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Education for All

DR. BABASAHEB AMBEDKAR
OPEN UNIVERSITY
(established by government of gujarat)

MBA02C203
Semester 2

FINANCIAL MANAGEMENT

Message for the Students

Dr. Babasaheb Ambedkar Open (University is the only state Open University, established by the Government of Gujarat by the Act No. 14 of 1994 passed by the Gujarat State Legislature; in the memory of the creator of Indian Constitution and Bharat Ratna Dr. Babasaheb Ambedkar. We Stand at the seventh position in terms of establishment of the Open Universities in the country. The University provides as many as 54 courses including various Certificate, Diploma, UG, PG as well as Doctoral to strengthen Higher Education across the state.

On the occasion of the birth anniversary of Babasaheb Ambedkar, the Gujarat government secured a quiet place with the latest convenience for University, and created a building with all the modern amenities named 'Jyotirmay' Parisar. The Board of Management of the University has greatly contributed to the making of the University and will continue to this by all the means.

Education is the perceived capital investment. Education can contribute more to improving the quality of the people. Here I remember the educational philosophy laid down by Shri Swami Vivekananda:

> ***"We want the education by which the character is formed, strength of mind is Increased, the intellect is expand and by which one can stand on one's own feet".***

In order to provide students with qualitative, skill and life oriented education at their threshold. Dr. Babaasaheb Ambedkar Open University is dedicated to this very manifestation of education. The university is incessantly working to provide higher education to the wider mass across the state of Gujarat and prepare them to face day to day challenges and lead their lives with all the capacity for the upliftment of the society in general and the nation in particular.

The university following the core motto 'स्वाध्यायः परमम् तपः' does believe in offering enriched curriculum to the student. The university has come up with lucid material for the better understanding of the students in their concerned subject. With this, the university has widened scope for those students who
are not able to continue with their education in regular/conventional mode. In every subject a dedicated term for Self Learning Material comprising of Programme advisory committee members, content writers and content and language reviewers has been formed to cater the needs of the students.

Matching with the pace of the digital world, the university has its own digital platform Omkar-e to provide education through ICT. Very soon, the University going to offer new online Certificate and Diploma programme on various subjects like Yoga, Naturopathy, and Indian Classical Dance etc. would be available as elective also.

With all these efforts, Dr. Babasaheb Ambedkar Open University is in the process of being core centre of Knowledge and Education and we invite you to join hands to this pious *Yajna* and bring the dreams of Dr. Babasaheb Ambedkar of Harmonious Society come true.

Prof. Ami Upadhyay
Vice Chancellor,
Dr. Babasaheb Ambedkar Open University,
Ahmedabad.

MBA

SEMESTER-2

FINANCIAL MANAGEMENT

BLOCK: 1

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FINANCIAL MANAGEMENT
SEMESTER-2

BLOCK

1

BLOCK

2

UNIT-1 FINANCIAL MANAGEMENT

1.1 INTRODUCTION- FINANCIAL MANAGEMENT

A company's financial health is vital. It works in the same way as lubrication does in wheels or fuel does in automobiles. Without finance, we can't conduct trade, industry, or commerce properly in today's world. As a result, finance is the key to a company's success. Management, on the other hand, is required for the successful operation of a business. How much money is required, how to spend it, when it may be used, when the ideal time and location are, how to select a project, and so on are some of the questions that must be answered promptly. As a result, management is an essential component of a successful organization.

Every beginner needs financial knowledge and management strategies to start a business or a company. Finance is interconnected with other departments such as marketing, production, and personnel. Any form of business anticipates that investments must be made in such a waythat the return exceeds the cost of capital. Finance is the flow of Money and Management is the managing of Money so Financial Management is the process of managing the flow of money to achieve the objectives of the firm like wealth maximization and Profit Maximisation. The application of management principles to financial decisions is referred to as financial management. Financial management answers question like where to invest, from where to raise funds, and how much to retain and distributed.

1.2 MEANING OF FINANCIAL MANAGEMENT

The term "financial management" is formed by combining the words "finance" and "management." Finance is the process of obtaining and allocating money supply sources based on the prediction of a company's monetary requirements.

The term "financial management" refers to the process of planning, organizing, directing, monitoring, and regulating financial activities such as the acquisition and utilization of a company's funds. It is critical for every type of organization to be able to obtain funding from several sources. Finance should be obtained in such a way that the investment returns exceed the financing costs. Any business needs funding to acquire resources, carry out production activities and other business operations, pay supplier compensation, and so on. Financial management is the process of acquiring and managing financial resources for a company to maximize the value of stockholder claims.

1.3 DEFINITION OF FINANCIAL MANAGEMENT

Different authors have define financial management in different ways.

- "Financial Management is the activity concerned with planning, raising, controlling and administering of funds used in the business." **– Guthman and Dougal**

- "Financial Management is that area of business management devoted to a judicious use of capital and a careful selection of the source of capital to enable a spending unit to move in the direction of reaching the goals." **– J.F. Brandley**

- "Financial Management is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations." **– Massie**

- "Financial Management is concerned with the efficient use of important economic resources, namely capital funds". **– Soloman**

1.4 EVOLUTION OF FINANCE MANAGEMENT

Financial management evolved as a unique subject of study in the early twenty-first century because all business decisions and operations have an impact on an organization's finances. There are three stages in the evolution of financial management. At the turn of the century, financial management became a distinct discipline of study. The three stages of its development are as follows:

1. The Traditional Phase:

The traditional period spans the first four decades of the twenty-first century, roughly from 1901 to 1940. During this time, financial management was referred to as corporate finance. Top management did not devote any special attention to financial matters. The ultimate objective of financial management was to raise the necessary finances.

The work of a finance manager was limited to estimating necessary money, selecting appropriate securities based on the number of funds, and selecting bankers and underwriters. During this era, the financial manager was responsible for maintaining accurate records, preparing various reports, and properly managing funds.

2. The Transitional Phase

The day-to-day difficulties that financial managers encountered were given priority during this period. In this phase, the overall problem of money analysis, planning, and control received increased attention. The transitional period began in 1940 and ended in the early 1950s. The nature of financial management during this phase remained like that of the traditional phase.

3. The Modern Phase

With the infusion of concepts from economic theories and applications of quantitative methods of analysis, this phase began in the middle of 1950 and has seen an increased speed of growth. During this time, the following aspects were prioritized:

- Financial management's scope has widened.
- A well-run Finance department was established.
- The role of the financial manager has been defined, which includes acquiring funds required in the business at the lowest possible cost, investing the funds obtained most efficiently to maximize returns, and making decisions regarding profit distribution, such as dividend policy and profit retention.

The modern era is still ongoing. The scope of financial management has significantly expanded in recent years. It is important to carry out financial analysis for a company.

1.5 OBJECTIVES OF FINANCIAL MANAGEMENT

The Primary Objectives of Financial Management are to acquire funds from different sources of finance, allocate the funds and have an efficient utilization of funds.

1. To ensure and guarantee that the firm receives a regular and adequate supply of funds.
2. To provide acceptable returns to shareholders, which will be determined by earningcapacity, share market price, and shareholder expectations.
3. To have a proper estimation of the total financial requirement
4. To ensure the optimum utilization of funds. As the funds are acquired, they should beput to the greatest possible use at the lowest possible cost.
5. To ensure safety on Investment, i.e., funds should be invested in such projects whereanadequate rate of return can be achieved.
6. To have an optimum capital structure, there should be an equitable balance betweendebt and equity.
7. To have a proper mobilization of funds.
8. To ensure that there should be a regular supply of cashflow, and finance manager isentrusted with the responsibility to maintain proper cashflow of the firm.

9. To increase the efficiency of the firm and reduces the operating risks.
10. To generate goodwill for the firm.

1.6 SCOPE OF FINANCIAL MANAGEMENT

Financial management is a wide term that encompasses a variety of actions. Financial decisions must include the interests of shareholders. The following are some of the aspects of financial management that will be discussed.

1. Investment Decisions:

The word itself denotes that they are investment-related decisions. It doesn't matter if it's fixed assets, working capital, or investment. These investment options will also be evaluated throughout the increase of a form's liquid assets and fixed assets. Managers must determine the amount of investment accessible from current funds, both long- and short-term. There are two kinds of them.

Long-term investment decisions, often known as Capital Budgeting, imply committing cash for a long time, like fixed assets. These choices are typically irrevocable and include those involving the purchase of a building and/or land, the acquisition of new plants/machinery or the replacement of existing ones, and so on. These choices influence a company's financial goals and success.

Working capital management or short-term investment choices refers to committing cash fora short period of time, such as current assets. This includes decisions on how to invest money in merchandise, cash, bank deposits, and other short-term investments. They have a direct impact on the company's liquidity and performance.

2. Financial Decision:

The word itself denotes that they are investment-related decisions. It doesn't matter if it's fixed assets, working capital, or investment. These investment options will also be evaluated throughout the increase of a form's liquid assets and fixed assets.

Managers also make judgments on raising funds from long-term (Capital Structure) and short-term (Short-Term) sources (called Working Capital). There are two kinds of them:

Decisions in financial planning include estimating the sources and applications of funds. It entails anticipating a company's financial demands to guarantee that sufficient funds are available. The basic goal of financial planning is to plan on time and guarantee that finances are accessible when needed.

Capital Structure considerations entail locating funding sources. They also include decisions on whether to raise capital from external sources such as issuing shares, bonds, or borrowing from banks, or internal sources such as retained earnings.

3. Dividend Decisions:

These are the judgements relating to the profit-sharing activity. There will be two methods of sharing. The first is profit for stockholders, and the second is profit retained by the company**.** These are decisions on how much of a company's profit should be given as a dividend. Shareholders consistently want a greater dividend, but management prefers to keep earnings for operational purposes. As a result, making this option is a difficult managerial task.

1.7 GOALS OF FINANCIAL MANAGEMENT

Everything you need to know about Financial Management Objectives. Financial management is a vital aspect of any company's operations. As a result, financial management objectives should be aligned with the company's overall objectives. The business's objectives or goals should be laid down by top management. A clear understanding of the business's aims is essential to make good financial decisions. The objectives provide a framework within which various investment, finance, and dividend decisions are to be made. Any company's primary goal should be to maximize its stockholders' financial health. The existence of certain objectives or goals is required for effective financial management because determining whether a financial choice is efficient must be done by some aim. As a result, the financial manager must identify the financial management's basic objectives.

The Goals of financial management are:

a) Profit Maximization
b) Wealth Maximisation

1. **Profit Maximisation:** According to this concept, a company should engage in all activities that increase earnings while avoiding those that decrease profits. This goal emphasizes the importance of profit maximization in all financial, dividend, and investment decisions. Finance functions should be focused on maximizing profit to achieve this goal. Every type and every size of business is always motivated by profit maximization. The financial manager needs to do the such operation of activities and select assets and projects which can maximize the profit of the firm. Profitability criteria are considered when deciding on new projects, assets acquisition and raising capital, etc. It has generally been maintained that the basic goal of a business is to make money and that the goal of financial management is to maximize profits. The basic purpose of a business is to make money, and the goal of financial management is to maximize profits. Maximizing profits entails Profit is the primary goal of any type of economic activity. A company's primary goal is to make money. Profit is the measuring techniques to understand the business efficiency of the concern.

❖ **The Arguments in favour of Profit Maximization are as follow:**

a) The efficiency of a business is measured by profit. It is a metric that can be used to assess a business financial success. The primary goal is to make money.

b) Profit maximisation leads to more efficient allocation and utilisation of a business's scare resources.
c) Profitability is also required to achieve the goal of social welfare. Profit maximization leads to a higher level of societal welfare. Profitability satisfies societal requirements.
d) With the support of profit, the risk of future business uncertainties such as recession, tough competition, and so on can be reduced. A businesswill be able to survive in the market if it has some earnings in such a situation. As a result, when the circumstances are favourable, a business should maximize its profit.
e) Profits are a company's most important source of funding for expansion.
f) It's a metric that can be used to measure the performance of thecompany.
g) It attracts investors to invest their savings in securities
h) It ensures efficient use of funds
i) It ensures that the interests of the company's shareholders, employees, and creditors are protected.

❖ **The Arguments against Profit Maximization**

a) Profit maximization results in worker and consumer exploitation.
b) Profit maximization leads to unethical actions such as corruption, unfair trading, and so on.
c) Customers, suppliers, public shareholders, and other stakeholders face inequalities because of profit maximization goals.

❖ **Criticism of Profit Maximization**

I. **Ambiguous and Vague**: The term profit is vague and unclear. Profit has differentmeanings for different people. Profit, for example, can be short-term or long- term, before or after taxes, total profit, or profit rate. It could also be based on total capital employed, total assets, or shareholders' funds.

II. **It ignores the time value of Money**: This method disregards the time value of money, i.e., it does not distinguish between profits earned over time. It ignores the fact that the current worth of a rupee is higher than the value of the same rupees one year later. Similarly, earnings gained in the first year will be worth more than gains earned later in the year.

III. **Ignores Risk:** The certainty of future benefits may differ. Profit Maximization ignores the principle that the higher the expected return, the higher the value, and the lower the expected return, the lower the value.

2. Wealth Maximization

Wealth Maximisation means maximisation of Net worth of shareholders. When making a financial decision to invest money in a project, be ensure that the present value of cash flowis greater than the present value of cash outflow to be invested. Thus, the time value of money concept is needed to be consider. Ensure that the

present value of cash flow is greater than the present value of cash outflow to be invested when making a financial decision to invest in a project. It refers to the gradual increase in the value of a company's assets in terms of the advantages it may generate. Any financial decision can be evaluated in terms of the advantages it generates compared to the cost of the decision. The market value of a company's shares reflects the company's wealth maximisation. Shareholders' wealth will be maximised because of this. A financial action with a positive net present value (NPV) generates wealth for shareholders and is hence desirable. If the project gives more cash flow than cash invested in the project, then it can be said that in increases net worth of shareholders. Any decision which maximises net present worth also maximise shareholders wealth. A decision which results into negative net present worth will reduce shareholder's wealth and so such decisions are not accepted. The goal of wealth maximisation considers the time value of money. It understands that the value of monetary benefits arising from a project in successive years is not the same. Therefore, the total value of a project's annual cash benefits is calculated by discounting them at a discount rate.

Simultaneously, it gives risk element due weightage by adjusting the discount rate as necessary. As a result, the projected cash benefits of a project with a higher risk exposure are discounted at a higher discount rate (, whereas the expected cash benefits of a project with a lower risk exposure are discounted at a lower discount rate (cost of capital). As a result, the discount rate used to calculate the present value of future cash earnings accounts for both time and risk.

Wealth = Present value of benefits – present value of costs

This objective of Maximisation of shareholders wealth considers the following points

I. **It is clear**: although cash flow is used to calculate the present value of money, there is no ambiguity in using the term, as there is in the case of profit.
II. **Time value of money is considered**: The Future cashflows are discounted properly so the financial decision is taken by considering the present value of money. Here present value of cash inflows and present value of cash outflows are taken into considerations.
III. **Risk element is considered**: The Cash Flow is discounted based on the future uncertainty. When discounting is done at a higher or lower rate depending on the degree of risk involved, the Net Present Value of cash flows with greater uncertainty will automatically decrease.

❖ **The Arguments in Favour of Wealth Maximization**

1) Maximizing wealth is a well-defined term. The cash flow's present value is considered here. It is possible to calculate the net effect of investment and benefits.
2) It considers the concept of money's time value. The present values of cash inflows and outflows help management in achieving a company's overall objectives.

3) The concept of wealth maximization is widely accepted since it protects the interests of financial institutions, their owners, employees, and society.
4) When calculating the Net Present Value at a given discount rate, the concept of wealth maximization considers the impact of risk.

❖ **The Arguments in against of Wealth Maximization**

1) Wealth maximisation leads to a prescriptive business concept, which may or maynot be appropriate for today's corporate activity.
2) Ownership-management conflict arises because of wealth maximisation.
3) The wealth maximisation objectives' goal is to maximise profit.

1.8 FUNCTIONS OF FINANCIAL MANAGEMENT

1. Capital requirements estimation: A finance manager must estimate the company's capital requirements. This will be determined by the anticipated expenses and earnings, as well as the company's future programmes and policies. Estimates must becreated to enhance the company's earning potential.

2. **Capital composition determination**: Once an estimate has been produced, the capital structure must be determined. This entails a debt equity analysis for both the short and long term. This will be determined by the firm's equity capital and any additional cash that must be raised from other sources.

3. **Choosing a funding source:** A corporation has various options for obtaining more capital, including

a) The issuance of shares and debentures.
b) Bank and financial institution loans are to be obtained.
c) Deposits from the public to be drawn in the form of bonds.
The choice of component will be based on the relative strengths and drawbacks ofeach source, as well as the duration of funding.

4. **Investment of money**: The finance manager must determine whether to invest funds in successful projects to ensure that the investment is secure and that regular returns are attainable.

5. **Surplus disposal**: The finance manager is responsible for deciding on net earnings.This can be accomplished in one of two ways:

a) Dividend declaration include determining the dividend rate as well as additionaladvantages such as bonuses.
b) Retained earnings: A volume must be determined, which will be determined by thecompany's expansion, innovation, and diversification objectives.

6. **Cash management**: The finance manager is responsible for making cash

management choices. Wages and salaries must be paid, electricity and water bills must be paid, creditors must be paid, current liabilities must be met, enough stock must be maintained, and raw materials must be purchased, among other things.

7. **Financial controls:** The finance manager is responsible for not just planning, procuring, and utilising funds, but also for maintaining financial control. Many strategies, such as ratio analysis, financial forecasting, cost and profit control, and so on, can be used to accomplish this

1.9 FINANCIAL MANAGER'S ROLE

The Most significant and complex activities of a firm is its financial activities. As a result, a financial manager does all the necessary financial activities to manage these activities. All theimportant financial functions are managed by a financial manager. The financial manager is responsible for ensuring that funds are handled wisely and with a long-term perspective. His decisions have a direct impact on the profitability, growth, and goodwill of the company. The primary function of a financial manager are as follows:

1) **Funds Raising**: It is critical to have sufficient cash and liquidity to meet the business's obligations. A company can use both equity and debt to raise capital. A financial manager determines the ratio of debt to equity. Maintaining a healthy mix between equity and debt is critical.
2) **Funds Allocation**: After the money have been raised through different methods, the next step is to allocate the funds. The money should be allocated in such a way that they are utilised to their maximum potential. The following aspect must be examined to allocate funds most efficiently feasible.

   - The company's size and potential to expand
   - Assets' long-term or short-term status, and
   - the method by which funds are raised.

   These financial decisions have an impact on other managerial actions both directlyand indirectly. As a result, one of the most significant activities is the constructionof suitable financial assets and proper resource allocation.

3) **Profit Planning**: Profit earning is one of the most significant priorities of any firm. Profit is critical for any organization's survival and sustainability. Profit planning refers to the proper use of a company's profits. Many factors influence profit, including pricing, industry competitiveness, the status of the economy, demand and supply mechanisms, cost, and output. A well-balanced blend of variable and fixed variables of production can boost a company's profitability.

4) **Understanding capital markets:** A stock exchange is where a company's shares are traded, and securities are constantly purchased. As a result, a financial manager's ability to analyse the capital markets is critical. A significant amount of risk is involved when securities are traded on the stock market. As a result, a

financial manager understands and assesses the risk associated with equity and debt trading.

5) **Finance control:** The financial manager's responsibilities include not only planning, organising, and obtaining funding, but also controlling and analysing the company's finance. his can be done using tools such as financial forecasting, ratio analysis, risk management, and profit and cost control.

1.10 CONCLUSIONS

Financial management is vital for companies and organizations because it creates the framework for achieving company objectives and goals. They must think about how their management actions will affect profitability, cash flow, and the company's financial situation. Every area of a company's performance has an influence on its financial success, and the owner must examine and manage them.

❖ CHECK YOUR PROGRESS

- **Multiple Choice Questions are as follows:**

1. Management of all matters related to an organisation's finance is called:
- **a)** Cash inflows and outflows
- **b)** Allocation of Resources
- **c)** Financial Management
- **d)** Finance

2. The most Important goal of Financial Management is:
- **a)** Profit maximisation
- **b)** Matching income and expenditure
- **c)** Using business assets effectively
- **d)** Wealth maximisation

3. Financial management mainly focuses on _____
- **a)** Efficient management of every business
- **b)** Cost of capital
- **c)** Arrangement of funds
- **d)** All element of acquiring, raising and allocation of funds

4. To Achieve wealth maximisation, the finance manager has to take careful decision inrespect of:
- **a)** Investment
- **b)** Financing
- **c)** Dividend
- **d)** All the Above

5. _____ Maximisation objective ignores timing of benefit i.e., time value ofmoney.
- **a)** Profit

b) Wealth
c) Value
d) None of the above

- **Theoretical questions**

1. Explain Wealth Maximisation and Profit Maximisation goals of financial management.
2. Discuss the Role of financial Manager.
3. Explain Meaning of Financial Management and discuss the function of Finance.

❖ **MCQ ANSWER :**

1	2	3	4	5
C	D	D	D	D

UNIT-2

TIME VALUE OF MONEY & VALUATION OF BONDS AND SHARES

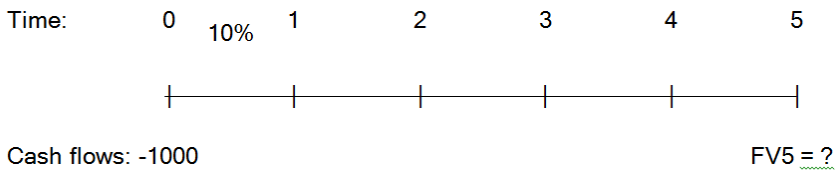
2.1 TIME VALUE OF MONEY

The concept of Time value of money is based upon the premise that a rupee today is worth more than a rupee to be received tomorrow or any future time period. This is because the sooner you receive a rupee, the quicker you can invest to earn more return on that. Most of the individuals and companies are expecting to earn positive return on the investment done by them. In a business, ideally, you invest some cash flow today in anticipation of some future benefits measured in terms of cash inflow. When you compare this inflow and outflow in their absolute value without adjusting them forthe time value of money, it may lead to poor decision making. As we have noted that cash flow at different time interval cannot be compared in their absolute value. Of all the techniques used in finance, none is more important than the concept of timevalue of money, also called discounted cash flow (DCF) analysis. Future value and present value techniques can be applied to a single cash flow (lump sum), ordinary annuities, annuities due, and uneven cash flow streams in finance decision

making.

Evaluating financial transactions requires valuing uncertain future cash flows. Translating a value (cash flow) to the future is referred to as compounding (finding the future value). Translating a value (cash flow) to the present is referred to as discounting (finding the present value).

Time lines are frequently used to illustrate graphically when the cash flows occur as they visualize what is happening in time value of money problems. Cash flows are placed directly below the tick marks, and interest rates are shown directly above the time line; unknown cash flows are indicated by a symbol for the particular item that is missing. Thus, to find the future value of INR1000 after 5 years at 10 percent interest, the following timeline can be set up:



2.2 FUTURE VALUE

Calculating the future value (FV) is also called compounding, whereinn we are moving from today's values (or present values) to future values (or future values). It can be calculated as $\mathbf{FV_n = PV(1 + i)^n = PV*(FVIF_{i,n}),}$

where PV = present value or beginning amount; i = interest rate per year; and n = number of periods of investment. $\mathbf{FVIF_{i,n},}$ the Future Value Interest Factor, is a short-hand way of writing the equation, and these values are readily available in the tables of Time value for students. This equation can be solved either numerically with a calculator or with MS Excel. For calculations, assume the following data that were presented in the timeline above: present value (PV) = INR 1000, interest rate (i) = 10%, and number of years (n) = 5.

To solve numerically, use a regular calculator to find 1 + i = 1.10 raised to the fifth power, which equals 1.61051. Multiply this figure by PV = INR 1000 to get the final answer of 1610.51. We can also solve this problem the with MS Excel formula using the FV function. Enter =FV(10%,5,0,-1000,1) in the cell of excel spreadsheet where the first argument of this formula is the interest rate, the second is the number of periods, the third is annual payments, the fourth is the present value, and the fifth (1) indicates that payments are all made at the end of the year while (0) interest rate in beginning of each year. If you plot the graph of future values at different interest rates, you will realise that the greater the interest rate, higher the future value.

Rule of 72:

Rule of 72 is used by most finance area experts to quickly calculate how much time it requires to double your investment. Using FVI the F table, you can easily interpret that when the interest rate is 8%, it takes about approximately 9 years to double your investment (FVIF table value 1.999). You can verify such different combination of year and rate of interest where FVIF value is near to 2. It leads to

general rule of thumb where in 72/interest rate is gives the doubling period.

Example:

If you deposit Rs.3,000 today at 8 percent rate of interest, in how many years (roughly) will this amount grow to Rs.1,92,000 ? Work this problem using the *rule of 72*–do not use tables.

INR 1,92,000 / Rs. 3,000 = 64 = 2^6

According to the Rule of 72 at 8 percent interest rate doubling takes place approximately in 72 / 8 = 9 years

So Rs.3000 will grow to INR1,92,000 in approximately 6 x 9 years = 54 years.

2.3 PRESENT VALUE

Calculating the present values is called discounting, and it is simply the reverse of compounding. It gives the present value of any future cash flow at appropriate discount rate. By solving for PV in the future value equation, the present value equation can be developed and written as follows:

$$PV = \frac{FV_n}{(1+i)^n} = FV_n\left(\frac{1}{1+i}\right)^n = FV_n(PVIF_{i,n}).$$

where PV = present value; i = interest rate per year; and n = number of periods of investment. $PVIF_{i,n}$, the Present Value Interest Factor, is a short-hand way of writing the equation and these values are readily available in the tables of Time value for students. This equation can be solved either numerically with a calculator or with MS Excel. To solve for the present value of INR 1610.51 discounted back 5 years at 10% discount rate using above equation, you are required to Divide 1610.51 by 1.10 five times to get PV = INR 1000. We can solve this problem with MS Excel formula also using PV function. Enter =PV(10%,5,0,1610.51,1) in the cell of excel spreadsheet where the first argument of this formula is the interest rate, the secondis the number of periods, the third is annual payments, the fourth is the present value, and the fifth (1) indicates that payments are all made at the end of the year while (0) indicate in beginning of each year. If you plot the graph of present values at different discount rates, you will realise that the greater the discount rate, the lower the present value.

There are four variables in the time value of money compounding and discounting equations: PV, FV, i, and n. If three of the four variables are known, you can find the value of the fourth one by changing the equation accordingly

2.4 ANNUITY

An annuity is a series of an equal amount of cash flow occurred at fixed intervals for a specified number of time periods. If the payments occur at the end of each period, as they typically do, the annuity is an ordinary (or deferred) annuity. If the payments occur at the beginning of each period, it is called an annuity due.

2.5 FUTURE VALUE OF AN ANNUITY

The future value of an annuity is the total amount of cash flow we receive at the end of the annuity period if each cash flow was invested at a particular interest rate at the end of each period for a given time period.

Considering FVA_n as the compound sum of an ordinary annuity of n years, and PMT as the periodic payment, we can write.

$$FVA_n = PMT\sum_{t=1}^{n}(1+i)^{n-t} = PMT\left(\frac{(1+i)^n - 1}{i}\right) = PMT(FVIFA_{i,n}).$$

$FVIFA_{i,n}$ is the future value interest factor for an ordinary Annuity. This is a short-hand notation for the formula shown above. For example, the future value of a 6-year, 10 percent ordinary annuity of INR 1000 per year would be INR 1000(7.71561) = INR 7715.61. In MS Excel **=FV(10%,6,-1000)** will give you future value of annuity.

For an annuity due, each payment is compounded for one additional period, so the future value of the entire annuity is equal to the future value of an ordinary annuity compounded for one additional period. Thus:

$$FVA_n \text{ (Annuity due)} = PMT(FVIFA_{i,n})(1 + i).$$

Example:

You plan to buy new car after working for the next five years and understand that an amount of INR 20,00,000 will be needed for this purpose at that time. You have decided to accumulate your savings by investing a fixed amount at the end of each year at 10 percent. What amount should you invest every year to achieve the target amount?
Let A be the annual savings.

A x FVIFA (10%, 5years)	=	20,00,000 INR
A x 6.105	=	20,00,000 INR
So, A= 2,000,000 / 6.105	=	3,27,600 INR

Example:

Your friend offers you that he will pay a lump sum of Rs.100,000 at the end of 5 years to you if you deposit annually Rs.12,000 with him. What interest rate is implicit in this offer?

FVIFA (*r*, 5 years) =1,00,000 / 12,000 = 8.333

From the tables we find that

FVIFA (24%, 5 years)	=	8.048
FVIFA (28%, 5 years)	=	8.700

Using linear interpolation in the interval, we get:(8.333– 8.048)
r = 24% + ……x 4% = 25.75% is the implicit interest rate
(8.700 ─ 8.048)

2.6 PRESENT VALUE OF AN ANNUITY

The present value of an annuity is the single amount of cash flow today that would be equivalent to the annuity cash flow spread over the annuity period. We can understand it easily if we consider our loan installment as Annuity and loan amountas Present Value of that annuity.

Considering PVA_n as the present value of an ordinary annuity of n years and PMT as the periodic payment, we can write.

$$\mathrm{PVA_n} = \mathrm{PMT}\sum_{t=1}^{n}\left(\frac{1}{1+i}\right)^{t} = PMT\left(\frac{1-\frac{1}{(1+i)^{n}}}{i}\right) = PMT(PVIFA_{i,n}).$$

$PVIFA_{i,n}$ is the present value interest factor for an ordinary annuity. This is a short-hand notation for the formula shown above. For example, an annuity of INR 1000 per year for 10 years at 10% has present value of INR 1000(6.14457) = INR 6144.57. In MS Excel **=PV(10%,10,-1000)** will give you present value of an annuity. The present value for an annuity due is PVA_n (Annuity due) = PMT(PVIFA $_{i,n}$)(1 + i).

Example:

At the time of his retirement, Mr. Gandhi is given a choice between two alternatives:

(a) an annual pension of INR 120,000 as long as he lives, and (b) a lump sum amount of INR10,00,000. If Mr. Gandhi expects to live for 20 years and the interest rate is expected to be 10 percent throughout, which option appears more attractive?
The present value of an annual pension of INR1,20,000 for 20 years when *r* = 10%

= 1,20,000 x PVIFA (10%, 20 years)

= 1,20,000 x 8.514 = INR 10, 21,680

The alternative is to receive a lump sum of Rs 10,00,000

Mr. Gandhi will be better off with the annual pension amount of INR 120,000

2.7 PRESENT VALUE OF PERPETUITY

An annuity that goes on indefinitely is called perpetuity. The cash flow of perpetuity is an infinite series of cash flow. The present value of perpetuity is:
PV (Perpetuity) = Payment/Interest rate = PMT/i.

Example:

If the interest rate is 5%, a perpetuity of INR 10000 a year would have a present value of INR 10000/0.05 = INR 200000.

Example:

What is the present value of an income stream which provides Rs.20,000 a year for the first 10 years and Rs.30,000 a year forever thereafter, if the discount rate is 14 percent ?

The present value of the income stream is:

20,000 x PVIFA (14%, 10 years) + (30,000/ 0.14) x PVIF (14%, 10 years)
= 20,000 x 5.216 + (30,000/0.14) x 0.270

= Rs.162,177

2.8 CHANGE IN FREQUENCY OF COMPOUNDING AND DISCOUNTING

In financial transactions, we cannot assume that all the time annual frequency of compounding and discounting. In real world, we are observing Semiannual, quarterly, and monthly compounding periods more frequent than an annual basis. If we assume compounding on semi-annual basis that means then interest will be calculated two times in a year, in case of quarterly compounding, 4 times in a year and for monthly, 12 times in a year. This shows that interest multiplier (m) is depending on frequency of compounding. Higher frequency of compounding results into more amount of interest as you will get interest on interest. This is the reason your effective annual interest rate will be higher than nominal rate of interest when compounding frequency changes from annual to semi-annually, quarterly or monthly. The general formula for future value calculation of a single cash flow for n years and m times of frequency of compounding is as follows:

$$FVn = PV\left(1+\frac{i}{m}\right)^{n\,xm} = PV_n(FVIF_{i/m,n\,xm}).$$

For example, if you deposit INR 3000 in SBI for 5 years. If the interest rate is 6% and frequency of compounding is semiannual, your deposit will grow as follows.
INR 6000 * (FVIF, $_{6/2,\ 5x2}$) therefore INR 6000 * (FVIF, $_{3\%,\ 10\ times}$)

declines over the life of the loan. The repayment of principal is smallest in the firstperiod, and it increases thereafter.

