and profitability. Precise estimation of the amount of working capital required will let the company spend just enough in current assets. The current asset holdings would be at the minimum level if there was absolute assurance as excessive investment in current assets won't provide expected return on investment and reduce cash flows. Conversely, a lower investment in current assets may result in disrupted production and sales due to frequent stockouts and a failure to pay creditors in time.

Since it is impossible to predict operating demands with accuracy, the company faces the dilemma of how much current assets to carry. Different risk-return implications apply to conservative or aggressive policy that a firm may follow to guide its working capital management.

Solvency and profitability are the two main goals of working capital management. When used technically, the term "solvency" refers to the company's ongoing capacity to pay for maturing liabilities. Creditors and lenders anticipate timely payment of their claim. The company needs to have a sizable investment in current asset holdings to guarantee solvency. Therefore, a liquid company has a lower chance of going out of business because it rarely runs out of cash or shares.

However, keeping a strong liquidity position comes at a price. The firm will have a significant amount of cash invested in existing assets hampering the profitability of the company if these investments remain dormant. The company's profitability will increase as a result of having fewer funds invested in idle current assets, but its solvency would be in jeopardy and it would be more vulnerable to cash shortages and stock outs.

Short term financing v/s long term financing

Deployment of long term and short-term funds to finance current assets also involves a trade-off. Long term debt is costly and usage of them to finance short term assets can reduce overall return on investment but they provide flexibility and are less risky in terms of rendering firms illiquid during tight working capital positions.



Hence, the company should minimize both the total cost of liquidity and the cost of illiquidity in order to balance the profitability-solvency knot. Illustration 9.1 numerically explains the risk return syndrome.

Illustration 9.1

Balance Sheet of ABC Ltd. as on 31st December 2022 is as follows:

Liabilities	Amount	Assets	Amount
Share capital	4,00,000	Non-current assets	6,00,000
Debentures	3,00,000	Current assets	2,00,000
Current liabilities	1,00,000		
Total	8,00,000	Total	8,00,000

The firm is earning 11% return on non-current assets and 2.5% return on current assets. Find out the effect on liquidity and profitability of the firm in following cases:

1. Increase in current assets by 30%
2. Decrease in current assets by 30%

Solution

The earnings of the firm may be ascertained as follows:

Particulars	Present Current Assets	Increase in current assets by 30%	Decrease in current assets by 30%
Current assets	200000	260000	140000
Non current assets	600000	600000	600000
Return on non current assets @11%	66000	66000	66000
Return on current assets @2.5%	5000	6500	3500



Total Return	71000	72500	69500
Ratio of current asset to total asset	25.00%	30.23%	18.92%
Current liabilities	100000	160000	40000
Ratio of current asset to current liabilities	2	1.625	3.5
Return as a percentage of total assets	8.88%	8.43%	9.39%

Here Financial manager is financing short term assets with short term financing therefore it can be observed that increase in current assets decreases current asset to current liability ratio while decrease in current asset affects ratio otherwise. Increasing the financing of current assets decreases the overall profitability of firm as can be noticed in return on asset ratio. Financial Manager should strike an optimal balance while investing in working capital as excessive funds in current assets may hamper the profitability.

IN-TEXT QUESTIONS

5. Which of the following needs to be true for a firm engaged in retailing:
 - a) High fixed cost
 - b) Low liquidity
 - c) High liquidity
 - d) High inventory turnover
6. “Financial Manager needs to strike a compromise between liquidity and profitability” Comment.

9.6 CASH MANAGEMENT

Businesses utilize cash on a regular basis to pay their debt commitments and operating expenditures, such as taxes, employee wages, inventory purchases, advertising costs etc. For long-term assets like property, plant, and equipment (PP&E) and other non-current assets, cash is employed as investment capital. For businesses to maintain adequate business



stability, a variety of cash inflows and outflows must be carefully managed. Maintaining cash balances is a key issue for financial managers.

Cash may be referred to fiat currency, cash at bank, demand draft, cheques held by the enterprise. In a broader sense cash comprises cash & cash equivalents. The cash equivalents are assets that can be readily converted into cash like marketable securities or short-term deposits with banks.

The process of controlling cash inflows and outflows is known as **Cash Management**. Cash is the main asset utilized to invest in and cover any liability, therefore this procedure is crucial for businesses. There are numerous alternatives for managing cash. In addition to giving organizations a window into their financial state, cash management may also be utilized to boost profitability by addressing liquidity issues.

Cash flows involved in day-to-day operations are dominated by changes in accounts receivables and accounts payable. A business can take numerous actions to increase the efficiency of its payables and receivables, which will ultimately result in more working capital and improved operating cash flow. Businesses may provide discounts enticing clients to pay early or on time, look for better financing terms for debt, use technology like automatic billing and electronic payments for payables administration as that will enable quicker and simpler payments.

Cash management calls for (i) effective cash forecasting and reporting systems, and (ii) achieving the best possible conservation strategies and use of cash resources.

Motives for holding cash

Every firm needs to maintain a minimum balance of cash and near cash assets for a variety of reasons. Three main motives behind maintaining a healthy cash & bank balance are Transactional, Precautionary and Speculative.

1. **Transactional Motive:** A business needs cash to conduct daily business transactions. The money is required to cover obligations like staff wages, freight charges, inventory purchases, buying tools or paying general expenses. The lack of perfect synchronization between cash receipts and payments causes the cash demands to arise. Sometimes cash payments exceed cash collections, and vice versa because of which firms need to maintain a minimum cash balance at all times. Funds requirement may be forecasted on the basis of probable payments and receipts in the near future. If more money is required for payments than for receipts, a bank overdraft may be used to raise the extra funds. However, if cash receipts exceed



payments, it may be invested in marketable securities. The maturity of securities may be modified to account for future payments, including interest and dividends.