2.9 LOAN AMORTIZATION SCHEDULE

Example: INR 50 Lakh, 5 year loan at 7%/year to be repaid in Equated Annual Installment. Payment equals 12,19,512.20 (i.e., 50 Lakh = PMT * PVIFA$_{7\%,\ 5\ Year}$).

Year	Payment	Beg. Balance	Interest	Repayment of Principal	End. Balance
1	12,19,512.20	50,00,000.00	3,50,000.00	8,69,512.20	41,30,487.80
2	12,19,512.20	41,30,487.80	2,89,134.15	9,30,378.05	32,00,109.76
3	12,19,512.20	32,00,109.76	2,24,007.68	9,95,504.51	22,04,605.24
4	12,19,512.20	22,04,605.24	1,54,322.37	10,65,189.83	11,39,415.42

5	12,19,512.20	11,39,415.42	79,759.08	11,39,753.12	(337.70) Round off
		= End Balance$_{t-1}$	Beg Bal * int.	Payment - Interest	Beg Bal – Repay. Prin.

Example:

Miss Katrina has housing loan worth INR 50,00,000 for 8 years. Axis Bank had offered 10% rate of interest on housing loan. Calculate the annual installment and prepare loan amortization schedule for 8 years.

EAI = Loan Amount /PVIFA 10%, 8 Year
EAI = 5000000/5.335 = 9,37,207 INR

Year	Begin Value of Loan	Interest @10%	EAI	Principal	End Value of Loan
1	5,000,000.00	500,000.00	937,207.00	437,207.00	4,562,793.00
2	4,562,793.00	456,279.30	937,207.00	480,927.70	4,081,865.30
3	4,081,865.30	408,186.53	937,207.00	529,020.47	3,552,844.83
4	3,552,844.83	355,284.48	937,207.00	581,922.52	2,970,922.31
5	2,970,922.31	297,092.23	937,207.00	640,114.77	2,330,807.54
6	2,330,807.54	233,080.75	937,207.00	704,126.25	1,626,681.30
7	1,626,681.30	162,668.13	937,207.00	774,538.87	852,142.43
8	852,142.43	85,214.24	937,207.00	851,992.76	*149.67(Round off)

2.10 VALUATION OF BONDS AND SHARES

With the understanding the concept of time value of money, we have realized that how do we value future cash flow in today's time frame with the help of discounting factor. The same concept now we are going to apply to value financial securities like equity shares and bonds or debentures. When any investor invests in any financial security, he or she expects to receive some future cash flow from that investment. Investor discounts that futures cash flow at appropriate discount rate to ascertain the value of that investment. In this discussion, we assume that appropriate discountrate is known to investor based on his ability to take risk in financial market.

Book Value: This is an historical accounting value of an asset after deducting depreciation. The book value of equity share is book value of asset less book value of liabilities.

Market Value: It is the current price at which the asset/security is traded in the market based on demand and supply.

Intrinsic Value: It is calculated as present value of any financial security by discounting all the cash flow associated with that security with the appropriate discount rate. Appropriate discount rate refers to discount rate represent the risk associated with that security. In this chapter, we will learn how to calculate Intrinsic Value.

Bonds:

Bonds are basically debt or fixed income securities issued by any borrower, private or government, in exchange of some principal amount. Borrower promises to pay back interest on this principal amount at specific time interval and full principal amount after the maturity life of this financial instrument. Bonds are also known as Debentures in India. Let us understand more features of Bonds. Bond has main three features. Par Value of Face Value, Interest rate or Coupon Rate and Maturity period or life of Bond.

Par Value: It is the value printed on the face of the bond represent the principal amount of borrowings that issuer promise to pay back along with interest after the stated maturity. Most of the bonds are redeemed at Par value (Face Value). Sometimes, bonds are also redeemed at premium or discount on par value...

Coupon Rate: It is the specific rate of interest applicable to calculate interest on periodic basis on the face value of Bond. Coupon can be annual or semi-annual.

Maturity Period: It is total time period for which company serves the bond holder in terms of interest payment and repay principal amount on the date of maturity.

The indenture: The indenture is the formal legal contract between the bondholders and the corporation that spells out the rights and responsibilities of both parties.

Valuation Model:

The present value of a bond is simply the present value of all future cash flows from the bond, discounted at the risk-adjusted discount rate. This concept is used universally to find the value of any financial assets or security. In the case of bonds, these future cash flows are quite predictable, because they're specified by the bond agreement. Bondholders receive interest payments periodically and a lump sum return of principal at the bond's maturity. Yearly interest is determined by applying the coupon rate to the face value of the bond, and the principal is simply the face value itself. For a bond, we need to find the present value of all the interest payments and the present value of the final payment, namely, the face amount of the bond.

We may write it mathematically as

$$B = \sum_{t=1}^{n} \frac{C}{(1+r)^t} + \frac{F}{(1+r)^n}$$

In the above equation, we define

B = the present value, or the market value of the bond

C = Coupon cash flow from the interest of the bond, and for semi-annual interestpayments, it should be one-half of the annual interest paid by the bond

N = The number of semi-annual payments receivedF = face amount of the bond

R = Risk-adjusted discount rate for the bond

Example:

Calculate the Value of Bond which has face value of INR 1000 with a coupon rate of 8% annual with 10 years of maturity life if the required rate of return is 10%. Let's illustrate the pattern of these payments by setting up a time line to display the cash flows. Most bonds pay interest semi-annually, but for this example we are assuming annual coupon payment. The timeline of cash inflows is as under:

From year 1 to year 10, INR 80 per annum and in 10th year, face value of INR 1000
The value of Bond is present value of all interest/coupon payment plus the present value of redemption price (face value of bond)

Bond Value = Coupon Amount x [$PVIFA_{10\%,\ 10\ times}$] +Redemption Amount x [$PVIF_{10\%,\ 10n}$]

Bond Value = 80 x [6.145] +1000 x [0.386] = 491.60 + 386 = 877.60 INR

If the coupon payment is semiannual then we need to adjust coupon amount and period for which we get it. In this case, coupon will be 40 Rs for 20 periods hence the formula will change as below:
Bond Value = Coupon Amount x [$PVIFA_{5\%,\ 20\ times}$] +Redemption Amount x [$PVIF_{5\%,\ 20\ time}$]

Bond Value = 40 x [12.462] +1000 x [0.377] = 498.48 + 377 = INR 875.48

2.11 ZERO-COUPON BOND

Another type of a bond is a zero-coupon bond. Such a bond does not pay any interest but it does pay the principal at maturity. An investor who does not need a steady income, but requires lump sum amount at a future time, may buy such abond. The value of a zero-coupon bond is found by following simple equation:

$$\text{Value of Zero-coupon Bond} = \frac{\text{Redemption Value}}{(1+r)^n}$$

Example:

Suppose a zero-coupon bond with face value INR 1000 is also available, which matures after 10 years. If required rate of return or discount rate is 6%, the price of this bond will be INR 558.48 [1000/(1.06)^10] Thus, Zero-coupon bonds are sold at a discount; occasionally well below their face value. Investors who wish to plan for their retirement or child's education or marriage are investing in zero-coupon bonds. Companies with shortage of cash flow to pay the interest payments may issue zero-coupon bonds. US Treasury bills are zero-coupon bonds. You buy them at a discount and when they mature, you get their face amount.

Yield and Yield to Maturity

Normally, investor invests in a bond for its yield. Yield is the annual return on the investment if I buy the bond at current market price. We may define the current yield, y, of a bond as the annual interest coupon amount C, divided by the market price of the bond B. $y = C/B$

This represents the return on investment provided one holds the bond for a short time. For instance, you buy a 8% coupon bond at INR 70. You will get the current yield as y = 8/70 = 11.43%

Suppose a bondholder wants to hold the bond all the way to its maturity. Then he may be interested to find its yield-to-maturity, Y. By definition, The yield-to-maturity of a bond is that particular value of r that will equate the market value of a bond to its calculated value by using following equation.

$$Market\ Value\ of\ Bond = \sum_{t=1}^{n} \frac{C}{(1+YTM)^t} + \frac{F}{(1+YTM)^n}$$

YTM calculation considers the current coupon income and capital gain or loss if investor holds the bond up to its maturity. It also takes into account the timing of cash flows to the investors.

Example:

Calculate the YTM for following Bond:

Par Value: 1000; Coupon Rate: 9%; Life of Bond: 8 years; Market value: INR 800

$$YTM \cong \frac{90 + (1000 - 800)/8}{0.4x1000 + 0.6x800} \cong 13.1\%$$

YTM is approximately 13.1%. This means that at 13% discount rate the price of this bond must be very near to INR 800. Let us cross verify this,

Bond Value = Coupon Amount x [$PVIFA_{13\%,\ 8\ years}$] +Redemption Amount x [$PVIF_{13\%,\ 8\ years}$]

Bond Value = 90 x [4.800] +1000 x [0.376] = 432 + 376 = INR 808

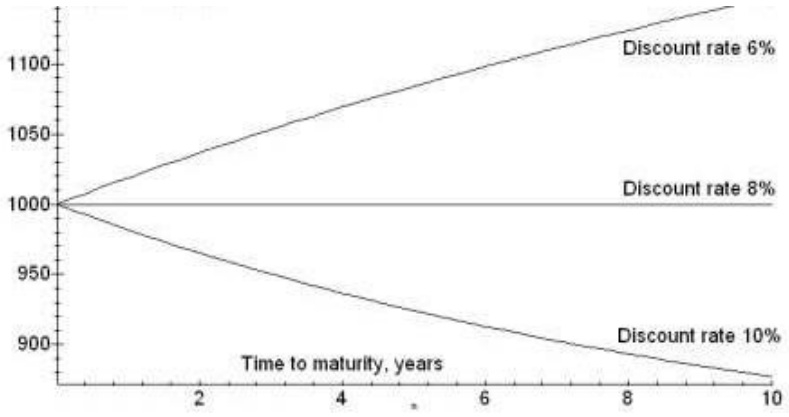
INR 808 is very near to current market price of INR 800 so YTM of 13.1% is correct.

2.12 BOND VALUE THEOREM

This theorem explains the relationship between coupon rate, YTM and price of the bond along with the time to maturity. These relationships are very important to understand for bond market investment.

Coupon rate has direct positive relationship with the bond's price. If other variable remain constant, rise in coupon will result into rise in bond's price and vice versa. Bond's price is inversely varies with yield or YTM. If the required yield in increasing, the present value of cash flow associated with bond declines while the fall in yieldwill result into high present value of cash flow of bonds.

Consider a bond with coupon rate 8% and 10 years to maturity. If the discount rate is 8%, then the bond is selling at par. Its value will remain INR 1000 with the passage of time. This is shown as the straight horizontal line in the middle of below figure.



If the discount rate is 6%, the bondholders' required rate of return is 6%. Since the bond is providing 8% coupon, it is more than the required rate of return. This will make the market value of the bond more than its face value and the bond will be selling at a premium. Calculations indicate that it should sell for INR 1146.8
Bond Value = Coupon Amount x [$PVIFA_{6\%,\ 10\ times}$] +Redemption Amount x [$PVIF_{6\%,\ 10n}$]

Bond Value = 80 x [7.360] +1000 x [0.558] = 588.8 + 558 = 1146.8 INR

As the time passes, the time to maturity gets shorter, and the value of the bond slides along the top curve until it becomes INR 1000 at maturity. Note that the curve is not a straight line. If the discount rate is 10%, the bond will sell at a price less than INR 1000. Its calculated value is INR 877.60 as per below calculations.
Bond Value = Coupon Amount x [$PVIFA_{10\%,\ 10\ times}$] +Redemption Amount x [$PVIF_{10\%,\ 10n}$]

Bond Value = 80 x [6.145] +1000 x [0.386] = 491.60 + 386 = 877.60 INR

This is shown as the bottom curve in above figure. With the passage of time the bond actually rises in value, and at maturity, it becomes INR 1000. Assuming that the company is financially strong, it will redeem the bonds at INR 1000 at maturity.
To summarize,

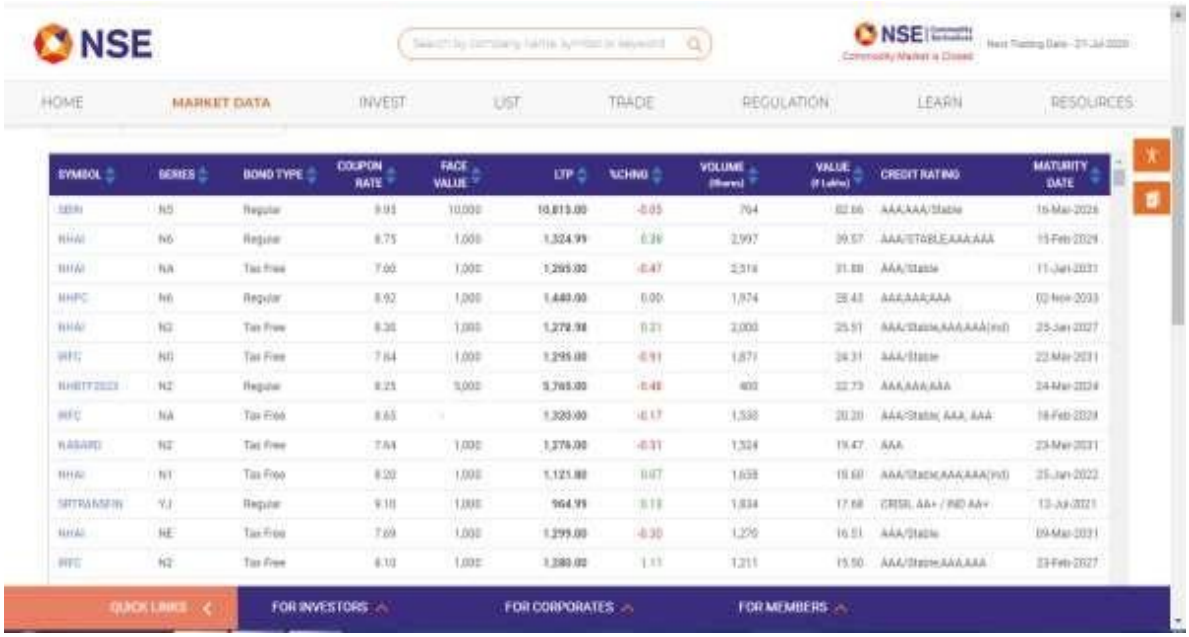
(i) The relationship can be depicted as under

Coupon Rate > Yield	Bond Price > Face Value	Premium Bond
Coupon Rate = Yield	Bond Price = Face Value	At par Bond
Coupon Rate < Yield	Bond Price < Face Value	Discount Bond

(ii) As maturity approaches, bond price approaches to its face value.

Be it corporate or government bonds, the bond market in India is still developing. For the longest time, debt mutual funds were the only way a retail investor could add bond exposure to his portfolio. Recently, via an app developed by the NSE, retail investors have the ability to directly invest in Indian government bonds. To expand

their bond investment opportunities, investors should look to global markets. Due to technological advancements and new-age companies, access to global markets has been greatly simplified for the Indian investor. The following screen shot of NSE website gives you feel of Bonds market in India.



2.13 VALUATION OF PREFERENCE SHARES

Preference shares has special category of shares issued by company where the rate of dividend is fixed at the time of issue of such shares. Their dividends are not linked with profits like equity shares. Even if preference share dividend is not paid for some time, company has to pay all past dividend in arrear before paying dividend to equity shareholders. If we assume that preference share pays fixed annual dividend and face value on maturity, its valuation can be done with following formula.

$$Po = \sum^{n} \frac{Pref.Div}{(1+rp)^{t}} + \frac{Maturity\ \ Price}{(1+rp)^{n}}$$

Where rp is rate of return required on preference share investment.

Example:

Find out the value of preference share whose face value is 100, with 10% of dividend, and 8 years of remaining life having required rate of return of 9%.

$$P_0 = \sum_{t=1}^{8} \frac{10}{(1+9\%)^{8}} + \frac{100}{(1+9\%)^{8}}$$

Pref. Share Value = 10 x [$PVIFA_{9\%,\ 8\ times}$] +100 x [$PVIF_{9\%,8th\ year}$]

Pref. Share Value = 10 x [5.535] +100 x [0.502] = 55.35 + 50.2 = 105.55 INR

2.14 VALUATION OF EQUITY SHARES

Bonds and Equity shares are major two sources of funds from company point of view. The equity shareholders are considered to be real owner of the company. They are buying equity shares of company where company do not promise them any fix rate of dividend on their equity investment as payment of dividend is the discretion of the company board. They are actually taking risk by accepting the uncertainty of dividend. On the contrary, the bondholders receive regular, guaranteed interest payment and cannot participate in the growth of the company. If the bondholders do not receive the interest payments on time, they have a right to sue the company and seize the assets of the firm. The bondholders also receive the face value of the bonds at maturity. The equity shareholders participate in the growth of the company and they also bear the losses during the difficult time of company. The cash flows or dividend from equity shares depends on company's earnings which are governed by many economic uncertainties. There is the possibility of strike, raw materials crisis, or change in even competitor's strategy. Each turn of events can make the earnings of the company unpredictable. The sudden rise or fall in the share prices in stock market are essentially reflection of the changes in the financial condition of company. The equity shareholders are sharing this risk of the company and hence they are considered to be real owner. The uncertainty of future expected cash flow in the form of dividend lead to valuation of equity shares little more complex.

Dividend Discount Model: Single Period Valuation

Let us start with Dividend Discount Model approach for finding the value of equity share which is in line with our discussion on discounted cash flow principle for valuation of any financial security. If we assume that you are buying equity share and holding it for one year, you will receive following cash flow at the end of year.

First one is Dividend — D_1 as you have held the share for one year and second is the Price - P_1 at which you will sell your share in market at the end of first year. So if you take the present value of these cash flows, it will become the value of equity sharetoday. If we denote P_0 as the value of share today, our formula looks like.

$$P_0 = \frac{D_1}{(1+r)} + \frac{P_1}{(1+r)}$$

Where r is required rate of return by investor or discount rate

Above model is very generic and plain vanilla kind of model. If we assume that the price of equity share is growing at some constant rate of growth g% annually, our equation will change as per follows:

$$P_0 = \frac{D_1}{(1+r)} + \frac{P_1(1+g)}{(1+r)}$$

If we simplify this equation by rearrangement mathematically, we will get following equation for value of equity share with constant growth assumption.

$$P_0 = \frac{D_1}{(r-g)}$$

Where r is required rate of return by investor or risk adjusted discount rate while D_1 is $D_0(1+g)$ and g is constant growth assumed in dividend.

This model is called as Gordon's growth model, after Myron J. Gordon who initiallydeveloped the above equation in 1959 at University of Toronto.

The above model is giving very good understanding of equity valuation but it has lots of inherent assumptions.

(1) The growth of the company is constant over the years. This may not be true for all companies in actual world. The growth rate may vary from year to year or in blocks of years. Growth is linked to the life cycle of company or its products so may be some years company observe super normal growth and later on normal growth.

(2) The dividends paid out by the firms will also grow at the same rate as the overall growth of the company. In real life, the companies set their dividend policy based on their investment needs, their cash flow projections, and their capital structure.

(3) The required rate of return of the stockholders is greater than the growth rate of the company. This is strictly a mathematical requirement to make sure that the formula will work properly. If reverse is a case this formula will not work.

Since no firm can meet all these conditions, the formula is only approximately true.

Example:

Calculate the value of equity share that just paid a dividend of INR 1.50, with the growth rate assumption of 3% annually. Investors' required rate of return is 16% for such kind of shares.

Since the stock just paid the dividend for this year, its dividend for next year will be 3% higher, like =1.50(1.03) - Using equation.

$$P_0 = \frac{1.50\ (1.03)}{(0.16 - 0.03)} = 11.88 \text{ INR}$$

2.15 CALCLULATING REQUIRED RATE OF RETURN

If we rearrange the equation that we just understood then with the given price of share we can calculate required rate or expected rate of return – r from this model.

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

The interpretation of this equation is quite simple: the required rate of return from equity share - r is the sum of its two components, the dividend yield D_1/P_0, and the growth rate of the dividends, g.

Example:

The expected Dividend per share of ABC Ltd. is INR 5 and the dividend is expected to grow at 6% per year. The share is currently trading at INR 50. What is the expected rate of return?

$$r = \frac{5}{50} + 0.06 = 0.16 = 16\%$$

2.16 CALCULATING EXPECTED RETURN WITH CAPM APPROACH

Capital Asset Pricing Model — CAPM has contributed significantly in calculation of required rate of return by investor. It is based on the concept of Risk free rate of return (R_f) and Beta. Beta is the measurement of market risk. Beta shows the sensitivity of your share returns with the market return. Market return (R_m) can be taken as Index return. According to CAPM, required rate of return can be calculated as per following formula.

$$r = R_f + Beta(R_m - R_f)$$

Example:

Calculate the required rate of return if your share has Beta of 1.5 and the Sensex return is 14%. Risk free return is considered as Treasury Bill return of 4%.

$$required\ rate\ of\ return = 4 + 1.5(14 - 4) = 19\%$$

2.17 WHAT DRIVES THE GROWTH ?

We have made assumption of growth but it is important to learn what drives the growth in the company. Two major driver of the growth are retention ratio and return on equity. Retention ratio refers to the part of profit that is reinvested in the company rather distributing as dividend. It is also known as plough back ratio. Return of Equity is ratio of net profit to total equity or net worth of the company. If company reinvest the profit then its equity or net worth base increases, and if we multiply this new increased equity base with ROE percentage we can get higher net profit in subsequent years. This leads to growth in earnings and subsequently in dividends too. This growth is internally funded as no external financing is used to increase net worth or equity base. *So Growth = Retention X Return of Equity.*

The expected EPS of PQR Ltd is INR 3.00 and company has a policy of 25% dividend payout ratio. Company's ROE is 15%. Calculate the value of PQR Share if the required rate of return is 12%.

$$Growth = Retention\ ratio\ X\ Return\ of\ Equity$$

$$Growth = (1 - 0.25) X\ 15 = 11.25\%$$

$$P_0 = \frac{3 \text{ x } 0.75}{(0.12 - 0.1125)} = 300 \text{ INR}$$

Example:

The current annual dividend of XYZ Ltd. is 20 paisa per share while its stock is selling at INR 30.90. The required rate of return is 10%. Find the expected rate of growth for the company.

$$30.90 = \frac{0.20\,(1+g)}{(0.10-g)}$$

So 30.90 (0.10 - g) = 0.20 (1+g)

If you solve above equation for g, growth rate would be 9.29%

2.18 ZERO GROWTH MODEL

If we assume zero growth, means you are not retaining any profit in the company and hence your retention ratio is zero and when it multiples with ROE, it gives zero growth. In this case company distribute 100% of its Earnings as Dividend hence your Dividend Per Share is equal to Earnings Per Share. i.e. D = E. The difference in the price with growth and without growth is known as Present Value of Growth Opportunity (PVGO)

Example:

Adinath Limited is expected to give a dividend of Rs.3 next year and the same would grow by 15 percent per year forever. Adinath pays out 30 percent of its earnings. The required rate of return on Adinath's share is 16 percent. What is the PVGO?

$$P_o = \frac{D_1}{r-g}$$

$$P_o = \frac{3}{0.16\text{-}0.15} = \text{Rs. } 300$$

$$P_o = \frac{E_1}{r} + \text{PVGO}$$

$$P_o = \frac{10}{0.16} + \text{PVGO}$$

$$300 = 62.5 + \text{PVGO}$$

So, PVGO = 237.50 INR

2.19 P/E RATIO APPROACH

This P/E multiplier approach is also very widely used by investment analyst for valuing equity share. P/E ratio is Market price to Earnings Ratio and it is widely published on stock market information websites. The P/E ratio shows the expectations of the market and is the price you must pay per unit of current earnings (or future earnings, as the case may be). Value of share under this approach uses estimated earnings — E_1 to derive today's price using P/E multiple is as follows:

$$P_0 = E_1 \times \frac{P}{E} \text{ Ratio}$$

Example:

ABC Ltd. has expected Earnings per Share (E1) of INR 2.50 and has a trailing 12- month P/E ratio of 15. Multiply the P/E ratio by its EPS, (=15 x 2.50) will get INR 37.50 as value of this share.

This P/E ratio is also used to get the expected or required rate of return r as per following formula.

$$P_0 = \frac{D}{(r-0)} = \frac{E}{r} \text{ so this can be written as } r = \frac{1}{\frac{P}{E}\text{Ratio}}$$

2.20 DIVIDEND DISCOUNT MODEL: MULTI PERIOD VALUATION

Now, you are familiar with basic simple valuation of equity share with single period valuation. Let us now look at the more complex and realistic case of multi period valuation. As we are aware that equity share has no fixed maturity life and it is perpetual in nature, it may bring infinite stream of dividend hence the valuation model can be written as.

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots\cdots\cdots + \frac{D_a}{(1+r)^a}$$

Above model is used for infinite holding duration, but if you want to hold equity share for say n year some finite period and sell it after n period at price P_n. The model can be rewritten as

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \cdots\cdots\cdots + \frac{D_n}{(1+r)^n} + \frac{P_n}{(1+r)^n}$$

Where, P_n can be calculated as Present Value of dividend received beyond the n_{th} year evaluated at the end of n_{th} year

$$P_n = \frac{D_{n+1}}{(1+r)^1} + \frac{D_{n+2}}{(1+r)^2} + \frac{D_{n+3}}{(1+r)^3} + \cdots\cdots\cdots + \frac{D_a}{(1+r)^a}$$

RIL has been expected to grow at 14 per cent per year for the next 4 years and then to grow indefinitely at the same rate as that of the national economy, that is, 5 per cent. The required rate of return on the equity shares is 12 per cent. Assume that the company paid a dividend of Rs. 2 per share last year. Determine the market price of the shares today.

The value of equity share is the sum of present value all the dividend payments during first 4 years and Present value of expected market price at the end of year 4 based on normal growth of 5% forever from 5th year onward.

Year	$D_t = D_0 (1+g)^t$	PVIF @ 12%	Present Value
1	$2(1+0.14)^1 = 2.28$	0.893	2.036
2	$2(1+0.14)^2 = 2.60$	0.797	2.072
3	$2(1+0.14)^3 = 2.96$	0.712	2.108
4	$2(1+0.14)^4 = 3.38$	0.636	2.150
PV of 4 years Div			**8.370**

$$P_4 = \frac{D_5}{(r - \text{normal growth})} = \frac{3.38\ (1.05)}{(0.12 - 0.05)} = 50.71\ \text{INR}$$

PV of market price of the share at the end of year 4 will be INR 50.71 multiplied by0.636 (PVIF 4th year) = INR 32.25

So final share value P_0= INR 8.370 + INR 32.25 = INR 40.62

Example:

Tata Ltd has been expected to grow with supernormal growth of 20% per year for the next 5 years and then the growth will come down to 12% normal forever. The required rate of return on the equity shares is 15%. Assume that the company paid a dividend of Rs 8 per share last year. Determine the market price of the shares today.

$D_t = D_0\ (1+g)^t$	Dividend	PVIF 15%	PV
YEAR 1	9.60	0.86957	8.35
YEAR 2	11.52	0.75614	8.71
YEAR 3	13.82	0.65752	9.09
YEAR 4	16.59	0.57175	9.48
YEAR 5	19.91	0.49718	9.90
PV of Dividend part 1 (year 1 to5)			45.53

$$P_5 = \frac{D_6}{(r - \text{normal growth})} = \frac{19.91\ (1.12)}{(0.15 - 0.12)} = 743.18\ \text{INR}$$

PV of market price of the share at the end of year 5 will be INR 743.18 multiplied by 0.49718 (PVIF 5th year) = INR 369.49
So final share value P_0= INR 45.53 + INR 369.49 = INR 415.02

Example:

The required return on SENSEX is 15 percent. The beta of share of City Union Bank is 1.5. The required return on the City Union Bank is 20 percent. The expected dividend growth on City Union Bank is 6 percent. The price per share of City Union Bank is INR 86. What is the expected dividend per share of City Union Bank next year? What will be the combined effect of the following on the price of share?

(a) The inflation premium increases by 3 percent.

(b) The decrease in the degree of risk-aversion reduces the differential between the return on market portfolio and the risk-free return by one-fourth.

(c) The expected growth rate of dividend on City Union Bank decrease to 3 percent.

(d) The beta of stock A falls to1.2

R_M = 15% β = 1.5 R =20 % g = 6 % P_o = Rs.86

$$P_0 = \frac{D_1}{(r-g)}$$

$$86 = \frac{D_1}{(0.20-0.06)} \text{ so } D_1 = \text{INR } 12.04$$

$$D_0 = \frac{D_1}{(1+g)} = \frac{12.04}{(1.06)} = \text{INR } 11.36$$

$$r = R_f + Beta(R_m - R_f)$$

$$0.20 = R_f + 1.5(0.15 - R_f)$$

$$0.5R_f = 0.025$$

So R_f = 0.05 or 5%.

	Original	*Revised*
R_f	5%	8%
$R_M - R_f$	10%	7.5%
g	6 %	3%
β_A	1.5	1.2

Revised Required rate of Return = 8 % + 1.2 (7.5%) = 17 %

Price per share of City Union Bank, given the above changes is

$$P_0 = \frac{11.36(1.03)}{(0.17-0.03)} = 83.58 \text{ INR}$$

❖ CHECK YOUR PROGRESS

- **Multiple Choice Questions**

1 The constant-growth dividend discount model will not produce a finitevalue if the dividend growth rate is:

(a) Above its historical average
(b) Below its historical average
(c) Above the required rate of return
(d) Below the required rate of return

2 Which one of the following is not a major driver of growth?

(a) Current ratio
(b) Retention ratio
(c) Return on equity
(d) All the above

3 For a depositor, when the frequency of compounding is increased

(a) Additional gains increase
(b) Additional gains dwindle
(c) Additional gains are unaffected
(d) There are no additional gains

4 The annual interest on a bond in relation to its prevailing market price iscalled its:

(a) Coupon rate
(b) Promised yield
(c) Current yield
(d) Yield to maturity

MCQ ANSWER :-

1	2	3	4
d	**d**	**a**	**a**

- **Numerical Exercise**

1. Calculate the value 5 years hence of a deposit of Rs.4000 made today if the interest rate is (a) 3 percent, (b) 4 percent, (c) 5 percent, and (d) 6 percent.

2. If you deposit Rs.3,000 today at 8 percent rate of interest in your PPF account, in how many years (roughly) will this amount grow to Rs.32,000 ? Work this problem using the *rule of 72*–do not use tables.

3. You can save Rs.1,000 a year for 4 years, and Rs.2,000 a year for 6 years thereafter. What will these savings cumulate to at the end of 10 years, if the rateof interest is 6 percent?

4. You plan to send your daughter for higher studies after five years and expected cost is Rs.50,00,000 at that time. You have decided to accumulate this amount by investing a fixed amount at the end of each year in PPF account offering a rate of interest at 8 percent. What amount should you invest every year to accumulate 50 Lakhs after 5 years?

5. LIC advertises that it will pay a lump sum of Rs.7,00,000 at the end of 5 yearsto policy holders who deposit annually premium of Rs.1,20,000. What interest rate is implicit in this offer?

6. What is the present value of the following cash flow from Projects?

End of year	Project A	Project B	Project C
1	5000	7500	6000
2	5500	7000	6000
3	6000	6500	6000
4	6500	6000	6000
5	7000	5500	6000
6	7500	5000	6000

The discount rate is 15 percent.

7. Suppose you deposit Rs.1,00,000 with an investment company which pays 8 percent interest with quarterly compounding, how much will this deposit grow to in 10 years?

8. What is the difference between the effective rate of interest and stated rate of interest in the following cases:

   ***Case A*:** Stated rate of interest is 8 percent and the frequency of compoundingis six times a year

   Case B: Stated rate of interest is 10 percent and the frequency of compounding is four times a year

9. Your company is taking a loan of 10,00,000, carrying an interest rate of 15 percent. The loan will be amortised in five equal installments. What fraction of the installment at the end of second year will represent principal repayment?

10. Anurag Limited borrows Rs.20,00,000 at an interest rate of 12 percent. The loan is to be repaid in 5 equal annual installments payable at the end of each of the next 5 years. Prepare the loan amortisation schedule.

11. After 8 years Mr.Tiwari will receive a pension of Rs.10,000 per month for 20 years. How much can Mr. Tiwari borrow now at 12 percent interest so that the borrowed amount can be paid with 40 percent of the pension amount? The interest will be accumulated till the first pension amount becomes receivable. PVIFA(1%, 240 T)=90.82, FVIF(1%,96T)=2.60

12. Rs.1000 par value bond bears a coupon rate of 10 percent and matures after 5 years. Interest is payable semi-annually. Compute the value of the bond if the required rate of return is 18 percent.

13. The market value of Rs.100 par value bond of PVR Ltd., carrying a coupon rate of 8.5 percent and maturing after 8 years, is INR 95.00 Calculate the yield to maturity on this Bond.

14. A company's current stock price is Rs.36 and its last dividend was Rs. 2.40. In view of strong financial position and its consequent to low risk, its required rate of return is only 12%. Its dividends are expected to grow at constant rate of 5%in future, and required rate of return is expected to remain 12%, what is theprice of the stock 5 years from now?

15. The current dividend on an equity share of Megha Limited is Rs. 10.00 on an earnings per share of Rs. 30.00. Assume that the dividend per share will growat the rate of 20 percent per year for the next 5 years. Thereafter, the growth rate is expected to fall and stabilise at 12 percent. Investors require a return of 15 percent from Megha's equity shares. What is the intrinsic value of Megha's equity share?

UNIT-3 COST OF CAPITAL

3.1 INTRODUCTION

Like other resources of the company, financial resources i.e. capital also involves cost for the company. Whenever company issue securities, it need to incur various floatation cost such as underwriting, legal, registration, brokerage etc. Due to these, there is an impact of cost of floatation on cost of capital. Flotation cost accounts to 10% to 12% of issue size. Higher the issue size the lesser will be flotation cost and lower the issue size the more will be flotation cost. By issuing new securities, the company Cost of Capital can be impacted by floating expenses.

There are several approaches of Cost of Capital. The Cost of Capital is nothing, but a rate of return anticipated by its investors. For any investment decision cost of capital is considered to be an integral part to measure the worth of investment. Each type of Capital whether it is Debt, Preference, and Equity should be integrated with the Cost of Capital.

3.2 CONCEPT AND MEANING OF COST OF CAPITAL

The cost of capital of a company is the minimum rate of return which is expected by its investors who had invested money in the company. When the company uses different forms of finances like Debt, Preference Share Capital, Retained Earnings and Equity Shares at that time finance manager of company must take careful decision with consideration to the cost of capital, because it is closely related with the firm value and earning capacity of the firm. Cost of capital can also be known as a required rate of return.

3.3 DEFINITION OF COST OF CAPITAL

- Cost of capital means minimum required rate of earnings in other words cut-off rate of capitalexpenditures - **Solomon Ezra**.

- According to **Cavan Horne** cost of capital means rate of return on a project that will leaveunchanged the market price of the stock.
- According to the definition of **William and Donaldson**," Cost of capital may be defined as therate that must be earned on the net proceeds to provide the cost elements of the burden at the time, they are due"

3.4 FEATURES OF COST OF CAPITAL

1. The Calculation of Cost of Capital is not a cost, but in fact it is the rate of return that firmsare needed to earn from its projects.
2. Cost of capital is a minimum rate of return that a company needs to earn.
3. It helps to identify the cost which needs to incur from each source of capital use in
4. thecompany capital structure.

3.5 IMPORTANCE OF COST OF CAPITAL

The calculations of cost of capital play an important role in financial management to decide about capital structure which is as follows:

1. **Importance to Capital budgeting decision:** The cost of capital of various sources of finances can affect the decision of Capital Structure. On the bases of net present value method, it is believed that company can earn more earnings if the present value of cash inflow is more than the present value of cash outflow. In capital Budgeting Decision, cost of capital is needed to be considered.

2. **Importance to structure decisions:** A Capital Structure is a combination of different types of long-term securities. The Company uses various types of sources for financing its business activities and in that company chooses such combination of sources where the cost of capital is lesser and suitable. So, for that purpose cost of capital helps to decide the capital structure of the company.

3. **Importance to Evolution of Financial performance**: The capital budgeting, capital structure and value of the firm can highly be influenced by the cost of capital. Even costof capital also helps to measures the financial performance of the firm because it can affect adversely.
4. **Importance to design debt policy**: In a company various financing policy refers to the decisions associated to the financial system like payment system, lending system, debt policy etc. The main Purpose to frame policies is to maintain financial stability and market efficiency and enhance the value of the firm for its shareholders. So, the cost of capital can also be useful in deciding the methods of financing at a point of time.

5. **Importance to other financial Decisions:** Other Areas such as Market Value of the Share, earning capacity of the securities, and capitalization of Profits etc. are

also cover in the cost of capital. Hence Cost of Capital Play an Important role in Financial Management.

❖ **CHECK YOUR PROGRESS A**

1) What is Cost of Capital?
2) What are the Features of Cost of Capital?
3) State the Importance of Cost of Capital?

3.6 COMPUTATION OF COST OF CAPITAL

The Computation of cost of capital can be representing or calculated into two parts:

1. Measurement of Specific cost
2. Measurement of Overall cost

3.6.1. Measurement of Specific Cost:

Measurement of Specific cost refers to the calculations of cost of each specific sources of capital of the company such as:

1. Cost of Debt
2. Cost of Preference Share
3. Cost of Equity Share
4. Cost of Retained Earning

Let us discuss each type of specific cost so it can have clear idea about how to calculate the cost of capital of each source.

3.6.1.1 Cost of Debt:

Let us understand with the concept of Calculation of cost of Debentures bond or loan. A Company may raise debt in a various way. Debt may be short term or Long term bases. The company may borrow funds from financial institution or from public i.e., Public Deposits for a specified period of time at a certain rate of interest. A bond may be issued at par or at premium or at discount as compared to its face value depends upon on the situation and financial position of company. Rate of Interest is the main bases forcalculating the cost of Debt. Debt may be redeemable or Irredeemable. Cost of debenture is denoted by $K_{d.}$ The cost of debt is the rate of interest payable on debt.

MEASUREMENT OF COST OF DEBT:

The formulas for calculating the cost of Debt for Redeemable and Irredeemable bond are as follows:

For Redeemable: whenever the company issues debt it is to be issued to be redeemed at the certain time period during the lifetime of the company. Such a debt issue is known as Redeemable Debt. Redeemable Debt may be calculated as follows:

Formula for a Cost of Debt before Tax

$$K_{db} = \frac{I + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

Formula for a cost of Debt After tax

$K_{dA} = K_{db}(1 - t)$ or

$$K_{dA} = \frac{I(1-t) + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

For Irredeemable: Irredeemable debentures are issues when the company does not give any approval for the repayment of money borrowed. Such types of debentures are repayable on the winding up of a company or on the expiry of a long period. It is also called perpetual debentures.

Before Tax

$$K_{db} = \frac{I}{B_0}$$

After Tax

$$K_{dA} = K_{db}(1 - t) \text{ OR}$$

$$K_{dA} = \frac{1}{B_0}(1 - t)$$

Where,

K_{db}=Cost of Debenture Before tax

n = Numbers of years

F =Face value of Debt

B_o= Present value of Debt

t =tax rate

K_{dA}=Cost of Debenture After tax

Debt issued at Par:

The calculations for identify cost of Debt which is issued at par a comparatively easy task rather than issued at discount or premium. The issue of bond at par

express that the company sold the bond at face value. Due to this, both Contract rate and market rate are associated with each other. It means that there is no discount or premium at bond. A bond is sold at its exact face value. Let us understand with a small example:

Example: Astha limited issues Rs. 40,000 at 8% debentures. Assuming the taxes rate at 50%. Compute the cost of debt, if debentures are an issue at (a) par (b) at premium of 10% (c) at discount of 10%.

Solution:

Here numbers of years are not defined means company has issues debenture for Irredeemable purposes. So Cost of Debentures after tax is calculated as follows:

Given Information: Face Value = 40000 at 8% interest rate

Tax rate = 50%

Cost of Debentures at Par is:

Interest rate (40000 * 8%) = 3200

After tax

$$K_{dA} = K_{db}(1 - t)$$

$$= \frac{1}{B_o}(1 - t)$$

$$= \frac{3200}{40000}(1 - t)$$

$$= 0.08\ (1 - 0.50)$$

$$= 0.08 \times 0.5$$

$$= 0.04$$

= 0.04 %

Debt issued at Premium: The issue of bond at premium express that the company sold the bond more than the face value. Due to this, both Contract rate and market rate are differing with each other. It means that the value of bond is more than the face value. Let us understand with a small example:

Cost of debentures at Premium is:

Interest rate (40000 * 8%) = 3200

Bond value at Premium = 40000 + 10% premium of face value i.e. 40000

= 40000 + 4000

= 44000

After tax

$$K_{dA} = K_{db}(1 - t)$$

$$= \frac{1}{B_o}(1 - t)$$

$$= \frac{3200}{44000}(1 - t)$$

$$= 0.073\ (1 - 0.50)$$

$$= 0.073 \times 0.5$$

$$= 0.0365$$

$$= 3.65\ \%$$

Debt issues at Discount: The issue of bond at discount express that the company sold the bond less than the face value. Due to this, both Contract rate and market rate are differing significantly with each other. A bond is sold less than face value it means the value earns is comparatively less than face value of bond. Let us understand with a small example:

Cost of debentures at discount is:

Interest rate (40000 * 8%) = 3200

Bond value at Premium = 40000 - 10% discount of face value i.e. 40000

= 40000 - 4000

= 36000

After tax

$$K_{dA} = K_{db}(1 - t)$$

$$= \frac{1}{B_o}(1 - t)$$

$$= \frac{3200}{36000}(1 - t)$$

$$= 0.089\ (1 - 0.50)$$

$$= 0.089 \times 0.5$$

$$= 0.0445$$

$$= 4.45\ \%$$

Sums on cost of debt

Example: XYZ LTD. Company issued 15% irredeemable debentures of Rs.100000. Tax rate is applicable on this debenture is 35%. Determine cost of debenture if debenture is redeemed at par, at 10 % premium, and at a 10 % discount.

Solution:

Here numbers of years are not defined means company has issues debenture for Irredeemable purposes. So Cost of Debentures after tax is calculated as follows:

Given Information: Face Value = 100000 at 15% interest rate

Tax rate = 35%

Cost of Debentures at Par is:

Interest rate (100000* 15%) = 15000

After tax

$$K_{dA} = K_{db}(1 - t)$$

$$= \frac{1}{B_o}(1 - t)$$

$$= \frac{15000}{100000}(1 - t)$$

$$= 0.15(1 - 0.35)$$

$$= 0.15 \times 0.65$$

$$= 0.0975$$

$$= 9.75\%$$

Bond value at Premium = 100000 + 10% premium of face value i.e. 100000
= 100000+ 10000
= 110000

Cost of debentures at Premium is:

Interest rate (100000* 15%) = 15000

Bond value at Premium = 100000 + 10% premium of face value i.e. 100000

= 100000 + 10000

= 110000

After tax

$K_{dA} = K_{db}(1 - t)$

$= \frac{1}{B_0}(1 - t)$

$= \frac{15000}{110000}(1 - t)$

$= 0.14(1 - 0.35)$

$= 0.14 \times 0.65$

$= 0.091$

$= 9.1\%$

Cost of debentures at discount is:

Interest rate (100000* 15%) = 15000

Bond value at Premium = 100000 - 10% premium of face value i.e. 40000

= 100000- 10000

= **9000**

After tax

$K_{dA} = K_{db}(1 - t)$

$= \frac{1}{B_0}(1 - t)$

$= \frac{15000}{90000}(1 - t)$

$= 0.167(1 - 0.35)$

$= 0.167 \times 0.65$

$= 0.109$

$= 10.9\%$

Example: A Company issues 12% debentures having Face value 1000 which is expected to sell at the rate of 4% discount. Floatation cost is 2.5%.The Maturity period for redeemable debenture is 10 years. Calculate before tax and after tax cost of debt assuming a tax rate of 50%.

Solution

Here numbers of years are being defined so company has issues debentures for Redeemable Purposes:

Given Information: Face Value = 1000 at 12%

Floatation cost = 2.5%

Numbers of years = 10

Tax rate = 50%

Rate of Discount = 4%

Interest value = 12% of 1000

= 120

Bond Value = Face Value - discount value – Floatation cost

= 1000 – (4% of 1000) – (2.5 % of 1000)

= 1000 - 40 – 25

= 935

Now, cost of debenture before tax

$$K_{db} = \frac{I + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

$$K_{db} = \frac{120 + \frac{1}{10}(1000 - 935)}{\frac{1}{2}(1000 + 935)}$$

$$K_{db} = \frac{120 + 0.1(65)}{0.5(1935)}$$

$$K_{db} = \frac{120 + 6.5}{967.5}$$

$$K_{db} = \frac{126.5}{967.5}$$

$$K_{db} = 0.13$$

Formula for a cost of Debt after tax

$$K_{dA} = K_{db}(1 - t)$$

$$K_{dA} = \frac{I(1-t) + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

$$K_{dA} = \frac{120(1-0.50) + \frac{1}{10}(1000 - 935)}{\frac{1}{2}(1000 + 935)}$$

$$K_{dA} = \frac{120(0.5) + 0.1(65)}{0.5(1935)}$$

$$K_{dA} = \frac{60 + 6.5}{967.5}$$

$$K_{dA} = \frac{66.5}{967.5}$$

$$K_{dA} = 0.07$$

When convert into percentage the $K_{dA} = 7\ \%$

There is another method to calculate cost of debentures after tax:

$K_{dA} = K_{db}(1 - t)$

$K_{dA} = 0.13(1 - 0.50)$

$K_{dA} = 0.13(0.50)$

$K_{dA} = 0.07$

When convert into percentage the $K_{dA} = 7\ \%$

Example: Y Ltd is issuing 8 years bonds at 12% interest rate having face value Rs. 100 which is currently sold at 95 Rs. Calculate cost of debenture if corporate tax is 30%.

Solution:

Here numbers of years are being defined so company has issues debentures for Redeemable Purposes:

Given Information:

Face Value = 100 at 12%

Numbers of years = 8

Tax rate = 30%

Bond value = 95

Interest rate = 12% of 100

= 12

Now, cost of debenture before tax

$$K_{db} = \frac{I + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

$$K_{db} = \frac{12 + \frac{1}{8}(100 - 95)}{\frac{1}{2}(100 + 95)}$$

$$K_{db} = \frac{12 + 0.125(5)}{0.5(195)}$$

$$K_{db} = \frac{12 + 0.625}{97.5}$$

$$K_{db} = \frac{12.625}{97.5}$$

$$K_{db} = 0.1295$$

Formula for a cost of Debt after tax

$$K_{dA} = K_{db}(1 - t)$$

$$K_{dA} = \frac{I(1-t) + \frac{1}{n}(F - B_0)}{\frac{1}{2}(F + B_0)}$$

$$K_{dA} = \frac{12(1-0.30) + \frac{1}{8}(100 - 95)}{\frac{1}{2}(100 + 95)}$$

$$K_{dA} = \frac{12(0.7) + 0.125(5)}{0.5(195)}$$

$$K_{dA} = \frac{8.4 + 0.625}{97.5}$$

$$K_{dA} = \frac{9.025}{97.5}$$

$$K_{dA} = 0.093$$

When convert into percentage the K_{dA}= 9. 3 %

There is another method to calculate cost of debentures after tax: $K_{dA} = K_{db}(1 - t)$

K_{dA} = 0.1295(1 – 0.30)

K_{dA} = 0.1295(0.70)

K_{dA} = 0.091

When convert into percentage the K_{dA}= 9. 1**%**

Example: Sonu ltd issued Rs. 200 lakh at 12% debentures which will be redeemed at par value having maturity period after 10 years. Calculate cost of debt in each of the following cases (assume tax rate 50%).

a) Case 1: If debt is Issue at par with no floatation cost.

b) Case 2: If debt is Issue at par with 4% floatation cost.

c) Case 3: If debt is Issue at 10% premium with 4% floatation cost

d) Case 4: If debt is issue at 10% discount with 6% floatation cost.

Solution:

Here numbers of years are being defined so company has issues debentures for Redeemable Purposes:

Given Information: Face Value = 200 at 12%

Numbers of years = 10

Tax rate = 50%

Case 1: If debt is Issue at par with no floatation cost.

$$K_{dA}= \frac{I(1-t)+\frac{1}{n}(F-B_0)}{\frac{1}{2}(F+B_0)}$$

$$K_{dA}= \frac{24(1-0.50)+\frac{1}{10}(200-200)}{\frac{1}{2}(200+200)}$$

$$K_{dA}= \frac{24(0.50)+0.1(0)}{0.5(400)}$$

$$K_{dA}= \frac{12+(0)}{200}$$

$$K_{dA}= \frac{12}{200}$$

$$K_{dA}= 0.06$$

$$K_{dA}= 6\%$$

Case 2: If debt is Issue at par with 4% floatation cost.

Bond value when 4% floatation cost is

Bond value = face value – 4% floatation cost

Bond value = 200 – (4% of 200)

Bond value = 200 – 8

Bond value = 192

$$K_{dA}= \frac{I(1-t)+\frac{1}{n}(F-B_0)}{\frac{1}{2}(F+B_0)}$$

$$K_{dA}= \frac{24(1-0.50)+\frac{1}{10}(200-192)}{\frac{1}{2}(200+192)}$$

$$K_{dA}= \frac{24(0.50)+0.1(8)}{0.5(392)}$$

$$K_{dA}= \frac{12+(0.8)}{196}$$

$$K_{dA}= \frac{12.8}{196}$$

$$K_{dA}= 0.07$$

$$K_{dA}= 7\%$$

Case 3: If debt is Issue at 10% premium with 4% floatation cost

Bond value when 10% premium with 4% floatation cost is

Bond value = face value + 10% premium value – 4% floatation cost

Bond value = 200 + (10% of 200) – (4% of 200)

Bond value = 200 + 20 – 8

Bond value = 200+12

Bond value = 212

$$K_{dA} = \frac{I(1-t)+\frac{1}{n}(F - B_0)}{\frac{1}{2}(F+B_0)}$$

$$K_{dA} = \frac{24(1-0.50)+\frac{1}{10}(200 - 212)}{\frac{1}{2}(200+212)}$$

$$K_{dA} = \frac{24(0.50)+0.1(-12)}{0.5(412)}$$

$$K_{dA} = \frac{12+(-1.2)}{206}$$

$$K_{dA} = \frac{10.8}{206}$$

$$K_{dA} = 0.052$$

$$K_{dA} = 5.2\%$$

Case 4: If debt is issue at 10% discount with 6% floatation cost

Bond value when 10% discount with 6% floatation cost is

Bond value = face value - 10% discount value – 6% floatation cost

Bond value = 200 - (10% of 200) – (6% of 200)

Bond value = 200 -20 – 12

Bond value = 180 – 12

Bond value = 168

$$K_{dA} = \frac{I(1-t)+\frac{1}{n}(F - B_0)}{\frac{1}{2}(F+B_0)}$$

$$K_{dA} = \frac{24(1-0.50)+\frac{1}{10}(200 - 168)}{\frac{1}{2}(200+168)}$$

$$K_{dA} = \frac{24(0.50)+0.1\ (32)}{0.5\ (368)}$$

$$K_{dA} = \frac{12+(3.2)}{184}$$

$$K_{dA} = \frac{15.2}{184}$$

$$K_{dA} = 0.08$$

$$K_{dA} = 8\%$$

3.6.1.2 Cost of Preference Shares:

Whenever the Company Issues Preference shares, a company used to calculate cost of preference which is payable to preference Shareholders.

So at time of issuing preference shares the company is liable to pay dividend to preference shareholders which are the part of cost of capital. The amount payable to Preference shareholders is in the form of dividend with fixed rate.

Measurement of cost of Preference shares:

The formulas for calculating the cost of Preference shares for Redeemable and Irredeemable bond are as follows:

For Redeemable: whenever the company issues Preference shares it is to be issued to be redeemed after the certain time period during the lifetime of the company. Such an issues Preference shares issue is known as Redeemable Preference shares. Redeemable
Preference shares may be calculated as follows:

Formula for a Cost of Preference Shares

$$K_P = \frac{P_{div} + \frac{1}{n}(F - P_0)}{\frac{1}{2}(F+P_0)}$$

For Irredeemable: Irredeemable Preferences are issues when the company does not give any approval for the repayment of money borrowed. Such types of Preference are

repayable on the winding up of a company or on the expiry of a long period. It is also called perpetual Preference Shares.

$$K_p = \frac{P_{div}}{P_0}$$

Where, Kp= cost of Preferences shares

P_{div} = dividend on Prefernce shares

P_0 = current price of Preference shares

n = Numbers of years

F = Face value of Preference shares.

Cost of Preference shares when tax rate is mention at that time the following formulas are used:

For Irredeemable purposes:

$$K_p = \frac{P_{div}(1+D_t)}{P_0}$$

For Redeemable Purposes:

$$K_P = \frac{P_{div\ (1+D_t)} + \frac{1}{n}(F - P_0)}{\frac{1}{2}(F+P_0)}$$

Preference issue at Par:

The calculations for identify cost of Preference shares which is issue at par a comparatively easy task rather than issued at discount or premium. The issues of preference share at par indicate that the company has sold the preference share at face value. Here both market rate and contract rate are having similar rate. It means that there is no discount or premium at preference shares. A Preference shares is sell at its exact face value. Let us understand with small example:

Example: XYZ Ltd issued 10% Preference share at the face value of Rs 1000. The preference share is sold at 3% flotation cost the company will redeemable preference shares after years.

Solution:

Here numbers of years are being defined so company has issues Preference for Redeemable Purposes:

Given Information: Face Value = 1000 at 10%

Floatation Cost: 3%

Numbers of years = 10 years

Po = F.V – 3% Flotation Cost

= 1000 – (3% of 1000)

= 1000 – 30

= 970

Dividend = 10 % of 10,000
= 100

$$K_P = \frac{P_{div} + \frac{1}{n}(F - P_o)}{\frac{1}{2}(F + P_o)}$$

$$= \frac{100 + \frac{1}{10}(1000 - 970)}{\frac{1}{2}(1000 + 970)}$$

$$= \frac{100 + 0.1(30)}{0.5(1970)}$$

$$= \frac{100+3}{985}$$

$$= \frac{103}{985}$$

$$= 0.105$$

$$= 10.5\ \%$$

Example: A- Company has 100 face value of preference shares paying a dividend of 15% will be sold at 3% discount. The floatation cost is 1 % of face value respectively.

Find out cost of Preference share

Solution: It's an irredeemable preference share, because numbers of years are not mention in the given problem**.**

Given Information: Face Value = 100

Discount Rate: 3%

Floatation Cost = 1%

Po = F.V – Discount Value – Flotation Cost

= 100 – (3% of 100) – (1% of 100)

= 1000 – 3 – 1

= 96

$$K_p = \frac{P_{div}}{P_o}$$

$$= \frac{15}{96}$$

$$= 0.16$$

$$K_p = 16\%$$

Example: Sargam Ltd has a preference share whose face value is 1000. 10% rate of dividend on Preference share. Calculate the Cost of Preference share if it is sold at par, at 10% premium and 4% discount.

What will be cost of Preference Share if it will redeem after 20 years and can be sold at par, at 10% premium and 5% discount? In both the cases give the effect of 5% floatation cost.

Solution:

On the first part of question the company has issued irredeemable preference shares as number of years is not defined and other part of question the company has issues redeemed shares for 20 years.

Given information:

Face value = 1000

Dividend rate = 10%

Dividend rate = (10% of 1000)

= 100

For Irredeemable Preference shares at par:

P_0 **= Face value – floatation cost**

= 1000 – (5% of 1000)

= 1000 – 50

= 950

$$K_p = \frac{P_{div}}{P_0}$$

$$= \frac{100}{950}$$

$$= 0.11$$

$$K_p = 11\%$$

For Irredeemable Preference shares at Premium:

P_0 **= Face value + premium value – floatation cost**

= 1000 + (10% of 1000) – (5% of 1000)

= 1000 + 100 - 50

= 1050

$$K_p = \frac{P_{div}}{P_0}$$

$$= \frac{100}{1050}$$

$$= 0.095$$

$$K_p = 9.5\%$$

For Irredeemable Preference shares at discount:

P_0 **= Face value - discount value – floatation cost**

= 1000 - (4% of 1000) – (5% of 1000)

= 1000 - 40 - 50

= 910

$$K_p = \frac{P_{div}}{P_o}$$

$$= \frac{100}{910}$$

$$= 0.10$$

$$K_p = 10\%$$

For Redeemable Preference shares at par:

P_0 **= Face value – floatation cost**

= 1000 – (5% of 1000)

= 1000 – 50

= 950

$$K_P = \frac{P_{div} + \frac{1}{n}(F - P_o)}{\frac{1}{2}(F + P_o)}$$

$$= \frac{100 + \frac{1}{20}(1000 - 950)}{\frac{1}{2}(1000 + 950)}$$

$$= \frac{100 + 0.05\ (50)}{0.5(1950)}$$

$$= \frac{100 + 2.5}{975}$$

$$= \frac{102.5}{975}$$

= 0.105

KP = 10.5%

For Redeemable Preference shares at Premium:

P0 = Face value + premium value – floatation cost

= 1000+ (10% of 1000) – (5% of 1000)

= 1000 + 100 - 50

= 1050

$$K_P = \frac{P_{div} + \frac{1}{n}(F - P_0)}{\frac{1}{2}(F + P_0)}$$

$$= \frac{100 + \frac{1}{20}(1000 - 1050)}{\frac{1}{2}(1000 + 1050)}$$

$$= \frac{100 + 0.05(-50)}{0.5(2050)}$$

$$= \frac{100 + 2.5}{1025}$$

$$= \frac{102.5}{1025}$$

$$= 0.10$$

K_P = **10%**

For Redeemable Preference shares at discount:

P_0 **= Face value - discount value – floatation cost**

= 1000 - (4% of 1000) – (5% of 1000)

= 1000 - 40 - 50

= 910

$$K_P = \frac{P_{div} + \frac{1}{n}(F - P_0)}{\frac{1}{2}(F + P_0)}$$

$$= \frac{100 + \frac{1}{20}(1000 - 910)}{\frac{1}{2}(1000 + 910)}$$

$$= \frac{100 + 0.05(90)}{0.5(1990)}$$

$$= \frac{100 + 4.5}{995}$$

$$= \frac{104.5}{995}$$

$$= 0.10$$

K_P = 10%

Example: XYZ Ltd has issues preference shares of 10lakh of Rs. 100 each at 12% to be redeemed after 5 years being issued at 5% discount and floatation cost is expected to be 2%.shares are issued at 10% premium and dividend tax rate is 20%. Evaluate the Cost of Preference Share.

Solution : here company has issues Preference shares on redeemed purposes.

Given information:

Face value = 10lakh

Dividend rate = 12%

Dividend rate = (12% of 100)

= 12

No of years = 5

Floatation cost = 2% of 100 lakh

Premium value = 10% of 100 lakh

=10

Tax rate = 20%

P0 = Face value + premium value – discount value – floatation cost

= 100 + (10% of 100) – (5% of 100) – (2% of 100)

= 100 + 10 – 5 – 2

= 103

$$K_P = \frac{P_{div\ (1+D_t)} + \frac{1}{n}\ (F - P_0)}{\frac{1}{2}(F + P_0)}$$

$$K_P = \frac{12\ (1+0.20) + \frac{1}{5}\ (100 - 103)}{\frac{1}{2}(100 + 103)}$$

$$K_P = \frac{12\ (1.2) + \frac{1}{5}\ (100 - 103)}{\frac{1}{2}(100 + 103)}$$

$$K_P = \frac{14.4 - 0.6}{101.5}$$

$$K_P = 0.14$$

Check your Progress B

1) What is Cost of Debt?

_____

_____

_____

2) What is Cost of Preference Share?

_____

_____

_____

There are different approaches for cost of equity

1. **Dividend price Ratio Approach.**

a) Cost of Equity without growth Rate

$Ke = \frac{D_1}{P_0}$

Where,

$D_1 = D_o (1+ g)$

P_o = Current Price of the share

b) Cost of Equity with growth rate

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

Where, g = growth rate

When expected dividend value is not at that time following formula is used

$D_1 = D_0 (1+ g)$

3.6.1.3 Cost of Equity Share:

There are different approaches for cost of equity

1. **Dividend price Ratio Approach.**

a) Cost of Equity without growth Rate

$Ke = \frac{1}{P_0}$

Where,

$D_1 = D_o (1+ g)$

P_o = Current Price of the share

b) Cost of Equity with growth rate

$Ke = \frac{D1}{P_0} + g$

Where, g = growth rate

When expected dividend value is not at that time following formula is used

$D_1 = D_0 (1+ g)$

Example: Suppose the Equity share of the company is currently selling for Rs 50. The dividend per share of a firm is expected to be 5 rupees per share which is likely to grow at the rate of 6% determine cost of equity.

Solution: The Growth rate is given so we need to use the approach of cost of equity withgrowth rate

Information given:$P_0 = 50$

$D_1 = 5$

g = 6%

$Ke = \frac{D1}{P_0} + g$

$= \frac{5}{50} + 0.06$

$= 0.16$

$= 16\ \%$

Example: Calculate Cost of Equity from the following:

6% growth is expected on dividend. Current dividend of Company is 3 per share andthe market price is Rs. 40

$P_0 = 40$

$D_0 = 3$

g = 6%

$D_1 = D_0 (1 + g)$

$= 3 (1 + 0.06)$

$= 3 (1.06)$

$= 3.18$

$$Ke = \frac{D1}{P_0} + g$$

$$= \frac{3.18}{40} + 0.06$$

$$= 0.070 + 0.06$$

$$= 0.13$$

$Ke = 13\%.$

Example: Present market value of Equity Share is Rs 80. The Company is expected to earn Rs 5 per share at the end of current year. The ratio of Dividend payout is 60%. A growth rate is 8%.

Solution: In this problem dividend payout Ratio is 60%. So retention Ratio will be 40%. i.e. equal to b. That is based on Price earnings ratio.

Information given:

$P_0 = 80$

$D_1 = 5$

$g = 8\%$

$Dp = 60\%$

E_1 = Expected Earning

$D_1 = E_1 (1 - b)$

$= 5 (1 - 0.40)$

$= 5 (0.60)$

$= 3$

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

$$= \frac{3}{80} + 0.08$$

= 0.0375 + 0.08

= 0.12

Ke = 12%.

Example: Equity share of the company is currently selling for Rs 70. The company at the end of last year had paid dividend of Rs 7 per share. Expected growth rate is 9%

$P_0 = 70$

$D_0 = 7$

$g = 9\%$

$D_1 = D_0 (1 + g)$

$= 7 (1 + 0.09)$

$= 7 (1.09)$

$= 7.63$

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

$= \frac{7.63}{70} + 0.09$

$= 0.199$

$Ke = 19.9\%.$

3.6.1.4 Cost of Retained Earnings (Kr)

There are different sources of capital such as equity shares, Preference Shares, Debentures and even Retained Earnings**.** Retained Earnings are to be considering as source of finance for which differ from other sources.

Whenever the company issues a source of finance as debt or a Preference shares then company is having a contractual obligation to pay interest and dividend on a fixed rate on debentures and preferences. Even when company issues equity shares at that time also company need to pay dividend. But when company use retained earnings as a source of capital at that time there is no obligation to pay return on Retained Earnings. Retained Earnings are consider as free of cost and its funds are not raised from market. However, it is not correct on the contrary they do involve cost like other source of finance.

When earnings retained, shareholders forced to forget the dividend. Therefore, cost of

Retained Earnings may define an Opportunity cost. The cost of Retained Earnings will be Equal to shareholders required rate of return i.e., Ke. Since Retained Earnings does not involve floatation cost. Therefore is less than Ke

So $k_r = \frac{D1}{Po} + g$

Cost of Retained earning

Kr= Ke

Kr = ($\frac{D1}{Po}$ + g) (1 – t) (1-b)

Where,

Kr = Ke(1-t) (1 – b)

D_1= expected dividend

g= growth rate

P_0 = Current Price of share

t= Tax rate

b = Cost of purchasing new securities of cost of brokerage.

Example: Suppose a Dividend per share of a firm is expected to be 2 rupees per share which is likely to grow at the rate of 5%. The market price is 25.The average tax rateis
30% and it is expected that 2% brokerage cost that shareholders will have to pay while
investing their dividends in alternative securities. Find out the cost of retained earnings.