2. Precautionary Motive: A business must maintain cash on hand to cover a variety of eventualities. Even though monetary inflows and outflows are predicted, these figures could change. For instance, a debtor who was supposed to pay after 3 days might need more time while a supplier who had extended credit for 15 days might not have the necessary goods. As purchases might be made from new vendors, cash might be needed rather than credit in certain circumstances. Such emergencies frequently occur in a business. A business must set aside money for these unforeseen circumstances. The ability to generate money quickly should be possible. Cash held back for unforeseen expenses is either ineffective or still ideal. However, such money may be put in marketable assets with a short maturity or low risk that could provide cash as and when needed.

3. Speculative Motive: The speculative motive involves keeping money on hand to invest in lucrative chances as they come along. Such chances don't present themselves frequently. Conjectures concerning these possibilities' occurrence can only be made. For instance, a company might want to make purchases at the temporary drop in raw material prices. If a company has cash on hand, then it may leverage such unexpected opportunities of making profit. These opportunities are transient in nature as they vanish away if not capitalized immediately.

Cash Conversion Cycle

The cash conversion cycle (CCC) is a metric that expresses the time in days that a firm takes to convert its investments in inventory and other resources into cash flows from sales. CCC attempts to measure how long each net input rupees is tied up in the production and sales process before it gets converted into cash received. This metric takes into account how much time the company needs to sell its inventory, how much time it takes to collect receivables, and how much time it has to pay its bills.

The CCC is one of several quantitative measures that help evaluate the efficiency of a company's operations and management. An increasing CCC should prompt more research and analysis based on other indicators, whereas falling CCC values over numerous periods are encouraging signs.

The cash conversion cycle is also called the net operating cycle (NOC) as the same is driven from gross operating cycle (GOC). GOC is the time involved in acquiring raw material, transferring raw material to production centres, converting the same into finished



goods, selling the goods and realizing cash out of those sales. The length of the gross operating cycle is thereby the sum of following:

- a. **Inventory Conversion Period (ICP)** i.e., the time taken from procurement to conversion of raw material into finished goods sales.

ICP can be decomposed into following:

Raw material Conversion Period (RMCP): Time taken to move procured raw material to production centers.

Work In Progress Conversion Period (WPCP): Time taken to engage raw material into production processes.

Finished Goods Conversion Period (FGCP): Time taken to convert finished goods into cash sales and credit sales.

- b. **Receivable Conversion Period (RCP):** Time taken from credit sales occurrence and collection from debtors.

$$\text{GOC} = \text{ICP} + \text{RCP}$$

Cash Conversion Cycle is calculated by deducting Deferral Period (DP) from gross operating period. Deferral period is the time period by which payables owed to creditors can be postponed.

$$\text{NOC or CCC} = \text{GOC} - \text{CC}$$

For calculation, above mentioned periods may be calculated as:

$$\text{RMCP} = \frac{\text{Average raw material stock}}{\text{Total raw material consumption}} \times 365$$

$$\text{WPCP} = \frac{\text{Average work in progress}}{\text{Total cost of production}} \times 365$$

$$\text{FGCP} = \frac{\text{Average finished goods}}{\text{Total cost of good sold}} \times 365$$

$$\text{RCP} = \frac{\text{Average receivables}}{\text{Total credit sales}} \times 365$$

$$\text{DP} = \frac{\text{Average payables}}{\text{Total credit purchases}} \times 365$$



Note:

1. Average of opening and closing balances of respective items will be used to calculate average value in formulas.
2. In order to arrive at denominator values on “per day” basis, the entire fraction is multiplied by the number of days in the specific period which is assumed to be a fiscal year.

The CCC is lengthened when management takes longer time to collect unpaid invoices, keeps an excessive amount of inventory on hand, or pays its bills too rapidly. Since it takes longer to create income, a longer CCC can force small businesses into bankruptcy. The CCC is shortened when a business collects past-due payments swiftly, accurately predicts its inventory needs, or pays its invoices slowly. A smaller CCC indicates improved business health and helps in growing profitability. The cash conversion cycle and operating cycle can also be understood with the help of following fig. 9.6.

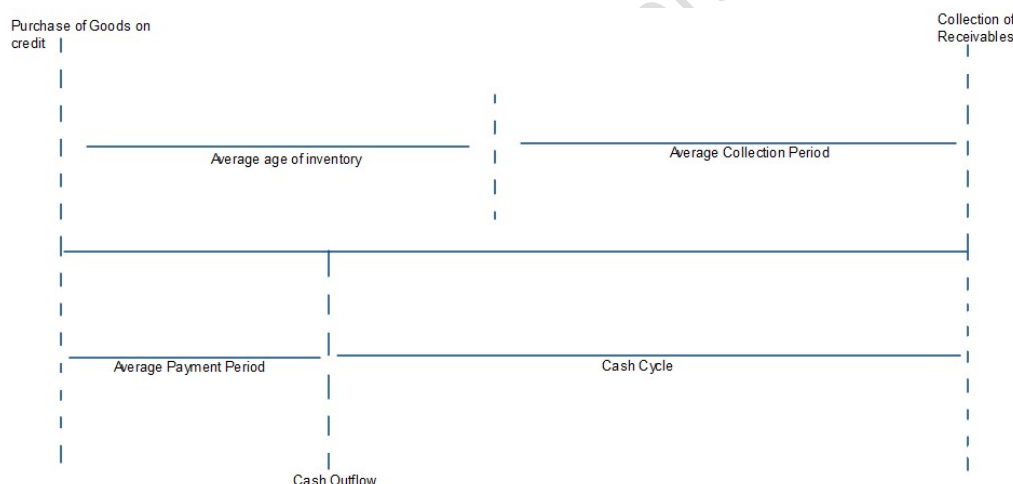


Fig. 9.6: Cash Conversion Cycle

Internal Control System for Cash Management

The financial management should take action to quickly recover money from creditors, and for this reason the company should create an effective internal control system. There should be a built-in method for prompt recovery from the debtors after the credit sales are completed. When customer checks or draughts are received, there shouldn't be any delay in depositing these receipts with the bank.