Given information

D_1= 2

g= 5%

t=30%

b = 2

P_0 = 25

Kr = ($\frac{D1}{Po}$ + g) (1 – t) (1-b)

= ($\frac{2}{25}$ + 0.05) (1 – 0.3) (1-0.02)

= 0.08 + 0.05 x 0.7 x 0.98

= 0.1143

3.7 WEIGHTED AVERAGE COST OF CAPITAL (WACC):

Weighted Average Cost of Capital is nothing but an average cost of various source of fund issued by the company where weights are being proportion of each source of fund in a mixture of Capital Structure. WACC is considered to be Composite cost of Capital. After calculating the specific cost of each source of funds issued by the company, weighted average cost of capital is computed by putting weights to the Specific costs of capital in Proportion of the various sources of funds to the total. It is denoted by K_0 i.e. overall cost of capital.

It may be bases on two types:

1. Book value Weight (BVW):

Book value weight is the value which is represents as per Balance Sheet which can be calculated with the help of following formula:

BVW for Secruity = FV of security × no. of security

2. Market Value Weight:

Market value weight is the value which is represents as per Market Quotation which can be calculated with the help of following formula:

MVW for Security = current market price of security × no. of security

NO. Of Security = Bv of security ÷ FV

Steps for Calculating WACC

2. First compute the cost of each source of fund on after tax bases
3. Allocate weights to each specific cost.
4. Multiply each cost of capital with the appropriate weights
5. Add weighted cost of all sources of capital

Sources of capital	Amount of each source of capital	Proportion / weights if given direct	Cost of each sources	Weighted average = proportion ×cost
Debentures	Xxx (1)	(1)/(5) = A	k_d	A × k_d
Preference shares	Xxx (2)	(2)/(5) = B	k_p	B × k_p
Equity shares	Xxx (3)	(3)/(5) =C	k_e	C × k_e
Retained earnings	Xxx (4)	(4)/(5)= D	k_r	D × k_r
Total	Xxx (5)	Weights should equal to 1		WACC

Sum on WACC

Example: From the following information given about capital structure. Find out WACC

Source	Amount	Cost
Equity share	4,00,000	16%
Preference share	1,50,000	15%
Retained earning	1,00,000	10%
Debenture	3,50,000	8%

Solution:

Weighted cost = proportion X cost of each source

Source	Amount	Proportion	Cost	W.A.
Equity share	4,00,000	0.4	0.16	0.064
Preference share	1,50,000	0.15	0.15	0.0225
Retained Earning	1,00,000	0.10	0.10	0.01
Debenture	3,50,000	0.35	0.08	0.028
Total	10,00,000	1		0.1245

K_0 = 0.1245X100

= 12.45%

Examples: The capital structure of a company given the following information.

Source	Amount	Cost
Preference share	1,50,000	15%
Equity share	5,50,000	16%
Debenture	3,00,000	10%

Tax rate is applicable on debenture is 30%.

Solution: The value of cost of debenture is before cost but taxe rate is given so it need to calculate cost of debt after tax.

Before tax Kd = 10%

After tax = Kd (1-t)

= 0.10 (1-0.30)

= 0.10 X 0.70

= 0.07

Source	Amt	proportion	cost	W.c
Preference	1,50,000	0.15	0.15	0.0225
Equity	5,50,000	0.55	0.16	0.088
Debenture	3,00,000	0.30	0.10	0.03
Total	10,00,000	1		0.1405

WACC = 0.1405 X 100

= 14.05%

Example: The following information revealed about the capital structure.

Source	Amount
Equity share	2,50,000
Preference share	1,50,000
Debenture share	3,50,000
Retained Earnings	2,50,000

The value of each source after tax is 3 % ,9%,12% and 10% respectively.

Calculate the overall cost of capital.

Source	Amount	proportion	cost	w.c
Equity share	2,50,000	0.25	0.03	0.0075

Pref share	1,50,000	0.15	0.09	0.0135
Debenture share	3,50,000	0.35	0.12	0.042
Retained earning	2,50,000	0.25	0.10	0.025
	10,00,000	1		0.088

WACC = 0.088 X 100

= 8.8%.

Examples:On the bases of book value and market value you are require to determine WACC from the following information.

Particular	B.V
Debenture share (100 Rs. Each)	5,00,000
Preference share (100 Rs. Each)	3,00,000
Equity share (10 Rs. Each)	10,00,000

All securities of capital structure of capital structure are traded in capital market and the current market price of each security are Rs 110,120 and 22 respectively.

Following are some additional information:

1. Rs 100 face value debenture redeemable at par having 10 years' maturity 12% coupon rate ,3% flotation cost, selling price is Rs 100.
2. The maturity period of preference share is 10 years at 11 % dividend rate and 5% floatation cost. The selling price is Rs 100 with the face value is 100.
3. Equity share is currently selling in the market at Rs 22 with a flotation cost 2 per share. The dividend which is expected to grow at8%. An expected dividend is 2 per share.

Solution

1. Cost of debt

F=100

n= 10years

I=12%

Flotation cost=3%

Bo=F.V – flotation cost

= 100 – (3% of 100)

= 100- 3

= 97

Interest value = 12% of 100 i.e. 12

$$Kd = \frac{I + \frac{1}{n}(F - Bo)}{\frac{1}{2}(F + Bo)}$$

$$Kd = \frac{12 + \frac{1}{10}(100 - 97)}{\frac{1}{2}(100 + 97)}$$

$$Kd = \frac{12 + 0.1\,(3)}{0.5\,(197)}$$

$$Kd = \frac{12 + (0.3)}{98.5}$$

$$Kd = 0.125$$

After tax = Kd(1-t)

= 0.125 (1 – 0.35)

= 0.08125

= 8.13 %

2. **Cost of preference.**

F=100

n=10 years

Pdiv=11%

Flotation Cost = 5%

Po= F.V -0 Flotation Cost

= 100 – (5% of 100)

= 95

Pdiv = 11% of 100

= 11.

$$Kd = \frac{I + \frac{1}{n}(F - Po)}{\frac{1}{2}(F - Po)}$$

$$Kd = \frac{11 + \frac{1}{10}(100 - 95)}{\frac{1}{2}(100 + 95)}$$

$$Kd = \frac{11 + 0.10(5)}{\frac{1}{2}(195)}$$

$$Kd = \frac{11 + 0.50}{97.5}$$

$$Kd = \frac{11.50}{97.5}$$

Kd = 0.128

= 12.8%

3) Cost of Equity

Po= 22

Flotation cost = 2

g=8%

D1 = 2

Po= 22 - (2% of flotation)

= 22-2

= 20

$$Ke = \frac{D1}{Po} + g$$

$$= \frac{2}{20} + 0.08$$

$$= 0.182$$

WACC based on book value

Source	Amount	Propor	cost	W.C
Debenture	5,00,000	0.28	0.0813	0.0228
Preference	3,00,000	0.17	0.128	0.0218
Equity	10,00,000	0.55	0.18	0.099
Total	18,00,000			0.1436

WACC = 0.436 X 100

= 14.36 %

WACC based on Market Value

Before finding WACC based on market value we need to calculate market value of each
securities.

Formula for finding Market value

Market value = Current price of security X no of share/debt

WACC based on Market Value

Before finding WACC based on market value we need to calculate market value of each securities.

Formula for finding Market value

Market value = Current price of security X no of share/debt

No of share / debenture = $\frac{B.V}{F.V}$

1) M.V of debenture

No of debenture = $\frac{B.V}{F.V}$

$$= \frac{5,00,000}{100}$$

= 5000

M.V = Bo X no of share

= 5000X110

= 5,50,000

2) M.V of preference

No of share $= \frac{3,00,000}{100}$

= 3000

M.V = Po X no of share

= 3000X120

=360000

3) M.V of Equity shares

No of share $= \frac{B.V}{F.V}$

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

=1,00,000

M.V = 1,00,000 X 22

= 2200000

WACC Based on M.V

Sources	Amount	Prop	Cost	WACC
Debenture	5,50,000	0.18	0.0813	0.015
Pref	3,60,000	0.120	0.128	0.0154
Equity	22,00,000	0.71	0.18	0.128
Total	3110000			0.1584

WACC = 0.1584 X 100
= 15.84%

❖ CHECK YOUR PROGRESS –C

1) Explain Cost of Equity Share?
2) What is Cost of Retained Earning?

❖ LET US SUM UP

Cost of capital refers to cost of each component of capital like Equity share, debenture, and retained earnings. Whenever the company needs to know whether capital has been mobilizes cost effectively, at the time cost of capital is useful. The

decision whether to accept or reject the investment proposal depends upon the cost of capital. Various cost of capital like Kd, Kp , Ke and Kr are calculated in order to determine the cost of preference share, cost of equity, cost of debenture and cost of return earning.

❖ KEY WORDS

Cost of Capital: Cost of Capital is the cost which company need to incur for the capitalstructure of the company.

K_d : Cost of Debt

K_P : Cost of Preference

K_e : Cost of Equity

K_r : Cost of Retained Earnings

WACC : Weighted Average Cost of Capital i.e. Overall cost of Capital

B.V. : Book Value

M.V. : Market Value

Redeemable shares : where the company issues shares for certain period of time.

Irredeemable shares: where a company is not obliged to pay the borrowed amount. It canbe paid at the time of winding up of company or on the expiry of the long period.

P_O : Current Price of Shares

B_o : Current Price of Bond.

❖ CHECK YOUR PROGRESS

1) Define Cost of Capital? Explain the measurement of Specific Cost?
2) Explain WACC.
3) A Company is issuing a debenture having face value of Rs. 1000 at 15% rate of interestand tax rate is 35%. Find the cost of debenture if debenture is issued at 5% discount.
4) A company has issues, 10% Preference share with Rs. 100 face value. The flotation costinvolve is 4% and having maturity period of five years.
5) A dividend per share of a company is expected to be a 3 rupee per share and is likely togrow at rate of 5%. Then determine the equity cost if the market price of share is 20

UNIT- 4 LEVERAGE AND CAPITAL STRUCTURE

4.1 INTRODUCTION: LEVERAGE

Leverage word is derived from a word Lever. The term Leverage is the excretion of force. Leverage means to lift a heavy things i.e. objects this may not be possible in other ways. Leverage term refers to a relationship between two interrelationship variables such as sales, revenue, earnings before interest and tax, earning per share, fixed costs, and variable costs.

From the Financial views, Leverage is the ratio of a Company's loan capital, i.e. (debt), to the value of its ordinary share, i.e. (equity). In simple words when leverage is implied in the business it means that money has been borrowed to purchase the company's assets. Leverage is considering as an investment strategy of using borrowed money. Whenever a company's manager or a management team required making decisions on financing and investment, leverage is considered to be an instrument. With the respect to meaning of Leverages, its means company ability to use fixed assets or funds in order to increases shareholders return. In a simple way, Leverage can be calculated as the percentage change in one variable divided by the percentage change in some other variable. Impliedly the numerator x is the dependent variable, and y is the independent variable. In Leverage analysis, it studies how reactive is the dependent variable to a change in the independent variable

$$\text{Analytical leverage} = \frac{\%\ \text{Change in the dependent variate}}{\%\ \text{Change in Independent variable}}$$

4.1.1 DEFINITION OF LEVERAGE

James Horse has defined Leverage as "the employment of an assets or fund forwhich the firm pays a fixed cost or fixed return.

According to **Ezra Solomon**, "Leverage is the ratio of Net Returns on Shareholderequity and the net rate of return on capitalization.

According to **J.C Van home**," Leverage is the employment of an assets or funds forwhich the firms pay a fixed cost or fixed return.

4.1.2 TYPE OF LEVERAGE

According to the capital structure of the company, the types or classification of Leverage can be into three subtitles.

The company may use financial Leverage or operating Leverage to identify and know the financial risk and business risk.

4.1.2.1 FINANCIAL LEVERAGE

When activities of leverage are done with financing activities, it is called a financial Leverage. Financial Leverage express the relationship between the company earnings before interest and taxes (EBIT) and Earning available to equity shareholder i.e., EPS. It reflects the effect of change in EBIT on the level of EPS.

The Financial Leverage measures the responsiveness of the EPS to a change in EBIT.The Financial Leverage can be defined as a percentage change in EPS divided by the percentage change in EBIT.In simple word, Financial Leverage refers to the usage of borrowed funds to acquire new assets which are accepted to generate a higher capital gain or income as compared to the cost of borrowing.

On the basis of fixed cost funds available to the company, the financial Leverage may be sometimes favorable or Unfavorable. Whenever the company earnings are more on the assets purchases rather than the cost used, the Company is holding favorable financial leverage which is consider to be a positive financial Leverage. Opposite to favorable is an unfavorable Leverage where the company doesn't earn more on purchases of assets as compare to the cost they used which is consider to be a negative leverage.

Simply financial leverage tell us what will be the impact of changes in operating profit i.e. EBIT on Earning per share. The primary purpose of using financial leverageis to increase earnings per share by using debt capital at lower interest rate than rateof return earned in the business.

The calculation of financial leverage can be calculated with the help of the following formula.

$$\text{Financial Leverage} = \frac{\text{Operating Profit}}{\text{Profit before tax}}$$

Degree of Financial leverage:
The degree of financial leverage denotes the level of fluctuation earningse earning per share (EPS) with the change in due tome as a result of the capital structure.

The degree of Financial Leverage measures the financial risk of the Company.

The degree of financial Leverage is a Percentages changes in taxable income to Percentage changes in Earnings before interest and tax. These may be calculated with the help of following formula:

$$\text{DFL} = \frac{\%\ \text{change in taxable income}}{\%\ \text{change in EBIT}}$$

Or

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

4.1.2.2 OPERATING LEVERAGE

In a company, there are two types of costs available: fixed costs andvariable costs. If a company needs to measure its efficiency, then operating Leverage is calculated. The Financial, Efficiency Ratio, i.e., ,operating Leverag,e help the company to identify or to determine the percentage uses of the total cost which is the combination of fixed costs and variable to generate more profit for the company. The firm will generate a larger profit from each incremental sale if its fixed costs are higher in proportion to variable costs, at that point the company operating Leverage ratio will be higher, and on other hand it will generate a low operating Leverage ratio, and the company will generate a smaller proportion of profit from each incremental sale.

The Higher level of fixed costs utilization will turn the Leverage ratio high, which can turn into higher profit with every increase in sales value. Usage of such assets in the company's operations for which it must pay fixed costs is called operating Leverage.

The degree of operating leverage depends upon the amount of various cost structuresstructures. When the company employs a significant number of ficostsiable cost,variable cost, then ithas said that the company had a high dBreak-Evenrating Leverage. Break - EhelpsAnalysis Help Company to determine the operating Leverage.The earnings before interest and taxes keep changing when there are continuous increases or decreases in sales. Operating Leverage studies the changes of EBIT to cthe hange in quantity of sales. Calculation of Operating Leverages is:

$$\text{Operating Leverage} = \frac{\text{contribution}}{\text{EBIT}}$$

4.1.2.3 COMBINED LEVERAGE

(1) DEGREE OF OPERATING LEVERAGE

The Percentages changes in earnings before interest and tax divPercentagecentages changes in sales measures the Degree leverageing Leverages. Thus the degree of operating Leverage is calculated as follows:

$$\text{Degree of operating leverage} = \frac{\text{Percentage changes in EBIT}}{\text{Percenatge changes in sales}}$$

$$\text{DOL} = \frac{\Delta \text{EBIT/EBIT}}{\Delta \text{Sales/sales}}$$

There is wide fluctuation in EPS for a given change in sales when operating, and financial Leverageis usede together. A small change in the level of salesubstantially affectfect on EPS when a company utilizes a high level of operating and financial Leverage. The degree of Operating and financial Leverages can be combinLeverage's total effects on EPS related toto on EPS related with a given change in sales. Combined Leverages study the effect of using fixed operating and fixed capital costs on the EPS. The following equation gives the degree of CombinedLeverage.

Combined Leverages = **Operating Leverages** × **Financial Leverages**

$$\text{CL} = \text{OL} \times \text{FL}$$

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

Where,

CL = Combined LeverageFL = Financial Leverage OL = Operating Leverage.

OP = Operating ProfitC = Contribution
PBT = Profit Before Tax

(2) DEGREE OF COMBINED LEVERAGE

The percentage change in a firm's EPS results from a percentage change in sales. This is also equal to the firm's degree of operating Leverage times its degree of financial Leverage at a particular level of sales.

$$\text{Degree of Combined Leverage} = \frac{\text{Percentage changes in EPS}}{\text{Percentage changes in Sales}}$$

DIFFERENCE BETWEEN OPERATING LEVERAGE AND FINANCIAL LEVERAGE

Points	Operating Leverage	Financial Leverage
Meaning	Operating Leverage is related to investment activities where a company uses such assets in the company's operation for which they have to pay a fixed cost.	Financial leverage is related to all financing activities where the company makes use of Debt in a company's capital structure for which it has to pay fixed interest.
Associated	Operating Leverage is related with sales and EBIT.	Financial Leverage is related with EBIT and EPS.
Measures	It measures and calculates the effect of fixed operating costs.	The effect of interest is measures and calculates by Financial Leverages.
Ascertained by / determined by	Operating Leverage is determined by company cost structure.	Company's capital structure determines financial leverage.
Risk	Operating Leverages used to measures the Business Risk.	Financial Leverages used to measures the financial risk
Dependency	Operating Leverage is totally depends on fixed cost and variable cost.	In Financial leverage, there is high dependency of operating Profit.
Affected by tax rate	It will be not affected by the tax rate and interest rate.	Financial leverage change due to change in tax rate and interest rate.

COMPUTATION OF OPERATING LEVERAGE:

$$\text{Operating Leverage} = \frac{\text{contribution}}{\text{EBIT}} \quad \text{OR} \quad \frac{C}{\text{EBIT}}$$

Where contribution = Sales – Variable cost

EBIT = Contribution – fixed cost

For decision purposes, if the contribution is more than fixed costs, then it will be favourable leverage. If the contribution is less than fixed cost, then it will be unfavourable leverage.

Example

The following information of Sonu Ltd is as follows.
Variable cost per unit = Rs.15
Selling price per unit = Rs. 30
Installed Capacity= Rs. 400
Actual sales are Rs. 300 units.
From the above information, calculate operating leverage.s

1. **When fixed, the costsis Rs. 1000**
2. **When fixed, the costs is Rs. 700**

Solution: Here in this question, we need to calculate operating leverage on the bases of two fixed cost bases

Statement showing calculation of operating Leverage

Particulars	**Case :1 when fixed cost is 1000**	**Case :2 when fixed cost is 700**
Sales	9000 (300×30)	9000 (300×30)
Less Variable Costs	4500 (300×15)	4500 (300×15)
Contribution	**4500**	**4500**
Less Fixed Costs	1000 (Given)	700 (Given)
Earning Before Tax	3500 (4500-1000)	3800 (4500-700)
Operating Leverage	**1.29 (4500/3500)**	**1.18 (4500/3800)**

Example

From the following information of two company find out the Operating Leverage and conclude which company has higher business risk. The Variablecost is 30% of sales for company A, and variable cost is 25% for a company B.

	Company X (value in Rs.)	Company Y (value in Rs.
Sales	**3000000**	**2000000**
Fixed Costs	**400000**	**500000**

Solution:

Statement of Profit

	Company X	Company Y
Sales	**3000000**	**2000000**
Less Variable Costs	**900000**	**500000**
Contribution	**2100000**	**1500000**
Less Fixed Costs	**400000**	**500000**
Earnings before tax	**1700000**	**1000000**

$$\textbf{Operating Leverage} = \frac{\textbf{Contribution}}{\textbf{EBIT}}$$

For Company "A"

$$\text{Operating Leverage} = \frac{\text{contribution}}{\text{EBIT}}$$

$$\text{Operating Leverage} = \frac{2100000}{1700000}$$

Operating leverage = 1.23

For Company "B"

$$\text{Operating Leverage} = \frac{\text{contribution}}{\text{EBIT}}$$

$$\text{Operating Leverage} = \frac{1500000}{1000000}$$

Operating Leverage = 1.5

Conclusion: Operating Leverage of B Company is higher than Company A so itcan conclude that company B is having a risk.

Financial Leverage:

$$\textbf{Financial Leverage} = \frac{\textbf{EBIT}}{\textbf{EBT}}$$

In the above formula the EBIT is earning before interest and tax and EBT is earningbefore tax

Example

The following information about Plastic Ltd is given below. Follisng are the

capital structure of the company.

Details	Amount
The preference Share capital of 10% of 100 each	250000
10% debentures (of Rs.100 each)	100000

If EBIT is (1) Rs.150000, (2) Rs.12000,0 (3) Rs.100000

Calculate financial leverage under three cases assuming a 50% tax rate.
Solution:
Computation of financial leverage

Particulars	Case 1	Case 2	Case 3
EBIT	150000	120000	100000
Less Interest on Debentures	10000	10000	10000
EBT	**140000**	**110000**	**90000**
Less Income Tax	70000	55000	45000
Profit After Tax	**70000**	**55000**	**45000**
Less Preference Dividend	25000	25000	25000
Earnings	**45000**	**30000**	**20000**

Case 1:

$$\textbf{Financial Leverage} = \frac{\textbf{EBIT}}{\textbf{EBT}}$$

$$\text{Financial Leverage} = \frac{150000}{140000}$$

Financial Leverage = 1.07

Case 2:

$$\textbf{Financial Leverage} = \frac{\textbf{EBIT}}{\textbf{EBT}}$$

$$\text{Financial Leverage} = \frac{120000}{110000}$$

Financial Leverage = 1.09

Case 3:

$$\textbf{Financial Leverage} = \frac{\textbf{EBIT}}{\textbf{EBT}}$$

$$\text{Financial Leverage} = \frac{100000}{90000}$$

Financial Leverage = 1.11

Example

A company has the following capital structure, whose detail is given below: Equity share capital Rs.200000
Debentures Rs.125000 at 8%Present EBIT is Rs.70000.
On the information provide, calculate financial leverage assuming a 50% tax rate.Solution:

Particulars	Rs.
EBIT	70000
Less interest	10000
EBT	60000
Less tax	30000
Earnings after tax	30000

$$\text{Financial Leverage} = \frac{\text{EBIT}}{\text{EBT}}$$

$$\text{Financial Leverage} = \frac{70000}{60000}$$

$$\text{Financial Leverage} = 1.167$$

Combined Leverage

Combined Leverage = Operating Leverage × Financial Leverage

It may be expresses as = $\frac{\text{contribution}}{\text{EBT}}$

Example

The following information the about company is available:Sales Rs. 110000 Variable cost Rs. 80000

Fixed Cost involves Rs. 15000

50000 at 10% consists of Long Term Loan.Calculate the combined leverage Solution:

Contribution = sales – variable costs

= 110000 – 80000

= 30000

EBIT = contribution – fixed costs

= 30000 – 15000

= 15000

$$\textbf{Financial Leverage} = \frac{\textbf{EBIT}}{\textbf{EBT}}$$

EBIT = Sales – Variable cost – Fixed costs

=110000 – 80000 -15000

=15000

EBT = 15000 -5000 = 10000

$$\text{Financial Leverage} = \frac{15000}{10000}$$

Financial Leverage = 1.5

Combined Leverage

Combined Leverage = Operating Leverage × Financial Leverage Combined Leverage = 2 × 1.5

Combined Leverage = 3

❖ **CHECK YOUR PROGRESS A**

1) What is Leverage?
2) What is Operating Leverage?
3) What is Combined Leverage?

4.2 INTRODUCTION : CAPITAL STRUCTURE

In all the companies, funds are required from the initial stage up to the end of the companies, as finance plays a vital role in the company's life to manage efficiently. The entire business can suffer, if funds are deficient, it is, therefore, necessary that an accurate estimate of the current and future needs of the capital be made to have an optimum capital structure.

Capital is a crucial part of all kinds of commercial activities, determined by the nature and size of the business enterprise. There are different sources to raise capital. To earn more profit and maximize the shareholder's wealth, the company needs to maintain proper and adequate capital.

4.2.1. MEANING AND CONCEPT

In simple language, structure is the arrangement of the various segments of parts. It means the furnishing of capital from various sources of capital so proper utilisation of long-term funds can be raised.

Capital structure is involved as combination of different securities like Equity share, Preference share, Debenture share, Long term loan and retained earnings raised by the firm in business to run the company.

Capital structure means how much amount the company's need to raise from each source of capital. In ther, words, capital structure is a mix of different sources

available for the company. In simple language decision about how much proportion of Debt and Equity is called Capital Structure. The combination of Debt and Equity is considered to be a Capital Structure.

Capital means investment in the long term either from an outsider i.e., debt and from an owner, i.e., equity. The proportion of equity and debt is considered to be ideal capital structure, if the company raise capital structure only through debt then it will be highly risky and involve fixed repayment of interest which in order increases the cost and in another hand its reduce the profit and the value of firm. But if the company raises through equity then whole owner's funds will be utilised and it reduce the cost but the ultimate profit and value of firm increases.

IMPORTANT POINTS OF CAPITAL STRUCTURE:

1. Owner's shares, Preference Shares, and debt are being issues

2. The process of capital gearing can determine the relative ratio effects. On thisbasis, the company is divided into two

i. Highly geared companies - firms that the proportion of small equity capitalization.

ii. Low geared company - Companies that dominate the total capitalization of equity capital.

4.2.2. DEFINITION

According to Gerestenbeg, "the company's capital structure refers to the composition or makes capitalization and it includes all the actual long-term capital resources: loans, backup, share and bond".

According to Presena Chandra, "The composition of financing a company consistsof shares, preference and debt"

According to the definition pf James C. Van Horne, "The mix of a firm's permanent long term financing represented by debt, preferred stock and common stock equity."

According to R.H. Wessel, "The long term sources of fund employed in a business enterprise"

4.2.3. OBJECTIVES OF CAPITAL STRUCTURE

Decisions of Capital structure aim at the following two important objectives

1. The main aim of capital structure decisions is to maximise the value of the company.
2. Another aim of capital structure decisions is to minimise the overall cost of capital

4.2.4 FORMS OF CAPITAL STRUCTURE

The patterns of capital structure vary from company to company and the availability of finance. Normally the following forms of capital structure mostly

used in practice

- Capital Structures with Equity Shares only
- Capital Structures with Equity and Preferences shares only
- Capital Structures with Equity and Debentures only
- Capital Structures with combination of Equity shares, Preferences shares and Debentures.

4.2.5 FEATURES OF CAPITAL STRUCTURE

A healthy capital structure should possess the following features:

1. **Maximum Return:** The financial structure which the company possess should have straight forward objectives because the main aim or goal is to maximize the shareholders' value or maximization of return to shareholders. The company's maximum return can be earned if it possesses a proper combination of capital through different sources of capital.

2. **Less risky:** There should be a proper balance between different types of ownership and debt securities which is essential to decreasing the risk of using of debt funds.

3. **Profitability:** A sound capital structure should allow the maximum use of the leverage at minimum cost to ensure greater profitability and maximize earnings per share.

4. **Safety:** A healthy capital structure should ensure that the investment is highly secure from various factors affecting such as interest rate, economic growth, inflation, availability of finance etc. Analysis of factors ensures proper safety of capital of the company.
5. **Liquidity:** Liquidity should characterize a sufficient amount of the asset. It is necessary to avoid a shortage of cash, if required. Loan payments should not be hampered by the scarcity of liquid cash. Liquidity, cash inflows and outflows should be carefully considered.

6. **Economy:** The capital structure of the company should assure that minimum cost of capital which revolves the company capacity to raise more wealth for the company.

7. **Flexibility:** There is an expansion and contraction of funds in a company capital structure. There should be continuous flexibility in a capital structure of firm whenever there is an requirement of additional funds or should have an ability to pay all dues whenever the situation occur in the company. Consideration flexibility provides financial managers the ability to change the company's capital structure with minimum cost. It should also be possible for companies to provide funds whenever required to finance activities that benefit. Changes in the capital markets should also be adjusted with the capital structure. Capital increase or reduction should not pose any difficulty in a capital asset structure.

8. **Conservatism:** Debt capacity of the company should not be exceed by the

Company. When company issues debt, its need to pay interest and these payments totally depends on future cash flows. If the company cash flows of future are not sufficient the, the cash insolvency can lead to legal insolvency.

9. **Control:** The company capital structure should be designed, so it does not dilute any control of equity shareholders who are the owners of the company. That is the main reason that convertible debentures should be issued with a great care.

10. **Solvency:** The mixture of capital structure should be such that it does not put company into an insolvent company which indicate that the firm is not liable to pay debts. It is difficult to manageable if company is holding too much of debtsas it can affect the company solvency. Extensive debt threatens the credit rating and credit of the company. Debt financing should be only to the extent that it can be repaired completely and be returned (if necessary).

4.2.6 Factors Affecting the Capital Structure (Determinants):

1. **Financial Leverage**: Financial leverage involves the use of long-term assets with a fixed interest bearing and the preference share along with equity share capital. It enhances the earning per share if the firms can earn higher returns rather than the cost of debt. The impact of leverage is more due to tax reduction but the companycan increase the earnings per share with preference shares.

2. **Growth and Stability of Sales:** There is a high impact on the company capital structure due to the growth and stability of sales of the company. The stability of sales can increase a higher level of debt. There will be no difficulty in paying fixed interest and repayments of debt if stability of sales is ensured in the company. If sales are highly fluctuating, it should not employ debt financing in its capital structure.

3. **Cost of Capital:** Cost of Capital is the return expected by shareholders that provide capital to get business enterprises. The capital structure should make sure that there would be a minimum cost of capital. Usually, debt is cheaper source of finance compared to preference and equity shares. Preference capital is a cheaper than equity because of lesser risk involved.

4. **Cash flow Ability to Service the Debt:** A stable and high cash inflows of a company can issues more debt in a capital structure in comparison to unstable cash inflows. To cover the fixed charges of an additional funds, company need to estimateand forecast the cash inflows.

5. **Nature and Size of Firm**: The Company's Capital Structure can also be affected by Nature and Size of the Firm. There can be variations in capital structure depend upon the nature of business. Public Utility Company can issue more debt in a capital structure because they have more stability and regularity of earnings. Small companies have to depend upon owned capital, as it is very difficult for them to raise long term loans on reasonable terms.

6. **Control:** whenever there is a requirement for additional funds in the company, management should raise funds without losing the control over the company. It is said that when the company issues funds through equity, the existing

shareholders can have less control over the company.

7. **Flexibility:** Capital structure of the firm should be flexible. I.e. it should be capableof the being adjusted according to the needs of changing conditions. A firm should arrange its capital structure in such a way that it can substitute one form of financing by other. Redeemable preference share capital and convertible debentures may be preferred on account of flexibility.
8. **Requirement of Investors:** The requirement of both private and institutional investors should be meeting whenever the company make use of debt financing. Investors, who are over cautious, prefer safety of investment, so debentures would be prefer by them. Investors, who are less cautious in approach, will prefer preference share capital.
9. **Capital Market Conditions:** The choice of securities is also influenced by the market conditions. Whenever the share market is down strain at that time company should not issue equity shares as every investor prefer safety of finance. In case of boom period, it would be advisable to issue equity share capital.
10. **Assets structure:** If fixed assets constitute a major portion of the company's total assets, it may be possible for the company to raise more long-term debts.
11. **Period of Financial:** If finance is required for the limited period, debentures should be preferred. If funds are needed for permanent basis, equity share capital is more appropriate.
12. **Purpose of financing:** If funds are required for the productive purpose, debt financing is suitable as interest can be paid out of profits generated from the investment.
13. **Costs of floatation:** The cost of financing a debt is generally less than the cost of floating equity and hence it may persuade the management to raise debt financing.
14. **Personal Consideration**: Management, which is experienced, does not hesitate to use more of debt in financing than less experienced and conservative management.
15. **Corporate Tax Rule:** High rate of corporate taxes on profits compels the companies to prefer debt financing, because interest is allowed to deduct while computing taxable profits.

CHECK YOUR PROGRESS B

1) What is Capital Structure?
2) State the features an ideal capital structure?

❖ **LET US SUM UP**

Leverage refers to lift heavy things with small force. The money is borrowed by the company to make use of company assets or sources of funds. It includes various classification of leverage like operation financial and combined.

Operating leverage measure operating profit by making utilization of fixed cost to magnify the effect of change in sales. The financial leverage measures the financial risk of the company. The multiplication of financial leverage and overall

leverage givea combined leverage of the company. Risk control of a company can be managed, if company is having low leverage.