Collection Centres



To avoid mail delays, a company may establish collection centres (banks) throughout the nation. This strategy minimizes the amount of time needed for dispatch, collection, etc. by opening the collection centres as close to the debtors as possible. Instead of sending payments to the central office, the company may instruct clients to mail their payments to a local bank or collection agency. By reducing collecting time through focus banking, improved cash management is achieved. The choice of collection centres must, however, take into account the amount of billing and activity in a certain geographic area.

Lock Box System

Customers who use the lock-box system mail their payments to a post office box close to their place of employment. The business makes arrangements with a bank to rapidly collect the payments and credit them to the business's account. The lock-box method is only cost-effective if a considerable volume of payments is being accepted at a given location because the costs associated with maintaining the system could be high. Commercial banks, on the other hand, typically offer their major clients the services of collecting the checks from the client's office and (ii) submitting the high value checks to the clearing system on the same day. Both of these services contribute to the huge clients' float. These advantages are not, however, unpaid. The bank typically assesses a fee for each check that is processed through the system.

A firm can improve its cash management and lower its cash requirements by exercising effective control over cash outflows or payments. A financial manager should make every effort to sluggish the payments. However, caution must be exercised to prevent damage to the company's reputation and credit standing. The discount that creditors offer in exchange for quick payment must be fairly assessed in terms of the costs and advantages of the discounts.

Regarding the management of inflows and outflows, using float is a crucial strategy to shorten the cash cycle. There is typically a delay between the time the check is written and the time it is cleared when a business receives or makes payments via checks, etc. The time that passes between the point at which the paying company writes a check and the point at which the funds supporting the check are actually debited in the bank account is referred to as the float for the paying firm. The period of time between receiving the check and having the money available in its account is known as the payee company's "float." Float consists of three parts:

Mail Time: It is the duration between the issue of a cheque and its receipt by the payee.

Processing Time: This is the period of time between receiving a check and depositing it in the payee's bank account;



Collection Time: This is the period of time required to move money from the payer's account to the payee's account via the banking system. This collection time is often the third or fourth including the day a check is deposited.

Payment float is the sum of checks issued but not yet presented for payment. The receipt float is the total amount of uncleared checks that have been deposited in banks. Net float is the distinction between the payment float and the reception float. Firm should strive to maintain a positive net float.

Optimum Cash Balance

The primary key issue as identified under discussion of cash management is the amount of minimum cash balance and safety cover maintained by organizations at all times. Firms make cash budgets on the basis of forecasted receipts and payments for subsequent periods. Shortages may be dealt by liquidating marketable securities, sourcing from new credit lines while surpluses should be invested in short term securities. Determination of optimum cash balance will mean striking a balance between risk and return. Few models have been advised to deal with optimum cash balance conundrum.

Baumol's Model

William Baumol proposed a model similar to the Economic Order Quantity Model of Inventory management. He came to the conclusion that money might also be viewed as a certain kind of stock, one that is essential for conducting business. Similar to carrying cost and ordering cost in EOQ model of inventory management, holding cost and transaction cost of replenishing cash comes into play while deriving optimal cash in Baumol's Model.

Holding cost of cash is its opportunity cost of holding cash in hand in place of investing the same in interest yielding marketable securities. Holding cost of cash is the interest foregone on such securities.

Transaction Cost of replenishing cash is the brokerage & commission charged while liquidating marketable securities.

The model's goal is to minimize the sum of opportunity cost and transaction cost, which represents the entire cost of keeping cash.

Fundamental presumptions of the model are as follows:

- Amount of cash requirement throughout the period is known & certain.
- Steady and predictable cash inflow.



- Stable interest rate for the entire term when investing in securities
- Transaction cost of liquidating securities is known and stable.
- Cash transfers are done with immediate effect without any delay.

Assuming that the firm begins with a cash balance of “a” amount by selling securities. While bearing day to day expenses, the cash balance will deplete and will become nil. The firm will be again replenishing “a” amount of cash. So, at all times the firm is holding $a/2$ cash on average. If return on foregone short-term investment is “r” then the holding cost will be as follows:

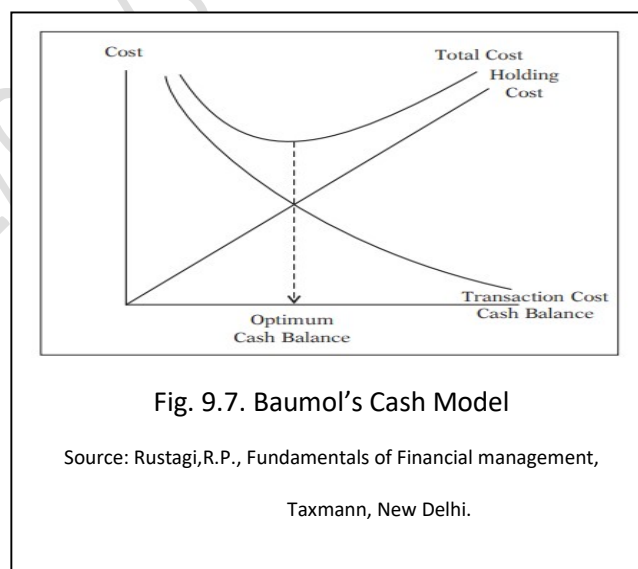
$$\text{Total Holding cost} = r \cdot (a/2)$$

Transaction cost will be charged every time cash is replenished with “a” amount. Number of times a transaction will take place will be equivalent to total funds needed during the year “T” divided by amount replenished in every transaction “a”. The transaction cost is assumed to be c per transaction.

$$\text{Total Transaction cost} = c \cdot (T/a)$$

$$\text{Total cost of cash requirement} = r \cdot (a/2) + c \cdot (T/a)$$

Holding cost increases as cash balance “a” increases while transaction cost will fall if “a” increases as the number of transactions will be lesser. The model strikes a balance by determining cash balance that minimizes cost as depicted in fig. 9.7.





Following is the formula driven for optimisation problem:

$$A^* = \sqrt{\frac{2cT}{r}}$$

Where

A^* = optimum cash balance i.e. the balance replenished every time the transaction is carried out.

c = cost per transaction

T = total amount of funds needed during the year.

r = rate of return foregone on marketable securities.

A^* will increase as transaction cost “ c ” increases while the cash balance will decrease if holding cost “ r ” increases.

Illustration 9.2

ACC Ltd requires Rs.5 lakh in cash for meeting its transaction needs over the next five months. This amount is available with ACC Ltd. in the form of marketable securities. It can earn 18 percent annual yield on its marketable securities. The conversion of marketable securities into cash entails a fixed cost of Rs. 500 per transaction. Find the optimum cash conversion size.

Solution

Opportunity cost “ r ” = $(18/12) \times 5 = 7.5\%$

which is 0.075 per rupee • Rounding it off – Rs. 81650 is the optimum transaction size. • Average cash holding = $C/2 = 81650/2 = 40825$ • No. of transactions = $T / C = 500000/81650 = 6.12$ or simply 6 • Average no. of days per transaction (we are assuming 30 days per month) = $150 / 6 = 25$ days • Per day usage of cash = $81650/25 = 3266$

Miller Orr Model

Miller and Orr (1966) Model is an improvement over Baumol's model which is not applicable in case cash requirement is not steady. The inventory type model cannot be employed when there is significant uncertainty regarding cash flows. Further on Baumol model also ignore the situation of cash surplus. Miller and Orr claimed that the cash balances fluctuate randomly based on empirical evidence. It does not get consumed at a consistent rate.



According to the Miller-Orr model, changes in cash balance during a specific period are random both in terms of amount and direction. The model presupposes that of the two assets, i.e. cash and marketable securities, the latter has a marginal yield and (ii) a seamless transfer of cash to marketable securities and vice versa is achievable, albeit at a price. For the cash balance, the model provides two control limitations. H is a ceiling above which cash balance should not go & a lower limit, L, below which the cash level is not permitted to go, and must not be allowed to go. Within these constraints, the cash balance should be permitted to fluctuate. At this stage, if the cash level has reached the upper control limit, H, some of the cash should be invested in marketable securities so that the cash balance falls to the return level, R, which is a predetermined amount. R is established as the goal cash balance. If the cash balance drops to level L, it is necessary to sell enough marketable securities to raise money, bringing the balance back up to level R. As long as the cash balance is between the and marketable securities, no transaction between the two.

Management determines the lower limit, L, based on how much risk of a cash deficit the firm is willing to bear, which in turn depends on both the availability of borrowings and the repercussions of a cash shortfall.

The model computes a gap between the lower and higher limit that diminishes the total of transaction costs and holding opportunity costs. There are three steps in the model. Setting a cash balance's bottom bound. Estimating the variability in future cash flows is the second phase. The third step is to calculate the spread as a result of the market interest rate, transaction costs, and fluctuation. Adding this spread to the lower cash limit will determine the upper limit .

$$Z = \sqrt[3]{\frac{3TV}{4i}}$$

where,

T = Transaction cost

V = Variance of daily cash flows

i = Daily % interest rate on investments.

If the firm take 'L' to be lower limit of cash balance, then the return level may be

defined as $R = L + Z$, and the upper limit H is defined as $H = 3Z + L$

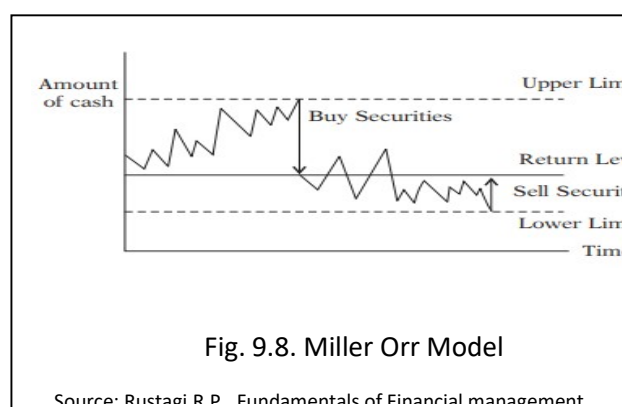


Fig. 9.8. Miller Orr Model

Source: Rustagi R P. Fundamentals of Financial management



For instance: the minimum cash balance of ₹10,000 is required at A. Co. and transferring money from the bank costs ₹40 per transaction. Inspection of daily cash flows over the past year suggests that the standard deviation is ₹3,000 per day, and hence the variance (standard deviation squared) is ₹9 million. The interest rate is 0.03% per day.

Calculate:

- (i) the spread between the upper and lower limits
- (ii) the upper limit
- (iii) the return point.

Solution:

$$(i) \text{Spread} = 3 \left(\frac{3}{4} \times 50 \times 9,000,000 / 0.0003 \right)^{1/3} = ₹31,200$$

$$(ii) \text{Upper limit} = 10,000 + 31,200 = ₹41,200$$

Illustration: 9.3

The following details concerning S Limited's cash management system are provided. Marketable securities have a 15% annual yield. Marketable securities transactions have a fixed cost per transaction of ₹ 2000. The daily cash balance change's standard deviation is 4,000 rupees. The cash balance must be at least ₹ 50,000. Determine return point and upper limit.