Capital structure is the combination of different source of capital which can be Equity, Preference, Debenture and Earning. Risk, return, flexibility, capacity and control are guiding principles for determining optimal capital structure. Combination of debt and equity is considered to be an ideal capital structure.

❖ KEY WORDS

Capital Structure: Equal proportion of debt and equity is a capital structure.

EBIT: It represents the Earnings before Interest and Tax

EPS: It represents the Earning per share.

Leverages: The use of company funds for which its pay fixed cost is called Leverage.

Operating Leverage: Operating Leverage measures the operating cost of the business.

Financial Leverage: It measures the Financial Risk where earnings before Interestand Tax is divide by Earnings before Interest.

Operating Leverage: It expresses the relationship among Operating leverage andfinancial Leverages.

❖ CHECK YOUR PROGRESS

1) Define leverage? Explain different types Leverages.
2) Explain the characteristics of capital structure?
3) Define Capital Structure. Explain the importance of Capital Structure?
4) Explain the determinants of Capital Structure?

• EXERCISES ON LEVERAGES SUMS:

1. The company has sales 1, 50,000, variable cost is 80,000, and fixed cost is 15,000. Interest amount to be 5000. The tax rate is 10%. Calculate combined leverage.
2. Fixed cost of a company is Rs. 90,000 and Rs. 6 is cost of variable. The business selling 50,000 units at a price of Rs 6.find operating leverage.

UNIT- 5

CAPITAL BUDGETING AND RISK ANALYSIS IN CAPITAL BUDGETING

5.1 INTRODUCTION

Capital budgeting is the process of evaluating and selecting long term investment that are in line with the goal of investor's wealth maximization. The capital budgeting decisions are essential, crucial and critical business decision the s due to substantial expenditure a involved; long period for the recovery of benefit s; irreversibility of decisions and the complexity in the involved in decisions investment decision. Capital budgeting is the process that a business uses to determine which proposed fixed asset purchases t should accept, and which should be declined. This process creates a quantitative view of each proposed fixed asset investment, thereby giving a rational basis for making a judgment.

5.2 MEANING

Capital budgeting analyzing analyses and compares substantial future investments and expenditures to determine which ones are most worthwhile. In other words, it‟s a process that company management uses to identify what capmost significantojects will create the biggest return compared with the funds invested in the project. Each project is ranked by its potential future return, so the company management can choose which one to invest in first.

5.3 CAPITAL BUDGETING PROCESS

1. Project identification and generation:

The first step towards capital budgeting is to generate a proposal for investments. There could be various reasons for taking up investments in a business. It could be the addition of a new product line or expanding the existing one. It could be a proposal toeither increase the production or reduce the costs of outputs.

2. Project Screening and Evaluation:

This step mainly involves selecting all correct criteria to judge the desirability of a proposal. This has to match the objective of the firm to maximize its market value. The tool of time value of money comes handy in this step. Also, the estimation of the benefits and the costs needs to be done. The total cash inflow

and outflow along withthe uncertainties and risks associated with the proposal has to be analyzed thoroughly and appropriate provisioning has to be done for the same.

3. Project Selection:

There is no such defined method for the selection of a proposal for investments as different businesses have different requirements. That is why, the approval of an investment proposal is done based on the selection criteria and screening process which is defined for every firm keeping in mind the objectives of the investment being undertaken. Once the proposal has been finalized,the the different alternatives for raising or acquiring funds have to be explored by the finance team. This is called preparing the capital budget. The average cost of funds has to be reduced. A detailed procedure for periodical reports and tracking the project for the lifetime needs to be streamlined in the initial phase itself. The final approvals are based on profitability, Economic constituents, viability and market conditions.

4. Implementation:

Money is spent and thus proposal is implemented. The different responsibilities like implementing the proposals, completion of the project within the requisite time periodand reduction of cost are allotted. The management then takes up the task ofmonitoring and containing the implementation of the proposals.

5. Performance review:

The final stage of capital budgeting involves comparison of actual results with the standard ones. The unfavorable results are identified and removing the various difficulties of the projects helps for future selection and execution of the proposals.

5.4 CAPITAL BUDGETING TECHNIQUES:

(a) Payback period method
(b) Discounted Payback period method
(c) Profitability index method
(d) Net Present value method
(e) Internal rate of return method

a) Payback Period Method:

Payback period represent the time period required for complete recovery of the initial investment in the project. It is the period within which total cash inflows from the projects equals the cost of investment in the project. The lower of the payback period, the better it is, since initial investment recouped faster. The payback period refers to the amount of time it takes to recover the cost of an investment. Simply put, the payback period is the length of time an investment reaches a break-even point. The desirability of an investment is directly related to its payback period. Shorter paybacks mean more attractive investments.

Suppose a project with an initial investment of Rs. 100 lakhs, yield profit of Rs.

20 lakhs, after writing off depreciation of Rs. 5 lakhs per annum. In this case, the payback period is computed as under-

(a) CFAT per annum= PAT + depreciation = Rs. 20 + Rs. 5 = Rs. 25 Lakh.
(b) Payback period = initial investment / CFAT per annum = 100 / 25 = 4 years

Procedure for computations of simple payback period:

(a) Determine the initial investment of the project.
(b) Determine the CFAT (cash flow after tax) from the project for various years.
(c) Compute payback period using the formula of initial investment / CFAT perannum.
(d) Accept if payback period is less than maximum or bench mark period, elsereject the project.

Example 1:

Consider the following mutually exclusive projects:

Projects	**C0**	**C1**	**C2**	**C3**	**C4**
A	-10000	6000	2000	2000	12000
B	-10000	2500	2500	5000	7500
C	-3500	1500	2500	500	5000
D	-3000	0	0	3000	6000

Calculate the payback period for each project.

ANSWER 1

Payback period of projects:

Project A= -10000 + 6000 + 2000 + 20000 = 3 years
Project B = -10000 + 2500 + 2500 + 5000 = 3 years
Project C = -3500 + 1500 + 2500 = 1 year and 9.6 months**
** (12/2500) * 2000 = 9.6 months
Project D = -3000 + 0 + 0 + 3000 = 3 years

b) Discounted Payback Period Method:

When the payback period is computed after discounting the cash flows by a pre-determined rate (cut-off rate), it is called as the „Discounted payback period". The discounted payback period is a capital budgeting procedure used to determine the profitability of a project. A discounted payback period gives the number of years it takes to break even from undertaking the initial expenditure, by discounting future cash flows and recognizing the time value of money. The metric is used to evaluate the feasibility and profitability of a given project. The procedure for calculating discounting payback period is as under:

(a) Determine the total cash outflow of the project (initial investment)
(b) Determine the cash inflow after tax (CFAT) for each year.
(c) Determine the PV factor for each year and compute discounted CFAT (DCFAT) for each year. DCFAT = CFAT of each year * PV factor for that year.
(d) Determine the cumulative DCFAT at the end of every year.
(e) Determine the year in which cumulative DCFAT exceeds initial investment.
(f) Compute discounted payback period as the time at which cumulative DCFAT
= initial investment. This is calculated in "time proportion basis"

Example 2

Consider the following mutually exclusive projects:

Projects	**C0**	**C1**	**C2**	**C3**	**C4**
A	-10000	6000	2000	2000	12000
B	-10000	2500	2500	5000	7500
C	-3500	1500	2500	500	5000
D	-3000	0	0	3000	6000

Calculated Discounted Payback Period for each project. Present Value factor at 10% are:
Year 1 = 0.9091
Year 2 = 0.8264
Year 3 = 0.7513
Year 4 = 0.6830

Answer 2:

Project A = -10000 + 5454.6 + 1652.8 + 1502. 6 + 8196
= 3 years + (12/8196) * 1390
= 3 years and 2 months
Project B = -10000 + 2272.75 + 2066 + 3756.6 + 5122.50
= 3 years + (12/5122.50) *1904.75
= 3 years and 4.6 months
Project C = -3500 + 1363.65 + 2066 + 375.65 + 3415
= 2 years + (12/375.65) * 70.35
= 2 years and 2.25 months
Project D = -3000 + 0 + 0 + 2253.9 + 4098
= 3 years + (12/4098) * 746.10
= 3 years and 2.18 months

❖ **The Difference Between Payback Period and Discounted Payback Period:**

The payback period is the amount of time for a project to break even in cash collections using nominal amount. Alternatively, the discounted payback period reflects the amount of time necessary to break even in a project based not only on what cash flows occur but when they occur and the prevailing rate of return in the

market.

These two calculations, although similar, may not return the same result due to discounting of cash flows. For example, projects with higher cash flows toward the end of the project life will experience greater discounting due to compound interest. For this reason, the payback period may return a positive figure, while the discounted payback period returns a negative figure.

C) Desirability Factor or Profitability Index Method:

Where different investment proposal each involving different initial investment and cash inflows are to be compared, the technique of profitability index is used. Profitability index represents the amount obtained at the end of the project life, for every rupee invested in the project at the initial stage. The higher the profitability index, the better it is, since the greater is the return for every rupee of investment in the project.

$$\text{Profitability index} = \frac{\text{Total discounted cash Inflow}}{\text{Total discounted cash outflow}}$$

If profitability index is greater than 1, accept the project. Surplus over and above the cut off rate is obtained.

If profitability index is equal to 1, project generates cash flow at a rate just equal to the cost of capital. Hence, it may be accepted or rejected. This constitute an Indifference point.

If profitability index is less than 1, reject the project. The project does not provide returns even equivalent to the cut-off rate.

- **Advantages:**

(a) This method consider the time value of money.
(b) This is better project evaluation technique than NPV and helps in rankingprojects where NPV is positive.
(c) It focuses on maximum return per rupee of investment and hence is useful incase of investment in divisible projects, when funds are not fully available.

❖ **Disadvantages:**

(a) It fails as a guide in resolving capital rationing when projects are indivisible. Once a single large project with high NPV is selected, possibility of accepting several small projects which together may have higher NPV than the single project is exclude.
(b) Situation may arise where a project with a lower profitability index selected may generate cash flows in such a way that another project can be taken up one or two years later, the total NPV in such case being more than the one with a project with highest profitability index.

D) Net Present Value Method:

The net present value of an investment proposal is defined as the sum of the

presentvalues of all future cash inflows less the sum of the present values of all cash outflows associated with the proposal. NPV is used in capital budgeting and investment planning to analyse the profitability of a projected investment or project.

NPV = Discounted cash inflows less Cash outflows (initial investment)

NPV= [fv1/(1+r)^1] + [fv2/(1+r)^2] + [fv3/(1+r)^3] + …. + [fvn/(1+r)^n] less Initialinvestment.

Where, r = cut off rate, fv = future cash inflows arising at points of time 1,2,3,…n.Initial investment pertains to time 0 and is hence not discounted.

❖ **Procedure for computation of NPV:**

(a) Determine the total cash outflow of the project and the time periods in whichthey occur.
(b) Compute the total discounted cash outflows = outflow*pv factor
(c) Determine the total cash inflows of the project and the time periods in whichthey arise.
(d) Compute the total discounted cash inflows = inflow * pv factor
(e) Compute NPV = discounted cash inflows less Discounted cash outflows

❖ **Decision Making or Acceptance Rule:**

If NPV is greater than 0, accept the project. Surplus over and above the cut off rateis obtained.

If NPV is equal to 0, project generates cash flow at a rate just equal to the cost of capital. Hence, it may be accepted or rejected. This constitute an Indifference point. If NPV is less than 0, reject the project. The project does not provide returns evenequivalent to the cut-off rate.

❖ **Advantages:**

(a) It consists the time value of money. Hence it is satisfied the basic criterion for project evaluation.
(b) Unlike payback period, all cash flows are considered.
(c) NPV constitutes addition to the wealth of shareholders and thus focuses onthe basic objective of financial management.
(d) Since all cash flows are converted into present value, different projects can becompared on NPV basis. Thus, each project can be evaluated independent of each other‟s on its own merit.

❖ **Disadvantages:**

(a) It involves complex calculations in discounting and present value computations.
(b) It involves forecasting cash flows and application of discount rate. Thus accuracy of NPV depends on accurate estimation of these two factors which may be quite difficult in practice.
(c) NPV and project ranking may differ at different discount rates, causing inconsistency in decision making.

(d) It ignores the difference in initial outflows, size of different proposals etc, whileevaluating mutually exclusive projects.

Example 3:

Consider the following mutually exclusive projects:

Projects	**C0**	**C1**	**C2**	**C3**	**C4**
A	-10000	6000	2000	2000	12000
B	-10000	2500	2500	5000	7500
C	-3500	1500	2500	500	5000
D	-3000	0	0	3000	6000

Calculate NPV of each projects when the cost of capital is 10%.

Answer 3:

NPV= [fv1/(1+0.10)^1] + [fv2/(1+0.10)^2]+ [fv3/(1+0.10)^3] + [fv4/(1+0.10)^4]

Project A = -10000 + 5454.6 + 1652.8 + 1502. 6 + 8196

NPV = 6806.2

Project B = -10000 + 2272.75 + 2066 + 3756.6 + 5122.50

NPV = 3217.75

Project C = -3500 + 1363.65 + 2066 + 375.65 + 3415

NPV = 3720.3

Project D = -3000 + 0 + 0 + 2253.9 + 4098

NPV = 3351.9

E) Internal Rate of Return Method:

Internal rate of return (IRR) is the rate at which the sum total of discounted cash inflows equals the discounted cash outflows. The internal rate of returns of a projectis the discount rate which makes Net present value of the project equal to zero. To calculate IRR using the formula, one would set NPV equal to zero and solve for the discount rate (r), which is the IRR. Because of the nature of the formula, however, IRR cannot be calculated analytically and must instead be calculated either through trial-and-error or using software programmed to calculate IRR. IRR is sometimes referred to as "economic rate of return" or "discounted cash flow rate of return."

[fv1/(1+r)^1] + [fv2/(1+r)^2] + [fv3/(1+r)^3] + …. + [fvn/(1+r)^n] less Initial investment.

The discounted rate i.e. cost of capital assumed to be known in the determination of Net Present Value, while in the internal rate of return calculation, the net

present value is set equal to zero and the discount rate which satisfies the condition is determine.

❖ **Interpretation:**

Internal rate of return can be interpreted in two ways (a) IRR represents the rate of return on the unrecovered investment balance in the project. (b) IRR is the rate of return earned on the initial investment made in the project. Of these, the first view seems to be more realistic, since it may not always be possible for an enterprise reinvest intermediate cash flows at a rate equal to IRR.

❖ **Procedure for calculating IRR:**

(a) Determine the total cash outflow of the project and the time periods in which they occur.
(b) Determine the total cash inflows of the project and the time periods in which they arise.
(c) Compute the NPV at an arbitrary discount rate, say 10%.
(d) Choose another discount rate and compute NPV. The second discount rate is chosen in such a way that one of the NPVs is negative and the other is positive. Suppose, NPV is positive at 10%, choose a higher discount rate soas to get a negative NPV. In case NPV is negative at 10%, choose a lower rate.
(e) On proportionate basis, compute the discount rate at which NPV is zero.

❖ **Decision Making or Acceptance Rule:**

If IRR is greater than r0, accept the project. Surplus over and above the cut off rateis obtained.
If IRR is equal to r0, project generates cash flow at a rate just equal to the cost of capital. Hence, it may be accepted or rejected. This constitute an Indifference point. If IRR is less than r0, reject the project. The project does not provide returns evenequivalent to the cut-off rate.

❖ **Advantages:**

(a) Time value of money is taken into account
(b) All cash inflows of the project, arising at different points of time are considered.
(c) Decisions are immediately taken by comparing IRR with the cost of capital.
(d) It helps in achieving the basic objective of maximisation of shareholders wealth. All projects having IRR above the cost of capital will be automatically accepted.

❖ **Disadvantages:**

(a) IRR is only an approximation and cannot be computed exactly always.
(b) It is tedious to compute in case of multiple cash outflows. Multiple IRR‟s mayresult, leading to difficulty in interpretation.
(c) It may conflict with NPV in case inflow / outflow pattern are different in alternative proposals.
(d) The presumption that a proposal future cash inflows are reinvestedat a rate

equal to the IRR may not be practically valid.

❖ **Superior in Project Evaluation (NPV or IRR):**

Generally, the higher the NPV, higher will be the IRR. However, NPV and IRR maygive conflicting results in the evaluation of different projects, in the following situation:

(i) Initial investment disparity i.e. different projects sizes,
(ii) Project life disparity i.e. different in project lives
(iii) Outflow pattern i.e. when cash outflows arise at different points of time during the project life, rather than as initial investment only.
(iv) Cash flow disparity — when there is a huge difference between initial CFAT and later years CFAT. A project with heavy initial CFAT than compared to later years will have higher IRR and vice-versa.

❖ **Superiority of NPV**: In the case of conflicting decisions based on NPV and IRR, the NPV method must prevail. Decision is based on NPV, due to the comparative superiority of NPV, as given from the following points-

(a) NPV represent the surplus from the project, but IRR represents the point of no surplus — no deficit.
(b) NPV considers cost of capital as constant. Under IRR, the discount rate is determined by reverse working, by setting NPV=0.
(c) NPV aids decision making by itself i.e. projects with positive NPV are accepted. IRR by itself does not aid decision making. For example, a project with IRR=18% will be accepted if R<18%. However, the project will be rejected if R=21%.
(d) NPV method considers the timing difference in cash flows at the appropriate discount rate. IRR is greatly affected by the volatility / variance in cash flow patterns.
(e) IRR presumes that intermediate cash inflows will be reinvested at that rate (IRR), whereas in the case of NPV method, intermediate cash inflows are presumed to be reinvested at the cut-off rate. The latter presumption viz. Reinvestment at the cut off rate, is more realistic than reinvestment at IRR.
(f) There may be projects with negative IRR / multiple IRR etc. If cash outflows arise at different points of time. This leads to difficulty in interpretation, NPV does not pose such interpretation problems.

Example 4:

The expected cash flows of a project are as follows.

Year	Cash flows (Rs)
0	-100000
1	20000
2	30000
3	40000
4	50000
5	30000

The cost of capital is 12 percent. Calculate NPV and IRR.

Answer 4:

(a) Net present value

= -100000 + 20000 / (1.12) + 30000 / (1.12)^2 + 40000 / (1.12)^3 + 50000 / (1.12)^4 + 30000 / (1.12)^5
= -10000 + 17860 + 23910 + 28480 + 31800 + 17010
= 19060

(b) Internal rate of return: try a discount rate of 18 percent. The NPV at 18 percent discounted rate is 1750. Try a discount rate of 19 percent. The NPVat 19 percent is — 780. Hence, IRR is:

18% + (1750/2530) * 1%

= 18.69%

5.5 RISK ANALYSIS IN CAPITAL BUDGETING:

Risk is associated with the variability of future returns of a project. The greater the variability of the expected returns, the risker the project. Risk exists because of the inability of the decision maker to make perfect forecasts. An investment is not risky if we can specify a unique sequence of cash flows for it. But the whole trouble is that cash flows cannot be forecast accurately. A large number of events influence forecasts. These events can be grouped in different ways.

There are numerous kinds of risks to be taken into account when considering capital budgeting including corporate risk, international risk (including currency risk), industry-specific risk, market risk, stand-alone risk, and project-specific risk. Each ofthese risks addresses an area in which some sort of volatility could forcibly alter the plan of firm managers. For example, market risk involves the risk of losses in position due to movement in market positions.

1. Sensitivity Analysis

A project's return on investment is affected by factors such as sales, investments, tax rate and cost of sales. Sensitivity analysis measures the extent to which the project's cash flows change in response to changes in one of these factors. The sensitivity analysis process involves identifying the factors that influence the project's cash flows, establishing a mathematical relationship between these factors and analysing how a change in each of these factors affects the project's cash flows. If a project's cash flows are sensitive to changes in any of the above-listed factors, it is considered risky and hence avoided. Sensitivity analysis is the study of how the uncertainty in the output of a model (numerical or otherwise) can be apportioned to different sources of uncertainty in the model input. A related practice is uncertainty analysis which focuses rather on quantifying uncertainty in model output. Ideally, uncertainty and sensitivity analysis should be run in tandem.

2. Scenario Analysis:

In sensitivity analysis, typically one variable is varied at a time. In scenario analysis, several variables are varied simultaneously. Most commonly, three scenarios are considered. Expected (or normal) scenario, pessimistic scenario and optimistic scenario. In the normal scenario, all variables assume their expected (or normal values); in the pessimistic scenario, all variables assume their pessimistic values; and in the optimistic scenario all variables assume their optimistic values. Scenario analysis is an improvement over sensitivity analysis because it considers variations in several variables together.

3. Simulation Analysis:

The Simulation Analysis is a method, wherein the infinite calculations are made to obtain the possible outcomes and probabilities for any choice of action. The concept of simulation analysis can be further comprehended through the following steps:

1. The first step is to model the project. A model shows how the net present value relates to the parameters and the exogenous variables. The parameters are the variables specified by the decision maker and are held constant throughout the simulation. In contrast, the exogenous variables are randomly determined and are beyond the control of the decision maker.
2. The next step is to specify the values of the parameters and assign probabilities to the random variables that arise from the external factors.
3. Randomly, select any value from the probability distribution of each exogenous variable.
4. Compute the NPV for the randomly generated values of exogenous variables and the parameter values, as the decision maker specifies.
5. Repeat the step 3 and 4 again and again, to get a large number of simulated values of NPV.

This whole process of simulation analysis compels the decision-maker to consider all the interdependencies and uncertainties characterizing the project. Thus, the viabilityof the project is determined on the basis of number of outcomes and the probabilitiesrealized through a series of actions performed during the simulation analysis.

4. Decision Tree Analysis:

A Decision Tree Analysis is a graphic representation of various alternative solutions available to solve a problem. The manner of illustrating often proves to be decisive when making a choice. A Decision Tree Analysis is created by answering a number of questions that are continued after each affirmative or negative answer until a final choice can be made.

❖ **Keywords:**

Decision tree, sensitivity analysis, scenario analysis, simulation analysis, risk, discounted payback period, net present value, internal rate of return, and profitability index.

❖ CHECK YOUR PROGRESS

- **Review Questions:**

1. What is capital budgeting? Why is it significant for a firm?
2. What do you understand by a payback period? How is it determined?
3. Outline the manner of computation of discounted payback period.
4. Explain the net present value method or discounted cash flow technique of capital budgeting.
5. Describe the various techniques of capital budgeting in detail.
6. What are the merits and demerits of the NPV methods?
7. What is meant by desirability factor or profitability index?
8. Discuss the role of internal rate of return in project evaluation.
9. NPV and IRR are superior in project evaluation methods.
10. Do the profitability index and NPV criterion of evaluating investment proposals lead to the same acceptance-rejection and ranking decision? In what situationwill they give conflicting results?

- **Multiple Choice Question:**

1. The values of the future net income discounted by the cost of capital are called
   (a) Average cost of capital
   (b) Discounted cost of capital
   (c) Net cost of capital
   (d) Net present value

2. Which of the following criterion is often preferred
   (a) Net present value
   (b) Profitability index
   (c) Internal rate of return
   (d) All of the above

3. A project is accepted when
   (a) Net present value is greater than zero
   (b) Internal rate of return will be greater than cost of capital
   (c) Profitability index will be greater than unity
   (d) Any of the above

4. Project with_____is preferred.
   (a) Lower payback period
   (b) Normal payback period
   (c) Higher payback period
   (d) Any of the above

5. Capital budgeting is part of
   (a) Investment decision
   (b) Working capital management
   (c) Capital structure
   (d) Marketing management

MCQ ANSWER

1	2	3	4	5
d	c	d	a	a

❖ **Practical Problems:**

- **Problem 1**

Considering the following two projects. Calculate their NPV at 9 percent and IRR. Do you find a difference in project ranking as per these two criteria? Why? Which projectwill you choose.

Cash Flows	Project A	Project B
C0	-840	-840
C1	700	70
C2	350	420
C3	70	760.

- **Problem 2**

A company is considering the following investment projects.

Projects	C0	C1	C2	C3
A	-10000	10000	------	------
B	-10000	17500	7500	------
C	-10000	12000	4000	12000
D	-10000	10000	3000	13000

Calculate payback period, NPV and IRR assuming the discount rate of 10 and 30 percent. Assuming the projects are independent, which one should be accepted? If the projects are mutually exclusive, which project is best?

- **Problem 3:**

Virat international is evaluating a project whose expected cash flows are as follows.

Year	Cash flow
0	-1000000
1	100000
2	200000
3	300000
4	600000
5	300000

(a) What is the NPV of the project, if the discount rate is 14% for the entire period?
(b) What is the NPV of the project, if the discount rate is 12% for year 1 and risesevery year by 1 percent?

- **Problem 4:**

A company propose to install a machine involving a capital cost of Rs. 360000. The life of machine is 5 years and its salvage value at the end of the life is nil. The machine will produce the net operating income after depreciation of Rs. 68000 per annum. The company‟s tax rate is 45%. You are required to calculate IRR of the proposal.

- **Problem 5:**

A company has to make a choice between two projects namely A and B. The initial capital outlay of two projects are Rs. 135000 and Rs. 240000 respectively for A and

B. There will be no scrap value at the end of the life of both the projects. Theopportunity cost of capital of the company is 16%.

Year	Project A	Project B	Discounting Factor
1	----	60000	0.862
2	30000	84000	0.743
3	132000	96000	0.641
4	84000	102000	0.552
5	84000	90000	0.476

You are required to calculate for each project. Discounted payback period, PI and NPV.

MBA

SEMESTER-2

FINANCIAL MANAGEMENT

BLOCK: 2

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UNIT-6 WORKING CAPITAL MANAGEMENT

6.1 INTRODUCTION

To conduct the day-to-day activities of business successfully, every company has to maintain a certain amount as a part of working capital. Any business cannot grow without keeping the optimum level of working capital. The goal of working capital management is to ensure that the firm can continue its business operations and that it has sufficient cash flow to satisfy short term debt and upcoming operational expenses. The basic objective of Working Capital Management is to avoid over-investment or under-investment in current assets. Maintaining the smooth and continuous flow of the organization is a challenging task for every organization, for this management needs the availability of Man, Machine, Money and Material. Day to day management of these four components is known as "WORKING CAPITAL MANAGEMENT".

6.2 MEANING

Working capital is the lifeblood of any business unit. If an organization use its working capital in very effective way, then it will be very much profitable to the organization only. If the company cannot be able to maintain a sufficient level of working capital then it will be very difficult for the company to survive in today'cutthroatat competition. The interaction between current assets and current liability is, therefore, the central theme of the theory of working capital management.

6.3 DEFINITION

A very simple and well define definition of Working Capital is that, "The difference between current assets and current liabilities of the business". Working capital is computed as the sum of Inventories (+) Trade receivables (+) Cash (-) Trade payables. Decisions relating to working capital and short-term financing are referred to as working capital management.

6.4 CONCEPT OF WORKING CAPITAL

Based on the above definition, two major working capital concepts are working capital based on Value and Working capital based on Time. Working Capital Management based on Value is again divided into Gross Working Capital and Net Working Capital. Working capital management based on time is divided into Permanent working capital and temporary working capital management.

- **BASED ON VALUE :-**

1. Gross Working Capital:

It refers to the firm's investment in current assets only. Here the organization will not consider current liabilities at all. Current assets are highly liquid and which can be easily converted into cash in a financial year. Type of current assets includes: stock, cash, bills receivables, prepayments, debtors etc.

2. Net Working Capital:

It refers to the difference between the business's current assets and liabilities. Current liabilities are those payments which organization have to pay to outsiders. Current liabilities include creditors, bills payables, short-term loans, outstanding expenses etc. There are two ways to look at the net working capital. First is positive net working capital which means that the current assets are much higher than the current liabilities, the meaning of that the company can be able to pay all the debts. Second is negative working capital which means that the company is currently is unable to pay and meet its short-term liabilities because they have less currents and more liabilities.

- **BASED ON TIME :-**

1. Permanente Working Capital:

It refers that the minimum level of investment in the current assets that is carried by the business at all times to carry out minimum level of its activities. It is also referring to hard-core working capital. The company cannot withdraw any amount from the permanent working capital at any given point in time. It is permanent in the same way as the firm's fixed assets are. It is the minimum level of investment required in the working capital of the business at any point in time.

2. Temporary Working Capital:

It refers to that part of total working capital, which is required by a business over and above permanent working capital. It is also called variable working capital or fluctuating working capital. It is likely to depend on factors like peak season, trade cycleboom, etc.

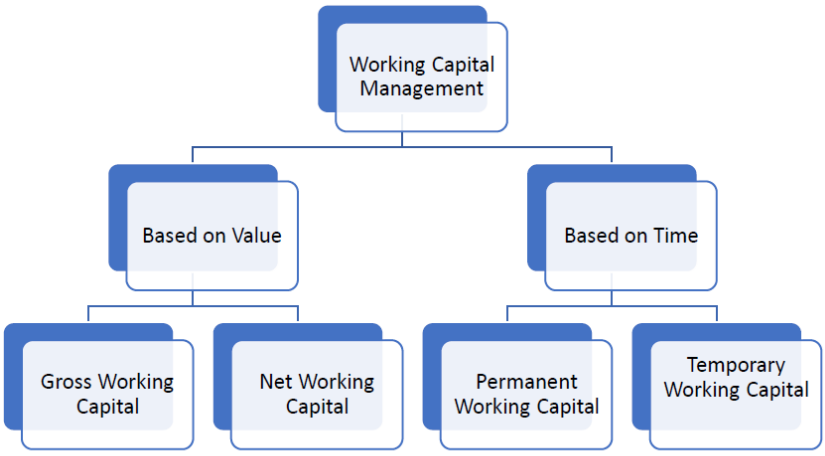


Figure 6.1 Types of Working Capital Management

- **Components of Working Capital Management:**

Operating Cycle or Working Capital Conversion Cycle:

We will hardly find any business firm that does not require any working capital. The need for working capital in day to day business operation activities must be addressed. There is always an operating cycle involved in the process of conversion of sales into cash. Whether it is a manufacturing firm or it is service firm, both of them require working capital to maintain. Indeed, the amount may differ depending on the kind of business, but they have to keep the balance of working capital.

The operating cycle or working capital cycle is the time duration for conversion of cash into cash equivalents like raw materials, work in progress, finished goods, sundry debtors and thereafter back into cash.

The operating cycle has the following segments. Starting from the conversion of cash into raw materials, then conversion of raw materials into working progress, thereafter conversion of working progress into finished goods, then conversion of finished goods into debtors and finally conversion of debtors into cash. The whole processwill take number of days to finished one full working capital cycle of the business.

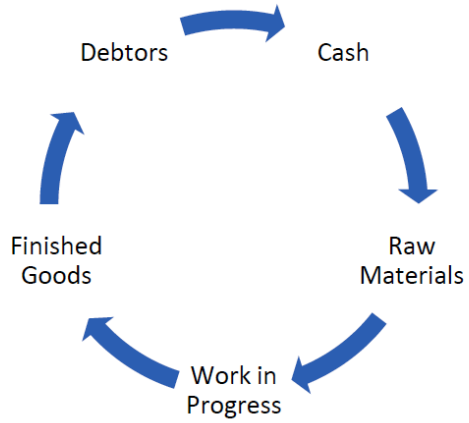


Figure 6.2 Working Capital Cycle of Manufacturing Firm

The length of the operating cycle of a manufacturing firm is the sum of (a) the Raw material conversion period, (b) work in progress conversion period, (c) finished goods conversion period, (d) debtors collection period. The sum of all of the above conversion periods refers to the **Gross Operating Cycle**. In practice, a firm may acquire resources on credit and may postpone payments on a temporary basis which generate creditors for the business. The creditors conversion period is the length of time the firm is able to defer payments on various resources. The difference between Gross operating cycle and creditors conversion cycle is known as **Net Operating Cycle.**

Formula to calculate

Net Operating Cycle = Raw material conversion period + Work In progress conversion period + Finished Goods conversion period + Debtors Collection Period –Creditors Payment Period.

$$\text{Raw Material Conversion Period} = \frac{\text{Average Stock of Raw Material} * 365}{\text{Average Cost of Raw Material}}$$

$$\text{Work in Progress Conversion Cycle Period} = \frac{\text{Average Work in Progress Stock} * 365}{\text{Cost of Productions}}$$

$$\text{Finished Goods Conversion Cycle} = \frac{\text{Average Stock of finished goods} * 365}{\text{Cost of Goods Sold}}$$

$$\text{Debtors Collection Period} = \frac{\text{Average Debtors} * 365}{\text{Credit Sales}}$$

$$\text{Creditors Payment Periods} = \frac{\text{Average Creditors} * 365}{\text{Credit Purchase}}$$

Here,

Average stock of raw material = Opening stock of raw material + Closing stock of raw material 1/ 2

Average cost of raw material = Opening stock + purchase – closing stock

Average stock of work in progress = Opening stock of raw material + closing stock of raw material 1/ 2

Cost of production = raw material consumption + wages + production expenses –closing stock of work in progress

Average stock of finished goods = opening stock or finished goods + closing stock of finished goods / 2

Cost of goods sold = cost of production + opening stock of finished goods – closing stock of finished goods

Average debtors = opening debtors + closing
debtors / 2 Average

creditors = opening creditors + closing creditors / 2

Operating cycle = R + W + F + D – C

❖ **Determinants of Working Capital Management:**

The determinants of working capital are items that directly impact the amount invested in current assets and. Managers like to keep a close watch over these

factors, since working capital can absorb a large part ofthe funding that an organization has at its disposal. Accordingly, managers are always trying to adjust how operations are run to pareback on the working capital investment. There are a number of determinants of working capital, which include the following:

1. **Credit policy:** If a business offers easy credit terms to its customers, the company is investing in accounts receivable that may be outstanding for a long time. This investment can be reduced by tightening the credit policy, but doing so may drive away some customers.