Solution

$$Z = \sqrt[3]{\frac{3TV}{4i}}$$

$$Z = \sqrt[3]{\frac{3 \times 2000 \times 4000 \times 4000}{4 \times 0.0416}}$$

$$Z = 8324.777$$

$$\text{Return Point} = 8324.777 + 50000 = ₹58324.777$$

$$H = 3Z + L$$

$$H = \text{Upper limit} = 3 \times 8327.777 + 50000 = ₹74983.331$$



IN-TEXT QUESTIONS

7. Operating cycle of a firm can be shortened by:

- (a) Increasing credit period to customers
- (b) Increasing stock of raw material
- (c) Increasing working-in-progress period
- (d) Increasing credit period from suppliers.

8. NOC is equal to:

- (a) GOC - DP
- (b) RMCP - RCP
- (c) GOC + DP
- (d) WPCP - CC

9. Find out the Cash Conversion Period if Receivable Conversion Period is 40 days, Deferral Period in 30 days and Inventory Holding Period in 25 days:

- (a) 30 days
- (b) 25 days
- (c) 35 days
- (d) 45 days

10. JJ Ltd. receives cash at gradual and steady rate of 3,50,000 p.a. The cash can be invested by the company to give a return of 12% p.a. However, every time, it invests, it has to meet transaction expenses of 50 plus 1% brokerage of the amount invested. Another investment broker has approached the company to take up the investment work. He has offered to charge 100 per transaction plus 0.8% of the amount invested. Should the company accept the offer?

9.7 RECEIVABLE MANAGEMENT

Account receivables are significant part of current assets and working capital. Account receivables arise from debt extended by company to its customers on its credit sales. The loan



extended to customers does not provide any interest income while it is just a facility provided on purchases. Firms may adopt a liberal or a stringent credit policy. A liberal one will help boost sales and increase profit potential while a stringent one will reduce the cost of default and increase liquidity. Receivable Management involves compromising a balance between liberal and stringent credit policy through a careful evaluation. Formulating credit standards, terms of extending credit and developing collection policy is all part of receivables management.

Costs associated with Receivables Management

The explicit cost associated with managing account receivable is financing cost, administrative cost, delinquency cost & cost of bad debt.

Financing Cost: Extending credit lengthens the operating and cash conversion cycle causing funds to be blocked for a longer time. So, fund demand has to be met by external or internal sources both of which carry cost.

Administrative Cost: The cost incurred on maintaining credit sales record. Cost pertaining to procuring creditworthiness information of customers before extending credit also forms part of administrative cost.

Delinquency Cost: Delay in payments also calls for sending reminders, legal notices and cost of those funds that remain stuck for longer than expected time.

Cost of Bad Debt: Default caused by customers will call for writing bad debt off against the firm's profits.

Cost of receivables management may be represented as per following figure 9.9.

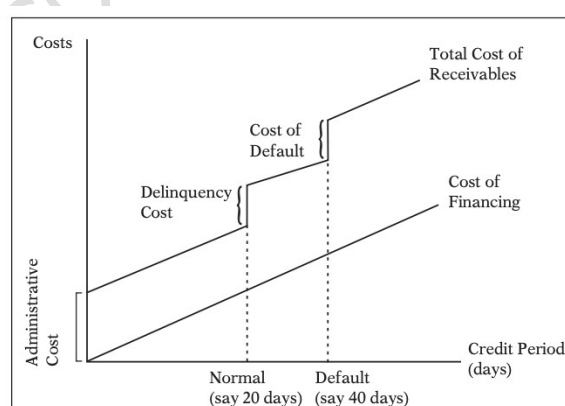


Fig.9.9 Costs incurred in Receivable Management



Important Aspects of Receivables Management

The receivables management must be attempted by adopting a systematic approach and considering the following aspects of receivables management:

1. The credit policy.
2. The credit evaluation.

Credit Policy

The fundamental choice to be made under credit policy in relation to receivables is how much and under what conditions firm should issue credit to a customer. Credit standard and terms of credit are determined with credit policy.

(i) **Credit Standards:** It is necessary to establish credit standards that gets used when choosing consumers for extending credit. Influence of a specific standard on sales volume, firm's overall bad debts, and the cost of collection must be assessed.

(ii) **Credit Terms:** The credit terms outline the specifics of how the credit will be made available, such as the duration of the credit offer, the interest rate, and the default costs. Following are various factors constituted in credit terms.

- (a) **Duration:** The period of time during which consumers may postpone payment will predominantly depend upon customary practices prevalent in that particular industry and market. Typically, the credit duration ranges from 3 to 60 days. Extending the credit period boosts sales, whereas shortening it has a diversionary impact. Changing the credit period policy or deviating from conventional practices in the market must be analyzed cautiously.
- (b) **Discount Policies:** Customers are extended a cash discount to encourage them to make payments on time. 3/10, 2/20, net 30 refers to a monetary discount of 3% if payment is made within 10 days, a discount of 2% if payment is made within 20 days, and a full payment requirement of 30% if payment is not made within 30 days of the sale date. When a business gives a cash discount, it wants to strengthen its financial position by accelerating the flow of cash into the business. The duration of the cash discount impacts the cash conversion cycle.
- (c) **Cost of discount:** The cost of discount offered must be compared to the cost of funding. For instance if a company's usual collection time is 30 days, one way to shorten that time is to give a cash discount of 2% if the payment is made within 10



days. A customer with a ₹ 10000 balance who was paying in 30 days now receives the 2% discount and makes their payment of ₹ 9800 on the tenth day. As a result, the company will have ₹ 9800 for 20 days (or 30-10), and the price is 200. The following formula can be used to determine the discount's annual cost:

$$\text{Cost of discount} = \frac{200}{9800} * \frac{365}{20} * 100 = 37.24\%$$

37.24% is the annual cost of discount which should be measured and assessed against the cost of raising funds. The formula may be standardized as follows:

$$\text{Annualized Cost of discount} = \frac{\text{Discount\%}}{100 - \text{Discount\%}} * \frac{365}{\text{Credit period} - \text{Discount period}} * 100$$

Increasing the discount rate for the same payment period or keeping it constant for a longer payment period is liberalizing the discount rate which will improve cash sales.

Credit Evaluation & Control

Before extending credit to customers, it is important to take note of their solvency and liquidity position. Collecting the right data and analysis of it will constitute credit evaluation. Bank statements, reports by credit rating agencies, credit ranking scores provided on recently issued fixed income securities can be used to assess credit worthiness of customer.

After gathering all relevant credit data, it is necessary to analyze it in order to draw a conclusion about the creditworthiness of a potential consumer. The well-known "five C's" of credit are: Character, cashflow, capital, collateral, and conditions in the economy. These traits can shed light on the customer's or default risk. The default risk may be used for pricing the credit extended.

Ratio analysis: Credit Monitoring constitutes analysing key financial ratios like Gross profit ratio, Net profit ratio, Current ratio, Quick ratio, Stock turnover ratio, Net worth, Asset turnover, Current asset turnover, Working capital turnover, Fixed asset turnover, Debt-Equity ratio, Debt service coverage ratio etc.

Controlling receivables after extending credit is imperative. Average collection period may be calculated to monitor receivables. The average collection period is the length of time it takes for a company to obtain accounts receivable payments due from its clients. To make sure companies have enough cash on hand to cover their financial responsibilities, businesses employ the average collection period. For businesses that largely rely on receivables for their cash flows, the average collection period is a crucial number since it shows how well a company manages its accounts receivable. In general, a shorter average collecting time is



preferable to a longer one. An organization's ability to collect money quickly is indicated by a low average collection period. This could indicate that the company's loan terms are excessively stringent, too.

Average Collection Period = $365 * (\text{Average Accounts Receivables} / \text{Net Credit Sales})$

Firm may analyse their trend in receivables by computing average collection period periodically.

Factoring Services

It is evident that a source of liquidity is required because the firm's finances are being blocked by its accounts receivable. The cost of discomfort involved with calling each individual debtor is another factor in the cost of collecting receivables, in addition to the delay between the date of sale and the date of receipt of dues. In a financial transaction known as factoring, a company sells its accounts receivable—that is, its invoices—to a third party (referred to as a factor) at a discount. A factor is a middleman who buys firms' receivables in order to supply them with cash. In essence, a factor is a source of capital that consents to pay the business the amount of an invoice less a discount for commission and other costs. By selling their receivables in exchange for a cash infusion from the factoring company, businesses can better meet their short-term liquidity demands. A factoring fee is the sum that the factoring business charges and deducts from firm's invoice to cover the cost of the factoring service. Rates are established based on how long an invoice is outstanding. The fee varies amongst factoring providers and is based on a number of factors, including the industry, credit worthiness, and invoice amount. As a result, factoring serves only as a stand-in for internal receivables management.

Forfaiting Services

Forfaiting is a form of financing of receivables pertaining to international trade. It denotes the purchase of trade bills/ promissory notes by a bank/financial institution without recourse to the seller. The purchase is in the form of discounting the documents covering entire risk of non-payment in collection. All risks and collection problems are fully the responsibility of the purchaser (forfeiter) who pays cash to seller after discounting the bills/notes. The salient features of forfaiting as a form of export relating financing are as under:

- (i) On a basis of deferred payment, the exporter sells and delivers items to the importer.
- (ii) In order to pay the exporter, including interest, the importer executes a series of promissory notes in their favour.



- (iii) The exporter receives the bills or notes. The bank that backs the promissory notes or bills may or may not be the bank of the importer. An Aval, which is a bank's endorsement ensuring importer payment, is what the guarantee by the bank is known as.
- (iv) The exporter and a forfeiter, often a reputable bank, enter into a forfaiting arrangement. The exporter sells the availed notes/bills to the bank at a discount without recourse and receives the payment.
- (v) The forfeiter may keep these notes or bills until they are paid in full by the bank of the importer.

Factoring v/s Forfaiting

Cross-border factoring and forfaiting are comparable to the extent that they both share the traits of non-recourse and advance payment. But, they are different in a number of crucial ways.

- (a) The factor funds between 75% and 85% of the note's or bill's value and preserves a factor reserve that is paid upon maturity. The forfeiter discounts the entire note's or bill's value.
- (b) Under the forfaiting arrangement, the availing bank's unconditional and irrevocable guarantee plays a crucial role, whereas in a financing agreement, especially one of the non-recourse variety, the export factor bases his credit judgement on the exporter's credit standards.
- (c) While factoring also includes ledger management, collection, and other services, forfaiting is a pure financial transaction.
- (d) In essence, factoring is a form of short-term finance. Finance notes and invoices that result from deferred credit transactions that span three to five years are forfeited.
- (e) A forfeiter charges a premium for this risk; a factor does not protect against variations in exchange rates.

Inventory Management

The company's inventory refers to and comprises both the products and services that are currently being sold by the company as well as the raw materials and other parts that are utilised to produce those products and services. A retail store owner maintains a stock of finished goods that are available to customers upon request. On the other hand, a



manufacturing company must maintain a stockpile of all the physical components utilised in the production process in addition to the finished goods they are making.