2. **Growth rate:** If a business is growing at a rapid rate, it is likely to increase its investments in receivables and inventory. Unless incrediblyre extremely high, it is unlikely that the entity can generate sufficient cash to pay for these receivables and inventory, resulting in a steady increase in working capital. Conversely, if a business shrinks, its working capital requirements will also decline, spilling off excess cash.

3. **Payables payment terms:** If a company can negotiate longer payment terms with its suppliers, it can reduce the amount of investment needed in working capital by obtaining a free loan from its suppliers. Conversely, short payment terms reduce this cash source, increasing the working capital balance.

4. **Production process flow:** If a company estimates its production needs, what it manufactures will likely vary somewhat from actual demand, resulting in an excess amount of inventory on hand. Conversely, a just-in-time system produces goods only to order, so the investment in inventory is reduced.

5. **Nature of business:** It is an important factor for determining the amount of working capital needed by various companies. The trading or manufacturing concerns will require more amount of working capital along-with their fixed investment of stock, raw materials and finished products. Public utilities and railway companies with huge fixed investments usually have the lowest needs for current assets, partly because of cash, the nature of their business and partly due to selling a service instead of a commodity. Similarly, basic and key industries or those engaged in the manufacture of producer's goods usually have less proportion of working capital to fixed capital than industries producing consumer goods.

6. **Seasonal Variations:** There are some industries which either produce goods or make sales only seasonally. For example, the sugar industry produces practically all the sugar between December and April, and the woollen textile industry makes its sales generally during winter. In both these cases the needs of working capital will be very large, during few months {i.e., season). The working capital requirements will gradually decrease as and when the sales are made.

7. **Cash Management:**

Cash is the important current asset for the operations of the business. It is thebasic input needed to keep the business running on a continuous basis. The firm should keep sufficient cash, neither more nor less. The term cash

includes coins, currency and cheques held by the firm, and balance in its bank accounts. Cash management is concerned with the managing of cash flows into and out of the firm, cash flows within the firm and cash balances held by the firm at the point oftime by financing deficit or investing surplus cash. Cash management is also important because it is difficult to predict cash flows accurately, particularly the inflows, and there is no perfect coincidence between the inflows and outflows of cash. There are four facets of cash management. They are cash planning, managing the cash flows, optimum cash level and investing surplus cash. Thereare three different motives for holding the cash the transaction motive, the precautionary motive and the speculative motive.

Cash management is the process of collecting and managing cash flows. Cash management can be important for both individuals and companies. In business, it is a key component of a company's financial stability. For individuals, cash is also essential for financial stability while also usually considered as part of a total wealth portfolio. Individuals and businesses have a wide range of offerings across the financial marketplace to help with all cash management needs. Banks are typically a primary financial service providers for the custody of cash assets. There are also many different cash management solutions for individuals and businesses seeking to obtain the best return on cash assets or the most efficient use of cash comprehensively.

8. Inventory Management:

Inventories constitute the most significant part of current assets for a large majority of companies in India. Inventories are stock of the product a company is manufacturing for sale and components that make up the product. The variousforms in which inventories exist in a manufacturing company are raw material,

work in progress and finished goods. The objectives of inventory management isto maintain a large size of inventories of raw material and work in progress for efficient and smooth functioning, production and finished goods for uninterrupted operations.

Inventory management refers to the process of ordering, storing, and using a company's inventory. These include the management of raw materials, components, and finished products, as well as warehousing and processing such items. For companies with complex supply chains and manufacturing processes, balancing the risks of inventory gluts and shortages is especially difficult. To achieve these balances, firms have developed two major methods for inventory management: just-in-time and materials requirement planning: just-in-time (JIT) and materials requirement planning (MRP).

Example 1:

Following information is forecasted by the Virat Limited for the year ending on 31st March, 2020.

Particular	Opening Balance	Closing Balance
Raw Material	45000	65356
Work in progress	35000	51300

Finished goods	60181	70175
Debtors	112123	135000
Creditors	50079	70469
Annual purchase of raw material		400000
Annual cost of production		750000
Annual cost of goods sold		915000
Annual operating cost		950000
Annual sales (all credit)		1100000

You may take one year as equal to 365 days.You are required to calculate:

(a) Net operating cycle period
(b) Number of operating cycles in the year.
(c) Amount of working capital equirement.

Answer 1:

- **Working notes:**

(i) **Raw material storage period:**

= (average stock of raw materials * 365) / annual consumption of raw material

= [(45000 + 65356) / 2] * 365 / 379644

= **53 days**

Annual consumption of raw material = opening stock + purchase – closing stock
= 45000 + 400000 – 65356
= 379644

(ii) **Work in progress conversion period:**

= (average stock of WIP * 365) / annual cost of production

= [(35000 + 51300) / 2] * 365 / 750000

= 21 days

(iii) **Finished goods storage period:**

= (average stock of finished goods * 365) / cost of goods sold

= [(60181 + 70175) / 2] * 365 / 915000

= **26 days**

(iv) **Debtors collection period:**

= (average debtors * 365) / credit sales

= [(112123 + 135000) / 2] *365 / 1100000

= **41 days**

(v) **Creditors payment period:**

= (average creditors * 365) / credit purchase

= [(50079 + 70469) /2] * 365 / 400000

= **55 days**

(a) **Operating cycle period**

= R + W + F + D – C
= 53 + 21 + 26 + 41 – 55
= 86 days

(b) **Number of operating cycles in the year**

= 365 / operating cycle period

= 365 / 86

=4.244

(c) **Amount of working capital required**

= annual operating cost / number of operating cycles in the year

= 950000 / 4.244

= 223845

Example 2:

A newly formed company has applied to the commercial bank for the first time for financing its working capital requirement. The following information is available aboutthe projections for the current year:

Element of cost	Per unit (Rs)
Raw material	40
Direct labour	15
Overheads	30
Total cost	85
Profit	15
Sales	100

Other Information:

Raw material in stock: average 4 weeks consumption, work in progress (completion stage, 50 per cent) on an average half a month. Finished goods in stock; on an average one month.

Credit allowed by suppliers is one month. Credit allowed to debtors is two months. Average time lag in payment of wages is 1.5 weeks and 4 weeks in overhead expenses. Cash in hand and at bank is desired to be maintained at Rs. 50000. All sales are on credit basis only.

You are required to prepare statement showing estimate of working capital needed to finance an activity level of 96000 units of production. Assume that production is carried on evenly throughout the year, and wages and overhead accrue similarly. For the calculation purpose 4 weeks may be taken as equivalent to a month and 52 weeks in a year.

Answer 2:

Particular	**Amount**	**Amount**
(A) Current Assets		
Stock of Raw material (96000*40*4/52)		295385
Work in progress		
Material (96000*40*2/52) * 0.50	73846	
Labour (96000*15*2/52) * 0.50	27692	
Overhead (96000*30*2/52) * 0.50	55385	156923
Finished stock (96000*85*4/52)		627692
Debtors (96000*85*8/52)		1255385
Cash in hand and bank		50000
Total current assets		**2385385**
(B) Current liability		
Creditors (96000*40*4/52)		295385
Average lag in payment of expenses		
Overheads (96000*30*4/52)	221538	
Labour (96000*15*3/104)	41538	263076
Total current liability		**558461**
Net working capital (A-B)		**1826924**

Example 3:

The following information is provided by the Rohit limited for the year ending 31st
March, 2020.

Raw material storage period	55 days
Work in progress conversion period	18 days
Finished goods storage period	22 days
Debtors collection period	45 days

Creditors payment period	60 days
Annual operating cost (including depreciation of Rs. 210000)	Rs. 2100000

Take 1 year = 360 days

You are required to calculate:

(a) Operating cycle period
(b) Number of operating cycles in a year
(c) Amount of working capital required for the company on a cash cost basis.
(d) The company is a market leader in its product, there is virtually no competitor in the market. Based on market research it is planning to discontinue sales on credit and deliver products based on pre-payment. Thereby, it can reduce its working capital requirement substantially. What would be the reduction in working capital requirement due to such decision?

Answer 3:

(a) Operating cycle period

= R + W + F + D – C

= 55 + 18 + 22 + 45 – 60

= 80 days

(b) Number of operating cycles in a year

= 360/operating cycle period

= 360/80

=4.5

(c) Amount of working capital required

= annual operating cost / number of operating cycles

= 1890000 / 4.5

= 420000

(d) Reduction in working capital

Operating cycle period = R + W + F – C
= 55 + 18 + 22 – 60
= 35 days

Amount of working capital required = (1890000*35) / 360

= 183750

Reduction in working capital = 420000 – 183750 = 236250

❖ **Key Words:**

Cash conversion cycle, variable working capital, permanent working capital, Grossworking capital, net working capital.

❖ **CHECK YOUR PROGRESS**

- **Review Questions:**

1. Explain the concept of working capital management.
2. Explain the types of working capital management based on value and basedon time.
3. Write down the determinants of working capital management.
4. Define working capital management. Why is it important to study themanagement of working capital as a separate area in financial management?
5. Discuss the estimation of working capital need based on operating cycleprocess.

- **MULTIPLE CHOICE QUESTIONS:**

1. Working capital means
(a) Current assets only
(b) Current liability only
(c) Current assets minus current liability
(d) Current assets plus current liability

2. Working capital management is managing
(a) Short term assets and liability
(b) Long term assets
(c) Long term liabilities
(d) Only short term assets

3. Permanent working capital
(a) Varies with seasonal needs
(b) Included fixed assets
(c) Includes accounts payables
(d) Is the amount of current assets required to meet a firms long termminimum needs.

4. Spontaneous financing includes
(a) accounts receivable.
(b) accounts payable.
(c) short-term loans.
(d) a line of credit.

5. Cash cycle of manufacturing firm include
(a) Raw material
(b) Debtors
(c) Finished goods
(d) All of the above

❖ MCQ ANSWER

1	2	3	4	5
c	a	d	b	d

- **Practical Problems Problem 1**

A pro forma of cost sheet of a company provides the following data:

Element of cost	Per unit (Rs)
Raw material	52
Direct labour	19.5
Overheads	39
Total cost	110.5
Profit	19.5
Sales	130

The following is the additional information available.

Average raw material in stock: one month; average material in process: half month. Credit allowed by suppliers: one month; credit allowed to debtors: two months. Time lag in payment of wages: one and half weeks. Overheads: one month. One – fourth of sales are on cash basis. Cash balance is expected to be Rs. 120000.

You are required to prepare a statement showing the working capital needed to finance the level of activity of 70000 units of output. You may assume that production is carried on evenly, throughout the year and wages and overheads accrue similarly.

Problem 2.

A pro forma of cost sheet of a company provides the following data:

Element of cost	Per unit (Rs)
Raw material	80
Direct labour	30
Overheads	60
Total cost	170
Profit	30
Sales	200

The following is the additional information available.

Average raw material in stock: one month; average material in process: half month. Finished goods in stock: on an average one month.

Credit allowed by suppliers: one month; credit allowed to debtors: two months. Time lag in payment of wages: one and half weeks. Overheads: one month. One – fourth of sales are on cash basis. Cash balance is expected to be Rs. 25000.

You are required to prepare a statement showing the working capital needed to finance the level of activity of 104000 units of output. You may assume that production is carried on evenly, throughout the year and wages and overheads accrue similarly.

Problem 3.

The following information is provided by the Rohit limited for the year ending 31st
March, 2020.

Raw material storage period	110 days
Work in progress conversion period	36 days
Finished goods storage period	44 days
Debtors collection period	90 days
Creditors payment period	120 days
Annual operating cost (including depreciation of Rs. 420000)	Rs. 4200000

Take 1 year = 365 days

You are required to calculate:

(a) Operating cycle period
(b) Number of operating cycles in a year
(c) Amount of working capital required for the company on a cash cost basis.

The company is a market leader in its product, there is virtually no competitor in the market. Based on market research it is planning to discontinue sales on credit and deliver products based on pre-payment. Thereby, it can reduce its working capital requirement substantially. What would be the reduction in working capital requirement due to such decision?

UNIT-7 CASH MANAGEMENT CONTENTS

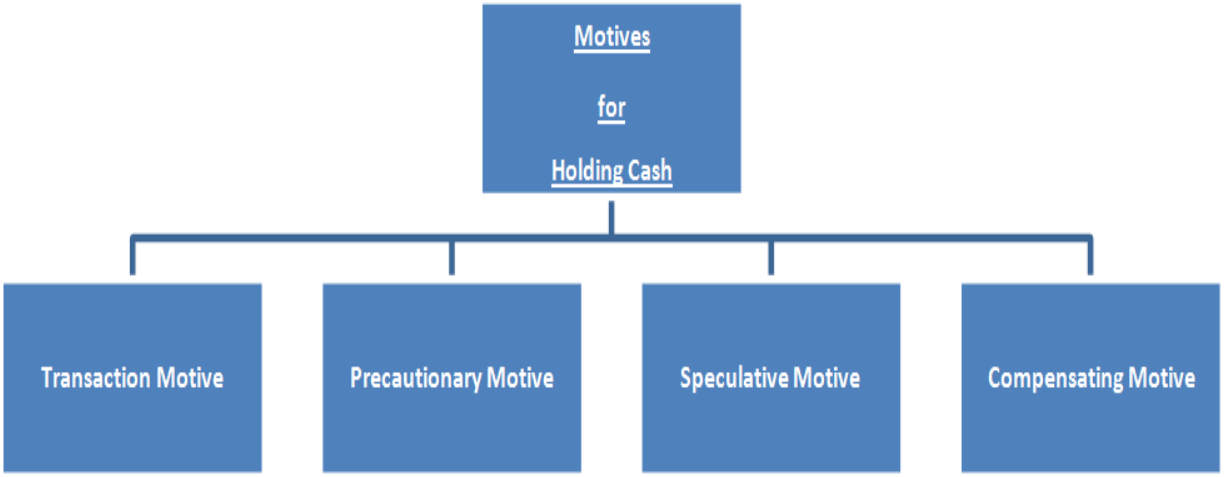
7.1 CONCEPT AND MEANING

Management of cash or cash management is one of the important aspects of working capital management. Cash is the most liquid asset among all current assets existing. Cash is the most common denominator to which all other assets are reduced. This is why cash is very important or significant to financial management. Managing cash is the duty of the finance manager, and he/she should be able to provide adequate finance to run the operations of the business. He/she needs to ensure that not a single penny is blocked or remains underutilized and should ensure that the funds are procured at the best rates based on the timing and requirement of the business. Therefore, a sound cash management scheme maintains the balance between the twin objectives of liquidity and cost.

The term **'CASH'** with reference to cash management is used in two broad categories. In a **narrow** sense, it includes coins, currency notes, cheques, bank drafts possessed by a firm and the demand deposits it holds in banks. In a **broader** sense, it also includes "near cash assets" such as marketable securities and time deposits with banks. Such securities or deposits can immediately be sold or converted into cash if the situation requires. The term cash management is generally used for the management of both cash and near cash assets.

A finance manager should be equipped with the knowledge of handling cash in such a way that not too much cash remains idle and at the same time not too much cash is invested which in turn affects liquidity. Hence, cash management is one of the key areas of financial management. In order to manage cash effectively, the finance manager should know about the motive for handling cash. Without it, the manager may face issues.

7.2 MOTIVES OF HOLDING CASH



A distinctive feature of cash as a current asset, irrespective of the organisation in which it is held, is that it does not have any capacity to earn any substantial return for the business. In spite of this fact, cash in held by the firm with the following motives:

1. Transaction Motive

This is normally a time lag between the incurring of the cost of overheads and the receipts of corresponding sales proceeds. All the firms require cash to finance their business activities during this time lag and this creates the motive for holding some cash for operation, which ispopularly known as transaction motive.

An organization enters into various transactions to accomplish its objectives which have to be paid for in the form of cash.

For example:

- Purchases
- Wages
- Operating expenses
- Financial charges like interest, taxes and dividends and so on

Likewise, there is a regular inflow of cash to the firm from sales revenue,returns on investments, and many more. These receipts and payments constitute a continuous two-way flow of cash. But the inflows (receipts) and outflows (disbursements) do not perfectly coincide or synchronize.

Many times, receipts are more than payments, or payments exceed the cash inflow. Under such conditions, liquidity may suffer. To ensure the firm meets all its obligations on time without any delay or disturbance in operations, an adequate cash balance is necessary for any organization. This additional cash balance at all times in the organization is termed as transaction motive. The cash held in this

motive is to satisfy all the operation requirements of the organization that are recurrent. The motive loses its significance if the receipts and payments coincide perfectly. Most of the time, this does not happen, and the firm has to keep additional cash. The strength of this motive relies on the unavailability of the funds on short notice and the cost of the funds. The firm needs to ensure this first.

2. Precautionary Motive

The majority of the organization would keep an additional amount in case of any unforeseen situation arise. Not only the organization, even at the individual level also, but we also tend to keep certain amount of reserve funds or cash which we may require in case of any emergency. Hence, when the firm keeps a certain amount just for this reason, it is popularly known as precautionary motive. The motive here is to use the funds in times of emergency. This provision is in addition to the transaction motive. While the transaction motive is certain for operations, precautionary motive is not certainly usable. It kept based on judgement and experience of the finance manager. Precautionary cash is kept when the organization is still determining the future expenses.

The unexpected cash needs at short notice may be the result of:

- Floods, strikes and failure of essential customers
- Bills may be presented for settlement earlier than expected
- Unexpected slowdown in collection of accounts receivables
- Cancellation of some orders for goods as the customer is notsatisfied, and
- Sharp increase in the cost of raw materials

3. Speculative Motive

The first two motives discussed where relatively defensive in nature. The firm there is keeping the money aside to avoid any trouble which may arise due any certain or unforeseen situations. While the speculative motive is positive and aggressive in nature. It represents the desire of an organisation to take advantage of many opportunities available in the environment which are normally outside the normal course of business. Here the firm aims to exploit profitable opportunities available in the environment by keeping reserve cash which they use during such times. The speculative motive helps to take advantage of;

- purchase raw materials at reduced price
- pay for immediate cash for a discount
- to speculate on interest rate movements by buying securitieswhen the rates are low
- delaying the purchase of raw materials in expectation of pricedecline.

4. Compensating Motive

Yet another motive to hold cash reserve is to compensate the services of banks which they provide to their customers. In normal business, Banks provide various services to business houses such as cheque clearing, credit information, transfer of funds, drafts and so on. Bank sometimes charges a commission or fee on such services for their own compensation. Generally, the organisations are required to maintain a minimum balance with the bank so that bank can utilise this money to get themselves paid and provide you services in return without charging any commission.

The compensating cash balances can take either of two forms:

- An absolute minimum, say, Rs. 5 lacs, below which the actual bank balance will never fall.
- A minimum average balance, say, Rs. 5 lacs over the month. The first alternative is more restrictive as the average amount of cash held during the month must be above Rs. 5 lacs by the amount of the transaction balance. From the firm‟s viewpoint, this is obviously dead money. Under the second alternative, the balance could fall to zero one day provided it was Rs. 10 lacs some other day with the average working to Rs. 5 lacs.

From the above motives of holding cash balance, the two most important are the transaction motive and compensation motive. The organisation normally do not speculate much and may not be keeping more cash under precautionary motive, but certainly, they would keep some transaction cash, and they would keep some money with the bank.

7.3 OBJECTIVES OF CASH MANAGEMENT

The objectives of cash management, like working capital management, our conflicting and contradictory in nature. The two basic objectives of cash management are discussed below:

Meeting Payments Schedule

In an ordinary course of business, the organisation needs to make payments on a continuous and regular basis to the suppliers, employees, vendors and so on. Moreover, at the same time, they may expect a constant inflow of cash through collections from debtors. Hence, organisation requires cash at any time during their operations. Just like blood is important for the body, cash is important for the organisation. It provides lubrication to the ever-running engine of the business. Technically, as cash is the most liquid asset, its basic objective is to meet the payment schedule. In short, it should meet the cash disbursement needs of the organization.

BENEFITS:

- It stops insolvency or bankruptcy, which arises out of the liability of a firm to meet its obligations

- It helps in building good relations with creditors and suppliers of raw materials, as immediate payment may help their own cash management.

- With immediate payment, cash discount can also be availed if available from the supplier.

- It also improves the firm's credit rating as it makes a mint in time. It alsogets appreciation when they make payments in time from bankers and other organisations

- If the firm has cash available, it can take advantage of business opportunities available in the environment.

- When the cash is available, the firm can need an anticipated expenditurewith the minimum damage during emergencies like fire, earthquake, strikes, etc.

On the other hand, when a firm keeps large cash balances, it has it has to incur or rather bear the cost of handling the cash. Hence, the firm should keep only sufficient cash which can be utilised to make a payment but should not keep excessive cash which costs the firm dearly.

MINIMIZING FUNDS COMMITTED TO CASH BALANCES

On the other side, the second objective of cash management is to make sure that unnecessary funds are not blocked in the operations. In minimising cash balance, major to conflict in aspects needs to be addressed. A relatively high cash balance will ensure prompt payment but at the same time the firm needs to keep cash for a long period of time, which does not help the firm in earning any revenue. These funds could have been invested to on a return whichthe firm could not as it in cash for making payment. A relatively lesser cash balance may put the firm in a liquidity crisis as the firm may not be able to meet the payment schedule due to the unavailability of cash in time.

Thus, cash management aims to arrive at an optimal cash balance which serves the above two mentioned objects used effectively. The form needs to make a trade-off between high cash and low cash balances

7.4 CASH MANAGEMENT MODELS

As discussed above, the firm needs to arrive at an optimal balance which will avoid excessive cash and make sure that sufficient cash is available to meet all the payment schedules in time. In order to arrive at an optimal balance, several cash

management models are available which will help the firm in data mining optimum cash balance. Nowadays, many organisations have started using these models in order to arrive at optimal cash balances. The two most prominent cash management models or approaches which are practised globallyare given below:

1. BAUMOL MODEL

William J. Baumol suggested this model. It is similar to one used for determination of Economic Order Quantity (EOQ). According to this model, optimum cash level is the level of cash where the carrying cost and transaction costs are the minimum.

Carrying Cost **–** This refers to the cost of holding cash, namely, the interest forgone on marketable securities. They may also be termed as opportunity costs of keeping cash balances.

Transaction Cost **–** This refers to the cost involved in getting the marketable securities converted into cash. This happens when the firm falls short of cash and has to sell certain securities/assets resulting in clerical, brokerage, registration and other costs.

There is an inverse relationship between the two costs. When one increases, the other decreases. Hence, the optimum level will be when these two costs are equal.

The formula for determining optimum cash balance can be put as follows:

$$C = \frac{2U \times P}{S}$$

Where,

C = Optimum cash balance
U = Annual (or monthly) cash disbursements
P = Fixed costs per transaction
S = Opportunity cost of one rupee p.a. (or p.m.)

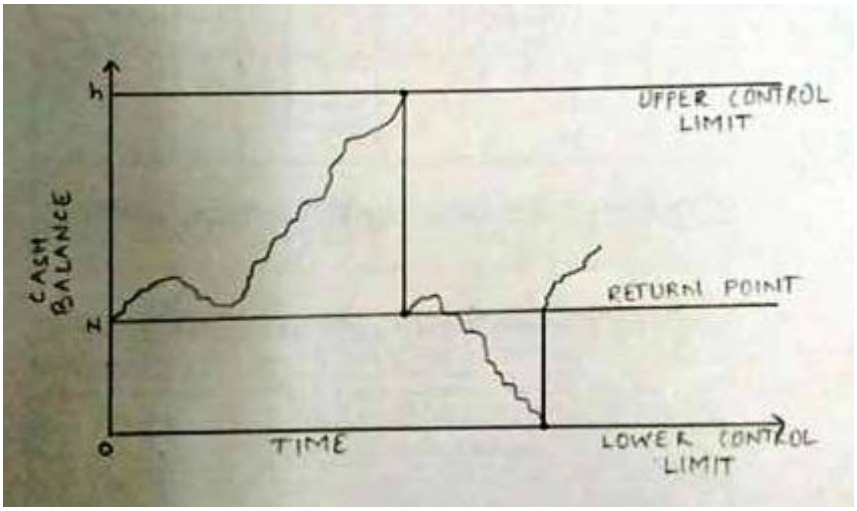
2. MILLER ORR MODEL

Baumol model is only suitable in those circumstances when the demand for cash is steady and cannot be known in advance. The Miller Orr Model helps determine the optimum cash level in such circumstances. It deals with cash management problems under the assumption of random cash flows by laying down control limits for cash balances. These limits consist of an upper limit, lower limit and return point.

When the cash balance reaches the upper limit, the firm has too much cash and should buy enough marketable securities to bring the cash balance back to the return point. When the cash balance hits zero, the financial manager must try to

return to the the return point by selling/converting securities into cash.

The model is illustrated in the form of the following chart:



The above chart shows that when the cash balance reaches the upper limit, an amount equal to "h – z" is invested in the marketable securities and the cash balance comes down to "z" level. When the cash balance touches the lower limit, marketable securities of the value of "z – o" are sold and cash balance again goes up to "z" level.

The upper and lower limits are set on the basis of the opportunity cost of holding cash, the degree of likely fluctuation in cash balances and the fixed costs associated with a securities transaction.

The optimal value of „z", the return point for securities transactions, can be determined by the following formula:

$$Z = \frac{3}{4i} \quad 3b^2$$

Where,

b = fixed cost associated with a security transaction

= variance of daily net cash flows

i = interest rate per day on marketable securities

In general, the cash model gives the financial manager a benchmark for judging the optimum cash balance. It can be used as a more precise rule governing his behavior. The model merely suggests what would be the optimal balance under a set of assumptions. The actual balance may be more or less if the assumptions do not hold good entirely.

❖ **CHECK YOUR PROGRESS**

- **Descriptive Questions**

1. Discuss the concept of cash management along with its objectives
2. Discuss in detail the conflicting objectives of cash management. Also, explain how itcan be resolved.
3. What is management of cash? Why cash is held by an organization?
4. Discuss the motives of cash in detail.
5. Discuss in detail Baumol Model for optimal cash balance with an example.
6. Discuss Miller Orr Model for optimal cash balance with an example.
7. Differentiate between Baumol Model and Miller Orr Model.

- **Short Notes**

A. Transaction Motive
B. Speculative Motive
C. Precautionary Motive
D. Compensating Motive
E. Baumol Model
F. Narrow and Broad Concept of Cash

- **Multiple Choice Questions**

1. One of the following is a miss-match…
a. Precautionary motive
b. Transaction motive
c. Speculative motive
d. None of these

2. Quarterly Cash requirement is Rs. 100000, Transaction cost is Rs. 100 and OpportunityCost is 12%. Calculate Optimum Cash Balance according to Baumol Model.
a. 25819
b. 12909
c. 6454
d. None of the above

3. ___Concept included Marketable securities in the defining the term cash.
a. Narrow
b. Broad
c. Profitability
d. Liquidity

4. Is the profitability certain in case of speculative motive?
a. Yes
b. No

c. Can‟t say
d. Subjective matter

5. Under EOQ, what exactly we seek for?
a. Economic ordering cost
b. Economic carrying cost
c. Re-ordering level
d. Economic lot size

6. Primary motive for holding cash is…
a. Precautionary
b. Transaction
c. Speculation
d. None of these

7. Which of the following is/are not inventory management tools/techniques?
a. ABC ANALYSIS
b. EOQ ANALYSIS
c. BAUMOL MODEL
d. ALL OF THESE

8. **In case of uncertain cash flows, the model applied for optimum cash balance** is....
a. Baomul Model
b. Miller – Orr
c. Subjective matter
d. Question is irrelevant

9. Idle cash leads to increase in ...
a. Profitability
b. Liquidity
c. Both
d. None of the above

MCQ ANSWER

1	2	3	4	5	6	7	8	9
d	b	d	b	a	b	c	b	b

UNIT-8 INVENTORY MANAGEMENT

8.1 CONCEPT AND MEANING

In simple terms, inventory means a stockpile of the product that the organization is trying to sell and also various inputs in the form of components which makes up the product. Inventory comes under thecurrent assets, which are to be sold in the near future under other ordinary course of business. Generally, the following things comprise the inventory of the firm, which it needs to stock up for future requirements:

(i) Raw materials,
(ii) Work-in-process (semi-finished goods), and
(iii) Finished goods.

Hence, inventory means any tangible asset which the firm holds for sale, is in the process of production that is a work in progress and is finished goods which are to be consumed by the user in the market.

The raw materials comprise the items that the organization purchases from the supplier, which are then converted into finished goods through some production process using technology. Technically they are the inputs for the finished product. The stock of those goods which are in the production process (work in progress) generally consists of various items that are partly finished and partly left to be finished which ultimately becomes a finished product. These goods are at some or the other stage of production in a multistage manufacturing process. Finished goods represent the final product for consumption which is made available in the market for consumers. This is stock that needs to be sold and in the market, or to realise the revenues. Thus, the above three represent the complete stockpile of an organization which represents the inventory., the manager needs to plan, organize, direct and control them in order to operate effectively and with total efficiency.

Considering inventory is one of the prominent current assets is distinguished from the other current assets as it involves so many other departments along with the production department. While managing inventory, the manager needs to take inputs from various functional areas such as finance, marketing, human resources, purchases etc. this is done because the opinions of all the functional area are significant to maintain adequate levels of inventory. If adequate levels of inventory is not maintained, then there will either be blockage of money unnecessarily in stockpile or production process may suffer due to less stock. Hence, the manager must reconcile the conflict in opinions of all the functional areas to arrive at an optimum inventory level. Again, the job of the manager should be such that matches with the firm's overall objective.

8.2 OBJECTIVES

Just like cash management, inventory management also faces two conflicting objectives where on one side the form should have all-time high stock in order to supply goods in a timely manner whenever the demand arises. On the other side not too much funds should be blocked which reduces the profitability of the organization. Hence, the firm needs to make a trade-off between these two conflicting objectives. The two counterbalancing object is of inventory management are mentioned below:

1. To minimize the investment in inventory
2. To meet the demand of the product efficiently

Now in order to study these two conflicts in objectives, one needs to study the costs and benefits associated with these two conflicting objectives. Once the firmassesses the conditions and thus cost-benefit analysis over inventory, it will be in a position to decide whether to minimise the inventory or maximise the inventory. Technically here, the organisation is supposed to study the merits and demerits of the form of costs and benefits in reconciling both of them to decide upon an optimum level of inventory on the basis of a trade-off between costs and benefits associated with the inventory levels. Let us discuss the costs and benefitsassociated with holding inventory:

1. Cost of Holding Inventory:

When it comes to the cost of holding inventory, most of the costs can be categorised into two basic categories: 1. Ordering cost, and 2. Carrying cost. Generally, when the firm decides to keep inventory levels high, the above-mentioned costs will be incurred by the firm. Let us discuss these two costs in detail:

(i) Ordering Costs:

Ordering costs are associated with the acquisition or procurement of the inventory is from various suppliers. The organisation needs to place orders frequently in order to replenish inventory of raw materials and other inputs. Hence, the expenses associated with bringing the raw material from suppliers please to production facility are known as ordering costs. When this transaction happens a lot of departments and processes gets involved which costs the organization which are mentioned below:

- preparing purchase order
- requisition form
- loading charges
- unloading charges
- receiving inspecting and recording the goods
- clerical and stationery costs and so on

ordering costs are also known as setup costs because the firm needs to do all these exercises repeatedly so as to facilitate the smooth travel of inputs to the production centres. These are generally fixed per order placed by the firm. So, if the firm orders it frequently, this cost will go high, and if the frequency reduces,

then the cost will also go down. This cost is inversely related to the size of inventory. When the cost is low, the level of inventory will undoubtedly be high and vice versa. The firm may intend to m this cost, but at the same time, it needs to make investments in huge inventory which blocks the funds unnecessarily for a long time.