Each company keeps a certain amount of raw materials, work-in-progress, and finished goods on hand, based on the needs of the business and other factors. Having inventory benefits it, without a question, but there are also costs associated with keeping inventory. Without these expenses, there would have been no inventory management issues and every company would have kept a higher and higher amount of stocks. Costs associated with holding inventory include storage cost, financing cost and cost of placing order for raw material.

A fundamental trade-off between risk and return must be made when investing in inventories, just like it is when choosing other current assets. The danger is that the various business processes won't work independently if the inventory level is too low. The savings from lower inventory levels cause the return. Storage and other expenses expand together with the amount of the inventory. As a result, when inventory levels rise, the danger of running out of stock declines while the cost of maintaining inventory rises.

One of the widely used techniques deployed for inventory management is “Economic Order Quantity Model”

Economic Order Quantity Model

The finance manager must find solutions to the order quantity problem and the order point problem, two interrelated challenges, in order to manage the investment in inventory. In order to reduce the expenses associated with various inventory levels, inventory management primarily focuses on maintaining an ideal level of inventory. The amount of units purchased in a single lot and the rate at which those units are used or sold determine the average level of inventory, in large part. With careful consideration of the quantity ordered, the carrying cost of the average level, and the yearly demand, entity can optimize investment in inventory.

The Economic Order Quantity (EOQ) methodology aims to identify the orders' minimum total cost of inventory. It is predicated on the idea that total inventory cost equals total carrying cost plus total ordering cost.

The EOQ model is based on the following assumptions:

- (a) The total usage of a particular item for a given period (usually a year) is known with certainty and that the usage rate is even throughout the period.
- (b) That there is no time gap between placing an order and getting its supply.



- (c) The cost per order of an item is constant and the cost of carrying inventory is also fixed and is given as a percentage of average value of inventory.
- (d) That there are only two costs associated with the inventory, and these are the cost of ordering and the cost of carrying the inventory.

Given the above assumption, the EOQ model may be presented as follows:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

where, EOQ = Economic quantity per order.

A = Total Annual requirement for the item.

O = Ordering cost per order of that item.

C = Carrying cost per unit per annum.

The total ordering cost for any particular item is decreasing as the size per order is increasing. This will happen because with the increase in size of the order, the total number of orders for a particular item will decrease resulting in decrease in the total order cost. The total annual carrying cost is increasing with the increase in order size. This will happen because the firm would be keeping more and more items in the stores. However, the total cost of inventory (i.e., the total carrying cost + the total ordering cost) initially reduces with the increase in size of order but then increases with the increase in size of order. The trade-off of these two costs is attained at the level at which the total annual cost is the least. At this particular level, the order size is designated as the economic order quantity. If the firm places the orders for that item of this economic order quantity, then the total annual cost of inventory of that item will be minimized.

ABC Analysis

There are other inventory management techniques including ABC Analysis. The ABC analysis classifies various inventory items into three sets or groups of priority and allocates managerial efforts in proportion of the priority. The most important items are classified as class A, those of intermediate importance are classified as class B and the remaining items are classified as class C. The financial manager should monitor different items belonging to different groups in that order of priority. Utmost attention is required for class A item, followed by items in class B and then items in class C. Different items are given priority order on the basis of total value of annual consumption. Item with the highest value is given



top priority and so on. The annual consumption value of all the items, already arranged in priority order, are then shown in cumulative terms for each and every item. Thereafter, the running cumulative totals of annual value of consumption are expressed as a percentage of total value of consumption. *The basic premise of ABC analysis is that every single item in an inventory doesn't have equal value and demand – some items cost much more than others. In contrast, some items are used more frequently, and the remaining are a mix of both.*

IN-TEXT QUESTIONS

11. Creditors turnover ratio may be worked out with the help of following formula:

- a. Purchases/Trade Payables
- b. (Credit Purchases/Trade Payables) *365
- c. (Trade Payables/ Purchases) *365
- d. Trade payables/ Purchases

12. Increasing volume of receivables without matching increase in sales is reflected by:

- a. A low Receivables turnover ratio
- b. A high Receivables turnover ratio
- c. A high creditors turnover ratio
- d. A low creditors turnover ratio

1.8 SUMMARY

Working capital can refer to either gross working capital, which is the sum of all current assets, or net working capital, which is the difference between current assets and liabilities. The amount of working capital a company needs to operate depends on a number of variables, including the business' operating cycle, nature, seasonality, business cycle changes, competitiveness in the market, credit policy, supplier conditions, etc. According to the Hedging Approach, long-term financing should be used for permanent requirements while short-term financing should be used for temporary requirements. The Conservative Approach, on the other hand, recommends funding the need for working capital in the first instance from long-term sources. According to the Aggressive Approach, even a small portion of a permanent requirement financed with current assets. In a larger sense, cash



management relates to controlling cash and bank balances as well as controlling cash inflows and outflows. banking for concentration. Float management and the lock box system are two methods for controlling the flow of cash. The ideal quantity of cash on hand is the level that the business should be at to minimise the cost of keeping cash on hand. The ideal cash balance provided by Baumol's model tries to reduce the overall cost of retaining cash. According to the Miller-Orr model, a company should keep its cash balance between a lower and upper limit. Receivable Management involves compromising a balance between liberal and stringent credit policy through a careful evaluation. Formulating credit standards, terms of extending credit and developing collection policy is all part of receivables management.

1.9 GLOSSARY

Accounts Payable: An account in the general ledger known as "Accounts Payable" denotes a business' responsibility to settle a recent debt with one of its suppliers or creditors.

Accounts Receivables: The balance of money owed to a business for goods or services delivered or utilised but not yet paid for by clients is known as accounts receivable (AR). On the balance sheet, accounts receivable is shown as a current asset. Any money that customers owe for purchases they made using credit is known as AR.

Bills of Exchange: A bill of exchange is a written document that binds one party to pay another party a specific amount of money on demand or at a specific date. It is most commonly used in international trade.

Cash Flow: The net quantity of cash and cash flow are referred to as cash flow. Equivalents moving in and out of a business. Money spent and money received reflect inflows and outflows, respectively. Fundamentally, a company's capacity to produce positive cash flows, or more specifically, its capacity to optimise long-term free cash flow, determines its ability to create value for shareholders (FCF). FCF is the cash a company generates from its regular business activities after deducting any funds used for capital expenditures.

Customer: A company or organisation that owes money on an invoice that the factor (i.e., the client's customers) purchased is known as a customer or account debtor.

Net worth: A person's or company's net worth is the value of their assets less the amount of obligations they have. It is a crucial indicator for assessing a company's health because it offers a helpful overview of its present financial situation.

Asset turnover: The asset turnover ratio measures the value of a company's sales or [revenues](#) relative to the value of its [assets](#). The asset turnover ratio can be used as an indicator of the efficiency with which a company is using its assets to generate revenue.



Working capital turnover: A ratio called working capital turnover assesses how well a business uses its working capital to promote sales and expansion. Working capital turnover, also known as net sales to working capital, gauges the connection between the resources utilised to finance an organization's operations and the revenues that organisation generates to maintain operations and make a profit.

Fixed asset turnover: Fixed Asset Turnover (FAT) is an efficiency ratio that indicates how well or efficiently a business uses fixed assets to generate sales. This ratio divides net sales by net fixed assets, calculated over an annual period.

Debt service coverage ratio: It is a measurement of a firm's available [cash flow](#) to pay current debt obligations. The DSCR shows investors whether a company has enough income to pay its debts.

Bankruptcy: Bankruptcy is a legal proceeding initiated when a person or business is unable to repay outstanding debts or obligations. It offers a fresh start for people who can no longer afford to pay their bills.

1.10 ANSWER TO IN TEXT QUESTIONS

- | | |
|--|---|
| 1. (d) All of the above. | 7. (d) Increasing credit period from suppliers. |
| 2. (b) Long-term funds have been used for current assets | 8. (a) GOC - DP |
| 3. (d) Liquidity & Profitability | 9. (c) 35 days |
| 4. (c) Total Current Assets | 11. b. (Credit Purchases/Trade Payables) *365 |
| 5. (c) High Liquidity | 12. a. A low Receivables turnover ratio |

1.11 SELF-ASSESSMENT QUESTIONS

1. Calculate the Operating cycle from the following figures related to Y company:

Particulars	Average amount Outstanding	Average value per day
-------------	----------------------------	-----------------------



Raw Material inventory	1,80,000	
Work-in-progress inventory	96,000	
Finished goods inventory	1,20,000	
Debtors	1,50,000	
Creditors	1,00,000	
Purchase of Raw Material		2,500
Cost of Sales		4,000
Sales		5,000.

2. The annual cash requirement of B Ltd. is ₹ 10 Lakhs. The company has marketable securities in lot sizes of ₹ 50,000, ₹ 1,00,000, ₹ 2,00,000, ₹ 2,50,000 and ₹ 5,00,000. Cost of conversion of marketable securities per lot is ₹ 1,000. The company can earn 5% annual yield on its securities. You are required to prepare a table indicating which lot size will have to be sold by the company. Also calculate the economic lot size can be obtained by the Baumal Model.
3. How would you describe the seasonal industry's working capital needs, where you have been appointed finance manager? Use the example to support your response.
4. "Efficient cash management will aim at maximizing the availability of cash inflows by decentralizing collections and decelerating cash outflows by centralizing the disbursements"? Discuss and explain.
5. Stapler Ltd. receives cash at gradual and steady rate of 3,50,000 p.a. The cash can be invested by the company to give a return of 12% p.a. However, every time, it invests, it has to meet transaction expenses of 50 plus 1% brokerage of the amount invested. Another investment broker has approach the company to take up the investment work. He has offered to charge 100 per transaction plus 0.8% of the amount invested. Should the company accept the offer ?
6. A company believes that it is possible to increase sales if credit terms are relaxed. The profit plan, based on the old credit terms, envisages projected sales at 10,00,000, a 30 per cent profit-volume ratio, fixed cost at 50,000, bad debts of 1.00 per cent and an accounts receivable turnover ratio of 10 times. The relaxed credit policy is expected to increase sales to 12,00,000. However, bad debts will rise to 2 per cent of sales, the accounts receivable turnover ratio will be decreased to 6 times. Should the company



adopt new (relaxed) credit policy, assuming the company's target rate of return is 20 per cent.

7. A company is currently engaged in the business of manufacturing computer component. The computer component is currently sold for 1,000 and its variable cost is 800. For the year ended, the company sold on an average 500 components per month. Presently company grants one month credit to its customers. The company is thinking of extending the credit to two months on account of which the following is expected: Increase in Sales : 25 per cent Increase in Stock : 2,00,000 Increase in Creditors : 1,00,000 You are required to advise the company whether or not to extend the credit terms. If all customers avail the credit period of two months. Company expects a minimum return of 40% on investment.
8. ABC Ltd. is examining the question of relaxing its credit policy. It sells at present 20,000 units at a price of 100 per unit, the variable cost per unit is 88 and average cost per unit at the current sales volume is 92. All the sales are on credit, the average collection period being 36 days. A relaxed credit policy is expected to increase sales by 10% and the average age of receivables to 60 days. Assuming 15% return, should the firm relax its credit policy ?

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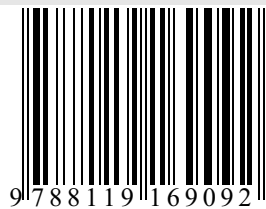
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