(ii) Carrying Costs:

The second set of costs is incurred in managing inventory carrying costs. Carrying costs basically involves maintaining theinventory at the premises. The cost of holding inventory at the factory site can be divided into two mouth categories:

A. The first set of costs arises when the inventory is understood into the warehouse. The main components of this category are:
   a. storage costs which includes taxation, depreciation, insurance of the building, maintenance, etc
   b. insurance of the inventory stored.
   c. Deterioration of inventory because of pilferage, technical and style obsolescence, changing tastes and preferences, etc
   d. cost of labour for handling inventory, clerical and accounting costs.

B. The second cost that is incurred in carrying inventory is opportunity cost of funds. It basically consists of expenses of blocking funds to finance the acquisition of inventory. If the funds are not invested in inventory they could have been invested somewhere else to on a return, this is the opportunity cost of funds.

The carrying costs In the size of"inve'tory are positively related i.e. when the inventory level goes up these costs also increase and when the levels go down the costs also goes down.

Once the costs are ascertained. They are compared with the benefits arising out of inventory to determine the optimum level of inventory. The manager needsto observe and study it well in order to arrive at the optimum inventory which121inimizess the cost and maximises the benefit.

2. Benefits of Holding Inventory:

The next aspect to the trade of the conflict of objectives of inventory management is the benefits of holding inventory. This aspect deals with holding inventory in such a way that it draws benefits which oversee the costs associated with holding inventory. In order to study the benefits of holding inventory, it is quite apt to study the basic functions of inventory. In simple words, in order to manage inventory, certain basic functions needs to be performed by the managers, which will help them derivemaximum benefits. These basic functions are discussed below:

In order to study the benefits of inventory, the main focus will be on the long term activities. This is true because in the short run it is very difficult to change everything but in case of longer and major changes can be put on in the form can take the benefit in the long run. For instance, a farm cannot change its

production capacity, technology, inputs, machines or labour in a period of three months, while all of these can change if the farm has beengiven a time span of 2 to 5 years. Hence all the basic functions will work effectively in the long run in order to derive maximum benefits.

(i) Benefits in Purchasing:

The form can get benefits from purchasing raw materials in bulk quantity. It is a proven fact that when an order is placed in bulk the firm can avail available discount. This is possible when the farm has enough cash available which can be utilised in the prices of the raw materials are reasonable or lesser than the market value. There is one condition attached to benefits of purchasing is that the purchasing of raw materials should not be connected to production or sales. In simple words the form should be able to purchase the raw materials independently to ensure that it is bought at a reasonable price with a discount which otherwise would not have been possible if bought in times of need. When this happens, it certainly cuts down on the cost of production and thereby went in the increase sales and profit simultaneously.

(ii) Benefits in Production:

Benefits of production can be availed when the firm producesproduct on a large scale without worrying about the purchase of raw material and sales. When the firm has to worry about sales level and flow of raw materials, or rather if the production isdependent on flow of raw materials, then the benefits of large scale production cannot be availed. Hence, if the production is independent of purchase of raw materials and sales level, it cantake advantage of large scale production through economies ofscale. The firm needs to pay special attention when they produce season product and the production is relied on either raw materials availability or demand in the market.

(iii) Benefits in Sales:

Inventory basically is a gap filler between actual sales level and current production. If the firm has stock in place when the demand arrives, it can supply goods instantly and earn the revenue. While, if the firm starts production of the goods when the demand arises, itmay not be able to meet the demand because of the lengthy production process. Hence, it is advisable to have adequate stock of finished goods ready for sale in order to take advantage of rising demand in the market. Additionally, few products belong to monopolistic market where the number of substitutes are more in the market and if the firm is not been able to provide goods on time, then the customer may switch to other options that are available and firm will lose the chance of earning revenue.

In short, the above discussion relates to the objectives ofinventory management, the two chief aspects pertaining to the minimization of investment in the inventory on the one hand and the need to ensure that there is enough inventory to meet demand such that the production and sales operations are smooth.

8.3 TECHNIQUES/METHODS TO INVENTORY CONTROL

1. ABC Technique
2. Re-ordering Level (ROL)
3. Economic Ordering Quantity
4. FSN
5. VED
6. Just in Time Inventory

1. ABC System:

The ABC system of inventory control is a widely used technique which basically identifies or puts various raw materials or inputs into three categories, namely, A, B and C. It goes with an assumption that only some items of raw material require equal degree of control. There are few items which available in abundance at reasonable rates, while others are not available in the nearby area and/or may not be available at reasonable price. Hence, based on their availability, price, their usage and significance in the production process, degree of control should be exercised. The firm should keep more control over items that are not readily available and costly.

Let us discuss the categories in which the items can be divided and the degree of control to be imposed on each:

- **Category A:**

Category A a set of items that are very important from the point of view of production, the usage in the production is very small as compared to other items and is also costly (high in value). One thing to be noted here is that in spite of being only a small proportion used in production, the cost of these items is very high. It may constitute, say, only 10% of the total of items used but represent almost 70% of the value of inventory. For instance, in the case of construction, iron rods are used to construct any structure of the building. Iron rods are used less as compared to bricks and cement but the value of iron rods is substantially very high as compared to the other two items. Hence, iron rods can be classified into category A as per the ABC system of inventory control.

When it comes to controlling, the manager should levied strict control. Right from placing order, receiving it, storage and issuing to production should be monitored carefully and nothing should be wasted. The firm should ensure that this type of items are not purchased in bulk and stored as they block the capital on which the firm could earn a return.

- **Category B:**

Category B items find itself in the middle of category A and category C. They are not so important as those in category A, but are significant enough to make their presence felt if not handled properly. They may constitute around 20 –25 percent of total inventory and represents 15 – 25 percent of the total value of the inventory. For instance, taking the above example of the construction of buildings, apart from iron rods, cement is another important ingredient used in

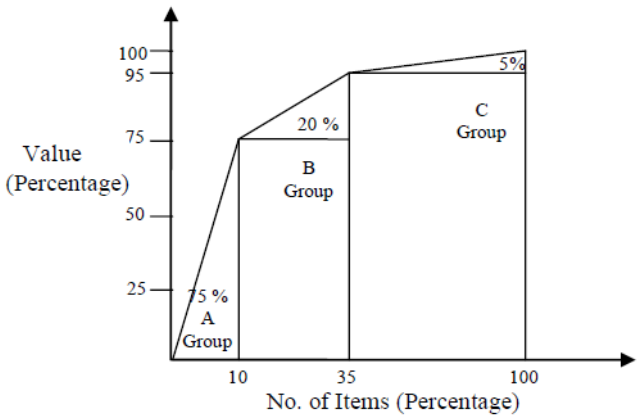
construction. Cement is not as important and costly as iron rods but requires some degree of control. Little lesser, the but manager needs to pay attention to managing category B items when it comes to its buying, storing and using.

- **Category C**:

Category C is the last division in which the inventory items can be divided. They form the most significant proportion of inventory items in the total inventory and cost the least of all. On average, they constitute 70 – 75 percentof the total number of items, but when it comes to value, it is only 5-10 percent of the total cost. Hence, least effort for controlling should be given in this category as they are not essential and does not block funds. Thus, a very mild degree of control could be levied on category C items. This is because, if more efforts are directed towards controlling them, the efforts would cost more than the inventory itself. Continuing with the last example, in the construction of building, the least costing and most used item is bricks.

Class	Number of items (in percentage of total number of items)	Value of items (in percentage of total value of inventory)
A	10	75
B	25	20
C	65	5

In the form of a graph this can be presented as follows



How it Works…?

The following steps are taken to implement the scheme:

a) The first step is to list all items in sequence to determine how many of each will be required during production along with the price range.
b) Next, for each of these listed items, determine consumption during production and the total cost it incurs.
c) Ranking should be applied to each input to be used based on total cost it bears. The items which bears maximum value should be ranked first and items with the least money value should be last.
d) Then, determine the percentage of each input. Firstly, the percentage of each item with total number must be determined and then the percentage of the total value of each input with total value of all items must be measured.

e) Lastly, based on the above calculations, all items must be grouped into A, B and C categories.

2. Order Quantity Problem: Economic Order Quantity (EOQ) Model

Once the inventories are classified into A, B and C categories, the management gets acquainted with the degree of control to be applied to various inventory items. They would know that if the item belongs to A category, rigourous control will be applied, while if the inventory belongs to C category, minimum control should be imposed. This way, they can minimise efforts to inventory control. But the problem that would come up is regarding how much of each of these categories should be ordered so that the cost of procuring and storing is reduced to a minimum. In simple words, the firm needs to answer the following questions: how much inventory should be bought in one lot for replenishment? Should the quantity be purchased in the small or large lot? Should we buy the materials for one month, a quarter, six months or a year? The inventory issues are popularly known as order quantity problems.

In order to solve these ordering quantity problems, the manager needs to address the two conflicting objectives of inventory management and thereby arrive at an optimal inventory level. There are two options for the firm, first, wherein the firm keeps a high average inventory in order to smoothen the production or sales operations and reducing the ordering costs. While, it may keep just in time inventory to avoid blockage of funds that can be invested elsewhere. When the firm successfully decides upon the optimum level of inventory, then there is said to be practicing economic ordering quantity.

Economic ordering quantity (EOQ) is that wanted the order, which reduces the total ordering costs and carrying costs. It is also popularly known as economic lot size. The two concepts mentioned above, i.e. ordering costs and carrying costs, are the nucleus on which the concept of EOQ is based. Let us first understand these two costs in order to understand the economic ordering quantity

Economic order quantity is the quantity ordered at which the total ordering costs and inventory carrying costs will be the minimum. Alternatively, it is also known as 'economic lot size'. If orders are placed for a relatively small quantity frequently, the company will have to place orders again and again during a year. Consequently, it will have to incur considerable costs in the form of transportation Costs and clerical-expenses. If on the other hand, large orders are placed, such costs will be minimised and in addition, the company will be able to enjoy advantages of bulk buying. As a result, per unit cost of placing an order will decline considerably. At the same time, bulk buying leads to the locking up capital and loss of interest to the company. Therefore, a company is required to consider a number of factors before fixing an economic ordering quantity. Of these factors, important ones are inventory carrying costs and ordering costs.

- **Ordering Cost:**

Ordering costs are those expenses incurred when the firm places an order to buy the inputs and also to replenish them. Cost of placing orders are generally fixed per order and includes the following:

- Clerical expenses
- Preparing schedule for quotation
- Sending them to suppliers to post or any other medium
- Receiving goods and inspecting them
- Preparing invoices
- Salary for staff and so on

Now, generally, when the firm places an order all the above-mentioned expenses are to be incurred every time. Hence, if the frequency of placing order increases than the cost of ordering also goes up. While, if the firm orders large quantity single or a few orders, the ordering costs will go down. Only demerit when the number of orders are less, the firm needs to keep large quantity in their storage which will increase blockage of capital.

- **Carrying Costs:**

Inventory carrying costs refers to storing and maintaining the inventory ofinputs at the factory site. The significant costs associated with caring inventory is that the amount of capital gets locked up in inputs that are ordered. Hence, this money cannot be invested on earn a return. Thus, the major carrying cost is the opportunity cost of funds that the firm has to bear. Apart from opportunity cost, the firm must spend on transportation (internal), insurance, and loss due to deterioration, obsolescence, etc. According to the Planning Commission of India,the inventory carrying costs in our country amounts to 15 to 20 per cent of the total cost of inventory. Of course the larger the inventory, the greater is the inventory carrying cost.

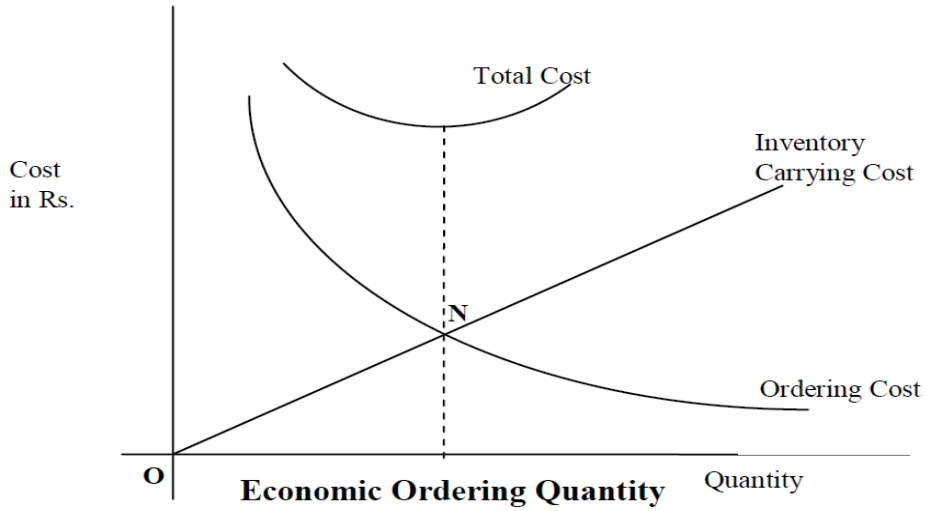
When inventory carrying cost and ordering cost are in balance, total cost of ordered quantity is lowest and therefore it is called economic order quantity. In other words, when the total ordering and carrying costs is the lowest, the quantity would be the economic order quantity.

There are three methods of determining EOQ

a) Graphic Method
b) Formula Method
c) Trial and Error Method

(A)Graphic Method:

The economic order quantity can be determined with the help of a graph as follows:



In the above diagram, upward moving straight line shows that inventory carrying cost increases with the quantity ordered. The downward sloping curve indicates that ordering cost per unit decreases with the increases in quantity ordered. The U-shaped curve shows that The total cost of decreases with die increases in quantity ordered up to point X. After this point it increases with the quantity ordered. In other words, the totalcost is the lowest when OX quantity is ordered. Hence OX is the economic ordering quantity. It should be remembered that economic ordering quantity is always obtained at the point of intersection between the inventory carrying cost line and the ordering cost line.

(B) Formula Method:

Different authors give different formulas to find out economic order quantity. The formula which is commonly used is as follows:

$$EOQ = \sqrt{\frac{2AO}{C}}$$

Where, EOQ = Economic order quantity
A =Annual consumption
O = Ordering cost
C = Carrying cost per unit

Assumptions of EOQ Model: EOQ model, as a technique to determine the economic order quantity is based on four major assumptions:

1. The annual demand or usage for a particular item of inventory is known with certainty.
2. The rate of usage of inventory is constant.
3. The orders to replenish the inventory of an item are filled instantaneously.In other words, lead time is assumed to be zero.
4. There is known or constant price per unit i.e. there are no price discounts.

(C) Trial and Error Method:

The trial and error approach has been designed because the answer received through the formula Method may not match with the actual lot size offered by

the suppliers. The suppliers offer goods in specific lot sizes which may not match the proper optimal balance received through EOQ formula. Hence, the firm needs to order raw materials and other supplies in the lot sizes available from the supplier. At the most firm can select lot sizes which are near to the optimal balance received through the formula Method. Let us understand this with the help ofan illustration:

The inventory requirement of a company for the year is 30,000 units of raw material. The ordering cost is Rs. 80 per order, and carrying costs are expected to be Re. 0. 10 per unit. It can make purchases in lots of 30,000 units, 15,000 units, 7,500 units, 5,000 units and 2,510"0 units. Find out the economic order quantity with the help of a trial and error approach.

Table showing Inventory Costs

Particulars	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5
1. Purchases (units)	30,000	15000	7500	5000	2500
2. No. of Orders	1	2	4	6	12
3. Cost per Order	Rs.80	Rs.80	Rs.80	Rs.80	Rs.80
4. Total Ordering Costs	Rs.80	Rs.160	Rs.320	Rs.480	Rs.960
5. Carrying Costs (per unit)	Re.0.10	Re.0.10	Re.0.10	Re.0.10	Re.0.10
6. Average Inventory (units)	15,000	7,500	3,750	2500	1250
7. Total Carrying Costs (Rs)	1500	750	375	250	125
8. Total Costs (Ordering+CarryingCosts)	1580	910	695	730	1085

The above calculations make it clear that when 7,500 units are purchased, thetotal cost is the lowest and so economic order quantity is 7500 units.

- **Order Point Problem:**

The EOQ technique helps the firm determine how much quantity to order when they need to replenish the inventory. It provides an optimal or economic lotsize of inventory which can be ordered to reduce the ordering and carrying cost. But at the same time, it does not answer the question, when should the firm place an order for replacement? Or when should the firm initiate the buying process to receive the goods on time? This aspect is resolved under the order point problem by deciding upon Re-Ordering Level (ROL).

3. Re-ordering Level (ROL)

The Re-ordering Level (ROL) is a level at which the order is placed to replenish the stock of inventory. In simple words, it is a specific point where if the current inventory reaches, then the firm places a fresh order to maintain the specific stock level. The quantity of the order will be equal to the Economic Ordering Quantity (EOQ). There is a specific formula to calculate the Re-ordering Level (ROL). This formula will exactly give the answers as to when to place an order of replenishing inventory so that, we the stock goes out, there will be fresh inventory waiting outside to be used. Of course, many assumptions are taken

into consideration but the formula largely works.

Formula:

Re-ordering Level (ROL) = Average Usage x Lead Time

The usage can be in days, weeks or months depending on the requirements andlead time can also be in days, weeks or months.

The term lead time generally refers to the time taken to receive inventory after placing an order with a supplier. It includes, selecting, loading, transporting andunloading of raw materials. It is the time required by suppliers to process the request and send the materials to the buyer.

4. V.E.D Analysis

As discussed above, ABC analysis classifies the inventory items based on its financial value and amount of consumption, VED analysis critically classifies the inventory items based on their availability and usability. VED stands for Vital, Essential and Desirable. Hence, the organization keeps the stock based on whether the inventory item is vital,essential or desirable.

VED analysis is very popular and are used in spare parts and medical stores. If any part or medicine is very important then it is categorized under the head VITAL and will be kept in stock all the times. If any item is not so important, then it is categorized as ESSENTIAL and the firm sometimes can afford to avoid stocking it, or it can face stock-out for a small period of time. While, those spare parts or medicines which are not essential are classified as DESIRABLE. These items are expected to be stock stocked at only some of times. They are just desired. For example, any cosmetic product comes under D category in the Medical store. The medical store may or may not have it in stock all the time but when it comes to medicines related to fever, cough, diabetes, blood pressure, etc should be there at all the time.

5. F.S.N. Analysis

FSN stands for Fast-moving, Slow-moving and Non-moving items. Here, the classification of inventory items is based on its demand and usage. If any item gets consumed quickly and the firm needs to stock it as many people demand it on a daily basis, then that items come under Fast-moving item. The items which are bought by people only a few times during a year constitute as Non-Moving item.

This technique is very useful to control the obsolescence of items. This method is most suited to a department store. FSN analysis is an apt inventory control method that facilitates adequate inventory controlling in the organization.
FSN helps identify active items that need to be reviewed regularly and surplus items that must be examined further. Non-moving items may be examined further, and their disposal can be considered.

❖ CHECK YOUR PROGRESS

- **Descriptive Questions**

1. What is inventory management? Discuss its objectives in detail
2. Discuss the concept of inventory management. Also discuss various costs and benefits associated with holding inventory.
3. Discuss the objectives of inventory management keeping in mind its costs and benefits.
4. Discuss in detail ABC system of inventory management
5. Explain in detail EOQ technique of inventory management
6. Discuss graphic and formula based methods of EOQ
7. What is order point problem? Explain how can it be solved?
8. Discuss in detail Reordering Level (ROL).
9. Differentiate between ABC and EOQ methods to inventory management
10. Differentiate between EOQ and ROL method to inventory management

- **Short Notes**

1. VED analysis
2. FSN analysis
3. Formula method of inventory management
4. Benefits of holding inventory
5. Costs of holding inventory
6. Differentiate between A, B and C categories of ABC system
7. Ordering costs and Carrying costs
8. Concept of inventory

- **Multiple Choice Questions**

1. Which analysis will help us in finding out inventory to be disposed?
   a. ABC
   b. FSN
   c. VED
   d. Pareto analysis

2. Finished goods are the only inventory in case of_____ company.
   a. Manufacturing
   b. Finance
   c. Trading
   d. Service

3. In VED analysis, E stands for…
   a. Essential
   b. Economic

c. Except
d. None of the above

4. ABC analysis is also known as…
a. All better cost
b. Always business control
c. Always better control
d. Always better costing

5. EOQ is that inventory level where total of ordering and carrying cost is…
a. Maximum
b. Minimum
c. Zero
d. None of the above

6. In FSN, S stands for…
a. Silver moment
b. Stand alone
c. Slow moving
d. Sure moving

7. In EOQ is also known as Economic Lot Size. Do you agree?
a. Yes
b. No
c. Can't say
d. Subjective matter

8. EOQ and ROL are used synonymously. Do you agree?
a. Yes
b. No
c. Can't say
d. Subjective matter

9. Both the objectives of inventory management are mutually exclusive. Thisstatement is…
a. True
b. False
c. Partially true
d. Partially false

10. Re-ordering Level (ROL) is same as EOQ. The statement is…
a. True
b. False
c. Partially true
d. Partially false

❖ **MCQ ANSWER**

1	2	3	4	5	6	7	8	9	10
b	c	a	c	b	c	a	b	a	b

UNIT-9 RECEIVABLES MANAGEMENT

9.1 CONCEPT AND MEANING

The term receivables are defined as "debt owed to the firm by customers arising from sale of goods or services in the ordinary course of business". When a firm makes an ordinary sale of goods or services and does not receive payment, the firm grants trade credit and creates accounts receivable which would be collected in the future. Receivables management is also called trade credit management. Thus, accounts receivable represents an extension of credit to customers, allowing them a reasonable period of time in which to pay for the goods which they have received.

The sale of goods on credit is an essential part of the modern competitive economic system. In fact, credit sales and, therefore, receivables are treated as a marketing tool to aid the sale of goods. The credit sales are generally made on *open* account in the sense that there are no formal acknowledgements of debt obligations through a financial instrument. As a marketing tool, they are intended to promote sales and thereby profits. However, extension of credit involves risk and cost. Management should weigh the benefits as well as cost to determine the goal of receivables management. Thus, the objective of receivables management is "to promote sales and profits *until* that point is reached where the return on investment in further funding of receivables is less than the cost of funds raisedto finance that additional credit.

- **Costs:**

The major categories of costs associated with the extension of credit and accounts receivable are: (1) collection cost, (2) capital cost, (3) delinquency cost, and (4) default cost.

(1) Collection cost:

The costs are administrative costs incurred in collecting the receivables from the customers to whom credit sales have been made. Included in this category of costs are: (a) additional expenses on the creation and maintenance of a credit department with staff, accounting records, stationary, postage and other related items; (b) expenses involved in acquiring credit information either through outside specialist agencies or by the staff of the firm itself. These expenses would not be incurred if the firm does not sell on credit.

(2) Capital Cost:

The increased level of accounts receivable is an investment is assets. They have to be financed thereby involving a cost. There is a time lag between the sale of goods to and payment by customers. Meanwhile, the firm has to pay employees

and suppliers of raw materials

This implies that the firm should arrange additional funds to meet its obligations while waiting for payment from its customers. The cost on the use of additional capital to support credit sales, which alternatively could be profitably employed elsewhere, is, therefore, a part of the cost of extending credit or receivables.

(3) Delinquency Cost:

Yet another cost is associated with extending credit to customers. This arises out of the failure of the customers to meet their obligations when payment on credit sales due after the expiry of the period of credit. Such costs are called delinquency costs. The important components of thiscost are (1) blocking-up of funds for an extended period, 2) cost associated with steps that have to be initiated to collect the overdues, such as, renubders and other collection efforts, legal charges, where necessary, and so on.

(4) Default Cost:

Finally, in addition to the above costs, the firm may not be able to recover the overdues because of the inability of the customers. Such debts are treated as bad debts and have to be written off as they cannot be realized. Such costs are default costs associated with credit salesand accounts receivable.

Benefits

Apart, from the cost, another factor that has a bearing on accounts receivable management is the *benefit* emanating from credit sales. *The benefits are the increased sales and profits anticipated because of a more liberal policy.* When firms extend trade crecddit,, i.e. invest in receivables, they intend to increase sales. The impact of a liberal policy of trade credit is likely to have two forms. First, it is oriented to sales expansion. In other words, affirm may grant trade credit to either increase sales to existing customers or attract new ones. This motive forinvestment in receivables is growth-oriented. Secondly, the firm may extend credit to protect its current sales against the emerging competition. Here the motive is sales-retention. As a result of increased sales the profitsof the firm will increase.

From the above discussion, it is clear that investments in receivables involve both benefits and costs. The extension of trade credit has a major impact on sales, costs and profitability. Other things being equal, a relatively liberal policy and, therefore, higher receivables investments will produce larger sales. However costs will be higher with liberal policies than with more stringent measures. Therefore, accounts receivablemanagement should aim at a trade-off between profit(benefit) and risk (cost). The decision to commit funds to receivables (or the decision to grant credit) will be based on a comparison of the benefits and costs involved while determining the *optimum* level of receivables. *The*

costs and benefits to be compared are marginal costs and benefits. The firm should only consider the incremental(additional) benefits and costs that result from a change in the receivables or trade credit policy.

While it is true that general economic conditions and industry practices have a strong impact on the level of receivables, a firm investment in this type of current assets is also greatly affected by its internal policy. It should be noted that a firm has little or no control over environmental factors such as economic conditions and industry practices. But it can improve its profitability through a properly conceived trade credit policy or receivables management.

9.2 ELEMENTS OF RECEIVABLES MANAGEMENT/DECISION AREAS

The three crucial decision areas in receivables management are: (a) Credit policies; (b) Credit terms; and (c) Collection policies. We now discuss them in detail.

(A) Credit Policies

In the preceding discussions, it has been clearly shown that the firm's objective with respect to receivables management is not merely to collect receivables quickly but attention should also be given to the benefit-cost trade-off involved in the various areas of accounts receivables management. The first decision area is Credit Policies.

The credit policy of a firm provides the framework to determine (a) whether or not to extent credit to a customer and (b) how much credit to extend. The credit policy decision of a firm has two broad dimensions: (i)Credit Standard and (ii) Credit analysis. A firm has to establish and use *standard* in making credit decisions and develop appropriate sources of credit information and methods of credit analysis. We illustrate below how these two aspects are relevant to the accounts receivable management of a firm.

(1) Credit Standard:

The term credit standards represent the basic criteria for the extension of credit to customers. The quantitative basis of establishing credit standards are factors such as credit ratings, credit references, average payments period and certain financial ratios. Since we are interested in illustrating the trade off between benefit and cost to the firm as a whole, we do not consider here these individual components of credit standards. To illustrate the effect, we have divided the overall standards into (a) tight or restrictive, and (b) liberal or non-restrictive. That is to say, *our aim is to show what happens to the trade-off when standards are relaxed or, alternatively, tightened.* The trade-off with reference to credit standards covers (i) the collection cost, (ii) the average collection period, (iii) level of bad debt losses, and (iv) level of

sales. These factors should be considered while deciding whether to relax credit standards or not. If standards are relaxed, it means more credit will be extended; if standards are tightened, less credit will be extended. Let us elaborate the implications of the fourfactors.

(i) Collection Cost:

The implications of relaxed credit standards are (1) more credit,(2) a larger credit department to service accounts and related matters, (3) increase in

collection costs. The effect of tightening of credit standards will be exactly the opposite. These costs are likely to be semi-variable as up to a certain point, the existing staff will be able to carry on the increased workload, but, beyond that, additional staff would be required. These are assumed to be included in the variable cost per unit and need not be separately identified.

(ii) Investments in Receivables or the Average Collection Period:-

The investment in accounts receivable involves a capital cost as funds have to be arranged by the firm to finance them till customers make payments. Moreover, the higher the average accounts receivable, the higher the capital or carrying cost. A change in the credit standards-relaxation or tightening-leads to a change in the level of accounts receivable either (a) through a change in sales or (b) through a change in collection.

A relaxation in credit standards, as already stated, implies an increase in sales which, in turn, would lead to higher average accounts receivable. Further, relaxed standards would mean that credit is extended liberally so that it is available to even less- credit-worthy customers who will take a longer period to pay overdue. The extension of trade credit to slow-paying customers would result in higher accounts receivable.

In contrast, tight of credit standards would signify (1) a decrease in sales and lower average accounts receivable, (2) an extension of credit limited to more credit-worthy customers who can promptly pay their bills and, thus, a lower averagelevel of accounts receivable.

Thus, a change in sales and a change in collection together with a relaxation in standards would produce a higher carrying cost, while changes in sales and collection result in lower costs when credit standards are tightened. These basic reactions also occur when changes in credit terms or collection procedures are made. We have discussed these in the subsequent sections of this chapter.

(iii) Bed debt Expenses:-

Another factor which is expected to be affected by changes in credit standards is bad debt expenses (default expenses). They can be expected to increase with relaxation in credit standards and decrease as credit standards become more restrictive.

(iii) Sales Volume:-

Changing credit standards can also be expected to change the volume of sales. As standards are relaxed, sales are expected to increase; conversely, a tightening is expected to cause adecline in sales.

(2) Credit Analysis:

Besides establishing credit standards, a firm should develop procedures for evaluating credit applications. The second aspect of credit policies of a firm is credit analysis and investigation. Two basic steps are involved in the credit investigation process: (a)obtaining credit information, and (b) analysis of credit

information.It is on the basis of credit analysis that the decisions to grant credit to a customer as well as the quantum of credit would be taken.

(i) Obtaining Credit Information:

The first step in credit analysis is obtaining credit information on which to base a customer's evaluation. The sources of information, broadly speaking, are (i) internal, and

(ii) external.

Usually, firms require their customers to fill various forms and documents giving details about financial operations. They are also required to furnish trade references with which the firms can have contacts to judge the customer's suitability for credit. This type of information is obtained from internal sources of credit information. Another internal source of credit information is derived from the records of the firms contemplating an extension of credit. A particular customer/applicant may likely have enjoyed credit facility in the past. In that case, the firm would have information on the behavior ofthe applicants in terms of historical payment pattern. This type of information may need to be more adequate therefore, have to be supplemented by information from other sources.

The second source of credit information is external. The availability of information from this source to assess the credit-worthiness of customers depends upon the development of institutional facilities and industry practices. In India, the external sources of credit information are less developed than in industrially advanced countries of the world. Depending upon the availability, the following external sources may be employed to collect information.

Financial Statements: One external source of credit informationis the published financial statements, i.e the Balance Sheet and the Profit and Loss Account. As discussed in Chapter 4, the financial statements contain very useful information. They throw light on an applicant's financial stability, liquidity, profitability and debt capacity. Although the financial statements do not directly reveal the past payment record of the applicant, they are very helpful in assessing the over-all financial position of a firm, which significantly determines its credit standing.

Bank References:- Another useful source credit information is the bank of the firm which is contemplating the extension of credit. The *modus operandi* here is that the firm's banker collects the necessary information from the applicant's banks. Alternatively, the applicant may be required to ask his banker toprovide the necessary information either directly to the firm or to its bank.

Trade References: **-** These are yet another external source of information. These refer to the collection of information from firms with whom the applicant has dealings and who on the basis of their experience, would vouch for the applicant.

Finally, *specialist credit bureau reports* from organizations specializing in supplying credit information can also be utilized.

(ii) Analysis of Credit Information:-

Once the credit information has been collected fromdifferent sources, it should be analysed to determine the applicant's credit worthiness. Although there are no established procedures to analyse the information, the firm should devise one to suit its needs. The analysis should cover two aspects: (i) quantitative, and (ii) qualitative.

The assessment of the quantitative aspect is based on the factual information available from the financial statements, the past records of the firm, and so on. The first step in this type of assessment is to prepare an Ageing Schedule of the accounts payable of the applicant and calculate the average age of the accounts payable. This exercise will give an insight into the past payment pattern of the customer. Another step in analyzing the credit information is through a ratio analysis of the applicant's liquidity, profitability and debt capacity. This ratio should be compared with the industry average. Moreover, trend analysis over a period of time would reveal the financial strength of the customer.

The quantitative assessment should be supplemented by a qualitative interpretation of the applicant's credit-worthiness. The subjective judgement would cover aspects relating to the quality of management. Here, the references from other suppliers, bank references, and specialist bureau reports would form the basis for the conclusions to be drawn. In the ultimate analysis, therefore, the decision whether to extend credit to the applicant and what amount to extend will depend upon thesubjective interpretation of his credit standing.

(B) Credit Terms:-

The second decision area in accounts receivable management is the credit terms. After the credit standards have been established and the credit-worthiness of the customers has been assessed, the management of a firm must determine the terms and conditions on which trade credit will be made available. The stipulations under which goods are sold on credit are referred to as *credit terms.* These relate to the repayment of the amount under thecredit sale. Thus, credit terms specify the repayment terms of receivables.

Credit terms have three components: (a) *credit period,* in terms of the duration of time for which trade credit is extended; during this period, the overdue amount must be paid by the customer; (b) *cash discount,* if any, which the customer can take advantage of, i.e. the overdue amount will be reduced by this amount; and (c) *cash discount period,* which refers to the duration during which the discount can be availed of.

These terms are usually written in abbreviations, i.e. 2/10 net 30. The three numerals are:

(i) 2 signifies the rate of cash discount (2%), which will be available to the customers if they pay the overdue within the stipulated time;
(ii) 10 represents the time duration (10 days) within which a customer must pay to be entitled to the discount;
(iii) 30 means the maximum period for which credit is available and the amount must be paid in any case before the expiry of 30 days.

In other words, the abbreviation 2/10 net 30 means that the customer is entitled to 2% cash discount (discount rate) if he pays within 10 days(discount period) after the beginning of the credit period (30 days). If, however, he fails to take advantage of the discount he may pay within 30 days. If the payment is not made within a maximum period of 30 days, the customer would be deemed to have defaulted.

The credit terms, like the credit standards, affect the profitability as well as the cost of a firm. A firm should determinethe credit terms on the basis of cost-benefit trade-off. We illustrate in the subsequent discussions how the three components of credit terms, namely, the rate of discount, period of discount and the credit period, affect the trade-off. *It should be noted that our focus in analyzing the credit terms is from the point of suppliers of trade credit and not the recipients for whom it is a source of financing.*

(i) Cash Discount:

The cash discount has implications for the sales volume, average collection period, bad debt expenses and profit per unit. In taking a decision regarding the grant of cash discount, the management has to see what happens to these factors if it initiates, increase, or decrease the discount rate. The changes in the discount rate would have both positive and negative effects. The implications of increasing or initiating cash discount are as follows:

The sales volume will increase. The grant of discount implies reduced prices. If the demand for the products is elastic, areduction in prices will result in higher sales volume.
Since the customers, to take advantage of the discount, would like to pay within the discount period, the average collection period would be reduced. The reduction in the collection period would lead to a reduction in the investment in receivables and also the cost. The decrease in the average collection period would also cause a fall in bad debt expenses. As a result, profits would increase.

The discount would have a negative effect on the profits. This is because the decrease in prices would affect the profit margin per unit of sale.

(C) Collection Policies:

The third area involved in accounts receivable management is collection policies. They refer to the procedures followed to collect accounts receivable when, after the expiry of the credit period, they become due. These policies cover two aspects: (i) the degree of effort to collect the overdues, and (ii) t type of collection efforts.

(i) <u>Degree of Collection Effort:</u>

To illustrate the effect of the collection effort, the credit policies of a firm may be categorized into (i) strict/tight, and (ii) lenient. The collection policy would be tight if very rigorous procedures are followed. A tight collection policy has implications which involve benefits as well costs. The management has to consider the trade-off between them. Likewise, a lenient collection effort also affects the cost-benefit trade-off. The effect of tightening the collection policy

would be as follows.

In the first place, the bad debt expenses (default cost) would decline. Moreover, the average collection period will be reduced. As a result of these two effects, the firm will benefit and its profits will increase. But, there would be a negative effect also. A very rigorous collection strategy would involve increased collection costs. Yet another negative effect may be in the form of a decline in the volume of sales. This may be because some customers may not like the pressure and intense efforts initiated by the firm and may switch to other firms

(ii) Type of Collection Efforts:-

The second aspect of collection policies relates to the steps that should be taken to collect overdue from the customers. A well-established collection policy should have clear-cut guidelines as to the sequence of collection efforts. After the credit, the period is over and payment remains due, the firm should initiate measures to collect them. The effort should in the beginning be polite, but, the passage of time it should become gradually more strict and stern. The steps usually taken are (i) letters, including reminders, to expedite payment; (ii) telephone calls for personal contact; (iii) personal visits; (iv) help of collection agencies; and finally ; (v) legal action. The form should take recourse to very stringent measures, like legal action, only after all other avenues have been fully exhausted. They not only involve a cost but also affect the relationship with the customer. The aim should not be to collect as early as possible; genuine difficulties of the customers should be given due consideration.

❖ **CHECK YOUR PROGRESS**

- **Descriptive Questions**

1. What is receivables management? How this is an asset that fits in the definition of working capital?
2. Discuss the concept of receivables management? Discuss its objectives.
3. Discuss various elements of receivables management in brief.
4. Discuss the element credit terms in detail
5. Discuss the element collection policies in detail
6. Discuss the element credit policies in detail

UNIT-10 DIVIDEND DECISIONS

10.1 INTRODUCTION

Dividend is the portion of profit shared among shareholders of the company. According to the Institute of Chartered Accountants of India, dividend is "a distribution to shareholders out of profits or reserves available for this purpose." This is basically discretionary power of the board to decide what percentage profit would be shared to shareholders and what percentage of profit would be reinvested in the company for its sustainable growth. In nutshell, dividend policy suggests the amount of earnings to be distributed to shareholders and the amount to be reinvested in the company. Retained earnings are considered to be internal sources of funding the growth of the company At the same time, dividends arealso extremely important from the shareholders' point of view as they tend to increase their current return. Dividends, however, depend on the liquidity position of the company. Dividend policy involves the balancing of the shareholders' desire for current dividends and the company's' requirement of funds for the growth of the company. A firm's dividend policy divides its net profit into retained earnings and dividends. The retained earnings provide funds to finance growth opportunities. As dividends are paid in cash, the distribution of dividends uses the liquidity of the company. If the company is willing to pay dividends and also needs funds to finance its investment opportunities, it will have to arrange external sources of financing, such as the issue of debt or equity. It is acceptable to refer to a distribution of earnings as a dividend and a distribution from capital as a liquidating dividend. More generally, any direct payment by the corporation to the shareholders may be considered a dividend ora part of the dividend policy.

Dividends come in several different forms, like cash or stock. The basic types of **cash dividends** are:

- ❖ Regular cash dividends
- ❖ Extra dividends
- ❖ Special dividends
- ❖ Liquidating dividends

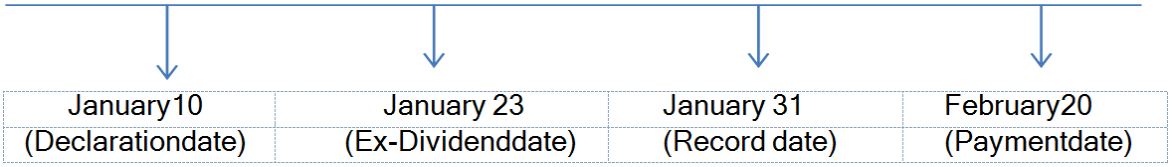
The most common type of dividend is a cash dividend. Commonly, all good companies pay regular cash dividends every quarter. Sometimes companies are paying extra cash dividend as this extra may or may not be continued in future. A special dividend is similar, but the name usually indicates that this

dividend is viewed as a truly unusual or one-time event and won't be repeated. Finally, the payment of liquidating dividends usually means that some or all of the business has been liquidated, that is, sold off. However, it is labeled, a cash dividend payment reduces corporate cash and retained earnings, except in the case of a liquidating dividend.

Stock dividends as name suggests, are not given in cash but it is given as popularly known as Bonus Share. Bonus shares are free of cost to existing shareholders in addition to the cash dividend and not in lieu of cash dividends. Hence, companies may supplement cash dividends by bonus issues. Issuing bonus shares increase the number of outstanding shares of the company. The bonus shares are distributed proportionately to the existing shareholder. Hence there is no dilution of ownership. For example, if a shareholder owns 100 shares at the time when a 10 per cent (ie., 1:10) bonus issue is made, he will receive 10 additional shares. The declaration of bonus shares will increase the paid-up share capital and reduce the reserve and surplus earnings of the company. The total net worth is not affected by the bonus issue.

As discussed, dividend payment is the discretionary power of the company's board of directors; shareholders cannot claim any regular income from equity shares like interest in case of debt capital. When a dividend has been declared, it becomes debt of the firm and cannot be rescinded quickly. After the declaration of dividend, it is distributed to all shareholders listed on the record date. Commonly, the amount of the cash dividend is expressed in terms of dividends per share.

Example of procedure for dividend payment



To summarize, the dividend policy decision involves two questions:

1) What fraction of earnings should be paid out, on average, over time?
2) What type of dividend policy should the firm follow? i.e. issues such as whether it should maintain a stable dividend per share or stable dividend payout ratio.

10.2 DIVIDEND POLICIES AND DECISIONS

It is observed that few companies pay a very high dividend while few pay very low dividends. The payment of dividends varies by industry wise and it also varies company wise within an industry. How do companies actually determine the level of dividends? There are three types of dividend policy observed in the industry.

1. Residual dividend policy
2. Dividend stability policy and
3. A Compromise Dividend Policy

1. Residual Dividend Policy

A residual dividend policy is used when the company is using internal funding to finance new positive NPV projects. The dividend is only paid out of what is leftover. This leftover is referred to as residual hence it is called residual dividend policy. With a residual dividend policy, the firm's objective is to meet its investment needs and maintain its desired debt-equity ratio before paying dividends.

Example:

The following data is available for XYZ Ltd.

Total earnings: 1000 INR ; Debt Equity Ratio: 0.5; PLANNED CAPEX: 900 IN What will be the residual dividend?
To maintain the capital structure of XYZ Ltd., this 900 INR must be financed by 2⁄3 equity and 1⁄3 debt. So, it will actually borrow 1⁄3 X INR 900 = INR 300. It will spend 2⁄3 X INR 900 = INR 600 of the INR 1,000 earning in equity available. There is INR 1,000 - 600 = INR 400 residual, so the dividend will be $400.

The firm's debt-equity ratio is unchanged at 0.50.

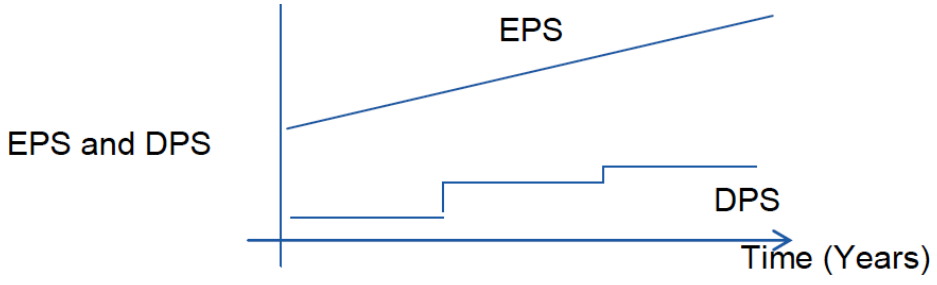
2. Dividend Stability Policy:

It is the most popular and desirable policy by the management of most companies in practices as shareholders highly welcome it because they value stable dividends more than the uncertain dividend. All other things being the same, the stable dividend policy may positively impact the share's market price. More precisely, the stability of dividends refers to the amounts paid out regularly.Three forms of such stability may be distinguished:

i. Constant dividend per share
ii. Constant dividend payout ratio.
iii. Constant dividend per share plus extra dividend.

i. Constant dividend per share

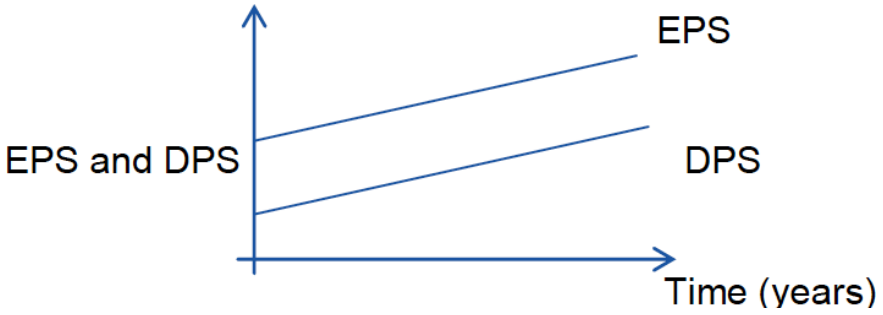
A company follows the policy of paying a fixed rate on paid-up capital as dividends every year, irrespective of fluctuations in the earnings. The companies announce dividends as per cent of the paid-up capital per share. This policy does not imply thatthe dividend per share or dividend rate will never be increased. When the company reaches new earnings levels and expects to maintain them, the annual dividend per share may increase. The relationship between earnings per shares and the dividend per share under this policy is shown below figure



Those investors who have dividends as they only source of their income may prefer the constant dividend policy. They do not accord much importance to the changes in share prices. In the long run, this may help to stabilize the market price of the share.

ii. Constant Dividend Payout Ratio

The ratio of DPS to EPS is known as the dividend payout ratio. Some companies may follow a policy of constant payout ratio i.e., paying a fixed percentage of net earnings every year. With this policy the amount of the dividend will fluctuate in direct proportion to earnings. If a company adopts a 60 percent payout ratio, 60 percent of net earnings will be paid out as adividend. The relation between the earnings per share and the dividend per share under the policy is exhibited in the below figure.



This policy is related to a company's ability to pay dividends. If the company incurs losses, no dividend shall be paid regardless of the desires of shareholders. Internal financing with retained earnings is automatic when this policy is followed. At any given payout ratio, the amount of dividends and the additions toretained earnings increase with increasing earnings and decrease with decreased earnings. This policy does not put any pressure on a company's liquidity since dividends are distributed only when the company has positive earnings.

iii. Constant dividend per share plus Extra dividend

The minimum amount of dividend per share is fixed to reduce the possibility of non-payment of dividend in any financial year. In case of the company's good performance, company pays extra dividend over and above this minimum amount. This type of policy enables a company to pay a constant amount of dividend regularly without a default and allows a great deal of flexibility for supplementing the income of shareholders only when the company earnings are higher than the usual, without committing itself to make a larger payments as part of the future fixed dividend.

3. A Compromise Dividend Policy

A compromise dividend policy is based on a few positive restrictions or targets before declaring a dividend. These restrictions may be related to the target debt-equity ratio or target internal funding for positive NPV projects or target dividend payout ratio. These restrictions are based on the priority of the company. Under the compromise approach, the debt-equity ratio is viewed as a long-range goal. It is allowed to vary in the short run if necessary to avoid a dividend cut or the

need to sell new equity. In addition to having a strong reluctance to cut dividends, financial managers tend to think of dividend payments in terms of a proportion of income, and they also tend to think investors are entitled to a "fair" share of corporate income. This share is the long-run target payout ratio, and it is the fraction of the earnings the firm expects to pay as dividends under ordinary circumstances. Again, this ratio is viewed as a long-range goal, so it might vary in the short run if this is necessary.

Factors Determining Dividend Decision or Policy

1. **Ability to raise external funds either from Debt or Equity:** All futures investments can be financed either by equity or debt or retained earnings. If the company can raise external funds easily with low cost debt or via selling new shares, then the company can adopt a more flexible dividend policy and has the freedom to distribute its earnings as dividends.
2. **Availability of cash or liquidity:** Cash dividends can be paid only with cash.

   The liquidity position of the company is major factor for dividend decisions. A shortage of cash in the bank can restrict dividend payments. However, the ability to borrow from the company can give some relief to manage their liquidity.

3. **Bond Indentures:** Debt contracts often limit dividend payments to earnings generated after the loan was granted. Also, debt contracts often stipulate that no dividends can be paid unless the current ratio, times-interest earned ratio, and other safety ratios exceed stated minimums.

4. **Flotation Cost of new Equity Issue:** If flotation costs (including any negative signaling effects of a stock offering) are high, then the cost of equity will be higher than the cost of retained earnings. In such cases it is better to set a low payout ratio and to finance through retained earnings rather than a new equity issue. On the other hand, a high dividend payout ratio is more feasible for a company whose flotation costs are low. Flotation costs also differ for different companies. For example, the flotation percentage is generally higher for small firms, so they tend to set low payout ratios.

5. **Impairment of capital:** Company cannot pay dividend more than the balance

   sheet item "retained earnings." This legal restriction, known as the *impairment of capital rule,* is designed to protect creditors. Without the rule, a company in trouble might distribute most of its assets to stockholders and leave its debt holders out in the cold.

6. **Investment opportunities of a company:** A large number of profitable investment opportunities will tend to put high pressure for the company to pay fewer dividends and vice versa if the profitable investment opportunities are very less in number.

7. **Possibility of accelerating or delaying projects.** Accelerating or postponing projects will permit companies to adhere more closely to a

stable dividend policy.

8. **Preferred stock restrictions.** Typically, common shares' dividends cannot be paid if the company has not paid any past or current dividend onpreference shares. The preference shareholders must be satisfied before common share holders' dividends are paid.

10.3 DIVIDEND THEORIES

There are two different theoretical approaches discussed in finance literature regarding dividend payment and its impact on the share price. First is the Irrelevance of Dividend payment on share price and second is the relevance of dividends for understanding the share price.

The first theory of the irrelevance of dividends is popularly known as MM theory of dividend developed by Modigliani and Miller. While the Relevance of Dividends was explained by Walter's and Gordon's models in finance literature.

- **Irrelevance of Dividend by Modigliani and Miller's Approach**

The dividend policy does not affect the share price of the company. There is no relation between the dividend rate and the value of the company hence dividend decision is irrelevant from company point of view. Modigliani and Miller contributed sufficient literature to prove the irrelevance theorem of dividends. According to MM, under a perfect market condition, the dividend policy of the company is irrelevant, and it does not affect the value of the company. "Under conditions of perfect markets, rational investors, absence of tax discrimination between dividend income and capital appreciation, given the company's investment policy, its dividend policy may have no influence on the market price of shares".

- **Assumptions**

MM approach is based on the following significant assumptions:

❖ Investors are rational.

❖ No risk or uncertainty.

❖ Perfect capital market.

❖ The firm has a fixed investment policy.

❖ There is no tax.

- **MM Preposition**

According to the M.M. hypothesis, the **"arbitrage process"** results into the irrelevance of dividend payment for share valuation. Arbitrage refers to the simultaneous movement of two transactions of paying dividends and raising capital through external funds, either the sale of new shares or loans to finance future investment opportunities. For financing future investment, the company can use retained earnings or external funding in either equity or debt. If dividends are distributed, an amount will have to be raised through the sale of new shares. The external raising of shares will exactly offset the increased value per share through dividends. The terminal value of shares will decline. Shareholders are

indifferent between retention of dividends or payment. If instead of raising equity shares, the firm raises the amount in the form of a loan, there will be no difference between debt and equity because of leverage, and the real cost of debt is the same as the real cost of equity. Therefore, according to the M.M. hypothesis, the dividend policy is irrelevant. The present value of a share afterthe dividend and external funding is equal to the present value of the share beforethe payment of the dividend.

- **Proof for MM approach**

The MM approach can be proved with the help of the following formula:

Step 1:

The market price of a share at the beginning of the period is equal to the present value of the dividends paid at the end of the period plus the market price of the share at the end of the period.

$$\mathbf{P_o = D_1 + P_1 / (1 + K_e)}$$

Where,

P_o = Prevailing market price of ashare;

K_e = Cost of equity capital.

D_1 = Dividend to be received at the end of periodone.

P_1 = Market price of the share at the end of period one.

Step 2:

Assuming no external financing, the total capitalized value of the firm would bethe number of shares (n) times the price of each shares P_0.

Thus, $nP_0 = \{1/(1 + k_e)\}*(nD_1 + nP_1)$

Step 3:

If the firm's internal source of financing falls short, Δn is the number of newshares issued at the end of year 1 at price P_1.

Thus, $nP_0 = \{1/(1 + k_e)\}*\{(nD_1+\Delta_n) P_1-(\Delta nP_1)\}$

Step 4:

If the firm were to finance all investment proposals, the total amount of newshares issued ΔnP_1 = Investment - (Earnings - Dividends)
$\Delta nP_1 = I – E + nD_1$

ΔnP_1 = The amount obtained from the sale of new shares to finance capital budget.

Step 5:

If Step 4 is substituted into Step 3

$$nP_0 \frac{1}{1+k_e} nD_1 + (n\Delta) P_1 - (I - E + nD_1)$$

Solving the equation

$$nP_0 \frac{nD_1+(n+\Delta n)P_1 - I - E + nD_1}{(1+k_e)}$$

There is a positive nD_1, and a negative nD_1. Therefore, nD_1 cancels, we then have

$$nP_0 = \frac{(n + \Delta n)P_1 - I - E}{(1 + k_e)}$$

Since Dividend D are not found in Step 5, M.M. Hypothesis concludes that dividends do not count and that the dividend has no effect on the share price

- **Criticism of MM approach**

The MM approach consists of certain criticisms also. The following are the major criticisms of MM approach.

- ❖ The MM approach assumes that tax does not exist. It is not applicable in the practical life of the firm.
- ❖ The MM approach assumes that, the investor behaves rationally. Butwe cannot give assurance that all the investors will behave rationally.
- ❖ The MM approach assumes that there is no risk and uncertainty of the investment. It is also not applicable in present-day business life.
- ❖ The MM approach considers only a single decrement rate, it doesnot exist in real practice.
- ❖ The MM approach does not consider floatation cost and transaction cost. It leads to affect the value of the firm.

RELEVANCE OF DIVIDEND

According to this concept, dividend payment influences the value of the company. Dividend relevance implies that shareholders prefer the current dividend and there is an impact of dividend payment on the share's price. The relevance of the dividend concept is supported by two eminent persons like, Walter and Gordon.

Walter's Model

Prof. James E. Walter argues that the dividend policy almost always affects the value of the company. Walter model is based on the relationship between the following important factors:

- ❖ Rate of return (r)
- ❖ Cost of capital (k)

According to Walter's model, if r > k, the firm is able to earn more than what the shareholders could by reinvesting if the earnings are paid to them. The implication of r > k is that the shareholders can earn a higher return by investing elsewhere. If

the firm has r = k, it is a matter of indifference whether earnings are retained or distributed.

Assumptions

Walter's model is based on the following important assumptions:

- ❖ The company does not use debt or equity finance.
- ❖ The company has a 100 percent payout.
- ❖ The company has a very long life.
- ❖ The company has constant EPS and dividend.
- ❖ The company has constant return and cost of capital.
- ❖ The company uses only internal finance.

Walter has evolved a mathematical formula for determining the value of themarket share.

$$\mathbf{P = (D + (r / K_e) (E-D)) / K_e}$$

Where,

P = Market price of an equity share; D = Dividend per share; r = Internal rate of return E = Earnings per share; K_e = Cost of equity capital

Example

From the following information supplied to you, ascertain whether the firm is following an optimum dividend policy as per Walter's Model?

Total Earnings INR 4,00,000
No. of equity shares (INR 100 each 40,000)
Dividend paid INR 2,00,000
P/E Ratio 10, Return Investment 15%

The firm is expected to maintain its rate of return on fresh investments. Will optimum dividend policy change if the P/E ratio is 5 and interest of 10%?

Solution

EPS = Earnings / No. of shares = 400,000 / 40,000 =INR 10.

PE ratio = 10 K_e =1 / PE ratio = 1 / 10= 0.10

DPS = Total dividend paid / no of shares = 2,00,000 / 40,000 = INR 5.
The value of the share as per Walter's Model is

$$\mathbf{P = (D + (E-D) (r / K_e)) / K_e}$$

$$= (5 + (10 – 5) 0.15 / 0.10)) / 0.10$$

$$= \text{INR } 125$$

Dividend payout = DPS / EPS x 100

$$= 5 / 10 \times 100 = 60\%$$

Here, the return on investment is greater than the cost of capital; hence the company is not following an optimum dividend policy of zero dividends. If the company does not pay any dividend and retain 100% of its earnings then the Market Price would be:

P = (0 + (10 – 0)0.15 / 0.10) / 0.10

= (0 + 15) / 0.10

P = INR 150

So, the MP of the share can be increased by following a zero payout policy.

If the P/E is 5 instead of 10 then the Ke =0.20 and in this case, the cost of capital is higher than the return on investment so the market price would be as follows if a company pays 50% of its earnings as dividend.

Price = (5 + (10 – 5) 0.15 / 0.2) / 0.2

= INR 43.75

If the company follows 100% dividend payout ratio, then the market price will be optimum.

Price = (10 + (10 – 10) 0.15 / 0.2) / 0.2

= INR 50

- **Criticism of Walter's Model**

The following are some of the important criticisms against Walter's model:

- ❖ According to Walter's model, it is based on the constant cost ofcapital. But it is not applicable in real life of the business.
- ❖ There is no possibility of constant return. The return may increase or decrease, depending upon the business situation. Hence, it is applicable.
- ❖ Walter's model assumes that the company uses no additional finance.It is not practically applicable.

Gordon's Model

Myron Gordon suggests one of the popular models, which assume that the dividend policy of a company affects its value, and it is based on the following important assumptions:

- ❖ Constant growth ratio depends on retention ratio and return on equity.
- ❖ Cost of capital and return are constant.
- ❖ Cost of capital is greater than the growth rate g
- ❖ The company uses only internal finance.
- ❖ The company has perpetual life.
- ❖ The company is an all-equity company.
- ❖ There are no taxes.

Gordon's model can be proved with the help of the following formula:

$P = E (1 – b) / (K_e – b*r)$

Where,

P = Price of a share; E = Earnings per share

1 – b = D/p ratio (i.e., percentage of earnings distributed asdividends)

K_e = Capitalization rate;
b = retention ratio and r = returnon equity
b*r = Growth rate

Example:

ABC company earns a rate of 12% of its total investment of INR 500,000 in assets. It has 50,000 outstanding common shares at INR 10 per share. The discount rate of the firm is 10% and it has a policy of retaining 40% of the earnings. Determine the price of its share using Gordon's Model. What shall happen to the price of the share if the company has a payout of 80% and 20%? According to Gordon's Model, the price of a share is

$P = E (1 – b) / K_e – br)$

Given: E = 12% of INR 10 =INR 1.20

r = 12%=0.12; K = 10%=0.10; t = 10%=0.10 b = 40%=0.40

Put the values into the formula

P =1.20 (1 – 0.40) / 0.10 – (0.40 x 0.12)

= 1.20 x (0.60) / 0.10 – 0.048

= 0.72 / 0.052

= INR 13.85

If the firm follows a policy of 80% payout then b=20% =0.20

The price is P =1.20 (1 -0.20) / 0.10 – (0.20 x 0.12)

= 12.63 INR

If the firm follows a policy of 20% payout then b=80% =0.80

The price is P =1.20 (1 -0.80) / 0.10 – (0.80 x 0.12)

= 60 INR

Example:

From the below information calculate the value of shares by using Gordon Dividend Model.
EPS = 20 INR; Cost of capital = 20%; Rate of Earning = 15%

Situation 1: Retention Ratio is 80%

Situation 2: Retention ratio is 50%.

Situation 3: Retention ratio is Nil

Gordon Model = Po = E(1-b)/(K – b*r)

Situation 1 : Retention ratio (b) is 80% P = 20 (1-0.8) / 0.20 - (0.8*0.15) =	Price of share 50
Situation 2 : Retention ratio (b) is 50% P = 20 (1-0.5) / 0.20 - (0.5*0.15) =	80
Situation 3 : Retention ratio (b) is 0% P = 20 (1-0) / 0.20 - (0*0.15) =	100

- **Criticism of Gordon's Model**

Gordon's model consists of the following important criticisms:

- ❖ According to Gordon's model, there is no tax payment. It is not practically applicable.
- ❖ Gordon model assumes that there is no debt and equity finance usedby the firm. It is not applicable to present day business.
- ❖ K_e and r cannot be constant in the real practice.
- ❖ If capitalization rate is less than growth rate, the model will not work.

❖ **CHECK YOUR PROGRESS**

- **Multiple Choice Questions**

1 Walter model assumes that for financing future investments, afirm will rely only on

(a) Debentures

(b) Term loans

(c) Retained earnings

(d) External equity

2 As per Gordon model when the rate of return is less than the discount rate,as the dividend payout ratio increases, price per share

(a) Increases

(b) Decreases

(c) Remains unchanged

(d) At first increases and then decreases

3 As per the Gordon Model Growth rate is a function of

(a) Return on Equity and Retention ratio

(b) Debt equity ratio and payout ratio

(c) Sales over the years

(c) Profit over the years

4 According to MM hypothesis, dividend is_____for share price.

(a) relevant

(b) irrelevant

(c) none of the above

(d) May or may not relevant

MCQ ANSWER

1	2	3	4
c	a	b	b

- **Essay type Questions:**

1. "The assumptions underlying the irrelevance hypothesis of Modigliani and Miller are unrealistic." Explain and illustrate
2. What is Modigliani-Miller's dividend irrelevance hypothesis?
3. Explain Gordon Model with its implications and assumptions.
4. What are the essentials of Walter's dividend model? Explain its shortcomings.

- **Numerical Exercise**

Q: 1 The following data is available for Baba Ltd.:

Earnings per share = INR 8.00, Rate of return = 16 percentCost of capital = 14 percent

(a) If Walter's valuation formula holds, what will be the price per sharewhen the dividend payout ratio is 30 percent? 40 percent?

(b) If Gordon's basic valuation formula holds, what will be the price pershare when the dividend payout is 30 percent, 40 percent?

Q: 2 From the below information, calculate the value of shares by using Gordon Dividend Model if the Retention Ratio is 60% and if the retention ratio is 10%.

EPS = 10 Rs; Cost of capital = 10%; Rate of Earning = 15%

Q: 3 The cost of capital and rate of return on investment of Netree Ltd. is 10% and15%, respectively. The company has 10 lakh equity shares of Rs.10 each outstanding and its EPS is Rs. 5. Calculate the value of the share in the following situation using Walter's model.

(a) 100% retention ratio
(b) (b) 50% retention ratio

Q: 4 The earnings per share of the company are INR 10, and the rate of capitalization applicable to the company is 10%. The company has an option of adopting a payout ratio of 25% or 50% or 75%. Using Walter's formula of dividend payout, compute the market value of the company's share if the ROE is (i) 15% (ii) 10% and (iii) 5%.

યુનિવર્સિટી ગીત

સ્વાધ્યાયઃ પરમં તપઃ
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શિક્ષણ, સંસ્કૃતિ, સદ્‌ભાવ, દિવ્યબોધનું ધામ
ડૉ. બાબાસાહેબ આંબેડકર ઓપન યુનિવર્સિટી નામ;
સૌને સૌની પાંખ મળે, ને સૌને સૌનું આભ,
દશે દિશામાં સ્મિત વહે હો દશે દિશે શુભ-લાભ.

અભણ રહી અજ્ઞાનના શાને, અંધકારને પીવો ?
કહે બુદ્ધ આંબેડકર કહે, તું થા તારો દીવો;
શારદીય અજવાળા પહોંચ્યાં ગુર્જર ગામે ગામ
ધ્રુવ તારકની જેમ ઝળહળે એકલવ્યની શાન.

સરસ્વતીના મયૂર તમારે ફળિયે આવી ગહેકે
અંધકારને હડસેલીને ઉજાસના ફૂલ મહેંકે;
બંધન નહીં કો સ્થાન સમયના જવું ન ઘરથી દૂર
ઘર આવી મા હરે શારદા દૈન્ય તિમિરના પૂર.

સંસ્કારોની સુગંધ મહેંકે, મન મંદિરને ધામે
સુખની ટપાલ પહોંચે સૌને પોતાને સરનામે;
સમાજ કેરે દરિયે હાંકી શિક્ષણ કેરું વહાણ,
આવો કરીયે આપણ સૌ
ભવ્ય રાષ્ટ્ર નિર્માણ...
દિવ્ય રાષ્ટ્ર નિર્માણ...
ભવ્ય રાષ્ટ્ર નિર્માણ

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